

Coastal Adaptation to Climate Change

Engaging communities: making it work

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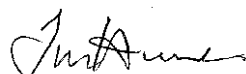
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Executive summary

This report has been prepared as part of the MSI funded Coastal Adaptation to Climate Change project (C01X0802). This is the final research report, which draws together theory from international literature, overseas experiences with engaging coastal communities about climate change issues, and our own case studies undertaken with New Zealand communities, to build a recommended approach to engaging communities in coastal adaptation issues in New Zealand.

From a theoretical perspective, participatory approaches are seen as a means of getting people on board, understanding complex systems and achieving outcomes through consensus. However, there are many challenges with this approach, such as:

- pinpointing the community of interest and getting a cross section of people to take part; the ability of groups to reach consensus;
- how to introduce technical information in a meaningful way which is in keeping with the spirit of partnership and yet guides the consensus of views towards scientifically robust outcomes; and
- making sure outcomes are locally focussed but not detrimental to regional or national outcomes.

Climate change adds an extra level of difficulty due to the complexity of climate change science, the perceived lack of scientific consensus about the likely impacts of climate change and the inter-generational enduring nature of the impacts.

The practical method that we developed for engaging coastal communities in climate change is based around large high-definition maps illustrating projected impacts of climate change, which:

- Provide local community participants with visual and scientifically grounded perspectives of the projected impacts of climate change on their community; and
- Allow people to link projected impacts with what they currently value about their community and wish to retain.

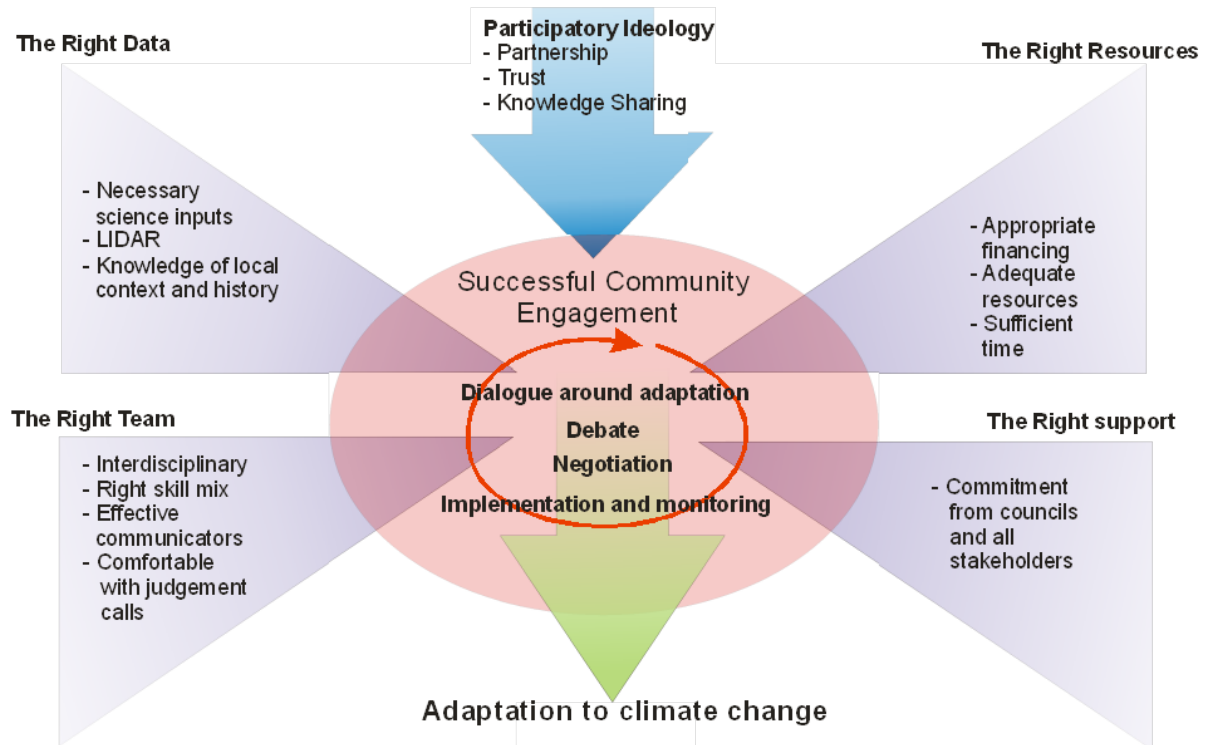
The maps also help to keep adaptation discussions grounded in reality and promote the discussion of pragmatic alternatives. Maps also clearly (and visually) illustrate the trade-off between various potential adaptation options. As part of our case studies we trialled this method for facilitating the initial steps towards community and council dialogue and debate around adaptation to climate change, in a two-stage community engagement process.

A review of the success factors of this method led the project team to outline our *Making it Work* approach, which shows that with:

- the right team,
- the right data,
- the right support, and
- the right resources

it is possible to engage successfully with a community.

Engaging communities: the *Making it Work* approach



To date, the testing of our method has been limited to a dialogue about the issues and options, and has not been used to take the additional steps required to move through debate towards negotiation of a final outcome or response. The conceptual approach could, however very simply be extended to form the basis for the further debate and negotiation, engaging all the relevant stakeholders in a forum where (all) participants work with the local management authorities to generate consensual responses to the projected impacts of climate change. This extension of our approach might benefit from appropriate 'how-to' guidance for councils to help councils through the three steps of dialogue, debate and negotiation with communities.

Economic information would be a key input required to help weigh the pros and cons of adaptation options. This would require work to improve the cost-benefit analysis of adaptation options, and look at the application of multi-criteria analysis processes for weighing options. Such work would bring in concepts such as valuations of ecosystem services, amenity and landscape values, existence values, or public access vs private property rights. These discussions would also require further consideration of managed retreat as an adaptation option, to explore the thresholds beyond which the movement of a community or parts of a community away from the coast becomes worthwhile - or in other words, when enough grief from the sea is enough.

1 Project background

The Coastal Adaptation to Climate Change (CACC) project is a three-year Ministry for Science and Innovation (MSI¹) funded project, intended to create the necessary information and tools to enable adaptation by central and local government and communities to the impacts of climate-induced change on the coastal environment.

The key outcomes of the CACC project will be:

More informed proactive communities and councils developing local adaptation strategies to climate change, the inclusion of these strategies in regional and community coastal planning documents and evaluation and monitoring of the uptake and performance of adaptation strategies.

The project has three key components or workstreams:

- Building a national coastal sensitivity profile
- Engaging communities and institutional decision-makers
- Encouraging best practice planning.

In particular, the work undertaken as part of the *Engaging communities* and *Encouraging best practice planning* workstreams is closely aligned. A number of outputs from the CACC project are available on the CACC project website (www.niwa.co.nz/our-science/coasts/research-projects/all/coastal-adaption-to-climate-change) and are referred to where appropriate throughout this report.

One of the final milestones of the project, relating mainly to the *Engaging communities* workstream, is about *Upscaling to national adaptation*. The description of the milestone is:

Mechanisms for translating the findings from the community research to regional and national levels have been determined, together with an identification of stakeholder issues and underlying social paradigms that need to be addressed to enable successful adaptation. The purpose, limits and expected outcomes of participatory processes, and how these can be used to shape policy and planning, have been determined.

This report aims to address this milestone, by drawing together theory from international literature, overseas experiences with engaging coastal communities about climate change issues, and our own case studies undertaken with New Zealand communities, to build a recommended approach to engaging communities in coastal adaptation issues in New Zealand. The report:

- Sets our local coastal adaptation case studies in a national and international context;
- Provides the theoretical background behind our research activities and directions;
- and

¹ Formerly the Foundation for Science Research and Technology, FRST

- Synthesises key messages from our research into an approach to help councils to engage communities successfully in developing plans and policy for adapting to coastal climate change.

Our report is intended to be useful to local government staff and politicians, interested community members, and researchers, with an interest in adapting to climate change at the coast.



Figure 1.1 Schematic of the development of our approach as described in this *Engaging Communities: Making it Work* report.

Figure 1.1 shows schematically how our *Making it Work* approach has been developed, pulling together the topics of international participation theory and challenges, a New Zealand context for climate change adaptation and engagement requirements, and international community engagement case studies and tools. These topics formed the foundation, or ‘legs of a stool’, to our engagement case studies in the Coromandel Peninsula area within the Waikato region of New Zealand. Our final recommended approach for community engagement around coastal adaptation to climate change in New Zealand – *Making it Work* - is built on the foundation of each ‘leg’ and the upscaled findings from our Whitianga community case study in particular.

1.1 Report structure

This report begins (in section 2) with a brief background to give some context for following discussions regarding climate change, and adaptation in particular. This section includes a brief overview of the four step process *Pathways to Change*, developed by the CACC team.

The report then traverses the legs of our stool: participatory theory from international literature (section 3); the New Zealand context for community engagement in coastal issues

(section 4); and international frameworks and experiences with engaging coastal communities about climate change issues (section 5) before summarising one of our own case studies undertaken with New Zealand communities (section 6). Our Whitianga community engagement case study (Rouse et al. 2011) is summarised in this report and our work with the Mercury Bay Area School, which used the maps developed for our Whitianga work, is also summarised (Hume et al. 2011). However, our work with the Manaia community, described in King et al. (in prep 2011) is not summarised here². Based on the success factors from our Whitianga case study in particular, we upscale our findings and develop a recommended conceptual approach to engaging communities in coastal adaptation issues in New Zealand (section 7), before wrapping up with suggestions for further work to extend our approach (section 8).

² This document is in preparation and will be available on the CACC project website as soon as it is complete.

2 Adapting to climate change at the coast

Development of the coast for holiday and permanent homes along with tourism and associated infrastructure such as marinas and roads have, over the past two decades, resulted in a dramatic rise in the risk from coastal sea-level rise and climate extremes (e.g., Bell et al. 2001, MfE 2008a, Peart 2009). There is plenty of research in progress to better understand the potential effects of climate change on New Zealand (and globally), and to better understand the potential for sea-level rise and changes to coastal hazards such as erosion and inundation and how that might affect our coastal communities. The focus of the CACC project is how to better help New Zealanders (communities, local, regional and national government) adapt to the effects of climate change on their coastal environment. This section provides some background context for these topics, and outlines our approach to adaptation which we call ‘*Pathways to Change*’.

2.1 Climate change

The Intergovernmental Panel for Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), with its aim to provide an objective source of information for policy makers about the causes of climate change, its potential environmental and socio-economic consequences and the adaptation and mitigation options to respond to it (www.ipcc.ch/about/index.htm). The IPCC is a scientific intergovernmental body, and its role is “*to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation.*” IPCC does not carry out any research.

The IPCC produced its first assessment of climate change science in 1990, and that first series of assessment reports identified the importance of climate change as a topic deserving a political platform among countries to tackle its consequences. Since 1990, the IPCC has produced a further three assessment reports at approximately six year intervals – the latest the Fourth Assessment report (AR4) in 2007. The reports aim to provide scientific technical and socio-economic information in a policy-relevant but policy neutral way to decision-makers.

Since 1990, the assessment reports have gradually established and confirmed the extent of global climate changes, and most recently the IPCC concluded that “*Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea-level.*” (IPCC 2007).

The AR4 summarises a number of findings that are important to understanding the background for adapting to climate change effects on New Zealand’s coasts. Box 2.1 provides key findings from three relevant chapters of the Working Group 2 (WGII) report *Climate Change 2007: Impacts, Adaptation and Vulnerability*.

Box 2.1

Main outcomes of IPCC AR4 (Working Group II report):

Important (policy relevant) messages taken from the executive summaries of the following chapters.

Coastal systems and low-lying areas (Chapter 6)

- Coasts are experiencing the adverse consequences of hazards related to climate and sea-level
- Coasts will be exposed to increasing risks, including coastal erosion, over coming decades due to climate change and sea-level rise
- The impact of climate change on coasts is exacerbated by increasing human-induced pressures
- Adaptation for coasts of developing countries will be more challenging than for coasts of developed countries due to constraints on adaptive capacity
- Adaptation costs for vulnerable coasts are much less than the costs of inaction
- The unavoidability of sea-level rise, even in the longer-term, frequently conflicts with present-day human development patterns and trends

Source: Nicholls et al. 2007

Australia & New Zealand (Chapter 11)

- Literature published since the IPCC Third Assessment Report confirms and extends its main findings
- Regional climate change has occurred
- Australia and New Zealand are already experiencing impacts from recent climate change
- Some adaptation has already occurred in response to observed climate change
- The climate of the 21st century is virtually certain to be warmer, with changes in extreme events
- Potential impacts of climate change are likely to be substantial without further adaptation
- Vulnerability is likely to increase in many sectors, but this depends on adaptive capacity

Source: Hennessy et al. 2007

Assessment of adaptation practices, options, constraints and capacity (Chapter 17)

- Adaptation to climate change is already taking place, but on a limited basis
- Adaptation measures are seldom undertaken in response to climate change alone
- Many adaptations can be implemented at low cost, but comprehensive estimates of adaptation costs and benefits are currently lacking
- Adaptive capacity is uneven across and within societies
- There are substantial limits and barriers to adaptation

Source: Adger et al. 2007

In particular for our CACC project we are concentrating on adapting to effects of climate change on the coast. The potential effects of climate change at the coast include (e.g., Bell et al. 2001, Nicholls et al. 2007):

- Sea-level rise
- Changes to coastal storms, leading to changes in storm-surge and wave heights
- Increased frequency of coastal inundation from tides, waves and coastal storm surges
- Increased erosion of coastal areas
- Salinisation of near-coast groundwater systems and lowland rivers and creeks
- Combined changes in river flooding and coastal inundation impacting on estuaries and coasts
- Increased challenges for drainage of coastal and estuary margins
- Changes in sedimentation in estuaries and harbours
- Coastal squeeze of ecological habitats between advancing shorelines and human development.

These effects increase the risk from coastal hazards on New Zealand's coastal communities.

2.2 Adaptation context

There are two complementary responses that are most often discussed with regard to global climate change: mitigation and adaptation. Mitigation includes attempts to decrease the effects of human-induced climate change, such as through reduction of the sources or an increase of the sinks of greenhouse gases (MfE 2008a, b).

Climate change literature contains many definitions of adaptation, but according to the IPCC's AR4 (Adger et al. 2007), adaptation includes:

Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. Various types of adaptation exist, e.g., anticipatory and reactive, private and public, and autonomous and planned. Examples are raising river or coastal dikes, the substitution of more temperature-shock resistant plants for sensitive ones, etc.

With a simpler and more New Zealand focus, the Ministry for the Environment's (MfE 2008a) definition is:

Undertaking actions to minimise threats or to maximise opportunities resulting from climate change and its effects.

The shift away from the sole pursuit of mitigation and control of greenhouse gas emissions, to the realisation that countries will need to adapt to buffer themselves from the worst impacts of climate change, is well documented (e.g., van Aalst et al. 2008; Parry et al. 2008; Brown et al. 2011).

In the climate change literature, recent work has distinguished between top-down and bottom-up approaches to considering adaptation³. For example top-down or impact approaches (van Aalst et al. 2008; Brown et al. 2011) often use global climate model (GCM) scenarios and downscale these, or use regional climate models (RCM), to provide projections of climate change to be used in local studies. In comparison, bottom-up approaches start at a local scale, often looking at particular vulnerabilities based on existing climate and/or recent hazard events (e.g., van Aalst et al. 2008; Urwin & Jordan 2008). They can then extend to considering future adaptation tipping points for the local community independent of any climate-change scenarios (Kwadijk et al. 2010; Nicholls 2011; Britton et al. 2011, section 6.4).

With top-down approaches, difficulty lies in producing climate change impact projections at a small enough scale to be useful for adaptation (e.g., Smith et al. 2009). While recent improvements in downscaling of GCMs (Randall et al. 2007) and developing RCMs (for example see www.niwa.co.nz/our-science/climate/research-projects/all/regional-modelling-of-new-zealand-climate) have greatly improved our ability to project future impacts of climate change, the most common outputs from these models mostly include mean surface temperature, rainfall, and sea-level rise (van Aalst et al. 2008). This is true for New Zealand, where such variables are widely available for each region (see MfE 2008a, 2008b). In reality, the complexities of how changes in temperature, rainfall extents and intensities, weather systems, and sea-level will interact to change catchment and near-shore processes and hence impact on our coastal environments are extremely hard to predict with any certainty.

Willby and Dessai (2010) recently noted: "For many practical purposes, detailed numerical modelling may not be feasible (because of time, cost, technical constraints etc) or even necessary if the [adaptation] option delivers benefits regardless of the climate outlook..."

³ The meanings to these terms in this context are slightly different to the participatory theory discussed in section 3: the phrases top-down and bottom-up here mean the way in which climate change information is introduced to adaptation discussions.

There is also a danger in using such top-down projections, in that uncertainties of projections and whether they are fit for purpose at the local scale may distract engagement discussions away from adaptation issues to the validity of the projections, and encourage a 'wait and see' approach (e.g., Smith et al. 2009).

In New Zealand, the responsibility for managing issues relating to climate change and coastal environments lies with regional and district/city councils. It is generally thought that developed countries have greater adaptive capacity than developing countries (e.g., Adger et al. 2007), but recent climate-related events have questioned this complacency (Moser & Ekstrom 2010). Recent floods in Australia and New Zealand, including storm-tide inundation of Auckland suburbs in January 2011, are a reminder that our own communities need to be able to adapt to climate variability and long-term change at the coast arising from sea-level rise and changes to coastal hazards.

2.3 Pathways to Change

It is in this general climate change context, and more specifically adaptation to climate change effects at the coast, that our CACC project is founded. As stated above, the main aim of our project is to enable adaptation by central and local government and communities to the impacts of climate-induced change on the coastal environment, through the creation of useful information and tools. One such tool that the project team have developed is the *Pathways to Change* guidance document, aimed to help councils plan for and implement actions which will help to make our communities more robust to the potential impacts of climate change in our coastal areas.

Adaptation allows for change over time, to reduce the risk to people, property and infrastructure from the effects of natural coastal hazards. As outlined above there are a wide range of adaptation actions possible, and adaptation is not a one-off exercise but rather a complex and iterative process involving various steps (Klein et al. 1999). It is in this context that adaptation can be seen as a journey which involves many steps along the way. It also involves iterative steps over time, especially as climate change accelerates, and so is an ongoing journey.

The CACC project team call this journey *Pathways to Change*, and a key output from the CACC project is the *Pathways to Change* guidance document which aims to help local government in New Zealand along this pathway (Britton et al. 2011). Table 2.1 summarises the four steps along this pathway.

Table 2.1: Outline of adaptation journey *Pathways to Change*. (Source Britton et al. 2011.)

Step 1	Awareness and Acceptance	<p>This step is about informing people within your council and your communities of the potential effects of climate change. It is also about accepting there's a problem and that further work is needed.</p> <ul style="list-style-type: none"> • <i>Why do we need to be doing anything about coastal adaptation to climate change?</i> • <i>How much of a priority is it?</i> • <i>What are the levels of political and community awareness, and how could we enhance this awareness?</i> • <i>How are other councils addressing coastal adaptation to climate change?</i> • <i>Do we have general acceptance that we have a problem to address?</i>
Step 2	Assessment	<p>This step is about gathering knowledge to be better informed on the scale and scope of potential effects of climate change</p> <ul style="list-style-type: none"> • <i>What information do we need to assess how climate change might affect our local coastal communities?</i> • <i>What issues do we face?</i> • <i>Where are our most vulnerable locations?</i> • <i>What is the level of risk we are facing?</i>
Step 3	Planning a way forward	<p>This step is about planning what needs to happen to achieve adaptation to climate change</p> <ul style="list-style-type: none"> • <i>What is going to be our strategic and long-term approach to adaptation?</i> • <i>What are the steps required to move us in this strategic direction over time and thereby build community resilience?</i> • <i>How do we get buy-in from key stakeholders and communities?</i>
Step 4	Implementation, Monitoring and Review	<p>This step is about undertaking the actions that have been set out in the adaptation plan developed in Step 3. It includes monitoring change over time of the environment, of information, of implementation progress and so on. The monitoring results then feed into regular reviews of the adaptation plan, in order to incrementally build community resilience to the increasing risks being faced.</p> <ul style="list-style-type: none"> • <i>Is our plan for a strategic way forward being implemented effectively?</i> • <i>Are our communities becoming more resilient to climate change?</i> • <i>What do we need to monitor, and what are the triggers for reviewing our adaptation plan?</i>

Throughout the four steps of the *Pathways to Change* journey, but particularly at the first step, an understanding of how to engage with local coastal communities about climate change is key. Having now provided some general background for coastal adaptation to climate change, the following sections of this report go on to look at how to engage communities more effectively in relation to complex issues such as climate change, by discussing the topics represented by the legs of the stool (Figure 1.1). We will start at the

central leg of the stool, by discussing why and how to engage with communities in the following section.

3 Engaging communities

3.1 Why engage?

The rise of participatory ideology in natural resource management and planning is often linked with the UN's Agenda 21, where participatory planning processes were presented as necessary to achieve sustainable development (Bass et al. 1995). Since then, the importance of public participation in decision-making has been supported by numerous United Nation Conventions (Giupponi et al. 2008). Moreover, the participatory ideology has been embedded in the documents produced by both the UN Framework Convention on Climate Change (UNFCCC) and the IPCC. This provides significant drivers to encourage climate change policies to be developed, and adaptation options explored, in a participatory way.

Over the last few decades, there has been a noticeable shift towards the utilisation of processes that are more participatory and designed to engage with the public over key issues. This shift has occurred simultaneously across a number of sectors, including public policy, development, planning, environmental management (Tewdwr-Jones & Thomas 1998), natural resource management (Parkins & Mitchell 2005), and health policy and medical research (Abelson 2003). Rowe and Frewer (2000) suggest there are two key underlying motivations behind this change: an ideological perspective where the democratic ideal of inclusion, transparency and accountability are paramount; and a more pragmatic approach with a strong desire to achieve outcomes. From a natural resource and environmental management perspective public participation is typically conceptualised as a means to improve decision-making and deliver better outcomes and solutions to complex issues (Parkins & Mitchell 2005). In essence, public engagement is perceived as a way to increase the likelihood of achieving successful outcomes by accounting for, and accommodating, the local social, economic and environmental context. Moreover, it is a means to counter the public backlash against, and perceived failure of, previous methodologies (Owens 2000; Isager et al. 2001), public disillusionment, and a gap between public knowledge and action on environmental issues (Burgess et al. 1998).

In the past, planners and environmental decision-makers typically favoured a 'top down', or 'command and control' approach to resolving issues (see section 2 for a different use of the phrase 'top-down' in a climate change context). The majority of decisions were made within management agencies, with varying degrees of public consultation, followed by campaigns to persuade the public via information provision (i.e., application of the information deficit model) to adopt certain practices or accept particular solutions and rules (Owens 2000; Isager et al. 2001). Proponents of participatory methodologies present several reasons as to why many of these campaigns failed to achieve the desired outcome.

Persuasion through information provision has been criticised because it fails to take into account the complex social and economic context in which information is interpreted and evaluated (Ziman 1999; Irwin et al. 1996; Bickerstaff & Walker 2002). People are far more likely to accept (and act on) information that is compatible with personal objectives (Vanclay & Lawrence 1994), values (Bickerstaff & Walker 2002), and cultural and social norms (Kollmuss & Agyeman 2002). Many people will reject ideas that conflict with their own through either a refusal to listen to different options, a reinterpretation to render it consistent with current view points, or a suppression of the memory so it will not be available for recall.

This is thought to occur so that new information does not create an unpleasant state of dissonance (conflict) for the individual - strongly held attitudes are more likely to be maintained in this manner (Eiser 1994). Rejection of information may be related to suspicion regarding the motives of the source and perceived interests in a given context (Owens 2000; Ziman 1991). For example, information may be rejected due to a suspicion of councils or institutions because of perceived incompetency (Blake 1999), or a distrust of information that cannot be verified by personal experience because it is beyond an individual's everyday reality (Macnaghten & Jacobs 1997; Kollmuss & Agyeman 2002). In short, provision of information may have little impact on an individual's perspective.

By approaching local issues in a command and control type manner, people (and communities) may not feel they own the decisions and may be less likely to undertake any required actions, particularly if these are voluntary. Moreover, the decisions may be challenged by whatever mechanisms are available to the affected parties. An additional effect may be reduced trust in government institutions and agencies (Burgess et al. 1998).

If resource managers, experts or decision-makers are not fully aware of the complexity and integration of ecological, social and economic systems in which the program (action or intervention) is embedded, unexpected outcomes occur. In addition, the program outcomes may be affected by a lack of practical operational information at the local level (Isager et al. 2001).

In summary, we should engage with communities because participatory approaches are a more effective means for getting people on side, enabling them to understand complex systems, and thus achieving outcomes through consensus. Jurgen Habermas laid the foundations for participatory processes in planning and environmental management through his work on the theory of communicative action (Habermas 1984, 1989; Outhwaite 1994). He suggested that the better argument (or the truth) would prevail through shared knowledge, mutual understanding and moral insights which could be achieved through undistorted and unrestrained dialogue between people (or groups). This form of dialogue is thought to produce robust consensus. Moreover, by participating in such a dialogue people will be more amenable to, and supportive of, jointly negotiated solutions as opposed to those solutions which are imposed by management agencies.

3.2 How should we engage? Some theory of participation

3.2.1 What does a participatory approach to decision-making look like?

Public participation has rapidly become a common term throughout natural resource management and environmental planning literature and projects. However, it is not often clear what participation means in any given context (Bass et al. 1995). Arnstien (1969) provided one of the earliest frameworks for evaluating what is participatory and what is not. Arnstien (1969) presents a means to evaluate claims of community participation with actual levels of involvement and engagement using an eight rung ladder model which is represented in Table 3.1. Her perspective has evolved from experience in the planning field but it is relevant to environmental and natural resource management.

Table 3.1: Table representing the Ladder of Participation (Source: Arnstien 1969).

Non-Participation	
Manipulation:	Community participation is presented as representation on boards and committees where the representative or group has no power. The role of the board or committee may be either to convince the public to accept a particular decision or to allow authorities to “tick” the citizen participation box. The decisions have already been made by others, and the public will be advised of the outcome and what is required of them.
Therapy:	A community is presented with a predetermined decision they are offered assistance to facilitate coming to terms with the personal impacts of that particular outcome. The decision itself is never challenged and the community is expected to adapt to the changes.
Degrees of tokenism (i.e., some participation)	
Informing:	Information is passed from experts to the community with the assumption that the information, if presented appropriately, will result in behaviour change towards, or acceptance of, the experts’ desired outcome
Consultation:	The community is provided with an opportunity to express their opinion, however others still decide the outcome once all the information is collected and analysed.
Placation:	Communities are provided with some power in order to “keep them happy” while key decisions are made elsewhere.
Degrees of citizen power (participation)	
Partnership:	In partnership arrangements, power is shared between those participating and traditional decision makers (Arnstien 1969). In their discussion of participatory approaches in sustainable agriculture, Bruges & Smith (2008) refer to this approach as collaboration.
Delegated power:	Where communities have delegated power, they have complete control over a particular project. However, this power is likely to be conferred by traditional decision-makers and will have boundaries both in time and scope.
Citizen control:	This level of participation is where the community initiates the project and has complete control over all elements of it.

Bass et al. (1995) present a further typology of participation through their analysis of sustainable development projects, shown in Table 3.2.

Table 3.2: A Typology of Participation: How People Participate in Development Programmes and Projects. (Source: Pretty et al. 1995 in Bass et al. 1995).

Typology	Characteristics of Each Type
<i>1. Manipulative Participation</i>	Participation is simply a pretence, with `people's' representatives on official boards but who are unelected and have no power.
<i>2. Passive Participation</i>	People participate by being told what has been decided or has already happened. It involves unilateral announcements by an administration or project management without any listening to people's responses. The information being shared belongs only to external professionals.
<i>3. Participation by Consultation</i>	People participate by being consulted or by answering questions. External agents define problems and information gathering processes, and so control analysis. Such a consultative process does not concede any share in decision-making, and professionals are under no obligation to take on board people's views.
<i>4. Participation for Material Incentives</i>	People participate by contributing resources, for example labour, in return for food, cash or other material incentives. Farmers may provide the fields and labour, but are involved in neither experimentation nor the process of learning. It is very common to see this called participation, yet people have no stake in prolonging technologies or practices when the incentives end.
<i>5. Functional Participation</i>	Participation seen by external agencies as a means to achieve project goals, especially reduced costs. People may participate by forming groups to meet predetermined objectives related to the project. Such involvement may be interactive and involve shared decision-making, but tends to arise only after major decisions have already been made by external agents. At worst, local people may still only be co-opted to serve external goals.
<i>6. Interactive Participation</i>	People participate in joint analysis, development of action plans and formation or strengthening of local institutions. Participation is seen as a right, not just the means to achieve project goals. The process involves interdisciplinary methodologies that seek multiple perspectives and make use of systemic and structured learning processes. As groups take control over local decisions and determine how available resources are used, so they have a stake in maintaining structures or practices.
<i>7. Self-Mobilisation</i>	People participate by taking initiatives independently of external institutions to change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Self-mobilization can spread if governments and NGOs provide an enabling framework of support. Such self-initiated mobilization may or may not challenge existing distributions of wealth and power.

The IAP2 (2011) has developed a further ‘spectrum of public participation’ which is illustrated in Table 3.3.

Table 3.3: The IAP2 (2011) spectrum of public participation.

Inform	Consult	Involve	Collaborate	Empower
<p>Goal: To provide the public with balanced and objective information to assist them in understanding the problem, alternatives opportunities and solutions</p>	<p>Goal: To obtain public feedback on analysis alternatives or decisions</p>	<p>Goal: To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered</p>	<p>Goal: To partner with the public in each aspect of the decision including the development of alternative and the identification of the preferred solution</p>	<p>Goal: To place final decision-making in the hands of the public</p>
<p>Promise to the public: we will keep you informed</p>	<p>Promise to the public: We will keep you informed, listen and acknowledge concerns and provide feedback on how public input influenced the decision</p>	<p>Promise to the public: We will work with you to ensure your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision</p>	<p>Promise to the public: We will look to you for direct advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible</p>	<p>Promise to the public: We will implement what you decide.</p>
<p>Common techniques: fact sheets, web pages, open houses</p>	<p>Common techniques: public comment, focus groups, surveys, public meetings</p>	<p>Common techniques: workshops, deliberative polling</p>	<p>Common techniques: citizen advisory, committees, consensus building, participatory decision-making</p>	<p>Common techniques: citizen juries, ballots, delegated decisions</p>

A comparison of Tables 3.1, 3.2 and 3.3 shows that the various classifications are not substantially different. Each progressive step transfers more power from traditional resource managers to the public, essentially moving from informing the public about decisions which affect them, through public consultation, to more participatory, power sharing arrangements.

We note here that the above approaches, and this part of our report, do not deal specifically with cultural differences to approaching participation. In New Zealand, it is important to understand ways to communicate (korero) with Māori communities, and this aspect of *Engaging communities* is being looked at by King et al. (in prep 2011) with the Ngāti Whanaunga iwi at Manaia.

3.2.2 Informing the public

In essence, this is where information is passed from experts to the community with the assumption that the information, if presented appropriately, will result in behaviour change towards, or acceptance of, the experts' desired outcome (Arnstein 1969). There are plenty of theories scattered throughout various academic disciplines that consider moral persuasion via information to be pivotal in determining the thoughts and actions of the public. However, the roots of the concept lie in behavioural psychology where cognitive models are devised to explain behaviour and attitudes so that more effective interventions could be constructed (Ajzen 1994). From a community perspective, participation usually involves viewing promotional material (pamphlets brochures or TV advertisements), attending seminars (Rogers 1983), exposure to incentives to change (social marketing) (McKenzie-Mohr 2000) or personal engagement with change agents or educators (i.e., extension officers) (Baran & Davis 2000; Vanclay & Lawrence 1994). In environmental debates, this approach manifests when scientists and planners (central and local government) determine the desirable outcome following which the public are informed and steered towards it by utilisation of persuasive communication techniques (Baran & Davis 2000; Bator & Cialdini 2000) and marketing (Slater 1994; Winett 1994).

This approach makes several key assumptions which are often implied rather than made explicit. The first assumption is that humans rationally process information and providing it is presented in an appropriate way, will arrive at similar conclusions over the best outcome or course of action. Economists draw strongly on this assumption.

Second, science (or other rational fields of study like economics or planning) remains, and should continue to remain, a dominant form of knowledge in society. A common argument is that if people better understood science they would be more prepared to engage in rigorous and meaningful dialogue (the science literacy argument). Proponents of science literacy believe that in general there is a knowledge deficiency amongst everyday citizens and therefore one of the roles of the scientist is to inform and lead (Jenkins 1994; Owens 2000).

Opponents believe that information provision alone (coined the information deficit model by Burgess et al. (1998)) rarely leads to any change in public environmental behaviour or attitudes. But it may have adverse side effects, especially disillusionment with the planning process and science in general (by the public) and frustration (with the public) from a planning and scientific perspective (Owens 2000).

Arnstein (1969) makes a special point of mentioning that information is an essential part of participation, but that it should not be the only stage. This is a key point because increased capacity through learning is very important in more participatory approaches.

3.2.3 Consulting with the public

An important feature of community consultation is that although participants are provided with an opportunity to express their opinion, others still decide the outcome once all the information is collected and analysed (Arnstein 1969). In New Zealand, both the Resource Management Act (1991) and the Local Government Act (2002) contain community consultation requirements for the formulation of plans, proposals, policies, developments or community initiatives (Wilson & Salter 2003: 'The Resource Management Act' 1991; see section 4). Although technical knowledge (typically scientific or economic arguments) is still placed at the centre of debates, it does allow for other perspectives to be considered. Once experts have weighed up the options and judged which outcome is the most desirable, the solution must be 'sold' to the public. At this point, consultation reverts to 'informing' and the information deficit model is usually applied. It is important to note that many times consultation and participation are used as interchangeable concepts when they actually have different meanings.

3.2.4 Public participation

Public participation is where the public (or specific stakeholders) has either the opportunity to work with resource management agencies to make joint decisions, or to make the decisions themselves (Arnstein 1969; Bass et al. 1995; IAP2 2011). For example, Isager et al. (2001) suggests that a process should only be considered as genuinely participatory if local people are involved in the planning, organization and decision-making of a project from the outset. However, other authors believe more partnership, power sharing arrangements can be considered participatory (IAP2 2011). This illustrates that even within the realm of "public participation" there are varying degrees of power sharing and a diversity of opinion of what level of control should rest with resource management agencies or the public.

Coupled with the rise in favour of the participatory ideology has been a proliferation of methods (participatory methods) which facilitate public engagement (e.g., see Chambers, 2002; Reid et al. 2009). However, participatory methods are tools which may be used within a truly participatory project framework or as a means to collect information from the public for another purpose (i.e., consultation or market research). We note that the use of participatory methods does not equate with a participatory project ideology; in other words it is possible to use participatory methods but if the engagement is not underpinned with a genuine commitment to participation it may be prone to failure.

3.2.5 Criticisms of Arnstein's ladder

One of the key criticisms of Arnstein's ladder (and subsequent similarly styled spectrums of public participation) is that they are framed as one-dimensional "overt struggles for power between resource management officials and community activists being played out in settings varying from community halls to committee rooms, each party yielding the minimum ground" (Tritter & McCallum 2005, p157). Moreover, that public participation is seen as the only desirable goal when in reality other forms of public involvement may be more appropriate for a given context (Tritter & McCallum 2005). Irrespective of this criticism, the spectrum of public participation provides a useful way to think through the different forms of public involvement, evaluate the pros and cons of each, and consider which is the most appropriate.

3.2.6 In summary

A participatory approach is one in which participants have a very real say in deciding on courses of action and outcomes. Overall, far from providing a panacea in resource management decision-making processes, public participation presents a plethora of additional challenges which need addressing in order to achieve outcomes (see section 3.3).

3.3 Challenges for participatory approaches

The call for more participatory approaches in environmental management has drawn criticism from authors who are sceptical of the ability to reach consensus and achieve environmental outcomes because of barriers related to reaching and implementing decisions (Blake 1999).

The first challenge for any participatory approach is pinpointing the community of interest and getting a cross section of people to take part (Laurian 2003). Common reasons for not participating include time commitments (Tewdwr-Jones & Thomas 1998), lack of confidence (McGuirk 2001; Laurian 2003) or concern/awareness (Laurian 2003), and poor perception of the possible impact of involvement (Miraftab 2003). In an ideal world all those who are interested would have an opportunity to enter into a dialogue and be involved in influencing the outcomes (Parkins & Mitchell 2005). However, in practice this level of inclusion is extremely difficult to achieve.

A second concern is around the ability of groups to reach consensus given the diverse range of social and political values they hold. McGuirk (2001) believes conflict is inevitable because of the diverse range of social, cultural, political and economic contexts of the participants. Moreover, that it is not possible for individuals to remove themselves from these and to reflect on issues in a way that is required to achieve deliberative consensus. This is particularly true if the views or values are deeply held (Moote et al. 1997; Wondolleck et al. 1996). A typical example of potentially irreconcilable differences is related to the NIMBY (Not In My Back Yard) principle (Bloomfield et al. 2001) where lobbying and existing power relations affect the ability to reach a consensus. Abstract issues and goals are far easier to reach a consensus on compared to more specific actions (Beierle & Konisky 2001) where personal interest is affected more tangibly. Agreement on specific actions often ends up revolving around financial or technical considerations (McGuirk 2001) where science and technology tend to dominate discussion. Many researchers believe that consensus favours the moral majority, side-lining minorities (Tewdwr-Jones & Thomas 1998) and question the representativeness of the groups involved (Beierle & Konisky 2001; O'Neill 2001).

Yoise (1998, cited in Beierle & Konisky 2001) is concerned that decisions made by consensus may be more publicly acceptable but less technically and scientifically correct. In participatory processes and research undertaken in the post-normal science tradition, all forms of knowledge are equal and the views of technical experts are not valued differently to any other. However, this presents the very real possibility that decisions may not yield ecologically or scientifically effective outcomes. To counter this, the challenge is to introduce technical information in a meaningful way which is in keeping with the spirit of partnership, yet guides the consensus towards scientifically effective outcomes.

Consensus-based solutions which are meaningful and reasonable at the local level may be detrimental at the national or global level (Burgess et al. 1998; Tewdwr-Jones & Thomas 1998; Blake 1999). This tension is clearly illustrated in the coastal environment where installation of a seawall may be an agreeable solution to protect properties at the local level, but at the regional level represents the loss of another sandy beach (Blackett & Hume 2007, Blackett et al. 2010a).

3.4 Participatory processes and climate change

3.4.1 The benefits

This chapter began with the question, *Why engage?* and discussed the benefits of a participatory approach to community engagement in general terms. A participatory approach has further benefits with regard to planning for adaptation to climate change.

The literature traversed above demonstrates that plans, strategies and action plans of any kind will be better targeted and more likely to succeed if local communities have been involved. For climate change adaptation, strategies need to be developed at the scale at which they will affect people. Knowledge of the local setting, physically and politically, is essential to develop context and place-specific adaptation actions (Few et al. 2007) and so participatory approaches have practical benefits in addition to adding weight to decision-making processes (Wilby & Dessai 2010). Few et al. (2007) remind us that adaptation actions tend to be context and place-specific, and thus there is practical and ethical value in developing the strategies in an inclusive way.

3.4.2 The challenges

The nature and complexity of climate change adds a number of challenges additional to the general challenges listed in section 3.3 above. Few et al. (2007) provide a useful overview of the challenges with participation specific to climate change adaptation projects. Difficulties with participation include making sure the right mode of engagement is used so that participation is meaningful, and securing broad-based public engagement. Public apathy, social disincentives and time-costs may limit motivation to participate. Particular problems arise when considering climate change due to the uncertainty of the projections of the magnitude and likelihood of events produced by scientists, the long inter-generational timeframes involved (e.g., Lorenzoni et al. 2007). There can also be a sense of the problem being 'too big' for people to take effective steps (Hobson & Niemeyer 2011).

In order to fully realise the benefits of utilising participatory processes, practitioners must be aware of, and seek to counter, the numerous challenges presented by public inclusion in decision-making. The CACC team has summarised these benefits and challenges (Rouse et al. 2011) as shown in Table 3.4.

Table 3.4: Benefits and challenges of a participatory process to engage with communities and stakeholder groups over the impacts of climate change on their communities (compiled from Few et al. 2007; Mostert 2003; Lorenzoni et al. 2007; Hobson & Niemeyer 2011; Burgess et al. 1998; Tewdwr-Jones & Thomas 1998; Blake 1999; Laurian 2003).

Benefits	Challenges
<p>Consensus and theoretical support for the agreed outcomes will lead into action on the part of individuals</p> <ul style="list-style-type: none"> • Participation can increase the efficiency of development activities by involving local resources and skills • Crucially, participation can help to secure the sustainability of the activities as beneficiaries assume ownership 	<p>Including scientific information to ensure ecologically or scientifically effective outcomes</p> <p>The nature of the scientific information offers certain challenges, for example:</p> <ul style="list-style-type: none"> • Climate change is extremely complex • There is a perceived lack of scientific consensus about the likely impacts of climate change
<p>Informed and aware community (from both a scientific perspective and a greater understanding and empathy for others)</p> <ul style="list-style-type: none"> • Participation helps to build local capacities and develop the abilities of local people to manage and to negotiate activities • Participation can lead to better targeting of benefits via the identification of key stakeholders who will be most affected by the activities 	<p>Tension between local level solutions and national or global interests</p> <p>In particular, people find it hard to see their personal impact on the problem due to:</p> <ul style="list-style-type: none"> • The inter-generational nature of the impacts • Global consequences and impact of any individual actions or sacrifices
<p>Integration of locally relevant social, economic, cultural and scientific concerns into the agreed solution</p> <ul style="list-style-type: none"> • Can increase the effectiveness of solutions by ensuring that they are based upon local knowledge and understanding of problems, and will therefore be more relevant to local needs 	<p>Achieving consensus can be hard</p> <ul style="list-style-type: none"> • Interpersonal animosity constrains communication • Fear of conflict inhibits discussion and debate
<p>A community which is better connected and has a greater understanding of and empathy with its members</p>	<p>Successful engagement with the community – getting the right people to the table, avoiding pitfalls such as:</p> <ul style="list-style-type: none"> • Not including the right stakeholders • Failure to include the decision-makers <p style="text-align: right;">Ensuring that decisions are representative of all participants</p>

We further discuss how we addressed the general and climate change specific challenges of participatory processes in our CACC project in section 6 below.

4 Adaptation in a New Zealand context

The next leg of the stool on which our approach is built is the New Zealand context for adaptation and community engagement.

4.1 Adaptation in a New Zealand local government context

In New Zealand, the responsibility for adapting to climate change effects at the coast lies with central, regional and local government. The Resource Management Act (RMA) 1991 is one of the key pieces of legislation for managing the effects of climate change. Through that legislation and its requirement for a mandatory New Zealand coastal policy statement (ss56–58; RMA), the main weight of this adaptation responsibility is devolved to regional and district/city councils.

Councils may undertake technical work to better understand natural hazards in general and the effects of climate change at the coast more specifically. Councils also are responsible for setting policy to establish how these effects will be managed for their community. The CACC project has undertaken work both to help councils understand their risks at the coast (through hazard and habitat exposure mapping, see Box 5.2, *Pathways to Change*, Britton et al. 2011), explore barriers to councils developing policies to adapt to coastal climate change (Britton 2010), and to look in particular at how councils can engage with their communities to develop robust policies that include steps along the *Pathways to Change* to adapt to potential climate change effects at the coast⁴.

This section aims to summarise what councils in New Zealand are currently required to do in terms of involving their communities in policy making. It looks briefly at the legislation that councils must comply with, in particular with regard to managing issues related to climate change effects at the coast, and how communities could be involved in setting policy directions.

4.2 The Local Government Act 2002

The legislation that provides the framework for councils to operate within is the Local Government Act (LGA) 2002. The purpose of the LGA (s3) is to provide for democratic and effective local government that recognises the diversity of New Zealand communities. It encourages councils to promote social, economic, environmental, and cultural well-being (these are known as ‘the four well-beings’) of their communities, taking a sustainable development approach. The LGA provides a framework and powers for councils to decide which activities they should undertake and the manner in which they will undertake them.

The LGA requires councils to develop a Long-Term Plan (or LTP). The purpose of an LTP is to:

- (a) describe the activities of the local authority; and
- (b) describe the community outcomes of the local authority's district or region; and

⁴ Outputs from the CACC project can be found at www.niwa.co.nz/our-science/coasts/research-projects/all/coastal-adaption-to-climate-change

- (c) provide integrated decision-making and co-ordination of the resources of the local authority; and
- (d) provide a long-term focus for the decisions and activities of the local authority; and
- (e) provide a basis for accountability of the local authority to the community; and
- (f) provide an opportunity for participation by the public in decision-making processes on activities to be undertaken by the local authority.

One of the issues that might be included in a council's LTP is its policy approach to dealing with climate change issues for the benefit of its community, and item (f) clearly states that councils in their LTP must allow for their communities to participate in the policy setting process. LTP's are written every 3 years, with a 10 year horizon to encourage longer-term planning. The LGA also requires councils to develop annual plans, which state any variations to the LTP along with work programmes and funding implications.

A recent 2010 amendment to the LGA has repealed some sections that previously had required councils to follow a separate process to consult with the community to establish 'community outcomes', and has streamlined the council's consultation processes. Box 3.1 summarises the section of the LGA that outlines the principles for consultation.

Box 3.1

LGA s82 Principles of consultation

- (1) Consultation that a local authority undertakes in relation to any decision or other matter must be undertaken, subject to subsections (3) to (5), in accordance with the following principles:
- (a) that persons who will or may be affected by, or have an interest in, the decision or matter should be provided by the local authority with reasonable access to relevant information in a manner and format that is appropriate to the preferences and needs of those persons:
 - (b) that persons who will or may be affected by, or have an interest in, the decision or matter should be encouraged by the local authority to present their views to the local authority:
 - (c) that persons who are invited or encouraged to present their views to the local authority should be given clear information by the local authority concerning the purpose of the consultation and the scope of the decisions to be taken following the consideration of views presented:
 - (d) that persons who wish to have their views on the decision or matter considered by the local authority should be provided by the local authority with a reasonable opportunity to present those views to the local authority in a manner and format that is appropriate to the preferences and needs of those persons:
 - (e) that the views presented to the local authority should be received by the local authority with an open mind and should be given by the local authority, in making a decision, due consideration:

(f) that persons who present views to the local authority should be provided by the local authority with information concerning both the relevant decisions and the reasons for those decisions.

(2) A local authority must ensure that it has in place processes for consulting with Māori in accordance with subsection (1).

(3) The principles set out in subsection (1) are, subject to subsections (4) and (5), to be observed by a local authority in such manner as the local authority considers, in its discretion, to be appropriate in any particular instance.

(4) A local authority must, in exercising its discretion under subsection (3), have regard to—

(a) the requirements of section 78 [Community views in relation to decisions]; and

(b) the extent to which the current views and preferences of persons who will or may be affected by, or have an interest in, the decision or matter are known to the local authority; and

(c) the nature and significance of the decision or matter, including its likely impact from the perspective of the persons who will or may be affected by, or have an interest in, the decision or matter; and

(d) the provisions of Part 1 of the Local Government Official Information and Meetings Act 1987 (which Part, among other things, sets out the circumstances in which there is good reason for withholding local authority information); and

(e) the costs and benefits of any consultation process or procedure.

(5) Where a local authority is authorised or required by this Act or any other enactment to undertake consultation in relation to any decision or matter and the procedure in respect of that consultation is prescribed by this Act or any other enactment, such of the provisions of the principles set out in subsection (1) as are inconsistent with specific requirements of the procedure so prescribed are not to be observed by the local authority in respect of that consultation.

While the purpose of the LGA and LTPs use the word 'participation', the specific details that control how public input is sought through the LGA is more aligned to the meaning of 'consultation' than participation in the theoretical framework of Arnstein (refer Table 3.1). However the framework in which the council and communities will engage is clearly explained i.e., the requirement that the basis of interaction is clearly understood before the process starts is met. This means that it is unlikely that community members enter into LGA processes with unrealistic expectations as to who the decision-makers are in the process. The legislation sets both principles and a process that councils must follow as a minimum requirement to consult with their communities.

4.3 The Resource Management Act 1991

The Resource Management Act (RMA) 1991 is the main piece of legislation guiding environmental management in New Zealand (e.g., Peart 2007). Its purpose is to promote the sustainable management of natural and physical resources. The 'effects of climate change' is identified in s7 as one of the 'other matters' that 'particular regard' must be given to by those operating under the Act. Management functions for the coastal environment are shared between the Minister of Conservation, regional councils and district/city councils.

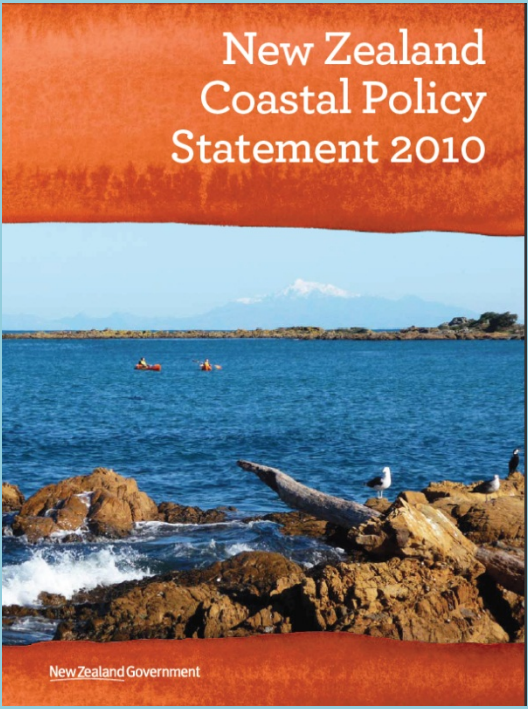
Under the RMA, central government provides a national overview with tools such as national policy statements (NPS) and national environmental standards (NES) at its disposal (Peart 2007). In particular a New Zealand Coastal Policy Statement (NZCPS) is mandatory, and the most recent version became operative in December 2010. The New Zealand Coastal Policy Statement (NZCPS) sets the national strategic policy direction for managing the coastal environment, including policy directives for coastal natural hazards and the management of coastal margin development (form and location).

Following an amendment to the RMA in 2003, any NPS (including the NZCPS) must be 'given effect to' by regional policy statements, regional plans and district plans. In other words, the seven objectives and 29 policies of the NZCPS 2010 must now be considered by all councils, and given effect to in planning and policy instruments at regional and district levels.

In brief, the objectives are:

1. Safeguard the integrity form, functioning, and resilience of the coastal environment
2. Preserve the natural character of the coastal environment and protect natural features and landscape values
3. Take into account the principles of the Treaty of Waitangi ... and provide for tangata whenua involvement in management of the coastal environment
4. Maintain and enhance public open space and recreation opportunities
5. Manage coastal hazard risks taking into account climate change
6. Provide for social, economic and cultural well-being of communities through the use and development of the coast
7. Provide for any international obligations in the management of the New Zealand coast.

The 29 policies support these objectives, by providing more detail on how the objectives should be achieved. The Department of Conservation (DoC) is currently developing guidance to help councils to implement the NZCPS (DoC 2011). Policies of particular interest to climate change at the coast and how we might adapt to it are listed In Box 3.2 below:

Box 3.2 - NZCPS 2010	Policies most relevant to climate-change
	<ul style="list-style-type: none"> 3 – Precautionary approach 7 – Strategic planning 10 – Reclamations (if considered suitable use of CMA) 17 – Historic heritage identification and protection 18 – Public open space 19 – Walking access 24 – Identification of coastal hazards 25 – Subdivision, use, and development in areas of coastal hazards risk 26 – Natural defences against coastal hazards 27 – Strategies for protecting significant existing development from coastal hazard risk

Under the RMA authority is devolved to councils to make regional and local decisions regarding resource management, based on the management of effects on the environment. It is mandatory for regional and unitary councils to prepare regional policy statements, and regional coastal plans, and optional to prepare other regional plans. District/City councils prepare (mandatory) district plans. Plans under the RMA provide a set of objectives, policies and rules that determine how resources can be used, and define instances when people need to apply for resource consents or coastal permits.

Within each region, the regional policy statement has a particular role in defining what the respective functions are for regional and territorial authorities, in regard to managing the adverse effects of natural hazards. This separation of functions between regional and territorial authorities, along with the jurisdictional boundary defined by Mean High Water Spring (MHWS) is readily acknowledged (e.g., in the NZCPS) as adding complexity to the integrated management of the sea-land interface and the adjacent coastal environment.

In general, the regional policy statement, along with regional and district plans should represent ‘the voice of the community’, in that the RMA allows for a process of community engagement in the setting of objectives for maintaining a range of values and for setting out how different resources should be managed. Box 3.3 summarises the schedule of the RMA that outlines the requirements for consultation for regional plans and the policy statement.

Box 3.3

RMA Schedule 1 Preparation, change, and review of policy statements and plans

3 Consultation

(1) During the preparation of a proposed policy statement or plan, the local authority concerned shall consult—

(a) the Minister for the Environment; and

(b) those other Ministers of the Crown who may be affected by the policy statement or plan; and

(c) local authorities who may be so affected; and

(d) the tangata whenua of the area who may be so affected, through iwi authorities; and

(e) any customary marine title group in the area.

(2) A local authority may consult anyone else during the preparation of a proposed policy statement or plan.

(3) Without limiting subclauses (1) and (2), a regional council which is preparing a regional coastal plan shall consult—

(a) the Minister of Conservation generally as to the content of the plan, and with particular respect to those activities to be described as restricted coastal activities in the proposed plan; and

(b) the Minister of Transport in relation to matters to do with navigation and the Minister's functions under Parts 18 to 27 of the Maritime Transport Act 1994; and

(c) the Minister of Fisheries in relation to fisheries management, and the management of aquaculture activities.

(4) In consulting persons for the purposes of subclause (2), a local authority must undertake the consultation in accordance with section 82 of the Local Government Act 2002.

Box 3.3 shows that RMA Schedule 1 requires that consultation on RMA plans follows the same community consultation requirements of the LGA. Again, when compared to a theoretical framework this process is more consultation than participation, but again the framework in which the council and communities will consult is at least clearly explained i.e., the basis of interaction is clearly understood before the process starts. As with the LGA, the legislation sets both principles and a process that councils must follow as a minimum requirement to consult with their communities.

4.4 Civil Defence and Emergency Management Act 2002

The Civil Defence and Emergency Management Act 2002 (CDEMA) promotes the sustainable management of hazards, encourages communities to achieve acceptable levels of risk and sets out a framework for emergency management and cooperation. One of its key purposes is to improve and promote the sustainable management of hazards in a way that contributes to the social, economic, cultural, and environmental well-being and safety of the public and also to the protection of property. It focuses on a risk-management approach to natural hazards and emphasises the 4 R's - reduction, readiness, response and recovery.

Regional and territorial authorities are required to form a joint CDEM Group for each CD region, and the Group is responsible for preparing a CDEM plan. Such plans cover the hazards and risks to be managed and the actions necessary to do so, and are to be reviewed every five years (s56). The RMA and Building Act provide complementary roles to the CDEMA, and are fundamental to achieving the 1st R - a 'reduction' of risk through land use and building controls.

The CDEMA does not specifically mention climate change, but includes a broad definition of hazards to mean 'something that may cause, or contribute substantially to the cause of, an emergency'. This broad definition allows climate change to be considered a hazard, as climate change will exacerbate weather-related coastal hazards and indirectly tsunami (through higher mean sea-levels). The CDEMA includes (s7) a requirement for councils to take a precautionary approach, stating that people exercising responsibilities for CDEM plans 'may be cautious in managing risks even if there is scientific and technical uncertainty about those risks'. A requirement of the CDEM plans is to clearly state (s48) the hazards and risks to be managed by the Group, and the civil defence emergency management necessary to manage those hazards and risks.

Box 3.4 summarises the parts of the CDEMA that outline the process for consultation for CDEM plans.

Box 3.4

CDEMA s38 Matters relevant to development of civil defence emergency management plans

All persons exercising functions in relation to the development of civil defence emergency management plans under this Act must have regard to—

- (a) the responsibility of people and communities to provide for their own well-being and the well-being of future generations:
- (b) the benefits to be derived for people and communities from the management of hazards and risks:
- (c) New Zealand's international obligations

CDEMA s52 Procedure for making civil defence emergency management group plans

(1) Before making a civil defence emergency management group plan, a Civil Defence Emergency Management Group must—

(a) give public notice, and any specific notice that the Group considers appropriate, of the proposal to make a plan; and

(b) specify in every notice given under paragraph (a) a period within which persons interested in the proposal may make submissions on the proposal to—

(i) the Group; or

(ii) a subgroup or committee of the Group; and

(c) ensure that any person who makes written submissions on the proposal within the period specified in the notice given under paragraph (a) is given a reasonable opportunity to be heard by the body to which the submissions are made; and

(d) make all written submissions on the proposal available to the public unless there is some good reason in law why it should not do so; and

(e) ensure that the final decision in relation to the proposal is made at a meeting of the Group.

(2) The period specified under subsection (1)(b)—

(a) must not be less than 1 month; and

(b) unless the Group otherwise directs, must not be more than 3 months.

Box 3.4 shows that while the CDEMA clearly requires the Group to have considered their communities in developing a CDEM plan, the CDEMA process for involving the community in the development of regional CDEM plans is again more consultation than participation when compared to a theoretical framework. Similarly to the LGA and RMA, the framework in which the council and communities will consult is at least clearly explained i.e., the basis of interaction is clearly understood before the process starts. As with the LGA and RMA, the legislation sets both principles and a process that councils must follow as a minimum requirement to consult with their communities.

The National CDEM Strategy (published in 2008 under s31 of the Act by the Ministry for Civil Defence and Emergency Management or MCDEM) also provides long-term direction to the application of CDEM in New Zealand. Goal One, Objective 1D of the Strategy is *Encouraging and enabling wider community participation in hazard risk management decisions* (MCDEM 2008). The premise is that communities that are aware of and understand the risks from hazards are better able to make decisions regarding the acceptability of the risks they face. Local government LTP and RMA planning processes are seen as the vehicle for

participation, with MCDEM's role to encourage effective processes at the local level, monitor progress and promote best practice.

4.5 Realities and barriers

The above sections have highlighted some of the key legal requirements of councils to work with their communities, under three pieces of legislation, to develop policies to manage the effects of climate change and associated hazards on the coastal environment. It is therefore required that councils consult with their communities when developing important documents like the LTP, and in the development of RMA and CDEM Group plans.

In a survey of councils (Britton 2010), when asked to rate themselves against the adaptation principles given in national guidance (MfE 2008a) councils overall rated themselves as 3 (out of 5 with 1 being poor and 5 being excellent) on the first adaptation principle 'Working in partnership with coastal communities'. Britton (2010) found that working in partnership with coastal communities was undertaken to varying degrees by all levels of local authorities, and noted this may have been reflective of the community pressures and adaptation issues being faced by some councils.

The reality is that the theoretical definition of participation, i.e., joint decision-making, is unlikely to take place given the time and cost constraints that councils operate within. Requirements for consultation are set in legislation, and councils have to consult on their policies at a variety of time intervals dependent on requirements for plan review, including:

- LTPs (every 3 years),
- LGA annual plans (annually),
- RMA plans (every 10 years), and
- CDEM plans (every 5 years).

It is also worth noting, however, that the legislation doesn't preclude councils from doing more than the legally required minimum, and of course the preceding section (section 3) of this report has highlighted reasons why involving communities more fully in decision-making around climate change issues is desirable. Current trends in council activities under the RMA for instance show a trend towards greater mediation and caucusing when making consent or planning decisions, and recent trends in national policy also reflect a move towards 'collaborative' processes including all stakeholders in policy setting⁵.

Certain stakeholder groups are more likely to be aware of consultation opportunities than 'the general public', and in fact anecdotal evidence suggests that many stakeholder groups, particularly iwi, suffer from consultation fatigue, and simply cannot meet the requirements of councils to stay involved in decision-making. In noting that these different legislative drivers have differing timeframes driving council consultation processes, it is also worth noting that there is a mismatch of timing between councils RMA regional plans and national RMA tools such as the NZCPS (Britton 2010).

⁵ Such as the Land & Water Forum, see <http://www.landandwater.org.nz/>

However, inherent in the way that local government works in New Zealand is the devolved responsibility for decision-making to the organisations (regional councils and territorial authorities including community boards) who have the best understanding of what their communities are likely to require. This ensures, at least to some extent, that any climate change adaptation policies developed are likely to be informed by local issues and local goals.

Having understood the New Zealand context for councils with regard to community engagement, we will move on to look at the third leg of the stool, international case studies.

5 International community engagement case studies and tools

As stated in section 2.2, the response to impending climate change has had a relatively recent shift in focus from predominantly mitigation more towards adaptation. A sensible place to start our review is the IPCC AR4 reports, and the chapter of Adger et al. (2007) *Assessment of adaptation practices, options, constraints and capacity*. Box 2.2 above showed that the main points from that chapter are:

- Adaptation to climate change is already taking place, but on a limited basis
- Adaptation measures are seldom undertaken in response to climate change alone
- Many adaptations can be implemented at low cost, but comprehensive estimates of adaptation costs and benefits are currently lacking
- Adaptive capacity is uneven across and within societies
- There are substantial limits and barriers to adaptation.

For our CACC project, we want to focus in particular on work being done regarding adaptation to climate change effects at the coast. International approaches responding to coastal climate change vary, and a number of these are summarised in Norman (2009). The Norman review, based in an Australian context, looks at case studies in New Zealand (Christchurch), the United Kingdom (London), the European Union (the Netherlands and Venice), Canada (New Brunswick and Halifax), United States (New York, San Francisco, Chesapeake Bay and Florida), South Africa (Cape Town and Western Cape), Asia-Pacific through the activities of PEMSEA, and Australia (Sydney coastal councils, Shire of Byron Bay, Western Port Greenhouse Alliance, Clarence City Council). Norman (2009) notes that a range of factors including geography, urban planning, natural resource management and coastal governance arrangements have influenced responses to coastal climate change impacts. All of these case studies offer insights into different approaches to adapting to coastal climate change. These approaches lie along a continuum of planning and management responses and adaptation strategies across general themes such as; 'protect', 'rebuild', 'elevate', 'relocate' and 'retreat' (Norman 2009).

Here, we look at four international cases – the European Union (EU; the Netherlands), the United Kingdom, the United States, and Australia – to see what tools (highlighted in **bold text**) have been developed to assist councils and communities to adapt to projected climate change impacts at the coast. In particular we highlight work or tools around how to engage communities in developing adaptation strategies or actions. We note that a lot of this work has been developed in parallel to our own work; some of it is very recent and has been produced since our project started.

5.1 The European Union – The Netherlands

In line with global trends, European coastal zones are subject to climate change pressures, and one-third of the European Union (EU) population lives within 50km of the coast (EEA 2005).

In 2009 the European Commission issued a White Paper *Adapting to climate change: Towards a European framework for action*. The White Paper established that the EU aims to enhance the EU's resilience by developing an adaptation strategy. This strategy will offer an integrated and coordinated approach at the EU level, encourage member states to develop national or regional adaptation strategies, and ensure consistency across national boundaries (EU 2009).

A dedicated Directorate-General to focus on climate change was created in 2010 (DG Climate Action [CLIMA]). DG CLIMA works to make adaptation to climate change a priority of all EU-level policies and coordinates EU adaptation policies (see ec.europa.eu/clima/sites/change/). DG CLIMA is working with relevant experts from different countries and sectors to develop a comprehensive Adaptation Strategy based on the White Paper, for release in 2013. The EU Strategy will further refine the key priorities for action and how EU policies in all areas can encourage effective adaptation action.

The White Paper also established steps to:

- Develop a European 'climate change impacts vulnerability and adaptation clearing house'. This will make it easier to find information on adaptation and different approaches. The clearing house, to be operational by 2012, should be the central point of reference on climate change adaptation for researchers, policy-makers and the public at large,
- Develop methods, models and prediction tools,
- Mainstream adaptation into EU policies, including the Marine Strategy Framework Directive, and
- Develop European guidelines on adaptation in coastal and marine areas.

Some EU countries have already undertaken steps towards developing national adaptation strategies. In the Netherlands, 75% of the population live within 50 km of coast (EEA 2005), and 60% of the nation is below sea-level (Norman 2009). It is estimated that 1 m of sea-level rise would affect 10 million people in Netherlands (coastal floodplain population; EEA 2005). The Netherlands is therefore a country used to dealing with flooding issues, and following the 1953 storm-tide inundation from the North Sea (with 1836 casualties), hard sea defences have until recently been the normal approach to coastal management.

The Netherlands' National Programme for Spatial Adaptation to Climate Change (ARK) is based on the shared belief that spatial adaptation to the effects of climate change is essential and a top administrative priority. The Netherlands has developed a National Adaptation Strategy, which was approved in November 2007. This strategy describes in general what is necessary to make the Netherlands climate-proof. It highlights an innovative and inter-sectoral approach and encourages parties to reflect, cooperate, reconsider and take action (www.maakruimtevoorklimaat.nl/english-summary.html).

Also in 2007, the Dutch Delta Committee (the Sustainable Coastal Development Committee) was established to provide advice to the Netherlands Minister for Housing, Spatial Planning and the Environment. The Dutch Delta Committee report (Deltacommissie 2008) provides 12 recommendations for climate proofing the Netherlands for the next century. Implementation

of the recommendations is being supported through a Delta Programme and a Delta Fund (see www.deltacommissaris.nl/english/), and in June 2011 the Delta Act, a major recommendation of the Delta Commission, was adopted.

A useful tool in the EU context is the EcoLogic Institute's (Ribeiro et al. 2009) ***Design of guidelines for the elaboration of regional climate change adaptation strategies*** (<http://ecologic.eu/download/projekte/1900-1949/1926/RAS-Final-Report.pdf>). This policy guidance is intended to assist regional authorities and other regional bodies in charge of formulating Regional Adaptation Strategies (RAS). The guidance contains a useful review of adaptation strategies in Europe to distil key success factors. The recommended steps that result are:

1. Prepare the ground
2. Assess vulnerability
3. Set the strategic direction
4. Plan and implement measures.

The guidance also identifies three cross-cutting themes essential for success, including:

- Gather information,
- Monitoring, evaluation and review, and
- Stakeholder engagement.

5.2 UK

Similar to the Netherlands, 75% of the population in the UK live within 50km of coast, and as a country there is plenty of activity to help councils to think about adapting to climate change. In the UK, there is a specific agency which exists to help with adaptation to climate change. The UK Climate Impacts Programme (UKCIP) was established in 1997 to help co-ordinate scientific research into the impacts of climate change, and to help organisations adapt to those unavoidable impacts (www.ukcip.org.uk). According to its website, "UKCIP works at the boundary between scientific research, policy makers and stakeholders (people working in the public, private and voluntary sectors interested in the impacts of climate change). We act to coordinate and influence research into our future climate and to share the outputs in ways that are useful to stakeholders."

UKCIP was funded by the UK Department for Environment, Food and Rural Affairs (Defra) up until 30 September 2011. It is now hosted at the Environmental Change Institute (ECI) at the University of Oxford and is known only by its acronym (UKCIP). It will continue to work on a number of adaptation-related activities. The work that UKCIP had been delivering for Defra, to support advice and guidance on adaptation across the UK, is being transferred to a government body – the Environment Agency (<http://www.environment-agency.gov.uk/research/132904.aspx>).

The overall responsibility for climate change policy lies with Defra, and changes outlined above will mean that the English Environment Agency will take more of a role in climate change adaptation in late 2011.

Several key reports and tools have been provided by UKCIP and Defra. Figure 3.1 shows how the UKCIP tools fit together. Some of the key tools are discussed briefly below.

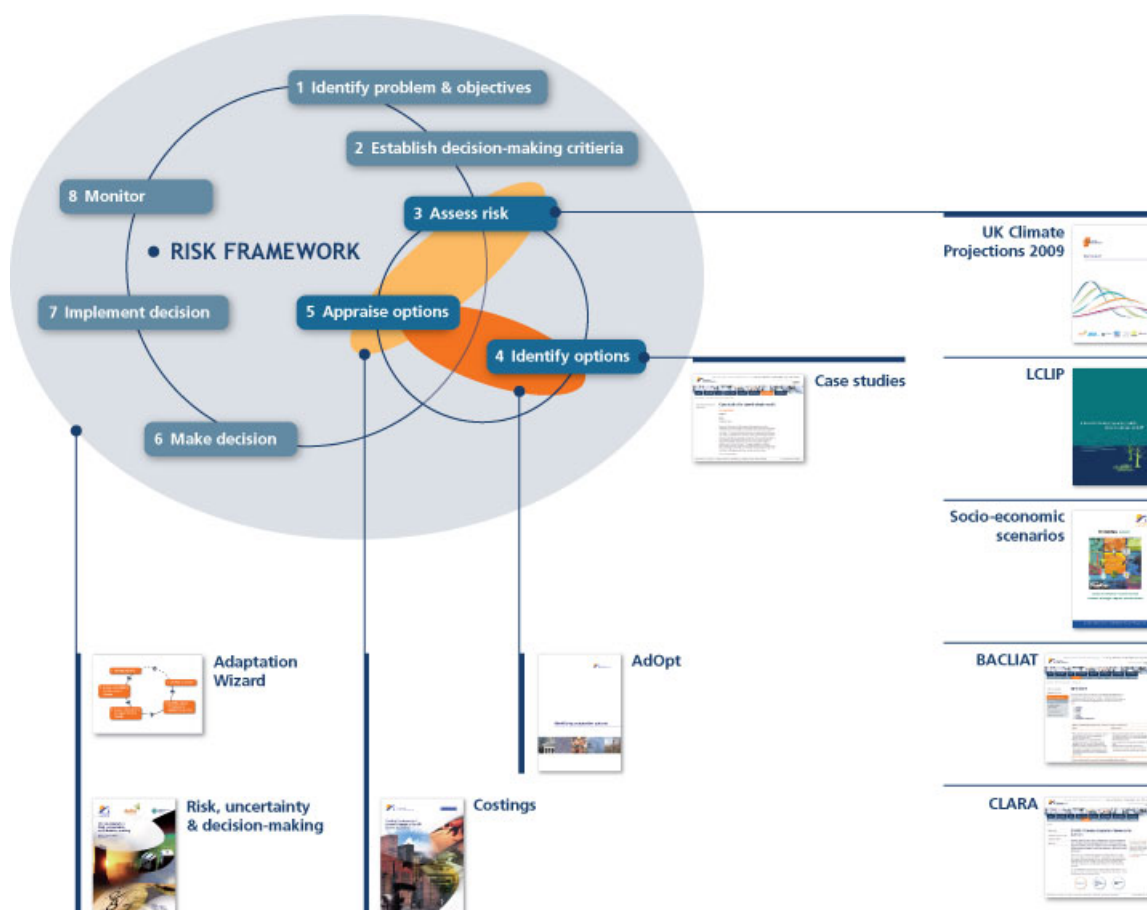


Figure 3.1 UKCIP tools for managing climate change (Source: UKCIP website)

Risk assessment framework (www.ukcip.org.uk/risk/)

The risk assessment framework was developed in 2003 (Willows & Connell 2003) and provides an eight stage process to guide decision-makers affected by the impacts of climate change. The framework (Figure 3.2) is circular, iterative, and tiered (i.e. makes use of both screening and advanced tools to determine risk). These features are aimed to promote good decision-making. The document has strong parallels with the NZ/AS ISO 31000 Risk Management Standard, as shown by the framework diagram (Figure 3.2). Importantly for our review, the framework stresses the importance of an open approach, i.e., taking account of stakeholder and affected parties' feedback, and encouraging active participation from interested groups. Each stage of the framework includes a number of questions which

decision-makers should consider, and provides information regarding tools that could be used to generate information to help at that stage of the assessment.

A more recent publication *Managing adaptation: linking theory and practice* (Brown et al. 2011) supplements the Risk, Uncertainty and Decision-making framework. It is designed to provide additional support for organisations seeking to undertake some form of adaptation planning, either for the first time or in consolidating work undertaken so far. It is aimed particularly at those undertaking a systematic climate change risk-based assessment as part of an adaptation work programme (http://www.ukcip.org.uk/wordpress/wp-content/PDFs/UKCIP_Managing_adaptation.pdf).

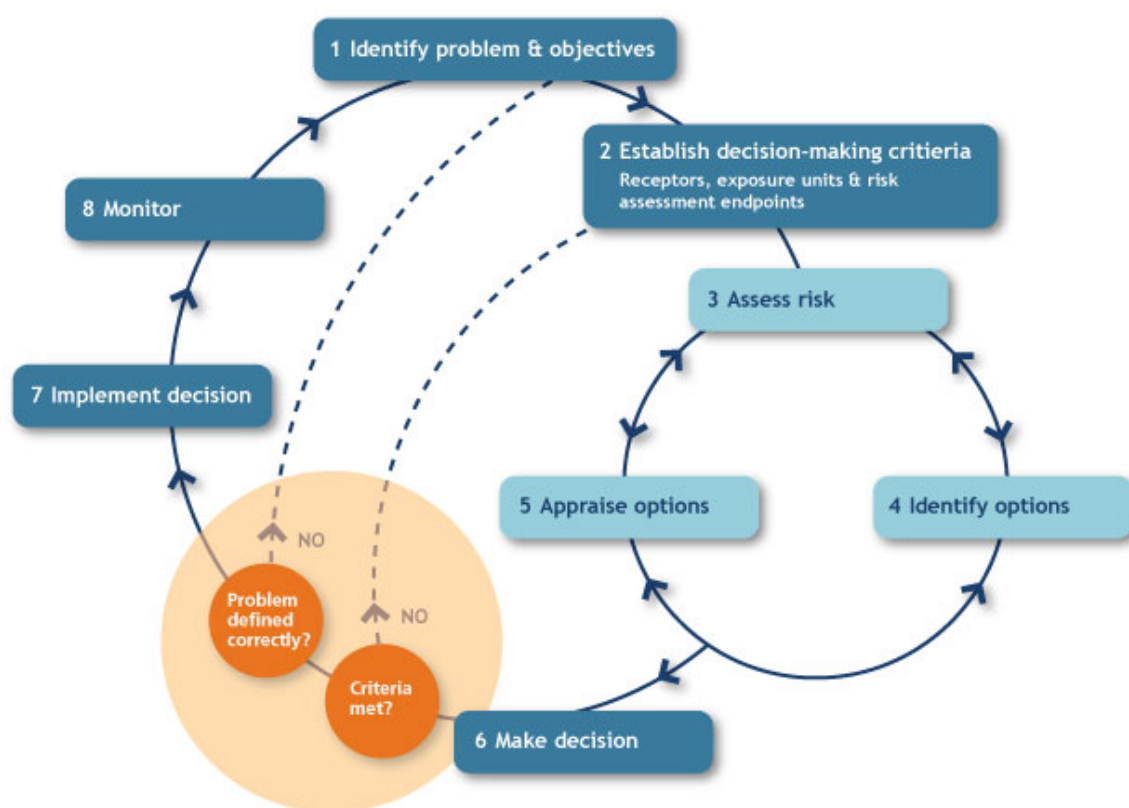


Figure 3.2 The UKCIP 8 step risk assessment framework (Willows & Connell 2003) (Source: UKCIP website).

Adaptation Wizard (www.ukcip.org.uk/wizard/)

The Adaptation Wizard was developed in 2010 (UKCIP 2010), and provides a 5 step process to help assess an organisation's vulnerability to current climate and future climate change (Figure 3.3). Each step has a series of questions to answer, and the Adaptation Wizard provides tables and a notepad for recording your information. Working through the tasks enables the user to establish their starting point in regard to adaptation, and then to identify options to address key climate risks, and develop and implement a climate change

adaptation strategy. The Wizard is also a guide to the information, tools and resources available from UKCIP to help organisations plan how to adapt. Another useful tool provided by the Wizard is the **UKCIP's Adaptation Imperative** (www.ukcip.org.uk/wizard/about-the-wizard/adaptation-imperative/) which outlines the benefits of adapting to climate change.

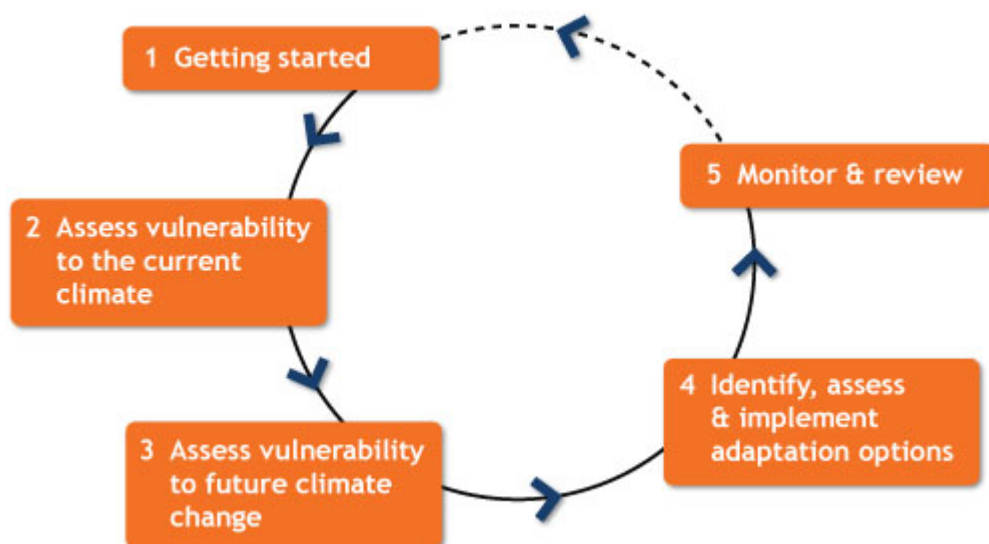


Figure 3.3 The UKCIP Adaptation Wizard 5 step process (Source: UKCIP website)

Measuring the impacts (www.ukcip.org.uk/publications/)

This UKCIP publication (West & Gawith 2005) provides a useful update on progress of adaptation studies in the UK. In particular, Chapter 5 of the document describes a number of lessons learned by people undertaking this work, and using the UKCIP tools. Importantly for our review, the document includes a specific section on lessons learned in regard to stakeholder engagement. Key barriers to engaging with communities around climate change identified are:

- Uncertainty about climate change extent and magnitude;
- The complexity of climate change and adaptation;
- The timeframes of climate change (long) as opposed to planning timeframes; and
- Resource constraints.

Success measures include:

- Engaging with stakeholders about current issues and risks first before casting to future changes;
- Enquire and engage on issues that are relevant to stakeholders concerns (climate change may not be one);

- Work with existing networks;
- Helping stakeholders understand that it is in their interest to adapt; and
- Be aware that engagement takes time and effort.

Case studies (www.ukcip.org.uk/case-studies/)

The UKCIP website also provides a series of case studies from UK organisations that have gone through some kind of adaptation assessment, often using the Risk Framework or the Adaptation Wizard.

Defra Website – advice for local councils

(www.defra.gov.uk/environment/climate/sectors/local-authorities/)

The Defra website contains resources for local councils, including:

Case studies (www.defra.gov.uk/environment/flooding/coastal-change/pathfinders/)

The Defra website contains examples of English local authorities working on coastal climate change adaptation.

Guidance on National Indicator 188 Planning to Adapt to Climate Change

(archive.defra.gov.uk/corporate/about/with/localgov/indicators/documents/ni188-guidance.pdf)

National Indicators (NI) are used to measure UK council's progress on climate change issues, including NI 188 Planning to Adapt to Climate Change. This website provides a guidance document to help councils to meet the NI188 requirements. The guidance, developed by the Local and Regional Partnership Board (LRAP; which works to support Local Government and Regional Bodies on adapting to climate change) works through five levels:

Level 0 Getting started

Level 1 Public commitment and impacts assessment

Level 2 Comprehensive risk assessment

Level 3 Comprehensive action plan

Level 4 Implementation, monitoring and continuous review.

Adapting to climate change: a guide for local councils (Defra 2010)

This short guide gives advice to local councils on actions they could be taking with regard to climate change adaptation. The guidance includes link to the UKCIP tools outlined above, and for example advice regarding Community Led Planning initiatives (www.acre.org.uk/our-work/community-led-planning). A number of case studies show what local councils could be doing.

Long-term Thames Flood Risk Management Plan (Environment Agency) (www.environment-agency.gov.uk/research/library/consultations/106100.aspx)

Thames Estuary 2100 is an (English) Environment Agency-led flood risk management project set up to protect London and the tidal reaches of the Thames. The project called for an adaptive plan able to protect up to a 1.9 metre rise in sea-level predicted in the UK's 'High++' scenario as well changes in the frequency and severity of North Sea storm surges and water drainage from the Thames and its tributaries. A description of the adaptive management approach taken in this study using a scenario-neutral (bottom-up) approach, particularly timing the stages for upgrading of the Thames Surge Barrier, is provided in Box 6.6 of the CACC projects *Pathways to Change* guidance document (Britton et al. 2011).

Another useful website for councils in the UK is the **Nottingham Declaration on Climate Change** (www.nottinghamdeclaration.org.uk). Launched in October 2000 in Nottingham, the Nottingham Declaration on Climate Change encourages all local authorities and their partners to sign, and thus pledge to systematically address the causes of climate change and to prepare their community for its impacts. The Declaration has now been signed by more than 300 English Councils, and the website notes that all Scottish and Welsh councils have signed their own versions. The website includes guidance for councils on developing an action plan (to enable them to fulfil their pledge), giving a five step framework: 1) Get started, 2) Assess the situation, 3) Develop your approach, 4) Prepare the action plan and 5) Implementation.

5.3 Australia

Australia has a huge coastline, and about 85 per cent of the population lives in the coastal region. For this reason, it is important for Australia to understand potential climate change driven risks to settlements, industries, the delivery of services and natural ecosystems within Australia's coastal zone. The Australian Government has a Department of Climate Change and Energy Efficiency (formerly the Department of Climate Change) which is responsible for Government activity around climate change. Their website (<http://climatechange.gov.au/default.aspx>) provides a range of links to initiatives being undertaken to understanding the potential effects of climate change for Australia, and help Australian councils and communities adapt to potential changes.

The Australian Government provides information regarding the potential coastal impacts of climate change, including sea-level rise maps, through the Department of Climate Change and Energy Efficiency and OzCoasts (www.ozcoasts.org.au/) websites.

One aspect of their work is to look at adaptation to climate change, and the position paper *Adapting to Climate Change* sets out the Government's vision for adapting to the impacts of climate change and proposes practical steps to realise that vision. The position paper outlines the Australian Government's role in adaptation, which includes building community resilience and establishing the right conditions for people to adapt; taking climate change into account in the management of Commonwealth assets and programs; providing sound scientific information; and leading national reform. The position paper identifies coasts as one of six national priority areas for action.

The Australian Government has identified the importance of working with communities, and is supporting work on engaging with communities and stakeholders through the Coasts and Climate Change Council, which was established in late 2009 to engage with communities and stakeholders and to advise the Government on key issues.

A number of tools are available to help Australian councils with adapting to coastal climate change:

A framework for stakeholder engagement on climate adaptation
(www.csiro.au/science/Climate-Change-Adaptation)

Australia's national science agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), has a number of science Flagship programmes, one of which is the Climate Adaptation Flagship (CAF). This CSIRO report was written at an early stage in the Flagship research programme, and contains best practice methods for engaging with stakeholders on the issue of climate adaptation. The document highlights three principles:

1. Engagement literature can offer some consistent guidelines
2. Climate change and adaptation are topics that make engagement hard
3. Mechanisms to overcome these barriers do exist.

A set of recommended 'mechanisms' are given:

- Prior to engagement – set goals and plan, contextualise the issue, define the stakeholders, manage expectations
- Engagement process – use group discussion, use varied presentation formats, allow mutual influence, foster trust, respect and ownership
- Climate change issues – address gaps in knowledge, acknowledge uncertainty
- Address scepticism, address emotional reactions
- Engagement follow-up and evaluation – maintain contact and feedback, plan evaluation from the outset, evaluate both process and outcomes, acknowledge other impacts.

OzCoasts (www.ozcoasts.org.au/)

OzCoasts provides comprehensive information about Australia's coast, including its estuaries, coastal waterways and climate change impact. This helps to generate a better understanding of coastal environments, the complex processes that occur in them, the potential environmental health issues and how to recognise and deal with these issues.

OzCoasts hosts a new Climate Change module, which provides information and tools to help communicate the risks of sea-level rise and other potential impacts of climate change on coastal areas. Tools to support adaptation include:

- Visualising sea-level rise,
- Elevation data and modelling, and
- Landform and stability mapping.

Case studies – Pathways (www.climatechange.gov.au/government/programs-and-rebates/coastal-adaptation-decision-pathways/projects.aspx)

An Australian government initiative provides funding for adaptation studies, called Coastal Adaptation Decision Pathways. The purpose of the funds and the case study projects is to demonstrate effective approaches to adaptation in the coastal zone. Thirteen projects, from different states, have received funding to develop leading practice approaches to better manage future climate risk to coastal assets and communities. The projects are due for completion in June 2012.

The objectives of Coastal Adaptation Decision Pathways projects are to:

- demonstrate the utility of flexible pathways that incorporate future climate risk and adaptation actions into decision-making
- establish the key partnerships that will position communities in the longer term to drive the reform required to manage climate change risks
- provide leadership in new approaches to cost-effectively manage legacy asset risk, and
- enhance the adaptive capacity of governments, communities and infrastructure and service providers through engagement in developing planning for future options.

5.4 USA

A recent study (Weiss et al. 2011) shows that sea-level rise of around 1 m could threaten an average of 9 percent of the land within 180 U.S. coastal cities by 2100.

There are two national agencies responsible for examining the impacts of sea-level rise on US coastlines, the National Oceanic and Atmospheric Administration (NOAA) and the United States Environmental Protection Agency (EPA). The US EPA is developing an EPA Climate

Change Adaptation Plan, aimed for release in 2012 (see www.epa.gov/climatechange/effects/downloads/adaptation-statement.pdf).

NOAA Coastal Services Center (csc.noaa.gov/climate/)

The NOAA Coastal Services Center helps communities take the steps needed to reduce harm to their communities and the planet. Commonly known as adaptation planning, a wide array of tools and services are available to help communities through this process, from conservation strategies to A to Z information about coastal inundation.

Coastal Climate Adaptation (collaborate.csc.noaa.gov/climateadaptation/default.aspx)

This website provides links to a number of resources regarding coastal climate change and adaptation, including:

- Adaptation and Action Plans
- Case Studies and Strategies
- Climate Change Communication
- Climate Change Science and Impacts
- Guidance and Guidebooks
- Outreach Materials
- Policies and Legislation
- Risk and Vulnerability Assessments
- Stakeholder Engagement
- Training and Workshop Materials.

US EPA (www.epa.gov/climatechange/effects/coastal/)

Coastal zones and sea-level rise – these pages provide an overview of these topics and a number of links to other tools, such as the links below.

Coastal Vulnerability and Adaptation Tools (www.epa.gov/climatereadyestuaries/vulnerability.html)

A number of resources are available to coastal resource managers seeking to assess risks and vulnerabilities in planning for climate change impacts. These include:

- Risk and Vulnerability Assessment Tools

- Planning Tools
- Examples of Vulnerability Assessments for Coastal Areas
- State Coastal Atlases.

Pew Center on Global Climate Change (www.pewclimate.org/communicating)

The Pew Center on Global Climate Change was established in 1998 as a non-profit, non-partisan and independent organization. The Center's mission is to provide credible information, straight answers, and innovative solutions in the effort to address global climate change. This website has some useful links to papers considering issues of communicating climate change issues.

Coastal Adaptation to Sea Level Rise Tool (COAST) (www.ebmtools.org/coastal-adaptation-sea-level-rise-tool-coast.html)

The Coastal Adaptation to Sea-Level Rise Tool (COAST) approach assesses costs and benefits of adaptations to SLR scenarios by incorporating a variety of existing tools and datasets, including the U.S. Army Corps of Engineers' depth-damage functions; NOAA's Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model; and other flood methods, as well as projected SLR scenarios over time, property values, and infrastructure costs, into a comprehensive GIS-based picture of potential economic damage.

Another GIS optimisation framework for comparing coastal response options has been applied regionally in New Jersey and nationally across the USA, based on a simplified cost-benefit analysis of hard protection and beach nourishment relative to a retreat response (Neumann et al. 2010; 2011). These approaches, along with complementary multi-criteria analysis, can help inform at what sea-level rise and when along the planning horizon the retreat response becomes the only sustainable option.

5.5 Summary

In this section we have looked at what other countries are doing around adaptation, and particularly we have looked for examples of tools or guidance regarding engaging communities in developing adaptation plans and strategies. This is the third leg of our stool, on which our practical method and conceptual approach have been built.

We note that a lot of this work has been developed in parallel to our own work; some of it is very recent and has been produced since our project started. Reading through this literature confirmed the research team's thinking and research plan regarding the use and development of participatory methods, and the importance of integration of place-based work with well thought-out scientific input.

Many of these examples were used by the CACC team as we developed our thinking behind our *Pathways to Change* guidance document (Britton et al. 2011). The earlier ones were also

used as a 'leg' for the development of our own case studies for engaging communities, summarised in the following section.

6 CACC Case studies

Having looked at the three legs of our stool in sections 3 (engaging communities), 4 (New Zealand context) and 5 (overseas examples and case studies), here we describe our CACC case studies (or seat to our stool).

6.1 Brief intro to our case studies

While this report develops a nationally applicable conceptual approach, the project has focussed its attention in the Waikato region and the Coromandel Peninsula in particular to develop and test participatory methods through three case studies.

We chose the Coromandel area for our case studies due to a number of coastal management issues. The total current value of property on the Coromandel Peninsula likely to be affected to some extent by coastal erosion over the next 100 years is about \$1.18 billion (see www.waikatoregion.govt.nz/Environmental-information/Environmental-indicators/Natural-hazards/Coastal-hazards/co14-keypoints/). These values are based on the registered capital value (2007), but the market value of beachfront property on the Coromandel Peninsula could be close to twice this value in spite of the recent recessionary trends. This risk will continue to increase as property values rise, and with climate change there will likely be a need to reassess the location of coastal hazard set-back lines.

One of the issues our CACC project aimed to address was how to raise the New Zealand public's awareness of adaptation to climate change, and where best to target information for information transfer to specific sector groups like schools, communities and councils. We identified a need to better understand what is valued by coastal stakeholders, and how these values vary and will be impacted by climate change. We also identified a need for specific adaptation methods to meet cultural needs.

The Coromandel offered the project team opportunities to look at all of these issues. The Waikato Regional Council (WRC) and Thames-Coromandel District Council (TCDC) have been project partners in the CACC project. The following sections give brief details of two of our three Coromandel case studies: our Whitianga community engagement case study (Rouse et al. 2011) and Mercury Bay Area School case study (Hume et al. 2011). However our work with the Manaia community is described in King et al. (in prep 2011) and is not summarised here.

6.2 Whitianga

Whitianga is located on the Eastern side of the Coromandel Peninsula, 208 km from Auckland, 93 km from Thames, and 42 km from Tairua. Whitianga is an attractive town with a navigable harbour, and is the main settlement of Mercury Bay. Whitianga has been continuously occupied for more than a thousand years since Maori explorer Kupe's tribe settled here after his visit in about 950 A.D. (Te Whitianga a Kupe is the town's original place name, meaning Kupe's crossing place.) Its population is projected to increase from about 3,800 in 2006 to about 6,000 by 2040. In summer the town experiences a large influx of

holidaymakers; the population peaked at 21,680 in 2003/04 and 14,810 in 2005/06 (Beca 2007, p12).

WRC and TCDC have undertaken various work streams on aspects of the town and its active community. These include the councils' respective Long Term Plans (LTPs⁶, prepared under the Local Government Act), 'Vision Whitianga' which is a Community Plan developed by TCDC in 2005, and a more recent future visioning project called the Coromandel Peninsula Blueprint. The latter is 'a strategic framework for managing growth and sustainable development for the Coromandel'⁷, and in it Whitianga is identified as a major growth hub for the Coromandel.

The Whitianga coast, comprising Buffalo Beach and Simpsons Beach, is prone to erosion and inundation hazards at present, with rock seawalls in place along parts of Buffalo Beach. Both Councils have undertaken research, monitoring and management work looking at these coastal issues. As a result, there is a wealth of information available, and the Whitianga community has an active interest in coastal issues. This level of information and community awareness was a great benefit in our engagement research. The Whitianga case study is written up in full in Rouse et al. (2011; available at www.niwa.co.nz/our-science/coasts/research-projects/all/coastal-adaption-to-climate-change), and summarised in Blackett et al. (2010b) and briefly below.

As we have discussed in section 3, the application of a participatory process and ideologies to resource management decisions presents a well-documented range of benefits and challenges. Few et al. (2007) provide some additional insights into challenges that are specific to climate change. In order to fully realise the benefits of utilising participatory processes, practitioners must be aware of, and seek to counter, the numerous challenges presented by public inclusion in decision-making. The CACC team has summarised these benefits and challenges (Rouse et al. 2011), as shown in Table 3.4.

The CACC team considered each of these challenges when designing the practical method to achieve successful engagement with the Whitianga community on complex social economic and environmental issues. Moreover, each challenge was evaluated in terms of the highly pragmatic outputs required from the research which were:

- 1) To understand what members of the community value about living in their community and how these values may be affected by the potential impacts of climate change;
- 2) To create a participative environment where members of the community can discuss future adaptation strategies (dialogue) with scientists and regional and local council staff; and
- 3) To support the adaptation discussion with robust and meaningful scientific information, at the appropriate level of complexity to provide participants with a good understanding of what the projected impacts on Whitianga may be as a result of climate change. In order to do this, the research team need to project local level impacts of climate change on the coast at Whitianga.

⁶ Previously called Long Term Council Community Plans or LTCCPs

⁷ See <http://www.coroblueprint.govt.nz/> for more details

6.2.1 Getting the right people to the table

Our definition of community was essentially a geographic description which included anyone who lived within a particular geographic area, or had an on-going financial interest in the area. This included all landowners, holiday home owners, residents, and business owners but it excludes those who visit the beach. Although this definition excludes wider national interests it was considered by the team to be appropriate, as the focus of the CACC project is about helping local communities to adapt to climate change to protect what they value. Once we had identified the boundaries of the community, our objective was to achieve as much community involvement as practicable while ensuring that participants gained value from the giving of their time. A further reason for approaching the community as a whole was that climate change is not a single issue (due to multiple impacts on multiple value objects over variable timeframes) thus it was difficult to identify specific stakeholder groups who may be impacted.

Financial and time constraints were incorporated into our considerations because these would be important for future replication of a method by local authorities.

The project team hoped that the opportunity to discuss climate change with scientists might be an incentive for some people to attend.

6.2.2 Achieving consensus and representative decision-making

Forester and Theckethil (2009) suggest that participatory processes require three stages to reach a consensus: dialogue, debate and negotiation. During dialogue, conversation between participants aims to develop an understanding of other participants' perspective, interests and values. Debate between participants establishes and tests each other's arguments and rationale for particular actions. The final step is negotiation, where participants begin to work towards a solution and consensus.

The aim of our work was to design a process which local authorities could use to initiate dialogue with communities around climate change impacts and potential adaptation pathways. In this respect it was not imperative to reach a consensus on how to adapt to climate change during the engagements with the community. Instead the resulting method (and underlying ideological approach) would form a stepping stone on the pathway which could progress to debate and negotiation in due course. To allow this, our method needed to contain all the necessary elements of a process that could be used to achieve representative consensus decision-making. This means that as far as practicable all interests needed to be represented in the discussions (Habermas 1984, 1989; Outhwaite 1994) and people needed the opportunity to explore ideas, share their knowledge (Habermas 1984, 1989; Outhwaite 1994), and start to come to terms with the complex biological, social, economic and political contexts of climate change. These are all essential steps in order to gain an appreciation of what strategies are available to develop alternative strategies and visions.

6.2.3 Local versus National Focus – personalising the impacts of climate change

In order to personalise the potential impacts of climate change and generate an impetus to increase understanding and take action, we considered it best to focus on local issues and

local adaptation solutions. The reason for this approach was that people are typically not concerned about a particular hazard if they have no experience of it and this is especially evident with coastal erosion issues (Cooper & McKenna 2008). If the potential effects of climate change cannot be personalised we considered it would be difficult to get dialogue, debate and traction around options to protect the community's values in the future. An appropriate method for this study had to attend to this problem and seek to illustrate how individuals may be affected by climate change. However, by focusing on the local level we recognised that other broader national or regional level interests may be neglected. As stated previously, a good example of this in the coastal environment is the installation of a seawall which may give an agreeable solution to protect properties at the local level, but at the regional level represents the loss of another sandy beach (Blackett & Hume 2007; Blackett et al. 2010a). It will be the responsibility of local government to ensure that these other interests are accounted for where they diverge from local interests, and to bring these perspective into participatory discussions.

6.2.4 Appropriate and meaningful inclusion of scientific information

The nature of scientific information around climate change is complex, still evolving, uncertain and mostly contested. As a consequence, any method we applied would need to be able to convey the impacts of climate change in an understandable way, address uncertainty and be flexible enough to entertain individual issues while remaining anchored in the Whitianga community (i.e., be place based).

Given the historical failures of the information deficit approach and the risks associated with information delivery via lecture style presentations (Pretty et al. 1995; Malouf 2003), we decided that our method should include one-on-one interactions to facilitate dialogue and learning between all participants (scientists, Council staff, practitioners and members of the community). We also chose to develop simple maps of projected climate change impacts (see section 6.2.5). All of the science information would be geared to support pragmatic solution-based dialogue.

6.2.5 What methods delivered the outcomes we wanted?

After working through the considerations we drafted a checklist of what a suitable method would be required to:

- Ensure place-based conversations;
- Maximise participation from all areas of the community;
- Facilitate pragmatic dialogue which facilitated learning and information exchange between scientists, council staff and the community;
- Integrate science into the discussion in a meaningful way and provide room to think about practical real world solutions for future adaptation.

Moreover, any method would need to deliver a way to identify things that are valued by the community and provide a platform for participants to discuss how those things of value could be protected into the future.

After considering and reviewing methods which could deliver the above outcomes the team concluded that utilising participatory GIS concepts within a participatory rural appraisal framework would be suitable.

Participatory rural appraisal (PRA) is the term used to describe a collection of methods which are used to “*enable rural people to share, enhance, and analyse their knowledge of life conditions to plan and to act*” (Chambers 1994, p953). These methods are frequently applied in the developing world, typically based on participatory ideologies and tend to be highly visual. Participatory GIS (PGIS) is an emergent practice developing out of participatory approaches to planning and spatial information and communication management (Abbot et al. 1998). It combines a range of geo-spatial information management tools and methods such as sketch maps, Participatory 3D Models (P3DM), aerial photographs, satellite imagery, Global Positioning Systems (GPS) and Geographic Information Systems (GIS) to represent peoples’ spatial knowledge in the forms of virtual or physical, 2- or 3-dimensional maps used as interactive vehicles for spatial learning, discussion, information exchange, analysis, decision-making and advocacy (Rambaldi et al. 2006). A similar approach used 2- and 3-dimensional GIS images to provide future ‘visions’ of the flood-prone Fraser River delta (British Columbia) in a participatory adaptation project (Shaw et al. 2009; Burch et al. 2010).

PGIS has evolved out of research in South Africa in the late 1990’s which applied typical participatory rural appraisal methodologies to capture data for representation in GIS (Cinderby 1999). Application of PGIS to air pollution issues in the UK has illustrated that the approach works well to capture public knowledge in a meaningful way (Cinderby & Forester, 2005; Cinderby et al. 2008). Moreover, it provides an excellent diagrammatic base from which to generate meaningful debate around policy alternative between experts and members of the public (Cinderby & Forester 2005). In practice, it appears as though the collection of information for PGIS can occur in many ways provided the method is based around diagrams or images of some type. Of particular, the method described by Cinderby (2009) was designed to engage with groups within society who typically do not engage in participatory forums. In essence, this approach placed a team of researchers on the side of a busy street around a large aerial photo. As they walked past, people were asked to write comments and concerns (about a particular issue) on small flags and position them in an appropriate location on the photo.

An immediate application was seen for capturing data for placed-based information of how climate change could potentially impact the things which the local community valued about living in Whitianga. More importantly, an aerial photo which located value objects within the community could be used to anchor a pragmatic discussion around potential future adaptation options.

6.2.6 Our chosen method

The method developed by Cinderby (2009) provided the team with inspiration and a solid basis on how to approach our community engagement. In essence, our method would be visual - we would develop large (A0, or 1200mm x 800mm) aerial photos/maps of the Whitianga area showing the potential impacts of climate change on the Whitianga coast using GIS (see below) to:

- Provide local community participants with visual and scientifically grounded perspectives of the projected impacts of climate change on the Whitianga community;
- Allow people to link projected impacts with what they currently value about their community and wish to retain; and
- Facilitate discussion around future options, and to begin consideration of what actions could be taken to protect the things which are of value in the community against the projected impacts of climate change.

However, as it would be difficult to achieve all of these goals in one engagement, we developed a two-stage process that incorporated two separate engagement opportunities - namely an Open Day and a more focussed Workshop (Blackett et al. 2010b).

The development of the large (A0) maps illustrating the potential impacts of climate change is discussed in detail in Rouse et al. (2011) and summarised very briefly here. The project team identified potential impacts of climate change in three key areas, namely:

- Coastal inundation and drainage;
- Coastal erosion; and
- Migration of coastal and estuarine habitats inland.

A map was created for each of these, with projected changes calculated using sea-level rise as the single driver of change. There was some discussion as to whether we should use different IPCC SRES⁸ scenarios to develop our projections. However we decided to follow the Ministry for the Environment (MfE 2008a) guidance for local authorities in regard to considering sea-level rise, *Coastal Hazards and Climate Change: a Guidance Manual for Local Government in New Zealand*. Thus for the 2040's we used a sea-level rise of 0.35 m, with 0.8 m for the 2090s relative to a 1980–99 average. By using this approach we not only used national best practice (from the MfE guidance materials) but also were able to use the latest credible sea-level guidance to help communicate the likelihood of future projections, and lessen debate from potential climate change sceptics.

The resulting three maps illustrated the current day situation (e.g., current mean high water spring tide mark for coastal inundation and drainage) along with different coloured overlays for projected changes in the 2040 and 2090s. The maps were used at both the Open Day and the Workshop.

The Open Day was designed to engage with as many locals as possible over what the impacts of climate change on Whitianga could be and how the changes might affect what they value about the community. It was held in the local town hall and was widely advertised in the local media. Personal invites were also offered to nearby shoppers in the main street on the day. On entering the hall participants walked through a 'time tunnel' illustrating Whitianga's history and some of the key local storm events and resulting impacts from the last 100 years. A member of the team was there to greet them and provide advice as requested. Once through the tunnel participants were presented with a large aerial image of

⁸ SRES =Special Report on Emission Scenarios (IPCC, 2000)

Whitianga and asked to write on post-it notes what they valued about living in the community. This was positioned to get participants thinking about what they appreciated about the community prior to being faced with projected climate change impact maps. Next stop were three tables with large (A0 size) coloured GIS maps overlain on aerial photos depicting different projected local impacts of climate on: coastal inundation and drainage, coastal erosion, and migration of coastal and estuarine habitats inland. Each map was attended by two scientists. Participants were encouraged to mark on the map (by writing on a small flag) what it was that they valued about Whitianga that could be affected by climate change. In this manner, the flags of information populated the three maps during the day to build up a picture of how life in the community may be affected by climate change. Additional members of the team were 'roving experts', with information flip charts, available to answer further questions and contribute to more detailed discussions that emerged away from the tables. The Open Day was considered a success by both the research team and the participants. Feedback from the participants proved to be unanimously positive with most finding the day extremely informative. In particular, participants reported that they appreciated the opportunity to ask the scientists questions about coastal hazards, habitats in the harbour and climate change. The large coloured GIS maps illustrating the projected impacts of climate change were especially well received. Over the course of the 4 hour period over 70 people attended the Open Day.



Figure 6.1: Whitianga Workshop participants use maps to ‘vision’ and consider adaptation options.

Three weeks after the Open Day, the Workshop was held. The Workshop was designed to promote further/more detailed discussion and dialogue on how the community could act to protect the things which are valued in the future. Discussion groups were set up based around the clusters of topics generated from the Open Day maps. Each topic was

attended by a scientist and facilitated to help the group consider how they might act to adapt to climate change in ways which protect the things the community values. Discussion was mostly pragmatic with identification of the key problem, some potential solutions and open discussion about the trade-offs, likely issues and key stakeholder groups. All the groups discussed the alternatives clearly and rationally without any reference to personal vested interest. This may have been because the forum was structured to achieve this, but more likely it was because no decisions were to be made at this Workshop. The situation would probably have been quite different had choices between different strategies (the debate and negotiation of Forester & Theckethil 2009) been the objective. The atmosphere created in the Workshop gave participants a place to begin considering the trade-offs and the choices required for successful adaptation to climate change (that is to maintain a community where the things which people value are protected) - a chance they said that they had not had in the past.

Overall, the method proved to be very successful in generating our desired outcomes. Further details of this Whitianga trial of our practical method for engaging communities are to be found in Rouse et al. (2011).

6.3 Mercury Bay Area School

In designing our community engagement method described above, the research team were aware that a particular subset of the community, youth, would not be easy to engage through such a process (Hipkins et al. 2002). The project team embarked on another case study, working with proactive local school teachers to engage school students in coastal adaptation to climate change issues. One of the 'tools' developed for the Whitianga case study above, namely the maps illustrating potential climate change impacts, were used in this process. However, the same two-stage process designed and trialled for engaging the more general community was not used in this case study.

Mercury Bay Area School (MBAS) in Whitianga is an age-integrated school, consisting of classes from Year 1 to Year 13 (i.e. from age 5 through to school leaving). The current total roll is 779 students with approximately 495 students in the Years 7-13 section of the school (www.mbas.ac.nz). It is a decile 6 school, and is New Zealand's largest Area School.

The CACC project work with MBAS is described in Hume et al. (2011; available at www.niwa.co.nz/our-science/coasts/research-projects/all/coastal-adaption-to-climate-change) and summarised briefly below.

The CACC project team identified MBAS as an important part of its work to engage with the Whitianga community. School pupils are likely to experience the effects of climate-induced changes to their coast in their lifetimes, and it is likely that in the future these same students would be involved in making decisions about how the Whitianga community might respond and adapt to these coastal changes. Thus the school was invited to collaborate with the team to help the Whitianga community begin thinking about how to address these issues.

The project team worked with Paul Scott (joint head of the Science Department) and some of his fellow teachers to develop a cross-curriculum unit which meets New Zealand Curriculum requirements for 'links between learning areas' as well as helping MBAS staff to explore a

project based pedagogical approach called 'Understanding by Design' (Wiggins & McTighe 2004). The real world context of coastal adaptation to change, the opportunity to work with other teachers across the school curriculum, tailored design of class experiments and local field exercises, and access to the collective expertise of the CACC team made this collaboration a success.

The unit was taught to a mixed ability Year 10 class for a 7-week period during Term 3, averaging 14 hours per week spread over Science, Mathematics, English and Social Studies timetabled classes (approximately 100 hours in total). Details of the teaching and learning sequence and students' learning activities can be found on the school website at www.mbas.ac.nz.



Figure 6.2: MBAS students display their coastal model at the Enviro Showcase at the conclusion of the learning unit.

Two quotes from project members, reported in Hume et al. (2011), are worth listing in their entirety to show the key case study outcomes.

Paul (science) summed up the learning experience for students as follows:

“What I would like to see from now on is that when our young people walk along the beach they see the world through different eyes. I don't know that this has been 'transformative learning' as such. The students didn't hold any strong views or have a very conscious frame of reference at the beginning of this unit. I don't think we have

deconstructed any previous knowledge or understanding, rather we have built knowledge and understanding. But what we have attempted to do with the learning tasks that we have provided is to take them step by step on a journey in which they have come to an understanding of the complex process involved if communities are to actively adapt to change. I think that our students have developed an understanding and are more likely to have the confidence to enter the coastal adaptation debate. I feel we have been able to grow advocates for the environment; it's not the erosion that is the 'problem' it's human development! We have unwittingly developed houses and roads in a natural environment that is constantly changing."

The CACC team impressions of the benefits of the collaboration are best summed up in the words of Dr Terry Hume (NIWA):

"It was a very rewarding experience for the project team to observe the way the teachers met the challenge of distilling complex scientific concepts of coastal processes and climate change into information the pupils could understand and relate to. Cross-curricular learning is a very logical learning methodology for students who one day will need to address environmental issues which are best addressed through an interdisciplinary approach. A personal highlight for me was seeing MBAS students at the NZ Coastal Society Conference in Whitianga proudly showing off their powerpoint presentations and models of the Whitianga beach front prepared as part of their course work to members of the science, planning and engineering fraternity."

6.4 Manaia

Our 3rd case study involved an iwi community, Ngaiti Whanaunga, at Manaia. Our work with the Manaia community is described in King et al. (in prep 2011). The overall outcomes of the Manaia case study, while not reported here, contributed to our approach described in section 7.

6.5 A note on upscaling

The next step in this report is to distill the good practice methodologies from the community scale projects we have carried out with the Whitianga community, the Mercury Bay Area School (and the Ngati Whanaunga iwi in Manaia reported in King et al. in prep 2011), and extrapolate or upscale these findings, in parallel with examples of good practice reported from overseas (section 5), to regional and national applications in New Zealand coastal communities. In other words, we draw from the legs of our stool to develop a conceptual approach which is more widely applicable in New Zealand.

A common theme for community research is to concentrate on vulnerable communities (or hotspots) or working with particularly motivated communities (van Aalst et al. 2008). While these are valid approaches, the end result may not necessarily have more broadly applicable findings for a region as a whole. In order to address this issue, a recommended approach is to select communities to work with who are representative of a geographical area, or socio-

economic group or lifestyle, that is common to the region, so that findings will be applicable to other similar communities.

In terms of our Whitianga community work, this community has existing coastal hazard issues which makes it a hotspot, and as a result has a community well engaged with coastal management issues. However, we consider that there were a number of values expressed at the Open Day which are consistent with those found in coastal communities elsewhere in New Zealand. In our opinion the trade-offs and tensions around potential adaptation options are likely to be similar to other New Zealand coastal communities.

We also note that, in New Zealand, the reality for most councils is that resources will only stretch to undertaking participatory engagement processes (over and above legislative requirements for consultation) in communities with particular vulnerabilities or hazard 'hotspots'. For these reasons we are comfortable that the case studies undertaken as a part of the CACC project are able to be used to draw conclusions for suggested good practice in engaging coastal communities in discussions regarding adaptation to climate change, and this is what this report moves on to do.

7 Suggested good practice approach for engaging communities – *Making it Work*

7.1 Key success factors

Looking back on our case studies outlined in section 6 above, and the practical method trialled in Whitianga in particular, we have analysed the different processes used and chosen four factors which we think were key to the success of our work. These are summarised in Figure 7.1.

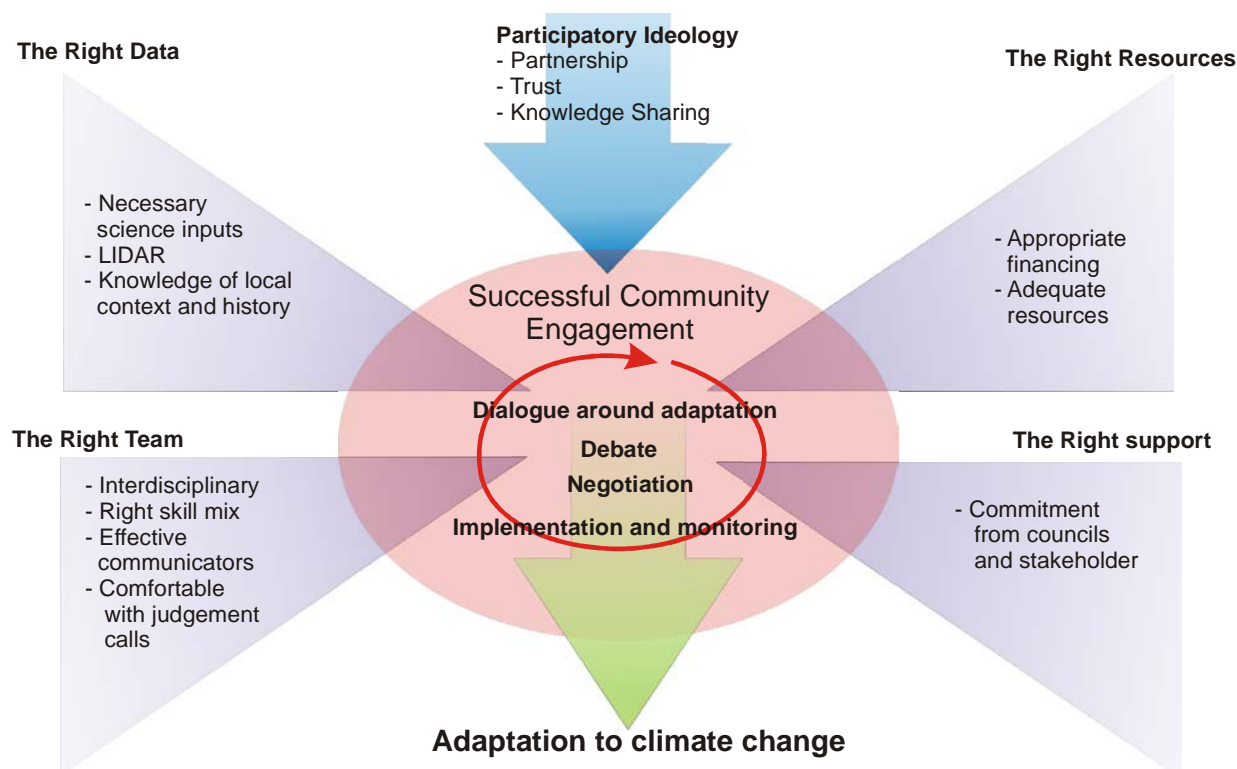


Figure 8.1 Engaging communities: Making it Work

Our conceptual approach has participatory ideology as its foundation, developing a partnership between the community and council and other participants, building trust and enabling the sharing of knowledge.

The *Making it Work* approach then requires four inputs.

7.1.1 The right team

A key step is to establish an interdisciplinary team who are able to provide the necessary expertise in terms of physical and ecological science and small group management techniques (i.e., social science). A certain level of expertise and skill within the project team is required to create the climate change projection maps, engage with participants and answer climate change related questions in a manner understandable to the public.

Scientists will need to be comfortable explaining concepts to the public and using their own judgement and opinion (and to speculate) in order to answer questions. Team members need knowledge about local coastal issues, as well as a broader understanding of potential community issues and politics. A mix of researchers, practitioners and council staff in the project team provides a good mix of theory and pragmatism with which to approach the community.

7.1.2 The right data

Two subsets of data are important, firstly scientific data and secondly knowledge of the community.

Access to the 'science' information required to construct the impact maps is essential for this approach (see section 6). LiDAR⁹ data are very important for underpinning the projections of potential impacts of climate change on coastal communities, and allowing these to be accurately and clearly mapped. While LiDAR is lacking in many coastal areas today it is becoming increasingly available, and so we make the assumption that these data will be available for this purpose in future. However, the approach that we suggest here for engagement is possible without LiDAR. Complementary to LiDAR topographic data is the use of high-definition satellite (e.g., Quickbird) or aerial photographic images to drape the climate-change shape files over. This enables members of the public to readily recognise their own properties and other areas or facilities they value. Credible projections of sea-level rise are also essential, and in this context are provided via MfE guidance (2008a).

In addition to these data, it will help if the team can draw on documents and advice which provide additional context for the engagements. Access to information (past and present) relevant to local coastal erosion/inundation and community planning issues, and a more general knowledge of the local area, are also important data inputs.

Both types of data also need to be presented in the right way – which of course requires the right team of people.

7.1.3 The right support

The commitment of the local councils to the process is a key element to success. The people from the councils bring the 'right' local contacts, and existing relationships which will help the process get off to a good start. If they are not fully supportive then no partnership will be established between researchers, the council and the community. As a consequence the step between exploring the adaptation alternatives and considering future implementation cannot occur.

7.1.4 The right resources

It is obvious but still worth stating that access to the necessary resources (\$ and staff availability) and time to organise and run the 2-step process is a pre-requisite for duplicating our community engagement approach. In addition, further resources will be required to run further sessions with key stakeholders and decision-makers to move beyond the dialogue and debate into negotiation, in order to prioritise certain areas or issues that require adaptive

⁹ LiDAR = Light Detection And Ranging (essentially a laser system on board an aircraft used to accurately map ground topography)

management. Securing funding from external sources, such as Envirolink¹⁰ advice grants for eligible councils, may be one way of helping fund such exercises.

With these four inputs, a successful community engagement process is possible. That engagement allows for dialogue, debate and negotiation between partners to develop possible adaptation options. Subsequent decisions can thus be made, allowing adaptation options to be implemented and monitored. This monitoring is vital to allow for subsequent adjustment of adaptation approaches, to ensure the most robust outcomes for the community and ultimately resulting in coastal communities that are more resilient to climate change.

7.2 Limitations of the method and approach

In terms of the practical method, at Whitianga we faced the same issues of low levels of participation as many other community engagement projects worldwide. As a result, only people with time and interest came to participate, so a large percentage of the Whitianga community is not any more aware of coastal climate change issues. However, if the Open Day design was modified into a more 'mobile' approach there is potential to increase local engagement and awareness. The Workshop aspect of the method presents a greater challenge for including a wider number of participants. Time is required in order to fully dialogue and debate adaptation to climate change. In addition, the Open Day and Workshop processes can only manage a certain number of people at any given time. More participants would require more resources in terms of personnel and time.

One of the key limitations of the conceptual approach as tested in our case studies is that it facilitates the initial steps towards community and council dialogue and debate around adaptation to climate change, but does not take the additional steps required to move through debate towards negotiation of a final outcome or response. Our approach will form one of the first steps in raising awareness of climate change impacts on the community and begin the discussion over what could be done. Many further face to face meetings would be necessary in order to formulate actual plans, and resolve conflicts. Nevertheless, the *Making it Work* approach has illustrated a considerable potential as it sets up a partnership between scientists, council staff and the community to begin to address future issues. Building trust and respect is a fundamental step of engagement processes. Another challenge to be managed in such an ongoing process is the potential for 'new' people to arrive part way through the discussions, who have not been part of the dialogue and debate stages.

7.3 Relationship to *Pathways to Change*

Our CACC project has produced a guidance document, *Pathways to Change*, which offers a four step framework to help councils work out how to build adaptation to coastal climate change into their mandatory plans and policies and implement them (section 2). This report and the *Making it Work* approach help in particular at steps 1 (Awareness and acceptance) and 3 (Planning a way forward) of the *Pathways to Change* framework. Much of the theory

¹⁰ <http://www.envirolink.govt.nz/>

and the case studies discussed in this report form useful background for the *Pathways to Change* guidance, so readers are recommended to read both documents.

8 Recommendations for further work

The conceptual approach we have described in this report facilitates the initial steps towards community and council dialogue and debate around local adaptation to climate change. Additional steps will be required to move through the debate stage towards negotiation of a workable outcome or response. Our practical method, based around large high-definition maps illustrating projected impacts of climate change, could very simply be extended to form the basis for the further debate and negotiation. This is principally because the use of maps appears to keep the discussion grounded in reality, promotes the discussion of pragmatic alternatives and clearly (and visually) illustrates the trade-off between various potential adaptation options. A major challenge would be embedding the maps in a process which engages all the relevant stakeholders in a forum where (all) participants work with the local management authorities to generate consensual responses to the projected impacts of climate change. Other researchers have trialled various methods that have been designed to do precisely this, and so further development would involve an evaluation of these methods and testing a suitable alternative. One such case study is the Delta community at the Fraser River mouth in British Columbia (Shaw et al. 2009), where landscape architecture skills have been utilised to provide realistic 3D imagery of a range of adaptation options to debate and work through to a preferred approach with the community.

In developing our approach further, to allow for engagement through into debate and negotiation of adaptation options, more work could be undertaken to provide 'how-to' guidance to help councils through the three steps of dialogue, debate and negotiation with communities. For example, topics may include: how to explore trade-offs; the reality or otherwise of seeking 'win-win' outcomes; building 'low regrets' approaches into business-as-usual planning; and community revitalization projects.

A key input in such conversations will be an understanding of the economic information required to help weigh the pros and cons of adaptation options. This could involve further work to improve the cost-benefit analysis of adaptation options, or perhaps looking at the application of multi-criteria analysis processes for weighing options. In addition work may be required to bring concepts such as valuations of ecosystem services, amenity and landscape values, existence values, or public access vs private property rights, into the community participatory process.

These discussions would also require further consideration of managed retreat as an adaptation option. Work could be undertaken to explore the thresholds or tipping points beyond which the movement of a community or parts of a community away from the coast is required, along with outlining realistic mechanisms for achieving such movements.

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