Tools to bridge the gap between climate science and adaptation:
The SimCLIM integrated modelling system

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Presented at
Climate Change Impacts on Water: An International Adaptation Forum,
January 27-29, 2010
Washington DC, USA.
PART 1:

Filling the research gap: the example of the SimCLIM integrated modelling system
SimCLIM

The integrated modelling system for assessing impacts and adaptation to climatic variability and change

www.climsystems.com

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SimCLIM can be used to:

- Describe baseline climates
- Examine current climate variability and extremes
- Assess risks – present and future
- Investigate adaptation – present and future
- Create climate change scenarios (including GCM ensembles)
- Conduct sensitivity analyses
- Examine sectoral impacts (e.g. links to DHI hydrologic models)
- Examine uncertainties
- Facilitate integrated impact analyses
The SimCLIM System

- Scenario selections
- Spatial climatologies
- Time-series climate data
- Model parameter values

Global-Mean Temperature and Sea-Level Projections

Local Climate Means, variability, extremes

Sectoral Impact Models

Coast Agriculture Water Health

Effects

- GCM patterns
- Synthetic changes
- Land data
- Other spatial data

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Multi-scale, open-framework system
Spatial pattern, time-slice analysis
e.g. California Oct-April precipitation

Observed baseline

% change by 2070

20 GCM ensemble, A1B

Time-series projections, for sites

Site specific climate/sea level scenario

Select a GCM Pattern: Ensemble: 20 GCMs Calif
Global projection: SRES A1B

Longitude: -118.80
Latitude: 34.27
Normalised GCM Value (%/°C): -6.70

Climate variable:
- Precip
- Tmin
- Tmean
- Tmax

2070
Analyses of time-series data
Example: change in risk of extreme hot days

Produced using the SimCLIM model
PART 2:

Assessing the risks to domestic rainwater harvesting systems from climate variability and change in Queensland, Australia
SimCLIM Water Tank Model

Rain water tank model

Model inputs:

- Daily water consumption (liters): 550.0
- Water tank size (liters): 90000
- Water catchment area (m²): 290.0
- Initial water storage(%): 50.0
- Length of critical dry period (days): 2

Rainfall Change
- In percentage (%): 0.00
- In absolute amount (mm): 0.00

Model Output:

<table>
<thead>
<tr>
<th>Output</th>
<th>Weather date</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>The longest dry period (days)</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>The number of dry period larger than critical dry period</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Click on the table for graphing.

Run Model | GEV Tool | Cancel
SimCLIM Water Tank Model

**Initial model run**
Variable: Daily rainfall  
Station: Brisbane Aero  
Time-series: 1961-1990

**Subsequent runs**
Variable: Daily rainfall  
Station: 41 sites  
Time-series: 1961-1990
Scenario of climate change

Percent change in April-September rainfall in 2050

Based on an eight-GCM ensemble, AIB emission scenario and mid-range climate sensitivity
Spatial patterns of risk:
Frequency of empty tanks

Failure every:
- >5 yrs
- 2-5 yrs
- 1-2 yrs
- >1 yrs

On average

Current climate

2050
Assessing adaptation options to reduce the risks

<table>
<thead>
<tr>
<th>SITE: University of Queensland, Gatton</th>
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<tbody>
<tr>
<td>Without Adaptation</td>
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<tr>
<td>Without climate change</td>
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<tr>
<td>With climate change</td>
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<tr>
<td>With Adaptation and Climate Change</td>
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<tr>
<td>Additional tank storage</td>
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<tr>
<td>Reduce daily consumption</td>
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<tr>
<td>Add catchment area</td>
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<td>Raise critical threshold level</td>
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CONCLUSIONS

- Research need: closing the gap between high-level climate science and on-the-ground adaptation
- In particular, there is a lack of user-friendly and user-accessible models and tools for bridging the gap
- Adaptation options to reduce the risks from climate variability and change can be assessed through simulation using integrated model systems like SimCLIM
Thank you.....