Netherlands Water Partnership

UNSW SYDNEY
Global Water Institute

Ministry of Foreign Affairs

Water Sector Study – Australia

June 2024

This report was commissioned by the Consulate-General of the Kingdom of the Netherlands in Sydney and executed by the Netherlands Water Partnership (NWP), in cooperation with the University of New South Wales . NWP is a network of approx. 180 public and private internationally oriented Dutch organizations. NWP is the first point of call internationally for anyone seeking Dutch expertise on water management issues or contact with the Dutch water sector.

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Content

Executive Summary

Australia faces a range of water-related challenges, including changes in hydrology due to climate change, droughts, periodic heavy rainfall and flooding events, impacts of bushfires on water quantity and quality, and rising sea level on coastal areas. Effective water management strategies and adaptation measures are essential to address these challenges and ensure water security in the country and protect coastal communities and ecosystems.

This study has identified two main areas where opportunities lie for the Dutch water sector (DWS) in Australia: in agri- and horticulture, and in solutions for water scarcity and floods. These are areas where we see both demand from the Australian side, and a high level of expertise and innovation on the side of the Dutch water sector.

Many acknowledge that right now is the right time to enter the Australian market with Dutch products, especially products that offer solutions for climate change mitigation.

The agricultural sector is growing, especially crop production. According to the Australian Department of Agriculture, Fisheries and Forestry, the agricultural sector accounts for 55% of land use and 74% of national water consumption. At the same time, both the Australian government and the agricultural sector are committed to reduce agricultural carbon emissions and water use. The Dutch experience in the water-agriculture nexus is therefore interesting for Australia.

The opportunities regarding water safety are also numerous. Water scarcity has led to a growing demand for circularity in the drinking water sector and the filtration of surface water. The impact that climate change has had on rainfall also influences the availability of drinking water. Water authorities are increasingly looking for alternative sources of potable water. Escalating annual rainfall and the increase in the severity of droughts also provide opportunities for stormwater capture and rainwater harvesting. In the area of water safety, there are more possibilities for cooperating with the public sector, particularly local governments.

Seeing that a large part of the Australian population lives in cities, Australia is increasingly looking for solutions for water problems in urban areas. Heat management forms a large part of this problem, with rising temperatures exacerbating heat stress in cities. Water governance and circularity in the mining sector also offer opportunities for the DWS.

The image of the Netherlands as a water country helps when developing initial business relations. The Australian business culture is perceived as similar to the Netherlands, with little to no culture and language barriers. The biggest challenges are the time difference and the distance. Having good local contacts and representation in Australia itself is important in doing business in Australia.

1. Introduction: why this Market Scan?

Australia is projected to experience ongoing changes to its weather in the coming decades due to climate change, such as continued warming, persistent drought and variable rainfall, increased fire risks, changes in coastal and marine environment, tropical cyclone activity and reduced snow depth. These changes will necessitate adaptation and mitigation efforts across sectors to address the challenges posed by these shifts and ensure the country's resilience and sustainability.

Currently there are Government to Government and Knowledge to Knowledge activities with organisations such as the Water Service Association Australia, Sydney Water and various state governments being undertaken by the Dutch Consulate-General in Sydney. In addition, the Australian federal government is currently investing over $15 billion in water reforms and $789 million in agricultural resilience schemes.
In addition, the National Water Initiative in Australia is currently under review to improve management of water for urban, regional, agricultural and environmental purposes in Australia. We reviewed the most recent submissions to the Productivity Commission's Inquiry into the National Water Initiative (NWI) and the National Water Inquiry 2024 from various organisations. Water is again high on the agenda of many Australian organisations, which makes it the perfect time to stimulate bilateral water cooperation.

In this context, the Dutch Consulate-General in Sydney commissioned a market scan to provide the Dutch water sector (DWS) with an overview of the above mentioned challenges and related business opportunities. It also aims to map the opportunities of working together with the Australian water sector, to connect the Dutch and Australian water sector and stimulate a knowledge exchange and B2B opportunities between the two countries. This market scan has been carried out by the Netherlands Water Partnership (NWP), in collaboration with the University of New South Wales in Sydney. The report is based on desk research, supplied by semi-structured interviews with relevant parties in both the Australian and Dutch water sectors.
This report should give insight into the Australian context and the present state of the water sector. It contains an overview of Australian demand, particularly in agri- and horticulture, flood management, coastal protection and water in urban settings. It also depicts relevant reports, and clearly points out business opportunities for the Dutch water sector.

Methodology

This water sector scan aims to identify main challenges and opportunities in terms of getting involved in the water sector in Australia. Within this study, semi-structured interviews were held with Dutch and Australian organisations who are operational and/or involved with the Australian water sector.

The Netherlands Water Partnership (NWP) has conducted 10 semi-structured interviews with
Dutch companies and organisations that are experts in water matching the water challenges of Australia with the demand in the Netherlands. The University of New South Wales has held multiple interviews with different Australian organisations in the sector. The interviews were prepared with pre-constructed open-ended questions that focused on understanding the water sector in Australia and operating within it from the perspective of the interviewees. Any factual information given during the interviews was then cross checked and verified, while personal experiences and testimonies were added without verification. Additionally, UNSW conducted a thorough review of the latest submissions to the Productivity Commission's Inquiry into the National Water Initiative (NWI) for the National Water Reform 2024. The Productivity Commission was tasked with assessing progress, identifying barriers, and suggesting improvements for the NWI, and the review summarised issues and recommendations from Australian Stakeholders in the water sector.

To identify strengths, weaknesses, opportunities and threats of the Australian Water Market, a SWOT analysis was conducted (section 7) based on the collected data. Furthermore, the findings were analysed to find the set of recommendations as guided by the Dutch and Australian actors (i.a. Large corporations, SMEs, governmental organisations, knowledge institutes) for working in the water sector.

2. Introduction to Ongoing Activities NL-Australia

Before we dive into the content of this market scan, some context on the bilateral activities between the Netherlands and Australia on water is appropriate.

Past intentions of cooperation between the Dutch and Australian water sectors translate to the current ambitions of the Dutch Consulate-General in Sydney to expand Dutch-Australian collaboration and to position the DWS in the Australian market. The water-related challenges that the country experiences, exacerbated by climate change, as well as the expected growth of hydrogen production and the ongoing urbanisation all provide opportunities for the Dutch water sector to expand their business in Australia. In addition, the upcoming Brisbane 2032 Olympics and the ambition to make the Games climate-positive opens the road for DWS parties to enter the Australian market.

The current Water Market Scan is the first action since 2016-18 specifically geared towards the private sector that realises the ambitions of the Consulate to better position the DWS in the Australian market. There are a number of other activities in line with these ambitions that are currently taking place. For example, the Consulate attended the EvokeAG trade fair for the agricultural sector, where there was also an interest in Dutch irrigation and agricultural knowledge. In addition, the Consulate facilitates knowledge exchange between the Water Services Association of Australia and DWS parties, as well as between the University of Queensland and water sector parties from the Netherlands.

There are a number of events and conferences that might be of interest for parties who are working in Australia or are looking to start doing business there.

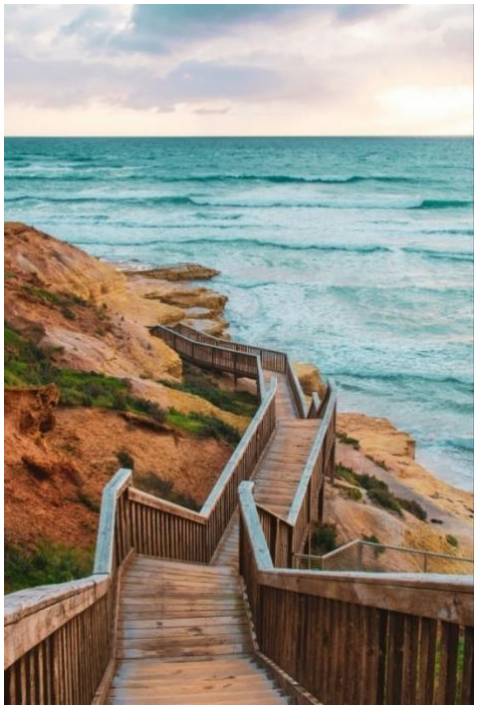
- OzWater is the biggest trade fair in Australia that is hosted in another city every year, which brings together a diverse group of water sector parties active in trade, industry, research and policymaking, among others.
- The Australian Water Association organises conferences on a federal level. This could be interesting for parties who are looking for further information on the difference between the states.
- Sydney Water Innovation festival biannual event in Sydney, with a strong focus on innovative solutions and discussions on problems in the water sector.
- Singapore International Water Week the counterpart of the Amsterdam International Water week. Although it doesn't take place in Australia, there is often a strong presence of Australian businesses, because it is closer than Amsterdam.
- Australian Smart Water Utilities conference mostly geared towards the water utility companies.

Depending on the interests of the Dutch water sector, the Consulate is considering attending OzWater to facilitate matchmaking activities between Dutch and Australian parties. The Consulate is also looking at the possibility to bring Australian delegations to the Amsterdam International Water Week.

In addition to these activities, the Consulate can also support companies that want to do business in Australia by conducting business partner scans, making connections with local contacts or by organising networking events for occasions such as King's Day and incoming delegations. In case there is sufficient interest from the DWS, the Consulate can set up trade missions and possibly a PIB programme to showcase Dutch companies on the Australian Market.

For more information and inquiries, you can reach out to Nathan de Bruijn at Syd-EZ@minbuza.nl

3. Geographical Overview of Australia



The Commonwealth of Australia (Australia) is located in the United Nations region of Oceania situated between the Indian and the South Pacific oceans. The total area including the Australian continent, the island state of Tasmania and other outlying islands, is 7,686,850 km^2 or approximately 185 times larger than the Kingdom of the Netherlands. In addition, since 1933 Australia has claim to 5,896,500 km^2 in the Australian Antarctic Territory, located on the east of the Antarctic continent. Australia is the 6th largest country by area with the third-largest exclusive economic zone EEZ (8,148,250 km^2 excluding the Australian Antarctic Territory). Australia does not share a land border and has jurisdiction over the largest area of ocean. The Australian mainland has a coastline of 35,821 km with an additional 23,860 km on Tasmania and the outlying islands. The country has approximately 8,866 km^2 of tidal flat area which is the third largest behind Indonesia (14416 km^2) and China (12,049 km^2).

Australia is approximately 3860 kilometres long from north to south and 4000 kilometres wide from east to west. The continental mainland extends from a latitude of 10° 40'S at Cape York in Queensland to 39°8'S at Wilsons Promontory in Victoria. The southernmost point on the main island of Tasmania occurs at 43°38' S at South East Cape, while the southernmost point occurs at Bishop and Clerk Islets at 55°03' S. The easternmost point is located at Cape Byron (New South Wales) at 28° 38' S, 153° 38' E and the western-most point is Shark Bay (Western Australia) at 26° 09'S 113° 09' E.

Governance and Population

The Commonwealth of Australia is a federation of six states and two self-governing territories as detailed below. The estimated resident population of Australia was 26,821,557 as of 30 September 2023 (ca 1.5x larger than the Kingdom of the Netherlands) and grew at an annual rate of 2.5% based on a natural increase of 110,000 and net overseas migration of 548,800. The population is projected to reach between 34.4 to 45.9 million, with an increase in median age from 38.5 in 2023 to 43.8 to 47.6 by 2071.

Approximately 77% of the population are located in the three eastern states of New South Wales (8.39 million), Victoria (6.86 million) and Queensland (5.46 million) while the largest state by area Western Australia (2.9 million) has approximately 10% of the population. The rest of the population are located in South Australia (1.86 million), Tasmania (0.56 million), the Northern Territory (0.25 million) and the Australian Capital Territory (0.46 million), which is the location of the City of Canberra, the national capital and parliament.

Australia is a highly urbanised country, with more than 90% of the 26.8 million people residing in 9 major cities, occupying less than 0.22% of the total land area. Additionally, 85% of the population are located within 50 km of the coast.

Australian Physical Water Landscape

Australia's water resource management relies heavily on understanding the spatial distribution, interconnections, and characteristics of hydrological features such as catchments, streams, aquifers, storages, wetlands, and man-made structures. This information forms a core requirement for effective management.

In response to this need, the Bureau of Meteorology (BoM), in collaboration with Geoscience Australia, CSIRO, and the Australian National University (ANU), initiated the development of the Australian Hydrological Geospatial

Fabric (Geofabric). The Geofabric utilises drainage-enforced digital elevation models to delineate topographic drainage divisions and river regions, illustrating the flow and drainage patterns across the landscape. This effort expands on the collaborative work of the Australian Water Resources Management Committee, including state, territory, and Australian Government bodies, in the Australia's River Basins 1997 project.

In Geofabric, the Australian continent is divided into drainage divisions, further subdivided into water regions and river basins. Geofabric delineates basin boundaries as defined by the Australian Water Resources Management Committee shown in Figure 2.1. Detailed data within this framework includes the names and numbers of 245 basins, 77 regions, and 13 divisions, providing crucial insights into Australia's hydrological landscape. A summary of drainage divisions, location, area, average rainfall, storage capacity, and river systems are provided in Table 2.1 (see appendix 1).

Among river systems in Australia, the Murray-Darling Basin is the largest, extending from Queensland and New South Wales, to Victoria and South Australia. It plays an important role in Australia's economic prosperity, water security, and biodiversity conservation efforts. The Murray-Darling Basin supports a thriving agricultural sector that contributes $30 billion annually to the nation's economy. Its rivers, lakes, and dams provide vital water resources for 2.4 million residents within the basin including over a million individuals in Adelaide. Moreover, the basin's ecosystems host 16 internationally recognized wetlands, crucial for the survival of more than 120 waterbird species and over 50 native fish species.

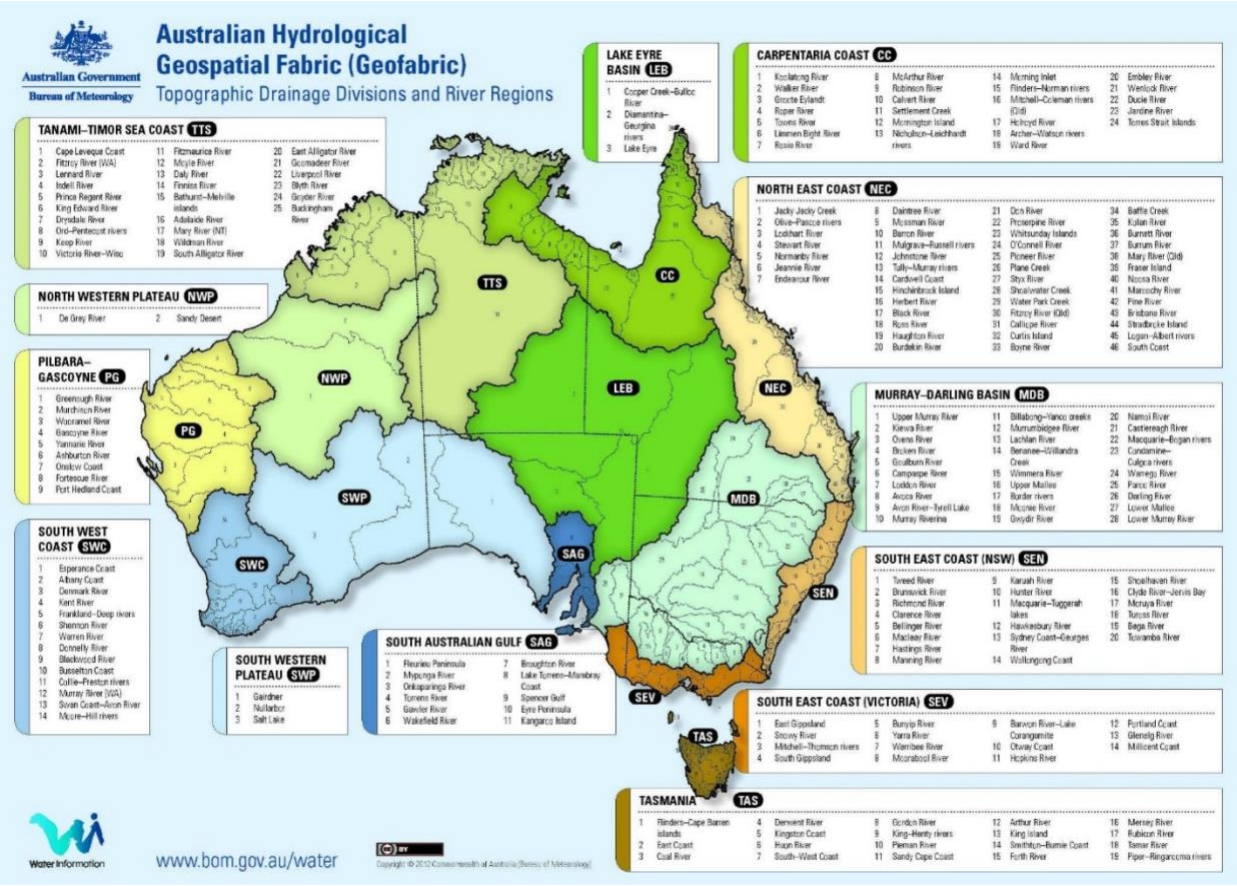


Figure 2.1. Australian Hydrological Geospatial Fabric (Geofabric) Topographic Drainage Divisions and River Regions. Download the map here.

Climate Change

The impacts of climate change in Australia are felt in the natural environment. We reviewed the latest State of the Climate 2022 report, jointly produced by the Bureau of Meteorology (BOM) and Commonwealth Scientific and Industrial Research Organisation (CSIRO), which presents current and projected changes in Australia's climate. It synthesises the latest national and international climate research, providing insights into year-to-year variability and long-term trends. The impacts of climate change on water-related challenges are discussed in the next chapter.

Incorporating new data since the previous report in 2020 and including findings from the 2021 IPCC Sixth Assessment Report, the report informs decision-making across governmental, industrial, and communal sectors regarding the economic, environmental, and social impacts of climate change. Key findings from the report are summarised below.

1. Rising Temperature

According to the report, Australia's climate has undergone significant changes over the past century. Rising temperatures have been a prominent feature, with an average warming of 1.47 ± 0.24 °C since national records began in 1910. This warming trend extends to the oceans, where sea surface temperatures have increased by approximately 1.05 °C since 1900. Consequently, there has been a noticeable uptick in the frequency of extreme heat events, both over land and sea. In 2019, there were 33 instances where the national daily average maximum temperatures surpassed 39 °C, a higher count than the total observed over the 59-year period from 1960 to 2018. This elevated heat has resulted in more fatalities in Australia than any other natural disaster and has significant repercussions on ecosystems and infrastructure.

2. Shift in Rainfall Patterns

The shift in rainfall patterns is another notable aspect highlighted in the report. In the southwest of Australia, there has been a marked decline of around 15% in April to October rainfall since 1970, with the most substantial decrease occurring during the May to July period. Similarly, the southeast region has experienced a decrease of approximately 10% in April to October rainfall since the late 1990s. However, there have been contrasting trends in northern Australia, where rainfall and streamflow have increased since the 1970s.

3. Extreme Weather Events

Extreme weather events have also become more prevalent across the country. Large parts of Australia have experienced an escalation in extreme fire weather conditions and a prolonged fire season since the 1950s. Additionally, while the number of observed tropical cyclones in the Australian region has decreased, a greater proportion is expected to be of high intensity. The report notes a decrease in snow depth, snow cover, and the number of snow days in alpine regions since the late 1950s.

4. Changing Coastline and Marine Environment

Furthermore, the report underscores the impact of climate change on Australia's marine environment. Oceans surrounding the continent have warmed by more than 1 °C since 1900, contributing to longer and more frequent marine heatwaves. The increasing frequency of marine heatwaves around Australia in recent years has permanently impacted marine ecosystem health, marine habitats and species. These impacts include depleting kelp forests and seagrasses, a poleward shift in some marine species, and increased occurrence of disease. This warming, coupled with rising sea levels, poses a growing threat to coastal infrastructure and communities, increasing the risk of inundation and damage.

Climate Change Expectations

According to the report, Australia is projected to experience ongoing changes to its weather and climate in the coming decades.

- Continued Warming: Air temperatures will rise, leading to more frequent heat extremes and fewer cold events.
- Persistent Drought and Variable Rainfall: Southern and eastern Australia will experience reduced cool season rainfall, resulting in more frequent droughts, alongside sporadic heavy rainfall events.
- Increased Fire Risks: The number of dangerous fire weather days will rise, lengthening the fire season in southern and eastern regions.
- Changes in Coastal and Marine Environment: Sea levels will continue to rise, and oceans around Australia will warm and acidify, leading to more frequent marine heatwaves and severe coral bleaching events.
- Tropical Cyclone Activity: While there may be fewer tropical cyclones overall, a greater proportion is expected to be of high intensity.
- Reduced Snow Depth: Alpine regions will see decreased average snow depth, impacting winter tourism and water resources. The Australian Alps, a vital freshwater source for southeastern Australia and home to a significant ski industry, are particularly vulnerable. Predictions indicate a potential 60% reduction in snow cover by 2070 due to diminishing snow depth and winter precipitation.

These changes will necessitate adaptation and mitigation efforts across sectors to address the challenges posed by these shifts and ensure the country's resilience and sustainability.

4. Water-related Challenges in Australia

Australia faces a range of water-related challenges, including changes in hydrology due to climate change, periodic heavy rainfall and flooding events, impacts of bushfires on water quantity and quality, and rising sea level on coastal areas. Effective water management strategies and adaptation measures are essential to address these challenges and ensure water security in the country, and to protect coastal communities and ecosystems.

The 2021 State of the Environment (SoE 2021) report represents the latest comprehensive assessment of Australia's environmental status. Delving into 12 critical themes - Air quality, Antarctica, Biodiversity, Climate, Coasts, Extreme events, Heritage, Indigenous, Inland water, Land, Marine, and Urban - the report provides an up-to-date and thorough examination of the nation's ecological landscape. Within this expansive review, we concentrate on the chapters dedicated to Inland Water, Coasts, and Urban environments, summarising relevant figures and insights on water-related challenges that Australia is currently facing.

1. Changes in Hydrology

Australia is undergoing significant changes in hydrology due to climate change, particularly manifesting as drier conditions in the southwest and southeast regions. Over the past two decades (2000–2019), there has been a marked decrease in rainfall during April to October in southern parts of the country. Notably, southwestern Australia has experienced about 15% decrease in rainfall during April–October since 1970, accompanied by a 20% decrease in May–July precipitation. Consequently, there has been a reduction in streamflow across various drainage divisions, including the Murray–Darling Basin, South West Coast, South Australia Gulf, and South East Coast. Three-quarters of the Hydrologic Reference Stations in Australia have shown declining trends in streamflow, with one-quarter exhibiting statistically significant trends. In response, water management authorities have shifted towards climate-resilient water sources such as desalination and groundwater, with nearly all of Perth's water supply being sourced from these alternative sources in 2019–2020.

2. Heavy Rainfall and Flooding

Australia experiences periodic heavy rainfall and flooding, influenced by its variable climate. In recent years, notable flooding events have occurred, such as in early 2020 and late March 2021. These events led to significant flooding in various parts of the country, including coastal New South Wales, southern Queensland, and south-east Queensland. The heavy rainfall in 2020 resulted in a substantial increase in Sydney's water storage, with the capacity of Warragamba Dam nearly doubling in just 10 days. However, the subsequent flooding in 2021 encountered catchments already saturated from previous rainfall, leading to more widespread and severe flooding across New South Wales, including major flooding in rivers and coastal regions. The increased run-off from these events has implications for water storage levels in the northern Murray–Darling Basin catchments.

3. Bushfires

The 2019–2020 bushfire season in south-eastern Australia was unprecedented in scale and impact, resulting in significant damage to property, loss of life, and environmental destruction. The immediate impacts on water included disruptions to water treatment plants and inadequate water availability for firefighting efforts. Longer-term effects include impacts on the quantity and quality of water from dam catchments affected by extensive bushfire damage. Mobilisation of sediment, ash, nutrients, and contaminants during rainfall events can lead to increased turbidity, nutrient loads, contamination, and algal blooms in water bodies. The destruction of catchment vegetation also affects catchment yield and water security in the long term.

4. Coasts

Rising sea levels are exacerbating erosion, recession, and inundation risks along Australia's coastlines, posing threats to both infrastructure and ecosystems. Erosion, driven by extreme storm events, coupled with recession, leads to landward shoreline movement, while inundation threatens low-lying areas, especially estuarine shorelines. Projected sea level rise of up to 1.1 metres by 2100 could significantly escalate these challenges, endangering coastal infrastructure valued at over $226 billion. This degradation of the coastal environment not only impacts biodiversity and ecosystem services but also poses economic and human wellbeing risks, including threats to the $60 billion tourism industry. Urgent action is needed to mitigate these risks, emphasising integrated conservation efforts and sustainable management practices for the conservation, inclusive management, and sustainable use of coastal assets.

5. Urban Environment

Urban water challenges in Australian cities are exacerbated by urban heat, which sees temperatures in major cities like Adelaide soaring up to 7°C higher than surrounding regions by 2090. This increase in heat is compounded by the urban heat island effect and climate change, posing a significant threat to water and energy resources. Population growth adds further pressure, with 76% of growth concentrated in the 18 largest cities, including Melbourne and Sydney, accommodating 39% of the population. With Australia's overall population expected to surpass 28.7 million by 2031, the strain on urban infrastructure intensifies, exacerbating water resource challenges.

5. Water Management in Australia

Water management in Australia involves all three levels of government; federal, state and local. The Federal Government provides national coordination and leadership to drive national water policy and law reforms to manage water resources sustainably, while state and local governments play a role in translating national objectives into actionable plans, and are primarily responsible for managing water within their jurisdictions. For instance, the Australian Parliament passed the Basin Plan into law in 2012, outlining a comprehensive approach to manage water resources in the Murray-Darling Basin. Under this plan, states are required to develop water resource plans consistent with its provisions, subject to accreditation by the Federal Minister. The Federal Government leads basin-wide planning and accreditation of state water plans, while state governments are responsible for determining allocations, environmental flows, and meeting interstate obligations. Allocation of water to individual users is managed at the state level through legal mechanisms like the MDB Agreement. While the Federal Government, through the Murray-Darling Basin Authority (MDBA), defines, monitors, and enforces water market rules, including sustainable diversion limits, actual oversight and enforcement take place at the state level (Wheeler, Owens, & Zuo, 2024).

National Water Initiative

Current laws and mechanisms for the management of water in Australia were developed through the Council of Australian Governments (COAG) which was the primary intergovernmental forum between the federal government, the governments of the six states and two mainland territories and the Australian Local Government Association. Formed in 1992 COAG was tasked with the management of governmental relations within Australia's federal system within the scope of matters of national importance.

In 2000, COAG developed the National Water Initiative (NWI) to improve management of water in Australia including the development of legislation that created the Water Act of 2007 which provides the frameworks and institutions to ensure that the Murray–Darling Basin – Australia's largest water resource – is managed in the national interest.

Under the NWI, all states and territories committed to:

- prepare water plans with provisions for the environment
- achieve sustainable water use in over-allocated or stressed water systems
- introduce registers of water rights and standards for water accounting
- expand trade in water rights
- improve pricing for water storage and delivery
- better manage urban water demands.

The National Water Initiative has been revised twice by the Australian Productivity Commission prior to 2024 and is currently under review to improve management of water for urban, regional, agricultural and environmental purposes in Australia. The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians.
See table 4.1 in appendix 2 a list of organisations that are either directly or indirectly vested in outcomes of the current Productivity Commission review. Their submissions and recommendations to the Productivity Commission are summarised in the next section.

Submissions to the Productivity Commission

We reviewed the most recent submissions to the Productivity Commission's Inquiry into the National Water Initiative (NWI) for the National Water Reform 2024. The Australian Government tasked the Productivity Commission with assessing progress towards NWI objectives, identifying barriers to implementation, and making recommendations for improvement. These recommendations include actions for NWI parties, support for national reform efforts, and better utilisation of the Water Act 2007.

Submissions included those from stakeholders listed in Table 4.1 above. The Australian Competition and Consumer Commission (ACCC), Australian Academy of Technological Sciences and Engineering (ATSE), Engineers Australia, National Farmers Federation (NFF), Commonwealth Scientific and Industrial Research Organisation (CSIRO), Water Research Australia (Water RA), Irrigation Australia, and Water Services Association of Australia (WSAA) have submitted their views. Key issues that emerged from the various submissions and their proposed recommendations are summarised below. These groups collectively emphasise the importance of transparency, collaboration, and adaptive management in addressing water challenges in Australia.

1. Water Governance & Transparency

Water governance and transparency emerge as critical issues highlighted by various groups, including the NFF, Engineers Australia, and Water RA. These organisations express concerns about the lack of transparency and information provision in water management, fragmented approaches to resource governance, and insufficient sharing of knowledge among stakeholders.

Their recommendations underscore the need to enhance transparency, promote collaboration, and develop holistic management approaches to address these challenges effectively.

2. Climate Change Adaptation

Climate change adaptation and resilience feature prominently in the recommendations put forth by the ACCC, CSIRO, and WSAA. These groups emphasise the importance of undertaking comprehensive assessments for climate resilience, implementing adaptive management strategies, and protecting critical water sector assets in the face of climate-related risks.

Ensuring climate-resilient infrastructure and bolstering system resilience emerge as key priorities for managing water resources sustainably. CSIRO recommends implementing floodplain inundation modelling, Managed Aquifer Recharge (MAR), and holistic approaches to manage sediment load from bushfires. It also suggests developing long and short-term water forecasting, and collecting comprehensive monitoring data for better aquatic ecosystem management nationwide. Additionally, it encourages investments in improved digital infrastructure, data management, and trading processes to adapt to seasonal variability and climate change, supporting evidence-based decision-making and innovation in water resource management. In remote areas, it calls for the development of a national strategy for regional and remote water supply that tackles economic and health disparities in remote communities. It suggests the use of innovative visualisation technologies like Virtual Reality (VR) and Augmented Reality (AR) digital twins to examine proposed future scenarios for local landscapes and their potential benefits to communities and stakeholders.

3. First Nations Water Rights

Issues related to First Nations water rights and Indigenous engagement receive attention from CSIRO, WSAA, and Water RA. These organisations highlight the unsatisfactory water quality and inadequate service delivery experienced by Indigenous communities, as well as the need to prioritise Indigenous involvement in water management and research initiatives.

Recommendations include addressing historical water rights issues, empowering Indigenous communities in decision-making processes, and fostering collaboration in water research.

4. Integrated Water Resource Management

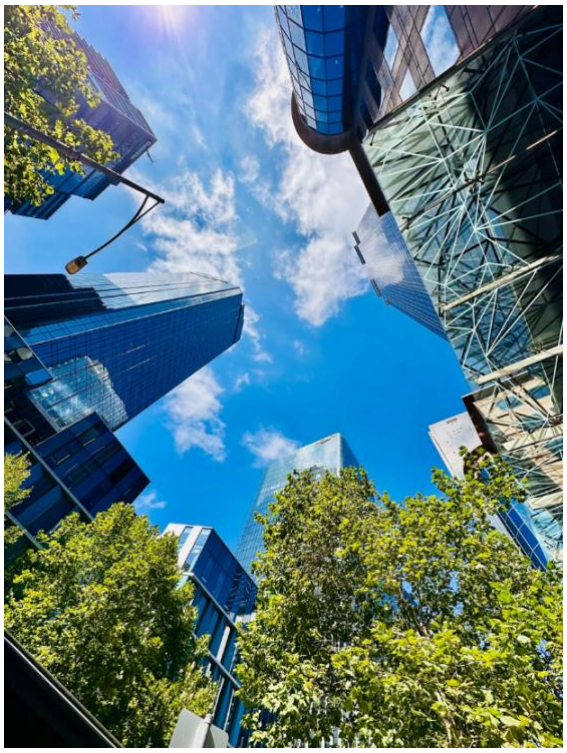
Integrated water resource management and governance emerge as central concerns raised by ATSE, Engineers Australia, and WSAA. These groups underscore the need for adaptable governance structures and holistic management approaches to effectively address the complexities of water resource management.

Their recommendations emphasise defining clear roles for government and institutions, promoting collaboration, and exemplifying state leadership in integrated water management.

5. Water Market Information

Water market information and integrity are highlighted by the ACCC, Engineers Australia, and WSAA as key areas requiring attention. Concerns revolve around the lack of quality information for water market participants, inadequate economic regulation, and challenges in securing water for environmental flows.

Recommendations include implementing reforms to enhance market transparency, improving information provision, and defining clear characteristics for secure water access entitlements.



6. Economic Environment of Australia

Having examined water management practices in Australia in the previous chapter, it is crucial to understand how these practices interact with and are influenced by the country's economic environment. The economic landscape significantly shapes the water market, impacting supply, demand, pricing, and investment. This chapter offers an environmental-economic account, providing detailed insights into water supply and usage across various sectors, including mining, agriculture, and other industries. National environmental and economic water data for Australia is compiled by the Australian Bureau of Statistics (ABS) in accordance with the United Nations System of Environmental-Economic Accounting (SEEA) and the SEEA-Water frameworks based on statistical and accounting measures that enable international comparison. According to ABS, the Australian Gross Domestic Product (GDP) for the fiscal year 2022-23 was AUD $2,406,521 million equivalent to USD $1.56 trillion.

Water Account

The ABS also compiles the Water Account, Australia (WAA), an environmental-economic account providing detailed information on water supply and use. It covers both physical volumes and monetary values, offering insights into water management across sectors. The WAA reveals that in the fiscal year 2021-22, the total volume of self-extracted water used was 66,205 GL, an increase of 3% from the previous year, of which:

- 62,582 GL (95%) was self-extracted surface water
- 3,249 GL (5%) was self-extracted groundwater
- 374 GL (<1%) was self-extracted seawater for desalination.

Self-extracted water is defined as water that is extracted directly from the environment. Possible sources include surface water (e.g. rivers and lakes), groundwater and desalinated sea water. Self-extracted water use is presented by industry in Table 5.1 below.

The electricity, gas, water and waste services industry division is the main driver behind total self-extracted water use. In 2021-22, this division used 61,752 GL, up 3% year on year, accounting for 93% of Australia's self-extracted water use. This industry division includes self-extracted water used for hydroelectricity generation - the vast majority of water used for hydroelectricity is returned directly to the environment.

Table 5.1. Self-extracted water use by industry in Australia (2021-22)

Industry	Self-extracted surface water (GL)	Self-extracted groundwater (GL)	Sea water for desalination (GL)
Agriculture, forestry and fishing	1,046	1,509	0
Mining, Manufacturing and Other industries	628	1,180	91
Electricity and gas supply	49,802	51	0
Water supply, sewerage and drainage services	11,106	510	283

In 2021-22, the total water consumption by industries and households was 13,449 GL (0.5% increase on 2020-21). Water consumption is defined as the amount of water extracted from the environment for use that is incorporated into products, evaporated during distribution, transpired by plants, or consumed by households or livestock, and is therefore not directly returned to water resources.

Water use by the Agriculture, forestry and fishing industries was 9,981 GL (3% increase) while the total urban water use was 1,779 GL (2% decrease). Water use is defined as the amount of water extracted from the environment plus water transferred between economic units (i.e. the sum of self-extracted water use, distributed water use, reuse water use and wastewater collection). Sea water used for desalination fell by 5% and groundwater use fell by 9%, following a 16% increase in major dam storages.

The average amount of water used by households was 175 kL per household (3% decrease from previous year) at an average price of $3.43 per kilolitre (0.6% increase). The average industrial water intensity expressed as megalitres per million gross value added was 6.65 ML/$m GVA at an average cost of $0.31 per kilolitre.

Economic Value of Agriculture

According to the Australian Bureau of Statistics, in 2020-21, Australian agriculture saw a 17% increase in value to $71 billion. The latest report reveals that Australia has 387 million hectares of agricultural land, of which, 332 million hectares is used for grazing and 32 million hectares is used for cropping. Favourable growing conditions and better access to water for irrigation resulted in dramatic increases in the production of many crops, especially ideal for wheat production. Compared with the previous year, the value of wheat grew by 99% to $9.9 billion in 2020-21 with production up 120%. Australia also saw above average yields and record production for other crops such as barley and canola in 2020-21. The value of barley rose by 24% to $3.7 billion with production up 45% on the previous year. Meanwhile, the value of canola rose by 114% to $2.9 billion.

In the previous year, 2019-20, low water availability led to a shift away from water-intensive crops like cotton and rice. During this period, the gross value of agricultural commodities supported by irrigation demonstrated varied trends: fruit and nuts (excluding grapes) saw an increase, reaching $5 billion, up 10%. Similarly, vegetable production amounted to $3.5 billion, showing a 4% increase, while dairy production totalled $2.3 billion, also up by 4%. Grapes reached $1.4 billion, reflecting a 9% increase, while nurseries, cut flowers, and cultivated turf collectively reached $1.3 billion, showing a modest 1% increase. Notably, cotton production continued to decline, falling by another 77% to $0.25 billion.

In 2020-2021, with drought-breaking rainfall and improved seasonal conditions, the production and value of irrigated crops such as cotton recovered from recent lows, up 451,300 tonnes to 566,000 tonnes and gross value up $1.2 billion to $1.5 billion. Compared with the previous year, the value of total livestock disposals fell 6%. However, the value of livestock products was largely steady with a strong result for eggs (up 28% to $1.1 billion) offsetting falls in wool (down 4% to $2.6 billion) and milk (down 3% to $4.7 billion).

Declines in the value of livestock disposals were largely due to farmers using the improved seasonal conditions and better pastures as an opportunity to rebuild their stocks. This approach saw the beef cattle herd increase 4% to 22.1 million head in 2020-21 compared with the previous year. Increases were also seen in the sheep flock (up 7% to 68.1 million head) and the dairy herd (up 1% to 2.4 million head).

Economic Value of Mining

In 2021-2022, the mining industry in Australia saw significant growth, with earnings increasing by $54.3 billion (32.7%) according to the annual estimates of key economic and financial performance of industries in Australia by the Australian Bureau of Statistics (ABS). This growth was observed across all key data items, with EBITDA also increasing by 32.7%, following a previous increase of 4.9% in 2020-21.

Coal and iron remain as important commodities in the sector. According to data published by the Australian Office of the Chief Economist on Resources and Energy, Australian export volumes for iron ore increased by 1.5% (year-on-year) to 884 million tonnes in 2022, with export volumes forecast to increase by 1.9% annually over the outlook period to 2028. Metallurgical coal export earnings are expected to remain solid despite a recent decline, and higher production is expected to lift Australia's exports from 163 million tonnes in 2021–22 to 172 million tonnes by 2027–28.

The mining sector primarily relies on self-supplied water, often regulated separately from the broader water entitlement system or utilities serving other users. Water plays a crucial role in various operational activities within the minerals industry, including transporting ore and waste in slurries, chemical and physical separation processes, cooling systems for power generation, dust suppression, equipment washing, and dewatering of mines. There is a growing interest in reusing grey water in mining and to move towards circularity. In addition to industrial water use in the mining sector, drinking water is essential to support remote towns housing mining staff. A significant portion of the water is extracted for dewatering mines or is a by-product of extraction, potentially containing acidic or toxic pollutants. While controls are placed on water quality before discharge into the environment, discharges in arid regions may alter natural flow regimes.

In 2021-2022, the mining industry extracted 1,411 GL of water from the environment, marking a 5% increase from the previous year. However, the usage of distributed water decreased by 14%, totaling 93 GL in 2021-22.

Economic Value of Water Intensive Industries (excluding mining, power generation and agribusiness)

Most water intensive industries in Australia are in regional areas removed from urban centres. In addition to natural resource extraction the major centres of fibre (pulp, paper, and paperboard), meat, brewing, and vegetable processing are located, on average, 150 km inland from the large coastal cities.

Water recycling schemes value waste as a resource and enable water-intensive industries in Australia to realise the benefits of the circular economy. In particular, the poultry processing, beer brewing, and wood fibre industries have invested in water recycling to increase domestic and export production while balancing the risk of projected declines in water availability due to a warmer and drier climate. Although the brewing, poultry, and fibre processing industries collectively account for less than 2% (approximately $23 billion) of Australia's Gross Domestic

Product, they are critical to regional towns as sources of direct and indirect employment and local economic activity.

The majority of brewing, poultry, and fibre processing industries are located in areas where the annual average rainfall has declined between 10 and 30 mm per decade from the long-term average (BOM, 2020). In some catchments, a 10% decline in rainfall translates to a 30% decline in surface water runoff into rivers and reservoirs (Jones & Brooke, 2005). This decline in water availability exposes water-intensive industries to supply chain vulnerabilities and can be a constraint on expansion of production. Beer brewing, poultry processing, and fibre processing are particularly vulnerable to water shortages. Collectively, these industries consume 133 GL per Annum (GLA) (Table 3.1). To put this value in perspective, in 2013-14, the Murray Darling Basin, the largest inland river system in eastern Australia, only allocated 320 GLA out of 8,024 GLA for activities not directly related to agricultural irrigation.

Over the past two decades, urban and regional water recycling projects in Australia have experienced growth. The percentage of water recycling is projected to reach 30% by 2030 with the completion of ongoing projects. Industrial wastewater recycling is also growing across Australia, but the installed capacity typically remains below 10% of municipal water recycling volume. Additionally, the unit cost ($/m^3) of industrial water recycling can exceed the cost of water supply by a factor of 1.5 to 2.

Table 3.1. Market size, employment and water demand of selected water intensive manufacturing industries

Industry	Brewing	Pulp & Paper	Poultry
Market size	$16.5 Bn (1.0% GDP)	$3.7 Bn (0.25% GDP)	$2.9 Bn (0.19% GDP)
Employment*: Production Total	3,700 141,200	12,450 60,800 (30,000 regional)	9,000 58,000
Water Use Total Specific Demand	5.6 GLA 4.0 L/ℓ (Avg)	100 GLA 20-40 m^3/tn Kraft 10-15 m^3/tn Newsprint 6-10 m^3/tn Paperboard	27.7 GLA 22.2 ℓ/Bird (Avg)

*Employment expressed as total contribution including production, supply chain and wholesale/retail

7. Opportunities for the Dutch Water Sector

Based on the information presented in the chapters above, this study has identified two main areas where opportunities lie for the Dutch water sector in Australia: in agri- and horticulture, and in water scarcity and floods. These are areas where we see both demand from the Australian side, and a high level of expertise and innovation on the side of the Dutch water sector.

The water-related challenges that Australia faces, as mentioned in previous chapters, are mostly linked to climate change, which causes droughts, water scarcity and higher temperatures. This means that Australian stakeholders are increasingly looking at sustainable and circular solutions for water use. At the same time, climate change causes heavy rainfall and floods. Here, there is an opportunity for stormwater capture, water retention solutions and early warning systems.

Dutch interviewees who are already working in the country say that because of the evident consequences of climate change, their sustainable solutions are gaining traction in Australia.

Many acknowledge that right now is the right time to enter the Australian market with Dutch products, especially products that offer solutions for climate change mitigation. There are two specific areas, related to climate change mitigation, where we see opportunities for the DWS: agri- and horticulture, and water scarcity and flood prevention.

Agri- and Horticulture

Based on our interviews with stakeholders from the Dutch water sector active in Australia, we see that there are many opportunities in the agricultural sector. Especially since Australia has a large agricultural sector and produces both for domestic consumption and for export (ABARES). As mentioned above, the agricultural sector is growing, especially crop production. According to the Australian Department of Agriculture, Fisheries and Forestry, the agricultural sector accounts for 55% of land use and 74% of national water consumption (ABARES). At the same time, both the Australian government and the agricultural sector are committed to reduce agricultural carbon emissions and water use. The Dutch experience in the water-agriculture nexus is therefore interesting for Australia. According to the National Farmers Federation (NFF), they are looking for ways to reduce their ecological footprint, which includes water use and protection for waterscapes (Broom and Long, 2023). Irrigation Australia is another organisation involved in agriculture, including organisations such as primary producers, government agencies (at federal, state and local levels), manufacturers, retailers, system designers and installers and many other service providers. Most Australian companies active in the agricultural sector are private parties, which are less time consuming to get in contact with than the public sector. At the same time, Dutch interviewees indicate that agriculture has become increasingly risky due to climate change, and that stakeholders in the sector are careful with doing large investments. This needs to be considered when doing business in the Australian agricultural sector.

The growing Australian interest for water solutions produced by Dutch companies is reflected in the interviews with Dutch stakeholders. Especially in the department of smart irrigation and data gathering we see opportunities. We also see the Australian Government encouraging smart irrigation initiatives. For example, Smarter Irrigation for Profit (project finalized in 2022) funded by the Department of Agriculture Water and the Environment (after 2022 Department of Agriculture, Fisheries and Forestry) has supported research into new irrigation technologies like

advanced sensors and analytics to improve scheduling and reduce water storage evaporation. This project is a partnership between the sugar, cotton, grains, dairy, and rice industries, research organisations, and farmer groups. It has supported 46 farmer-led optimised irrigation sites on commercial farms across Australia.

The Australian system for certifications proves a challenge here. European product certificates are often not accepted in Australia, and foreign products need to be certified by Australian standards. Adhering to Australian Standards is essential across industries to ensure safety, quality, and reliability. Products certified under international standards often need recertification to meet Australian standards, creating entry barriers.

For example, materials must meet Australian flammability standards even if they comply with the international UL 94 standard. We also see rigorous enforcement of Australian Standards in construction, where compliance is mandatory for all aspects, including building materials and construction methodology. Construction contracts are meticulously drafted often including clauses such as: "will only use products in relation to the Works that comply with the relevant Australian Standards published by, or on behalf of, Standards Australia." (www.standards.org.au)

A common feature is the interest in partnering up with Australian companies that offer products in the field/sector of agricultural water use. Some of the Dutch stakeholders that were interviewed mentioned they cooperated with a company from the country itself to embed their technologies (e.g. measuring tools) within an Australian product to have easier access to national permits or certifications. Partnerships with local firms can be instrumental for foreign companies aiming to enter new markets. In the case of a European company in high-end electronic security solutions offering system design, engineering & installation, acquiring an Australian firm proved to be an effective strategy for navigating local requirements and establishing a strong presence in the Australian market.

A possible niche market within horticulture where opportunities lie for Dutch companies is in protected cropping (greenhouses). Australia has over 1200 square hectares of greenhouses, used for the production of mainly capsicum, tomatoes and lettuce (Almeida Lima & Leslie, 2020). Unlike in northern Europe, the challenge in Australia is to keep the greenhouses cool. There are Dutch companies that are already implementing cooling solutions for greenhouses in the Middle East and Northern Africa (for example, see HortiRoad2theGulf).

There are opportunities for these products in Australia as well. The need for circular solutions for water usage and cooling systems, along with the high level of technological maturity in Australia creates room for Dutch companies to implement their products.

In addition to cooling greenhouses, there are also opportunities for circular solutions in urban greening and cooling initiatives particularly in Western Sydney. However, the critical role of engaging Indigenous communities emerges, in embedding green infrastructure into policy and design practices as part of regular operations. This engagement promotes sustainable water management practices and encourages the adoption of environmentally friendly initiatives.

Water Scarcity and Floods

The opportunities regarding water safety are numerous. Water scarcity has led to a growing demand for circularity in the drinking water sector and the filtration of surface water. The impact that climate change has had on rainfall also influences the availability of drinking water. As mentioned above, water authorities are looking increasingly for alternative sources of potable water. Groundwater extraction and desalination are key solutions here, which provides an opening on the Australian market for Dutch companies who work in these sectors. Escalating annual rainfall and the increase in the severity of droughts also provides opportunities for stormwater capture and rainwater harvesting. In the area of water safety, there are more possibilities for cooperating with the public sector, particularly local governments. Here, there is room for cooperation with organisations such as the

Australian Water Association (AWA) and the Water Services Association of Australia (WSAA), who are looking for ways to make water resource management more sustainable.

Dutch interviewees experienced working with public parties as more time-consuming and bureaucratic than working together with private parties. However, seeing that the demand within the public sector for alternative sources of drinking water is growing, this might be an opening for Dutch companies who fit within this category. In addition, there might be room for collaboration with knowledge institutes and organisations, such as the Australian Academy of Technological Sciences and Engineering (ATSE), the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Water Research Australia (WaterRA).

Other opportunities lie in flood prevention and flood management. The floods in 2020-2021 shows the threats heavy rainfall poses for water catchments. When it comes to flood management, there specifically is a demand for monitoring and forecasting equipment. We also see opportunities in the water utilities sector in the area of water security & resilience, to improve environmental performance and eliminate overflow under both wet and dry conditions, through intelligent monitoring and a risk-based approach, and enhance virtual emergency management capabilities. Here, some overlap can be seen with opportunities in the agricultural sector. As is the case for measuring equipment for agri- and horticulture, foreign companies often need Australian certifications, which makes it convenient to partner up with national businesses to have their technologies implemented.

Within the flood management sector, there is also an opening for the implementation of solutions for stormwater capture, which provides opportunities for Dutch businesses who work in this field. Respondents from the Dutch Water Sector also mentioned Australian interest in smart solutions for impact mitigation in case of floodings, such as flood-resilient buildings.

Other Opportunities

Besides the two main opportunities mentioned above, we have identified three other possible areas of interest for the Dutch water sector. These are: urban climate change adaptation, water governance, and the mining sector. A number of other areas of interest are mentioned at the end of this section.

Urban Climate Change Adaptation and Liveable Cities

Seeing that a large part of the Australian population lives in cities, stakeholders are increasingly looking for solutions for water problems in urban areas. Heat management forms a large part of this problem, with rising temperatures exacerbating heat stress in cities.

Urban heat threatens the productivity and liveability of cities and endangers human lives and urban infrastructure. In addition, during heatwaves there is more water demand in general. Because of global climate change, this is an increasing problem in Australian cities.

Managing demand for resources, promoting energy efficiency measures, embracing circular economy initiatives, and implementing water-sensitive urban design approaches are crucial strategies to address these challenges and ensure the sustainability and liveability of Australian cities.

Water and green infrastructure can help mitigate or prevent urban heat stress. Policies for implementing green corridors, parks and blue/green roofs can be useful here. Several federal or municipal governments are planning or already carrying out programmes to combat urban heat stress. The water utilities sector in New South Wales are proactively looking for circular solutions in urban greening and cooling initiatives. This brings opportunities for the Dutch water sector. The Water Services Association of Australia (WSAA) could be an opportunity for collaboration in this regard. The interviews with the Dutch water sector parties showed there was an interest in measuring tools and research equipment to optimise green solutions for urban areas.

Mining and hydrogen

The mining industry is a very important player in the Australian economy, and strongly connected to Australia's export model (as can be seen in figure 6.1). According to Geoscience Australia, the country is one of the biggest producers of aluminium and iron ore, gold, lithium and uranium, among others. Especially iron ore and black coal are important for export. In addition, the extraction of Rare Earth Elements (REE) is becoming increasingly important in the Australian mining sector. The country is the leading competitor of China in the production of REE, attempting to set up an integrated supply chain that could lower global dependence on China (Barakos, Dyer & Hitch, 2022).

There are a number of Dutch Water Sector companies that work in the mining sector. This can be in drinking water provision, or in wastewater treatment of the water used in mining processes. Private parties in the mining sector are open to Dutch technologies for water saving and circular solutions for water use. Within the mining sector, iron ores are a definite opportunity.

In addition, there is a future potential for hydrogen, the production of which is often closely located near mining areas due to favourable geography. Hydrogen production is a climate and energy intensive industry, meaning that there is an increasing demand for water and water technology here. This also translates to a growing demand for expansion of ports and port infrastructure, as they will need to adapt and evolve to deal with the increased volume of differentiated products and different loads.

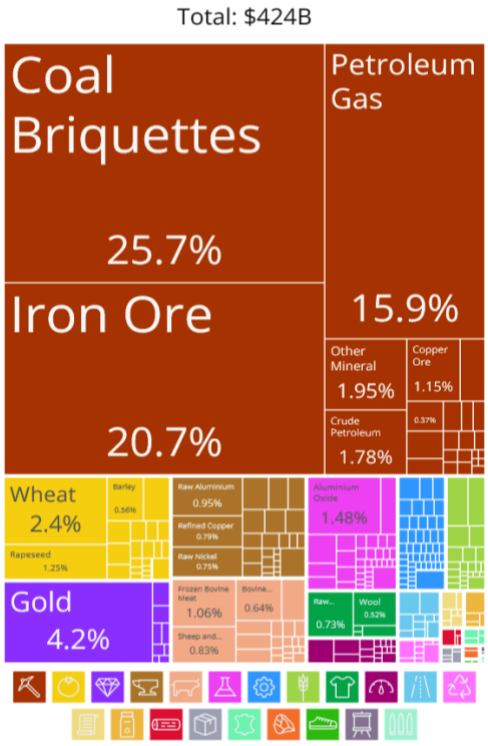


Figure 6.1: Australia's exports in 2022. (OEC, 2024)

Water Governance

As becomes apparent from the submissions to the Productivity Commission's Inquiry for the National Water Initiative, key players in the Australian water sector are concerned about the lack of transparency and consistency in water governance. There is a need for information sharing between shareholders, collaboration and a holistic approach to water governance. In addition, the respondents to the Productivity Commission's Inquiry indicated the importance of involving First Nations in decision-making processes regarding water, and paying attention to indigenous water rights. Lastly, integrated water resource management was also mentioned in the Inquiry, with respondents expressing the need for a consistent national approach to water management.

Based on the interviews with Dutch companies that operate in Australia, there is no indication that there are currently any Dutch organisations working in the field of water governance or water resource management. However, given that the Netherlands has a good track record with water governance, there could be opportunities in this sector for Dutch Water Sector organisations that specialise in water management.

Other

As seen in this research, there are several sectors where Dutch water expertise can definitely be applied. This research only covered the main sectors where we see the most opportunities. However, there are other markets that could be investigated as well. These are: coastal protection/coral reef protection, water-intensive industries other than mining (poultry, brewing, and paper), offshore (wind)farming and K2K collaboration with research- and knowledge institutions for data gathering.

Considerations when doing Business in Australia.

Most interviewees in the Dutch water sector mention that, culturally speaking, Australia is very similar to the Netherlands. There are no issues with the language barrier. Dutch participants mentioned that Australians are often laid-back, which can slow down processes, and are proud of their natural environment, which leads to a desire to implement sustainable solutions to protect nature and the environment. The image of the Netherlands as a water country helps when developing initial business relations. There are some other considerations when doing business in Australia as well:

1. The importance of having local contacts: Most Dutch interviewees mention their struggle to promote their product when first starting business in Australia. They indicate the importance of having a local contact that can vouch for you. In addition, here is often a need to “prove” the quality of your product through pilot programmes or other demonstrations to confirm that your product is applicable in the Australian context.
2. Australian certifications: although some international or European certifications are accepted in Australia, Dutch interviewees claim there is often less willingness to buy foreign products if they don’t also have an Australian product certificate. While international certifications may be similar or equivalent to Australian certifications, recertification is often necessary in Australia. If you are looking for more information, you can check out The Water Conservancy and the Australian Competition & Consumer Commission. In addition, the Dutch embassy in Australia is available for questions and support regarding certifications, and they are more than happy to connect you to other local water entities who have experience navigating this.
3. The time difference and scale of the country: one of the things that presents the most problems for the interviewees is the time difference. There is a 8 to 10 hour time difference with Sydney, and the country itself also covers multiple time zones. This makes communication between the Netherlands and Australia more difficult. The Dutch interviewees stress the importance of having “boots on the ground.” The large size of the country proves both challenging and helpful. Travel distances are large, which is often time-consuming. At the same time, there is a lot of empty land, which makes it easier for large-scale solutions to be implemented.
4. Federal state: seeing that Australia is a federal state, there are differences in terms of policy, qualifications etc. between the different states. This is something to keep in mind when doing business in Australia.

8. Analysis

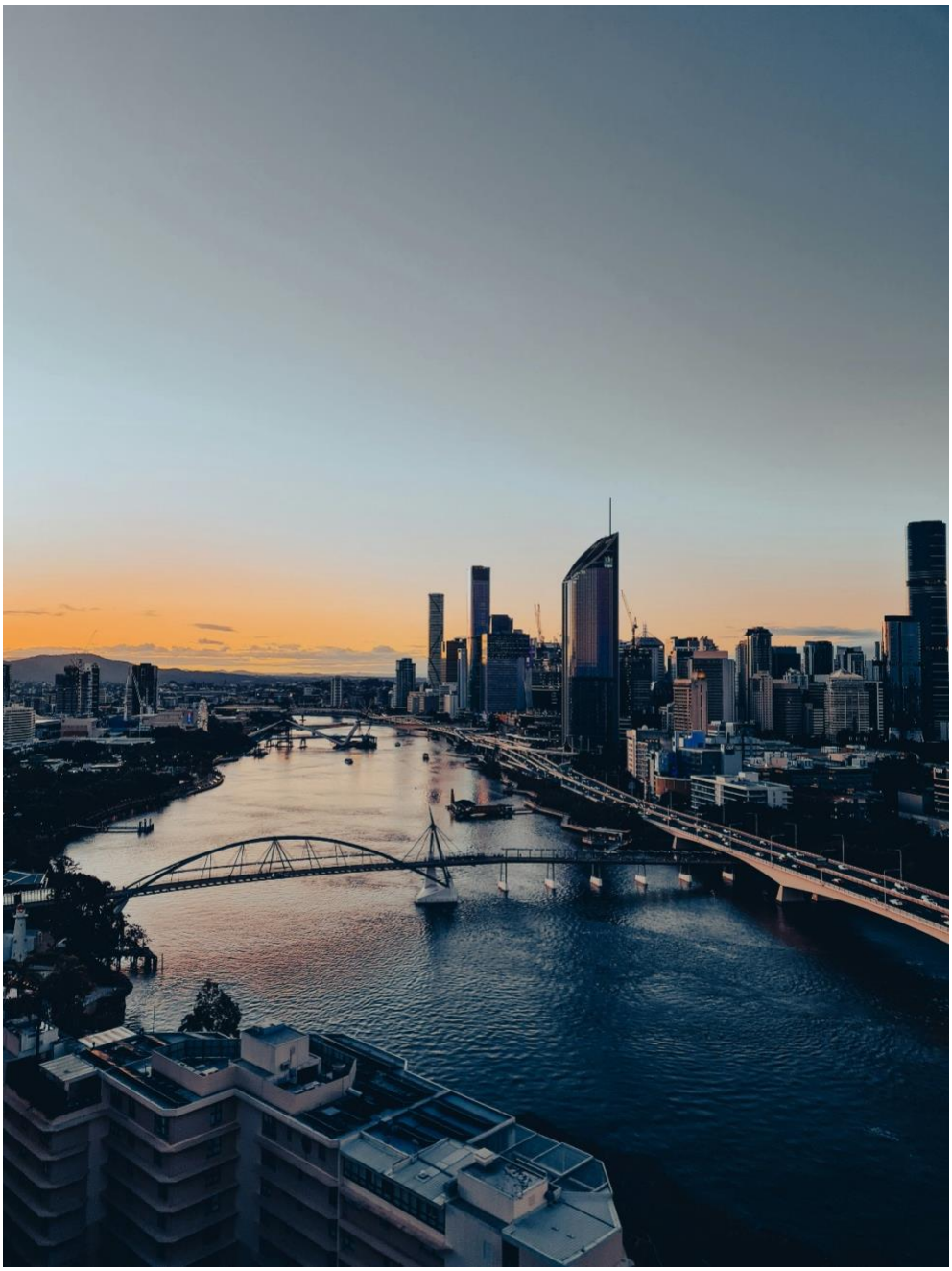
Looking at the strengths, weaknesses, opportunities and threats of doing business in the water sector in Australia, we have the following observations:

Strengths: the Dutch water sector offers high quality products and contains a lot of (international) experience with water solutions. Within the sector, there is a strong willingness to cooperate. Many products that are developed by Dutch companies align well with the necessities in the Australian market (ex. Agricultural solutions, combating droughts, products for urban areas).

Weaknesses: Dutch companies lack contact with fellow DWS organisations they could partner up with or start consortia with. In addition, while there is no shortage of local contacts in the initial phase, follow-ups often fall short, making it hard to move forward with business in Australia.

Opportunities: there is currently a strong demand for sustainable and circular solutions, with the federal government currently committing large funds to water reforms and agricultural resilience. Water-related challenges in Australia are multiple and pressing. Australians love their country/nature and are motivated to protect it. Dutch water management has a good reputation in Australia. Australian culture is not that different from the Netherlands, which makes cultural barriers lower. Australia has a high level of technological knowledge and development, which makes it easier to implement products. Lastly, Australia can be used as a starting point for entering the New Zealand and Pacific Islands market as well.

Threats: the time difference with Australia is large, which makes it more difficult to schedule meetings if you do not have a local liaison. Australians prefer to use their own products. There are certain requirements for certifications that don't align with EU certification systems. Even when standards appear equivalent, Australian recertification is still required. It is difficult to start a business if you don't have a local contact. Working with government partners is difficult.



9. Conclusions

The main goal of this water scan is to give an overview of the Australian water sector, its challenges and the corresponding opportunities for the Dutch water sector. At the same time, this market scan also aims to assist the General Consulate of the Kingdom of the Netherlands in Australia in engaging with the Dutch water sector to stimulate cooperation between Dutch and Australian stakeholders working with water.

As was illustrated by the background information in this market scan, Australia is a very large country, with a big part of the population residing in cities. It is a federal state, which means that there are some differences in laws and regulations between states. Another feature is the fact that Australia is highly dependent on catchments and storages for its water supply. Water management happens on the national, state and local level, although there is collaboration between the levels through the Council of Australian Governments (COAG).

As in many other places in the world, **the effects of climate change are strongly felt in Australia.** Naturally existing water scarcity is exacerbated by climate change. This leads to droughts and threats to the drinking water supply. Changes in rainfall patterns increase the risks of floods and water security issues. These developments mean that **circular solutions are in high demand in Australia**, as becomes evident from the interviews with Dutch water sector stakeholders. Dutch respondents report a strong motivation in Australian society to work towards sustainable solutions in order to mitigate the negative effects of climate change. In addition, the country has both the economic and technological potential to implement high-tech solutions for water-related challenges, as can be seen in the recent commitment of the federal government to invest $15 billion in water reform projects. This provides opportunities for the DWS, especially in the sectors of **agri- and horticulture, and in water scarcity and flood management**. Smaller opportunities for the DSW might lie in solutions for urban heat stress, water governance, and circularity in the mining sector.

The interviews with the Dutch water sector actors showed that they generally perceive Australian business culture as similar to the Netherlands, with **little to no culture and language barriers**. The biggest challenges for them were the **time difference and the distance**. They also stressed the importance of having good **local contacts and representation** in Australia itself. Different standards of **certification** might also prove a challenge for the implementation of Dutch technologies. In general, they found that **Dutch water management has a good reputation in Australia**, with many local partners being willing to work with a Dutch counterpart.

In conclusion, if you are a company in the Dutch Water Sector that is interested in doing business in Australia, now is the right time to get started. The first point of contact is the Consulate-General of the Kingdom of the Netherlands in Australia to guide you the way towards the right Australian stakeholders. You can reach out to the consulate at Syd-EZ@minbuza.nl

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Independent consultant

Appendix 1. Average Rainfall and Accessible Storage Capacity in Australian Drainage Division

Table 2.1. Summary of Average Rainfall and Accessible Storage Capacity in Australian Drainage Division

Code	Name	Area (km^2)	Average rainfall (mm)	Accessible surface storage capacity (GL)	Major rivers	Drains to
NEC	North East Coast (Queensland)	451,000	827	9,771	Suttor River, Belyando River, Nogoa River	Coral Sea (Pacific Ocean)
SEN	South East Coast (NSW)	129,500	995	4,056	Manning River, Karuah River, Hunter River, Hawkesbury River	Tasman Sea (Pacific Ocean)
SEV	South East Coast (Victoria)	134,600	734	7,570	Thomson River (VIC), Macalister River, Snowy River, Yarra River, Glenelg River	Southern Ocean, Bass Strait
TAS	Tasmania	68,000	1,398	22,041	River Derwent, Gordon River, Huon River, South Esk River	Southern Ocean, Bass Strait, Tasman Sea (Pacific Ocean)
MDB	Murray-Darling Basin	1,061,000	458	25,320	Murray River, Darling River, Murrumbidgee River, Lachlan River	Southern Ocean
SAG	South Australian Gulf	117,700	306	197	River Torrens, Onkaparinga River, Gawler River, Broughton River	Great Australian Bight (Southern Ocean)
SWP	South Western Plateau	1,093,000	232	No data		Great Australian Bight (Southern Ocean)
SWC	South West Coast	326,000	439	959	Avon River, Blackwood River	Indian Ocean, Great Australian Bight (Southern Ocean)
PG	Pilbara-Gascoyne	478,000	259	63	Greenough River, Murchison River	Indian Ocean
NWP	North Western Plateau	716,000	316	No data	De Grey River	Indian Ocean
TTS	Tanami-Timor Sea Coast	1,162,000	656	10,747	Ord River, Alligator Rivers, Daly River, Katherine River, Fitzroy River	Timor Sea (Indian Ocean)
LEB	Lake Eyre Basin	1,281,000	242	No data	Georgina River, Diamantina River, Thomson River (QLD), Barcoo River, Cooper Creek	Lake Eyre

CC	Carpentaria Coast	647,000	744	99	Mitchell River, Flinders River, Gilbert River, Leichhardt River	Gulf of Carpentaria, Arafura Sea

Notes:

- TAS - Much of the storage capacity is used for hydroelectricity
- SWP - Driest region in Australia with no major storage
- NWP - No major storage
- LEB - Only major surface Endorheic basin

Source: Water sources | Australia state of the environment 2021 (dcceew.gov.au)

Appendix 2. Stakeholders Productivity Commission Review

Table 4.1. Stakeholder Engagement in the Productivity Commission Review

Organisation	*Description*
Australian Competition and Consumer Commission (ACCC)	The ACCC is an independent Commonwealth statutory agency that promotes competition, consumer protection, fair trading and product safety for the benefit of consumers, businesses and the Australian community. The primary responsibilities of the ACCC are to promote compliance with the Competition and Consumer Act 2010 (CCA), regulate national infrastructure and undertake market studies. Under the Water Act 2007 (Cth), the ACCC has several ongoing functions that contribute to the effective operation of water (and related) markets in the Murray-Darling Basin. These roles include: ● advising the Commonwealth Minister on water rules and the Murray-Darling Basin Authority on the Basin Plan water trading rules, ● monitoring and reporting on regulated water charges, transformation arrangements and compliance with the water rules, ● enforcing the water rules and the CCA, including the Australian Consumer Law, and ● additional functions provided for by the Water Amendment (Restoring Our Rivers) Act 2023 (Restoring Our Rivers Act).
Australian Academy of Technological Sciences and Engineering (ATSE)	The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity. ATSE calls for a nationally led, locally implemented, contemporary National Water Initiative (NWI) which considers climate change, urban water, water quality, Indigenous interests, the processes for future investments in water infrastructure, and improved data and knowledge about water.
Australian Water Association (AWA)	The Australian Water Association (AWA) is Australia's largest water network. AWA members include individuals and organisations and AWA shares information through an extensive range of technical seminars, courses and conferences at a state, national and international level. Focus areas include: ● Water issues in regional and remote Australia. ● Water resilience and sustainability ● Cultural and economic value of water and its contribution to liveability. ● First Nations water management and connection to the country.

Commonwealth Scientific and Industrial Research Organisation (CSIRO)	The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is Australia's national science agency. Over the past 15 years, CSIRO and partners have delivered a suite of integrated water resource assessments to underpin regulatory decisions and development decisions, beginning with the landmark Murray-Darling Basin Sustainable Yields Project in 2007-2008. CSIRO continues to undertake major regional-scale studies to support policy makers and river managers to understand and manage the system's ecological assets of significant environmental, cultural, social, and economic value.
Engineers Australia	Engineers Australia is Australia's national body for engineering. They provide members with resources, connections, and growth to do ethical, competent, and high-value work in communities. A mission-based, not-for-profit professional association, Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community. They have a membership of 120,000-plus. Engineers Australia has long been active in water governance and management through interactions with governments, peak bodies and our members to bring about better water governance and management, for a more resilient future.
Irrigation Australia	Irrigation Australia Ltd is the peak national organisation representing the irrigation industry. Their membership includes organisations and individuals from across the supply chain including primary producers, government agencies (at federal, state and local levels), manufacturers, retailers, system designers and installers and many other service providers. They are also a Registered Training Organisation delivering accredited training – specifically in irrigation technology, management and a range of certified short courses which support qualifications with a commitment to continuing professional development. Key activities under the "Irrigation Futures" banner includes four key program areas. ● Irrigation industry profile and industry policy; ● Adoption of best practice, including research and development; ● Industry skilling, including Irrigation Training Australia (the RTO); and ● Industry careers.
National Farmers Federation (NFF)	The National Farmers' Federation (NFF) is the voice of Australian farmers. The NFF was established in 1979 as the national peak body representing farmers and more broadly, agriculture across Australia. The NFF's membership comprises all of Australia's major agricultural commodities across the breadth and the length of the supply chain. The NFF represents Australian agriculture on national and foreign policy issues including workplace relations, trade, and natural resource management. Their

	members complement this work through the delivery of direct 'grass roots' member services as well as state based policy and commodity-specific interests.
Water Research Australia (WaterRA)	Water Research Australia (WaterRA) is a leading source of water science and knowledge for healthy communities. The mission of WaterRA is to deliver collaborative water research, innovation and capability building that supports public health and safeguards the sustainability of water resources. WaterRA, a surplus-for-purpose member-funded organisation dedicated to delivering collaborative research and capability building for nearly 30 years to address the needs of the water sector. They possess a unique vantage point to evaluate past progress and propose future directions for various aspects of Australia's water reform journey, drawing insights from their research and other activities.
Water Services Association of Australia (WSAA)	The Water Services Association of Australia (WSAA) is the peak industry body representing the urban water industry. Formed as a not-for-profit in 1995 WSAA members provide water and sewerage services to over 20 million customers in Australia.

Sources

Almeida Lima, V. & Leslie, G. (2020) Next-generation protected cropping facilities: Global innovation trends and R&D opportunities for Southern Hemisphere conditions. Future Food Systems. Retrieved from https://files.futurefoodsystems.com.au/P2-006-Next-generation-protected-cropping-facilities.pdf

Australian Bureau of Statistics. (n.d.). Australian Industry - Latest Release. Retrieved from https://www.abs.gov.au/statistics/industry/industry-overview/australian-industry/latest-release

Australian Bureau of Statistics. (n.d.). Home [Website]. Retrieved from https://www.abs.gov.au/

Australian Bureau of Statistics. (n.d.). Key indicators. Retrieved from https://www.abs.gov.au/statistics/economy/key-indicators

Australian Bureau of Statistics. (2021). Water Account Australia 2021-22. Retrieved from https://www.abs.gov.au/statistics/environment/environmental-management/water-account-australia/2021-22

Australian Bureau of Statistics. (2021, June 15). Value of Aussie agriculture hits $71 billion in 2020-21. Retrieved from https://www.abs.gov.au/articles/value-aussie-agriculture-hits-71-billion-2020-21

Australian Competition & Consumer Commission. (n.d.). Industry codes. Retrieved from https://www.accc.gov.au/business/industry-codes

Australian Government Department of Industry, Science, Energy and Resources, (2023). Resources and Energy Quarterly - March 2023. Retrieved from https://www.industry.gov.au/publications/resources-and-energy-quarterly-march-2023

Barakos, G., Dyer, L. & Hitch, M. (2022) The long uphill journey of Australia's rare earth element industry: challenges and opportunities. International Journal of Mining, Reclamation and Environment. DOI: 10.1080/17480930.2022.2127248

Broom, F. & Long, W. (2023). Net Zero 2050 plan a work in progress with the federal government seeking input on cutting farm emissions. ABC News. Retrieved from https://www.abc.net.au/news/rural/2023-11-10/push-to-reduce-agriculture-emissions-net-zero-2050-plan/103086446

Bureau of Meteorology. (2020). Climate Change: Time Series Graphs [Webpage]. Retrieved from http://www.bom.gov.au/climate/change/#tabs=Tracker&tracker=trend-maps&tQ=map%3Drain%26area%3Daus%26season%3D0112%26period%3D1970.

Bureau of Meteorology. (2024). Geofabric [Webpage]. Retrieved from http://www.bom.gov.au/water/geofabric/

Climate Council. (2021). Brisbane Olympics 2032: the first climate positive Olympics. Retrieved from https://www.climatecouncil.org.au/climate-positive-brisbane-olympics-2032/

Cresswell, I. D. & Murphy, H. T. (2017). Australia State of the Environment 2016: Biodiversity, Independent Report to the Australian Government Minister for the Environment and Energy. Australian Government Department of the Environment and Energy: Canberra, ACT.

CSIRO & Bureau of Meteorology, Government of Australia. (2022). State of the Climate. Retrieved from https://www.csiro.au/en/research/environmental-impacts/climate-change/State-of-the-Climate

Department of Agriculture, Fisheries and Forestry. (2023).National Statement on Climate Change and Agriculture. ABARES research. Retrieved from https://www.agriculture.gov.au/agriculture-land/farm-food-drought/climatechange/national-statement-on-climate-change-and-agriculture

Department of Agriculture, Fisheries and Forestry. (2024). Snapshot of Australian Agriculture 2024. ABARES research. Retrieved from https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australian-agriculture#around-72-of-agricultural-production-is-exported

Department of Climate Change, Energy, the Environment and Water. (2024). Australian Government investment in water reform. Retrieved from https://www.dcceew.gov.au/water/policy/programs/water-reform

Department of the Environment and Energy. (n.d.). National Water Initiative. Retrieved from https://www.dcceew.gov.au/water/policy/policy/nwi

Department of Industry, Science and Resources. (2023). Resources and Energy Quarterly March 2023. Retrieved from https://www.industry.gov.au/publications/resources-and-energy-quarterly-march-2023

Department of the Environment and Energy. (n.d.). Water policy. Retrieved from https://www.dcceew.gov.au/water/policy/policy#:~:text=State%20and%20territory%20governments%20are%20primarily%20responsible%20for,sustainably%20and%20productively%20for%20future%20generations%20of%20Australians

Dutch Water Sector. (2016). Netherlands-Australia agreement to help increase water security in the Asia Pacific region. Retrieved from https://www.dutchwatersector.com/news/netherlands-australia-agreement-to-help-increase-water-security-in-the-asia-pacific-region

Geoscience Australia. (2024). Australian mineral facts. Retrieved from https://www.ga.gov.au/education/minerals-energy/australian-mineral-facts

Government of Western Australia. (2024). Perth and Peel Urban Greening Strategy. Retrieved from https://www.wa.gov.au/organisation/department-of-planning-lands-and-heritage/perth-and-peel-urban-greening-strategy

HortiRoad2theGulf. (n.d.). About us. Retrieved from https://hortiroad2thegulf.com/

International Energy Agency. (2023). Australia has raised its climate targets and now needs to accelerate its clean energy transition, says new IEA review. Retrieved from https://www.iea.org/news/australia-has-raised-its-climate-targets-and-now-needs-to-accelerate-its-clean-energy-transition-says-new-iea-review

Jones, R. N. & Brooke, C. (2005). Adapting Australia's Water Resources to a Changing Climate. CSIRO Atmospheric Research.

Lucas, J. (2023). Solving water shortages in Kalgoorlie-Boulder could deliver 'prize' worth billions in new projects. Retrieved from https://www.abc.net.au/news/2023-11-06/kalgoorlie-boulder-council-examines-water-contracts-with-mines/102860554

Nice, K. (2021). Managing urban heat in water sensitive cities: research and policy responses. Cooperative Research Centre for Water Sensitive Cities. Retrieved from https://watersensitivecities.org.au/wp-content/uploads/2021/05/210517_V2_Urban-Heat-Policy-Focus.pdf

NSW Government. (n.d.). Urban Heat. Retrieved from https://www.planning.nsw.gov.au/policy-and-legislation/resilience-and-natural-hazard-risk/urban-heat

Melbourne Water. (2023). Urban Cooling. Retrieved from https://www.melbournewater.com.au/water-and-environment/climate-change/urban-cooling

Ministry for Agriculture, Fisheries and Forestry. (2024). Budget 2024-25: Protecting and Growing the Future of Agriculture. Retrieved from https://minister.agriculture.gov.au/watt/media-releases/budget-2024-25

Murray-Darling Basin Authority. (n.d.). Why the Murray-Darling Basin matters. Retrieved from https://www.mdba.gov.au/basin/why-murray-darling-basin-matters

Observatory of Economic Complexity. (2024). Australia. Retrieved from https://oec.world/en/profile/country/aus#latest-data

Productivity Commission. (n.d.). Submissions - Water Reform 2024. Retrieved from https://www.pc.gov.au/inquiries/current/water-reform-2024/submissions

Smarter Irrigation for Profit. (n.d.). Retrieved from https://smarterirrigation.com.au/

Standards Australia. (n.d.). Retrieved from https://www.standards.org.au/

The Water Conservancy. (n.d.). Smart Approved WaterMark. Retrieved from https://thewaterconservancy.org/smart-approved-watermark/

Tng KH; Leslie-Keefe C; Leslie G. (2020). Industrial Water Recycling in Australia's Circular Economy, in Water Reuse Within a Circular Economy Context, UNESCO Publishing, pp. 85 - 103

Trewin B., Morgan-Bulled D. & Cooper S. (2021). Australia state of the environment 2021: climate, independent report to the Australian Government Minister for the Environment, Commonwealth of Australia, Canberra, DOI: 10.26194/rdze-5d59.

Wheeler, S. A., Owens, K., & Zuo, A. (2024). Is there public desire for a federal takeover of water resource management in Australia?. Water Research, 248, 120861. https://www.sciencedirect.com/science/article/pii/S0043135423013015

Image sources

Front page image
Image on page 6
Image on page 9
Image on page 11
Image on page 14
Image on page 15
Image on page 19
Image on page 21
Image on page 24
Image on page 26
Image on back page

Netherlands Water Partnership

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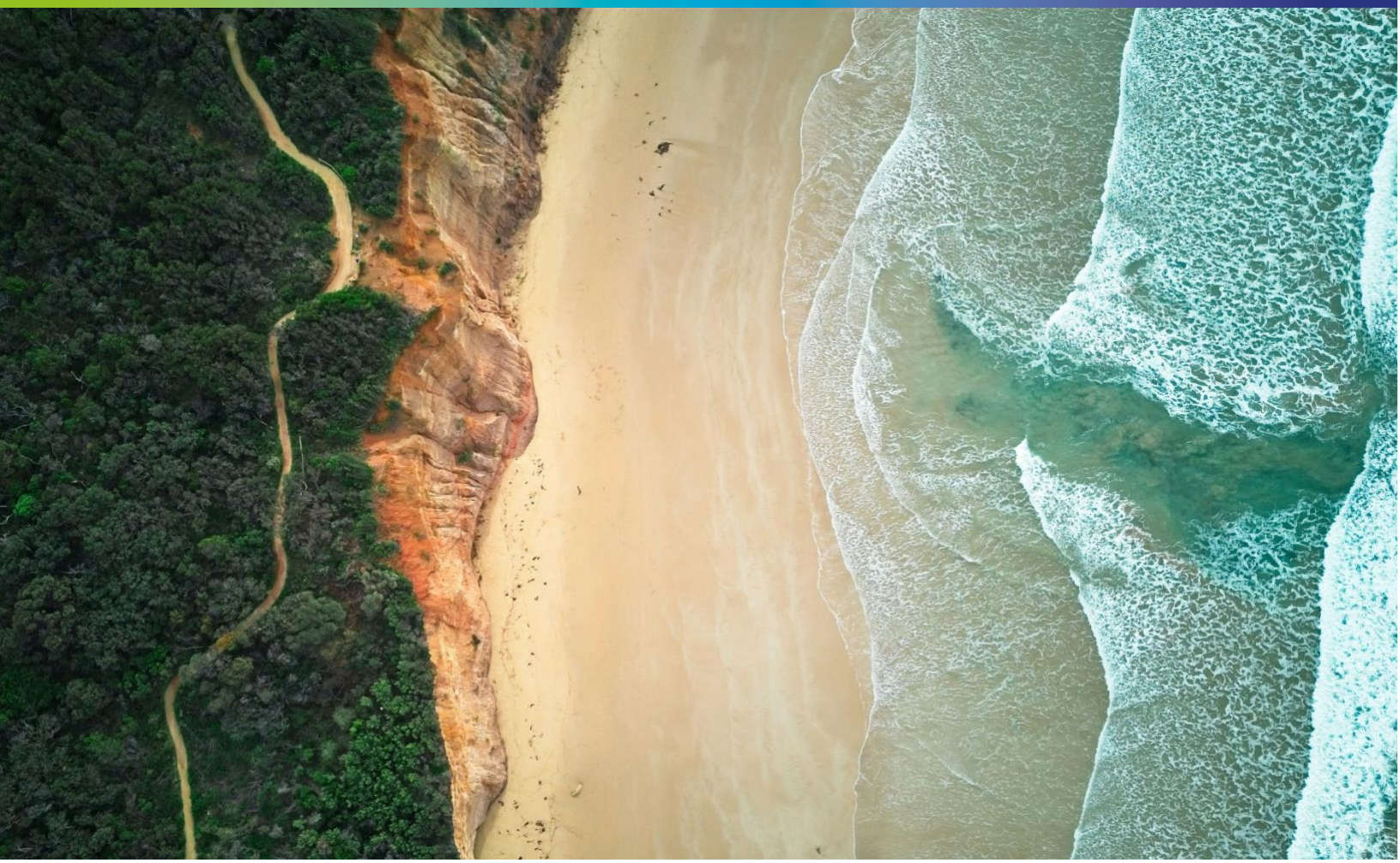

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