coastal Collaboration Cluster





Understanding barriers to the uptake of science

The roles of science and other institutional structures in decision-making and negotiation processeshave changed since the 1970s with increasing requirements for environmental assessment and environmental outcomes and the move away from highly centralised government to broader governance. At the same time, the capacities, complexities and areas of specialisation of science have increased greatly as have requirements for environmental assessment and environmental outcomes. Part of this changing context has been increasing contestation of science in resource and environmental contexts where decision making requires synthesis of biophysical and socio-economic knowledge. While scientific institutions, including CSIRO and universities have the role of trusted expert advisor built substantially on a foundation of biophysical science expertise there is an expectation of clearer communication and engagement with the social sciences and a broader range of stakeholders within systems of governance.

The barriers to the application of science reflect changing institutional expectations of science. The challenge in an increasingly informed world is to address the credibility and salience of science. The theme 5 survey and discussion with local government, State and Commonwealth government employees, community advisory and volunteer groups, researchers and industry indicated issues in client-science engagement:

Clarity about data needs

Limited in-house capacity and inadequate engagement between researchers and information users were key issues identified in the survey and follow up interviews. Typically two areas are needed in the application of science for planning.

The first is for desk study and analysis of existing data and peer reviewed literature to establish baseline understanding of the current situation and outlook with no change to management.

The second is for best available information and local data to fill gaps in understanding within available and often limited, time and resources, in order to better understand the constraints and opportunities for development of new management policy. Where it is not possible to conduct substantial local studies scientific inputs may be constrained to critical analysis of published research, information and data from comparable situations with limited new data to relate these to the local situation.

Conceptual and contractual clarity between client and science provider from the start of a task and through ongoing discussions are important for defining realistically achievable data needs and addressing contingency modifications. This should assist in the final product addressing the defined need as well as possible changes/adaptations within the constraints of the program.

Scale

Spatial scale is a particularly important consideration in problem structure for coastal management. Small areas, specific sites or areas of primary value for competing uses by more than one individual or group will often present un- or poorly structured problems.

Larger areas may enable differential allocation of such uses to subunits of the area. Thus their management may be addressed as moderately, or poorly structured problems resolvable by least-worst solutions where stakeholders accept a solution package as reasonable which does not necessarily deliver the preferred outcome for each stakeholder. However this does not preclude significant public and political debate in arriving at such a solution.

Differential allocation of use in time including periodic access or closure for particular uses or phasing in of changes to usage may similarly enable acceptable solutions to address strategic objectives in coastal zone management.

The CSIRO Flagship Collaboration Fund facilitates involvement of the wider Australian research community in addressing the nation's most significant challenges and opportunities. Flagship Clusters are three-year partnerships between Flagships, universities and other public research agencies.

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Temporal scale is similarly important. The underlying processes of biophysical and socio-economic change in coastal areas are medium to long term in relation to the short time horizon of most financial or political/electoral decision cycles and catastrophe response strategies.

The timescale challenge for a problem to move from an unstructured, through poorly to moderately structured, and thus enable major strategic responses may be seen in response to climate change. The term “shifting baselines” is often used in discussing perception of the nature and implications of gradual environmental change. For each generation the baseline is the condition at the time of their early experience. In that context, the gradual change of sea-level rise can present as a poorly structured problem for strategic policy response.

In the context of the expected effects of climate change, the immediate and short-term coastal management decision driver is most likely the preparation for an emergency response to, and post event recovery from severe weather events. The intermediate medium-term strategic decision driver is preparation for expected increases in frequency and intensity of such events, while the long-term decision driver is the expected rise in mean sea level by the middle / end of the century.

Information sharing and understanding the applicability of the science

In coastal zone planning and management the data, information and knowledge developed through biophysical science interact with cultural, social and economic values, attitudes and traditional knowledge. Information derived from complex analyses may be shared through publication or internet systems but understanding the various forms of knowledge and how biophysical scientific knowledge interacts with socio-economic and community knowledge generally requires engagement, explanation and the development of trust within boundary organisations.

Uncertainty, risk and standards of proof

The challenges of science application in coastal zone management arise in part from difficulties in communicating the concepts of statistical confidence, addressing uncertainty in research design, and degrees of risk in relation to false positive (type 1) and false negative (type 2) errors associated with projected impacts and consequent design of strategic responses to climate change and coastal areas.