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What does 'water security' mean for Australia? A review of Australian policy

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Contents

Glossary of abbreviations

AWA	Australian Water Association
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
IWRM	Integrated Water Resource Management
NWC	National Water Commission
NWI	National Water Initiative
SDL	Sustainable Diversion Limit
UN	United Nations
WAE	Water Access Entitlement
WSAA	Water Services Association Australia

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Executive summary

Australian water professionals say their number one priority is water security for all Australians.[1] But what does 'water security' mean in national policy?

This review examines recent Australian national legislation and policy. The review found that although policy often refers to 'water security,' there was no formal national approach or definition.

When 'water security' is used, it usually refers to water availability, applied to a variety of water use contexts, such as irrigation, drinking water supplies and the environment. This focus on water availability corresponds to a 'narrow' water security approach.

The lack of a clear framework combined with a tendency towards a 'narrow' focus on water availability has several policy impacts. It de-emphases other aspects of integrated water management, such as water quality, political stability and reducing the risk of water related disasters. Narrow framings of water security tend to exclude social equity concerns. A narrow approach rarely asks, 'for whom is water security sought?' Critics argue the narrow and poorly defined approach could be an exacerbating factor in a policy environment that, after decades of water reform, has done little to advance Indigenous peoples' water rights.

International research suggests that water security at a national scale is best served by a broad, integrative approach, rather than a narrow one.[2] The UN-Water's definition of water security is a widely used example of a broad framing. According to UN-Water, water security is:

> 'the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.'[3]

The Australian Water Association and the Water Services Association of Australia both refer to this UN-Water definition.

Australian states and territories have the primary responsibility for managing water. However, the Australian federal government has multiple roles relevant to water security. These include co-ordinating water reform, national climate change policy, water information reporting, and funding water initiatives and research. In addition, there are benefits to harmonising water security approaches across Australian jurisdictions.

This report identifies several options:

- adopting the UN-Water definition as a national framework
- alternatively, developing an Australian framework for water security
- monitoring water security using a scorecard or similar
- undertaking water security risk assessment to inform water funding and investment
- developing a water security framework could be part of the 'refreshed' National Water Initiative and
- establishing an independent advisory body for water.

Water is one of Australia's most precious resources and an ongoing policy challenge. For water security policy to be robust and consistent, greater clarity of approach is essential. A consistent national framework based on a broad, integrative approach could enhance Australia's water security.

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[1] Australian Water Association, *'Emerging Challenges and Opportunities to Secure Our Water Future Discussion Paper,'* 2017.

[2] M Zeitoun, B Lankford, K Tobias, T Forsyth, R Carter, A Hoeskstra & R Taylor 'Reductionist and Integrative Research Approaches to Complex Water Security Policy Challenges', Global Environmental Change, Vol 39, July 2016: 143–54.

[3] H Bigas, Water Security and the Global Water Agenda a UN-Water Analytical Brief, United Nations University—Institute for Water, Environment and Health, Hamilton, 2013.

Introduction

A recent survey of Australian water professionals found that 'water security for all Australians' was their number one priority.[4] 'Water security' is often referred to as a policy goal. An example is the Howard government's A$10 billion commitment to water in 2007, the National Water Security Plan. But what does 'water security' mean? This report reviews how the nebulous term 'water security' is conceptualised in Australia, and what this may have meant for national policy. The report focuses on the recent decades of major water reform, from the 1990s to today, 2019.

Background: water in Australia

Water is a critical issue for Australia, the driest inhabited continent in the world.[5] Water availability is crucial for human flourishing, food security, ecosystems and the economy.

Seventy per cent of Australia's water extraction is for agriculture (Figure1). In 2015–16 the gross value of Australian agricultural production was more than A$56 billion, and more than A$15 billion of this was irrigated production.[6] Around 65 per cent of Australia's total agricultural production, worth A$44.7 billion, is exported.[7] Agricultural products are approximately 14 per cent of Australia's total goods and services exports.

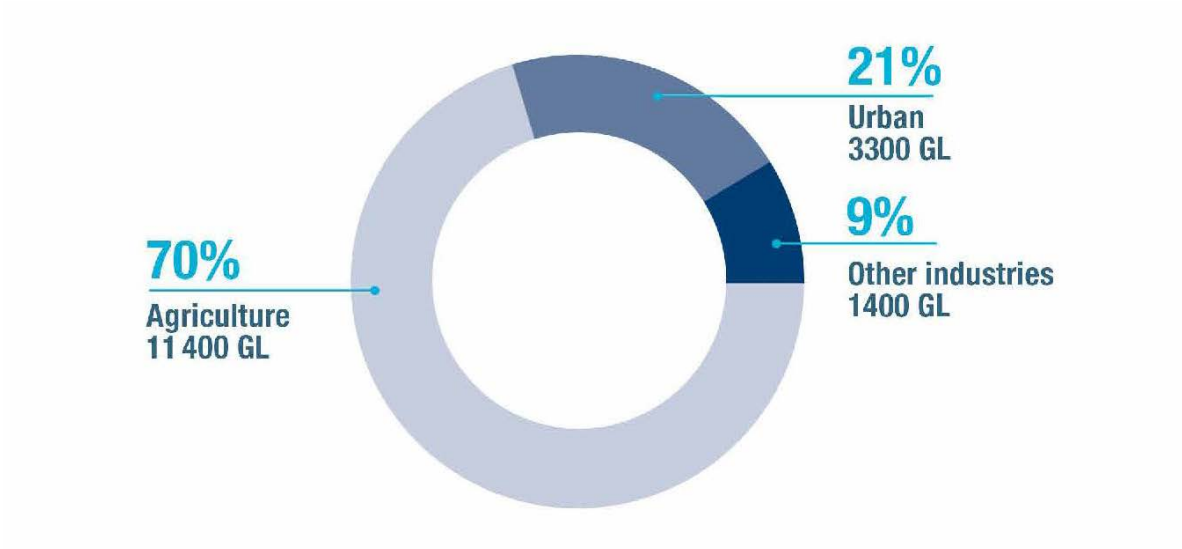

Figure 1: Total water extractions by industry sector in Australia 2015-2016

Source: Bureau of Meteorology, Water in Australia 2015-16, Melbourne, Victoria 2017, p35.

Water is of strategic interest to our international relationships and trade. Australia's water entitlement market itself is said to be worth more than A$30 billion and investment funds trading in water reportedly get strong returns.[8] Australia's water market attracts foreign investors, who currently own 10.4 per cent

[4] Australian Water Association, '*Emerging Challenges*,' op. cit.

[5] Geoscience Australia, '*Deserts*' Geoscience Australia website, accessed 20 July 2018.

[6] Australian Government, 'Australia's Water Resources,' Department of Agriculture and Water Resources website, 2018, accessed 2 April 2019.

[7] Australian Government, 'Agricultural Trade,' Department of Foreign Affairs and Trade website, accessed April 1, 2019.

[8] M Cranston, 'How Funds Are Surviving Australia's Water Market Chaos,' Australian Financial Review, November 27, 2016, accessed 2 April 2019.

of entitlements with the largest foreign investors from China (1.9 per cent), the United States of America (1.9 per cent) and the United Kingdom (1.1 per cent).[9]

A significant portion of Australia's water use, 21 per cent, is urban water providing our domestic drinking water supplies.[10]

Furthermore, water is essential for healthy ecosystems. The value of ecosystem services provided by inland wetlands, for example, is estimated to be US$25,682 per hectare per year in 2012.[11] Tourism, fishing, and other industries rely on water to sustain the environment. Water's non-market values are also significant.

Water is a critical policy concern because Australia is relatively dry. Australia represents 5.6 per cent of the world's landmass but has only one per cent of the world's available freshwater.[12] There is high variation in rainfall from year to year[13] and the effects of natural rainfall variability are predicted to be exacerbated by anthropogenic climate change. The effects of climate change mean Australia's populous south-west and south-east are experiencing a drying trend, with cool season rainfall projected to decrease by around 15 per cent by 2030.[14] Predictions for northern Australia indicate the intensity of severe storms will increase. It is unclear whether total rainfall will also increase and how this might impact other factors, such as groundwater recharge.

It is likely that Australia's water demand will continue to increase at the same time as availability decreases or becomes more unpredictable. Australia's population grows at a rate of 1.6 per cent, which is relatively high for a developed country.[15] Globally, the demand for crops is predicted to increase by at least 25 per cent, [16] and potentially double by 2050.[17] A 2014 water security analysis suggested that current water availability in Australia will not meet future demand.[18]

The potential increases resulting in water extraction would put further pressure on water resources that are already stressed. Despite measures to address overallocation, the Productivity Commission's 2018 review of national water reform found a number of water systems that are still overallocated and that some high-use areas do not have water plans.[19] Australian governments therefore face the challenge of reconciling competing claims for a scarce and declining resource, which partially explaining the political complexity of water management.

Both surface water and groundwater are managed by Australian water plans. 'Surface water' includes rivers, creeks, and dams. 'Groundwater' is water that is held underground between grains of sand or rock. Australia also uses water sources such as desalinated water and recycled wastewater. In 2015–16, an estimated 4900 GL of groundwater was extracted across Australia, or around thirty per cent of Australia's total water use, (see Figure 2 below), and much of South Australia, Western Australia, and the Northern Territory and Queensland depend on groundwater rather than surface water.[20]

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[9] Schremmer, 'China and US Are the Biggest Investors in Australian Water Entitlements,' ABC Rural, March 25, 2019, accessed 2 April 2019.

[10] Bureau of Meteorology, *Water in Australia 2015-16,* Melbourne, Victoria 2017, p. 35.

[11] R Costanza, R de Groot, P Sutton, S van der Ploeg, SJ Anderson, I Kubiszewski, S Farber and RK Turner, 'Changes in the Global Value of Ecosystem Services,' *Global Environmental Change* Volume 26, May 2014, p. 152–58.

[12] S Lehane, 'Australia's Water Security Part 1: Water Resources' Future Directions International, 2014, p. 1.

[13] Bureau of Meteorology, *'Australian Climate Influences'*, accessed 30 July 2018.

[14] CSIRO and Bureau of Meteorology, '*Climate Change in Australia Website*,' accessed 26 April 2018.

[15] E Young, 'Australia's Population to Hit 25 Million: Can We Cope?,' SBS News, 25, accessed 1 April 2019.

[16] M Hunter, 'We Don't Need to Double World Food Production by 2050 – Here's Why,' *The Conversation*, accessed 1 April 2019.

[17] DK Ray, MD Mueller, PC West, and JA Foley, 'Yield Trends Are Insufficient to Double Global Crop Production by 2050', PLOS 1 Volume 8, 2013.

[18] S Lehane, 'Australia's Water Security Part 2: Water Use,' *Future Directions International*, 2014, p. 1.

[19] Productivity Commission, 'National Water Reform, Report No. 87' Canberra, 2017, p. 72.

[20] Bureau of Meteorology, *Water in Australia,*op.cit.

Figure 2: Groundwater use as a percentage of total water use

Source: Harrington, N & Cook, P 2014, 'Groundwater in Australia', National Centre for Groundwater Research and Training

Water management is primarily a state/territory responsibility. The Australian Government's Constitutional powers do not explicitly mention water nor the environment.[21]

[21] A Moeller and J McKay, 'Is There Power in the Australian Constitution to Make Australian Laws for Water Quality?', *Environmental Planning and Law Journal*, Volume 14, 2000.

Despite the limitations of the Australian Government's role, it is involved in water through funding, coordinating water reforms, and information and reporting. For example, the 2007 *National Plan for Water Security* allocated A$10 billion in funding over ten years.[22] The Commonwealth Scientific and Industrial Research Organisation (CSIRO) undertakes research such as the Northern Australia Water Resources Assessment.[23] The Bureau of Meteorology and the Australian Bureau of Statistics both have water reporting roles, publishing the *Water in Australia* report[24] and the *Water Account, Australia* report respectively.[25] The Water Register of foreign ownership of water entitlements is administered by the Australian Taxation Office.

In addition, the Australian Government has a role in numerous policy areas that indirectly impact water security. For example, national climate change programs. Drought and rural support are provided at the Commonwealth level.[26] More indirectly, many Australian national policies impact population growth rates, such as migration quotas[27] and these in turn affect urban water planning and infrastructure.

The Australian Government's direct roles in water have increased in recent decades. National water reform brought together the Council of Australian Governments (COAG) in recognition of the need for cross-jurisdictional co-ordination of water management.[28] Through the National Water Initiative (NWI), a suite of governance reforms was implemented, notably the introduction of a national water market and the *Water Act 2007* (Cth).[29] Water reform has centred around overallocation in the Murray-Darling Basin, a multi-jurisdictional region which grows a large portion of Australia's agricultural production (46 per cent in 2014-2015).[30] Despite improvements in Australian water governance, 'gaps' remain.[31] Water reform is an ongoing process that concerns the states, territories and Australian Government.

Water security: an evolving concept

The use of the term 'water security' has increased in recent decades.[32] Although the concept of 'water security' is becoming more popular, debates about what it is and how to achieve it remain contentious.[33] Water security is goal-oriented and has the potential to provide a 'vision' of what policy is trying to achieve. By contrast, Integrated Water Resources Management (IWRM) is more process oriented. Many water security definitions focus on two main goals: harnessing water benefits whilst managing detrimental impacts. Different academic subject areas emphasise different aspects of water security. Cook & Bakker identify multiple water security approaches, listed in Table 1 below.

[22] Australian Government, 'Water: Ongoing Initiatives,' Budget 2007-2008, accessed 13 April 2018.

[23] CSIRO, 'NAWRA Overview and Findings,' accessed 30 August 2018.

[24] Bureau of Meteorology, *Water in Australia,* op.cit.

[25] Australian Bureau of Statistics (ABS), 'Water Account, Australia, 2016-17,' Cat. no. 4610.0, ABS, 2017, accessed 1 April 2019.

[26] Australian Government, 'Drought and Rural Assistance', Department of Agriculture and Water Resources, accessed 3 April 2019.

[27] Australian Government, 'Migration—Australian Migration Flows and Population,' Parliamentary Library, accessed 3 April 2019.

[28] Council of Australian Governments, 'Intergovernmental Agreement on a National Water Initiative between the Commonwealth of Australia and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory', Canberra, A.C.T., 2004.

[29] National Water Commission, '*The National Water Initiative - Securing Australia's Water Future: 2011 Assessment',* Canberra, A.C.T, 2011.

[30] Murray Darling Basin Authority, '*Towards a healthy, working, Murray-Darling Basin Plan: Basin Plan Annual Report 2015–16*,' Murray Darling Basin Authority*,* 2016.

[31] Productivity Commission, 'National Water Reform', op.cit.

[32] C Cook and K Bakker, 'Water Security: Debating an Emerging Paradigm,' *Global Environmental Change* 22, Volume 22, no. 1, 2012, p. 94–102.

[33] Zeitoun et al., 'Reductionist and Integrated Research Approaches', op.cit.

Table 1: Academic subject area and water security focus

Subject area	Water security focus
Agriculture	Input to agricultural production and food security
Engineering	Protection against water related hazards (floods, droughts, contamination, and terrorism)
	Supply security (percentage of demand satisfied)
Environmental science, environmental studies	Access to water functions and services for humans and the environment
	Water availability in terms of quality and quantity
	Minimizing impacts of hydrological variability
Fisheries, geology/geosciences, hydrology	Hydrologic (groundwater) variability
	Security of the entire hydrological cycle
Public health	Supply security and access to safe water
	Prevention and assessment of contamination of water in distribution systems
Anthropology, economics, geography, history, law, management, political science	Drinking water infrastructure security
	Input to food production and human health/wellbeing
	Armed/violent conflict (motivator for occupation or barrier to cooperation and/or peace)
	Minimising (household) vulnerability to hydrological variability
Policy	Interdisciplinary linkages (food, climate, energy, economy and human security)
	Sustainable development
	Protection against water-related hazards
	Protection of water systems and against floods and droughts; sustainable development of water resources to ensure access to water functions and services
Water resources	Water scarcity
	Supply security (demand management)
	'Green' (versus 'blue') water security: the return flow of vapour

Source: Cook & Bakker 2012, 'Water Security: Debating an Emerging Paradigm,' *Global Environmental Change* 22, no. 1, February 2012, pp. 94–102.

Although definitions of water security vary in emphasis, they tend to follow one of two approaches: narrow and reductionist, or broad and integrative.[34]

Broad, integrative framings describe the complex, interconnected challenges inherent in water. Broad approaches are thought to be better equipped for addressing uncertainties and social inequalities. Likewise, broad, integrative approaches are suited to managing water resources that are 'less-easily controlled' that is, places where rainfall is scarce, highly variable from year to year, or both.[35] Australia is a geographically large country with 'less easily controlled' hydrology, therefore a broad/ integrative definition would be suited to understanding water security at the national level.

[34] Zeitoun et al., 'Reductionist and Integrated Research Approaches', op.cit.

[35] Ibid.

An example of a broad/ integrative approach is the UN-Water's definition of water security:

> the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.[36]

The UN-Water definition is widely used in water security literature and has several components:

- emphasising sustainable access to water
- addressing both water quality and quantity
- covering beneficial uses of water: sustaining livelihoods, human well-being, as well as socio-economic development and preserving ecosystems
- including protection against water-borne pollution and water-related disasters as an important component and
- linking water to peace and political stability.

The disadvantage of broad framings is that they can be difficult to operationalise. Multiple variables increase the complexity of managing trade-offs. 'Narrow' definitions are often more specific and easier to operationalise. The disadvantage of narrow framings, however, is that they can be reductive, rigid, and reproduce system of inequalities.[37] Water has multiple stressors and narrow definitions tend to focus on a limited number.[38] An example of a narrow, reductionist definition is 'water security is a tolerable level of water-related risk to society'. This definition was proposed in an academic opinion piece by Grey et al.[39] Whilst succinct, Zeitoun et al assert that the definition lacked comprehensiveness and a basis for equity.[40]

Security and scarcity: water risk vs water availability

Water insecurity and water scarcity are distinct concepts. 'Water scarcity' is a simple quantitative measure of water availability relative to demand within a region at a particular time. Scarcity changes over time due to natural variability in rainfall and hydrology. Water (in)security, in contrast, is related to risk management and takes in a range of factors.[41]

Review: Australian 'water security' approaches

This section reviews Australia's national approach to water security and the possible policy impacts, examining recent Australian legislation and policy. The documents reviewed are listed in Appendix 1.

None of the documents reviewed directly defined water security, including the *Water Act 2007* (Cth), the Basin Plan 2012 and the National Water Initiative. Even the *National Plan for Water Security* did not explicitly define 'water security'.

Although there was not a formal definition or clear approach, several of the policy documents reviewed referred to 'water security' or variants of the term. A brief analysis of the context in which 'water security' was used (Appendix 1) revealed the following themes:

- availability of water for all uses
- water for environmental flows, establishing Sustainable Diversion Limits (SDLs) to ensure environmental flows
- water for public benefit outcomes
- water for urban and rural water supplies, drinking water

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[36] H Bigas, Water Security, op.cit.

[37] Zeitoun et al., 'Reductionist and Integrated Research Approaches', op.cit.

[38] C Cook and K Bakker, 'Water Security', op.cit.

[39] D Grey, D Garrick, D Blackmore. J Kelman, M Mueller, and C Saddoff, 'Water Security in One Blue Planet: Twenty-First Century Policy Challenges for Science', *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, Volume 371, no. 2013.

[40] Zeitoun et al., 'Reductionist and Integrated Research Approaches', op.cit.

[41] R Q Grafton, 'Responding to the "Wicked Problem" of Water Insecurity', *Water Resources Management* 31, no. 10, August 2017, pp. 3023–41.

- water storage and other infrastructure
- water access entitlement (WAE) reliability categories
- legal mechanisms to support WAEs or other water property rights and
- the importance of water planning providing certainty to water users.

According to this review, 'water security' usually meant water availability and the term was applied to multiple types of water use, including water for the environment. There was also an emphasis on water property rights and water sharing plans as mechanisms for achieving water security. These results support Cook & Bakker's 2012 analysis which suggested that in Australia, water security is predominately conceptualised as a water availability (quantity) concern.[42]

The review further found that water quality was linked to water security less frequently than quantity. There were few, if any, explicit links between water security and protection from water hazards like flooding. Furthermore, water security was generally not linked to peace or political stability, nor explicitly linked to risk.

It is worth noting that 'security' is used to refer to other matters that are also related to water, including:

- water access entitlement (WAE) reliability categories which in New South Wales are 'high security' or 'general security,' whereas Victoria uses the categories 'high reliability' and 'low reliability'
- 'security' as in financial security, that is, a tradable financial asset such as a WAE and
- 'security' as in fencing, locks and other protection of water infrastructure.

In the above examples, 'security' has a distinct meaning that is not equivalent to 'water security' in the general sense of water risk management. It is possible that these similar sounding terms could cause confusion, particularly given the lack of a clear conceptual framework for water security within policy.

This review focuses on Commonwealth government national water policy and legislation. States and territories are adopting their own approaches for water security. As the Australian Water Association (AWA) noted, 'Whilst many of these [state/territory water security approaches] are ground-breaking and establishing best practice, there is no nationally harmonised or consistent approach to regulating water security, which might bring considerable benefits to our governments, industry and communities'.[43]

Peak water bodies in Australia, the AWA and the Water Services Association of Australia (WSAA), both refer to the UN Water definition of water security. In addition, the AWA proposed a list of principles to inform an Australian water security framework.[44] The principles are: water fit for purpose, water efficiency, water sustainability, water reliability, resilience, flexibility, transparency, accountability and customer-focus. The WSAA elaborates for the water services sector: 'Water security is about balancing the future supply of water with future demand. It is important to achieve this balance without the need for long periods of outdoor water restrictions.'[45]

Discussion

Australian policy documents use the term 'water security,' albeit sporadically and when 'water security' is mentioned in policy or legislation, it remained undefined. However, the implicit meanings were linked to water availability and property rights. A variety of water uses were considered to need 'water security', including irrigation, public benefit and the environment. In some instances, the importance of water planning to water security was emphasised. 'Water security' was rarely linked to more integrative management concerns, such as water quality, peace, and managing water related disasters/detrimental impacts.

[42] C Cook and K Bakker, 'Water Security', op.cit.

[43] Australian Water Association, 'Emerging Challenges', op.cit.

[44] Ibid.

[45] Water Services Association Australia, '*WSAA Water Security Information Pack Five*,' WSAA, 2013, accessed 24 January 2018.

In summary, Australia lacks an overarching water security policy framework. The term 'water security' is usually meant in a narrow way, not to more integrated interpretations of water security.

Policy impact

Australian policy has yet to clearly define what water security means at the national level. Without a clear overarching framework, the implicit interpretations of water security tend to narrowly focus on water availability. This raises several potential problems.

Lack of clarity about what policy objectives can lead to ad-hoc or inconsistent strategies. The tendency towards narrower framings misses out on the advantages of a broad approach to deal with the complexity of water in an integrated way, including social equity issues. Analyses of Australian water security have been undertaken from time to time by non-government organisations. For example, the AWA and Future Directions International, a not-for-profit research institute.[46] These analyses provide insight into water security and both reports highlight the need for a strategic national approach to a number of water challenges.

As noted by UN-Water, 'when assessing either the success or failure around water security, it is important to consider for whom water security is being sought, for what purpose and at what level'.[47] In Australia, a significant social equity issue is Indigenous peoples' water access. It is possible that the 'narrow' view of water security has contributed to a policy environment that continues to fail Indigenous peoples.[48] Indigenous water rights remain part of the 'unfinished business' of Australian water reform and contributes to Indigenous economic disadvantage.[49] In Northern Australia, lack of clarity about water property rights regimes is an issue for regional economic development.[50] Policy work undertaken by Indigenous organisations have provided innovative frameworks for water, however, the national water reform agenda has provided limited support. To date, government policy for Indigenous water rights in Australia has been ad-hoc and not adequately protected by legislation.[51]

Given that the Australian government policy and funding decisions can directly impact water security, there is an argument for a cohesive national approach. In particular, a national framework that highlights water security risks could help target water related funding and investment.

Australia's future water security

Australia does not have a water security conceptual framework at the national level. Without a national approach, poorly defined and 'narrow' interpretations prevail and while everyone agrees that 'water security' is important, effective agreement becomes difficult if the term means something different to everyone.

This review indicates that policy cohesiveness could be enhanced by introducing a clear definition or framework. International literature suggests that broad, integrative framings are useful for understanding water's complex challenges and are appropriate for considering water security at the national policy level.[52] The AWA suggests a 'nationally harmonised or consistent approach to regulating water security, which might bring considerable benefits to our governments, industry and communities'.[53]

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[46] AWA, Emerging Challenges, op.cit. and S Lehane, op.cit.

[47] H Bigas, *Water Security,* op.cit., p. 9.

[48] V Marshall, *Overturning Aqua Nullius*, Canberra, A.C.T., Aboriginal Studies Press, 2017.

[49] Productivity Commission, 'National Water Reform', op.cit.; J Altman, 'Indigenous Interests and Water Property Rights', *Academy of Social Sciences* 31, no. 23, 2004.

[50] Joint Select Committee on Northern Australia, *Our North, Our Future: White Paper on Developing Northern Australia,* Canberra, ACT. Commonwealth of Australia, 2015.

[51] Indigenous Water Policy Group, '*A Policy Statement on North Australian Indigenous Water Rights*', Northern Australian Indigenous Land and Sea Management Alliance, Darwin, NT 2009.; P Whitehead, 'An Indigenous Prospectus for Northern Development: Setting the Agenda A Position from the Second Forum Position Paper North Australian Indigenous Experts Forum on Sustainable Economic Development' Darwin, NT, 2013; KS Taylor, BJ Moggridge, and A Poelina, 'Australian Indigenous Water Policy and the Impacts of the Ever-Changing Political Cycle,' *Australasian Journal of Water Resources* 20, no. 2, 2016, pp. 132–47.

[52] C Cook and K Bakker, 'Water Security', op.cit.

[53] Australian Water Association, 'Emerging Challenges,' op.cit.

Several options are available. The UN-Water definition of water security could be adopted, representing an international best practice standard. Alternatively, an Australian-specific definition could be developed, potentially as part of the water reform leadership role undertaken by the Australian Government through the Department of Agriculture and Water Resources.[54] The Productivity Commission has called for a renewed agreement on water reform by 2020, which could provide an opportunity to develop a water security framework. Establishing a dedicated independent national advisory body on water offers another option for progressing water security policy development.

Establishment of a framework then makes possible regular national water security risk analyses to identify priority areas for investment and policy development. The United Nations, European Union, United States and Asian Development Bank all have framework / scorecard approaches to water security that articulate objectives and track progress.[55]

Conclusions

Tackling water security is an enduring challenge for Australia. The findings here suggest some areas for national water security policy development and action.

A consistent, clear approach to water security could enhance policy cohesiveness. By narrowly focusing on water availability, social equity concerns are in danger of being forgotten, particularly in relation to Indigenous peoples' water rights. A comprehensive water security framework would integrate water benefits with water's detrimental side (floods, water borne disease etc.) and provide a vehicle for considering the difficulty trade-offs between competing water uses. As climate change progresses, this imperative will increase. A 'vision' for water security could also provide clearer objectives for investment, with funds directed more strategically based on risk.

In conclusion, there is potential to improve Australia's water security by developing a broad, integrative national approach and using it as the basis for water policy.

[54] Australian Government, 'Water Policy and Resources,' Department of Agriculture and Water Resources, 2018, accessed 28 March 2019.

[55] Australian Water Association, 'Emerging Challenges,' op.cit.

Appendix

Table 2: water security definitions and usage in key documents and legislation reviewed by this report

Document	Defines water security?	Uses of 'security' or 'water security' within document
1994 Water Resource Policy[56]	No	n/a
Environment Protection and Biodiversity Conservation Act 1999 (& Regulations)[57]	No	n/a
2004 National Water Initiative[58]	No	Security of water access entitlement is mentioned several times, e.g. '… enhance the security and commercial certainty of water access entitlements …' [by statutory means] Water for *'environmental and other public benefit outcomes …* have at least the same degree of security as water access entitlements' Water planning provides '… resource security outcomes by determining the shares in the consumptive pool *…'*
2007 National Plan for Water Security[59]	No	'The National Plan for Water Security … is designed to *ensure rural water use is placed on a sustainable footing* within the next decade'; 'sharing of water savings on a 50:50 basis between irrigators and the Commonwealth Government leading to *greater water security and increased environmental flows';* 'water secured for the *environment*'. 'These changes have already eroded the security of water entitlements,'
Water Act 2007 (Cth) and the Basin Plan 2012	No	One of the objects of Act is 'to improve water security for *all uses of Basin water resources'* Likewise, a purpose of the Basin Plan is 'improved water security for all uses of Basin water resources'.
2013 Intergovernmental Agreement on implementing water reform in the Murray-Darling Basin[60]	No	n/a
2014 Review of the Water Act[61]	No	'… financiers in *taking security* over irrigation rights …'
2015 Agricultural Competitiveness White Paper[62]	No	'$500 million National Water Infrastructure Fund for *farmers' future* water security'
2015 Our North, Our Future	No	'In the north, CRCs are working in areas such as economic development, agriculture, water security …'

[56] Commonwealth Government, '*Water Resource Policy*' Commonwealth of Australia, Canberra, 1994.

[57] *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

[58] COAG, 2004, Intergovernmental agreement on a National Water Initiative.

[59] Commonwealth Government, '*National Plan for Water Security*,' 2007.

[60] Council of Australian Governments, COAG, 2013 '*Intergovernmental Agreement on Implementing Water Reform in the Murray Darling Basin*,' Revised March 2017.

[61] Australian Government, *Report of the Independent Review of the Water Act 2007,* Commonwealth of Australia, 2014.

[62] Australian Government, Agricultural Competitiveness White Paper, *Stronger Farmers Stronger Economy*, Commonwealth of Australia, Canberra, ACT, 2015.

		'expand the water trading market and improve *water entitlement* security.' 'Government is best placed to improve investor security over land and *water property rights*,'
2016 Governor-General's Address to Parliament[63] [Peter Cosgrove's opening address is included in this table because it directly addressed the topic of water security. Other Governor-General's speeches reviewed did not provide relevant material to this paper]	No	'… most significant investment in water infrastructure in our nation's history … rollout of more than $10 billion worth of projects in the Murray-Darling Basin, providing not only water security for our farmers, but also enduring, sustainable agricultural production and consequent economic benefits for all Australians'.
2017 Productivity Commission Review of Water Reform[64]	No	'supply security for rural and urban communities' 'promote *water supply* security'
2017 Basin Plan Evaluation[65]		'The Basin Plan improves water security by establishing: a common standard for *water resource plans* in all jurisdictions …'
2018 Murray Darling Basin Plan Five Year Review: Issues Paper[66]	No	'Securing contracted but not yet delivered water from water-saving infrastructure projects.'

Sources provided in footnotes

[63] Australian Government, Governor-General's Speech; House of Representatives Official Hansard No. 1 2016, Tuesday, 30 August 2016, Forty-Fifth Parliament, first session, first period, 2016.

[64] Productivity Commission, '*National Water Reform*', op.cit.

[65] Murray Darling Basin Authority, '*Basin Plan Evaluation,'* Murray Darling Basin Authority, 2017.

[66] Productivity Commission, '*Murray-Darling Basin Plan: Five-Year Assessment*', Canberra, ACT, 2018.