Climate change adaptation strategies: The science/policy interface

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The climate change issue: Human dimensions

Climate change adaptation strategies

- Nature of the CC issue
- What science tells us
- Science-policy interface
- Human dimensions
- Management approaches

Global surface temperature change relative to 1951-1980 mean

Gravity satellite ice sheet measurements

Hansen et al. (2010)


Contributed 0.4 mm/year sea level rise

Contributed 0.6 mm/year sea level rise

Greenland Ice Sheet

Antarctic Ice Sheet
**Heat storage in upper 2000 meters of oceans**

![Graph showing heat storage in oceans over time](image)


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**Global sea level rise, Satellite measurements**

![Graph showing global sea level rise](image)

http://sealevel.colorado.edu and Leuliette et al., 2006: Winter Geol., 37(1-2), 79-84

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**Cascade of effects on local sea-level events**

- **Global warming**
- Climate energetics
- Atmospheric pressure
- Penetration of heat into the ocean
- Global ocean circulation
- Regional sea level
- Coastal geomorphology
- Land stability
- Terrestrial water storage
- Thermal expansion
- Deglaciation
- Glaciation
- Local
- Temporal

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**Planetary biology is changing**

E.g. For south-eastern Australian marine fish

- “dramatic” warming of the oceans has been observed
- 45 species exhibit major geographic shifts thought to be climate related


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**It is the high pressure ridge that dominates much of our climate**

![Map showing high pressure ridge](image)

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**Intensity (pressure) of the SE Australian Autumn-Winter subtropical ridge and global average temperature**

![Graph showing intensity and temperature](image)

Tindall et al. (2009): South eastern Australian Climate Initiative
"One swallow does not a summer make, nor one fine day; similarly one day or brief time of happiness does not make a person entirely happy."
Aristotle (384 - 322 BC)

One wet season does not a drought break or invalidate the wisdom of actions designed to manage the risk of ongoing drought.

Where to get your facts

Mechanisms for Science-Policy Interface

Barriers to a functioning interface
- Gatekeepers
- Purchaser-provider model
  - Capture
  - Media
  - Independence
- Emergence of the non-reality world
  - Role of narratives
- Time scales
  - Immediate single solutions or strategic
- Complexity
  - Personal experience versus advice
  - Purpose and system
• “The great enemy of the truth is very often not the lie -- deliberate, contrived and dishonest, but the myth, persistent, persuasive, and unrealistic. Belief in myths allows the comfort of opinion without the discomfort of thought”

John F. Kennedy (1917 - 1963)

How well do we assess risk?

• There are 6 million parts in a Boeing 747
  ‒ How many could be removed or rendered inoperable before you would decide not to fly?
• IPCC concluded that there is a 50% chance of a 20-30% of all species being at risk with a warming of 1.5-2.5°C
  ‒ There has been virtually no media or public attention to this risk
• What are the consequences of inoperable ecosystems?

Common reactions to learning about severe environmental problems

- Anxious
- Scared
- Sad
- Depressed
- Numb
- Helpless
- Hopeless
- Frustrated
- Angry
- Minimising
- Denying
- Avoiding
- Scepticism
- Desensitises
- Depend on others
- Resigned
- Cynical
- Fed up


Diversity of coping mechanisms

- Active denial
  ‒ “Climate change is not happening”; “it’s a millenarian cult”
- Passive denial
  ‒ “I don’t wish to think about it, it is all too complicated”
- Blame
  ‒ “Australia is an insignificant emitter”; “nothing we do can make any difference”; “It is all the Prime Minister’s fault”; “It is all China’s fault”
- Vested interests
  ‒ Defense of existing values
  ‒ “Something must be done but not at the expense of jobs, trade competitiveness, personal welfare or lifestyle”, etc.
- Narrow perspectives
  ‒ Enthusiastic support for poorly evaluated options
  ‒ ”It can all be done with renewable energy”

Assumption about rationality

<table>
<thead>
<tr>
<th>Common assumptions</th>
<th>Alternative assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>People are essentially rational</td>
<td>• What is rational in one context may be irrational in another</td>
</tr>
<tr>
<td>Rationality is conscious (we choose)</td>
<td>• Most rationalities are “stored” in the unconscious</td>
</tr>
<tr>
<td>Denial is a kind of irrationality</td>
<td>• Every rationality is guided by emotion</td>
</tr>
<tr>
<td>Irrationality and denial can be overcome by more information</td>
<td></td>
</tr>
</tbody>
</table>

De Kirby et al. (2007): In what can you do to fight global warming and spark a movement, Island press, Washington DC
Fien et al. (2008): personal communication

Climate change adaptation strategies

• Human dimensions

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Social evolution is opportunistic and devoid of strategic direction

<table>
<thead>
<tr>
<th>Social evolution</th>
<th>Convergence</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Technological opportunities</td>
<td>Social institutions</td>
</tr>
<tr>
<td>Biological evolution</td>
<td>Diversity</td>
<td>Success</td>
</tr>
<tr>
<td>Time/selection</td>
<td></td>
<td></td>
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</tbody>
</table>

No relation to where the future might best be

<table>
<thead>
<tr>
<th>Dominant view of society</th>
<th>Alternative view of society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td></td>
</tr>
<tr>
<td>Productivity</td>
<td>Nourishment, shelter</td>
</tr>
<tr>
<td>Profit</td>
<td>Fulfillment</td>
</tr>
<tr>
<td>Power</td>
<td>Sustainability, maintenance</td>
</tr>
<tr>
<td>Objective</td>
<td></td>
</tr>
<tr>
<td>More (no limit)</td>
<td>Enough (limit)</td>
</tr>
<tr>
<td>Means</td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>Balance</td>
</tr>
<tr>
<td>Competition</td>
<td>Cooperation</td>
</tr>
<tr>
<td>Centralisation</td>
<td>Decentralisation</td>
</tr>
<tr>
<td>Non-renewable resources</td>
<td></td>
</tr>
<tr>
<td>Wasted, exhausted</td>
<td>Limited, prioritised users</td>
</tr>
<tr>
<td>Renewable resources</td>
<td></td>
</tr>
<tr>
<td>Degraded</td>
<td>Require balance management</td>
</tr>
<tr>
<td>The Human Condition</td>
<td></td>
</tr>
<tr>
<td>Stressed</td>
<td>Joyful</td>
</tr>
<tr>
<td>Detached</td>
<td>Integrated</td>
</tr>
<tr>
<td>Degenerating</td>
<td>Evolving</td>
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</tbody>
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Barrett, Pearson and Walker (2010)

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Market based solutions?

- Pricing is arguably a move in the right direction by internalising the externalities but
  - There are large disagreements about the extent of externalities
  
  - Markets are far from perfect
    - Behavioral economics, identity economics
    - Leadership

“Along with others, I have tried to pry economists away from narrow assumptions about self interest.

Behavior is driven by a much richer set of values and preferences”

Gary Becker, Nobel Prize acceptance lecture, 1992

Behavioural economics: “... people are susceptible to irrelevant influences ... emotions, short-sightedness”

Identity Economics: “Peoples identity defines who they are, (and this) influences their decisions.”

Akerlof and Kranton (2010): Identity economics

Characteristics of management

- Accepting uncertainty & adherence to risk management
- Holism in assessment of options

- Flexibility of planning
- Strategic-ness of planning
- No regrets
- Evidence-based
- Equitability

Barrett, Pearson and Walker (2010)
Summary

Messages about sustainability
The climate change issue results from:
• Our expectations
  – Culture, history, education, market economy, advertising
• Technological innovations
• Our choices
• Natural resource inheritance

Messages about sustainability
Solutions to the CC issue depend on:
• Acceptance that we will not know all that we would like to know before action is necessary
  – We have to manage the risk
• Challenge the largely unconscious drivers of our behaviour, institutions and society
  – Commercialism
  – Advertising
  – Non-strategic social evolution

CC is “diabolical” (Ross Garnaut) because
• Uncertain, its format and extent
• Insidious rather than (as yet) confrontational
• Long-term rather than immediate
• International as well as national
• Potentially dangerous in the absence of effective management

Further complicated by the way we are:
• Our personal behaviour:
  – Aspirations, concepts of success & happiness

• Evolution of society:
  – Influence on conformity & community values
  – May have led us to where we do not wish to be unsustainable

Solutions may depend on changes that threaten our aspirations, belief systems and attitudes