Climate Change Adaptation Research Grants Program
- Settlements and Infrastructure Projects

Project title:
Past, Present and Future Landscapes: Understanding Alternative Futures for Climate Change Adaptation of Coastal Settlements and Communities.

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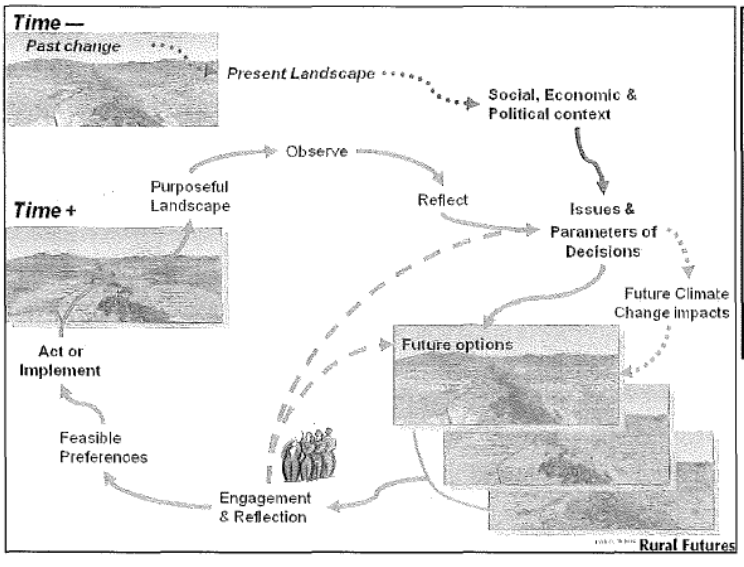
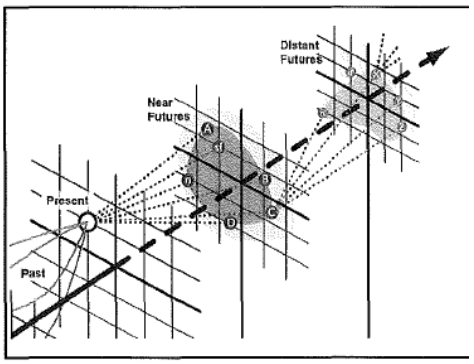
Lead organisation: University of New England

Objectives:
1. What are the objectives?

a) Develop spatial analysis and visualisation tools to examine future trends of settlement and social patterns.
b) Provide a clear quantitative understanding of current settlement trends and their future trajectories (the future landscape pattern they will produce and their climate change vulnerability at that time in the future).
c) Design and test several alternative landscape futures as adaptive strategies reducing vulnerability of settlements and communities to predicted climate change events (priority 5.2).
d) By application to a case study area (northern coastal NSW; priority 3.1) demonstrate application and transferability to other contexts and landscapes / regions (priority 1.2); and, demonstrate integration and synthesis capabilities of techniques (priority 5.3).
e) Develop and demonstrate one solution to a current gap and difficulty of temporal inconsistency in climate change vulnerability studies.
f) Contribute to national and regional policy and planning decisions through multiple NCCARF S&I priorities and, in particular, provide an integrated synthesis approach to better guide planning and policy decisions for adaptive actions now that provide for future resilience.

Project design and methods:
As social-ecological systems are closely entwined in their change and evolution that create positive and negative externalities and changed conditions over time (e.g., settlement patterns and other land uses), this project will contribute methodological and technique advances and transferable applications towards "Designing Climate Proof Landscape Changes" (Opdam et a1. 2009: 718). ill application, our team is working on understanding and evaluating how different designs of settlement and other land-use pattern changes (because of 'domino' effects) might create future landscapes that are adapted and resilient to future climate change event impacts.

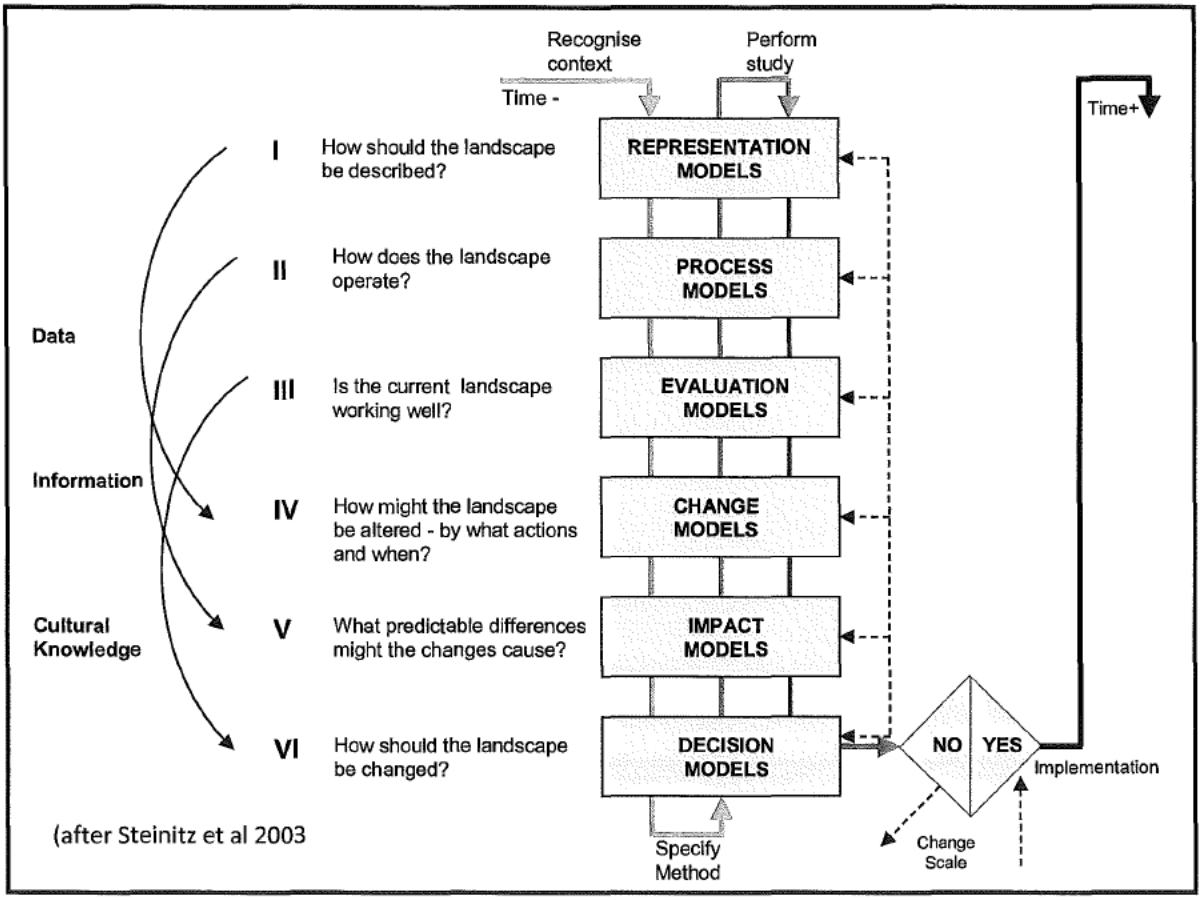




Understanding the dynamics future change of landscape patterns together with climate change (above after Steinitz et al. 2003, Shearer et al. 2006; LHS adapted from Brunckhorst 2002)

The project builds on methods of mapping past and current land use trends, to predict the future trajectory of settlement patterns (Brunckhorst et a1. 2009). The spatial patterns of likely future settlements and other landscape elements will be analysed to quantify areas of land use affected by climate change impacts (e.g., SLR+flood, storm surge). Alternative landscape futures scenarios will be designed and analysed to provide a quantifiable understanding of adaptation towards more resilient landscape futures to avoid or minimise future climate event impacts. Development and demonstration will occur through iterative application on a coastal NSW Northern Rivers case study. While the Scope of the project is large, the Institute's interdisciplinary team has considerable experience with similar projects (e.g., previous ALF projects; Hunter Coast NCCCVA project; community/social sensitivity and adaptation projects for MDBA; NWC MDB socio-economic impact study; NSW 'Eco-Civic' regionalisation).

The methodology has been considerably adapted from Steinitz et a1. 2003; Shearer et a1. 2006 and Hulse et al 2000. Regional context and project framing marks the beginning of an iterative methodology to understand interacting settlement and land-use changes and issues that will inevitably arise in the future (Figure below). The framework identifies several different questions. The procedural path initially starts from the top (Figure boxes) passing down through each series of questions required of each theory driven model. This 'first pass' specifies the context, content and scope and defines specific questions (within each of six major questions) specific to the context of the study area.



However to increase robustness and transferability our approach in this project will include an examination of past change and trends that contribute to future likely trajectories this will contribute explicit understanding of what kind of landscape recent population change and settlement patterns are taking us towards. Landscape futures designs are analysed to distil the most plausible, practical and 'sustainable' and 'climate resilient' alternative/so.

The framework with these questions contributes to the stakeholder feedback process and analytical methodology. After recognising and describing the context and scope of purposeful landscape change, we need a means of deciding on whether to, or what to, change and a way to compare alternatives or evaluate the changes that would be imposed on the present landscape by the future landscape scenario/so Therefore the procedure iteratively goes back through the steps to model and assess change on the regional landscape - an adaptive methodology to provide knowledge for futures with adaptive capacity.