

This country profile was compiled by the OECD Secretariat and reflects information available as of June 2013. Further information and analysis can be found in the publication: OECD (2013) *Water and Climate Change Adaptation: Policies to Navigate Uncharted Waters*, OECD Studies on Water, OECD Publishing. <http://dx.doi.org/10.1787/9789264200449-en>. Country profiles for all OECD member countries are available for download at: www.oecd.org/env/resources/waterandclimatechange.htm. These profiles will be regularly updated and it is planned to expand coverage over time to include key partner countries.

Australia

Climate change impacts on water systems

Observed changes and trends	<ul style="list-style-type: none"> • Annual average daily mean temperature has increased by 0.9 °C from 1910 to 2011. • During recent decades, there has been a general trend towards increased spring and summer monsoonal rainfall across Australia's north, higher than normal rainfall across the centre, and decreased late autumn and winter rainfall across the south. • Reductions in rainfall over southern Australia, coupled with increases in temperatures, have led to dramatic reductions in stream flow in these regions. • Increase in the intensity and frequency of extreme temperatures and severe drought.
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Projected impacts	<ul style="list-style-type: none"> • Increase in temperature of 0.5 °C to 1 °C by 2030 and of 0.5 °C to 2 °C by 2070 above 1990 levels under the "optimistic" scenario. • Increase in temperature of 1 °C to 2 °C by 2030 and of 3 °C to 6 °C by 2070 above 1990 levels under the "challenging" scenario. • Decrease in precipitation across southern Australia during winter and over southern and eastern Australia during spring over the coming decades. • Runoff affected by declining rainfall in winter, along with higher temperature. Rainfall and runoff changes will affect aquifer recharge. • Adverse impacts on the quality of surface resources and groundwater; possible contamination of water supply. • Increase in extreme rainfall events in many areas, increasing the likelihood and severity of floods. • Changes in the frequency of drought ranging from -20% to +80% by 2070 relative to present conditions, depending on the location. The largest increases in drought frequency are projected to take place in southwest Western Australia. • Increases in drought, salinity and other water quality issues and changes in water availability are threats to ecosystems. • The El Niño-Southern Oscillation (ENSO) phenomenon plays an important role in patterns of rainfall over parts of Australia, however potential changes in ENSO are not well understood.
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Primary concerns	Water quantity	Water quality	Water supply and sanitation	Extreme weather events	Ecosystems
	✓	✓ (e.g. salinity, exposure of acid sulphate soils in wetlands, blackwater events, increased toxic algal blooms)	✓ (increased development of WSS infrastructure – notably desalination plants and pipelines – in response to the Millennium Drought and threat of increased drought frequency)	✓ (drought, particularly in the south-west and floods, in some parts of northern Australia)	✓

Key vulnerabilities	<ul style="list-style-type: none"> • Australia is the driest of all inhabited continents. • Extreme variability of inter-annual rainfall in areas of high population, agricultural and environmental significance.
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Sources: Australian Government (2009), *Australia's Fifth National Communication on Climate Change*, Department of Climate Change, Canberra, http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/4903.php, accessed 15 June 2012; Australian Government (2012), *Water Policy and Climate Change in Australia*, National Water Commission, Canberra; Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Australian Bureau of Meteorology (2012), *State of the Climate – 2012*, www.csiro.au/Outcomes/Climate/Understanding/State-of-the-Climate-2012.aspx, accessed 10 October 2012; PMSEIC Independent Working Group (2007), "Climate Change in Australia: Regional Impacts and Adaptation – Managing the Risk for Australia", *Report prepared for the Prime Minister's Science, Engineering and Innovation Council*, Canberra.

Key policy documents

Document	Reference to water?	Type	Year	Responsible institution
Water Act	Y	Legal act	2007	The Australian Government
Water Amendment Act	Y	Legal act	2008	The Australian Government
National Water Initiative	Y	National water policy framework	2004	The Council of Australian Governments
National Climate Change Adaptation Framework	Y	National adaptation strategy	2007	The Council of Australian Governments
National Coastal Risk Assessment Biodiversity Vulnerability Assessment	Y	National risk/vulnerability assessment	2009	Department of Climate Change and Energy Efficiency
Murray-Darling Basin Agreement (under the Water Act)	Y	Sub-national responses	2008	The Australian, ACT, NSW, QLD, SA, and VIC Governments
Murray-Darling Basin Plan (under the Water Act)	Y	Legal act	2012	Murray-Darling Basin Authority

Policy instruments

Areas	Policy mix	Regulatory instruments	Economic instruments	Information and other instruments
Water quantity	<ul style="list-style-type: none"> The water market rules: Prohibit actions that prevent or unreasonably delay irrigators from transforming their irrigation rights into separate statutory water access entitlements, allowing them to be traded outside the irrigation district. The water charge rules: Promote efficient water pricing and sustainable use of water resources and water infrastructure across the Murray-Darling Basin. Murray-Darling Basin Plan: Sets enforceable limits on the use of water that reflect an environmentally sustainable level of use. These limits will be responsive to changes in water availability. 	<ul style="list-style-type: none"> Water trading under the National Water Initiative (NWI):¹ Transfer of water access entitlements (permanent) and seasonal water allocations (temporary) between different entities. Water trading allows scarce water resources to be transferred to their most productive uses and allows access to water resources to be reallocated over time in response to: <ul style="list-style-type: none"> – changing commodity prices; – changing environmental conditions; – changes to the size of cities and towns; and – changes in the availability of water, www.environment.gov.au/water/publications/action/nwi-wts-report.html. 	<ul style="list-style-type: none"> The National Water Initiative (NWI) is Australia's enduring blueprint for water reform; through it, governments across Australia have agreed on actions to achieve a more cohesive national approach to the way Australia manages, plans for, measures, prices, and trades water, www.environment.gov.au/water/australia/nwi/index.html. This includes best practice water pricing, www.environment.gov.au/water/publications/action/nwi-pricing-principles.html. The National Water Market System (NWMS) Project (ongoing): Aims to ensure water trading systems and processes better meet the Water Market Performance Characteristics set by Council of Australian Government and National Water Initiative requirements, www.nationalwatermarket.gov.au/site-information/index.html. Reform of drought-related programmes: In October 2012, Australian primary industries ministers agreed to a new package of measures to better support farmers and their families to prepare for future challenges. The focus of the package is on helping farmers to better plan and prepare for drought and other challenges rather than waiting until they are in crisis to offer assistance, www.daff.gov.au/agriculture-food/drought/drought-program-reform. 	
Water quality				
Water supply and sanitation				
Extreme weather events			<ul style="list-style-type: none"> The Government recently undertook public consultations on a proposal to require all general insurers offering home and contents insurance to include flood cover in those insurance policies whilst giving the insurers the option of allowing consumers to opt out of purchasing flood cover. The Government has deferred consideration of this proposal awaiting the final report of the Productivity Commission on <i>Barriers to Effective Climate Change Adaptation</i>. 	

Policy instruments (cont.)

Areas	Policy mix	Regulatory instruments	Economic instruments	Information and other instruments
Ecosystems		<ul style="list-style-type: none"> The Murray-Darling Basin Plan: Must include an environmental watering plan (EWP) to co-ordinate environmental water use. One of the three primary objectives of the draft EWP is "to ensure that water-dependent ecosystems are resilient to climate change and other risks and threats", www.mdba.gov.au/draft-basin-plan/supporting-documents/ewp. 	<ul style="list-style-type: none"> Water entitlement buy backs: AUD 3.1 billion for purchasing water entitlements to help restore the health of vitally important rivers, wetlands, and floodplains, www.environment.gov.au/water/policy-programs/entitlement-purchasing/index.html. 	<ul style="list-style-type: none"> National Guidelines for the National Flood Risk Information Program: The Government will establish Guidelines for the reporting of flood risk information and establish a flood risk information portal to provide a single access point for flood mapping data, www.em.gov.au/Publications/Program%20publications/Pages/National-Guidelines-for-the-National-Flood-Risk-Information-Program.aspx. Water for the Future programme: The Australian Government's effort to facilitate adaptation to climate change and as a response to increasing water scarcity (see below), www.environment.gov.au/water/australia/index.html. The National Water Quality Management Strategy (NWQMS) provides information and tools to help communities manage their water resources to meet current and future needs,² www.environment.gov.au/water/policy-programs/water-quality/index.html. Water Quality Improvement Plans (ongoing),³ www.environment.gov.au/water/policy-programs/nwqms/wqip/index.html. Australian Water Resources Information System (AWRIS): AWRIS is being developed by the Bureau of Meteorology to provide key water information to enhance understanding of Australia's water resources. Water Efficiency and Labelling Standards (WELS) Scheme,⁴ www.waterrating.gov.au.

1. Creating an environment in which individual water access entitlement holders are able to trade water quickly and easily will contribute to a more productive and efficient use of Australia's water over time. The Australian Government is also introducing water market charges and trading rules under the Water Act 2007, which will improve the water market by freeing up and setting rules for trade, and by ensuring appropriate price signals. Best practice water pricing is a key element of the National Water Initiative.
2. It provides policies, a process and a series of national guidelines for water quality management. As part of the NWQMS, the Water Quality Management Framework includes a step-by-step approach to planning, implementing and managing water quality, plus information about common environmental stressors.
3. The Australian Government is working in collaboration with States and Territories to develop Water Quality Improvement Plans (WQIP) to reduce pollution being released into freshwater ecosystems considered hotspots. It aims to reduce pollutants through the identification of environmental values of water, setting water quality and environmental flow objectives and implementation of catchment based management actions and monitoring.
4. It encourages water conservation by requiring that certain products, including clothes-washing machines, showers and lavatory equipment, be registered and labelled with their water efficiency when offered for supply.

Main research programmes

- The Australian Climate Change Science Program (ACCSP), delivered through the Australian Government Department of Climate Change and Energy Efficiency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Bureau of Meteorology and Australian universities, nationally co-ordinated under *A Plan for Implementing Climate Change Science in Australia*. The ACCSP improves understanding of the drivers of rainfall and how they are changing informing planning and adaptation decisions.
- The CSIRO research programme on climate change, including the Adaptation Flagship, www.csiro.au/en/Outcomes/Climate/Understanding.aspx.
- National Climate Change Adaptation Research Facility (NCCARF) Water Sector Adaptation Research Network, www.nccarf.edu.au.

Principal financing mechanisms and investment programmes

- The Australian Government has invested over AUD 300 million over the period 2007-12 to fund national adaptation actions, with those elements most relevant to water including:
 - AUD 50 million to establish and fund a National Climate Change Adaptation Research Facility (NCCARF) to build capacity in the research community on adaptation and to generate the information decision-makers need to adapt to the impacts of climate change, www.nccarf.edu.au.
 - AUD 44 million for a CSIRO Climate Change Adaptation Flagship, www.csiro.au/en/Organisation-Structure/Flagships/Climate-Adaptation-Flagship/ClimateAdaptationFlagshipOverview.aspx.
 - AUD 130 million to assist farmers to tackle the threat of climate change as part of the "Australia's Farming Future" program, www.daff.gov.au/climatechange/australias-farming-future.
 - Grants to local governments to develop strategies for managing risks from climate change impacts, www.climatechange.gov.au/government/initiatives/lapp.aspx; www.climatechange.gov.au/government/initiatives/coastal-adaptation-decision-pathways.aspx.
- Water for the Future programme: The Australian Government is investing AUD 14 billion over 12 years to facilitate adaptation to climate change and as a response to increasing water scarcity. The program aims to improve water management and deliver a range of water policy reforms. Measures under the program include:
 - Sustainable Rural Water Use and Infrastructure Programme: As part of the national investments in the Water for the Future initiative, the Australian Government has committed AUD 5.8 billion to increase water use efficiency in rural Australia. Under the programme, the Government has agreed to provide approximately AUD 3.2 billion for State Priority Projects (which includes Commonwealth led projects) in South Australia, New South Wales, Victoria, Queensland and the Australian Capital Territory (ACT), subject to a due diligence assessment of the social, economic, environmental, financial and technical aspects of the projects, www.environment.gov.au/water/programs/srwui/index.html.
 - Restoring the Balance in the Murray-Darling Basin Program: The Government has committed AUD 3.1 billion to facilitate water buy backs to protect and restore the environmental health of the Murray-Darling Basin. The programme allows irrigators to voluntarily sell their water entitlements to the Australian Government, www.environment.gov.au/water/policy-programs/entitlement-purchasing/index.html.
 - Urban water programmes to secure and diversify urban water supplies: Through the National Water Security Plan for Cities and Towns programme, the Australian Government has committed over AUD 250 million to fund practical projects that save water and reduce water losses in cities and towns nationally with populations of less than 50 000. In addition, over AUD 680 million has been committed to investments in desalination plants, water recycling schemes, stormwater harvesting and reuse projects. Funding is also provided for research into improving the technologies and use of desalination and water recycling, www.environment.gov.au/water/policy-programs.
 - Improving Water Information Program: The Bureau of Meteorology received funding of AUD 450 million over ten years to revolutionise the way water information is measured, accounted for, reported, forecasted and analysed.

Highlights and innovative initiatives

- **National Water Initiative:** In 2004, The Council of Australian Governments (COAG) agreed on a policy blueprint, the National Water Initiative, to improve the way Australia manages its water resources. It is designed to increase the efficiency of Australia's water use, leading to greater certainty of investment and productivity, for rural and urban use that optimises economic, social and environmental outcomes, www.nwc.gov.au/reform/nwi.
- **Water trading in the southern Murray-Darling Basin:** During severe drought conditions, water trading was vital in securing critical supply needs. The increases in flows due to trading were beneficial to river systems and provided important benefits to regions and local communities, www.nwc.gov.au/publications/topic/rural/impacts-of-water-trading-in-the-southern-murray-darling-basin.
- **The Commonwealth Environmental Water Holder:** The Commonwealth Environmental Water Holder is a statutory position under the Water Act that manages water recovered by the Australian Government to protect and restore environmental assets. This water must be managed in accordance with the EWP, www.environment.gov.au/ewater/about/index.html.