



Queensland
Government

Bradfield Regional Assessment and Development Panel

Queensland Government response

Overview

The Bradfield Regional Assessment and Development Panel (the expert panel) has concluded that the Bradfield Scheme or Bradfield-like proposals are not feasible due to the lack of consistently available water to supply the scheme. However, maximising the use of water closer to where it is located through regional water grids, or 'Mini-Bradfield Grids' and effective local use of water resources presents an opportunity to realise sustainable regional development, environment and cultural heritage benefits across regional Queensland.

The Bradfield Scheme, at its heart, was a broad regional development initiative focused on water as an enabler to support economic growth. The expert panel members assessed it in that context.

The expert panel found the Bradfield Scheme and its large-scale variants faltered at the first hurdle: the availability of water.

The expert panel's detailed assessment of the Bradfield Scheme and others like it determined that it did not provide a realistic representation of hydrology and water availability, nor did it represent sustainable environmental practice and a thorough understanding of hydrology.

This assessment aligns with the Australian Government's report prepared by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), *An assessment of contemporary variations of the Bradfield Scheme*. CSIRO concluded that even under the most optimistic of agronomic and economic assumptions, the high financial losses, ecological impacts and community concerns with Bradfield-style schemes mean that such schemes are not viable. However, like the expert panel, CSIRO found that the concerns with Bradfield-style schemes could potentially be mitigated by strategic development and staging of smaller resource developments, closer to where the water is captured.

In addition to insufficient water for the Bradfield Scheme or Bradfield-like proposals, the expert panel identified that regional development requires good planning. The state must be satisfied that the value of using water further away from where it falls in localised regions would be greater. The expert panel noted the disadvantages of large-scale movement of water to major new economic centres include:

- high cost of moving water
- water lost in evaporation and seepage along the way
- higher evaporation that would be experienced in inland agriculture
- soils and growing conditions are not obviously superior to those closer to the source of water
- greater need for new investment in urban and other local infrastructure
- exceptional opportunities for integrating large-scale use of water, biomass, energy and low-carbon industrial development in the port cities to the east, alongside smaller-scale versions of similar developments in parts of the west.

The expert panel provided an alternative, contemporary, achievable approach, focused on water development closer to where it falls as a critical enabler of regional development.

Specifically, they recommended a joined-up, place-based approach that focuses government efforts on investing in the strategic, targeted development of water infrastructure that will enable responsible economic development and enhance water trading opportunities in areas where the water naturally occurs through rainfall, riverine and overland flows and in aquifer recharge. The expert panel's recommendations align with CSIRO's analysis and in their report, CSIRO points to opportunities for new irrigated agriculture closer to where the water is available.

The expert panel identified that by making water work better within individual catchments in northern and central Queensland, there would be a competitive advantage for Queensland to integrate water and energy development in a Water, Agri-Business, Technology and Energy Region (WATER) Development Zone.

Australia has unequalled opportunities for generating solar and wind energy at low cost and the Queensland WATER Development Zone has among the best combinations of solar, wind and rainfall for biomass in the country. The expert panel envisages the WATER Development Zone could be the epicentre for four Mini-Bradfield grids as well as measures to 'make water work' to achieve the best regional outcomes in partnership with communities.

The expert panel also considers there should be specific focus on maximising culturally appropriate, sustainable and innovative water-based development in the Gulf of Carpentaria and Lake Eyre Basin.

The expert panel supports the Queensland Government's water planning framework. It is consistent with National Water Initiative principles and is soundly based. It ensures water is available to: encourage established economic activities including irrigated agriculture, towns and industry; protect the cultural values of First Nations peoples; protect environmental flows; and address the impacts of climate change.

The expert panel highlights the expected impacts of climate change on water availability in their report and supported the Queensland Government's requirement to consider climate change impacts in future water plan reviews.

The expert panel also recognises the importance of reducing nutrient, sediment and pesticide loads into the Great Barrier Reef as well as the need to avoid significant ecological damage in Cape York, the Wet Tropics, the Gulf and Lake Eyre Basin.

Water planning decisions should be reviewed and updated through the processes embedded in the existing legislative frameworks. If current disciplines were abandoned to favour a Bradfield Scheme, it would only be a matter of time before the over-allocation problems experienced in the Murray–Darling would occur on the rivers, industries and ecosystems of central and northern Queensland, particularly in the Burdekin.

Bradfield Regional Assessment and Development Panel

The most recent review of the Bradfield Scheme was undertaken by the Queensland Government almost 15 years ago. With the prospect of a modernised Bradfield-like scheme, an independent expert review was announced in September 2020.

The Queensland Government appointed the expert panel—Professor Ross Garnaut (Chair), Doctor Georgina Davis and Professor Allan Dale—to analyse the financial, economic, environmental, social, cultural and technical viability of the Bradfield Scheme and Bradfield-like concepts and provide their recommendations.

In developing their report, the expert panel met with and sought the views of a wide range of key stakeholders from across Queensland and Australia:

- advocates of the Bradfield Scheme and large-scale Bradfield-like proposals
- local governments
- water infrastructure proponents
- bulk water supply operators—Sunwater and Seqwater
- representative bodies of First Nations Peoples
- environmental sector
- multiple state agencies—wide-ranging technical inputs
- Commonwealth:
 - The then Department of Agriculture, Water and the Environment
 - North Queensland Water Infrastructure Authority
 - National Water Grid Authority (NWGA)
- CSIRO—technical assessments.

As noted above, this assessment aligns with the Australian Government’s report prepared by CSIRO.

In their report, CSIRO concluded that the original Bradfield schemes and the contemporary CSIRO variant are not economically viable for reasons including the following:

- the maximum quantity of water that could physically be diverted was less than half what Bradfield identified
- capital costs of key infrastructure range from \$10 billion to \$32 billion
- annual operating and maintenance costs of \$140 million to \$280 million
- at best, only 25 per cent of the Bradfield Scheme’s costs would be covered by the revenue from farm production
- it would take more than 20 years to construct the Bradfield Scheme before any return on investment.

CSIRO’s study was also undertaken under highly optimistic agronomic and economic assumptions. To achieve this outcome it did not take into consideration the current regulatory requirements for environmental flows and protection of existing water users nor did it consider cultural or social impacts.

CSIRO does note that taking these matters into account would further reduce water availability for Bradfield-style schemes. The expert panel’s assessments and recommendations were also informed by specialised economic modelling research undertaken by the Centre of Policy Studies, Victoria University.

The expert panel’s assessment is grounded in the best available catchment hydrologic modelling undertaken by both the Queensland Department of Environment and Science (DES) and the CSIRO to determine water availability for Bradfield-like proposals from the Wet Tropics, Burdekin and Lake Eyre Basin catchments. The modelling determined there is insufficient water for any proposal like the original Bradfield or subsequent large-scale variants.

Recommendations and the Queensland Government response

The expert panel's report contains eight recommendations to promote transformative, water-centric regional development through Mini-Bradfield Grids and effective local use of water resources in northern and central Queensland. The expert panel recommends against proceeding with the Bradfield Scheme or any of the large-scale Bradfield-like proposals primarily based on water availability. It provides recommendations to guide sustainable water development and water security to support regional development.

The Queensland Government accepts or accepts in principle all the recommendations.

Following the 2020 Queensland state election, water management, planning and development was prioritised by establishing a specific portfolio responsibility under the Minister for Water. This was paired with the overarching responsibility for regional development and manufacturing. The formation of the Department of Regional Development, Manufacturing and Water (DRDMW) established clear responsibilities for this agency to deliver sustainable water allocation and management and to lead and plan water infrastructure development to support regional economic development. This revised governance framework will support prosperous and resilient Queensland communities, agriculture, businesses and natural ecosystems.

The Queensland Government shares the Panel's acknowledgement of the importance of place-based regional development and has frameworks in place to ensure a whole-of-government approach to delivering on economic priorities. Important tools include the statutory regional planning framework, the *State Infrastructure Strategy* and supporting regional infrastructure planning frameworks. Water and associated infrastructure, coupled with other infrastructure, will continue to play a critical role in economic supply chain systems needed for current and new economies in agriculture, manufacturing and resources.

The Queensland Government strongly believes that regional growth is critical for Queensland's economy and future prosperity. This can be achieved while minimising environmental impacts, including meeting the government's commitments to net zero greenhouse gas emissions by 2050 and Great Barrier Reef water quality targets. A key driver to success is the well-planned integration of water, energy and land opportunities.

The government will continue to invest in water and energy infrastructure, and research and development opportunities where Queensland has a competitive advantage and it meets Queensland Government policies. Investments in research, water infrastructure, pumped hydro-electric schemes and renewable hydrogen facilities are occurring throughout northern, central and western Queensland. This approach is supported by the Australian Government and both governments are committed to a shared long-term growth plan for water infrastructure in North and Central Queensland as well as the best local use of water in western Queensland.

Key recent announcements include:

- finalising the Environmental Impact Statement (EIS) and Detailed Business Case for raising Burdekin Falls Dam on the basis of a two-metre raise to deliver 150,000 megalitres of medium-priority water allocation and to increase the dam storage capacity by 31 per cent
- committing to rebuilding Paradise Dam to its original full supply level
- detailed design and cost analysis for the Pioneer-Burdekin Pumped Hydro Energy Storage
- releasing Gulf Water Plan unallocated water:
 - 110,000 megalitres in the Flinders catchment for agriculture
 - Flinders catchment strategic reserve for the Saint Elmo Vanadium Project
- the release of the draft Water Plan (Barron) for public consultation
- undertaking regional water assessments in the Bundaberg and Burnett region and Tablelands region
- developing a Strategic Water Infrastructure Plan.

These announcements continue the Queensland Government's pipeline of investments in water infrastructure projects. Since 2015, \$3.4 billion has provided for water infrastructure projects throughout Queensland, including:

- constructing Rookwood weir on the Fitzroy River
- finalisation of construction of the Mareeba–Dimbulah Water Supply Scheme Modernisation upgrades
- committing to construct Big Rocks Weir near Charters Towers
- leading large-scale renewable hydrogen energy developments and investigating the future water requirements for the development of the hydrogen industry in Gladstone and Townsville
- pipeline investigations including Burdekin to Townsville, Burdekin to Bowen and Fitzroy to Gladstone for agricultural, urban and industrial water needs
- investing \$81 million in the Great Artesian Basin Rehabilitation Program, which has saved more than 214,000 megalitres throughout western Queensland
- a case study in western Queensland that focuses on energy system optimisation, biomass and minerals processing, and fertiliser production. This provides a model for growth in sophisticated manufacturing and sustainable development in regional areas.

The following table outlines the recommendations made by the expert panel and the Queensland Government response.

The Queensland Government is committed to building on the recommendations from the expert panel's report to drive prosperous and sustainable growth for all of Queensland's regions, by delivering water for continued regional economic development through effective local use of water resources and opportunities such as the development of Mini-Bradfield Grids in the short, medium and long term.

Queensland Government response to:

The Bradfield Regional Assessment and Development Panel report recommendations

Recommendation	
1	<p>There is no economic, environmental, social or cultural heritage case for immense storage of water in northern Queensland with a view to its movement over long distances west and south for irrigation. The panel recommends against proceeding with any of the Bradfield or Bradfield-like proposals.</p>
Government response	
ACCEPTED	<p>The Queensland Government accepts this recommendation.</p> <p>The panel’s detailed assessment of the Bradfield Scheme and other large-scale Bradfield-like proposals recommends against proceeding with these proposals because:</p> <ul style="list-style-type: none"> • there is not enough consistently available water • of the high cost of moving water • there are heavy impacts on the environment • of water lost in evaporation and seepage along the way • higher evaporation would be experienced in western irrigated agriculture • soils and growing conditions are not obviously superior to those closer to the source of water. <p>The panel recognises that large-scale regional development in central and northern Queensland, through the sustainable use of water, is a laudable policy goal.</p> <p>The Queensland Government supports the panel’s alternative approach to contemporary regional development, focused on the use of water closer to where it falls as a critical enabler, to deliver economic outcomes that are sustainable, adaptable and timely.</p> <p>The panel has recommended a joined-up, place-based approach that focuses government efforts on investing in strategic, targeted development of water infrastructure that will enable responsible economic development and enhanced water trading opportunities in areas where the water naturally occurs through rainfall, and riverine and overland flows and in aquifers recharge.</p> <p>The Queensland Government shares the panel’s view that Queensland has exceptional opportunities for integrating large-scale use of water, biomass, energy and low-carbon industrial development in the port cities to the east, alongside smaller-scale versions of similar developments in parts of the west of the state. The state does not need Bradfield-scale water projects to deliver these opportunities.</p> <p>The Queensland Government will underpin regional development through sustainable water allocation and management. For western Queensland, this includes making unallocated water releases, investing in making the Great Artesian Basin watertight, and ensuring local communities have safe and reliable drinking water supplies.</p>

Recommendation	
2	<p>There is a strong case for planning and investing in the use of water closer to where it falls to accelerate regional development in central and northern Queensland, including in the Gulf of Carpentaria and Lake Eyre Basin areas.</p>
Government response	
ACCEPTED	<p>The Queensland Government accepts this recommendation.</p> <p>The Queensland Government recognises the importance of place-based regional development and is committed to making effective use of development opportunities in central and northern Queensland. The Queensland Government:</p> <ul style="list-style-type: none"> • continues to invest in water infrastructure projects with \$3.4 billion provided for water infrastructure projects since 2015 • is undertaking detailed design and cost analysis for a potential 5-gigawatt pumped hydro energy storage facility in the Pioneer Valley, west of Mackay • is leading large-scale renewable hydrogen energy developments and investigating the future water requirements for the development of the hydrogen industry in Gladstone and Townsville. <p>The Queensland Government also has frameworks in place to ensure a whole-of-government approach to delivering economic priorities. This is done through the statutory regional planning framework, the State Infrastructure Strategy and supporting regional infrastructure planning frameworks.</p> <p>The Queensland Government is committed to planning and investing in regional water development including through the Queensland Bulk Water Infrastructure Assessment initiative to invest \$5.5 million over 4 years, which will include the development of a Strategic Water Infrastructure Plan. The Australian Government is also providing \$11.5 million towards strategic planning for improving water security in Queensland.</p> <p>Furthermore, the government is providing additional funding of \$7.1 million over 4 years to increase the capacity for water modelling technical assessments and providing critical information on water availability.</p> <p>In central and northern Queensland, the Queensland Government is engaged in the following developments, programs and proposals.</p> <p>Northern Queensland</p> <ul style="list-style-type: none"> • Constructing: <ul style="list-style-type: none"> – Mareeba–Dimbulah Water Supply Scheme Modernisation Project with assistance from the National Water Grid Fund (NWGF) • Commitment to constructing: <ul style="list-style-type: none"> – Big Rocks Weir with assistance from the NWGF • EIS and Detailed Business Case: <ul style="list-style-type: none"> – Raising Burdekin Falls Dam • Assessments: <ul style="list-style-type: none"> – NWGF funded detailed assessment for Burdekin–Haughton Water Supply Scheme modernisation project – NWGF funded detailed assessment for Bowen Pipeline for taking water from the Burdekin Haughton Water Supply Scheme and potentially a raised Burdekin Falls Dam – NWGF funded detailed assessment for Urannah Dam – NWGF funded detailed business case assessment for Lakelands Irrigation Project – NWGF funding application for detailed assessments for the Hughenden Irrigation Project – Detailed design and cost analysis for the Pioneer-Burdekin Pumped Hydro Energy Storage • Unallocated water releases: <ul style="list-style-type: none"> – Release 110,000 megalitres in the Flinders catchment for agriculture – Flinders catchment strategic reserve for the Saint Elmo Vanadium Project

Government response (continued)	
ACCEPTED	<ul style="list-style-type: none"> • Committed additional funding: <ul style="list-style-type: none"> – \$25.6 million towards the Hughenden Water Bank project (subject to a business case and matching Australian Government funding) – \$26 million for a 13km raw water pipeline and associated infrastructure connecting the Lansdown Eco-Industrial Precinct to the Houghton Pipeline (subject to an assessment and contribution from the Australian Government) – \$107.5 million over 2 years for the Cairns Water Security Program (subject to a business case) with matching contributions from the Australian Government – \$12.5 million from Sunwater for groundwater improvement and water efficiency in the lower Burdekin with matching contributions from the Australian Government. <p>Central Queensland</p> <ul style="list-style-type: none"> • Under construction: <ul style="list-style-type: none"> – Rookwood Weir – Essential works for Paradise Dam • Commitment to constructing: <ul style="list-style-type: none"> – Rebuilding Paradise Dam to original full supply level – Additional funding of \$40.4 million to construct the drinking water pipeline from Gracemere to Mt Morgan (subject to a business case) with a \$3.5 million contribution from the Australian Government • Detailed Business Case: <ul style="list-style-type: none"> – Fitzroy to Gladstone pipeline • Assessments: <ul style="list-style-type: none"> – Burnett Infrastructure Study—Paradise Dam – NWGF funded Dawson Valley water security options assessment including Paranui Weir – NWGF funded Nogoa–Mackenzie water security options assessment <p>Western Queensland</p> <ul style="list-style-type: none"> • State investment of \$81 million in the Great Artesian Basin Rehabilitation Program, which has saved 214,000 megalitres so far with a further 89,000 megalitres to be saved • Release unallocated Great Artesian Basin groundwater from general reserve totalling 4,545 ML in parts of the Cadnaowie, Hooray, Springbok Walloon and Hutton groundwater units through a fixed price sale process • Funding construction of the Isisford Weir upgrade • State Government investment in urban water security and water quality improvements through the \$70 million Building Our Regions 6 Program • Urban water service improvements through the commitment of \$2 million per annum in ongoing funding to continue the Queensland Water Regional Alliance Program
Recommendation	
3	Within this development framework, explore the feasibility of four “Mini-Bradfield Grids” referred to as Regional Water Grids.
Government response	
ACCEPTED	<p>The Queensland Government accepts this recommendation.</p> <p>The Queensland Government will commence feasibility work on the four Mini-Bradfield Grids (Regional Water Grids), taking into account the outcomes of the following key initiatives. These initiatives, along with relevant water plan reviews, will provide improved scientific and technical information along with community feedback to support further consideration of water grids.</p> <p>Atherton Tablelands–Cairns Area</p> <ul style="list-style-type: none"> • Under construction: <ul style="list-style-type: none"> – Mareeba–Dimbulah Water Supply Scheme Modernisation (Practical completion)

Government response (continued)

- Assessments:
 - Tablelands Regional Water Assessment
 - NWGF detailed business case assessment for Lakelands Irrigation Project
- Burdekin–Townsville Area**
- Commitment to constructing:
 - Big Rocks Weir
- EIS and Detailed Business Case:
 - Raising Burdekin Falls Dam
- Assessments:
 - Sunwater-led Detailed Business Case for the two-metre raising of Burdekin Falls Dam
 - Burdekin–Haughton Water Supply Scheme modernisation project
 - Bowen Pipeline for taking water from the Burdekin Haughton Water Supply Scheme and potentially a raised Burdekin Falls Dam
 - NWGF detailed assessment of Urannah Dam
- Investigations into inter-basin pipelines or Mini-Bradfield Grids (Regional Water Grids):
 - Burdekin–Townsville: urban and industry
 - Burdekin–Bowen: agriculture and urban
 - Through the Burdekin Water Plan review, take into account feasible options for water storage.
- Committed additional funding:
 - \$26 million for a 13km raw water pipeline and associated infrastructure connecting the Lansdown Eco-Industrial Precinct to the Haughton Pipeline (subject to an assessment and contribution from the Australian Government)
- Fitzroy–Rockhampton–Gladstone Area**
- Under construction:
 - Rookwood Weir
- Commitment to constructing:
 - Additional funding of \$40.4 million to construct the drinking water pipeline from Gracemere to Mt Morgan (subject to a business case) with a \$3.5 million contribution from the Australian Government
- Assessments:
 - Fitzroy–Gladstone pipeline; commenced a detailed assessment and detailed business case under way with the Gladstone Area Water Board
 - NWGF funded Dawson Valley water security options assessment including Paranui Weir
 - NWGF funded Nogoa–Mackenzie water security options assessment including raising Bedford Weir
- Burnett–Bundaberg Area**
- Commitment to constructing:
 - Long term remediation and improvement of Paradise Dam including returning to its original full supply level
- Assessments:
 - Bundaberg and Burnett Regional Water Assessment
 - Burnett Infrastructure Study—Paradise Dam.

Recommendation	
4	Explore and, where viable, build links between these regional water grids so a temporary abundance of water in one grid can be used to balance a temporary dearth in another.
Government response	
ACCEPTED	<p>The Queensland Government accepts this recommendation.</p> <p>The Queensland Government will consider the potential linking of grids as a long-term option. A demonstration of viability will be critical due to the very high cost of moving water long distances. This recommendation will be considered as part of future water planning and infrastructure assessments.</p> <p>The Queensland Government notes the panel’s success criteria for this recommendation includes the integration of regional development frameworks and alignment of policy, planning and project activities.</p>
Recommendation	
5	Make available water work better within individual catchments in northern and central Queensland outside the Regional Water Grids.
Government response	
ACCEPTED	<p>The Queensland Government accepts this recommendation.</p> <p>The panel has highlighted the need for innovative and effective local use of water and the opportunity for increased economic value by using existing resources more effectively and building skills to do things better.</p> <p>The Queensland Government is committed to facilitating the movement of water to its highest and best use. Water plans provide clarity of water entitlements and how water may be accessed, establish a water trading framework, reserve water for future needs and ensure healthy ecosystems. But more can be done, and some initiatives are under way already.</p> <p><i>The Queensland Water Markets Optimisation Strategy is:</i></p> <ul style="list-style-type: none"> • improving water market awareness and opportunities • assisting investors to access water for their projects • providing greater transparency of water market prices • developing on-line tools to provide information and connect buyers and sellers to support water trading. <p>The Queensland Government is also facilitating Australian Government funding in association with the following water infrastructure development proposals and other water-related regional development activities in the Gulf of Carpentaria and the Lake Eyre Basin:</p> <ul style="list-style-type: none"> • NWGF funded detailed business case assessment for Lakelands Irrigation Project • NWGF funding application for detailed assessments for the Hughenden Irrigation Project • State investment of \$81 million in the Great Artesian Basin Rehabilitation Program, which has saved 214,000 megalitres so far with a further 89,000 megalitres to be saved • State commitment to constructing the Isisford Weir upgrade • From the Gulf Water Plan, DRDMW will: <ul style="list-style-type: none"> – release 110,000 megalitres of unallocated water in the Flinders catchment for agriculture – deliver catchment strategic reserve for the Saint Elmo Vanadium Project • In relation to the Lake Eyre Basin, the Queensland Government remains committed to working with stakeholders and communities to ensure adequate protection of Kati Thanda–Lake Eyre Basin streams and watercourses, which also supports sustainable economic development. The government has established a Stakeholder Advisory Group (SAG) for the Queensland Lake Eyre Basin region to help inform the development of a consultation Regulatory Impact Statement (RIS). It is expected that the RIS will be released in the second half of 2022.

Recommendation	
6	Increase public funding for research into the value of the use of water and land for agriculture, carbon sequestration and biomass for industry.
Government response	
ACCEPTED IN PRINCIPLE	<p>The Queensland Government accepts this recommendation in principle.</p> <p>The Queensland Government will continue to invest in research and development opportunities to support economic growth, recognising that innovation works best when industry and researchers work together to bring new ideas to life and to market.</p> <p>To support this approach, the Queensland Government:</p> <ul style="list-style-type: none"> • has provided \$500 million to the Land Restoration Fund (LRF). One of the objectives of the LRF is to invest in research and development in emerging carbon farming areas where Queensland has a comparative advantage • is a partner in the following cooperative research centres (CRCs): <ul style="list-style-type: none"> – Food Agility – Development Northern Australia – Future Energy Exports • has, over the past six years, provided \$170 million in Advance Queensland funding to more than 4,600 regional innovators • has recently released a discussion paper, A Place for Innovation, which identifies agriculture and bio-futures as priority industries. <p>The Queensland Government is also investing in research to make information available in relation to the value of the use of water and land for carbon sequestration and biomass to encourage further investment attraction for businesses through these and other initiatives. Following are some examples.</p> <p>Renewable Energy and Industrial Hub</p> <p>The Queensland Government is supporting a case study in western Queensland that focuses on energy system optimisation, biomass and minerals processing, and fertiliser production. The case study provides a model for growth in sophisticated manufacturing and sustainable development in regional areas.</p> <p>DES and ARENA</p> <p>These agencies coordinated the Queensland component of the Commonwealth’s Australian Biomass for Bioenergy Assessment (ABBA). ABBA collated, reviewed and spatialised available data on sources of biomass (feedstock) for potential conversion to energy to help support initiatives for bio-energy development activities.</p> <p>Soil carbon projects</p> <p>The government has examined approaches for estimating soil carbon stocks in the grazing lands of north-eastern Australia, including the measurement of soil organic carbon stocks under cropping, grazing and native regrowth. These studies inform soil carbon methods developed by the Clean Energy Regulator, under the Emissions Reduction Fund.</p> <p>Crop Suitability Tool</p> <p>The Queensland Government has assessed soil physical properties for land suitability information for selected crops for the Rookwood Weir proposed irrigation expansion. The panel made specific reference to expanding the capability of the Crop Suitability Tool. The government is currently expanding the tool for state-wide application.</p> <p>Reef regulations tool</p> <p>This tool identifies land resource limitations in all the reef catchments and provides information for a consistent range of potential crops and irrigation options.</p> <p>Digital soil mapping and Queensland soil monitoring program</p> <p>This program is improving soil knowledge to inform regional planning and decision making. It compares long-term soil changes in major cropping areas.</p>

Government response (continued)	
	<p>Queensland timber plantations These plantations present an opportunity for carbon sequestration, as well as global market for timber and biodiversity outcomes.</p> <p>Queensland Plant Protein Project This project is a long-term strategic initiative to add value to produce grown by the pulses and legumes industry.</p> <p>Biomanufacturing The burgeoning biomanufacturing industry in Queensland includes investigations into the use of bioenergy and biowaste sources to manufacture bioproducts.</p> <p>Queensland Indigenous Native Food Program This program is developing commercial native food production that may also contribute to carbon sequestration.</p> <p>Queensland Low Emissions Agriculture Roadmap 2022–2032 The Roadmap is currently being co-developed with industry to assist the sector to transition to low emissions production, including the adoption of renewable energy opportunities and best management practices.</p>
Recommendation	
7	Review all matters affecting pricing of inputs into, and the use of, infrastructure. This should ensure cost-reflective pricing emerges from competitive markets (including water, energy and ecosystem service markets) and encompassing other development inputs. The review particularly needs to examine opportunities for expanding innovation in the role of water markets.
Government response	
ACCEPTED IN PRINCIPLE	<p>The Queensland Government accepts this recommendation in principle.</p> <p>The Queensland Government recognises water prices need to reflect the true costs of efficient delivery of water to users and encourage optimal water and land use. The Queensland Competition Authority reviews irrigation water pricing and advises government every four years.</p> <p>The Queensland Government also recognises the broader contribution to the Queensland economy that the agriculture sector plays and has a number of measures in place to keep irrigation prices affordable, including:</p> <ul style="list-style-type: none"> • transitioning Sunwater and Seqwater schemes where the QCA recommends prices to ‘lower bound’ irrigation prices, which includes operating, maintenance and refurbishment costs but excludes any costs of building the assets • limiting annual price increases to \$2.50 per megalitre (in 2022 dollars) plus inflation where prices are below the cost-recovery level • absorbing irrigators’ share of the costs of dam safety upgrades rather than recovering these costs in irrigation prices • discounting Sunwater and Seqwater irrigation prices by 50 per cent for the irrigation of horticulture crops and by 15 per cent for all other irrigation over three years from 1 July 2021. <p>In addition, the Queensland Government’s <i>Queensland Water Markets Optimisation Strategy</i> is:</p> <ul style="list-style-type: none"> • improving water market awareness and opportunities • assisting investors in accessing water for their projects • providing greater transparency of water market prices • developing online tools to provide information and connect buyers and sellers to support water trading.

Recommendation	
8	Move promptly to establish the new approaches to water development planning. Delays will cause bottlenecks for infrastructure needed to build the WATER Development Zone and to deliver development for adjacent regions in central and northern Queensland.
Government response	
ACCEPTED	<p>The Queensland Government accepts this recommendation.</p> <p>The panel’s report and recommendations will be used to inform water infrastructure developments. The Queensland Government recognises regional growth is critical for Queensland’s economy and future prosperity. A key driver to success is the well-planned integration of water, energy and land opportunities.</p> <p>To support water development planning, the government is providing \$5.5 million over 4 years to develop a strategic water infrastructure plan to inform optimal decisions around investment and the forward program.</p>



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