

Implications of climate change for Australia's national security

AWP Submission to the Senate Joint Committee on Foreign Affairs Defence and Trade

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1 Introduction

The **Australian Water Partnership** (AWP), established in May 2015, aims to share Australia's water experience and expertise with countries in the Indo-Pacific region to build capacity and improve sustainable water management. The Australian Government through DFAT has agreed to support the AWP for eight years with initial funding of \$20 million for four years.

The AWP program focuses its water resource management activities around four themes:

- Understanding the resource base
- Integrated river basin planning and water allocations
- Governance reforms & institutional strengthening
- Managing demand & improving efficiency

Across four water management **domains**:

- Catchments and river basins
- Urban water
- Irrigation water
- Environmental water

In its first two years, AWP has focussed its activities in the Indo-Pacific region with significant engagement in India, Myanmar and in the Pacific. Requests for assistance are increasing from Africa, Middle East and Latin American countries, attesting the international demand for access to Australia's water experience and expertise. Over the next 4 year period, it is expected that AWP will extend its partnerships to help improve water security beyond the Indo-Pacific region.

AWP recognises that the impacts of climate change will be channelled primarily through the water cycle, with consequences that could be large and uneven across the globe.ⁱ Improving the management of increasingly limited water resources is a key climate change adaptation challenge. Without sufficient water, human life, health, food, economic development and the sustainability of the ecosystem will all be detrimentally affected.

(Reference A) Threats and long-term risks posed by climate change to national security and international security

Droughts are becoming longer and more intense, and they are covering wider areas. Although the average annual precipitation globally is expected to increase due to global warming, changes in the amount and intensity of precipitation will vary significantly by region. Water scarcity due to climate change will add to tensions within and between countries. Water-related climate risks cascade through food, energy, urban and environmental systems.

- The World Economic Forum has ranked 'water crises' as one of the top five global risks in terms of impact for the last six consecutive years. Changes in water availability and variability can induce migration and ignite conflict.ⁱⁱ

- More than half of the world's cities and 75 percent of irrigated farms are experiencing water shortages on a recurring basis, jeopardising world food supplies, access to water and sanitation, and economic development.
- Some regions could see their growth rates decline by as much as 6 percent of GDP by 2050 as a result of water-related losses in agriculture, health, income and property – sending them into sustained negative growth.ⁱⁱⁱ
- some 4 billion people currently experience water shortages for at least one month of the year.

Water insecurity can cause severe disruptions and compound fragilities in social, economic and environmental systems, according to a recent World Bank Report.^{iv}

- By 2030, half of the world's poor are expected to live in fragile contexts affected by climate change impacts.^v
- **The World Bank has estimated that 2 billion people live in countries where development outcomes are affected by fragility and 95% of refugees and internally displaced people live in developing countries, victims of 10 conflicts since 1991.**

Weather related disasters are becoming increasingly frequent due to the sustained rise in the number of floods and storms. Flooding alone accounts for 47% of all weather-related disasters in 1995-2015, affecting 2.3 billion people, the majority (95%) in Asia.^{vi} The vast majority of these deaths were in lower income countries even though they experienced only a quarter of all storms. The increasing frequency of climate change induced floods and storms exacerbates poverty and adds to the fragility of poorer nations, especially in Asia.

Fragility Tension Conflict Displacement Migration

Climate Change is a key driver contributing to an unfolding water crisis. In the coming years, demand for water will increase as populations grow and move, industries develop and consumption increases. The lack of water security can induce migration and ignite civil conflict. Food price spikes caused by droughts can inflame latent conflicts and drive migration. Recognition is growing of the role that water crises can play in aggravating fragility and conflict.^{vii} Popular media and scholars have pointed to water challenges, especially in the form of water scarcity and drought, as possible causes of conflicts between countries and territories and large-scale mass migration.^{viii}

To reduce the tension and dangers of water crises, governments can improve planning and establish more resilient water systems, strengthen governance and better manage scarce resources.

Regions where Australia has military engagement face the most severe water shortages

Nearly all of the countries in the Middle East suffer from water scarcity, with water consumption significantly exceeding total renewable water supplies. An estimated 66 per cent of available surface freshwater originates outside the region. Water scarcity and conflict have collided in the Middle East and it is also the region where Australian troops are currently engaged in conflict.

Most of the countries cannot sustainably meet their current water demand. With current population growth and increased demand, water availability per capita is expected to be cut in half by 2050. As climate change is expected to bring a reduction in rainfall and higher rates of evaporation to already water scarce regions, competition for water will escalate dramatically.

The combination of protracted drought and ongoing conflict in the Middle East have pushed the region's water resources and water service delivery systems close to the breaking point. Throughout the region, people are suffering from severe water shortages that undermine agricultural production, impact livelihoods and affect the local economy.

North Africa and the Middle East are projected to experience water shortages in coming years due to decades of poor management and overuse, exacerbated by climate change. The losses of water reserves are significant. In seven years, beginning in 2003, parts of Turkey, Syria, Iraq and Iran along the Tigris and Euphrates rivers lost 144 cubic kilometres of stored freshwater – or about the same amount of water in the Dead Sea, according to data compiled by the Grace satellites mission and released last year. Much of the water was lost to evaporation from lakes and reservoirs. But the majority of the water lost, 90km³, or about 60%, was due to reductions in groundwater.^{ix}

Farmers, facing drought, resorted to pumping out groundwater – at times on a massive scale. The Iraqi government drilled about 1,000 wells to weather the 2007 drought, all drawing from the same stressed supply. Iranian officials are already making contingency plans for water rationing in the greater Tehran area, home to 22 million people.^x

Against this backdrop, the protracted drought has added to the misery of conflict-affected populations in Syria, making them more vulnerable. As of February 2017, 13.5 million Syrians were in need of humanitarian assistance and 6.3 million were internally displaced. Overall, the conflict reduced the availability of drinking water by 67 per cent between 2011 and 2015. In some areas, access to water is only about 10 litres a day per person – a small amount to cover drinking, cooking, washing and personal hygiene needs. Overall, as of mid-2016, there were about 5.3 million registered Syrian refugees. Most live in resettlement camps or host communities in neighbouring countries. As of mid-2016, about 2.7 million lived in Turkey, 1 million in Lebanon and 660,000 in Jordan.

Mass dislocation of people, increased conflict, reduced health and well-being, economic stagnation and environmental devastation are just some of the impacts of water scarcity and drought exacerbated by climate change.

Numerous potential conflict flashpoints exist across the region. The construction of the Grand Renaissance Dam by Ethiopia in the upper reaches of the Nile poses a risk for river flows in the Nile and potentially increased salt water incursions into the Nile delta in Egypt, impacting a key food growing region. Jordan, with the third lowest reserves in the region, is struggling with an influx of Syrian refugees. The country is undergoing power cuts because of water shortages. The chances of countries going to war over water, however are assessed as slim, but as water shortages become more acute beyond the next 10 years, water in shared basins may increasingly be used as leverage. The use of water as a weapon or to further terrorist objectives is also expected to become more likely beyond 10 years.

The Mosul Dam in Iraq, for instance, has been used by ISIS to threaten both floods and supply shortages for the downstream community of over half a million people. Water in such cases serves as a divisive strategic asset, a “threat multiplier,” and even a political bargaining chip.^{xi}

Sub-national disputes pose the risk of spilling over into cross border tensions and underline the importance of linking improved water management to conflict prevention. Water issues could also lead to larger waves of migration away from these conflict zones, increasing strains on immigration systems globally.^{xii}

In a 2012 report, the US director of national intelligence warned that overuse of water – as in India and other countries – was a source of conflict that could potentially compromise US national security. The report focused on water basins critical to the US security regime – the Nile, Tigris-Euphrates, Mekong, Jordan, Indus, Brahmaputra and Amu Darya.^{xiii}

It concluded: "During the next 10 years, many countries important to the United States will experience water problems – shortages, poor water quality, or floods – that will risk instability and state failure, increase regional tensions, and distract them from working with the United States."

The national intelligence report warned ominously: "As water shortages become more acute beyond the next 10 years, water in shared basins will increasingly be used as leverage; the use of water as a weapon or to further terrorist objectives will become more likely beyond 10 years."^{xiv}

Climate change impacts pose threats to security in our region

South Asia

About 600 million people live on the 2,000km swath that extends from eastern Pakistan, across the hot dry plains of northern India and into Bangladesh, and the land is the most intensely irrigated in the world. Up to 75% of farmers rely on pumped groundwater to water their crops, and water use is intensifying.

Climate change is likely to have a detrimental effect on South Asia out to 2030 and beyond, mainly because of its ability to exacerbate one of South Asia's biggest challenges: an expanding population and the challenge of feeding, housing, clothing, watering and employing it. The potential for conflict over a scarce but essential resource is likely to increase as too is the likelihood of people moving from

water scarce regions into already crowded urban centers or to seek refuge and a new life outside the country.

Climate Change is having an impact on the glaciers of the Himalayas which form the so called 'water tower' for South Asia and the Mekong region, being home for the Mekong, Ayeyarwady and Salween rivers. As temperatures rise in the Himalayas and with the impact of black carbon, the glaciers are receding at varying rates across the region. In some places the glaciers are advancing. Less water is being stored in the mountain ice and the meltwater flow is changing. The region also appears to be becoming more susceptible to heavy downpours and flash floods. There are multiple implications: increased flash flooding is unpredictable, having an impact on human life and disrupting agriculture as well as causing greater erosion.

Periods of drought may be longer and alongside higher temperatures in the region, commonly in the high 40s to low 50s degrees Celcius, are increasing the rate of evaporation causing reduced soil moisture and loss of stored water. Unsustainable withdrawal of groundwater is further exacerbating the water crisis in India and across South Asia. What was once a good reserve for a dry season, is now under threat as overuse increases and little policy emphasis is given to aquifer recharge.

In southern India in September 2016, street riots and conflict occurred in Bangalore against a Court decision to release water from a dam in Karnataka for farmers downstream on the Cauvery River in Tamil Nadu. Tension on allocation of water from rivers crossing state boundaries in India is likely to increase if climate change affects the rainfall pattern and water management on India's rivers is not improved.

India-Pakistan

The highest potential for conflict over water in the region is that between India and Pakistan over the increasingly unpredictable water flow of the Indus River. The people of Pakistan depend on the food production from the largest irrigation system in the world in Sindh province in Pakistan. The irrigation depends on waters from the Indus. India and Pakistan have long abided by the Indus Water Treaty signed in collaboration with the World Bank but it only a water sharing agreement on three tributaries of the Indus and there is pressure from India to build new dams that may impede the water flow to Pakistan.

India-China

Tension between India and China also ebbs and flows over China's plan to build a cascade of hydropower dams on the Brahmaputra just before it enters Assam. While the dams are unlikely to be able to stop the flooding in the Brahmaputra, because of the sheer volume of water that flows down the river in the wet season, the dams will have an impact on the sediment load carried by the river. Many of the sand islands downstream provide homes and agricultural lands for the people of India and Bangladesh, and changes in the sediment flow will affect these sand islands.

Further downstream, a decline in sediment carried by the rivers entering Bangladesh could exacerbate the subsidence of the land in the delta. The land subsidence and the sea level rise are

increasing the likelihood of significant salt water incursion into the Ganges delta region. Climate Change has already been predicted to lead to the movement of 35 million people from the delta region. Initially, it is expected the people will move further upstream into Bangladesh but the Indian Government has built a border fence to stem the flow of migrants into India.

India-Bangladesh

While India and Bangladesh generally enjoy a good relationship, there has been tension over water between the two countries and the impacts of climate change on water are likely to increase the tension. The Farakka barrage on the Ganges River just upstream from the Bangladesh border has long been a sore point for Bangladesh. Built to increase the flow of water down to Hoogly River to sustain the port of Calcutta, Bangladesh accuses India annually for allowing flood water through to flood Bangladesh and stopping the flows in the dry season exacerbating drought in Bangladesh.

West Bengal's Chief Minister has also taken a strong political stand to stop an agreement between India and Bangladesh on sharing the waters of the Teesta River.

Mekong Region

Farming, fisheries, forestry, and other environmentally sensitive sectors represent significant portions of the economies of most developing nations, making them particularly vulnerable to climate impacts. In the Mekong region, economies and societies are heavily dependent on these sectors. Climate change will exacerbate already fragile environments

In early 2016, the Mekong Delta faced its worst drought in recent history, causing food and water shortages for over half a million people. In April 2016, the Chinese government announced it would release water from the Jinghong dam upstream to benefit Cambodia, Laos, Myanmar, Thailand, and Vietnam.

There was significant evidence to suggest an El Niño weather system was the primary cause of the massive drought that has damaged 160,000 hectares (approximately 620 square miles) of rice in the Mekong Delta, which left 600,000 people with drinking water shortages and resulted in losses of over \$220 million. However, environmental activists pointed to the "excessive construction of more than 10 hydropower dams on the upper stream of the river." A weather/climate event can have a harmful impact but it can also incite long standing political issues and tensions, whether or not the facts support deleterious action by government.^{xv}

China's planned cascade of dams upstream on the Mekong have added to regional tension over the management of the Mekong River. China and Thailand's funding support for Laos' ambitions to become the 'battery of Asia' through hydropower has also added to regional tensions with downstream countries, particularly Vietnam. Vietnam is concerned about the impacts of increasing upstream hydropower development coupled with the already felt impacts of climate change on the Delta (facing severe saltwater intrusion to farmland), Vietnam's rice bowl responsible for approximately 25 percent of Vietnam's GDP.

With tensions high between Vietnam and China on South China Sea issues, additional tensions about water use and availability could pose additional security concerns.

The Mekong River Commission, the intergovernmental body charged with regional cooperation of the Mekong River, is struggling to accommodate the highly political nature of water discussions in the region, and will remain an important body to try and alleviate escalating tension on managing the region's water issues.

As water scarcity, brought on by development and climate change, starts to result in serious social and economic impacts, regional dialogue processes will become increasingly important.

Low lying Pacific Islands and productive Asian Deltas

The apparent increased intensity and frequency of extreme weather events is having an impact on coastal communities around the world, including in the Pacific and in the large deltas in Asia – notably the Mekong Delta, the Ganges Delta and the Ayeyarwady Delta. Deltas often sustain high population density because they are rich in natural resources. But the increasing frequency and intensity of floods and storms are resulting in rising salt water intrusion into deltas, undermining agriculture. The potential impacts of rising sea levels in such low-lying regions is likely to result in migration of substantial numbers of people. Some estimates suggest that up to 30 million people in the Ganges Delta in Bangladesh could be forced to migrate, and India has already erected a border fence in an attempt to reduce the flow of Bangladeshi migrants into India. Movements of large numbers of so-called 'climate change refugee' will add to instability across the region and add pressure on Australia to accept such migrants.

In the Pacific, the low lying coral atoll islands depend on lenses of freshwater often underlying most of the island. Higher tides and stronger tidal surges threaten to introduce salt water into the freshwater lenses. As withdrawals of water increase due to population growth, the possibility of freshwater lenses becoming salinised is increasing. Failing water supplies may well cause migration from small island communities. Desalination of salt water offers a solution but the cost is often beyond the means of the local community, increasing their dependency.

(Reference D) How Australia's development cooperation can assist climate change adaptation

Over recent decades, Australia has faced its own water security challenges and has responded by developing world-leading practices to better account for, allocate and use water. The Murray-Darling Basin is the most quoted international example of the benefits of water markets for balancing competing demands for scarce water resources, growing the value of agriculture, securing supplies for cities and towns, and providing water for the environment.

Australia's experience in water reform in a Federal system of government, the application of science to build the foundation for national water policy, and the establishment of institutions to ensure the sustainability of reforms are of great international interest. The development and operation of

water markets in Australia is the test case of water policy innovation, representing the single most important step change in water management seen in the last century.

Our technologies in weather and water forecasting, river basin planning and management, irrigation efficiency, groundwater management, water sensitive cities, and delivering water for the environment are often applicable outside Australia and can play an important role in improving water security in the region and beyond. Water security is the goal of improved water management.

The emerging international water crisis presents Australia with an urgent and timely opportunity for Australia to consolidate and extend our role as a steward of sustainable water resource management to improve water security.

AWP's contribution to Climate Change adaptation

AWP shares the Government's concern about the increasing risks to peace and security created by extreme weather events, including water scarcity. Cities, towns and peri-urban areas require functional water supply and sanitation systems as well as protection from flooding. Failure to provide such services often leads to community tension and instability that can lead to conflict.

In signing the Sustainable Development Goals (SDGs), Australia agreed to work with the international community to implement the SDGs including SDG 6, which aims to achieve universal and equitable access to safe and affordable drinking water. The Australia Government invests significantly in water management programs in the Greater Mekong region, and in South Asia, and supports improved access to water, sanitation and hygiene (WASH) services in the Indo-Pacific through country programs working directly with governments and the civil society.

In early 2016, Prime Minister Turnbull accepted an invitation to join with ten other Heads of State /Government in the **UN/World Bank High Level Panel on Water**. Australia is leading initiatives on water data and water use efficiency to promote improved water resource management internationally.^{xvi} AWP has been pleased to be able to assist DFAT to actively contribute to the work of the Panel, including publishing WaterGuide, an analytical framework (commissioned by DFAT, written by Aither) that draws on Australia's experience to assist countries to understand trade-offs in water resource management, and develop roadmaps for long-term sustainable water planning.

Australia's technologies, services and products are often applicable outside Australia and AWP is helping them play an important role in climate change adaptation by strengthening water security in the region and beyond. Successful examples include application of Australia's National Hydrological Modelling Platform, eWater Source; Rubicon Water, world leader in gravity fed irrigation networks; and advice on water data analysis and management by the Bureau of Meteorology.

To date AWP has focussed its activities in the Indo-Pacific region with significant engagement in India, Myanmar and in the Pacific. More recently, AWP has been invited by the Government in Jordan to explore if Australia can assist in addressing the severe water shortage that Jordan faces. Similarly, AWP has been invited to assist the Government of Iran to help address the environmental consequences of the drying up of Lake Urmia. The Water Minister in Iraq has also expressed interest

in drawing from Australia's water management experience. Requests for assistance are increasing from Africa, Middle East and Latin American countries, attesting to the international demand for access to Australia's water experience and expertise.

Regional Frameworks and Basin Cooperation

Across Asia and the Pacific, drought has affected more than 1.6 billion people and cost more than \$53 billion in damage since 1970, but these are likely to be underestimates. The impacts of drought are difficult to delineate: a drought can reach over vast areas of land, often crossing country borders. It can also be hard to determine when it starts and finishes, and since the damage is indirect it is thus difficult to capture the full costs. However, what is certain is that the tragic consequences of drought include:

- Loss of human life and livelihoods
- Reduced water and food security
- Increase in debt among farmers
- Deepening poverty with intergenerational consequences
- Farmer suicides
- Potential for unrest and violence
- Land degradation and desertification.^{xvii}

Asian regional cooperation through the UN Regional Drought Mechanism, managed by the UNESCAP, is working to provide timely and free access to space-based data, products and services to participating countries, who also receive training and other capacity building to effectively utilise them. UNESCAP has recently requested support from the **Australian Water Partnership** to incorporate eWater's Tools, the Data Cube of Geoscience Australia, and the Bureau of Meteorology forecasting methods into the Regional Drought Mechanism to add a strong repeatable workflow from raw data processing through to hydrological analysis and forecasting capability to ESCAP's program, which at present does not have water availability forecasting as a component. ESCAP believes the combination of tools would add a predictive layer to the Drought Mechanism which would greatly enhance the opportunity for Governments and Communities to improve drought monitoring and early warning and proactively manage risk via more informed decision-making related to cropping practices and reservoir management.

Competition over water is often viewed as a driver of conflict and has emerged as a key component in many current and past conflicts. However, disputes over water, whether scarce or abundant, do not always result in violence. In fact, the management of water often brings parties together and encourages cooperation; it can be an integral factor in conflict prevention, peacebuilding, and reconciliation processes. Since fresh water is irreplaceable and indispensable to life, it is a valuable and contested resource that requires careful, conflict-sensitive management to ensure that it will continue to fulfill its purposes over the long term.^{xviii}

But solutions do exist. Water management tools, such as this developed in Australia, can help authorities to allocate water resources between users in a fair and transparent manner thereby reducing tension by ensuring equitable access. By improving cross boundary water sharing/management agreements, the risk of conflict over critical resources like water can be reduced. The **Senegal River Basin Organisation** (OMVS) has helped maintain peace and enhance development among the four riparian states for more than 30 years. Similarly, the **Mekong River Commission** (and its predecessor organisation) in South East Asia has helped maintain peace and enhanced development among its four riparian member states for more than 20 years.

United Nations Secretary General, Antonio Guterres, told the UN Security Council in June that “water, peace and security are inextricably linked”. With climate change having a growing impact, water scarcity is a growing concern, he pointed out, noting that by 2050 at least one in four people will live in a country where the lack of freshwater is chronic or recurrent.

Three quarters of UN member states share rivers or lake basins with their neighbours. There are more than 270 internationally shared river basins, which serve as the primary source of freshwater for approximately 40 percent of the world’s population, including the Nile, the Indus, the Ganges, the Euphrates-Tigris, and the Mekong.

That is why it is essential that nations cooperate to ensure water is shared equitably and used sustainably, he said.^{xix} Water serves as a catalyst for cooperation among nations.

Australia has internationally respected water management experience and expertise, especially in the context of scarcity. By offering and sharing our water management experience, Australia can help countries adapt to climate change and encourage cooperation thereby reducing the potential for conflict.

ENDS

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