



## Overcoming barriers to climate adaptation at the local scale in Ireland using Fuzzy Cognitive Mapping

Stefan Gray (1), Barry O'Dwyer (1), Steven Gray (2), Anthony Patterson (1), Cathal O'Mahony (1), and Jeremy Gault (1)

(1) Coastal and Marine Research Centre, Environmental Research Institute, University College Cork, Ireland, (2) Department of Natural Resources and Environmental Management, University of Hawai'i at Manoa, USA

One of the principal barriers to the initiation of climate adaptation at the local scale is determining how adaptation problems should be framed. Arriving at a shared conception among local decision makers and stakeholders regarding i) how climate change will impact the system in question, and ii) how climate impacts should best be adapted to is therefore essential. In the absence of some form of compromise being brokered over these fundamental questions, evidence to date suggests that the process is likely to stall at its outset.

Fuzzy Cognitive Mapping (FCM) links nodes in a cognitive network with weighted edge relationships to create semi-quantitative soft-systems models of a given issue or problem space. Employing FCM in an adaptation context therefore allows the framing of climate problems among key decision makers and stakeholders to be made explicit. In support of research into adaptation to climate change on the coast of Ireland, key individual actors in adaptation at the local scale have built FCMs of the coastal adaptation problem space as they perceive it. These FCMs provide evidence of their 'mental modelling' of the issues at hand, allowing understandings to be readily communicable both among the diverse local actors who must come to an agreed view as to how to proceed, and to information providers at higher scales seeking to monitor coastal system response to climatic stimuli and respond to any information deficits presented. Further, by aggregating these individual FCMs to create a shared view of the system in a facilitated workshop setting, considerable success has been achieved in Ireland in reaching consensus among local stakeholders with respect to how the impacts of climate change will be experienced locally.

In order to subsequently negotiate an agreement among local scale stakeholders regarding appropriate adaptation responses to the impacts of climate change, a further strength of semi-quantitative analysis offered by FCM has drawn on in Ireland. Using simple matrix algebra, scenarios of change are readily simulated within the shared system model arrived at by stakeholders. This facility of FCM allows adaptive interventions to be evaluated in a thought provoking and engaging way, with the deliberative space presented by the jointly arrived at model providing a neutral platform for conflict resolution, and for scientific climate information to be coherently integrated with locally generated tacit knowledge.