

From Climate Science to Adaptation Decision-Making

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CLIMATE ADAPTATION FLAGSHIP
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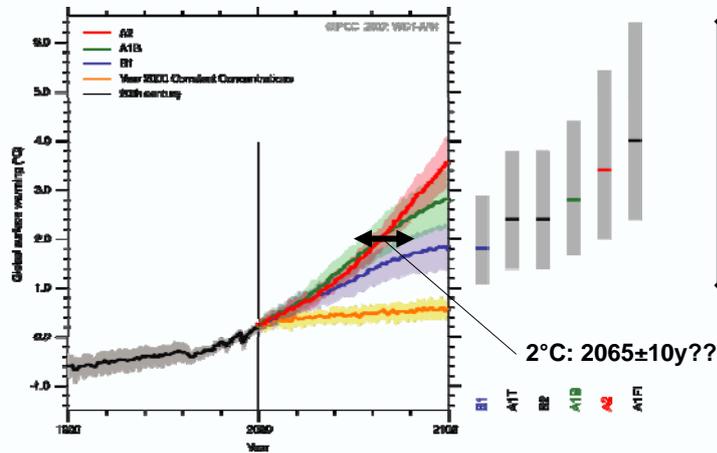
EIANZ Melbourne, 23rd October 2013



Adapt, Innovate, Advocate – Business as Usual is not an Option



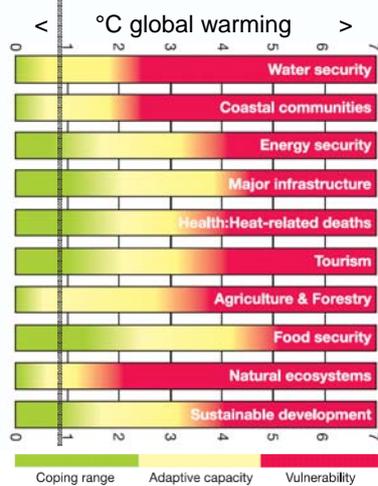
IPCC 2007: 1.1-6.4°C? – probably not any more



IPCC (2007) Summary for Policy Makers (Fig.SPM.5)



Australia: vulnerable among OECD nations



(a) Qualitatively different levels of impact, vulnerabilities and adaptation needs at 4°C compared to 2°C

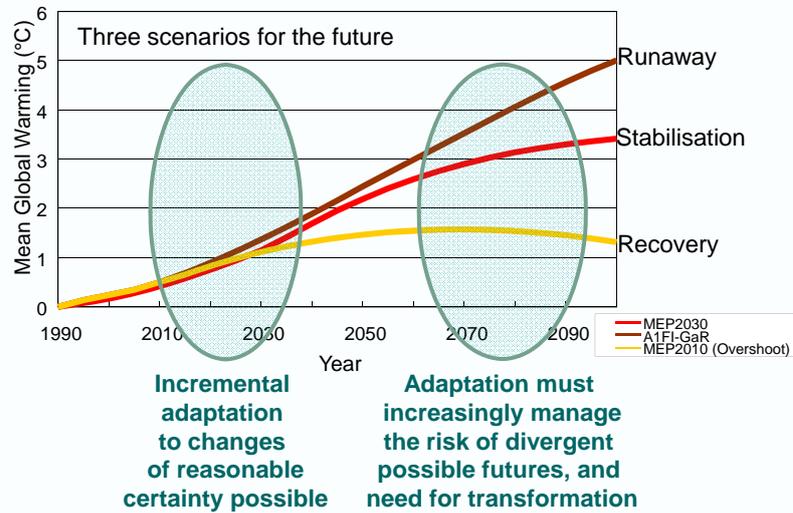
(b) Proactive adaptation needed to plan for stabilising at 2°C are very different to those needed for 2°C heading for 4°C+

Could be disempowering...

IPCC (2007) (Fig.11.4: Australia)



Managing the risk from diverging possible futures



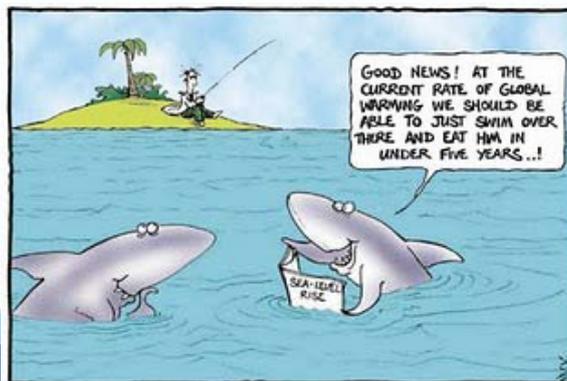
Stafford Smith et al 2011, Phil.Trans.Roy.Soc. 369



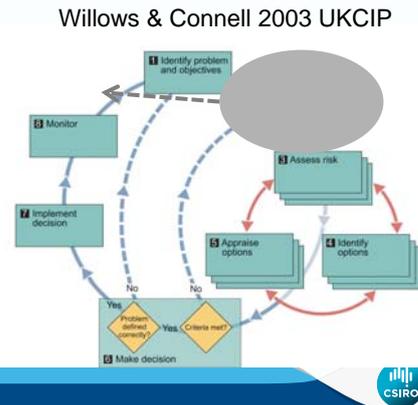
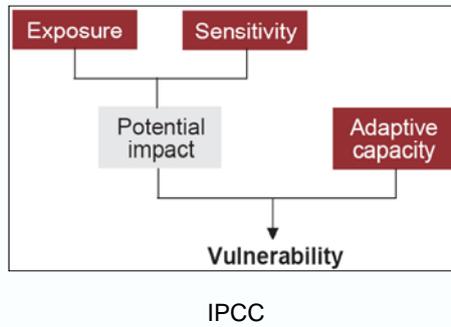
Working towards *adaptation planning*

It all seems disempoweringly complex...

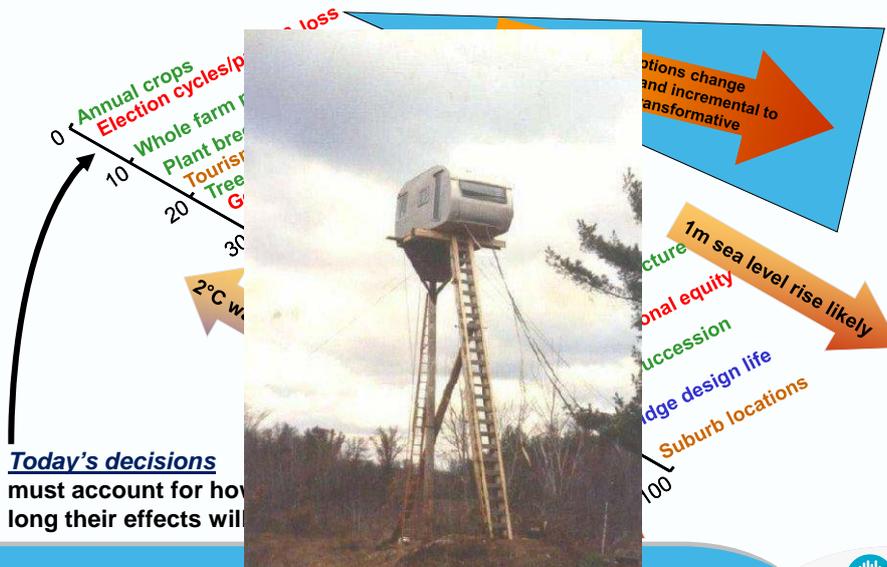
- Getting past impacts, vulnerability and adaptive capacity assessments, to adaptation decision pathways
 - Not all decisions are the same
 - Not all aspects of the future are equally uncertain
 - There *are* systematic approaches!



Problem or solution-centred??



Adaptation timing and priorities



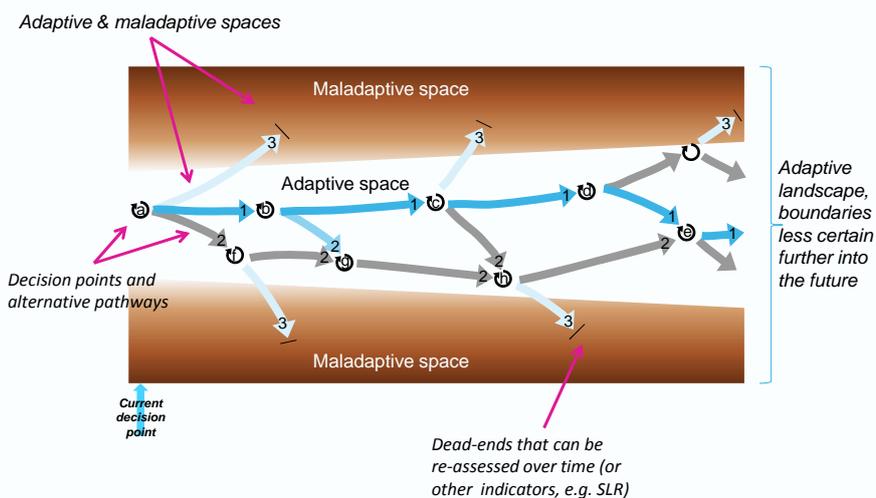
Systematising responses

1. Short lifetime decisions
 - Mainly adapt incrementally, watch out for thresholds
2. Long lifetime decisions (where risk often falls to government)
 1. Monotonic, ~certain to occur, timing unsure
 - E.g. 2°C, 1m sea level rise, more hot periods, more extremes, more CO2
 - Plan for these, look for no regrets actions, use precautionary principle
 2. Direction sure but extent unsure
 - E.g. drying SW Australia and reduced water flows, fire risk in many areas
 - Use risk management, 'soft adaptations' to delay expensive decisions (but prepare for these), 'real options' analysis
 3. Even direction of response unsure
 - Robust decision-making, risk hedging against alternative futures, etc
3. And plan adaptation pathways, with critical decision-points
 - May include no action options, but deliberately!

Stafford Smith et al, *PhilTransRoySoc* 2010



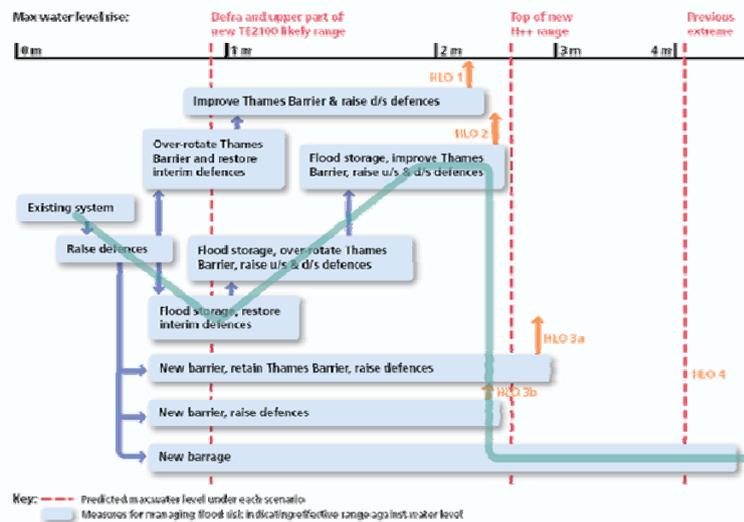
The 'classic' adaptation pathway concept



Wise et al., *GEC* forthcoming



Flexible decision pathways: Thames Estuary



Lowe et al, UK Met Office 2009



Systematising a *decision*-centred approach...

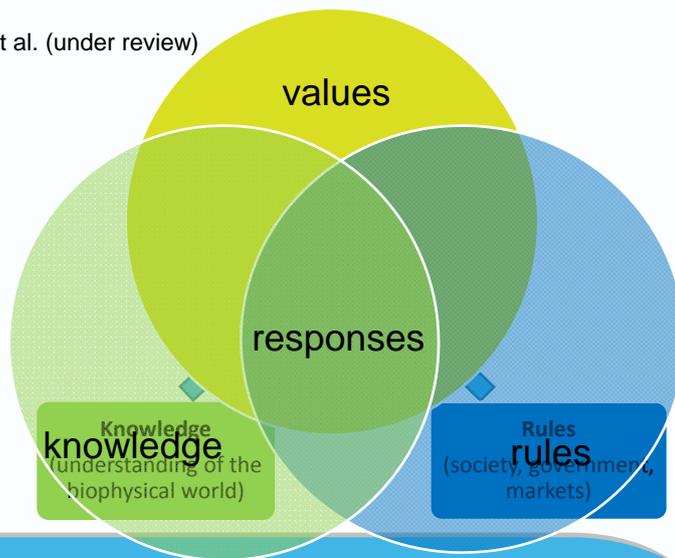
1. Not all decisions (& lifetimes) are equal
2. Not all threats are equal, nor equally uncertain
3. There are many approaches to managing risk
4. Adaptation will not be a once-off action >> adaptation pathways
5. Cycles of incremental and more transformative responses
 - *Evaluating whether adaptation is worthwhile...*



Getting attention....



Gorddard et al. (under review)



Adaptation Services | R Wise et al.



Assessing options, and related processes

1. Clear values and future risk profiles
 - Simple cost:benefits analyses, can be top-down study
2. Clear values but risk profiles uncertain
 - Real options with possible value of delay; can be fairly top-down
3. Values and risk profiles uncertain
 - Economic analysis flawed, need adaptive management/governance approaches, possibly MCAs; engagement processes essential
4. Values and risks uncertain, and institutions in contention
 - Analysis not yet possible, engagement and conflict resolution needed first

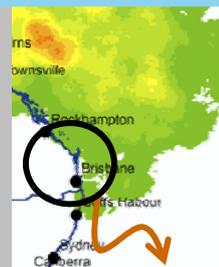
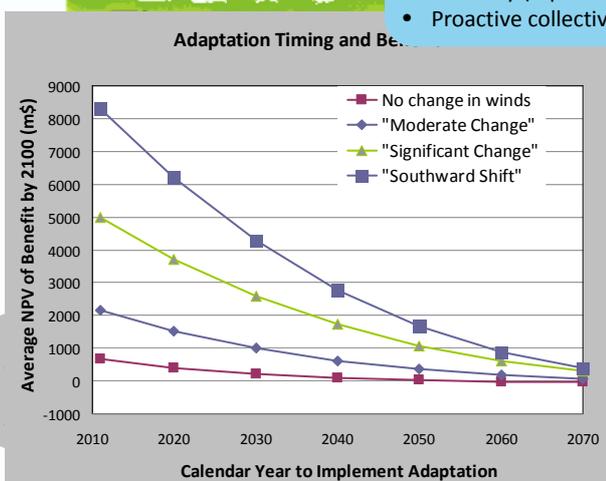
Russ Wise, Russell Gorddard, Tim Capon



Specific decisions: Area

Key attributes

- No regrets (value even if no climate change)
- Robust (value for all scenarios)
- Act early (rapid decline in value over time)
- Proactive collective action (else delay)



Vulnerable to extreme wind hazard, especially if cyclones move south

Stewart & Wang, *Climate Adaptation Flagship*, 2011



Queensland floods and cyclones 2010-11



Extreme events, value chains & productivity

Unexpected high-intensity rain and other weather affects transport, energy and mining infrastructure

Intensities expected to increase in many areas



Ensham Mine, Queensland, 2008
 • Production stopped for over a year
 • \$mil



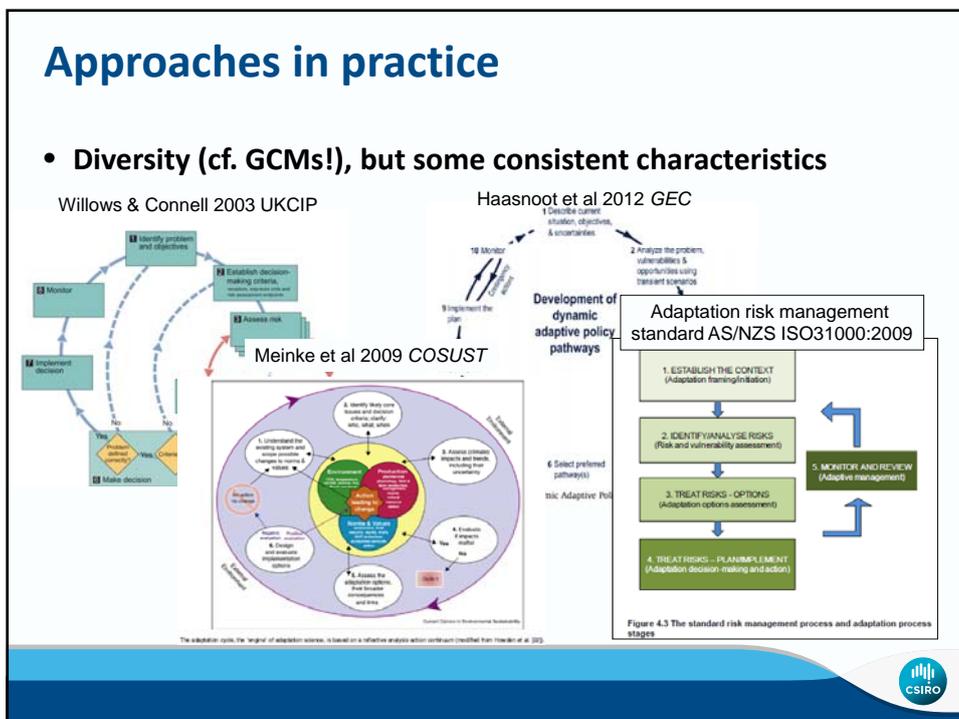
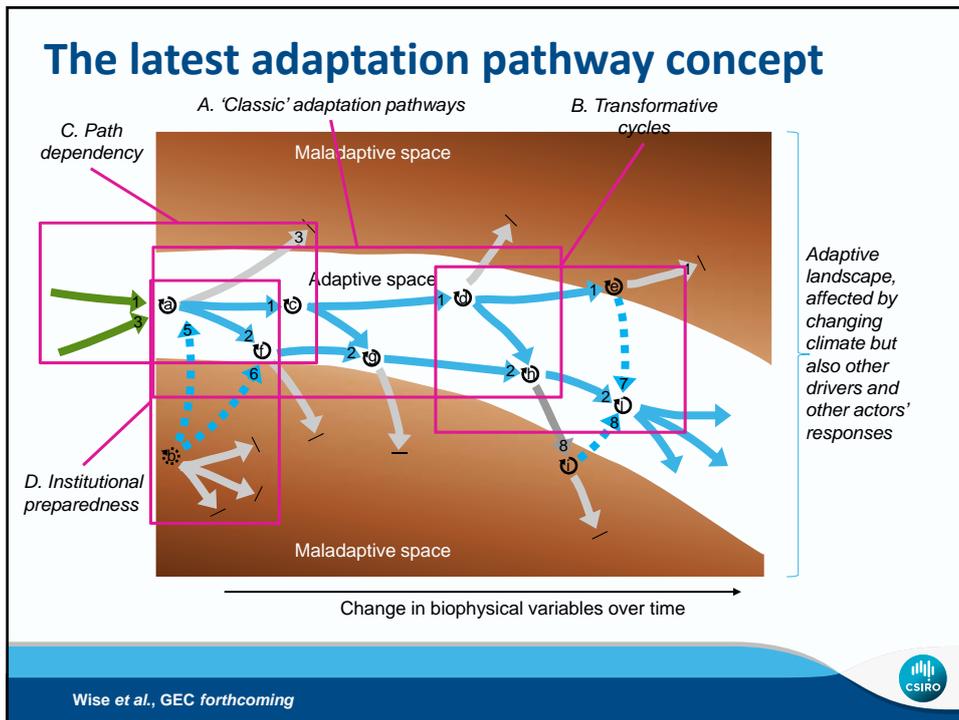
Yallourn, Victoria, 2007:
 • Excessive rainfall caused a



Pilbara, WA, 2006, 2009:
 • Cyclones in 2006 and

Despite major disruptions, evidence from surveys (2010) that mining industry in Australia is lagging behind
 ➤ 'climate adaptation action' - 40% (Canada) vs. 10% (Australia), vs. 45% LGAs (Australia)





Approaches in practice

- **Diversity (cf. GCMs!), but some consistent characteristics**
 - Decision/solutions-oriented
 - Iterative
 - Attentive to near-term decisions
 - avoiding maladaptation / closing options in face of uncertainty
 - With engagement
 - level required determined by Knowledge-Values-Rules limitations
- **Different levels of decision making**
 - National/regional adaptation planning
 - Prioritising within a specific sector, business, local government
 - Analysing options for a specific decision
 - etc



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