



Australian
National
University

4 August 2017

Senate Inquiry into the Implications of Climate Change for
Australia's National Security -
Foreign Affairs, Defence and Trade Committee
Department of the Senate
PO Box 6100
Parliament House
Canberra ACT 2600

Professor Mark Howden

Director, ANU Climate Change Institute
+ 61 2 6125 7266
Mark.Howden@anu.edu.au

Australian National University
Acton ACT 2601

**Submission to the Senate Inquiry on the Implications of climate change for
Australia's national security by the Australian National University Climate Change
Institute**

Dear Foreign Affairs, Defence and Trade Committee,

Please find enclosed a submission coordinated by the Australian National University (ANU) Climate Change Institute to the Senate Inquiry on the Implications of climate change for Australia's national security.

This submission includes authored contributions from scholars across disciplines and Colleges in the ANU, including from the ANU Energy Change Institute, the ANU Development Policy Centre, the Research School of Biology, and the Fenner School of Environment and Society.

We would welcome the opportunity to meet with members of the Committee to discuss our submission further.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'M. Howden', written in a cursive style.

Professor Mark Howden,
Director, ANU Climate Change Institute

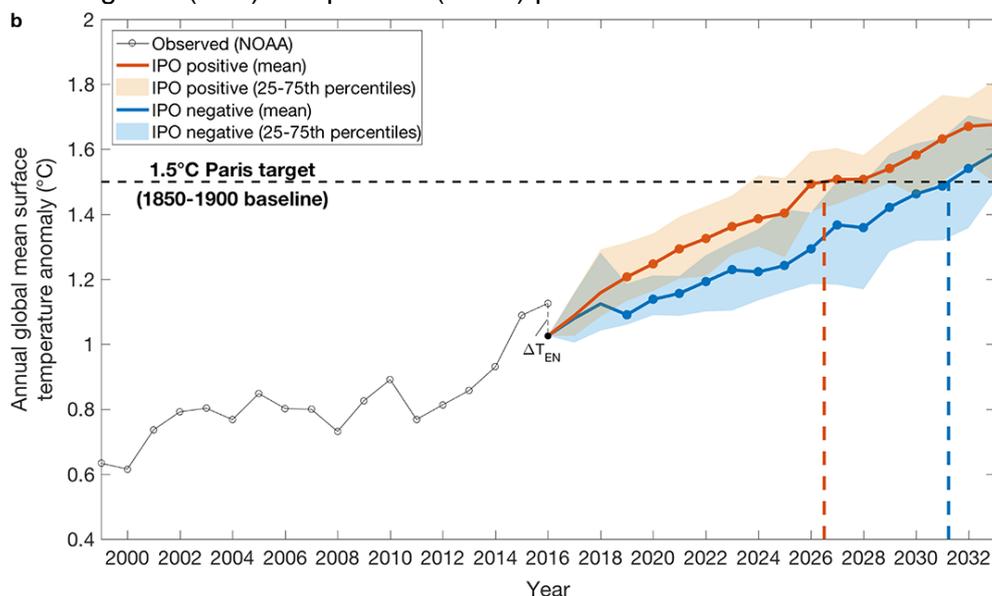
Introduction

The ANU Climate Change Institute represents over 200 researchers from throughout the university, including experts on the earth’s systems, climate impacts and adaptation, climate change mitigation, institutional responses to climate change and transformational approaches. The mission of the ANU Climate Change Institute (CCI) is to contribute to climate change solutions through innovative, interdisciplinary approaches to research and teaching, drawing on the wealth of expertise across the University, and to connect our work to governments, the private sector and civil society.

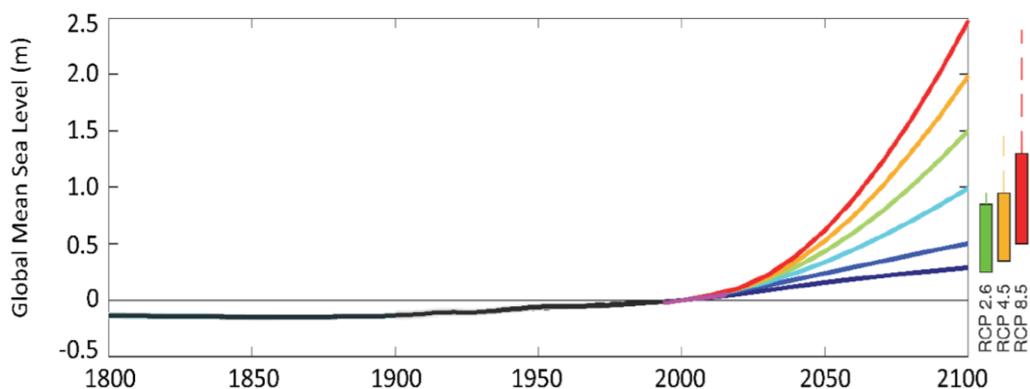
Given the broad implications of the Review and the diversity of expert researchers at the ANU, we have chosen to contribute a collated submission to the Senate Inquiry.

As a preamble to this submission, we wish to highlight some key advancements in the scientific understanding of climate change, and the implications of this for Australia’s National Security.

The urgency of climate change: Depending on Pacific Ocean circulation patterns, global warming could reach 1.5°C in 2026¹. The figure below shows recent research outlining global warming under negative (cool) and positive (warm) phases of the Interdecadal Pacific Oscillation.



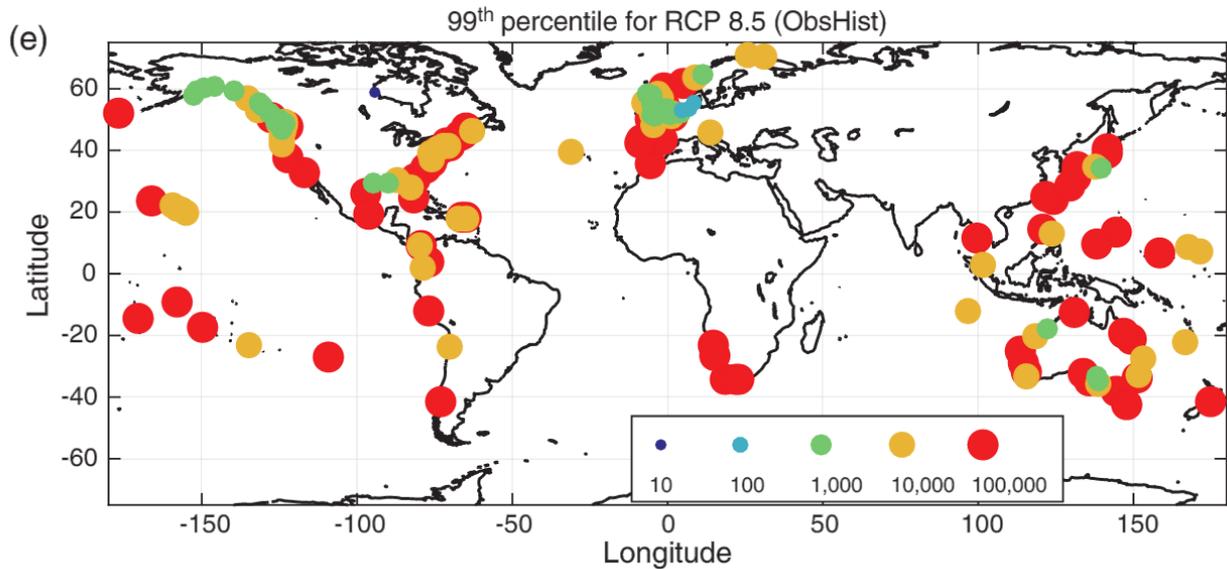
Sea level rise scenarios have been revised upwards: Recent research on potential future sea level rise (SLR) due to global warming has increased the upper-bound for expected SLR to 2.5m by 2100².



¹ <http://onlinelibrary.wiley.com/doi/10.1002/2017GL073480/full>

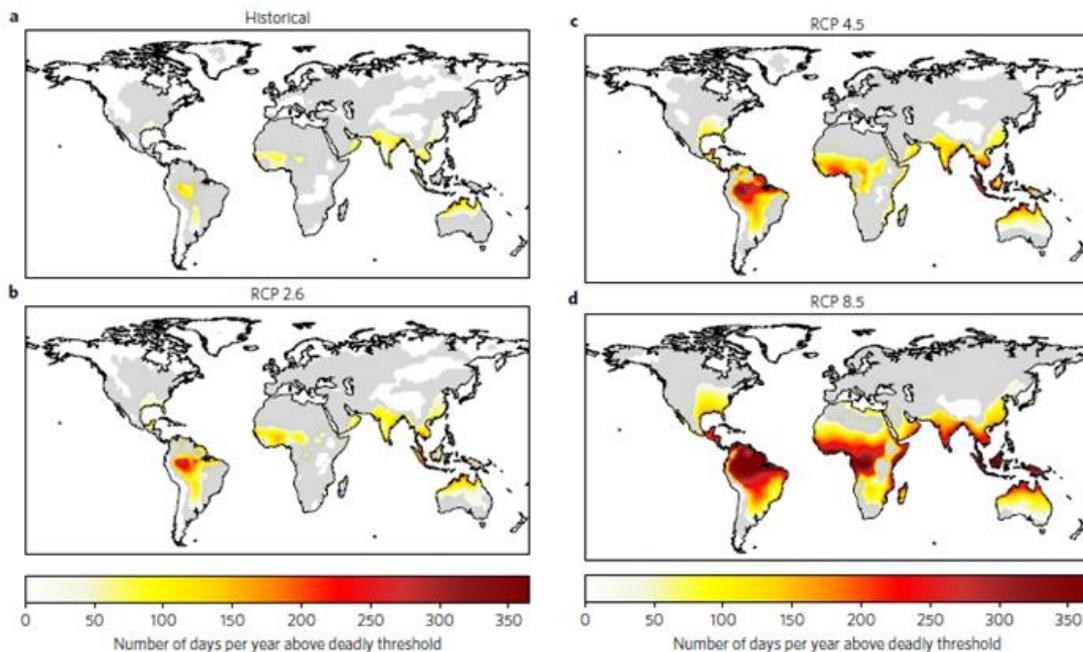
² https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf

Extreme events caused by SLR will increase: The changes to sea level described above will radically increase the frequency of what historically have been extreme sea level events³. 10,000x increase in likelihood means that a current once-a-century flooding level is reached every normal high tide.



Water stress and flood exposure will increase: Both water stress and flood exposure are likely to increase markedly with economic, social, environmental and displacement impacts⁴.

The number of deadly heat days will increase: The frequency and coverage of 'deadly heat days' will increase significantly⁵. This will impact on operational security but also on regional populations, leading to increased risk of disruption and displacement.



³ <http://onlinelibrary.wiley.com/doi/10.1002/2016EF000508/full>

⁴ <https://link.springer.com/article/10.1007/s10584-013-0948-4>

⁵ <https://www.nature.com/nclimate/journal/v7/n7/full/nclimate3322.html>

Table of Contents

Climate risks to national security (ToR a)

[Dr Andrew Glikson: Dangerous developments in the atmosphere-ocean-ice sheets system.....5](#)

[Associate Professor Jamie Pittock: Australian contributions to management of shared water resources for national security.....10](#)

Humanitarian and military responses to climate change (ToR b)

[Professor Justin Borevitz: The role of both humanitarian and military response in addressing climate change, and the means by which these responses are implemented.....17](#)

Overseas development for climate change (ToR d)

[Dr Matthew Dornan: Aid and climate finance.....18](#)

Mitigating climate change for national security (ToR e)

[ANU Energy Change Institute: Impacts of climate change mitigation and energy.....20](#)

Other matters: migration and labour mobility (ToR f)

[Dr Matthew Dornan: Migration and labour mobility.....24](#)

Climate risks to national security

The threats and long-term risks posed by climate change to national security and international security, including those canvassed in the National security implications of climate-related risks and a changing climate report by the United States Department of Defense

1. Dr Andrew Glikson: Dangerous developments in the atmosphere-ocean-ice sheets system
2. Associate Professor Jamie Pittock: Australian contributions to management of shared water resources for national security

Dangerous developments in the atmosphere-ocean-ice sheets system

Dr Andrew Glikson, Earth and paleo-climate scientist, Australian National University, email: Andrew.glikson@anu.edu.au.

Key message: Potential large-scale changes to the global climate pose risks for national security, particularly including the potential for displacement of people due to sea level rise and extreme weather events.

Summary

Developments in the atmosphere/ocean system reported by major climate research organizations (NASA, NOAA, NSIDC, Hadley-Met, Tyndall, Potsdam, the World's academies of science), and in Australia the CSIRO and BOM, include:

- A. An unprecedented rise rate of atmospheric greenhouse gases (CO₂, CH₄, NO₂) (Figures 1A and 1B) and temperature (Figure 2) implies ice melt rates, sea level rise (Figure 3)⁶ and extreme weather events⁷ would rise faster than anticipated.
- B. This rise is unlikely to be gradual. Paleoclimate evidence indicates that breakdown and melting of Greenland ice, apart from raising sea levels by some 4-5 meters⁸, is likely to result in the collapse of the North Atlantic Thermohaline current (NATC)⁹ (Figure 4) and thereby a deep freeze of the North Atlantic region, North America and western Europe.
- C. The increase in extreme weather events, when coupled with sea level rise on metres scale, is likely to hit major industrial centers in Europe and China. The flooding of delta and lower river valleys (Ganges, Indus, Mekong, Yellow River), where hundreds of millions of people live and which are the bread basket of entire countries, in particular in south and Southeast Asia (Figure 3).
- D. The flooding of low-lying Pacific islands and parts of Melanesia and Indonesia is bound to result in large numbers of displaced people, many attempting to reach Australia.
- E. The security implications of the above are clear—Due to extreme weather events, including in Australia¹⁰, such as droughts, heat waves, fires and storms (Figure 5)¹¹, major

⁶ <http://www.atmos-chem-phys.net/16/3761/2016/acp-16-3761-2016.pdf>

⁷ <http://www.ipcc.ch/ipccreports/tar/wg2/index.php?idp=354>

⁸ <http://iopscience.iop.org/article/10.1088/1748-9326/2/2/024002>

⁹ <https://scripps.ucsd.edu/news/climate-model-suggests-collapse-atlantic-circulation-possible>

¹⁰ <https://www.csiro.au/en/Research/OandA/Areas/Assessing-our-climate/Climate-change-QA/Extreme-weather>

¹¹ <http://www.dw.com/en/extreme-weather-whats-normal-what-isnt/a-18780989>

disruptions to food production and supply, communication systems, consequent famine, floods of refugees and armed conflict in several parts of the world would disrupt global order as we know it.

The Shift in the State of the Climate

The 2017 CO₂ level measured at the Mouna Loa Observatory as 406.75 ± 0.61 ppm, higher by 2.46 ppm than 2016¹², represent an acceleration of the rise of ~90 ppm CO₂ since 1957 (Figure 1A) at rates ranging between 2 and 3 ppm CO₂/year (Figure 1B). Extrapolating to the mid-21st century, by mid-century CO₂ level would reach 472 ppm (406+66 ppm). Adding the role of methane (>1800 ppb) (25 X 1.8 ppm = 45 ppm) the greenhouse gas concentration would breach the stability threshold of the Greenland and West Antarctica ice sheets of approximately ~500 ppm CO₂¹³ by mid-century. At ~750 ppm CO₂ the stability threshold of the East Antarctic ice sheet could be exceeded¹⁴ by the next century. Extrapolating a ratio of temperature rise (TC_R) to CO₂ rise (CO_{2R} for 1970-2017 of 78 ppm) (1.1C/78 = 0.014C/year) to mid-21st century (33X0.014 = 0.46C) mean global temperatures would reach ~2C on the continents, where mean temperature has already reached ~1.5C above pre-industrial levels¹⁵.

Linear projections of global temperature, however, are fraught with uncertainty. With perspective of the repeated stadial events (mid-interglacial freezing events due to extensive ocean cooling by ice melt water, such as the Younger dryas, the Laurentian melt event and earlier interglacial stadial events), A future collapse of the North Atlantic Thermohaline Current (Figure 4) would transiently reverse global warming around the Atlantic whereas the elevated atmospheric CO₂ and CH₄ would continue to warm other parts of the Earth, causing further climate disruptions. Due to increasing temperature gradients this would result in enhanced extreme weather events. In the wake of the stadial freeze a rise in temperatures would resume due to the high level of long residence atmospheric greenhouse gases inherited from the industrial age.

¹² <http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/long-range/forecasts/co2-forecast>

¹³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4822588/>

https://websites.pmc.ucsc.edu/~jzachos/pubs/Zachos_Dickens_Zeebe_08.pdf

¹⁴ <http://www.nature.com/nature/journal/v455/n7213/full/nature07337.html>

¹⁵ <http://berkeleyearth.org/summary-of-findings/>

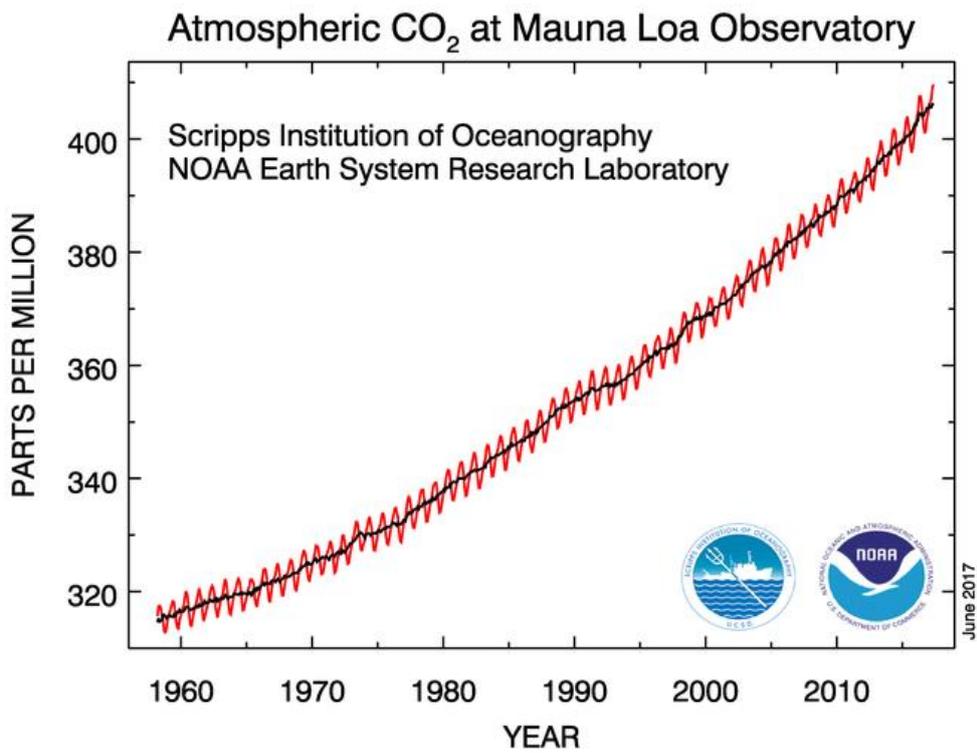


Fig. 1A – Global CO₂ trend 1960-2017
<https://www.esrl.noaa.gov/gmd/ccgg/trends/full.html>

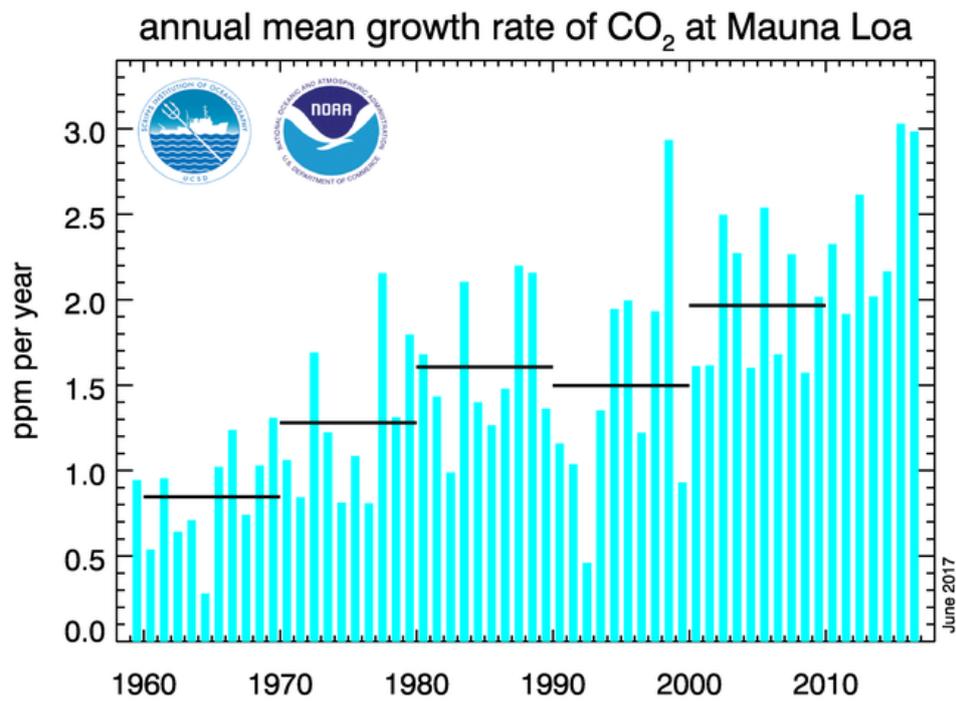


Figure 1B – CO₂ rise rates 1960-2017 <https://www.esrl.noaa.gov/gmd/ccgg/trends/gr.html>

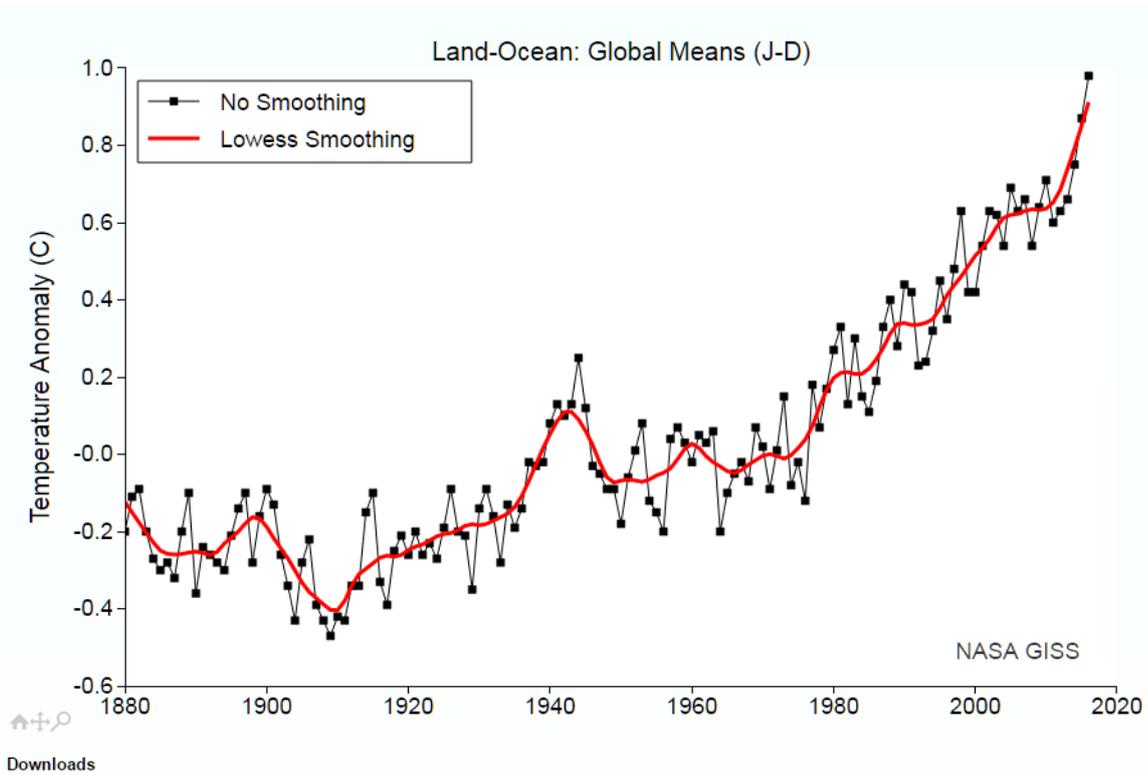


Figure 2 – Global mean land-ocean temperature anomalies relative to base line 1951-1980 1880-2017
<https://data.giss.nasa.gov/gistemp/graphs/customize.html>

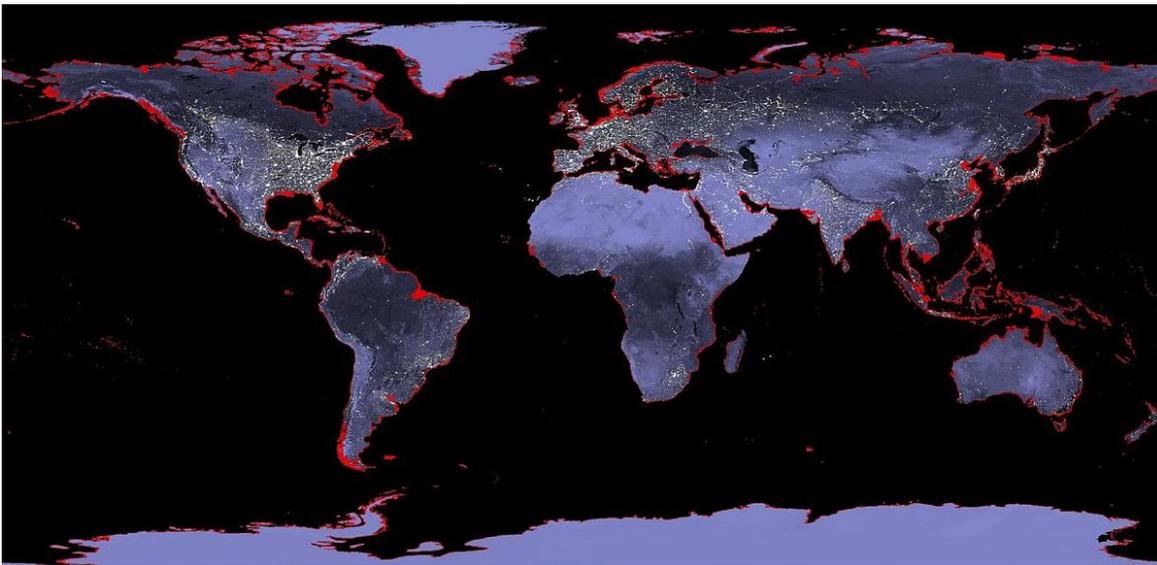


Figure 3. Flooding consequent on Six meters sea level rise
https://commons.wikimedia.org/wiki/File:6m_Sea_Level_Rise.jpg

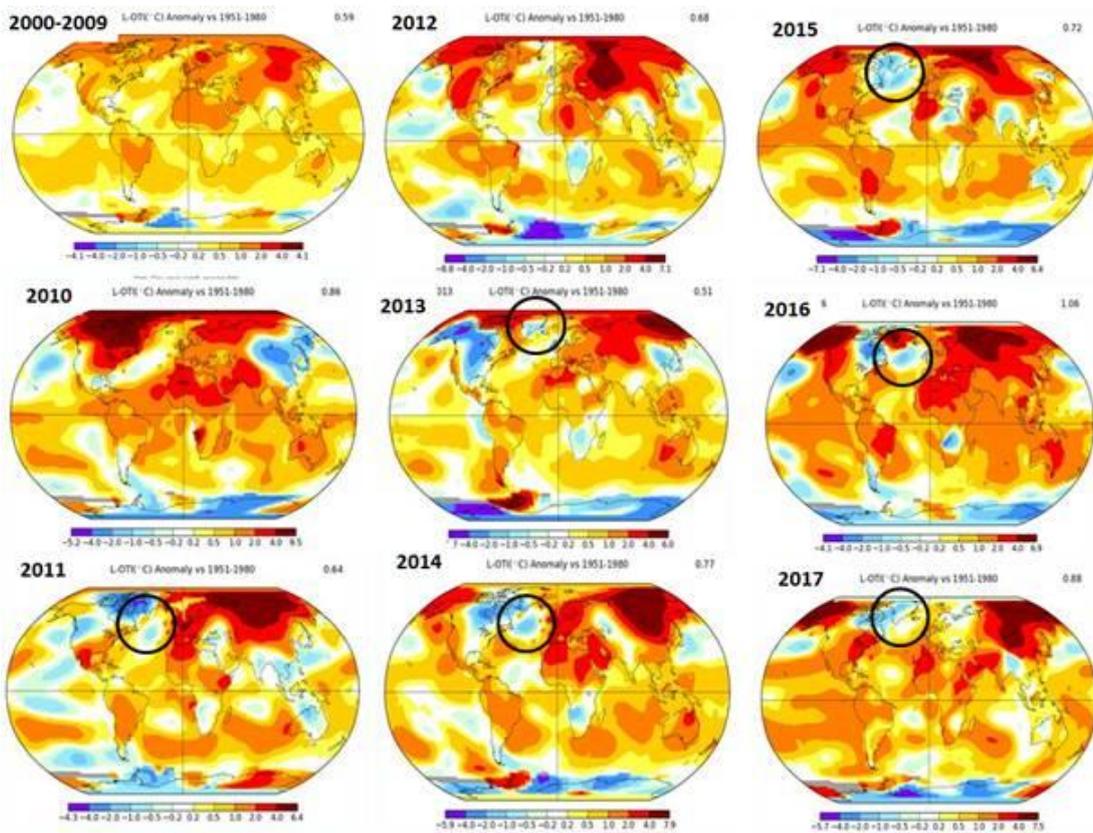


Figure 4. The growth in the cold water region of the North Atlantic Ocean south of Greenland. <https://data.giss.nasa.gov/gistemp/maps/>

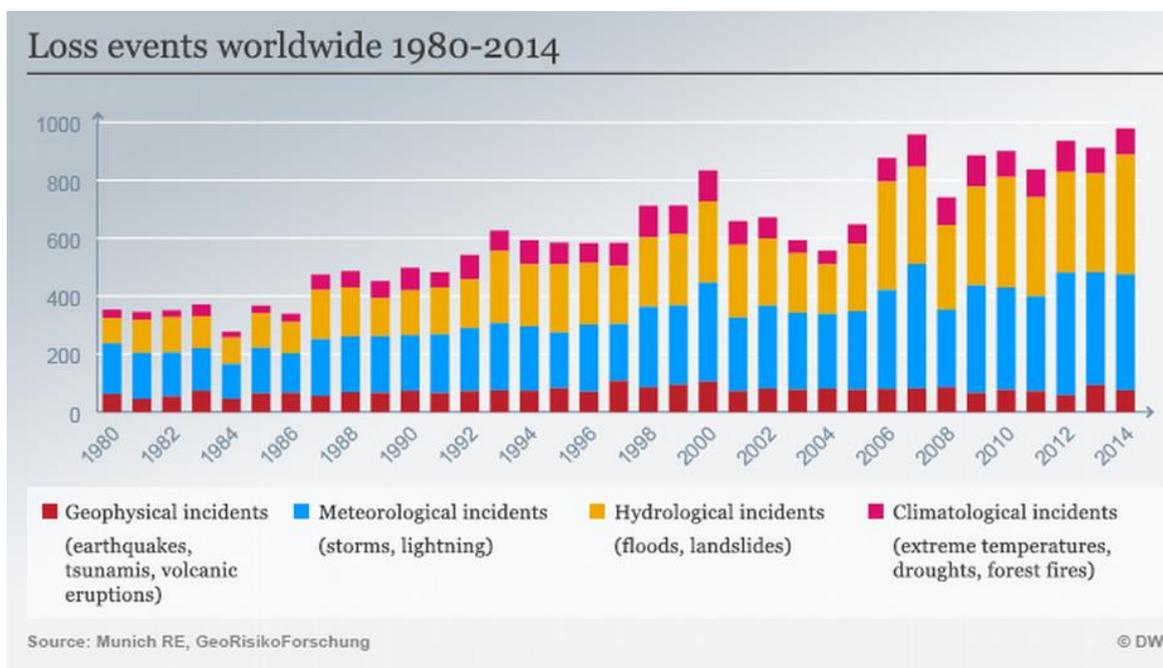


Figure 5. The rise in extreme weather events 1980-2014 <http://www.dw.com/en/extreme-weather-whats-normal-what-isnt/a-18780989>

Australian contributions to management of shared water resources for national security

Associate Professor Jamie Pittock, ANU Fenner School of Environment and Society, ph: +61 (0)2 6125 5563, email: Jamie.Pittock@anu.edu.au.

Key message: Climate change will increase risks to national security posed by transboundary water resources. Management solutions are available.

Challenges

Many of the worst impacts of climate change will be expressed through changes to water: too little with droughts, too much with flooding, too quickly through more intense storms. This is at a time when water is becoming increasingly scarce as global demand grows for greater consumption to grow the food needed to feed a larger population of wealthier people consuming thirstier products.

Most of the world's water resources are shared: transboundary lake and river basins account for 60% of global freshwater. Current figures indicate that there are (at least) 286 transboundary river basins¹⁶ and 592 transboundary aquifers¹⁷. In the past shared water resources have been a focus of cooperation between nations, but as water becomes scarcer and less reliable there are fears that it will be a source of greater conflict. Already some researchers ascribe conflicts in places like Darfur and Syria to drought and water scarcity. Existing agreements, such as those that apportion historical water flows will become ineffective as climate changes water availability. Further, as the limits of exploitation of more and more of the world's rivers are being reached, conflicts over water will increase.

Around the world the places where Australia is concerned over conflicts and gaining refugees involve growing water scarcity, including in the Middle East, South Asia and north east Africa. In the past, Federal Government agencies have recognised this. Fairfax media reported from WikiLeaks supplied cables on 16th December 2010 that the then deputy director of Australia's Office of National Assessment was briefing the US Embassy in Canberra on the dangers of climate change induced instability over shared rivers between India and Pakistan, and between China and its neighbours. In terms of reduced water flows from the Himalayas' the cable is quoted as warning of a "cascade of economic, social and political consequences".¹⁸

¹⁶ Oregon State University counted 310 recently and is validating the data.

¹⁷ Transboundary river basin delineations and areas as well as presence of an agreement and of a basin organisation: Global Environment Facility supported Transboundary Waters Assessment Programme (TWAP) <http://www.geftwap.org/twap-project> – International Freshwater Treaties Database, Oregon State University <http://www.transboundarywaters.orst.edu/database/interfreshwatertreatdata.html> – Information about transboundary aquifers : regional inventories of the UNESCO-led Internationally Shared Aquifer Resources Management, database of the UNESCO International Groundwater Resources Assessment Centre (IGRAC) <https://www.un-igrac.org/>

¹⁸ 2010 Fairfax report: <http://www.smh.com.au/national/climate-change-warning-over-southeast-asia-20101215-18y6b.html#ixzz39we6tCvi>

It is in Australia's national interest to prevent conflict over and stimulate good governance of international waters. Better governance of shared rivers – particularly in Asia - is in Australia's national interest to promote peace and security, sustainable development, and to prevent further displacement of people. Australia is involved diplomatically and militarily in promoting peace and sustainable development in river basins like those of the Tigris and Euphrates (Iraq and Syria), Indus (Pakistan and Afghanistan), and the Nile (Sudan) where conflict creates security concerns for Australia. In other places in Asia shared rivers without co-management agreements are on sensitive borders, such as between Indonesia and Timor Leste and also Papua New Guinea.

Solutions

There are three main interlinked approaches for promoting good governance of shared waters, including:

- a) Sharing hydrological data to inform decision making and enhance cooperation;
- b) Promoting the establishment of better governance institutions, such as river basin management organisations; and
- c) Codifying international laws to set standards and provide dispute resolution procedures for good governance of shared waters.

These are outlined in turn below.

Sharing hydrological data

Data on water enables managers to assess changes, predict required responses and better prepare for extreme events like droughts and floods. Unfortunately a number of nations like India regard hydrological data as confidential information inhibiting cooperation with neighboring states.

Australia has a long history of innovation with water monitoring for better management. World leading technology for measuring and electronic reporting of water resources has been developed and deployed in places like the Murray-Darling Basin. The Bureau of Meteorology's national water accounting system is one of the best in the world. Exporting this technology and expertise could enable Australia to help other nations build confidence and cooperate in better managing shared waters.

Better governance institutions

Shared waters require common organisations, like river basin commissions, to bring together relevant governments to regularly discuss and resolve management challenges. This will become more important as the hydrology changes with the climate. Australian institutions and experts are highly regarded in the field of transboundary water and river management. Australia's aid

investments in better river management in places like the Mekong River Basin are exactly the sort of measures that may enhance our national security by promoting better governance in our region.

International law – the UN Watercourses Convention

Only 40% of the world's shared rivers are subject to existing bilateral or basin treaties and 80% of water basins do not have treaties covering all states. Many of the existing treaties are incapable of dealing with new challenges, such as changes to hydrology following climate change.

Hard international law is needed to codify standards for cooperative management because and when:

1. Rivers and lakes do not respect political or administrative boundaries – indeed, they are often the basis of conflict;
2. National legislation is non-existent, outdated and/ or does not cover shared water(s);
3. Mechanisms needed to prevent water from being held, diverted, or polluted by one country to the disadvantage of others;
4. Harmonization even within countries / between basins with same riparians; States struggle to implement multiple agreements in a coordinated fashion;
5. Need for procedures or frameworks for considering claims or resolving disputes over transboundary water resources (three quarters of the world's countries face potential disputes with neighbors over shared rivers, lakes, wetlands or aquifers).

Two treaties have entered into force to enhance governance of shared waters. The Convention on the Law of the Non-Navigational Uses of International Watercourses (UN Watercourses Convention - UNWC) is a flexible and overarching global legal framework that establishes basic standards and rules for cooperation between watercourse states on the use, management, and protection of international watercourses. It defines nation states' right to use waters while doing no significant harm to neighbors and sustaining river health. Importantly, it provides a graduated series of dispute resolution procedures. The Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention; ECEWC) is intended to strengthen national measures for the protection and ecologically sound management of transboundary surface waters and ground waters. The Convention obligates parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management. Initially negotiated as a European instrument in 1992, the Convention was amended in 2003 to allow accession by all the United Nations Member States. More information on these treaties is provided in the annexes.

Australia has not ratified either treaty. It may seem odd for an island nation to accede to a treaty that codifies customary international law for the rivers and lakes shared by two or more countries, yet we believe there is a compelling rationale for Australia to become a contracting party to (one or both) conventions. At the very least Australia should ratify the UN Watercourses Convention. Ratification would cost Australia very little, enhance our ability to promote cooperation over conflict in management of shared waters in Asia, as well as support export of Australian water management expertise and technologies. The treaties have no domestic application in Australia.

In 1997 in the UN General Assembly, Australia voted for the UN Watercourses Convention, which was adopted in a vote of 103 to 3. Australian officials have questioned whether the Convention can be effective without membership of major nations, especially in Asia. We argue that Australia acceding would be a strong signal. Vietnam acceded to the convention, bringing it into force. Regional meetings in the Mekong show a heightened interest, e.g. of Cambodia to start using some of the tools provided by the UNWC to fill the gaps in the existing agreement. The following states are in different stages of deliberating accession: Gambia (currently in Parliament), Ghana, Belgium, Romania, Lithuania, Myanmar (internal process expected to be finalized by end of 2017), Senegal, Republic of (South) Korea, Paraguay, Costa Rica, Tanzania and Cambodia. Several countries have announced that they are internally deliberating accession to one or more of the Conventions (among them Japan, Kenya, Uganda, Ethiopia, Mexico).

Relationship to the UN Sustainable Development Goals

Lastly, Australian contributions to better management of shared waters can increase our security by helping to implement the UN Sustainable Development Goals. Australia is one of the front-runners for implementing the SDG6 and water-related targets in other SDGs as a member of the High Level Panel on Water. Australia can assist in “setting the tone” especially in contributing in different ways to the implementation of SDG 6.5 and 6.6. Accession to the UN Watercourses Convention by Australia would support action 8 of the High-level Panel (HLP) on Water action Plan and would set an example. (Action 8: “Endorse/promote such agreements and instruments that are likely to help with water transboundary issues”).

SDG Target 6.5 is: “By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate”.

SDG Target 6.6 is: “highlights the need to consider water and groundwater dependent ecosystems and act accordingly to restore such ecosystems” (SDG15).

The conventions:

- Stimulate cooperation among countries and involvement of stakeholders at large.
- Fix gaps in existing water agreements e.g. notification and conflict resolution (examples: Mekong, Grand Ethiopian Renaissance Dam (GERD) project etc.).
- Complement other treaties/ conventions (general obligation to protect and maintain the ecosystems of international watercourses also in other treaties). Complete set of laws at various levels on protection and enhancement of water quality, water quantity and the infrastructure for international watercourses.
- Stimulate Knowledge and information exchange.
- Give guidance on accountability and transparency: clear responsibilities and rights and incorporate other stakeholders.

In summary, climate change impacts on shared waters around the world present a risk of increased conflict that would diminish Australia's national security. Australia has the opportunities through our technologies, experience and promotion of better governance to make a substantial contribution to collaborative governance of these resources. We urge the inquiry to consider: a) promotion of Australia river basin management expertise, and b) ratification of the UN Watercourses Convention.

Annex 1: Status of Governance of Transboundary Basins

- > 60% of transboundary basins do not have any agreements in place
- 80% of existing agreements are bilateral/do not necessarily involve all basin states
- Many agreements *do not*:
 - ❖ Provide for regular data-sharing/ notification.
 - ❖ Establish water allocation & benefit-sharing criteria/processes.
 - ❖ Contain dispute prevention/settlement rules.
 - ❖ Apply to entire river basin / aquifer system, etc.

In 1997, more than 100 nations gathered to adopt the Convention on the Law of the Non-Navigational Uses of International Watercourses (UN Watercourses Convention - UNWC) – a flexible and overarching global legal framework that establishes basic standards and rules for cooperation between watercourse states on the use, management, and protection of international watercourses¹⁹.

The UN Watercourses Convention today (2017) counts 36 contracting parties. The UNWC does currently not have any provisions for a governance structure but informal discussions about this

¹⁹ http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-12&chapter=27&lang=en, <http://wwf.panda.org/UNWC> and www.unwatercoursesconvention.org.

are ongoing. The [Convention on the Protection and Use of Transboundary Watercourses and International Lakes](#) (Water Convention; ECEWC) is intended to strengthen national measures for the protection and ecologically sound management of transboundary surface waters and ground waters. The Convention obliges Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management. Initially negotiated as a regional instrument in 1992, the Convention was amended in 2003 to allow accession by all the United Nations Member States. The amendment entered into force on 6 February 2013, turning the Convention into a global legal framework for transboundary water cooperation²⁰.

The water convention currently has 41 contracting states and the amendment has been ratified by 37+ states. The Secretariat for the UNECE WC is based in Geneva with the UNECE. Currently, 15 countries are party to both conventions; hence 62 countries are party to one or both conventions.

The “Draft articles on the Law of Transboundary Aquifers”²¹: in 2013 the draft resolution entitled “The law of transboundary aquifers” (A/C.6/68/L.25) was adopted as guidance for bilateral or regional agreements and arrangements for the proper management of transboundary aquifers. The draft articles were discussed again in November 2016²² and are seen as “as guidance for bilateral or regional agreements and arrangements for the proper management of transboundary aquifers” (A/C.6/71/L.22). The draft laws will be discussed again in 2019. UNESCO-IHP is the “custodian”.

Annex 2: Status of the UN Watercourses Convention (UNWC) and UN Economic Commission for Europe Water Convention (UNECE WC) 2017:

- 36 states have ratified (January 2015)
- UNWC into force 17 August 2014
- 15 States have ratified/ acceded to both conventions > 62 States are a Party to one/ both conventions
- All original parties to the ECEWC have now ratified the amendment, also in practice making it possible for countries from outside the UNECE to accede to the WC²³

Status of the Conventions (2017):

Country	Signatory Convention 1997	Ratified / Party UN Convention 1997 (into force August, 17 2014)	Party UNECE Convention	Ratified amendment 1992 Convention (into force 6/2/2013)
Albania			x	X

²⁰ http://www.unece.org/fileadmin/DAM/env/documents/2009/Wat/MOP5/ECE.MP.WAT.2009.L.2_EN.pdf

²¹ <http://www.un.org/en/ga/sixth/68/TransAquifers.shtml>

²² http://www.un.org/en/ga/sixth/71/transboundary_aquifers.shtml

²³ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-5-b&chapter=27&lang=en

Armenia				
Austria			x	X
Azerbaijan			x	X
Belarus			x	X
Belgium			x	x
Benin		X		
Bosnia and Herzegovina			x	x
Bulgaria			x	x
Burkina Faso		x		
Chad		X		
Côte d'Ivoire	x	X		
Croatia			x	x
Cyprus				
Czech Republic			x	x
Denmark		x	x	X
Estonia			x	x
Finland	x	x	x	x
France		x	x	x
Georgia				
Germany	x	x	x	X
Guinea-Bissau		x		
Greece		x	x	x
Hungary	x	x	x	x
Iceland				
Iraq		x		
Ireland		x		
Italy		X	x	X
Jordan	X	x		
Kazakhstan			x	x
Latvia			x	x
Lebanon		X		
Libyan Arab Jamahiriya		x		
Liechtenstein			x	X
Lithuania			x	X
Luxembourg	x	X	x	x
Malta				
Moldova			x	x
Monaco				
Montenegro		x	x	x
Morocco		x		
Namibia	x	x		
Netherlands	x	x	x	x
Niger		X		
Nigeria		x		
Norway	x	x	x	X
Paraguay	x			
Poland			x	x
Portugal	x	x	x	x
Qatar		x		
Romania			x	x
Russian Federation			x	X
Serbia			x	x
Slovakia			x	x
Slovenia			x	x
South Africa	x	x		
Spain		x	x	x
State of Palestine		X		
Sweden		x	x	x
Syrian Arab Republic	x	x		
Switzerland			x	x
The former Yugoslav Republic of Macedonia			X	X
Tunisia	x	x		
Turkmenistan			X	
Ukraine			x	X
United Kingdom		X	(signatory)	
Uzbekistan		x	x	X
Venezuela	x			
Vietnam		x		
Yemen	X			
European Community/ Union			x	x
Total	16	36	41	40

Humanitarian and military responses to climate change

The role of both humanitarian and military response in addressing climate change, and the means by which these responses are implemented

Opportunities for addressing climate change through Defence

Professor Justin Borevitz, ANU Research School of Biology, ph: 02 6125 3068 email: justin.borevitz@anu.edu.au.

Key message: Defence presents an institutional framework through which climate change can be addressed as a national security challenge.

Defence plays a key role in disaster preparedness and response, such as responding to the disaster in Aceh from the tsunami. It can identify weaknesses in infrastructure, power, water, roads and other critical facilities, that if lost would cripple populations. Rather than military targets, intervention prior to natural disaster can save lives and money and build compassion and social cohesion. In the USA, the Army Corps of Engineers has led several initiatives for ecosystem/environmental management in response to major weather events²⁴.

The Australian military can develop unbiased plans for Australia's coastline, power, water and even urban water treatment systems, using risk management approaches that bypass capture by special interests²⁵. It can organize essential industrial capacity to make preparations and assist in nation building. These activities would include mitigation, adaptation, and climate systems intervention. Such national service can also be applied in our greater region and may galvanize a new generation of public service youth. The Defence sector is bipartisan and can draw expertise from other sectors; academic, agriculture, mining, energy, water, land.

Recognition of climate change as a national security issue is appropriate given the current climate emergency unfolding (refer to response to ToR question a response). Environmental security in the region underlies food security, which is necessary for social and economic stability. Failure to provide this leads to cascading disasters and failed states which would threaten the social order of Australia and the world²⁶. Our time to act on climate change is now. Australia has the capacity and responsibility (as a large per capita emitter²⁷) to lead in providing environmental security at home and abroad. Through utilising the existing capacity of Defence in Australia, critical early steps toward addressing climate change as a national security challenge can be taken.

²⁴ <http://www.pnas.org/content/103/40/14653.short>

²⁵ <http://onlinelibrary.wiley.com/doi/10.1111/ajph.12349/full>

²⁶ <http://onlinelibrary.wiley.com/doi/10.1111/1758-5899.12074/full>

²⁷ <https://www.nature.com/articles/srep20281>

Overseas development for climate change

The role of Australia's overseas development assistance in climate change mitigation and adaptation more broadly;

Aid and climate finance

Dr Matthew Dornan, ANU Development Policy Centre, ph: +61 2 6125 1592, email: matthew.dornan@anu.edu.au.

Key message: Aid and climate finance is an important mechanism for promoting positive standing for Australia in the international community.

Introduction

This submission compiles various pieces of work from researchers based at the Australian National University Development Policy Centre (Devpolicy), a think tank for aid and development serving Australia, the region, and the global development community.

The submission is intended to be brief and selective. This first section is focused on Australia's development assistance and climate finance (point d. in the terms of reference). An additional contribution prepared by the ANU Development Policy Centre is focused on the role that migration and labour mobility opportunities can play in increasing climate resilience in the region and is located under point f. in the terms of reference. Thank you for the opportunity to make a submission. I would be happy to discuss it further, as would the colleagues on whose work I draw.

Aid and climate finance

The challenges that climate change presents in developing countries cannot be dissociated from broader development challenges. Approximately 10% of the world's population, or nearly 800 million people, live on less than \$1.90 per day. 30% live on less than \$3.10 a day. People living in extreme or moderate poverty are especially vulnerable to changes in the climate. They both lack the financial resources to adapt to climate change, and are disproportionately reliant for their livelihoods on natural resources affected by a changing climate. Since some climate change impacts are no longer avoidable, assistance for adaptation in developing countries is needed. As for the avoidance of impacts, investments in climate change mitigation in developing countries offer high return on investment relative to similar investments in developed countries. Australia has recognised this in the past, advocating for and making investments in efforts to reduce tropical deforestation as one particularly low-cost climate change mitigation strategy. Many developing countries are unlikely to invest in climate change mitigation initiatives entirely from their own budgets, given their broader economic development objectives and fiscal constraints, and require at least some international incentives to adopt lower-carbon, higher-cost policies. Developed countries like Australia have a role to play in helping to fund adaptation and mitigation initiatives in developing countries. The need to assist "particularly vulnerable" developing

countries to adapt to climate change was recognised by developed countries in the 1992 United Nations Framework Convention to Climate Change (UNFCCC). At the 2009 Copenhagen Summit, developed countries pledged US\$30 billion in so-called fast-start finance for the period 2010 through 2012, and committed to mobilise US\$100 billion in “new and additional resources” every year for both mitigation and adaptation in developing countries by 2020. While it was never envisaged that all of this commitment would comprise public funding, public aid budgets have an important role to play, particularly in the case of adaptation, since adaptation cannot be traded in regional or global markets in the same way as mitigation.

The Australian Government’s climate finance commitments have to date been disappointing. Robin Davies has previously written²⁸ about how the Turnbull Government’s climate finance pledge made at COP 21 (A\$1 billion over five years) compares unfavourably with those of most other bilateral donors. The allocation of an annual A\$200 million represents a continuation of funding provided over the 2010-12 fast start period, at a time when most other developed countries significantly scaled up their commitments. The Turnbull Government’s climate finance pledge also coincides with broader reductions in Australia’s aid budget, which has declined over 30% in real terms since 2013.

Australia’s international standing is affected by performance on aid and climate finance. There is no doubt that perceptions about Australia’s climate finance commitments, combined with perceived weakness with respect to climate change mitigation, have damaged Australia’s standing internationally. Nowhere is this more evident than in the Pacific islands region, where, rightly or wrongly, Australia is viewed internationally as having a special responsibility²⁹. The Government has played a leadership role in the design and governance of the Green Climate Fund (for which it should be commended), and the Fund’s secretariat is now led by a distinguished Australian. It should now match that engagement with an increased funding commitment. Going forward, there will be international pressure to do so. Bob McMullan and Robin Davies, in a recent Devpolicy policy brief³⁰, note that it “seems unlikely that Australia will get away indefinitely with the ‘business as usual’ financing announced by the Prime Minister”. They note also that at the time of Australia’s fast-start commitment there was an understanding that climate change financing would account for around 5% of Australia’s aid budget.

²⁸ <http://devpolicy.org/climate-finance-the-paris-opera-and-australias-unsupporting-role-20151202/>

²⁹ Take for example the Fiji Prime Minister’s 2015 description of Australia as siding with the “coalition of the selfish”. This criticism, while serving a political purpose of the Fiji Prime Minister’s, nonetheless resonates with many Pacific Islanders.

³⁰ http://devpolicy.org/publications/policy_briefs/PB18AllocationprioritiesAustralia2017aidbudget.pdf

Strategies for aid and climate finance

To address these challenges, the Australian Government may revisit its 'business as usual' approach to the provision of climate finance, increasing its funding commitment to at least \$300 million annually by 2020. While such funding is likely be delivered through the aid program, the increase could be funded from an overall increase in the aid budget, rather than coming at the expense of existing aid programs. There is a strong case, on general grounds, for Australia's aid program to grow back to a level of \$6 billion or more by 2020, of which \$300 million would constitute 5%. For efficiency reasons, the majority of any additional funding in this area should be channelled through the Green Climate Fund or the multilateral development banks. That said, it may make sense to channel such funding bilaterally in the case of some of the smallest Pacific island countries which can find it challenging to access multilateral funds.

Mitigating climate change for national security

The role of climate mitigation policies in reducing national security risks

Impacts of climate change mitigation and energy

ANU Energy Change Institute, ph: + 61 (0)2 6125 4702 email: energy.change@anu.edu.au.

Key message: Climate change mitigation policies will change energy provision systems in Australia, causing impacts – both positive and negative – on national security.

The variety of potential changes associated with climate change models is substantial, with similarly widely-varying implications for the national security challenges that are generated by climate change³¹. By contrast, policies implemented in Australia designed to mitigate climate change (“climate mitigation policies”) have perhaps more predictable effects on Australia’s national security.

Here we assess the implications of climate mitigation policies in terms of Australia’s national security objectives – specifically, protecting and strengthening Australian sovereignty, ensuring a safe and resilient population, securing Australian assets, infrastructure and institutions, and promoting a favourable international environment³². We organize our comments around two types of policy goals that are central to climate mitigation strategies: the decarbonisation of fuels used in Australia’s primary energy supply, and measures designed to reduce the amount of energy used in economic activities (i.e. energy productivity).

We note that historically, interest in the national security risks of energy use concentrated on supply chain interdiction associated with the importation of fossil fuels, particularly oil and oil products, and the economic impacts of energy price volatility. This is also the case for Australia as the energy balance has shifted in the oil sector towards imports, and refinery capacity has fallen³³.

The risks of energy import dependence fall as the flexibility of energy markets increases. Climate mitigation policies can also reduce energy security risks, to the extent they increase the diversity of energy supplies, and the use of domestically produced resources for providing energy services, thus strengthening Australian sovereignty³⁴. Increasing the share of solar photovoltaics, wind power, pumped hydro, and other sources of domestically generated renewable energy in power generation contribute to the goals of diversification and reducing import dependence.

³¹ CSIRO. 2015. Climate Change in Australia: Technical Report.

³² Commonwealth of Australia. 2013. Guide to Australia’s National Security Capability.

³³ Blackburn, J.O. 2013. Australia’s Liquid Fuel Security: A Report for NRMA Motoring and Services.

³⁴ McCollum, David L., et al. 2013. “Climate policies can help resolve energy security and air pollution challenges.” *Climatic Change* 119.2: 479-494.

Policies that promote the electrification of transport through the deployment of battery electric vehicles, plug-in hybrid vehicles, and other technologies, will reduce the role of oil in the economy, thus reducing any residual physical supply vulnerability associated with oil import dependence, as well as reducing the economic impact of oil price volatility. Other domestically-fuelled technology options in the transportation sector – such as compressed (unconventional) natural gas, biofuels and other synthetic fuels, should have similar positive effects on national security risks.

Amongst this, natural gas is a case that warrants special attention in considering the relationship between climate change mitigation and national security. Deep decarbonisation scenarios for climate change mitigation point to a reduced, but ongoing role for natural gas in Australia's energy mix³⁵. An increased role for natural gas in power generation promotes the policy goal of supply diversification, in addition to supporting the domestic production of Australian energy needs, subject to important infrastructure constraints.

In addition, Australia has emerged as an important supplier of natural gas to the Asia-Pacific region through the increased exports of Liquefied Natural Gas³⁶. If we adopt a broader definition of national security, the increased role of Australia as an energy exporter contributes to a favourable international environment by increasing the share of energy exports provided by a politically stable market economy, while providing an opportunity for energy importers such as Japan and China to diversify their energy supplies geographically, a key goal of each countries' energy policy strategies.

The national security co-benefits of climate mitigation policies are tempered, however, by the increased economic costs that may be incurred through any disruption to the electricity network, given any increase in electrification. This increases the importance of a robust regime that manages risks from cyberattacks, and assesses national security risks associated with the purchase of infrastructure by non-Australian firms. Finally, any efforts by governments to implement geo-engineering policies, unilaterally, or in cooperation with others, without robust assessment of the risks, could generate elevated national security risks.

In summary, policies in the energy sector designed to mitigate climate change should increase Australian national security through promoting diversification and the availability of domestic energy supplies, through the development of:

³⁵ Sustainable Development Solutions Network and Institute for Sustainable Development and International Relations, 2014. Pathways to Deep Decarbonization: Australia Chapter.

³⁶ Cronshaw, I, Grafton, Q, and Hughes, L. 2017. "Discussion Paper: Increasing the Use of Natural Gas in the Asia-Pacific Region" Council on Foreign Relations. Available at: https://www.cfr.org/sites/default/files/report_pdf/Discussion_Paper_Cronshaw_Grafton_Hughes_Gas_in_Asia-Pacific_OR_1.pdf

- renewables – primarily solar and wind
- unconventional gas – coal seam, shale, tight gas – replacing coal
- liquid fuels – shale oil, biofuel, synthetic fuels – replacing petroleum
- widespread electrification – in transport, household cooking and heating, and industrial processes – powered by predominantly domestic, low-carbon energy sources
- nuclear power, which uses very small fuel volumes.

There are nevertheless risks to be considered, including:

- Greater opportunities for cybersecurity interdiction in disseminated energy systems
- Potential nuclear proliferation
- Potential domestic energy security issues through energy transitioning problems
- Security risks from global (and unilateral) geo-engineering

ANU Energy Change Institute contribution prepared by Professor Ken Baldwin, Associate Professor Llewelyn Hughes, and Dr Christian Downie.

Other matters: migration and labour mobility

Any other related matters

Migration and labour mobility

Dr Matthew Dornan, ANU Development Policy Centre, ph: +61 2 6125 1592, email:

matthew.dornan@anu.edu.au.

Key message: Labour mobility between Australia and Pacific Island countries can promote economic development and climate resilience in the Pacific region.

Introduction

This submission compiles various pieces of work from researchers based at the Australian National University Development Policy Centre (Devpolicy), a think tank for aid and development serving Australia, the region, and the global development community. This contribution on migration and labour mobility follows from an earlier section pertaining to point *d* in the Terms of Reference, included above, by the ANU Development Policy Centre.

Migration and labour mobility

Employment provided as a result of migration or temporary labour mobility schemes is of considerable economic benefit to poor people from developing countries. In providing cash income and supporting economic development through remittances and skills development, such opportunities have the potential to increase resilience to climate change among affected communities in developing countries—providing livelihood opportunities to families that might otherwise have none available.

Australia's provision of migration and labour mobility opportunities is especially important in the case of our immediate neighbours in the Pacific Islands. Australia's unique role and responsibility in the Pacific Islands has long been recognised in Australian foreign policy. A significant portion of our aid budget is directed toward these countries. Small changes in Australian policy, whether in relation to aid, defence or migration policy, have significant ramifications for small island states in the region.

The economic benefits from labour mobility for Pacific island countries are well established. Pacific Possible: Labour Mobility³⁷, a report co-authored by researchers from the Development Policy Centre and the World Bank, projects that the potential benefit for the Pacific Islands of expanding labour mobility to developed countries is in the order of \$10 billion dollars. Australia has already moved to increase access to the Australian labour market for Pacific Islanders. The establishment and formalisation of the Seasonal Worker Program (SWP) in 2012 has benefitted

³⁷ <http://pubdocs.worldbank.org/en/555421468204932199/pdf/labour-mobility-pacific-possible.pdf>

both Australian employers and Pacific Islander workers. The announcement of a ‘micro-states’ visa as part of the Northern Australia policy is likely to do the same.

More can be done. Pacific Possible: Labour Mobility points to a series of ‘win-win’ opportunities that are available. It argues for the introduction of a permanent Pacific visa to Australia, mirroring New Zealand’s existing Pacific Access Category, which is widely deemed a success. These visas would require a job offer and be available by lottery, thus limiting overall numbers (which should be consistent with the needs of the Australian labour market) and ensuring that migrants are not reliant on social security. The report also recommends an ‘Atoll Access Agreement’ be considered with three atoll states (Kiribati, Tuvalu and Nauru): states which do not have good economic prospects, do not have free access to the labour markets of another developed economy, and which are expected to be significantly impacted by climate change. In addition to these migration pathways, the report also identifies opportunities for expanding Pacific Islander access to temporary work opportunities—both through measures to expand uptake of existing schemes like the Seasonal Worker Program, and through establishment of new programs. It also identifies training and skills development priorities. For further detail, please see the report (a four page summary of which is also available).

The provision of such opportunities need not be considered charity. An ageing Australian population will change both labour demand in Australia and the composition of the labour market. Industries and occupations such as aged care and personal carers are well suited to match to Pacific labour mobility. Expanding labour mobility and migration opportunities thus makes economic sense for Australia. It can also deliver real and significant development benefits in the region, thereby helping poor people in developing countries cope with the effects of climate change. However, this will be difficult to achieve in a reactive manner. We must look ahead and carefully plan how labour mobility can both assist Australia better meet its labour market needs (in the context of an ageing society) and assist poor people from our region who are adversely affected by climate change.

Opportunities

The Australian Government may expand labour mobility and migration opportunities available to Pacific Islanders, both with a view to addressing labour market shortages in selected industries, and in order to promote economic development and climate resilience in the Pacific. Measures that could be considered include a permanent Pacific visa to Australia (such as exists in New Zealand) and an ‘Atoll Access Agreement’ for countries severely affected by climate change.