

The Limits to Adaptation and Maladaptation

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NCCARF

National
Climate Change Adaptation
Research Facility

Adaptation Research Network

SOCIAL, ECONOMIC AND INSTITUTIONAL DIMENSIONS

Overview

1. The problem with adaptation
2. The limits to adaptation
3. Maladaptation
4. Conclusions



1. The problem with adaptation

Adaptation is not easy:

- What are the risks to be avoided?
- Who is at risk?
- Who decides, and on what basis?
- What information is needed?
- Who pays?
- Who implements?
- What policy instruments are to be used?
- Which groups win?
- Which groups lose?
- How much time is there to adapt?



1. The problem with adaptation

What is adaptation?

- Actions that are taken to reduce vulnerability to climate change:
 1. reduce exposure to risks
 2. reduce susceptibility to damage
 3. increase capacity to adjust



1. The problem with adaptation

Why doesn't it happen?

1. Barriers: “obstacles that can be overcome with concerted effort” (Moser and Eckstrom 2010: 22027)
 - Cultural, e.g: beliefs and values, public acceptance of climate change and the need to adapt, wealth, trust in and attitudes towards science and decision makers.....
 - Institutional, e.g: the distribution of roles, responsibilities and capacities of different levels of government, and between the public, private and third sectors.....
 - Legal, e.g: legal rights to compensation; the risks to government of legal liability; laws regarding land title.....



1. The problem with adaptation

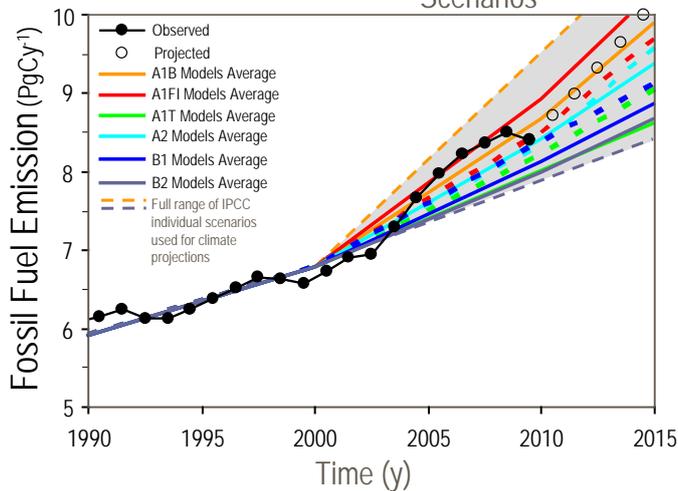
Why doesn't it happen?

2. Limits to adaptation: the thresholds beyond which actions to adapt fail to avoid climate impacts
3. Maladaptation: action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups



2. The limits to adaptation

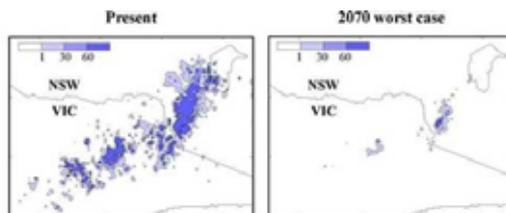
Global Carbon Project 2010: Fossil Fuel Emissions: Actual vs. IPCC Scenarios



2. The limits to adaptation

	98% decrease in Bowerbird habitat in N Australia ⁶⁷
	80% loss of freshwater wetlands in Kakadu (30 cm sea level rise) ⁷¹
3-4	Catastrophic mortality of coral species annually ⁶¹
	95% decrease in distribution of Great Barrier Reef species ⁶¹
	65% loss of Great Barrier Reef species in the Cairns region ⁵⁹
	20-85% shrinkage of total snow-covered area in the Australian Alps ⁵⁰
	38-96% decline in 60-day snow cover in the Australian Alps ⁵⁸
	30-70% loss of core habitat for Victoria and montane tropical vertebrate species ⁶⁵
4-5	60-90% loss of core habitat for Victoria and montane tropical vertebrate species ⁶⁵
>5	90-100% of core habitat lost for most Australian vertebrates ^{63,64}

Preston and Jones 2006



CSIRO



2. The limits to adaptation

Adaptation cannot avoid all impacts

Four kinds of limits:

1. ecological and physical thresholds (e.g. beyond 2°C no amount of human action can avoid coral bleaching)
2. economic thresholds, where the costs of adaptation exceed the costs of impacts averted (e.g. costs of protecting small coastal towns from SLR may exceed costs of impacts).
3. technological thresholds, where available technologies cannot avoid climate impacts (e.g. limits to snowmaking in Alpine areas)
4. social limits, where groups judge adaptation actions to have failed (e.g. desalination, or recycled water).



2. The limits to adaptation



3. Maldaptation

Five dimensions of maladaptation (*actions that, relative to alternatives*):

- increase emissions of greenhouse gases
- disproportionately burden the most vulnerable
- have high opportunity costs
- reduce incentives to adapt
- set paths that limit future choices

Example: water in Melbourne



3. Maldaptation

- Annual rainfall below long-term average each year 1996-2010
- Average reservoir level was <30% 2008-2010
 - Drought 'broke' 2010-11 with rainfall levels similar to average (and water restrictions lifted)

'Climate change and record low rainfall demands a dramatic new approach to how we plan for Victoria's water needs'

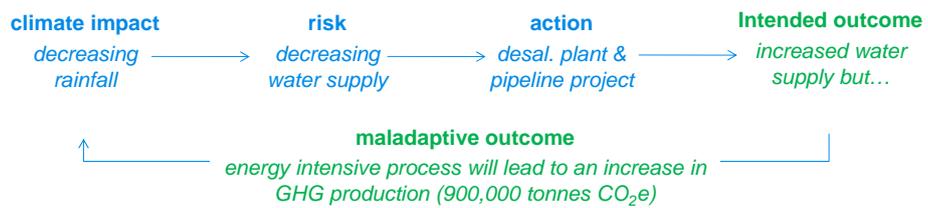
(Premier Bracks, 2007)

- Wonthaggi desal. plant: 150 GL/annum
- Sugarloaf Pipeline Project: 75 GL/annum



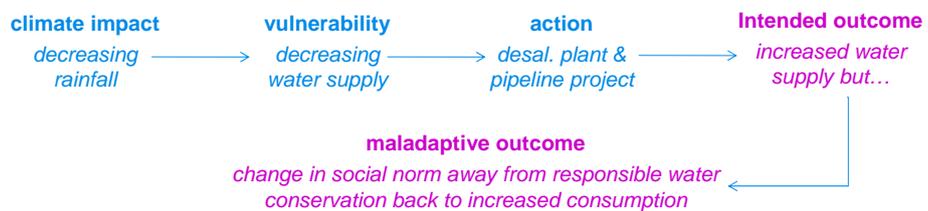
3. Maldaptation

Actions are maladaptative if, relative to alternatives, they:
increase emissions of greenhouse gases



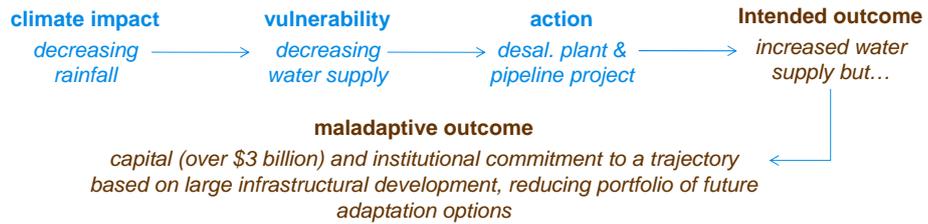
3. Maldaptation

Actions are maladaptative if, relative to alternatives, they:
reduce incentives to adapt



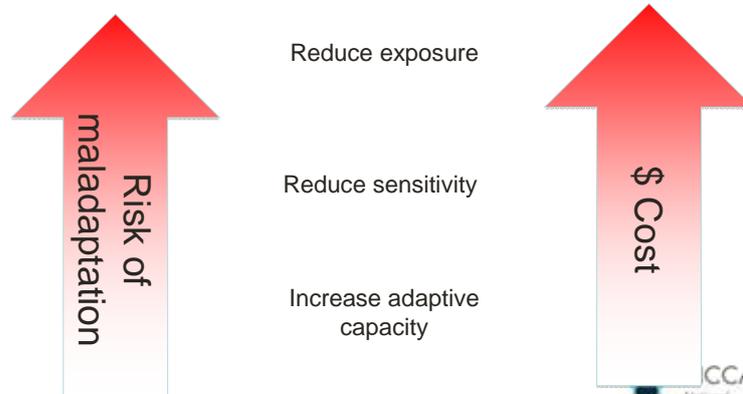
3. Maldaptation

Actions are maladaptive if, relative to alternatives, they:
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3. Maldaptation

Does the risk of maladaptation change with the 'nature' of adaptation?



4. Conclusions

Adaptation will not happen if:

- changes in climate are too great
- it costs too much
- people don't accept that impacts have been averted
- responses do more harm than good

So:

- mitigation is necessary to avoid limits
- beware expensive fixes
- decisions need to be legitimate
- decisions need to be screened for maladaptation

