

# Dam bad ideas - The lack of economic evidence for dam building in Australia

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If we were spending the money ourselves and of our own choice, we would, I think, like to have a good deal more information as to the problems of transport and marketing. It is one thing to feel reasonably satisfied that certain commodities can be grown under irrigation. It is, of course, quite another to determine whether they can be profitably grown.

Robert Menzies<sup>1</sup>

## Introduction

The Coalition government has committed \$7.4 billion<sup>2</sup> to the construction of new dams and water infrastructure in Australia, the vast majority of which will be spent in North Queensland even though only 1.1% percent of Australians live in that region and 97 percent<sup>3</sup> of agricultural production occurs outside of that region (Figure 1).

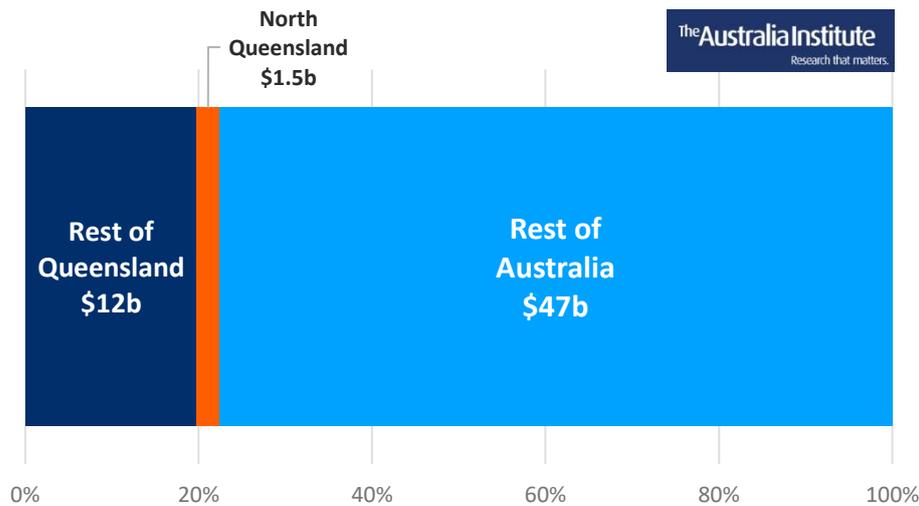
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<sup>1</sup> Quoted in: Powell (1988) *An Historical Geography of Modern Australia: The restive fringe*, Cambridge University Press

<sup>2</sup> Australian Government (2022) *Budget 2022-23, Budget Strategy and Outlook Budget Paper No.1 2022-23*, p. 18, <https://budget.gov.au/2022-23/content/bp1/index.htm>

<sup>3</sup> Based on estimates from: Townsville Enterprise, et al. (2019) *North Queensland Agricultural Market and Supply Chain Study*, <https://www.burdekin.qld.gov.au/downloads/file/236/north-queensland-market-and-agricultural-supply-chain-study>

**Figure 1: Distribution of agricultural output across Australia, 2019-20**



Source: ABS Value of Agricultural Commodities Produced, Australia, 2019-20 and North Qld Agriculture Market and Supply Chain Study  
<https://www.burdekin.qld.gov.au/downloads/file/236/north-queensland-market-and-agricultural-supply-chain-study>

While dams cost a lot of money to build, like roads they directly employ very few people after their construction is completed. Again, like roads, if dams are built in the right spot they can deliver significant lasting benefits but, when built in the wrong places, they create little more than ongoing maintenance obligations.

Economic analysis of the potential location and size of new dams is important if repeating failures such as the Ord River Scheme is to be avoided. The Ord River scheme consists of 2 dams (the original Kununurra Diversion Dam and the Ord River Dam) at an estimated overall scheme cost of \$1.45 billion<sup>4</sup> – and 49 years after it commenced, it is still being expanded despite the failure of the project to deliver any of the promised benefits.<sup>5</sup>

Unfortunately, despite the clear history of big, publicly funded ‘northern development’ projects failing to deliver on their promised economic and community benefits, excuses (particularly that the projects have failed because they were not big enough) continue to be made and new projects that mirror the past failures continue to be

<sup>4</sup> The Wilderness Society Estimate: Economists at Large (2013) *Rivers, rivers, everywhere: The Ord River Irrigation Area and the economics of developing riparian water resources*, <http://www.ecolarge.com/wp-content/uploads/2014/10/Rivers-Rivers-Everywhere-Developing-Northern-Australia-The-Ord-River-Irrigation-Area-Ecolarge-FINAL.pdf>

<sup>5</sup> For a comprehensive assessment of the failure of the Ord River Scheme to live up to the promises of its proponents see: Campbell and Grudnoff (2017) *Dam the expense: The Ord River irrigation scheme and the development of northern Australia*, <https://australiainstitute.org.au/report/dam-the-expense-the-ord-river-irrigation-scheme-and-the-development-of-northern-australia/>

proposed. Indeed, as noted by the Coalition Government's own 2015 White Paper entitled '*Our North, Our Future*' poor planning and high hopes meant that "many failed projects and plans litter the north".<sup>6</sup> As Robert Menzies made clear in the quotation cited above, growing crops in Northern Australia is a lot easier than growing crops profitably.

But despite the lessons of the past, and the warnings contained in its own White Paper into northern development, the Morrison government has committed \$7.4 billion of public money to building new dams. The vast majority of this money is earmarked for the \$5.4 billion Hells Gate dam which has been rejected by Labor and Coalition Treasurers and Finance ministers for 80 years. It seems almost redundant to mention the 2018 cost benefit analysis of the project which found a central case loss of \$2.6 billion.<sup>7</sup> Of further concern is the absence of:

- A detailed business case for the public investment;
- Any evidence that of all the ways to spend \$5.4 billion on water infrastructure, the Hells Gate dam offers the highest returns;
- That of all the ways to invest \$5.4 billion in North Queensland, building a dam will provide the greatest benefits in the short term or in the long term;
- That of all the places in Australia that would benefit from \$5.4 billion in infrastructure spending, North Queensland offers the highest returns.

While it has been rumoured that the Hells Gate dam is part of \$20 billion worth of projects that were secured by the National Party as part of a deal that allowed the Morrison Government to make a non-binding commitment for future governments to achieve 'net zero emissions' in 28 years' time, what is clear is that the vast majority of new water infrastructure spending is being allocated to where the National Party vote is highest, not to where the agricultural potential is highest.

To be clear, spending billions of dollars building anything, in any electorate, will create some local jobs in the short term. If a billion dollars was spent literally digging a large hole and filling it in, this would create a significant number of jobs for people who dig holes and pour concrete, and it would deliver a significant amount of profit to those who provide digging and concrete services. But while spending significant amounts of

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<sup>6</sup> Australian Government (2015) *Our North, Our Future: White Paper on Developing Northern Australia*, p.2, <https://www.cdu.edu.au/sites/default/files/the-northern-institute/docs/northern-australia-white-paper.pdf>

<sup>7</sup> SMEC Australia (2018) *Hells Gates Dam feasibility study*, <https://qldgov.softlinkhosting.com.au/liberty/opac/search.do?mode=ADVANCED&sortDirection=ASC&corporation=DERM&sortField=relevanceRanking&action=search&anonymous=true&queryTerm=423149&includeNonPhysicalItems=true&operator=AND>

public money in a small region will inevitably create short term jobs in construction, as the Ord River Scheme clearly shows, there is no clear link between building large dams and creating a significant amount of ongoing jobs in agriculture, hence the urging of the 2015 White Paper to carefully research and plan before making major spending decisions.

While the announcement of \$5.4 billion for Hells Gate was made without scrutiny from the Commonwealth's own National Water Grid Advisory Board, an environmental impact assessment or even a business case, Prime Minister Morrison has made clear that funding would be dependent on the results of the business case. However, leaving aside the issue of why funding for the project was committed before such a business case was completed, it is entirely unclear why Prime Minister Morrison would also state:

Now, the only thing that will stop it (the Hells Gate dam), I think, is if the Greens get in the ear of either the federal Labor party, which we've seen them do that before. Or they get in the ear of the state Labor government. But as far as the LNP is concerned, here in Queensland, we're all for building this dam and many more.<sup>8</sup>

It is as if the Prime Minister cannot believe that the business case, rather than the election result, might determine whether the \$5.4 billion is spent.

Unfortunately, in Australia building dams has become a symbol of the National Party's ability to extract 'a good deal' for regional voters from the Liberal Party rather than on the basis that such projects are in the national interest. As a result of the symbiotic importance that dam building has taken on within the Coalition, decision making about the size and location of dams appears to have been separated from the collection of evidence to support such dams, to the detriment of other water projects, other infrastructure more generally, and other states and regions that are not represented by the National Party.

## How to evaluate the economics of a dam

For a publicly funded dam such as the \$5.4 billion Hells Gate dam to make a significant positive contribution to the regional and national economy, community and

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<sup>8</sup> Smee (2022) 'Pie in the sky': Coalition's \$6bn dams pitch puts politics before process, <https://www.theguardian.com/australia-news/2022/mar/25/pie-in-the-sky-coalitions-6bn-dams-pitch-puts-politics-before-process>

environment, above the short term benefit of pouring millions of tonnes of concrete, the dam would need to meet a number of clear criteria including:

1. It will capture fresh water that would otherwise have little or no value;
2. It will provide that water to users who value it more highly than current users (including the natural environment);
3. That new users of the water have access to the transport, workforce, energy supply, soil types and markets for their product to make new agriculture viable;
4. It will cause minimal disruption to non-agricultural users of the existing river system including local residents, indigenous landowners, tourism operators and the local ecosystem (including the Great Barrier Reef);
5. That commercial use of the dam's water supply will not be significantly impacted by climate change over the century long life of the project;
6. That the economic benefits from such large capital expenditures provide the highest possible long term returns to the regional and national economies.

In short, while the direct employment benefits of spending billions of dollars pouring millions of tonnes of concrete in a small region are obviously significant compared to not spending that money, the fact that dams are so capital intensive, completely immobile, and have no alternate uses means that, perhaps more than any other form of infrastructure, they require careful analysis of likely costs and benefits over their long planned lives. But despite the clear need for careful analysis for such expensive, single use assets, the Deputy Prime Minister Barnaby Joyce has made clear he places little faith in such analysis. When asked about the business case for the Dungowan dam near Tamworth in NSW he stated:

We're not asking for a return, so we're not really interested in the business case...I want the thing built. We believe it's the right thing to do for the city.<sup>9</sup>

Similarly, when the Commonwealth Environment Minister was asked if she could guarantee that \$500 million in public money for the Urannah dam in Central Queensland represented value for money she replied:

That's not a guarantee I can give on this program ... I suggest you talk to the proponents.<sup>10</sup>

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<sup>9</sup> Bell and Reading (2022) *Deputy PM Barnaby Joyce 'not interested' in calls for transparency about new Dungowan Dam*, <https://www.abc.net.au/news/2022-03-24/barnaby-joyce-not-interested-in-business-case-for-dungowan-dam/100931464>

<sup>10</sup> Murphy, Morton and Cox (2022) *Barnaby Joyce tags \$500m for Queensland dam despite lack of environmental approvals*, <https://www.theguardian.com/australia-news/2022/mar/17/barnaby-joyce-tags-500m-for-queensland-dam-despite-lack-of-environmental-approvals>

It is also important to note that Deputy Prime Minister Joyce also recently disbanded the National Water Grid advisory board created only 2 years ago to advise the Commonwealth Government on precisely such decisions.<sup>11</sup>

Despite the lack of a clear business case for the Hells Gate dam, it is possible, using publicly available data to consider the magnitude and distribution of the likely benefits of spending \$5.4 billion in one part of Queensland with alternative options for such spending. The following sections provide some of the context that the Commonwealth has decided not to collect or provide before making its decision.

## Employment benefits from dams

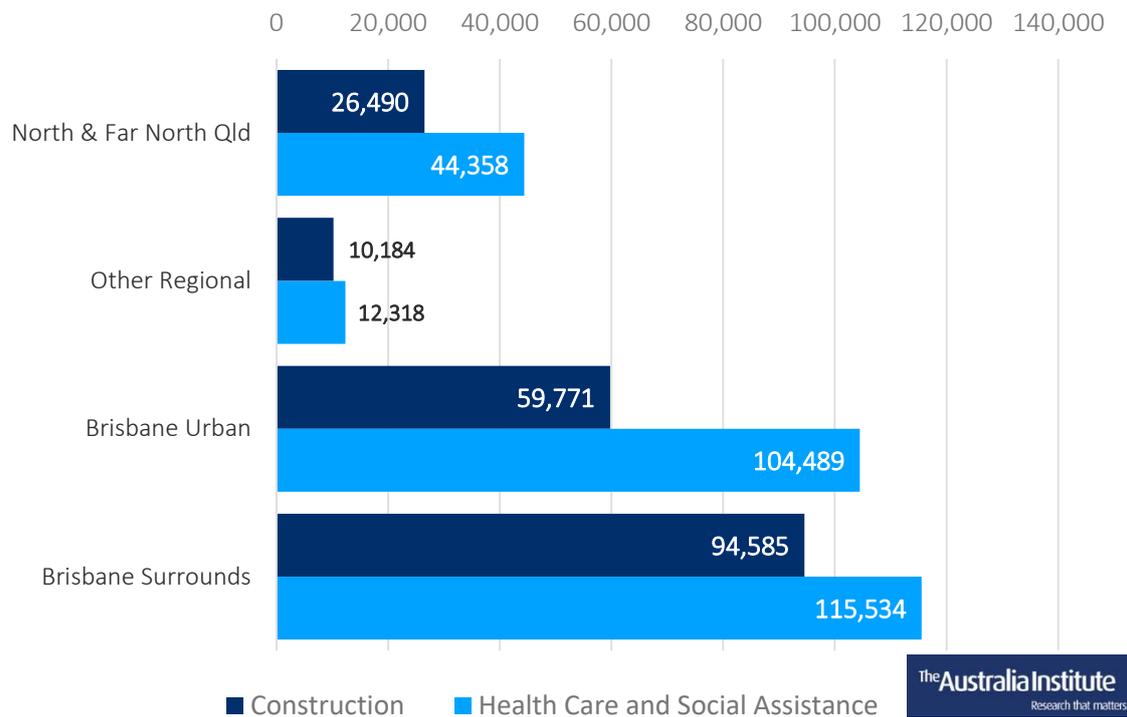
Unemployment is at record lows, but more than half a million people remain out of work and over 900,000 are underemployed. While all public expenditure has the potential to create jobs, and all those employed on new public projects spend their money in their local economies creating so called 'flow on' or 'indirect jobs' not all forms of government spending create the same amount or kind of jobs.

While the mining and construction industries are often described as the 'backbone' of the Australian economy and, indeed, of regional economies, in reality a far larger number of Australians are employed in the health and aged care industries than in construction or mining. Figure 2 shows that this pattern is consistent across all Queensland regions.

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<sup>11</sup> Smee and Cox (2022) *Barnaby Joyce abolishes body set up to advise on major water projects after dam announcements*, <https://www.theguardian.com/australia-news/2022/mar/30/barnaby-joyce-abolishes-body-set-up-to-advise-on-major-water-projects-after-dam-announcements>

**Figure 2: Employment in construction v's health & aged-care by Qld region, 2016**



Source: ABS Census data 2016.

While there is no doubt that a large injection of public money into any particular industry will lead to some boost in employment in that industry, the extent of that boost and the broader benefits of such expenditure are determined by a number of key factors that would usually be carefully modelled in a business case or cost benefit analysis, these key factors include:

- Is the sector labour intensive or capital intensive, that is, will a significant amount be spent on raw materials or capital equipment rather than employees?
- Is there idle skilled labour available or will the project draw labour from other projects/sectors?
- Will the project boost the productivity of other industries in the medium and long term?

The following section uses publicly available data to consider these factors.

## Employment intensity of dam construction

Using the latest Input-Output (I-O) tables of the Australian economy developed by the Australian Bureau of Statistics (ABS) it is possible to estimate the likely economic

impacts of the construction phase of the new dam, compared to an alternative use of the same expenditure.

The following analysis is based on the Australian I-O table so the estimated impacts are Australia wide, but in reality the impacts would significantly occur in Queensland. However not all of the benefits would occur in the local region or Queensland as not all inputs into the construction process could be sourced locally, especially some of specialised labour inputs.

An analysis using the I-O tables allows for an estimation of the likely direct, indirect and flow-on impacts of the dam’s construction compared to alternate uses. The indirect impacts occur as the dam construction increases the demand for output for industries that supply goods and services to the Heavy Civil Engineering industry that builds the dam. The flow-on impacts occur when workers on the dam construction spend their earnings across different industries throughout Queensland and Australia.

For large scale projects, such as the Hells Gate Dam, the recommended practise is to focus on the smaller indirect effects only, since the larger flow-on impacts could fail to materialise in reality due to significant price and cost movements that may follow such a large expenditure, especially in smaller and regional areas.

For this analysis, a \$5.4 billion construction spend on the new dam is compared to the same expenditure on aged care services to highlight the relative differences in economic activity and employment when capital intensive and labour intensive activities receive an increase in public funding.

The direct impacts are shown in Table 1 for output, employment, and GDP. The direct output impacts are identical since they represent the initial \$5.4 billion expenditure, however, the employment impacts are much greater for aged care services representing the much higher labour intensity of this industry compared to heavy civil engineering. Similarly, the initial value added (GDP) impacts are also greater, but to a lesser degree, for aged care services compared to dam construction.

**Table 1: Direct impacts of a \$5.4 billion expenditure, 2018/19**

	Expenditure, \$b	Employment	GDP, \$b
Dam Construction	\$5.4	8,755	\$2.24
Aged Care Services	\$5.4	39,630	\$3.99

Source: Author calculations using ABS Australian National Accounts: Input-Output Tables (<https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-input-output-tables>)

The total impacts including the indirect impacts are summarised in Table 2.

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**Table 2: Total impacts (Direct + Indirect) of \$5.4 billion expenditure**

<b>Total Output, \$b</b>	<b>Direct</b>	<b>Indirect</b>	<b>Total</b>
Dam Construction	\$5.4	\$5.72	\$11.12
Aged Care	\$5.4	\$2.14	\$7.54
<b>Employment, FTEs</b>	<b>Direct</b>	<b>Indirect</b>	<b>Total</b>
Dam Construction	8,755	18,834	27,589
Aged Care	39,630	8,218	47,848
<b>Valued Added (GDP), \$b</b>	<b>Direct</b>	<b>Indirect</b>	<b>Total</b>
Dam Construction	\$2.24	\$2.42	\$4.66
Aged Care	\$3.99	\$1.03	\$5.02
<b>Female Employment, FTEs</b>	<b>Direct</b>	<b>Indirect</b>	<b>Total</b>
Dam Construction	967	5,580	6,547
Aged Care	31,148	3,336	34,484

Source: Author calculations using ABS Australian National Accounts: Input-Output Tables (<https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-input-output-tables>)

A comparison of the impacts reveals a number of interesting patterns. Due to the heavy reliance on other industries, such as concrete manufacturing, dam construction has strong indirect impacts on output that are significantly higher than aged care services.

For value added (GDP) the story is similar, but because of the much higher valued added share (wages plus profits) in aged care services the impacts are moderately greater compared to dam construction.

While the output and value added impacts are similar this is not the case for employment. Because of the labour intensive nature of aged-care services the employment impacts are much higher relative to dam construction. In essence, dam construction relies upon a large amount of concrete and earth moving equipment, whereas aged-care services utilise a lot of people (typically women in Australia) per million dollars spent. All up, including the indirect impacts, spending \$5.4 billion dollars on dam construction could increase employment by close to 28,000 compared to almost 48,000 for aged-care services.

It is important to note that these numbers are presented to highlight the relatively low labour intensity of dam building, compared to other possible sources of employment creation, and are not intended to be a forecast of likely employment. In particular, care should be taken interpreting the results since the impacts are estimated for Australia wide and assume that there is sufficient 'idle labour' to meet those new demands.

For north Queensland it is likely than some, or a significant share, of the inputs for the dam construction would come from other regions, and that would lower the indirect output impacts pertaining to north Queensland. That is, all the concrete and earth

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moving services needs to be supplied from within north Queensland for the scale of indirect impacts highlighted in Table 2 to be realised in north Queensland. Similarly, for aged care it is unlikely that over 40,000 suitable workers could be found to support such a rapid expansion in output from that industry if the money were spent in one year.

While those caveats are important in terms of estimating absolute employment impacts, the analysis clearly shows that, in relative terms, expenditure on labour intensive activities are likely to create significantly more jobs, per dollar spent, than capital intensive projects like the Hells Gate dam.

Longer term, the employment and GDP benefits of the dam would depend on the dam's success or otherwise in expanding agricultural outputs in North Queensland which is why it is so important for careful analysis of the likely potential of these benefits to be conducted before committing to such major projects.

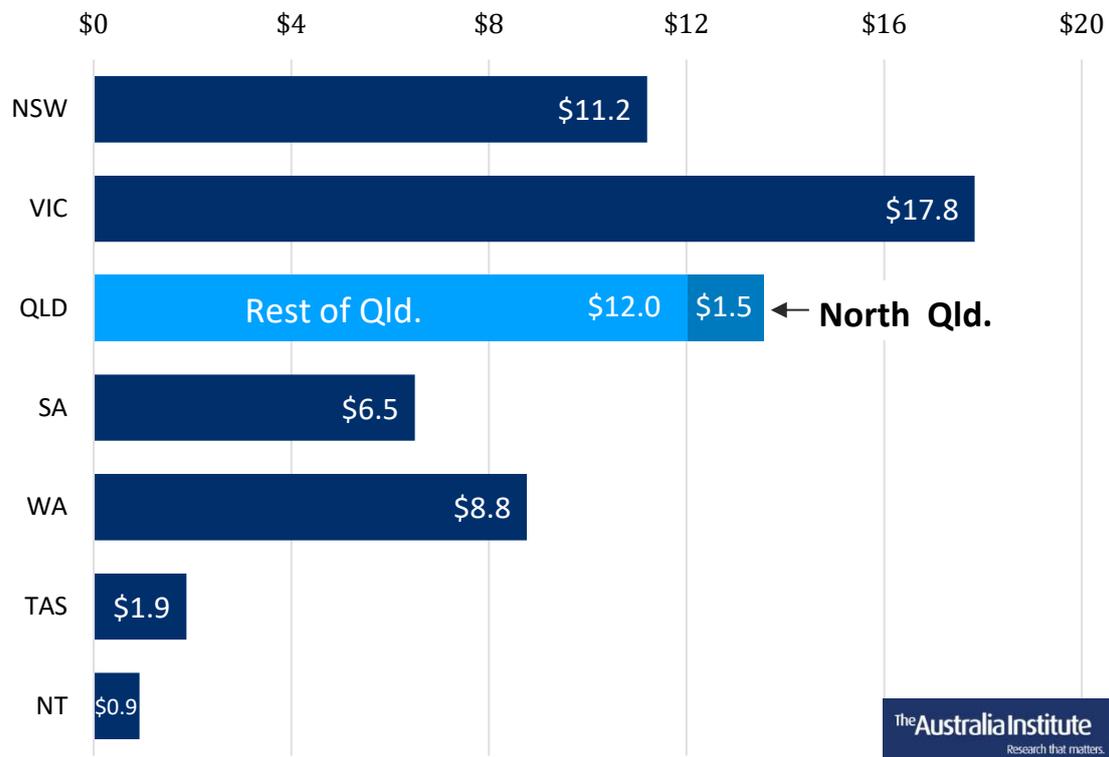
## Why Queensland?

Agriculture plays a small but significant role in the Australian economy and in some regional economies, and the availability of water plays a significant role in the viability, and profitability, of agricultural enterprises all across Australia.

While there is no doubt that a large amount of rain falls in Queensland and there is no doubt that, if billions of dollars are spent on new dams that large amounts of that rainfall could be captured and stored, the Morrison government has presented no evidence to support the conclusion that the most productive way to deploy \$7.4 billion in new water infrastructure is to build the dams that it has selected. Indeed, as it has recently disbanded the body to advise on such decisions it is unlikely that any such comparative analysis will ever be forthcoming.

As shown in Figure 3 the vast majority of Australian agriculture takes place outside of Queensland and, in turn, the vast majority of Australian agriculture will receive little or no benefit from what is one the largest investments in Australian water infrastructure, all without a business case, and announced on the eve of an election campaign.

**Figure 3: Value of agricultural commodities produced, by state, 2019-20**



Source: ABS Value of Agricultural Commodities Produced, Australia (<https://www.abs.gov.au/statistics/industry/agriculture/value-agricultural-commodities-produced-australia/2019-20>) and estimates for North Qld based on <https://www.burdekin.qld.gov.au/downloads/file/236/north-queensland-market-and-agricultural-supply-chain-study>

Compared to the Murray Darling Basin (MDB) plan that has taken 15 years, so far, since Howard’s announcement, funded to the tune of \$13 billion, with bi-partisan support on the back of extensive scientific, environmental, and economic research across a range of stakeholders, experts, and all levels of government, affecting millions across the country, the Hells Gate proposal, rejected many times already, looks like a bad policy idea scratched on the back of a beer coaster.

If the Coalition had a true desire to improve water infrastructure across Australia, then a read of the many and extensive reviews of the MBD Plan, and what remains to complete Howard’s vision to address the “major national challenge”<sup>12</sup> of water scarcity in Australia would be a fair place to start.

<sup>12</sup> Howard (2007) *A National Plan for Water Security*, [https://webarchive.nla.gov.au/awa/20100221232450/http://pandora.nla.gov.au/pan/116124/20100219-1436/www.nalwt.gov.au/files/national\\_plan\\_for\\_water\\_security.pdf](https://webarchive.nla.gov.au/awa/20100221232450/http://pandora.nla.gov.au/pan/116124/20100219-1436/www.nalwt.gov.au/files/national_plan_for_water_security.pdf)

## Conclusion

While dams have come to perform an important symbolic function in Australian politics, there is no evidence that their economic function is proportionate to their cost. For more than 80 years, projects like the Hells Gate Dam have been rejected by successive Coalition and Labor governments despite the strong advocacy of local proponents. While those local proponents have presented the Morrison government with no stronger evidence to support their desires than previous proponents, it seems it is the resolve of the current Treasurer and Finance Minister to resist such overtures that has changed.

Spending large amounts of money on an immobile asset with no alternate uses in a time of rapidly changing climate is a high risk, low return option. While the direct and indirect employment benefits of such expenditure are lower than other non-water infrastructure options it is also clear that there are other water infrastructure options elsewhere in Australia that would deliver larger benefits at lower cost.

While there is nothing illegal or unconstitutional about siting dams, car parks, or any other projects in regions based on election results rather than the results of careful economic analysis, there is no reason to expect that projects selected on that basis will deliver any lasting economic benefits to anyone other than those employed in pouring the concrete.