



**Earth Systems and  
Climate Change  
Hub**

National Environmental Science Programme

# Adapting to Climate Change in the Tiwi Islands



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Report on the Climate Change Adaptation workshop for the Tiwi Land  
Council

November 2017

## **Acknowledgements**

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Fig. 2 Concept of a staged approach adaptation pathway – a sequence of manageable steps over time, each triggered by a change in environmental (or social) conditions (Panel a), and illustration of the Lakes Entrance Growth and Adaptation Strategy pathways (Panel b).

## Tables

Table 1. Complete list of participants in the climate change adaptation workshop for the Tiwi Islands, held 1 November 2017 in Wurrumiyanga.

# ADAPTING TO CLIMATE CHANGE IN THE TIWI ISLANDS

## WORKSHOP REPORT

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### 1. Introduction

#### 1.1 Background

There is global scientific consensus that naturally occurring climatic changes have accelerated over the past century due to increased production of greenhouse gases (Solomon et al. 2007; Climate Commission 2011). Projected extreme weather and climate events associated with global climate change are expected to have profound environmental, social, and economic impacts (Climate Commission 2011). Australia, like many other countries, faces rising temperatures, variable patterns of rainfall and wind speeds, increased frequency and intensity of heatwaves, droughts, bushfires, storms, and floods (Department of Climate Change 2009).

Australia's coasts and coastal communities will be at the frontline of climate change impacts. As sea levels are predicted to rise between 0.5m and 1m by 2100, exacerbating the impact of increased rainfall and storms, many low-lying coastal areas are at risk of more frequent and severe inundation (Climate Commission 2011). Rising sea levels and increased frequency of storm surges and flooding will intensify processes of shoreline erosion, saline intrusion to freshwater systems, and marine and coastal habitat shifts and destruction (Steffen et al. 2009; Department of Climate Change 2009). As the potential risks for coastal areas increase with growing evidence on climate change risk, the need for climate change adaptation plans also grows. Climate change considerations need to be incorporated across all aspects of local decision making, and integrated across the different sectors of local government responsibility (e.g. strategic spatial planning and development, emergency

services, community health, coastal management, and economic development (Department of Climate Change and Energy Efficiency 2010).

## 1.2 Scope

This report presents a summary of a workshop held 7 November 2017 on adapting to climate change in the Tiwi Islands. The Tiwi Islands lie north of Darwin, Northern Territory, in the Arafura Sea, and comprise two large islands – Melville Island, Bathurst Island – and nine smaller uninhabited islands, with a combined area of approximately 8,320 km<sup>2</sup> and an estimated population of 2,579 (Australian Bureau of Statistics 2011). The islands are inhabited by the Tiwi people, as they have been since before European settlement in Australia. Most of the Tiwi population live in Wurrumiyanga on Bathurst Island, and Pirlangimpi (Garden Point) and Milikapiti (Snake Bay) on Melville Island, though other smaller settlements are present on western Bathurst Island. The majority of Tiwi Islands communities reside along the coastline and are remote, with many accessible only by boat or plane. Adaptation to climate change is now necessary in the Tiwi Islands given unavoidable future changes in climate and sea-level and their potential effects on people and the places and practices they value. Adaptation is more effective, equitable and efficient when commenced early and with forethought. The aim of the workshop was therefore to discuss opportunities and challenges associated with adapting to climate change in the Tiwi Islands, and to begin planning for the inevitable impacts of climate change.

## 2. Adaptation workshop

### 2.1 Context

The climate change adaptation workshop was held Wednesday 1 November 2017 in Wurrumiyanga, Bathurst Island. In April 2017, the National Climate Change Adaptation Research Facility (NCCARF) ran a workshop on sea-level rise with the Tiwi Shire Council and other interested parties. Following this event, the Tiwi Land Council (TLC) requested a second workshop on climate change adaptation through the Scientific Reference Committee that the TLC shares with the University of Melbourne. This report is a summary of that second workshop, which was hosted by the Tiwi Land Council at Wurrumiyanga.

### 2.2 Participants

*Table 1. Complete list of participants in the climate change adaptation workshop for the Tiwi Islands, held 1 November 2017 in Wurrumiyanga.*

<b>Attendee</b>		
Brian Austral	Gibson Illortaminni	Joseph Puantulura
Jon Barnett	Dominic Kantilla	Richard Puruntatameri
Cecil Black	Stephen Kantilla	Willie Rioli
Kim Brooks	Colin Kerinaiaua	Willie Roberts
James Desantis	Mavis Kerinaiaua	Steve Swearer
Tom Duncan	Wally Kerinaiaua	Bonaventure Timaepatua
Ivan Fernando	Teresa Konlechner	Brian Tipungwuti
Kate Hadden	Anne Leitch	Charles Tipungwuti
Lesley Head	Jonathon Munkara	Leslie Tungatulum
Graeme Henry-Whiting	Vernard Pilakui	John Wilson
Bruce Holland	Chitra Priyandari	

## 2.3 Why adapt?

Professor Jon Barnett, University of Melbourne, presented a talk on the risks of climate change, why adaptation is necessary, and how to best adapt. The presentation covered the nature of climate change and the risks it poses to places like the Tiwi islands. Professor Barnett stressed that little was known about risks in the Tiwi Islands, and that the examples he presented were from small islands in the South Pacific. What follows is a summary of this presentation.

As the evidence base for climate change grows, so does the severity of the risks. Global mean temperatures are predicted to increase by 1.3-2.8 C by 2090, leading to more extreme hot days (4x increase by 2030) and more warm spells, an increase in intense rainfall events, more intense droughts and extreme fire days, sea-level rise and higher extreme sea-levels (i.e. during storms), and more intense tropical cyclones. While climate change can have devastating environmental impacts, climate change is mostly a social problem as it may impact things that are necessary for people to live their lives. Projected impacts of climate change can impact human basic needs, such as health, food security, water security, as well as development, including settlements and infrastructure, jobs and economic growth, and the cost of living. Climate change can also impact social values, such as community values, equity, and culture.

A 2010 AECOMM study suggested that by 2030, the Tiwi Islands would be at increased risk of damages from greater cyclone intensity, as well as heat related illness including heat stress. The study also concluded that medium-level climate change risks for the Islands were: damage or loss of power transmission and distribution; damages to communications infrastructure; damages to communities from bushfire; damages to settlements from storm surge and flooding; salt-water intrusion into freshwater waterways and billabongs; and decreasing availability of bush tucker (Fig. 1).

Failing to adapt to climate change not only increases risks to Tiwi people and the things they value, it also creates legal and financial risks for local authorities. In Australia, climate change is now entrenched in State and Territory laws, and responsible authorities who fail to adapt may be uninsurable, and liable for negligence. State and Territory governments may suspend certain local powers if responsible authorities fail to take action.

## 2.4 How to adapt?

Adaptation is the process of adjustment to actual or expected climate and its effects. The goal of adaptation is to avoid impacts, and/or to capture new opportunities. Adaptation to climate change can be accomplished in two ways: 1) reducing exposure to climatic events, and 2) reducing the sensitivity of things exposed to climate. The first step to adaptation – altering exposure to the unwanted impact – is essentially getting out of harm’s way, or not putting new things in harm’s way. The Tiwi Islands can incorporate this adaptation step by factoring climate risks into future land use and development planning. The second step to adaptation requires altering current practices and infrastructure to reduce the impacts of climate change on things most likely to be affected; for example, through disaster management plans and cyclone shelters, public health programs, oral history projects and museums, insurance systems, diversifying electricity and water sources, and economic diversification.

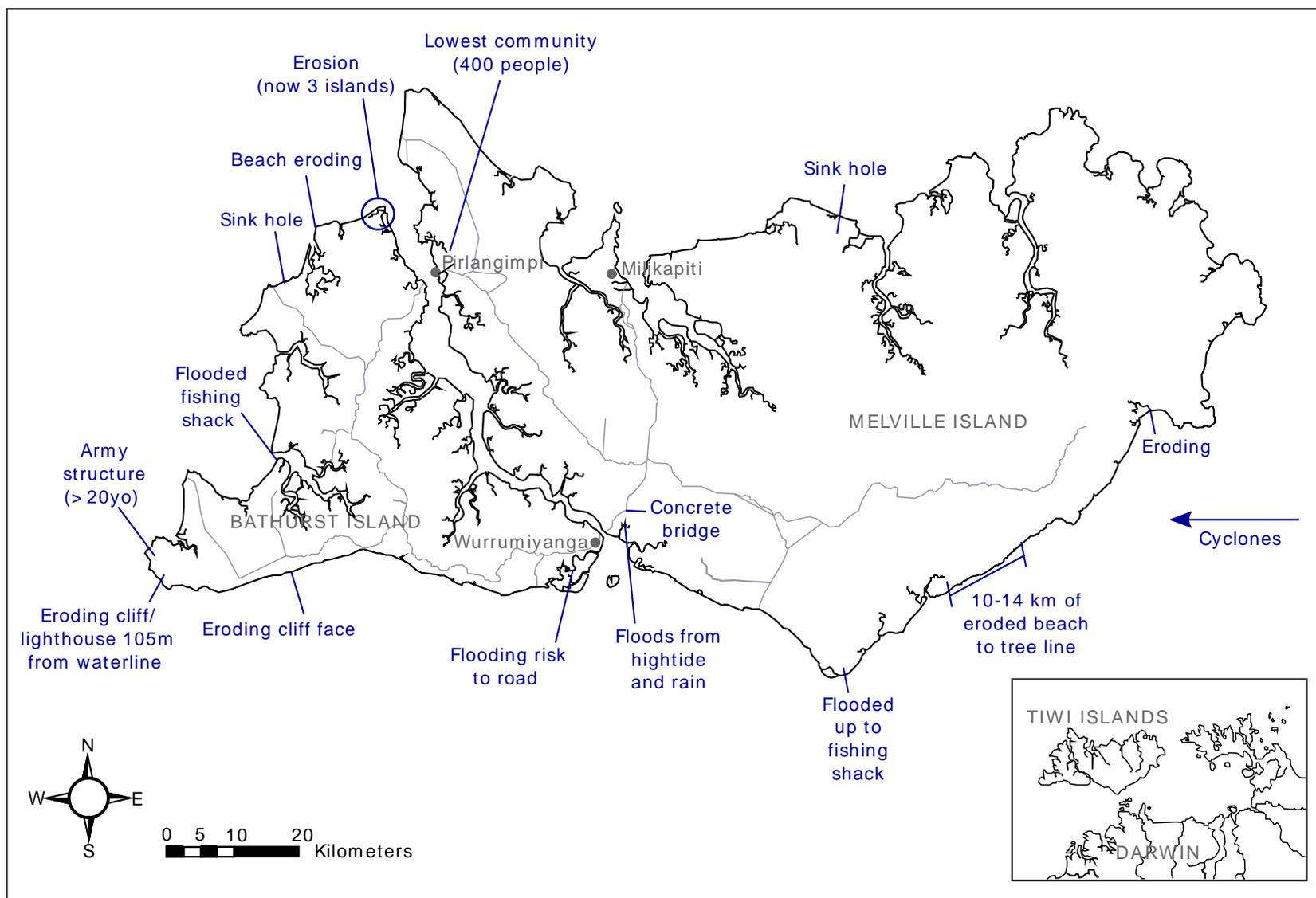


Fig. 1 Map of Melville and Bathurst Islands, the two largest of the Tiwi Islands, showing currently impacted and at-risk areas for climate driven change.

## 2.5 When to adapt?

Adaptation is not a complicated concept. Adaptation to climate change requires accepting that the environment is changing, planning ahead to reduce risks from projected impacts, and collective actions from communities and governments to implement change. However, one key challenge for adaptation is knowing *when* to act.

Early and no-regrets adaptation will be cheaper and more effective than if actions are delayed. It costs very little to factor climate change risks into plans, for example for land use and infrastructure, disaster management, health services, agricultural and forestry, and economic and community planning, and this can begin immediately. However, not everything can and should be done *now* – adaptation is a long game.

In addition to immediately integrating climate change risks into development and management plans, it is recommended that a staged response plan also be developed. This staged approach to adaptation should establish a sequence of predetermined manageable steps over time, each of which is triggered by a change in environmental or social conditions (Fig. 2a). In effect it means asking ‘what will we do if this happens?’ and, establishing the indicators of that change (so we know it is happening) and the actions that should be taken (so that we know what to do when the time comes).

Such a staged response will spread the costs of climate change adaptation over time, and can complement and help make more resilient development plans. For an example of a staged approach to climate change adaptation, see the Lakes Entrance Growth and Adaptation Strategy pathways (Fig. 2b).

It was concluded that successful adaptation requires early action, knowing who is at risk and what is important to them, strategic planning over short and long time-scales, and consensus about changes and collective actions to implement them.

## 2.6 Workshop discussion

During and after the presentations on adaptation to climate change, attendees raised concerns and issues for discussion. Key issues discussed included how climate change will affect wet and dry seasons, the timing and strength of the monsoon, and frequency of cyclones; and physical processes such as coastal erosion and flooding, king tides, storm surges, and inundation; and ecologically important habitats such as seagrasses, corals, mangroves and beaches; and infrastructure such as the power grid, roads and bridges, and health facilities. There was also discussion about how to adapt management practices to reduce these impacts (including changes to disaster management plans, fire management practices, and new monitoring projects). More detail of the discussion can be found in the complete workshop minutes (Appendix I).



## 2.7 Next steps

Participants discussed the next steps to progress adaptation to climate change in the Tiwi Islands. This included:

- A focus on townships as sites in need of adaptation plans
- Involvement of the Tiwi Shire Council in adaptation measures
- Involvement of the Office of Township Leasing
- The formation of a climate change working group, comprised of Trustees, the Shire Council, Office of Township Leasing, and others (police, health sector, and schools)
- Inclusion of the issue of climate change on the agenda of the Tiwi Leaders forum
- A return of the University of Melbourne team to the Tiwi Islands in the wet season to observe the seasonal impacts of climate change
- Immediate planning for flood risks on certain at-risk roads
- Include climate change risks into disaster management plans
- Development of systems for monitoring relevant changes, including of erosion
- Development of ways to involve the broader community
- Increase climate change awareness through local media
- Begin discussion of where settlements may move to if movement is necessary, and how to plan the process of movement
- Development of a climate change strategy for the Tiwi islands
- Discussion on how the Tiwi islands can become a national leader in climate change responses and as an example of best practice for climate change adaptation
- Development of a map of who is responsible for what actions
- Potential assignment of an adaptation champion for each community

The workshop concluded with the following recommendations for further action:

- Hold a meeting with Office of Township Leasing (Jon Barnett and Gibson Illortaminni)
- Discuss climate change at the next Tiwi Leaders forum
- Produce a story about today's workshop in the local news (Kate Hadden)

- University of Melbourne team to explore options to fund further work on climate change with the Tiwi Land Council (Jon Barnett and Steve Swearer)
- Explore ways to include climate change in disaster management plans
- Provide examples of climate change strategies (Jon Barnett)
- Provide links to information in CoastAdapt (Anne)

### 3 Conclusions

The Tiwi Islands are at risk of social, environmental, and financial damages from climate change impacts. It is critical that local authorities and communities work together to adapt to these changes and develop management plans for impending climate driven impacts.

Implementing early a no-regrets adaptation strategy, and a longer-term staged approach will help mitigate the impacts of climate change through preparedness and preventative action. By developing a climate change strategy and adapting management practices, the Tiwi Islands can become a national leader in climate change responses, and act as an example of best practice for climate change adaptation.

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## Tiwi Land Council / University of Melbourne Workshop on Adapting to Climate Change in the Tiwi Islands

Wurrumiyanga, Bathurst Island  
1<sup>st</sup> November 2017

### MINUTES

AGENDA ITEM	ACTION
<p><b>Present:</b> Brian Austral, Jon Barnett, Cecil Black, Kim Brooks, James Desantis, Tom Duncan, Ivan Fernando, Kate Hadden, Lesley Head, Graeme Henry-Whiting, Bruce Holland, Gibson Illortaminni, Dominic Kantilla, Stephen Kantilla, Colin Kerinaiuua, Mavis Kerinaiuua, Wally Kerinaiuua, Teresa Konlechner, Anne Leitch, Jonathon Munkara, Vernard Pilakui, Chitra Priyandari, Joseph Puantulura, Richard Puruntatameri, Willie Rioli, Willie Roberts, Steve Swearer, Bonaventure Timaepatua, Brian Tipungwuti, Charles Tipungwuti, Leslie Tungatulum, John Wilson</p>	
<p><b>1 Introduction</b></p> <ul style="list-style-type: none"> <li>▪ In April 2017 the National Climate Change Adaptation Research Facility (NCCARF) ran a workshop on sea-level rise with the Tiwi Shire Council and other interested people. Following on from this, the Tiwi Land Council (TLC) requested a further workshop on climate change adaptation through the Scientific Reference Committee that the TLC shares with the University of Melbourne. This is a record of that second workshop, which was hosted by the Tiwi Land Council and Warrumiyanga on November 1<sup>st</sup> 2017.</li> </ul>	
<p><b>2 Proceedings</b></p> <ul style="list-style-type: none"> <li>▪ After a welcome by the Chair of the Tiwi Land Council Mr. Gibson Illortaminni, Mr. Ivan Fernando was appointed Chair for the day.</li> <li>▪ Barnett then delivered a presentation about the nature of climate change and the risks it poses to places like the Tiwi islands. He stressed that little was known about risks in the Tiwi Islands, and that the examples he presented were from small islands in the South Pacific. This slides from this presentation are attached to these minutes.</li> <li>▪ There was much discussion throughout this presentation. Issues raised by attendees included: <ul style="list-style-type: none"> <li>• Past changes in climate and the environment in the long history of the Tiwi islands</li> <li>• Concerns were raised about an increased number of snakes in the aged care facility.</li> <li>• Implications for power grid but underwater power supply to other communities is likely to be okay.</li> <li>• The effect of climate change on wet and dry seasons</li> <li>• That the effect of climate change on the timing and strength of the monsoon is very uncertain</li> <li>• Possible changes in the height of king tides, and concerns about increased storm surges</li> <li>• Erosion of the shoreline near the renal clinic</li> </ul> </li> </ul>	

## Appendix I: Workshop Proceedings

<ul style="list-style-type: none"> <li>• The effects of an increase in the number of hot days</li> <li>• The effects of rainfall on fire and burning</li> <li>• The issue of coral bleaching, which has been observed in the Tiwi Islands. The need to reduce other stressors on corals (pollution, over fishing) to give corals the best chance of coping with heat waves.</li> <li>• Observed changes in the Vernon Islands</li> <li>• Possible changes in sea-grasses: people from Melbourne University suggested that this may not be a major problem in the immediate future.</li> <li>• The implications of temperature changes and also sea-level changes on the breeding and gender of turtles.</li> <li>• That no dry season fires this year went out overnight because it did not cool down enough overnight. It was suggested that knowledge of burning patterns and timing could be an indicator for monitoring climate change.</li> <li>• That fire management and forestry may need to adapt to climate change.</li> <li>• That records of sea-level rise in Northern Australia show a faster rate of increase than in southern Australia.</li> <li>• Many observations of changes in coastal areas in the north of the Tiwi islands. A cemetery is being inundated. A camping place with a big well is now inundated. There was discussion about the influence of changes in wind and currents on the coast.</li> <li>• Sinkholes which have been observed in recent times and if climate change could be a cause of that. No-one knows.</li> <li>• Insurance and if it would be available for new businesses in areas at risk from sea-level rise</li> <li>• Who would be responsible for climate change damages to new developments on Tiwi lands</li> <li>• Who has jurisdiction and responsibility for townships? OTL, local govt, TLC, shire. It was considered that everyone needs to be involved in making adaptation decisions.</li> <li>• The need to factor climate change risks into disaster management plans</li> <li>• The need to educate children so that they are aware of the issue and can get involved in monitoring projects.</li> <li>• Young people aren't following the culture so important to capture customs as the environment changes.</li> </ul> <ul style="list-style-type: none"> <li>▪ After lunch, Jon Barnett delivered a second presentation on adapting to climate change.</li> <li>▪ There was some discussion throughout this presentation. Issues raised by attendees included: <ul style="list-style-type: none"> <li>▪ The design of the new wharf, which allows for sea-level changes and storms</li> <li>▪ Who should be involved in making decisions about adaptation</li> <li>▪ The importance of taking into account climate change when planning for new developments such as buildings and businesses, to avoid impacts and possible liability for damages.</li> <li>▪ The importance of all relevant agencies and partners to be engaged in adaptation planning in the Tiwi islands, including the Tiwi Shire Council and the Office of Township Leasing.</li> <li>▪ Other agencies identified included: Power and Water Corporation, Police, and Health.</li> <li>▪ It was noted that the Tiwi Land Council hosted this meeting, many agencies were invited, but very few came.</li> <li>▪ The location of boatshed now and when to move it in the future</li> </ul> </li> </ul>	
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## Appendix I: Workshop Proceedings

	<ul style="list-style-type: none"> <li>▪ The frequency of cyclones – last year there were three, which was unusual.</li> <li>▪ The degree to which the territory government will take responsibility for adaptation in the Tiwi Islands</li> </ul>	
<p><b>3</b></p>	<p><b>Discussion of Next Steps</b></p> <ul style="list-style-type: none"> <li>▪ Following the presentations, there was discussion about the next steps to progress adaptation to climate change in the Tiwi Islands. This included: <ul style="list-style-type: none"> <li>▪ A focus on townships as sites in need of adaptation plans given their coastal locations and the risk of lost assets (such as the renal clinic) due to erosion and from cyclones</li> <li>▪ Recognition that the Tiwi Shire Council must be involved given its areas of responsibility</li> <li>▪ The Office of Township Leasing must be involved given its areas of responsibility, and that it could work with Consultative Forums to make adaptation part of its core business, and to develop adaptation plans for each township.</li> <li>▪ A proposal to present some information to the Office of Township Leasing and to ask them to engage in adaptation planning for townships with local stakeholders.</li> <li>▪ A proposal to form a climate change working group, comprised of Trustees and the Shire Council and OTL, and maybe strong women, Police, Health, and schools.</li> <li>▪ A proposal to include the issue of climate change on the agenda of the Tiwi Leaders forum</li> <li>▪ A proposal that the University of Melbourne team return in the wet season to observe the kinds of things that happen then</li> <li>▪ Flood risks in certain roads, including at 4-mile and three-ways, as examples where planning needs to happen now because there is nowhere else to put the road.</li> <li>▪ A proposal to include climate change risks into disaster management plans (Jon offered to help with this).</li> <li>▪ Discussion about systems for monitoring relevant changes, including of erosion</li> <li>▪ Discussion of ways to involve the broader community – Infographics in CoastAdapt could be useful as explainers</li> <li>▪ A proposal to write a story about climate change for the local news based on today’s workshop</li> <li>▪ Discussion of where settlements may move to if movement is necessary, and how to plan the process of movement</li> <li>▪ The possibility of developing a climate change strategy for the Tiwi islands.</li> <li>▪ The possibility that the Tiwi islands becomes a national leader in climate change responses and as an example of best practice climate change adaptation.</li> <li>▪ The need to map who is responsible for what actions</li> <li>▪ The possibility of an adaptation champion for each community</li> </ul> </li> </ul>	

## Appendix I: Workshop Proceedings

<p><b>4</b></p>	<p><b>Items for Action</b></p> <ul style="list-style-type: none"> <li>▪ The meeting ended with some agreement that there should be further action, including:             <ol style="list-style-type: none"> <li>1. A meeting with OTL</li> <li>2. Discussing climate change at the next Tiwi Leaders forum</li> <li>3. A story about today’s workshop in the local news</li> <li>4. University of Melbourne team to explore options to fund further work on climate change with the Tiwi Land Council.</li> <li>5. Explore ways to include climate change in disaster management plans</li> <li>6. Provide examples of climate change strategies</li> <li>7. Provide links to information in CoastAdapt that Kate might find useful</li> </ol> </li> </ul>	<ol style="list-style-type: none"> <li>1. Jon Barnett and Gibson Illortaminni</li> <li>3. Kate Hadden</li> <li>4. Jon Barnett and Steve Swearer</li> <li>6. Jon Barnett</li> <li>7. Anne</li> </ol>
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## **Appendix II: Why adapt to climate change?**

Slides presented at the Climate Change Adaptation workshop for the Tiwi

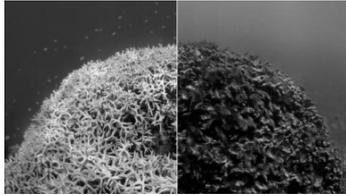
Land Council

November 2017



# Climate change is a social problem

Jon Barnett, School of Geography



1



# Introduction



2



## Changes in Climate

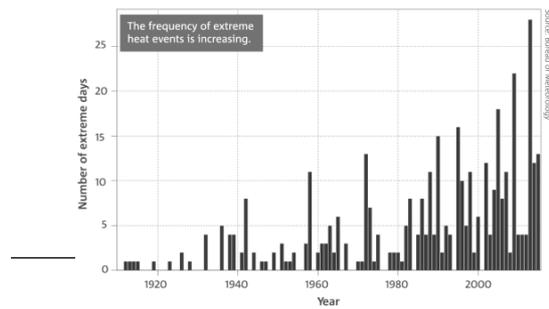
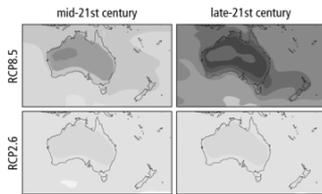
Expected changes in climate include:

- Increase in average temperatures (1.3 - 2.8°C warmer by 2090)
- More very hot days (x4 by 2030), and more warm spells

Annual Temperature Change



Difference from 1986-2005 mean (°C)



## Changes in Climate

Expected changes:

- More intense rainfall events
- Possibly more intense droughts and extreme fire days

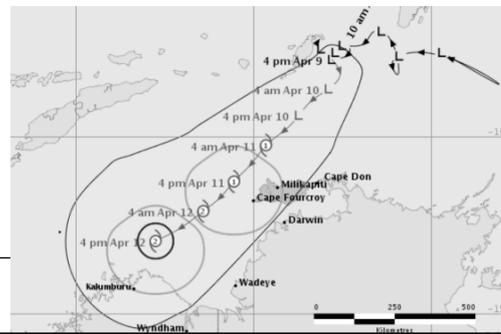




## Changes in Climate

Expected changes:

- Sea-level rise, and higher extreme sea-levels (during storms)
- More intense tropical cyclones



## Risks to things that people value

Climate change is mostly a social problem

because it may impact on the things that are needed for people to live good lives

For example basic needs,

- health



## Risks to things that people value

Basic needs:

- food security



- water security



## Risks to things that people value

And to development:

- settlements and infrastructure





## Risks to things that people value

### Development

- jobs and economic growth



9



## Risks to things that people value

### Development

- the costs of living (esp. water, infrastructure and insurance)





## Risks to things that people value

### Social values:

Community values and equity



11



## Risks to things that people value

### Social values:

Culture



12



## Risks to things that people value

And risks to independence and autonomy

- Climate change is now entrenched in State and Territory laws
- Responsible authorities who fail to adapt may be liable for negligence
- State and territory governments may suspend local powers if responsible authorities fail to take action
- Local authorities who fail to adapt may be uninsurable



13



## What is at risk in the Tiwi Islands?

AECOMM study suggested high risks (for 2030) were:

- Damages from greater cyclone intensity
- Heat related illness (including heat stress)

Medium risks (by 2030) included:

- Damage or loss of power transmission and distribution
- Damages to communications infrastructure
- Damages to communities from bushfire
- Damages to settlements from storm surge and flooding
- Salt water intrusion into freshwater waterways and billabongs
- Decreasing availability of bush tucker

14



## What is at risk in the Tiwi Islands?

What do Tiwi people value?

Could those things be at risk from climate change?



13 November

15

## **Appendix III: How to adapt to climate change?**

Slides presented at the Climate Change Adaptation workshop for the Tiwi

Land Council

November 2017



# How to Adapt to Climate Change

Jon Barnett, School of Geography



1



# What is adaptation?

The process of adjustment to actual or expected climate and its effects

- to avoid impacts
- to capture opportunities



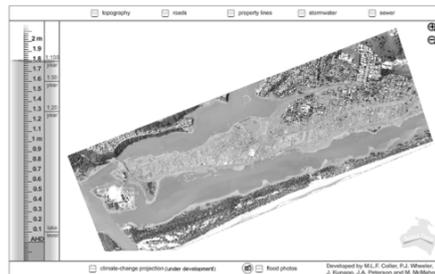
13 November, 2017



## What is adaptation?

Altering exposure: *getting out of harm's way....*

- What could be moved?



13 November, 2017

3



## What is adaptation?

Altering exposure: *not putting new things in harm's way....*

- Factor climate risks into land use and development planning



13 November, 2017

4



## What is adaptation?

Reducing the *sensitivity* of things exposed to climate



5



## What is adaptation?

Reducing the *sensitivity* of things exposed to climate



6



## What is adaptation?

Reducing *sensitivity*, e.g.

- Irrigation
- Disaster management plans and cyclone shelters
- Public health programs
- Mosquito eradication programs
- Oral history and museums
- Insurance systems
- Diversity electricity and water sources
- Economic diversification

13 November, 2017

7



## When to Adapt?

When you think about it, adaptation isn't that hard

It is mostly about:

- getting used to the idea that the environment is changing
- planning ahead
- doing some things better or differently
- collective action (community + governments)

The problem is really one of *knowing when to act*

8



## When to Adapt?

Important to *start now*:

early and no-regrets adaptation will be cheaper and more effective

- it doesn't cost much to mainstream climate change into land use planning, disaster management, disaster responses, capital works, health services, agricultural extension, economic planning, community planning.....

work together to develop responses

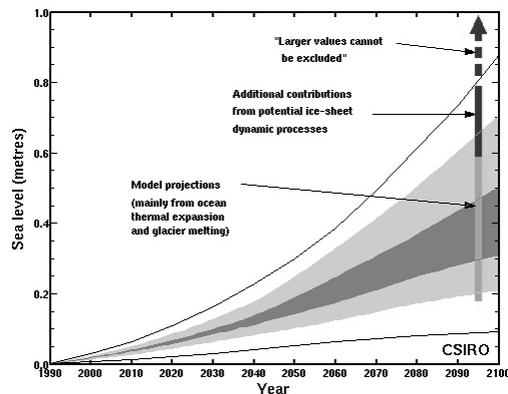
13 November, 2017

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## When to Adapt?

But not everything can and should be done now

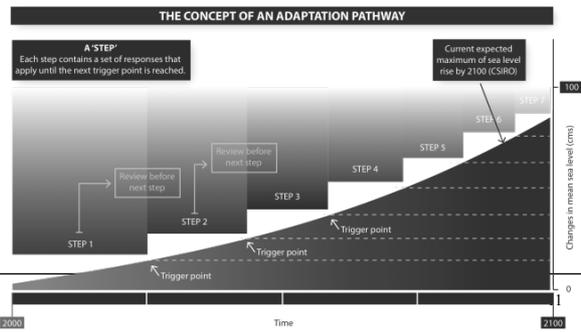




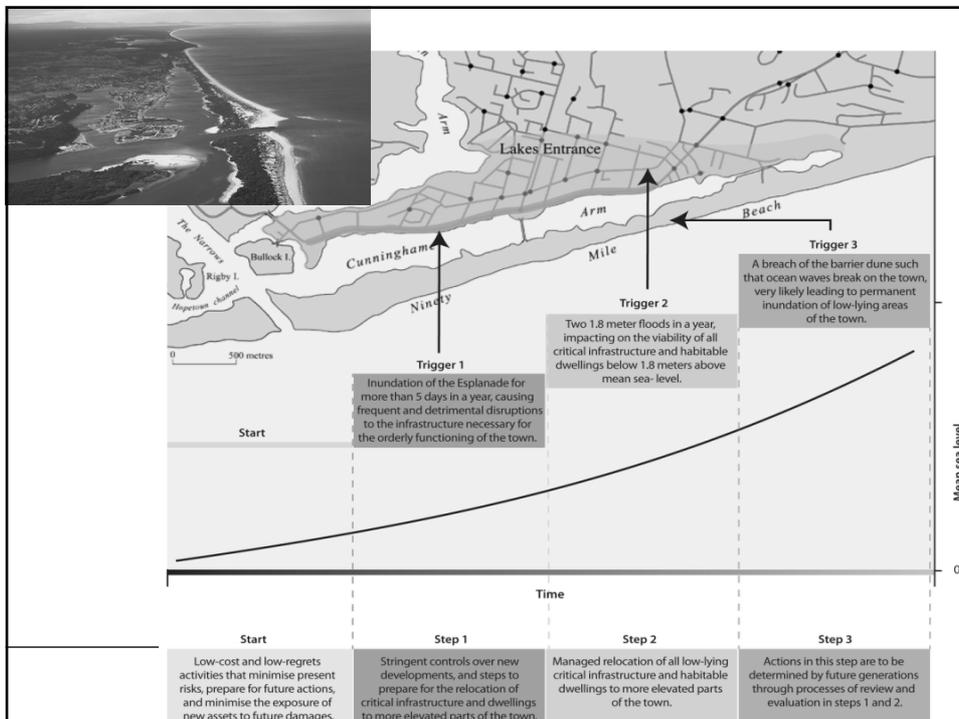
# When to Adapt?

Adaptation is a long game

A staged approach: a sequence of manageable steps over time, each of which is triggered by a change in environmental (or social) conditions



13 November, 2017





## When to Adapt?

Lakes Entrance *Growth and Adaptation Strategy*

Adaptation pathways

1. spread costs over time
2. start with no/low regrets responses and build consensus
3. policy windows: more dramatic step-wise changes are justified when agreed triggers are reached
4. adaptation as a strategy for growth and renewal rather than a process of distributing costs

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## Conclusions

Many of the risks of climate change can be avoided

Adaptation requires:

- early action
- knowing who is at risk and what is important to them
- strategic planning, over long time scales
- awareness and collective action

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