



# Uncertainty in decision making processes: Challenges and Opportunities in Water and Climate Change

'Too Much, too little: The role of water in adaptation' Conference, Lisboa, Portugal, 7-9 October 2013



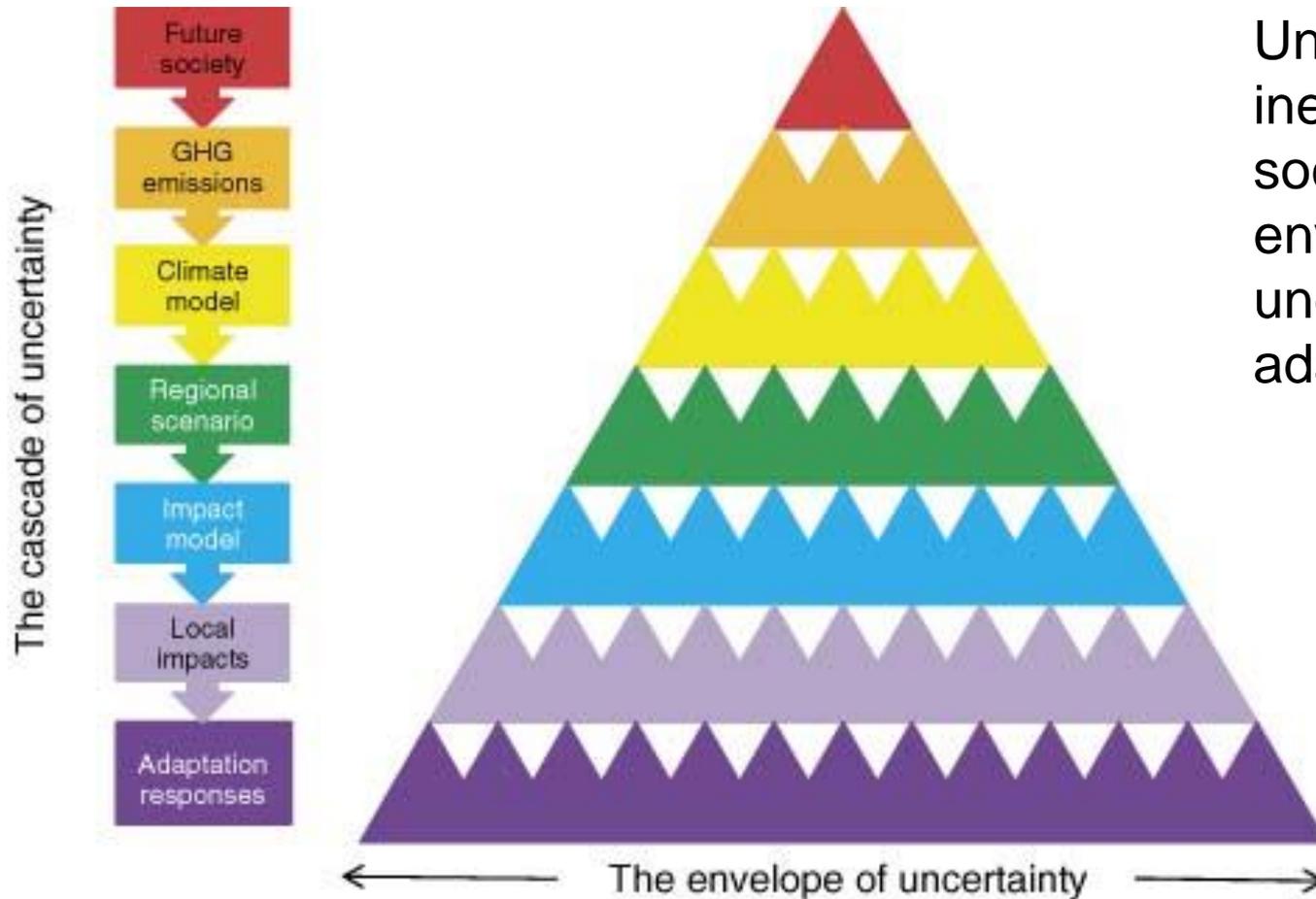
# Some key questions...

- Why are uncertainties a challenge for adaptation decision-makers?
  - What does uncertainty mean?
  - Why does it matter?
- How can we respond to uncertainty?
  - Some options
- How can we accommodate uncertainty?
  - Example from the water sector in UK

# What do we mean by uncertainty?

*“Uncertainty describes a condition where we lack certain knowledge that we think may be important to making a decision.”*  
Willows and Connell (2003)

# Uncertainty: the scale of the challenge



Uncertainty is inevitable – climate, social, economic and environmental uncertainties all shape adaptation responses

(Wilby & Dessai 2010)

# Uncertainty and adaptation decision-making

- Complex inter-relationships and assumptions underpin impacts and outcomes
  - e.g. future planning policy is a critical uncertainty in flood management
- Decisions with long-term implications must take account of longer-term climate change and significant uncertainty
  - e.g. Spatial planning implications for water management; long lifetime infrastructure.
- In many cases uncertainties are unreduceable - they must be included in decision-making processes
- *So how can we ever make good adaptation decisions?*

# Uncertainty is normal

- Uncertainties are inherent when considering the future
- Decisions and policies that address existing and future risks (and opportunities) are necessary and constantly taken
  - Population, economic growth or exchange rates are all uncertain – yet we still make decisions
- Climate change is an additional source of uncertainty (but it is not unique)
- Uncertainties in evidence are not a barrier to action
- Uncertainties do not diminish the need for action nor require a delay in action to some future time or generation

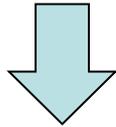


# We have a few options....

- Ignore uncertainties
  - Do nothing until we 'know for sure' (fear and paralysis)
  - Limit consideration of evidence to a 'known' or desired level of certainty
    - But 'wait and see' is a valid response if evidence-based
- Reduce uncertainties where possible
  - e.g. better understanding of climate systems
  - But as our knowledge grows we often 'create' more uncertainties (Trenberth 2010)
  - Some are 'unreducible'
- ***Acknowledge and accommodate uncertainties – improve decision making processes***

# Uncertainty in water management

- Traditional ‘predict-and-plan’ approaches don’t cope well with uncertainty



“Can’t we reduce this climate change uncertainty?”

*‘Too much attention has been focused on reducing, clarifying, and representing climatic uncertainty and too little attention has been directed to building capacity to accommodate uncertainty and change’ (Gober 2013)*

- But how do we ‘accommodate’ uncertainty?



# Developing Novel Approaches to Tracking Domestic Water Demand Under Uncertainty (Browne et al. 2013)

- **ARCC-Water** UK-based, 3 year project aiming to design robust water-supply systems in a changing climate
- **Problem:** Climate change, socio-demographic change and changing patterns of consumption = new pressures and uncertainties
- Demand management at household level viewed a robust, low regret adaptation option in the face of climatic change
  - **Conventional response:** Seek more precision in modelling the micro-components of demand then estimate demand patterns at the population level
- ARCC-Water took a different approach:
  - Examined the ways different branches of social science combine to to offer a model that helps explain current and future uncertainties

# Key findings (Browne et al. 2013)



- ‘There is too much water in water demand research!’
- Household water demand is distributed across a complex system of industrial systems, actors and social practices
- Need to understand the value of water, drivers of water demand, the value of the services that water enables for the domestic consumer
  - how people use water, what they do when they are using it, why they use it and when they use it?

# Key findings (Browne et al. 2013)

- Proxy measurements could act as ‘indicators of change’ that could then be used to inform research and policy strategies.
- Could help to reveal where the drivers of change for demand may lie (adaptation opportunities)

*A better understanding of uncertainties may be more effective than trying to eliminate uncertainties*

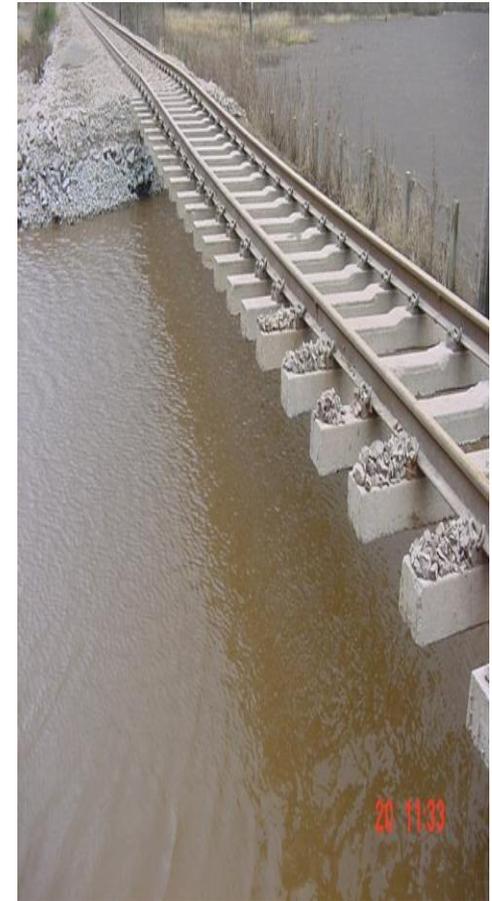
# Accommodating uncertainty

- Uncertainties need to be managed and effectively incorporated in decisions and policies
- Recognise that key uncertainties may concern lifestyle preferences, growth prospects, and public attitudes rather than climate science
- Key questions are often political, not scientific; they require participation from a very wide range of stakeholders
- Search for robust, flexible strategies that work well across a range of future climatic and socio-economic conditions (e.g. Thames Barrier)
- Focus on decisions that need to be made in the near future and consider the 'lifetime' of those decisions



# Accommodating uncertainty

- Consider those uncertainties that really matter i.e. those that are relevant to the decision.
  - Are there particular sensitivities or thresholds?
- Make use of existing techniques - the precautionary principle, real options, adaptive management, robust decision-making, etc
- Move from asking '*what is the most likely future?*' to '*what kind of future do we want and what decisions do we need to make to get there?*'



# ***Uncertainty is not an insurmountable obstacle to adaptation decision-making!***

Thank you for listening.



For more information on our work please visit [www.ukcip.org.uk](http://www.ukcip.org.uk)  
or email [patrick.pringle@ukcip.org.uk](mailto:patrick.pringle@ukcip.org.uk)



[www.ukcip.org.uk](http://www.ukcip.org.uk)

