Visualisation methods for linking scientific and local knowledge of climate change impacts

Scott N. Lieske, Kari Martin, Ben Grant and Claudia Baldwin

Australian Climate Change Adaptation Research Network for Settlements & Infrastructure
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11:00 – 11:20 16 Feb 2016
Visualisation methods for linking scientific and local knowledge of climate change impacts

Today’s ~20 minute agenda

I. Intro: The physical science of climate change in Southeast Queensland

II. Background – need and potential

III. Research Question

IV. Study Area

V. Methods, both workshops and visual methods

VI. Results and Discussion
IPCC Fifth Assessment: sea level rise will continue. Higher emissions + warmer temperature will result in ice sheet melting and sea level rise in meters.

SEQ was identified as a climate change ‘hotpot’ in the IPCC Fourth Assessment; Highlights risks specifically referring to “high value canal estates.”

Projections for the Sunshine Coast region include temp increases up to 6.5°C, sea level rise of 0.8 - 1.1 meters, an increase in the number of severe storms.
Background: The Current State of Adaptation

- Local governments in SEQ are not effectively planning for climate impacts (Baker et al. 2012).
- Councils overwhelmed by CC info and don’t know how to effectively engage with locals on the issue (Balston et al. 2012).
- There is a “... gaping hole ...” (Sheppard 2012 p. 50) between the scientific literature and local climate knowledge.

- There is a clear role for geographic visualization in generating a societal response to top down inaction on CC (Sheppard 2012, Burch et al. 2009, 2010).
- The idea is to make ... climate change visible where we care the most, in our local communities.
Research Question

What participatory and visual methods are most effective for an exchange of scientific and local knowledge at the local scale?

The innovation: Moving from potential to multiple participatory methods
Study Area: Twin Waters Canal Estate

Vulnerable to CC ✓ Present and Future Climate info ✓ Resident’s Association ✓
Methods

Test multiple visual methods within a participatory process – two workshops

Workshop I

Goal: Establish baseline impacts of climate change for the study area

1. Present council’s current and year and 2100 flood maps,
2. Participatory mapping of vulnerable areas,
3. Introduce Photovoice
Workshop II
Goal: *Sharing and Discussion*

1. Photovoice sharing and discussion,

2. Display 3D scenes of climate scenarios,

3. Discussion on adaptation and mitigation methods (throughout),

4. Assessment via post-workshop survey
Two Climate Scenarios

(1) Current climate 100 year flood event

(2) Year 2100 Climate 100 year flood event* incorporating projected impacts from climate change: an 800mm increase in mean sea-level, a 20% increase in rainfall intensity.

Both scenarios take into account riverine flooding, storm surge and tides.

*Based on IPCC 2007 4th Assessment Report (AR4) A1FI projections
Participatory Method 1: Local Government Flood Risk Maps

Presented with an explanation of Predicted climate changes

Confusing

Inaccurate

Yet, ultimately relatable

Participants raised concern about property values and Insurance premiums
Participatory Method 4: Geographic Visualization

- **Source/Create Terrain**
  - Digital Elevation Model (DEM)
  - Digital Surface Model (DSM)

- **Texture Terrain**
  - Aerial imagery draped over DEM to texture terrain
  - Flood polygon overlaying terrain to represent flood height

- **Create Scene Detail**
  - Extruded building footprints sitting on terrain and flood polygon layer representing flood height
  - Further scene detail on focused section of study area
  - Create flood polygon layer & drape over flood elevation layer
3D Results
Bird’s eye

Council: scenes accurately reflect flood data

Current: virtually no Property impacted by flooding

Future: 685 / 750 Properties at risk
3D Results closer in

Relief, no houses inundated in current climate

Future: Far way, less of a problem

Presentation of scenarios and ability to focus beneficial

Like walk-through perspective
3D Results Slabs

Generated interest, own properties,

Emergency evacuation Routes

Current Climate

Year 2100
Current information is difficult to understand.

Residents, what they’ve seen is shown in the 3D scenes.

Qld Gov’t, SCC and developers are not engaging the community about risks associated with CC.

People stayed away due to fear about insurance and property values.

Should be done for all low lying areas on the Sunshine Coast.
What participatory and visual methods are most effective for an exchange of scientific and local knowledge at the local scale?

The combination of participatory methods worked well.

Of those methods, interactive 3D scenes were the most effectively for conveying climate information.
Future Directions:

Scaling up the participatory process

Additional local gov’ts:
Brisbane City
Morton Bay Regional
Mackay Regional

Improved Visuals
Questions / Comments?


For more information:
Scott N. Lieske
s.lieske@unsw.edu.au