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Climate change, security and the Australian Defence Force

a presentation to the Institute on 29 March 2016 by

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With global surface warming currently tracking towards +3.7°C (rather than the international +2°C target) by 2060, compounded by global population rising to 10 billion, climate change and its concomitant effects pose an existential threat to humankind within our grandchildren's lifetime and, short of that, as national, regional and global security threat multipliers. The 2016 Defence White Paper aspirations notwithstanding, compared with its allies the Australian Defence Force is ill-prepared for these challenges and urgent action is needed to remedy the situation.

Key words: climate change; global warming; global population; security; threat multipliers; Australian Defence Force; Australia's 2016 Defence White Paper.

I am often asked why I have been speaking about climate change. I had not considered it a major issue until I read the book *Our Final Hour* by Sir Martin Rees, the Astronomer Royal (Rees 2004). It alerted me to the issues of climate change, exacerbated by the dynamics of population growth and demographics, which my grandchildren will face over the course of their lifetimes. It is not an exaggeration to say that these issues constitute an existential challenge for humankind. Indeed, Rees predicts that by 2100 there is a 50 per cent chance that there may be no humans left on the planet. Over that period, there will be a 30 per cent growth in global population from the current 7 billion to 10 billion and, with people living longer, we will move from 6 people to support each person over 60 years of age to only 2.3 people to support each elderly person.

We now have incontrovertible evidence of climate change based on sound science. A major problem, though, is that people generally do not understand the science and its relevance to them. In fact, climate change is a truly wicked problem that is not amenable to any simple solution. It involves complex adaptive natural systems and there is no linear relationship between specific events and direct consequences. Hence there is considerable uncertainty and associated risk. It follows that there are no 'tame' solutions – no simple obvious contained series of actions that would resolved the problem. Further, the solution must involve us all; everyone on the planet – we cannot leave it to someone else.

An interesting perspective on climate change is provided by American businessman Ray Anderson who underwent a transformative experience about climate change in the early 1990s. He ran a carpet company and changed his methods to reduce his carbon footprint. This experience led him to the conclusion that if business doesn't get it, it is not going to happen (Anderson and White 2011)[2].

Climate Change

Recognising that climate change was poorly understood in the community, the then Australian federal government in 2011 established the Climate Commission as an independent body to communicate reliable and authoritative information about climate change in Australia. The Commission produced material for the general public which showed that 2010 to 2020 would be the critical decade for action. The decisions we make today will lock in our children's future pathway – whether they will be on a pathway to a global mean surface warming by 2060 of +2°C; or + 4° to +6°C. The first pathway might still be able to sustain life as we currently know it. The second pathway would lead to an environment inimical to humankind and to other species that have co-evolved with us.

Five years into the decade, it now seems that restricting warming to just +2°C by 2060 is no longer achievable. As a minimum, +3.7°C appears to be locked in. But we do not know what the consequences of this might be as modelled scenarios and their predictions have been based warming being held to +2°C. What, for example, might be the consequences for us of a summer that is 7-months long rather than the current 3 months?

So we must redouble our efforts to avoid unmanageable climate change and prevent dangerous climate change. As global greenhouse gas emissions and temperatures rise, adapting to climate change becomes more difficult; and the costs of adaptation and the risks of getting it wrong increase commensurately.

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[2]An interview with the late Ray Anderson can be accessed at: https://ted.com/speakers/ray_anderson

Climate Change Risks

Just how big the risks are of these non-linear changes is the subject of intense study, but we already have some good indications. Analysis undertaken to date – which takes into account impacts on agriculture, infrastructure, health, ecosystems and regional security – indicates that while Brisbane and Melbourne, for example, currently have $3.4 billion and $2.2 billion respectively in exposed assets, a rise in average global temperatures of 'only' a couple of degrees sees their exposure increase to $33 billion and $40 billion respectively.

Indeed, if the current trend towards +3.7°C by 2060 is realised, there are predicted to be impacts like the following:

- ***agriculture*** – initially wheat yield may increase but its quality decline, and irrigated agriculture in the Murray-Darling basin may decline by 12 – 40 per cent;
- ***infrastructure*** – urban water supplies will be stressed and some $226 billion in transport and building assets will be exposed to rising sea levels;
- ***health*** – there will be a rise in physical and mental health impacts associate with extreme weather events and tropical insect-borne diseases such as dengue will spread southward;
- ***ecosystems*** – there will be changes in many ecological communities, the potential destruction of the Great Barrier Reef, and the loss of all fish from the Pacific as the waters warm and acidify; and
- ***regional security*** – rising sea-levels will displace the citizens of small Pacific islands.

In just 90 days, during the "angry summer" of 2012-13 in Australia, some 123 weather records were broken, including temperature, flood, rainfall, and heatwave records. To name but a few, it was the hottest summer on record; the hottest January on record; the hottest day on record; and the first time that the temperature exceeded 39°C across Australia for 7 days in a row.

It is often not appreciated that heatwaves in Australia kill more people than bushfires kill. January 2016 was the hottest month on record until February 2016 which eclipsed it.

The Climate Commission's work focused on Australia. The issue of course is global. At the planetary scale, the impact of climate change caused by the current increase in warming of 'only' a little over +1°C is very evident, such as:

- the melting of the polar icecaps;
- the thawing of the Siberian permafrost – potentially releasing the powerful greenhouse gas, methane, stored beneath;
- the melting and loss of the Himalayan glaciers – on which millions in China, Pakistan, India and Bangladesh depend for fresh water; and
- rising sea-levels making South Pacific islands (such as Kiribati) uninhabitable.

Indeed, the I-Kiribati are already looking for somewhere else to live, with New Zealand and Australia the primary destinations; and the millions dependent on Himalayan glacier water may be forced to do likewise ere long. Further, major dislocation across low-lying Asian megacities can be expected by 2060 as sea-levels rise.

Mitigation, Adaptation and Vulnerability

The measures proposed to address climate change can be grouped into two classes: mitigation measures; and adaptation measures. Mitigation measures are designed to address the root cause of climate change by seeking to reduce greenhouse gases. Adaptation measures seek to lower the risks posed by the consequences of climate change. Both are needed in parallel. Adaptation measures become inevitable as the effects of climate change are experienced.

Assessments of vulnerability can be used to prioritise adaptation measures. Vulnerability has three aspects: exposure to hazards; sensitivity to hazards; and capacity to adapt to hazards. Such vulnerability assessments can be the basis for plans developed for the management of say: the threat to an area posed by sea-level rise; or to the threat to community health posed by a heatwave.

The climate change risks to communities in New South Wales have been assessed and include:

- the greatest increases in temperature are expected to be in the north and west;
- the frequency and severity of dangerous bushfire weather has increased and is expected to increase further;
- the cane toad is likely to invade the north coast;
- irrigated agriculture across the Murray-Darling Basin could decline by up to 70 per cent by 2050 due to decreased rainfall runoff;
- 40,800 to 62,400 residential buildings are at risk from a 1.1 metre sea-level rise – they could become valueless – and several coastal sewage treatment plants would go under water and coastal transport routes would be cut;
- a reduction in the alpine zone in the south-east will place stress on the mountain pigmy possum; and
- the south-west is expected to experience a considerable reduction in annual rainfall runoff, especially in winter.

Additionally, in the Australian Capital Territory:

- the average number of hot days over 35°C is expected to at least double by 2070;
- Canberra's water supplies could be threatened by changing rainfall patterns, especially the likely decrease in winter and spring rainfall;
- the frequency of frost nights is expected to decrease; and
- the Northern Corroboree Frog is likely to further reduce its already limited climatically-suitable habitat.

Climate Change and the Australian Defence Force

Climate change has implications for several aspects of security including: energy security – Australia, for example, has high dependence on sea-borne imported oil and on road transport systems; sea-level rise; ocean acidification, which is inimical to coral reefs and fish, with potential impacts on tourism, fishing industries and food supplies; extreme weather events – tropical cyclones are becoming more frequent and will extend further south into New South Wales; food and water security; mass migration – from highly affected countries to less affected ones; and lost countries (as in the example of Kiribati given above).

Threat multipliers: Conflict may erupt because of issues about energy security; water security; food security; health issues; and uncontrolled mass migrations. In military terminology, these factors can become "threat multipliers". Hence, all these factors can impinge on Australian Defence Force (ADF) planning and response requirements.

These issues can also be of direct concern to the ADF as it is fossil-fuels based. In a crisis, the ADF would not necessarily be given priority for limited fossil fuels ahead say of hospitals, police or other emergency services. Further, in the places where the ADF is likely to be called on to operate, a shortage of fresh water could severely constrain ADF operations.

For the ADF, there are two parts to this problem:

1. Problem One: Are the ADF's bases, the operating environment, and the ADF's equipment adequately positioned to enable the provision of Defence assistance to the civil community at short notice?
2. Problem Two: Is the ADF able to respond appropriately to man-made and natural disasters within Australia, and in our region?

Cyclone Yasi is an example of why these issues are of potential concern. Cyclone Yasi, a severe tropical cyclone, struck northern Queensland on 3 February 2011 causing severe damage to affected areas as far inland as Mount Isa and a damage bill of some $US3.6 billion. It was the first cyclone since 1918 to reach Category 5 – it had winds of up to 285km/h and the storm surge was some 7m above the high water mark. When the ADF was called on to respond, it did not have a ship available that was able to support disaster relief operations – its three biggest support ships were out-of-action or unseaworthy. Navy's inability to provide a large amphibious transport capability after a request by Queensland emergency management officials was branded a "national scandal" by politicians. This preparedness failure led to an independent investigation of Navy's preparedness, the Risso Report.

While the issues identified by the Risso report have since been acted on and Navy now has two new amphibious assault ships (LHD) and an amphibious landing ship (LSD) that are suitable for humanitarian assistance and disaster relief operations, we can expect demand to grow for ADF support when communities are *in extremis*. The ADF can provide succour and security, depending on needs; and can complement other agencies when necessary.

That said, climate change is continuing to put the ADF under pressure. Defence assisted in 275 domestic emergencies alone in the 7 years between 2005-06 and 2012-13. The following are examples of instances in which the ADF has been called on to provide humanitarian assistance and/or disaster relief either at home or in our neighbourhood in recent years and exemplify the range of emergencies that can necessitate ADF input:

- PNG drought in 1997 lasted 6 months – 450 personnel delivered 3200 tonnes of aid to more than 90,000 people in 10 drought-affected provinces;
- PNG flooding in 2007 drew upon 170 personnel and involved delivery of 350 tonnes of humanitarian stores;
- Victoria Black Saturday bushfires, 2009 – Defence support reached a peak operational strength of some 800 military personnel per day, with more than 1250 ADF personnel providing assistance over the 7 weeks of the operation;
- Tropical Cyclone Yasi, Queensland, 2011, involved more than 1200 ADF personnel deployed to assist with the recovery;
- Queensland floods, 2011 – Defence deployed some 1440 personnel with 26 aircraft flying 572 hours transporting about 1000 people with more than 500 tonnes of stores;
- New South Wales bushfires, 2011 – an Army engineer remediation force conducted over 200 demolition tasks, 338 tree-felling tasks, 21 pool drainage tasks and over 200 site reconnaissance tasks;
- Typhoon Haiyan, Philippines, 2013 – the ADF evacuated over 3500 internally displaced persons and moved thousands of tonnes of aid in the Philippines; and
- Tropical Cyclone Pam, Vanuatu, March 2015 – more than 500 ADF personnel were deployed to assist in the recovery.

Despite these commendable efforts, the ADF has not kept pace in this area with its allies and friends. Barrie *et al.* (2015) compared military action on climate change by the United States Department of Defence, the United Kingdom Ministry of Defence and the ADF, looking at military planning and operations; military training and testing; the military estate (built and natural infrastructure); and military acquisition and supply. They found that, in comparison to Australia, the United States and United Kingdom militaries are taking significant steps to identify and respond to the security challenges exacerbated by climate change. The United States and the United Kingdom are well ahead of Australia particularly in terms of understanding the impact of climate change on military missions and its effect on the Defence estate. We have some catching up to do and should put a priority on main-streaming climate change plans into our Defence priorities.

The Defence operational priorities that should flow from climate change impacts include:

- short-term priorities related to Defence assistance to the civil community and training to enhance humanitarian assistance and disaster relief capabilities;
- long-term priorities related to preparedness, base and equipment capabilities; and
- the integration of climate change impacts into the other Defence priorities.

Discussion

Defence preparedness is not a substitute for developing resilience in our community. Further, in 35 years, there will be close to 7 billion people in our region – this will put great demands on us! This raises two questions:

- Will we be able to grow the number of people in the ADF and our emergency services so they are able to respond when necessary?
- How can we best work with allies and friends in the region?

To date, there has been a somewhat tortuous journey leading to the ADF getting to the point of taking action on

climate change. There was some early action in 2012, but a change of government in 2013 put this on hold – indeed, 2013 to 2015 was a dark period during which any discussion of climate change was forbidden – until there was a leadership transition (change of prime ministers) on 15 September 2015 which made speaking about climate change within the ADF possible again.

Prior to the leadership change, on 22 June 2015 the Centre for Policy Development released a report on Australia's climate security challenge (Sturrock and Ferguson 2015). The report explored Australia's preparedness for the coming security impacts of climate change and examined how our defence force must adapt. It found that Australia is critically underprepared for a coming climate security crisis bound to have disproportionate impacts in Australia and in our immediate region.

On 22 September 2015, the Climate Council launched its report on climate change (Barre *et al.* 2015). This report found that climate change poses a significant and growing threat to human and societal well-being. In military terms it is a "threat multiplier" which is putting the ADF under pressure, but the ADF is lagging behind its allies in preparing for this challenge. Strong action to reduce greenhouse gas emissions is critical for limiting the security implications of a changing climate.

The United Nations Climate Change Conference – the 21st yearly meeting of the Conference of the Parties (COP21) – was held in Paris in December 2015. The conference negotiated the Paris Agreement, a global agreement on the reduction of climate change, which set a goal of limiting global warming to less than 2°C compared to pre-industrial levels; and zero net anthropogenic greenhouse gas emissions to be reached during the second half of the 21st century. The parties will also "pursue efforts to" limit the temperature increase to 1.5 °C, which would probably require zero emissions sometime between 2030 and 2050 – something which now appears unattainable.

For its part, the Australian government has now responded with its release of its 2016 Defence White Paper (Department of Defence 2016), in which it treats climate change as a serious issue for the ADF. The Executive Summary recognises that instability may flow from factors such as variable economic growth, crime and social, governance and climate change challenges that contribute to uneven progress. In Chap 2 on the Strategic Outlook, it notes that under Australia's security environment one of six key shaping drivers relevant in the period till 2035 is state fragility within our immediate neighbourhood caused by uneven economic growth, crime, social, environmental and governance challenges and climate change. In Chap 4 on the Future ADF, it notes that a key enabler will be the need to deal with climate change consequences in bases plans, including sea-level rise and extreme weather events, while noting a larger, heavier and more high technology ADF will require new bases, wharves, airfields and training and weapons testing ranges.

Conclusion

Through its impacts on energy security, water security, food security, health security, and uncontrolled mass migration – each of which, singly or collectively, can lead to conflict – climate change is a threat multiplier and a major challenge for defence forces and emergency services throughout the world. All these factors impinge on ADF planning and response requirements, but the ADF is critically underprepared for the coming security crisis and badly lags behind our allies and friends in its preparation.

Now that the ADF has been released from the constraints in this area imposed on it by the previous government, it has much work to do to catch up to our key partners; to properly prepare to meet future challenges through infrastructure plans; and to maintain its capacity to deal appropriately with security threats flowing from climate change consequences.

The Author: Admiral Christopher A. Barrie served for 41 years as a permanent officer in the Royal Australian Navy and saw active service during Indonesia-Malaysia confrontation and the Vietnam War. His career culminated in his appointment as Chief of the Defence Force on 4 July 1998. As CDF, he commanded the operation to secure East Timor in 1999-2000; and after the 9/11 tragedy in 2001, he advised the government about specific roles for Australia's armed forces. He retired on 3 July 2002. He was appointed to the Military Division of the Order of Australia as a member in 1994, an officer in 1998, and a companion in 2001.

Over the last 13 years, he has focused on strategic leadership as a consultant, teacher and mentor. From 2002 to 2011, he participated in Oxford University's Strategic Leadership and Stimulus Forum; and is now a member of the Oxford Praxis Forum. From 2004 to 2009, he also taught strategic leadership at the National Defense University in Washington DC. He is now an adjunct professor in the Centre for Strategic and Defence Studies at the Australian National University; and is a member of Australia's Climate Council, and the Global Military Advisory Council on Climate Change. He was a co-author of the 2015 Climate Council report, *Be Prepared: Climate Change, Security and Australia's Defence Force* (Barrie *et al.* 2015). [Photo of Admiral Barrie: Colonel J. M. Hutcheson, MC]

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