Panel report: Independent assessment of social and economic conditions in the Basin

Draft report

**A draft report prepared for The Hon. Keith Pitt MP,
Minister for Resources, Water and Northern Australia**

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Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
AIHW	Australian Institute of Health and Welfare
CSO	Community Service Obligation
GL	Gigalitres
GVIAP	Gross value of irrigated agricultural production
IIO	Irrigation infrastructure operator
IVT	Inter Valley Trade
LGA	Local Government Area
MDB	Murray–Darling Basin
MDBA	Murray–Darling Basin Authority
MDBEDP	Murray–Darling Basin Economic Diversification Program
ML	Megalitres
MLDRIN	Murray Lower Darling Rivers Indigenous Nations
NBAN	Northern Basin Aboriginal Nations
NRM	Natural Resource Management
PC	Productivity Commission
RDC	Rural Research and Development Corporation
R&I	Research and Innovation
RWS	Regional Wellbeing Survey
SBC	Strengthening Basin Communities
SRDCP	Stronger Regional Digital Connectivity Package
VU	Victoria University
WERP	Water and Environment Research Program
WESA	Water for Environment Special Account

Acknowledgement

We acknowledge that First Nations peoples are the traditional owners of the land and water, and pay respect to Elders past, present and future. We also recognise the unique, diverse and enduring Culture of First Nations peoples, and the wisdom that comes from such a long connection and respect for Country that can inform today's decisions.

The Panel recognises pressures that rural and regional communities in the Basin are under, and we are indebted to the people who participated in this consultation and appreciate their generous contribution of time, ideas and insights.

Foreword

As someone who grew up on an irrigation farm in southern New South Wales and now runs a dryland farm in northern New South Wales, I have always been proud to live and work in regional and rural Australia, and to call the Basin home.

It was an honour to be appointed Chair of the independent panel assessing the social and economic impacts of water reform on Basin communities, joining six other respected individuals from across the Basin. As a panel, we bring diverse skills and experience to the task, united in our commitment to understand the needs of people living and working in Basin communities.

There are more than two million Australians who live in the Murray–Darling Basin. Whole communities have been built on generations of hard work to create a prosperous and vibrant life, with a commitment to ensuring a sustainable environment.

Through the course of the review, we have seen communities experiencing challenges around water reform, as well as hardship from the drought and more recently the fires. We also looked carefully at other big drivers, such as new technology, swings in commodity prices, and movements in the Australian dollar. After visiting Basin communities and reviewing expert analysis, we found many communities struggling, including some in dire circumstances.

We saw a complex array of factors are contributing to this distress. Pinning it on one factor or another is not going to solve things. Given the scale and depth of concern, we need to get the diagnoses and responses right—quickly—across all levels of government.

As a Panel, we were disheartened to see communities at a crossroads despite countless studies, reviews and inquiries. Visions and policies in our irrigated communities focusing on overall gains have not dealt fairly with those left behind, nor worked hard enough to be fully inclusive. Our Basin communities are changing. The pace has been rapid and the impacts profound. The future is no longer secure or certain for some people and regions, despite their hard work.

We heard from people caught in a one-way conversation—over-consulted and under-listened to. They were frustrated that decisions are being made 'for' them, often with short term objectives as the predominant driver. They want to be part of a conversation that sets a coherent vision and drives sound policy that deals them in again. First Nations communities have also expressed deficiencies in current and future water planning, management and access arrangements.

Through our assessment, the Panel has seen first-hand the uneven impact of this lack of shared vision. Morale has eroded, and a sense of hopelessness is spreading; in many cases, people no longer feel confident in their future. These impacts are not only being felt in the 'back pocket', but witnessed in the main streets of towns, and in the prospects for our next generation.

Despite this despair, it was encouraging to witness industries and businesses defying these outlooks. They are predominately in larger Basin communities, in communities where irrigation has expanded, and where water has moved into districts following unbundling and water market reforms.

Above all, many Basin communities remain open to supporting Basin water reform. It was clear that people do recognise the importance of enhanced environmental outcomes in maintaining a healthy working river and improving conditions for Basin communities. They just hope the Plan is fair and equitable for all and managed soundly. For this outcome to occur, affected communities must be at the heart of decisions deciding their future.

Communities are calling for courageous leadership. They want greater involvement in decisions that impact them—not via ad-hoc town hall meetings—but by helping to shape a long term vision for regional and rural Australia and their Basin.

The Panel hopes this report not only captures what communities have told us, but also highlights where critical information or data is missing. Sound judgements cannot be achieved when data is outdated, incomplete or inaccurate.

This report presents our draft findings and recommendations. We will continue our investigations and engagements, recognising we are operating in a dynamic environment where circumstances can quickly change. We seek your input as we develop the Final Report.

We see it as vital that governments adjust their approach. They need to give more attention to the uneven and indirect impact of their action or inaction, provide greater policy clarity and inclusiveness, and improve information for decision making. This work requires genuinely engaging with communities and supporting them as they determine their future. Communities can then stand up and lead—working collaboratively, cooperatively and in a collegial manner to achieve a more prosperous and vibrant future for all.

The Panel looks forward to continuing to work closely with Basin communities and its stakeholders to finalise our report and recommendations by 30 April 2020.

Robbie Sefton

Chair, Independent Panel for the Assessment of Social and Economic Conditions in the Murray–Darling Basin

How to provide feedback on this report

This draft report presents the Panel's draft findings and recommendations. We are seeking feedback, and we will use this to refine the draft findings and recommendations for our final report.

You can provide your feedback via a public submission, which you can make through our website. You can also send us any questions via our website.

The Panel has no required format for your response. We want to hear what you have to say in the way you want to say it.

You don't have to tell us anything about you and your circumstances in your response. But we'll appreciate it if you do, because it will help us understand your response. For example, you might let us know:

- Where you are from, how long have you lived there?
- If you work, what do you do for work?
- If you own or manage a non agricultural business, what type of business?
- If you are a farmer, what do you produce, and how long have you been farming?
- If you are an irrigator, do you own entitlements / licences or source most water from a temporary market (where it operates)?
- Have you participated in on-farm upgrades or buybacks? Are you part of an irrigation scheme?

As we said, we are seeking your feedback on anything about social and economic conditions in the Basin, and the impacts of Basin and other reforms, and on our draft findings and recommendations. Here are some specific areas on which we would like your views:

1. How does the draft report match your community's experience and situation?
2. Are there any significant gaps? What are we missing?
3. To what extent do you agree with the Panel's key findings?
4. To what extent do you agree with the Panel's recommendations?
5. If implemented, do you think our recommendations would make a difference or have a benefit to you and/or your community?

Key messages

Our Murray–Darling Basin communities are changing. For many, the pace has been rapid and the impacts profound. Technological change, shifts in consumer demand, changing trade patterns and climate change are among the many never-ending pressures that are transforming farms, supply chains, service industries and rural communities across the northern and southern Basins. On top of all this change, we are transforming how we manage and use water resources in the Basin. And this review has taken place in a time of prolonged and widespread drought, and the recent serious bushfires on the scale never seen before.

Rural and regional communities usually just see the end result of all these factors combining. It is difficult to disentangle how each factor contributes to their lived experience. Unless we recognise that the causes of community condition are complex and conditions are changing over time, there is a risk that misattribution of the source of problems could result in a misguided response. The Panel's focus has been to report on how we see communities are changing as water reforms roll forward, the world we live in changes, and new pressures and opportunities emerge.

Reporting on socioeconomic conditions requires us to reflect on the nature of our communities in the Basin—their connections to water, landscape, farming, families, businesses and institutions that service and bind us together. At the heart of Basin communities are people who come together to support one another and share, but at the same time often compete for resources in markets and in the provision of services. Community wellbeing comes from balancing these outcomes and tensions.

Australian farmers and rural and regional communities have always demonstrated great skill and capacity in how they continually adjust to changing circumstances. But we are concerned for people living in Basin communities experiencing significant distress.

Water reform is a bundle of many reforms—some delivered wins to irrigators and other water users, and to the broader community. But significant transfers of wealth and opportunity across industries and regions have taken place—some communities have watched jobs dwindle away, communities decline, and in some cases nearly disappear. We also note that water reform has largely failed to deliver meaningful outcomes for First Nations people.

We heard from people living in the Basin who have a deep distrust in governments—local, state and federal. They feel abandoned by all levels of government. Many have not been on the upside of technology change, water markets and reforms, nor been the direct recipients of compensatory actions or support to date.

Since the 1950s, irrigation has helped provide predictability in many local Basin economies, stimulating and sustaining towns, regions and industries. Governments have a long history of involvement in the Basin in ways that have shaped the way industries and regions have evolved. But risks are rising for irrigated agriculture as farms intensify, become less diverse, and compete for a reduced and more variable consumptive pool of water. These risks flow on to irrigation dependent communities and those with less diverse economies, which are often smaller outer regional and remote towns.

In previously vibrant communities, volatility, rapid change, and uncertainty are resulting in sharp falls in investment and a loss of confidence. These outcomes have contributed to widespread farm exits, social dislocation, vulnerable supply chains, small town decline, and downstream processors and employers contemplating their future in the Basin.

The Panel recognises the benefits to our nation from water reform over the past 15 years. We are not about going back. Many of the past reforms put us in a much better place to manage risk and take advantage of opportunities. But the Panel considers that markets are not perfect, and we are seeing the significant consequences of failure to put in place adequate policies and strategies to manage the distributional impacts of changes that Basin water reforms have facilitated and exacerbated. The Panel's view is that fundamental reforms with broad national benefits could be at risk if community support for water reforms falls further from where we are now.

This must change. Across a range of social and economic indicators, we see and have heard sufficient evidence for us to make an immediate call to action. In this Draft Report, we provide a way forward—by way of 20 draft recommendations—to address these concerns while still enabling the upsides of change to continue. The following summary clusters the draft recommendations by topic (not in order of recommendation number). Note that draft recommendation 1 has multiple components that we explain in the next section (page 1).

Bring communities back to the heart of conversations and actions that decide their future

- Find better and more effective ways to engage with rural and regional communities. Engagement should empower communities and keep government accountable, as well as making the case for reform **(Draft recommendation 1).**
- Commit to providing greater clarity and certainty around long term policy, and drive greater accountability and improved delivery of outcomes to build trust and ensure more people share in the benefits of Basin water reforms **(Draft recommendation 1).**
- Ensure local leadership capacity and government are part of the solution so that policies are tailored to community needs **(Draft recommendation 1).**
- Basin Governments should invest in the ongoing development of effective water markets and improving the water literacy of participants and users of basin assets. **(Draft recommendation 1).**
- Extend the Murray–Darling Basin Economic Development Program beyond its 2023 completion date, and increase its scale. The program should be extended to 2030, then reviewed. This extension will empower communities to make longer term investments in their future **(Draft recommendation 3).**

- Recognise that the benefits of the full suite of water reforms have been uneven, and ensure future dividends are shared more evenly. The Australian Government should refocus future investment in the Murray–Darling Basin Economic Development Program into vulnerable and disadvantaged communities most negatively impacted by Basin water reforms **(Draft recommendation 4).**

- Allow flexibility for the socioeconomic neutrality test to be supplemented by a process that empowers communities wishing to move to a less water dependent future with options to explore that future. **(Draft recommendation 5).**

Meet the pressing needs of First Nations

- Do more to increase First Nations communities' access to water for cultural and economic purposes **(Draft recommendation 9).**

- Fund First Nations groups to work with experts in valuing ecosystem services at culturally significant sites (including, but not limited to, the 17 Ramsar sites in the Basin). **(Draft recommendation 10).**

- Work to better embed and mainstream First Nations participation in water policy and planning at all levels over the long term **(Draft recommendation 11).**

Implement water reform with greater care so potential harms are minimised

- Time further water recovery to match the capacity to deliver water to where needed to achieve enhanced environmental, social and working river outcomes. This approach means slowing further recovery in the Basin, and accelerating efforts to relax delivery constraints **(Draft recommendation 2).**

- Continue addressing deliverability constraints as a priority, reflecting community concerns **(Draft recommendation 6).**

- Fund coordinated efforts to monitor and evaluate environmental benefits, and research to improve the efficiency and effectiveness of environmental watering **(Draft recommendation 14).**

- Increase research and innovation funding and focus on the diversification of farm systems across industries, translating research and innovation knowledge into on-ground application **(Draft recommendation 15).**

- Consider using community service obligations to make transparent the future obligations of government, water users and utilities to provide and maintain water infrastructure **(Draft recommendation 18).**

Support the capacity of communities to adapt to change

- Improve water security planning and investment for Basin towns and cities **(Draft recommendation 7).**
- Develop Australian Government regional pilot programs for alternative urban water supply sources, including indirect potable reuse **(Draft recommendation 8)**
- Agree a framework to develop better indicators of community wellbeing in the Basin **(Draft recommendation 12).**
- Fund a program for First Nations groups to build a baseline and track social and economic conditions and outcomes from water reform **(Draft recommendation 13).**
- Create a baseline to track environmental outcomes from water reform and how these outcomes impact Basin communities' social and economic wellbeing **(Draft recommendation 14).**
- Governments should consider developing a Basin-specific infrastructure fund, with a focus on digital connectivity **(Draft recommendation 17).**

Address critical and urgent gaps in wellbeing, infrastructure and services

- Address gaps in government service and infrastructure provision for outer regional and remote Basin communities **(Draft recommendation 16).**
- Direct resources to attract and retain frontline service providers that specialise in addressing household distress, mental health issues, and financial hardship, in Basin regions and towns experiencing acute social or economic issues **(Draft recommendation 19).**
- Governments need to work with communities in the Basin with acute social and economic issues to develop action and outcome plans that will address these issues over the next three years. Such plans should build on any existing plans and be driven by local communities that are provided with additional skills and expertise to help them develop long term (say, two to three decades) and short term (up to 10 years) tailored plans **(Draft recommendation 20).**

The Panel's draft recommendations to sustain, stimulate, support and promote rural and regional communities in the Basin

Governments must rebuild community trust in water reform, and lead from the front

Across the Basin, we found trust in governments—particularly federal and state—to deliver good long term policy and support rural and regional communities has been severely diminished. This fall in trust has resulted from a failure to adequately include people in conversations about government policy and their future, especially those who have not been on the upside of change. We heard strong messages that successive governments have hollowed out their local and regional capability and knowledge, and they have failed to provide clear leadership or a compelling vision.

We acknowledge that governments in the past 12 months have embarked on steps to increase confidence and trust in institutions and governance. This work includes establishing the interim Inspector-General of Murray–Darling Basin Water Resources to provide independent assurance on Basin Plan implementation. But more effort is required, not just now but into the long term too. Coordinated and collaborative strategic leadership that results in shared Basin vision and action across all tiers of government is urgently needed, or there is a risk that a growing toxicity infecting our Basin conversation will set back our capacity to cope with future change and lead to further decline in socioeconomic conditions.

Draft Recommendation 1

The Panel recommends all Basin governments commit to providing greater clarity and certainty around long term policy, and drive greater accountability and improved delivery of outcomes to build trust and ensure more people share in the benefits of Basin water reforms. Specific commitments and initiatives should include:

- All Basin governments and relevant authorities must work together cooperatively, to deliver the Basin Plan. This work may require adapting to changing circumstances and new information.
- The Murray–Darling Basin Ministerial Council should demonstrate a shared vision and clear objectives, showing it can articulate what it sees as common goals with clear roles, accountabilities and actions, that provide long term policy certainty.

- All parties involved in the design, development, implementation, monitoring and evaluation of water policy and reform should recognise the importance of transparency, and accountability in providing certainty and confidence to communities.

- Basin governments must find better and more effective ways to engage with rural and regional communities. Basin communities want to be part of decision and policy making that makes their communities better places to live. This engagement should empower communities and keep government accountable, as well as making the case for reform.

- Basin Governments should invest in the ongoing development of effective water markets and improving the water literacy of participants and users of basin assets. This could be done by developing an easily accessible, Basin-wide water resource information platform. The platform could provide timely information and simple description and definitions of water terms, policies, operational settings, rules and their implementation, and changes (or those proposed) to them. It could also provide easily understandable indicators of water supply and demand and enable rapid understanding of the composition of, and changes in, river flows, and storages, both temporally and spatially as well as access and release triggers.

- Basin governments need to invest in developing improved water literacy in communities and within government, so all understand what policy proposals mean in practice.

- Strong and effective local leadership that understands is what is required for successful outcomes. Basin governments should explore ways to build local leadership capacity to work with governments to design policies that are tailored to community needs.

From this point on, governments should match the pace of all further water recovery to the capacity of systems and communities to absorb and adjust to change

The Panel considers there is insufficient evidence that future water recovery is being implemented to deliver water in the places needed to effectively achieve enhanced environmental outcomes, working river systems, and improved social wellbeing in the Basin (section 3.4). Research commissioned by the Panel found future water recovery is likely to lead to significant falls in water use and production by irrigated cropping, pastures, rice and dairy sectors. While increasing dryland production will offset some of these falls, towns and communities in these regions will still be impacted negatively, especially under drought conditions. The Panel also notes the long time it can take communities to recover from the impacts of drought (section 4.2.1).

In addition, there is growing recognition that the overall target for water recovery of 2,750 GL per year plus 450 GL per year of efficiency measures cannot be achieved by 2024 without significant cost to the Australian taxpayer, and significant Basin community disruption. Rather than a relentless pursuit of targets, the Panel considers that matching the pace of recovery with the capacity of the delivery systems would lead to a better outcome for all.

This approach means slowing the pace of water recovery going forward, and accelerating the relaxation of delivery constraints.

These two measures will provide other advantages too:

- Recovering 450 GL of upwater by 2024 would cost more than $4 billion at current water market prices. Slowing the pace of recovery may bring down costs to the Australian taxpayer.
- Slowing the pace of recovery will enable implementation of programs that address pressing socioeconomic concerns, especially under the current drought, and help maintain community support for Basin water reforms
- Without clear evidence of the environmental, social and working river benefits of achieving the 2024 recovery targets, the potential costs imposed on irrigation communities are not justifiable. Slowing recovery will allow time for the Australian Government to work with Basin communities to show better evidence of the enhanced environmental, working river, and social wellbeing benefits of past and future water recovery.

Draft Recommendation 2

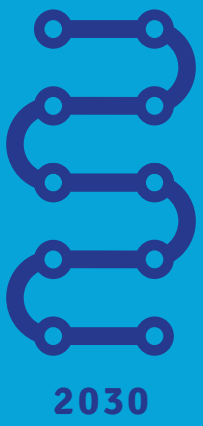
The Australian Government should time further water recovery to match the capacity to deliver water to where needed to achieve enhanced environmental, social and working river outcomes. This approach means slowing further recovery in the Basin, and accelerating efforts to relax delivery constraints.

Current funding is not enough to support community led transitions for Basin communities impacted by water reform

We found the suite of Basin water reforms are delivering uneven outcomes across the Basin. In particular, work commissioned by the Panel shows:

- farms, farming regions and towns that have more water recovered through on-farm irrigation infrastructure upgrades have gained a competitive advantage compared with farms, farming regions and towns that have sold more of their water to the Australian Government through open tender buybacks (section 3.2.2)
- dairy, rice and annual cropping regions and regional communities highly reliant on these industries have benefitted less from past water reforms, and (based on current settings) will also benefit less in the future
- reforms have disrupted smaller, outer regional and remote communities that heavily rely on irrigated agriculture and irrigated agricultural value chains, particularly when water recovery reforms have been fast (section 3.2.2).

We are concerned that much of the past funding to support Basin regions and towns impacted by Basin water reforms has not been effective or well targeted (section 3.5). Current funding is better targeted and likely to be more effective at supporting transitioning regions and communities. But the Panel's view, given the shortcoming with earlier community funding rounds, is that current funding falls well short of being enough to address the community impacts of Basin water reform, or to drive effective economic development and structural adjustment.



Draft Recommendation 3

The Australian Government should extend the Murray–Darling Basin Economic Development Program beyond its 2023 completion date, and increase its scale. Past and future impacts of Basin water reforms will still be passing through Basin regions and towns after 2023.

The program should be extended to 2030, then reviewed. Project delivery timeframes should be extended beyond the current four year timeframe to 2030. This extension will empower communities to make longer term investments in their future.

Draft Recommendation 4

The Australian Government should prioritise future investment in the Murray–Darling Basin Economic Development Program in vulnerable and disadvantaged communities most negatively impacted by Basin water reforms. The Panel's assessment shows these communities include:

- Basin regions where more water has been recovered through open tender buybacks, and less through on-farm irrigation investments
- dairy and annual cropping regions and towns in the southern Basin that have benefitted less from past water reforms and will decline with future water recovery
- smaller Basin communities that have poor socioeconomic conditions and rely heavily on irrigated agriculture, and/or where water recovery and other reforms proceeded quickly (such as through single 'strategic' purchases).

Socioeconomic neutrality criteria should be accompanied by a process to provide flexibility for communities to move to less water dependent futures where communities request this

Basin communities supported the neutrality criteria agreed in December 2018 because the criteria provide important protections. However, the criteria may also limit the ability of a region to transition effectively to a less water dependant future. The criteria say programs or projects cannot have negative third party impacts on the irrigation system, water market, or regional communities or jobs. They also say programs or projects in an irrigation district cannot reduce the overall productive capacity of the relevant region.

We consider communities, regions, and irrigation infrastructure operators (IIOs) should be empowered to engage with government beyond the neutrality tests. If neutrality (as defined) is unlikely to be achieved via the recovery of the final 450 GL of the Basin Plan, then transparent discussions about trade-offs and alternatives must be allowed to commence. Any proposal that steps outside the established neutrality criteria should trigger a formal conversation around whether and how third party impacts could be offset in a way that is acceptable to those negatively affected by the change. Such discussions must be community led.

Draft Recommendation 5

Where an upwater recovery proposal fails to meet established neutrality criteria, this failure should trigger a formal process to consider and agree on whether and how third party impacts could be offset in a way that is acceptable to those negatively affected by the change. This process must be community led.

The Panel considers this process would likely stimulate a more diverse range of community led recovery proposals, which may alleviate an otherwise protracted and even more painful and unmanaged transition for regions.

Basin communities need greater clarity around river operations

The December 2019 Commonwealth and state water ministers meeting in Brisbane agreed there are real delivery risks in the southern Basin. We consider there remains an urgent requirement to not worsen binding river constraints that impact upstream and downstream irrigators and the environment (section 3.2.1). Such an avoidance is an opportunity to:

- develop efficient and effective longer term responses to the relaxation of deliverability constraints. This work may involve exploring new water markets and products to help manage capacity and congestion issues around the Choke.
- better incorporate local and regional information and decision making in water recovery planning.

Draft Recommendation 6

Reflecting community concerns, Basin governments should continue addressing deliverability constraints as a priority. This work includes:

- Commonwealth and state water ministers developing an aligned multi-state approach to development below the Choke, as a priority action
- consistent with Victoria's approach, NSW and South Australia not establishing new or expanded water licences until a clear long term plan for managing deliverability below the Choke is agreed.

The Panel considers long term clarity and confidence around coordinated development above and below the Choke will better stimulate, support and promote healthy and sustainable rural and regional communities in the Basin, compared with the current approach.

Basin communities need greater clarity around river operations

Urban water security and investment in rural and regional communities need to improve. The prolonged and deep drought has left urban water supply for many town communities under threat of critical failures (section 2.3). If the future sees a warmer, drier climate, regional Basin communities will have less water flowing into their dams. They will potentially need more water for essential use and to keep cities and towns sustainable. Further, more extreme weather events and a greater risk of fire in water supply catchments will increase risks to conventional supply reliability. As a result, the costs of servicing towns and other water users, while maintaining service standards, may increase.

The Panel notes Infrastructure Australia's February 2020 infrastructure priority list has specifically identified town and city water security as a new High Priority Initiative. The Panel also recognises the National Water Grid Authority and the National Water Infrastructure Development Fund will be instrumental in securing town and regional centre water supply in the future.

Draft Recommendation 7

Improve water security planning and investment for Basin towns and cities. Improvements should include better supply and demand forecasting and planning; more focus on non-rainfall based supply options; investment decisions based on a full assessment of costs, benefits, risks and uncertainties; and better meeting of the water supply needs of First Nations communities.

Draft Recommendation 8

The Australian Government should develop regional pilot programs for alternative urban supply sources, including indirect potable reuse. These investments may be part funded through the National Water Infrastructure Development Fund.

More needs to be done to improve social, cultural and economic outcomes for First Nations communities

Some water reforms and government decisions have improved in principle First Nations participation in water planning and access to water. However, in practice, improved outcomes for First Nation people are yet to materialise, and some jurisdictions have made more progress than others have (section 3.2.1). More needs to be done to ensure improved social and economic outcomes are achieved for and by First Nations communities in the Basin. There are significant opportunities for substantive improvements.

First Nations groups that we consulted emphasised the need for efforts to build knowledge and improve understanding, and for those efforts to be led by First Nations with appropriate support.

Draft Recommendation 9

Governments should do more to increase First Nations communities' access to water for cultural and economic purposes, by:

- working with First Nations groups to define levels of access required to support improved outcomes for First Nation peoples across the Basin
- recognising the relationship between, and benefits from, First Nations' increasing access to water and land, and working on approaches that provide for both.

Draft Recommendation 10

The Australian Government (potentially in partnership with state governments) should fund First Nations groups to work with experts in valuing ecosystem services provided by, and the benefits arising from, culturally significant sites (including, but not limited to, the 17 Ramsar sites in the Basin). The goal should be to better understand the cultural and economic benefits of improving First Nations groups' access to water, and environmental outcomes.

Funding should also be provided to support Aboriginal enterprise development in associated First Nations communities that use (or could use) ecosystem services.

Draft Recommendation 11

Basin governments should work to better embed and mainstream First Nations participation in water policy and planning at all levels over the long term. Basin-wide processes have provided for greater First Nations involvement, but involvement in state and local decision making and planning varies and should be increased.

The quality, timeliness and awareness of indicators related to wellbeing and the environment need to be better

Basin water reforms look to achieve:

- healthy and resilient rivers, wetlands and floodplains (enhanced environmental outcomes)
- productive and resilient industries, and confident communities (working river systems, and social and economic wellbeing)
- better decisions made at the right level (better governance).

There is some evidence that enhanced environmental outcomes may contribute to better liveability, water quality, human health and wellbeing, and cultural values in the Basin (section 3.4). But a lack of good evidence showing how enhanced environmental and working river outcomes flow to Basin communities reduces confidence that the costs of environmental water recovery are worthwhile (section 3.4). Urgent effort is needed to quantify the social and economic benefits of Basin water reforms and water recovery, so communities are sure those benefits outweigh the costs of reducing the consumptive pool.

We also consider governments need to (re)build capacity (within agencies and the general public) to access, analyse, interpret and report on social and economic data. This work could build on the frameworks and data already available. Future work should include compare different communities of interest, to better understand which groups of people are experiencing more and less positive social and economic conditions, particularly First Nations people, people employed in different occupations, and people of different ages and genders. Consideration could be given to the New Zealand approach to measuring wellbeing and incorporating this information into policy and decision making.

Draft Recommendation 12

To improve decision making and enable well focused and timely responses to wellbeing concerns, governments should agree on a framework to more regularly monitor and, where feasible, develop improved and more granular indicators of community wellbeing in the Basin. Consideration should be given to reporting Basin community wellbeing at least every four years, and every two years in communities with higher vulnerability.

Draft Recommendation 13

Basin governments should fund a program for First Nations groups to build a baseline and track social and economic conditions, and water reform outcomes. First Nations groups could partner with the Murray–Darling Basin Authority and Australian Bureau of Statistics to complete this work.

Research and innovation need more focus on helping farm businesses transition to flexible farming systems

Draft Recommendation 14

Improvements in monitoring and evaluation should include creating a solid baseline and tracking environmental outcomes from water reform, and how these impact Basin communities' social and economic wellbeing. Measures should include, but not be limited to, demonstrating how enhanced environmental outcomes of water reform affect tourism, recreation, liveability, human health and wellbeing, and cultural values.

This tracking is a critical need, and communities should be more involved in the design of this program compared with previous efforts.

Research and innovation need more focus on helping farm businesses transition to flexible farming systems

Australia's Rural Research and Development Corporations (RDCs) have been investing in agriculture in the Basin for more than 30 years. RDCs are accountable to both industry and government, and they fill a key gap in research and innovation (R&I) and practice change that enable farm system diversification to address emerging risks and opportunities. Public expenditure on this R&I will be essential to prevent the well recognised problem in agriculture of under investment in private R&I.

Current R&I efforts seem focused at an industry scale, so farm business have limited information on how to transition to more flexible farming systems that are not industry focused. We also observed gaps in help for farmers to translate R&I knowledge into on-ground application. There may be, therefore, opportunities to provide resources that enable this translation.

Draft Recommendation 15

In response to the emerging risks in Basin, increase the focus and funding of research and innovation in the following key areas:

- enabling the diversification of farm systems across industries
- translating research and innovation knowledge into on-ground application.

The Australian Government needs to further invest in regional connectivity in the Basin

Our commissioned work shows many rural and regional communities in the Basin—including most of the 600,000 people (approximately 28% of the Basin population) living in outer regional and remote Basin regions and towns—say they have poorer access to essential services and infrastructure than has the rest of regional Australia. Basin communities with poor access to infrastructure and essential services at are a competitive disadvantage. Not addressing these disadvantages will lock in the decline underway in many of the outer regional and remote Basin regions and towns.

People across the Basin communities say they have less access to high speed reliable Internet and mobile phone reception, relative to communities outside the Basin (section 2.2). The Panel notes economic modelling from the Accelerating Precision Agriculture to Decision Agriculture project indicates digital agriculture could increase the gross value of Australian agricultural production by $20.3 billion (a 25% increase on 2014–15 levels). Regional tourism in the Basin would also benefit from greater connectivity.

We acknowledge the Australian Government's $220 million Stronger Regional Digital Connectivity Package (SRDCP) (announced in the government's response to the 2018 Regional Telecommunications Review) aims to improve connectivity across the Basin. We also acknowledge the Australian Government has released draft grant opportunity guidelines for public consultation for the SRDCP, which is the last opportunity to comment on the design of the program before the program guidelines are finalised and a call for applications is made. Submissions are due 13 March 2020. Merit criteria are based on economic and social benefits. People whom we spoke with in Basin regions were not aware of the SRDCP or the upcoming application dates.

Draft Recommendation 16

Governments should invest to improve essential infrastructure in Basin communities, particularly in outer regional and remote communities that are at a relative disadvantage.

Draft Recommendation 17

Governments should consider developing a Basin-specific infrastructure fund, with a focus on digital connectivity. Basin communities already have a significant infrastructure deficit, and they should not have to compete with other regions in a new fund.

Moving towards more sustainable irrigation infrastructure

We are concerned that off-farm irrigation infrastructure investment may be creating a medium to long term financial challenge for some Basin IIOs. The financial challenges could have significant pricing implications for irrigators supplied by IIOs, which will have flow-on impacts in regions and towns.

Further water recovery through off-farm infrastructure should clarify future service requirements and how costs are fairly shared. A legislated Community Service Obligation (CSO) mechanism could help in some circumstances. These mechanisms can set out the Australian Government's longer term expectations for service provision.

IIOs should also provide irrigators with more information about the potential medium (five or more years) to long term (10 or more years) pricing implications of IIO capital investments.

Draft Recommendation 18

Community Service Obligations may be helpful in some circumstances to clarify future service requirements and how costs are shared when off-farm infrastructure is provided to achieve water recovery.

Basin regions and towns facing acute social and economic issues need immediate support

The Basin is home to regions and towns with higher community vulnerability and lower adaptive capacity. Many of the 600,000 people (approximately 28% of the Basin population) in outer regional and remote Basin regions and towns live in higher vulnerability areas. We found (section 2.2) these communities, compared with similar areas outside the Basin, score relatively worse in terms of:

- their overall community wellbeing
- the pace at which populations are falling and ageing, and their health outcomes
- their economic performance and standards of living
- their access to essential services and infrastructure.

We identified Basin regions with acute social issues, incl uding poor mental health, household distress and financial hardship (section 2.2).

Draft Recommendation 19

Basin governments should direct resources to attract and retain frontline service providers that specialise in addressing household distress, mental health issues, and financial hardship, in Basin locations experiencing acute social or economic issues. Section 2.2 of this report identifies these Basin regions and towns, and their frontline resource needs.

Draft Recommendation 20

Governments need to work with communities in the Basin with acute social and economic issues to develop action and outcome plans that will address these issues over the next three years. Such plans should build on any existing plans and be driven by local communities that are provided with additional skills and expertise to help them develop long term (say, two to three decades) and short term (up to 10 years) tailored plans.

Governments need to work with communities in the Basin

1. About this Review

In June 2019, the Hon. David Littleproud MP, the then Minister for Water Resources, Drought, Rural Finance, Natural Disaster and Emergency Management, appointed a seven-member Independent Panel to investigate social and economic conditions affecting rural and regional communities across the Murray–Darling Basin (the Basin). He also asked the Panel to look at the impacts of water reform on those communities.

The Panel members are Robbie Sefton (Chairperson), Andrew Kassebaum, David McKenzie, Dr Deborah Peterson, Michelle Ramsay, Bruce Simpson and Rene Woods. This report outlines our draft findings and recommendations to stimulate, support and promote healthy and sustainable rural and regional communities in the Basin in the longer term.

This section outlines what we were asked to do, our approach, and how stakeholders can comment on our draft findings and recommendations. We will use this feedback as we develop the final report, which will be delivered to the Minister for Resources, Water and Northern Australia at the end of April 2020.

1.1. What the Panel was asked to do

The Panel developed our Terms of Reference (see Box below) following broad public consultation and engagement with people in Basin communities and other stakeholders.

Box 1 Terms of Reference

A. The review al and economic conditions in rural and regional communities across the Murray–Darling Basin.

B. The review will assess impacts (positive and negative) of water reforms including the Basin Plan on the vulnerability, resilience and adaptive capacity of Murray–Darling Basin communities and their development potential. This will include consideration of social and economic impacts of the environmental effects of water reforms.

C. The review will consider on-going structural changes influencing different communities in the Murray–Darling Basin, and seek to separate the effects of these trends, and events such as drought, from the effects of water reform, including the Basin Plan.

D. The review will support longer-term efforts to monitor and understand social and economic conditions in the Basin, and the impact (positive and negative) of water reform on different communities in the Murray–Darling Basin. This will be used by governments and leaders to help understand the outcomes of water reform, including the Basin Plan. However, this is not a review of the Basin Plan.

E. The work of the Panel will explore a range of options that stimulate, support and promote healthy and sustainable rural and regional communities in the Basin.

1 There have been significant changes and events over this period, which is also the period of most significant water reform.

We focused on Basin rural and regional communities, and how communities have changed over the past two decades.[1] We define Basin communities broadly, but we particularly wanted to understand the people whose life, livelihoods and future are most connected to and impacted by water, and by Basin water reform. Regional and remote communities on which the Panel focused are shown in Box 2.

Box 2: Basin rural and regional communities on which we focused

- Irrigators and irrigation communities
- Recreational and commercial users of rivers and riverine environments
- First Nations groups and communities
- Businesses operating in local economies that are deeply connected to the rivers
- Groups who have clear local, cultural and other connections to the Basin's rivers and water management

At the same time as this Review, many other reviews and inquiries were also underway, looking at a range of issues. The Panel has deliberately not focused on the issues that these reviews and inquiries are looking at. We list the reviews and inquiries in appendix 1.

The Panel also recognises many reports and inquiries in recent years have looked at water policy in the Murray–Darling Basin. They include the Productivity Commission's Five-year assessment of Basin Plan implementation (2018), the National water reform inquiry (2017), the Northern Basin Review (2016) and many more. There has also been a lot of work done profiling social and economic conditions in southern and northern Basin communities. The Panel considered these reports, government responses, and other supporting work.

1.2. Our approach to this Review

To inform our draft findings and recommendations, we engaged with stakeholders across the Basin in late 2019. We met face to face with more than 750 people across Queensland, NSW, Victoria and South Australia. Plus, we received over 100 written submissions and 600 survey responses between July and November 2019.[2] This engagement coincided with a time of severe drought in many parts of the Basin and before the more recent bushfires and rainfall in parts of the Basin.

Alongside our consultation, we commissioned new research looking at:

- summarising the existing literature and knowledge on the impacts of reforms, government spending in the Basin, existing data and knowledge of social and economic conditions in the Basin, and strategies for building community resilience, adaptability and wellbeing.
- social and economic metrics, to help understand conditions in different Basin communities, based on six recognised dimensions of a thriving community.
- trends and drivers shaping water markets, availability and agricultural production in the northern and southern Basin
- what might happen when 497 GL of future water recovery occurs, especially given the likelihood of more frequent droughts occurring and given the climate is drying.

2 To read about the outcomes from our stakeholder engagement, see our Progress Report (December 2019).

2. How are Basin rural and regional communities faring, and why?

We were asked to provide an independent assessment of social and economic conditions in rural and regional communities across the Murray–Darling Basin. We were also asked to consider how ongoing structural changes are influencing different communities in the Basin.

We based our assessment on a mix of lived experience, community engagement, and evidence from past studies and research. We also commissioned new research, which looked at a wide range of available social and economic factors. This chapter describes what we currently know about Basin communities' social and economic conditions, based on what we understand is the best available evidence. But there are gaps. More and better evidence is needed to accurately reflect the current social and economic conditions of Basin communities, and this evidence must be at a very local scale.

2.1. What we heard from people in rural and regional communities

During our consultations (between July and November2019), many people told us that their communities were under immense pressure. They considered themselves and their communities to be in crisis, with physical and mental health, and wellbeing in severe decline. Their communities are being damaged, dismantled, and even potentially destroyed. Many people in smaller northern Basin communities are observing rapid population decline, and people in southern parts felt social cohesion is crumbling.

This decline was a particularly common theme in communities in northern Victoria and southern NSW that relied traditionally on dairy and cropping. It was also common in some northern Basin communities, where there is little water for agricultural production or for critical human needs and recreational uses.

Many First Nations communities in the Basin are experiencing poor social and economic conditions, both over the longer term and more recently caused by the drought and environmental decline. Their health and wellbeing are suffering, and so are their identity and culture. They also feel they are being marginalised and excluded from the benefits of water reform.

Further, data and information on the social and economic conditions of First Nations communities are often non-existent or incomplete, with many community members being missed in major surveys (including the census). We heard this situation is often also the case for non-Indigenous people living in remote areas or 'off-the-grid'.

But, not all communities are faring badly. We heard of areas of optimism and regions experiencing growth. Industries and businesses are expanding, some niche industries are doing well, and economic benefits are flowing to some sectors and regions. These positive stories come from many of the Basin's larger towns, and areas with expanding irrigation opportunities.

Many people we spoke with in northern Basin communities, where the length and extent of the drought have been most severe, are under immense pressure. Many people spoke of making serious decisions about having to reduce staff hours and lay off workers in town and farm businesses. People told us about how the associated rapid population declines are impacting schools, the volunteering base, capacity for businesses to rebound when the season turns, and the social demographic of both larger and small communities. Declining access to essential services, particularly health services, was raised as a serious problem, particularly in more remote areas. Despite great community pride, the stresses of living through the drought—combined with concern about the lack of rebound capacity due to water reforms and climate change reducing available consumptive water—were adding to uncertainty in the future.

Some participants in southern Basin communities are optimistic about the future. They see opportunity in the agricultural sector, with favourable commodity prices and modernised farms ready to take advantage when water becomes available. The growth in cotton production further south, around Hay for example, has helped underpin the local economy and provide new farming opportunities into the future. Large corporate developments have brought new investment, industry and jobs, although we heard from people who believe this wealth is not being kept in the region.

Some people in bigger southern zone centres such as Swan Hill and Shepparton consider they are in a better position than many others in the Basin. They have more diverse economies and opportunities outside of irrigated agriculture, and more stable or even growing populations (sometimes absorbing people from surrounding towns). They are not immune from social and economic challenges, but they are more hopeful for the future than elsewhere in the Basin.

The views of people we spoke with in the western communities varied. Some people in towns such as Mildura, Wentworth and Murray Bridge feel they are being negatively impacted by drought, but not as badly as the surrounding smaller communities (or remote communities like Menindee, Walgett and Bourke), which are declining much faster. By contrast, other people in Mildura, Wentworth and Barmera noted irrigated agriculture in their regions has expanded considerably in recent years.

Their communities are being damaged, dismantled, and even potentially destroyed

2.2. What we found about the social and economic conditions

We used commissioned research as well as existing literature and data to better understand Basin social and economic conditions. The commissioned research draws on data from the Australian Bureau of Statistics (ABS), the Hutchinson Drought Severity Index, the Australian Institute of Health and Welfare (AIHW) and the Regional Wellbeing Survey (RWS).[3] While we understand these data represent the best available data for Local Government Areas (LGA), there are important limitations, including the fact that some of the data is dated so does not reflect current conditions in Basin communities. For example:

- the most recent ABS census data was produced in 2016. In some communities, conditions in 2019 were quite different from those in 2016, 2017 or 2018, particularly where drought worsened substantially through 2018 and 2019. This problem emphasises that data must be collected more frequently if governments want to understand current community conditions.
- the data does not always go to a very local scale, like a town. So, the data may not reflect differences in wellbeing across people within regions. For example, some people living in the Balonne LGA will be doing better than others. Many of the datasets do not allow us to look at differences within regions well. This limitation means, given data and time constraints, we had to look at average conditions within LGA regions.
- First Nations people are underrepresented in existing datasets. It is difficult, therefore, to understand social and economic conditions at present, to track changes over time, or to demonstrate issues and needs, as well as benefits and successes.
- the relationships between ecological and working river condition and social and economic condition are not established. We discuss this issue more in section 3.4

We can describe communities and their social and economic conditions in many ways. And, there are no agreed thresholds for defining 'good' versus 'bad' conditions. Consequently, our evaluation compared Basin regions to regional Australia averages.

Draft finding 1

There are significant gaps in information on the current social and economic conditions of Basin communities. The Panel has had to draw on a range of quantitative and qualitative methods, data and information to form our view.

3 You can read more about the evaluation approach and datasets in the commissioned research.

Social and economic conditions vary across the Basin

The commissioned research focused on the non-ACT Basin population—that is, 2.2 million of the nearly 2.8 million people who call the Basin home.[4] Of this focus population:

- around 1.38 million people (64%) live in regions with economic, employment and standard of living conditions in line with the regional Australia average. Nearly a third live in regions below that average, while only 6% live in regions above the average.
- around 1.29 million people (60%) live in regions with population, health and ageing conditions in line with the regional Australia average. A quarter live in regions below that average, while 15% live in regions above the average.
- around 910,000 people (42%) live in regions with higher overall community wellbeing than the regional Australia average. Just over a third live in regions in line with that average, and 12% live in regions below the average.
- around 900,000 people (41%) live in regions with better infrastructure and services than the regional Australia average. Nearly a quarter live in regions in line with that average, while just over a third live in regions below the average.

Figure 1– Figure 4 show how Basin communities are faring in terms of the economy, employment and standard of living; population, ageing and health; community and social cohesion; and access to services and infrastructure. These maps compare how Basin communities are faring relative to the average for all regional Australia (defined as all areas outside Australia's major cities).

Collectively, these figures show:

- many outer regional and remote communities are faring worse than the regional Australian average
- regions with overall community wellbeing higher than the regional Australian average are mainly in the southern Basin, and the south eastern corner of the northern Basin (Figure 3)
- access to services and infrastructure are lower than regional Australian averages across most Basin regions.

Draft finding 1

Social and economic conditions vary considerably across the Basin for different measures and indicators. Overarching conditions do not give the full picture, and net assessments can disguise substantial differences and hide areas of severe impact.

4 In this report, we call this group 'the Basin communities' or 'the Basin population'.

Many smaller communities in outer regional and remote areas are declining in population while regional centres are growing

According to the commissioned research, populations of larger communities are generally growing, while many smaller communities' populations are falling. This pattern of population decline in smaller towns is happening across most of regional and rural Australia, not just in the Basin (Productivity Commission 2017). Many Australians are moving from smaller towns to larger regional towns and metropolitan cities, because larger centres offer things they want, and larger communities are more economically diverse. Often, it is younger families with children who are moving, and for many reasons.

Figure 5 shows this trend for 60 Basin community towns.[5] Figure 5 shows many Basin communities maintained a similar trajectory over the past decade as before 2006:

- Towns with more than 14,000 people in 1996 have grown (shown in the top right quadrant). These regional centres were growing before 2006, and they have continued to grow and become more diversified over the past decade. Most growth towns are located in inner regional areas.
- Towns with 8,000–14,000 people in 1996 were often not economically diverse and were based around agriculture and agricultural value chains (for example, Leeton). Since 1996, these towns have experienced mixed population results. Some are growing; most others are shrinking. Most of the towns in this band are in outer regional areas.
- Towns with fewer than 8,000 people in 1996 were often experiencing population decline and were declining over decades before water reform. Towns where populations declined over 1996–2006 and 2006–16 are located in the bottom left quadrant.

Draft finding 2

Many smaller communities in outer regional and remote Basin communities have declining populations, while larger populations in inner regional areas are growing. These trends pre-date water reform.

5 These data come from the MDBA southern Basin community profile series.

Outer regional and remote communities, and smaller communities often have less economic diversity and rely more on agriculture for jobs

The economic diversity trends are consistent with findings of previous reviews. Table 4 shows the general relationship between population size, remoteness and economic diversity, by Basin region and state. Broadly, smaller and more remote community regions rely more on agriculture for employment and economic activity.

Less economic diversity means communities may be less able to absorb negative 'shocks' on their economies and communities. On the other hand, they can likely take advantage of upswings in the limited number of industries on which their local economy depends.

Work commissioned by the Panel suggests low economic diversity, high dependence on agriculture, and remoteness are associated with poorer social and economic outcomes in the Basin than in areas outside the Basin. This result suggests a need to focus attention on the social and economic trajectory impacts of often very high dependence on agricultural employment in outer regional and remote Basin communities.

Draft finding 3

Many smaller communities have less economic diversity and higher reliance on agriculture, and are more susceptible to shocks (such as drought) as a result. These Basin communities have worse social and economic conditions than those of similar communities outside the Basin. They may need more targeted support to deal with the impacts of water reform and transitioning to a drier future.

Outer regional and remote communities typically have less access to infrastructure and services

Healthy, thriving communities that are resilient to change have good access to key services, including health, education, shops, professional services such as accountants and banks, transport, and telecommunications. Work commissioned by the Panel shows communities in the Basin typically say they have poorer infrastructure and services compared with those of larger regional centres and inner regional areas.[6] This finding is particularly true for outer regional and remote communities. In addition, rural and regional communities in the Basin say they have less access to high speed reliable Internet and mobile phone reception relative to communities outside the Basin.

6 This fact has been well established in other Basin reviews. See Appendix A of the commissioned work for detailed data (by Basin region and LGA) on access to different types of services and infrastructure.

Table 1: Local Government Areas with infrastructure and services above and below the regional Australia average*

	Higher than average	Lower than average
Inner regional areas	Ballarat, Greater Bendigo, Orange, Cabonne, Toowoomba, Murray Bridge, Wodonga, Wangaratta, Indigo, Blayney, Bathurst Regional, Oberon, Lithgow and Greater Shepparton	Yass Valley, Barossa, Snowy Valleys, Mitchell, Armidale Regional, Pyrenees, Ararat, and Northern Grampians
Outer regional areas	Leeton and Towong	All 50 other outer regional Local Government areas other than Temora, Murrumbidgee, Riverland, Murraylands, Griffith and Mildura, of which 27 of these 44 LGAs are in the southern Basin
Remote & very remote areas	None	All 16 remote and very remote LGAs, of which 11 are in the northern Basin

Note: Based on five subjective measures of infrastructure and services condition from the 2018 Regional Wellbeing Survey.

Draft finding 4

Most Basin communities in outer regional and remote areas say they have markedly worse access to infrastructure and services, compared with the rest of regional Australia.

Across the Basin there are differences in confidence in community ability to cope with challenges

The commissioned work shows inner regional Basin communities tend to be more confident than outer regional and remote communities in their ability to cope with challenges. They are also more likely to recommend their community to others as a great place to live.

Confidence in outer regional communities is similar in the Basin and outside, with one key exception: Basin outer regional communities are less confident that their community has a bright future. But, people living in these Basin communities also said they would be less likely to wish they could live elsewhere, reflecting a strong commitment and connection to their communities. This finding resonates strongly with what we heard from many of the people we spoke with.

Draft finding 5

Basin residents in outer regional and remote areas have a strong connection to their communities and place, but they are generally less confident about the future than are inner regional Basin communities.

More work is needed to understand social and economic conditions of First Nations

First Nations communities are represented across the Basin in remote, outer regional and inner regional areas. There are 75,000 First Nations people living in the Basin, and they represent 15% of the national First Nations population. Most are Traditional Owners who belong to over 40 First Nation groups. First Nations groups are the original custodians and users of the natural environment within the Basin, and have been managing the Murray–Darling system for over 30,000 years, including actively managing and using the Murray–Darling system for food production (Murray Darling Association; Pascoe 2018).

First Nations groups engaged through this Review were concerned about the social and economic wellbeing of their communities, and the negative effects on wellbeing caused by declining river and ecosystem health. However, data on First Nations communities is inadequate, and both Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and Northern Basin Aboriginal Nation (NBAN) leaders noted many individuals are not picked up in data collections such as the census. So, First Nations populations are likely to be underrepresented in official records.

Available information points to poor social and economic outcomes for First Nations. For example, unemployment by LGA averages 3.2%, while Indigenous unemployment is 11.2%. And, the Australia-wide Close the Gap initiative's 2020 progress report noted most targets to close the gap (including life expectancy, child mortality and school attendance) are not on track or being met.

Draft finding 6

Available information on the social and economic conditions of First Nations communities in the Basin is poor.

Draft finding 7

Based on lived experience and limited evidence that is available, First Nations communities appear to be experiencing poorer and sometimes worsening social and economic conditions. In these communities, the Gap is widening, not closing.

There are Basin communities with acutely poor social and economic conditions

During consultations, we identified regions and towns where social and economic conditions are poor and are trending markedly downward. Many people we spoke with in these communities consider themselves to be in crisis. Confidence is low, resilience is poor, and anxiety levels are high.

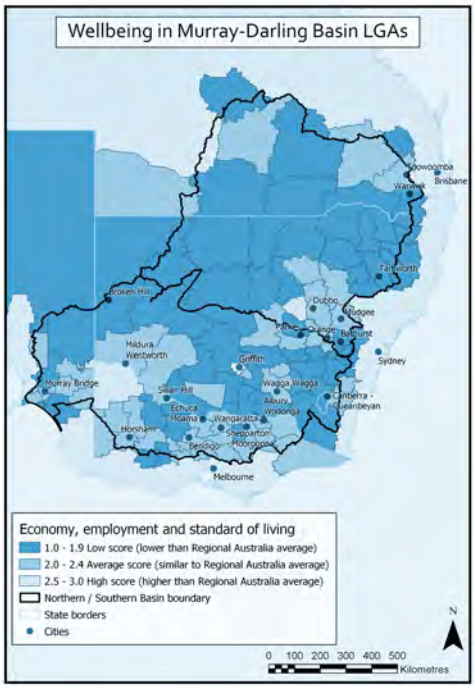
Regions with acute social and economic conditions included areas in northern Victoria and southern NSW, and remote areas across the northern Basin.

The Panel is concerned about what we heard in places such as Balranald, Cohuna, Barooga (Cobram), Wakool, Finley, Deniliquin, Coonamble, Dirranbandi, Menindee, Walgett and Warren. The commissioned research also highlights areas where social and economic conditions are well below regional Australia averages and provides more interpretation of the LGA results.

Draft finding 8

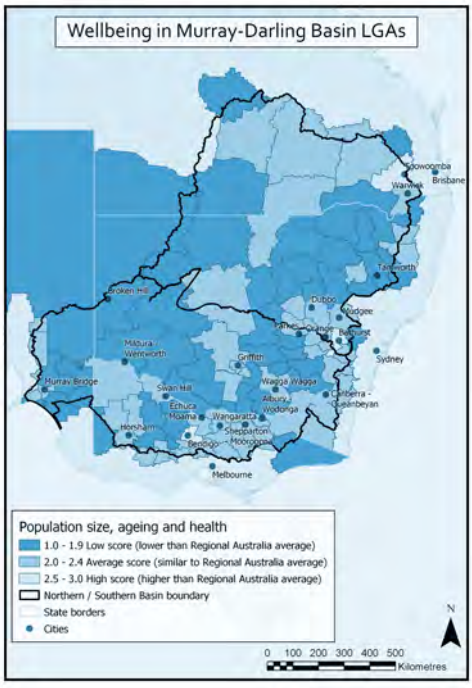
There are Basin communities with acutely poor social and economic conditions.

Figure 1: Economy, employment and standard of living in Murray–Darling Basin LGAs



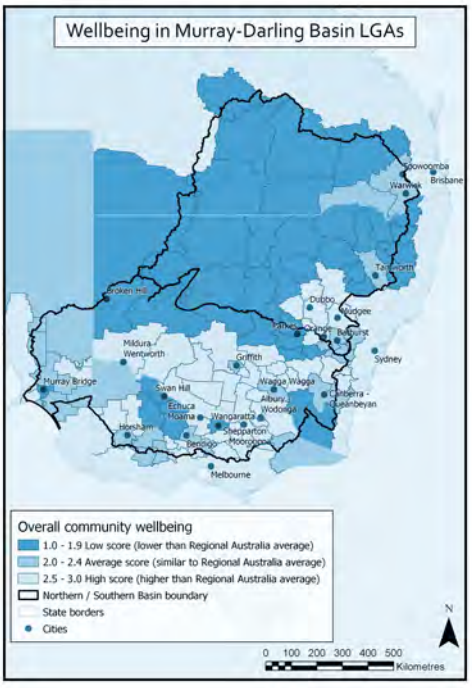
Source: Schirmer et al 2020.

Figure 2: Population size, ageing and health in Murray–Darling Basin LGAs



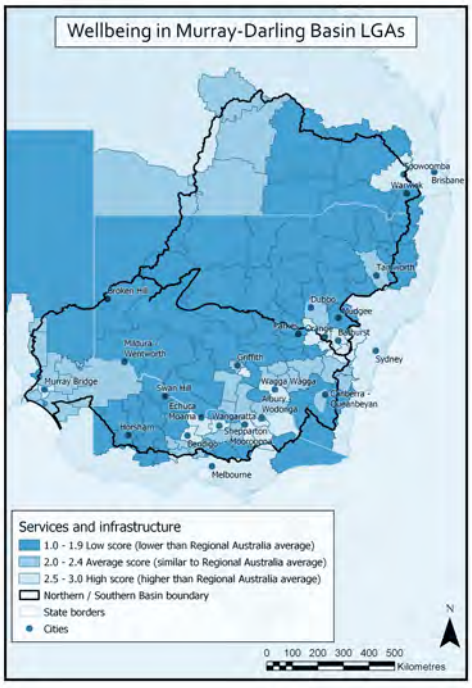
Source: Schirmer et al 2020.

Figure 3: Overall community wellbeing in Murray–Darling Basin LGAs



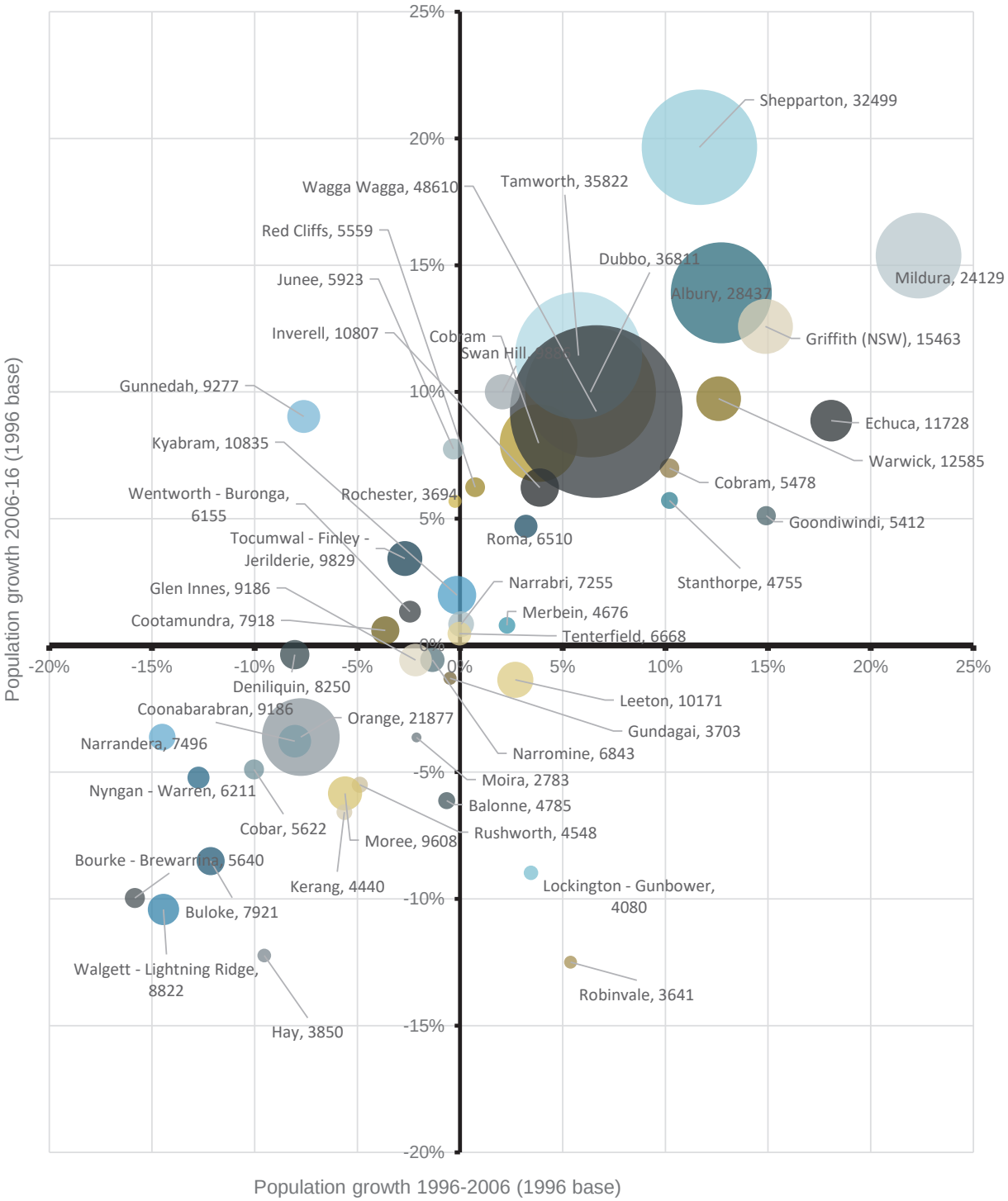
Source: Schirmer et al 2020.

Figure 4: Services and infrastructure in Murray–Darling Basin LGAs



Source: Schirmer et al 2020.

Figure 5: Population change in 60 Basin regions, 1996–2016



The bubble size shows the population in 1996. The horizontal axis measures the % population change in the decade between 1996 and 2006. The vertical axis measures the % population change in the decade between 2006 and 2016, when Basin reforms and environmental water recovery peaked.

Source: Data from MDBA community profiles for the southern and northern Basins.

2.3. What is driving social and economic conditions

Social and economic conditions in rural and regional communities are constantly changing in response to multiple pressures or events. The coronavirus in 2020 is affecting farm exports to China, and for Basin businesses that rely on products or parts made in China. The full impacts are yet to become clear and have not been captured in the Panel's work. Pressures include water reform, as well as major external forces, drought, and government policies and programs. These forces and shocks are often intertwined or linked, with reinforcing trends and flow on effects.

Many national and international forces are behind the changes in Basin communities

Other than water reform, key drivers shaping social and economic conditions include:

- **Globalisation, commodity prices, exchange rates and changing terms of trade across different sectors:** These factors have implications across the economy. Within farming, everything from trade agreements to exchange rates and international commodity prices feeds back into the profitability and viability of different products for both domestic consumption and export. This impact leads to changes in industry composition, with some industries contracting while others expand or new industries emerge, in turn impacting dependent communities. Commissioned work has looked at these impacts in detail.

- **Changing structure of the Australian economy:** Over time, Australia's economy has gradually shifted away from agriculture[7] and manufacturing towards services, education, and even tourism.[8] Figure 6 shows the long term shift from agriculture and manufacturing employment to service sector employment. In the 1950s, agriculture's share of GDP in Australia was around 20%. Now, its share is less than 3%. In the Murray–Darling Basin, agriculture's share of regional income in 2015–16, based on the 2016 census, was less than 18%. Changes in the structure of our economy have been driven by a range of factors, including rising demand for services, the industrialisation of east Asia, economic reform and technical change. In turn, the changes influence where employment opportunities exist, with regional centres and cities typically having more diverse economies with significant services sectors.

7 This does not mean the value of agriculture has declined, but its relative share of the economy and employment has diminished over time.

8 Mining has been highly prominent at times, but also fluctuated over the last few decades.

Changes in population and demographics: Population growth (or decline) and demographic change have a significant impact on social and economic conditions at the local, regional and national scale. Two key trends include:

- Australia's ageing population (which is often more pronounced in regional and rural areas). Ageing changes the structure of the population and the workforce, which influences the economic and social conditions of communities.
- populations in agricultural regions consolidating in larger towns. This trend is a product of many factors, including reduced agriculture employment needs, and better access to services and opportunities in regional centres. It can support a reinforcing cycle whereby reducing populations in small towns result in fewer services and employment opportunities, which leads to more people moving to regional centres.

Government policies, programs and services: These can influence social and economic conditions, and they may be ongoing or created or adjusted in response to specific needs or events, or other trends and drivers. Examples include competition policy, regulation, taxation, immigration, education, infrastructure, health and social services.

Technology and innovation: Improved technology plays a key role in increasing productivity, which helps to improve profitability, income and economic growth. However, technological advances can also result in lower labour needs (that is, reduced employment). This trend is particularly evident in agriculture all over the world, where typically labour intensive farming has been replaced by more efficient and technology driven operations.

Consolidation of farms: Coupled with (and sometimes driven by) technological innovation is a pattern of farm consolidation, to improve efficiency and productivity. It contributes to growth, but also reduces agriculture employment needs. Similar trends are also occurring up and down the agricultural supply chain, with the consolidation of processing centres and distribution hubs reducing labour needs.

Changing climate: Australia's weather and climate continues to change in response to a warming global climate.[9] Australia has warmed by just over 1 °C since 1910, with most warming since 1950. This warming has seen an increase in the frequency of extreme heat events, and increased the severity of drought conditions during periods of below average rainfall. Changing climate has already had, and will keep having, a significant impact on agricultural production, as well as on other sectors and communities, impacting on quality of life and health. Changes in the level and distribution of rainfall and temperatures, for example, will vary across the Basin.

Changes in community expectations and preferences: Over time, expectations and preferences change, which also changes social and economic conditions. Many younger people, for example, may seek higher levels of education, or they want to pursue different lifestyles found in larger cities, or they seek career opportunities that are available only in other areas. At the same time, many 'city changers' have been pursuing lifestyle opportunities in peri urban or semi-rural areas. Another example is the changing preferences and demands for different agricultural products (and methods and standards of production) over time.

9 CSIRO 2018, State of the Climate.

Many past studies sought to separate and disentangle drivers of structural changes (such as those listed above), including to separate out government policies that have influenced structural change (so as to respond more effectively). Previous reports focused on identifying the dominant drivers of change, but noted predicting or tracing how this relationship flows through to responses by businesses, industries and communities is far more complex. Further, it was noted in one Productivity Commission discussion paper that in a continually evolving, complex economy, it is not possible to attribute quantified consequences to one factor — such as a policy change .a specific material consequence can be attributed to a cause beyond reasonable doubt only in exceptional circumstances (p7).

The Panel has found it difficult to separate the specific consequences and outcomes from the drivers of change based on our research, commissioned work and engagement. However, it is clear that they, in combination, are significant and often long term influences that are responsible for shaping Basin communities.

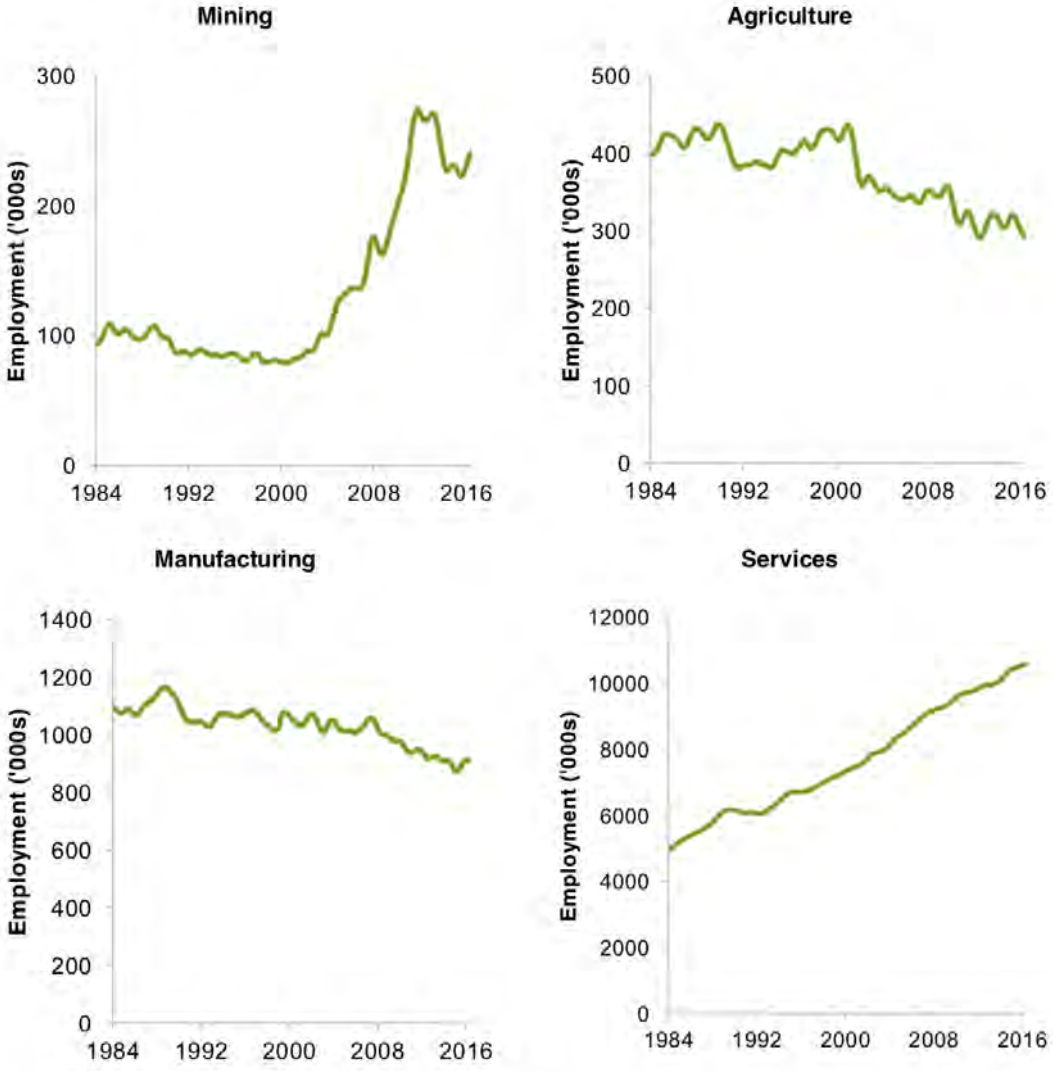
Figure 6 helps to show how this influence has played out over time, showing the long run and consistent shifts in employment away from manufacturing and agriculture towards services (and mining). But, at the same time, production and exports, as well as the value earned from agricultural activities, continue to increase.

Many national and international forces are behind the changes in Basin communities

Draft finding 9

Basin communities' fortunes are changed by many significant external influences. These factors have been shaping our nation, and the Basin, for decades. These effects are difficult to disentangle from each other and from other influences such as policy changes and responses of Government.

Figure 6: National trends in employment, by industry

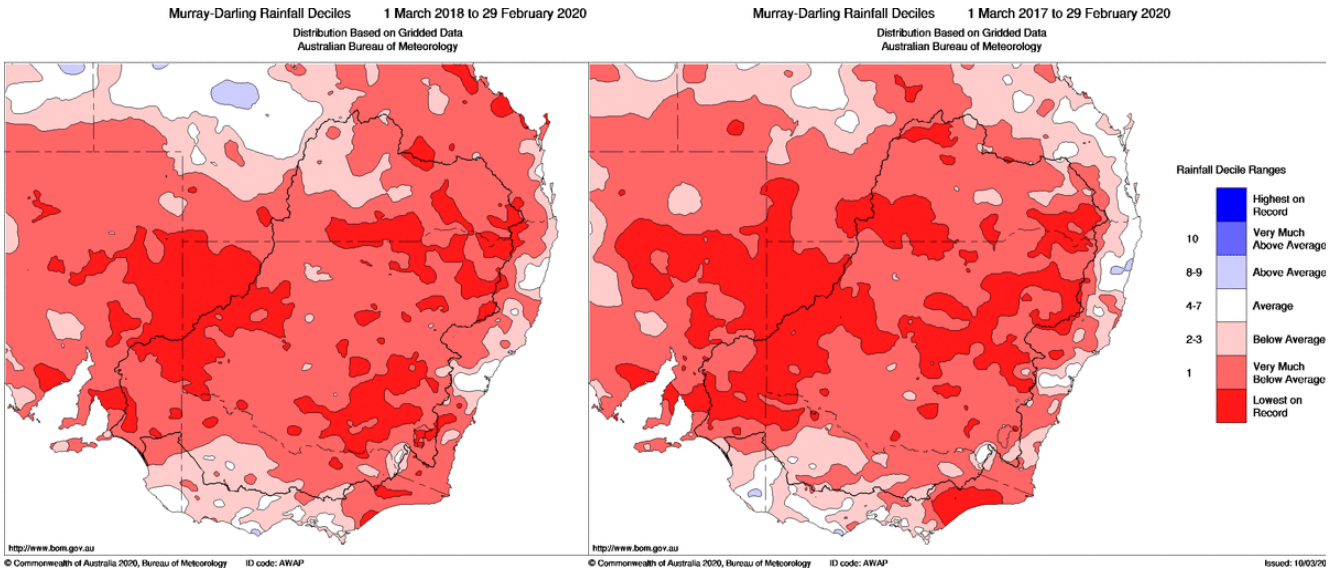


Source: Productivity Commission 2017, Transitional regional economies, study report.

Drought has amplified existing pressures and created challenges for many Basin communities

This Review is taking place in a time of exceptional dryness. Rainfall in most of the Basin was substantially below average in each of 2017, 2018 and 2019 (Figure 7). Worsening these dry conditions were record high temperatures, low soil moisture, and declining water storages. As a result, southern Basin storages were at 38% of capacity in January 2020. Even worse, in the northern Basin, consistent low inflows to major catchments meant storage levels were below 6% by January 2020—lower than levels during the millennium drought (2001–09). Some towns, such as Euchareena and Stanthorpe, had to truck in water in 2019 for critical human needs.

Figure 7: Australian rainfall deciles since 1900



Source: BoM monthly drought update.

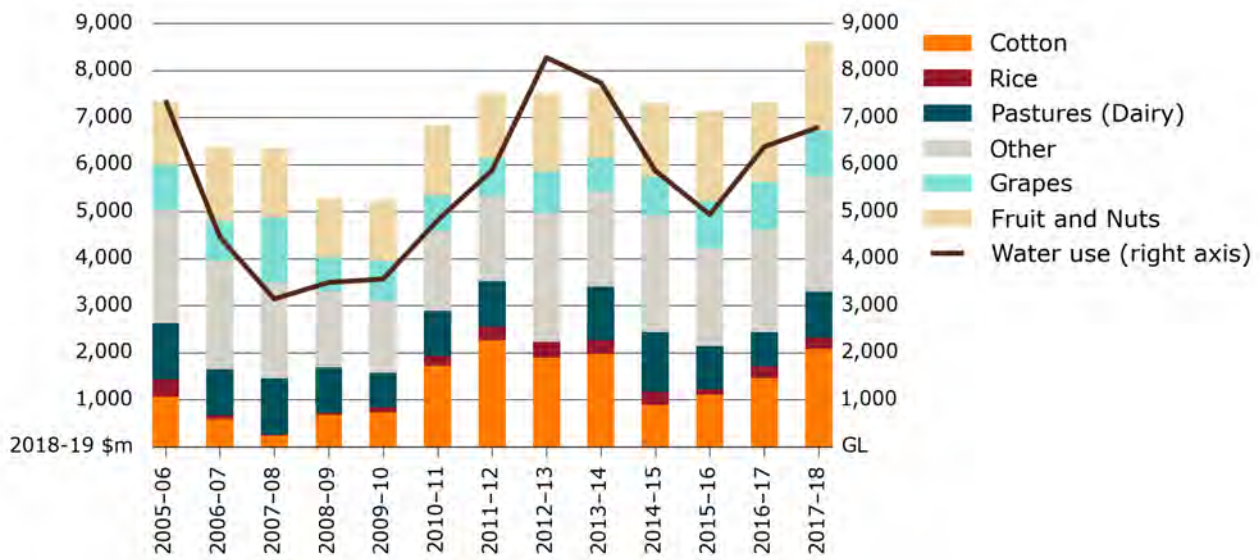
Lower than average rainfall over the past few decades, and recent drought conditions across most of the Basin have placed pressures on agriculture (dryland and irrigated), town supplies, First Nations ecosystems and recreational users.

Low rainfall resulted in low water allocations to entitlement holders. So, less water is available for production, which leads to reduced irrigation commodity output. However, the relationship between water use and the gross value of irrigated agricultural production (GVIAP) is not linear, because water moves to higher value uses. Figure 8 shows this relationship for the GVIAP and water use in the Basin for the past 15 years. While water use fell by 57% during 2005–06 and 2007–08, GVIAP fell by only 13%. In part, this outcome happened because water could shift to higher value uses in these years. Sustaining the value of production in this way can significantly reduce negative social and economic consequences of lower water availability due to drought.

Drought conditions heavily influence water markets, including driving increased water prices. Supply is the biggest driver of water allocation prices, and rainfall is the most significant factor influencing supply. Drought conditions over the past few years mean water prices in the southern Basin are at their highest levels since the millennium drought. Higher prices are placing additional pressures on irrigators who need to purchase water. They are particularly challenging those who mainly or completely rely on the water allocation market.

Many regional communities are also facing water restrictions for town and domestic uses. The costs of these restrictions can be difficult to estimate, but can be very high for Basin households, as demonstrated by analysis undertaken following the millennium drought. We spoke with some communities that are concerned about water security for critical needs, as well as the negative impacts of drought on amenity, health, wellbeing, recreational fishing and boating, tourism and investment.

Figure 8: Gross value of irrigated agricultural production and water use in the Murray–Darling Basin



Source: ABS.
Note: In 2012-13 'other' includes 'Dairy production'.

Drought is part of the long history of Basin communities. And First Nations people have a deep appreciation for how wet and dry cycles affect the life of our rivers and landscape. They are deeply concerned that the way we use water and manage the rivers is contributing to changes not consistent with this tradition. They consider worsening river conditions in dry times is contributing to poorer health outcomes in their communities and causing despair for their loss of tradition.

Draft finding 10

Drought is placing enormous pressure on the agricultural sector, as well as on the wellbeing and health of Basin communities.

Draft finding 11

Drought is the main factor contributing to higher water allocation prices over the past 18 months.

Draft finding 12

Basin communities and First Nations groups are observing the impacts of drought through poorer social, health, wellbeing and recreational outcomes.

Image: Barwon / Namoi junction taken by Jason Wilson

Governments are investing in Basin communities for regional development and drought relief, and to address water reform impacts

Government policy and investment in programs or other activities can play a major role in social and economic conditions. Broad based measures and policies can include taxation, health and social services, and immigration policy. However, governments can also target activities to improve outcomes for rural and regional communities, including through agriculture, water and drought programs, regional development, and infrastructure. Box 3 has examples of major regional development, drought and water reform programs.

Box 3: Examples of major regional development, drought and water reform funding streams

Regional development: A range of regional development funds and programs are open to Basin communities. At May 2017, the Australian Government committed an estimated $20.9 billion in expenditure on regional programs. This funding excludes concessional loan schemes and programs with significant but unspecified regional components. Examples of major national programs include:

- the Building Better Regions Fund, worth $841.6 million over four rounds (with $200 million committed to round four funding, which closed to application in December 2019)
- the Community Development Grants Programme, which allocated $978.9 million in funding from 2013 to 2016
- the National Stronger Regions Fund, worth $1 billion over 2015 to 2020.

Drought support: Australian Government initiatives target drought affected farmers and communities, with funding commitments well over $100 million a year. In addition, many other programs offer support to farmers, including Farm Management Deposits, free financial counselling, funding for open access mental health and emotional support services, rebates for on-farm infrastructure, and subsidised water for fodder. The recently announced Future Drought Fund will provide more continuous funding to drought initiatives (including some of those listed above). This fund begins with an initial credit of $3.9 billion, with earnings reinvested until it reaches $5 billion. From July 2020, $100 million will be made available each year.

Water reform: Examples of support for water reform include Commonwealth and state recovery of environmental water above market rates. This policy was intended to support Basin communities by investing in irrigation infrastructure and on-farm works (which can increase water use efficiency and productivity, and in turn help commercial viability). Maintaining or increasing the commercial viability of farms helps communities that are impacted by water reform and environmental water recovery. The Australian Government has committed more than $13 billion to implement Basin water reforms. Around $6 billion has been invested in water recovery through on- and off-farm infrastructure. This total includes $60 million committed to improving outcomes for First Nations communities and addressing the social and economic impacts of the Basin Plan, under the Basin Plan Commitments Package. Programs such as the Murray–Darling Basin Regional Economic Diversification Program, the Strengthening Basin Communities program, and the economic development component of the South Australia River Murray Sustainability program have contributed another $189 million of investment.

Draft finding 13

Governments make substantial investments in rural and regional communities across the Basin, as well as setting policy and implementing programs that influence communities

Government policy and investment in programs or other activities can play a major role in social and economic conditions

3. Impacts of Basin water reforms on social and economic conditions in communities

Basin water reforms over the past few decades have transformed how we manage and use water resources in the Basin. The reforms over the past 25 years aimed to address challenges largely created by the Australian and state government focus until the 1980s on expanding irrigated agriculture and available water use. They include:

- ensuring the legal security of water entitlements
- enabling water markets and trade
- introducing cost recovery for water infrastructure and services
- protecting town supplies
- reallocating water to the environment.

Box 4: Basin water reforms have transformed how and where water is used

Water management and water markets have evolved, as have government responses to new information and community concerns. The onset of the millennium drought in the late 1990s exposed weaknesses in how we managed water in the Basin, and highlighted the pressing need for continuing reform. This need led to the 2004 National Water Initiative (NWI), which committed all Australian governments to, among other things, prepare water resource plans, achieve sustainable water use in over-allocated water systems, undertake water property right reform, expand trade in water rights, and improve pricing for water storage and delivery.

The NWI also recognised rural and regional communities need support in adjusting to the reform related reduction in water availability. Section 97 of the NWI states:

"The Parties agree to address significant adjustment issues affecting water access entitlement holders and communities that may arise from reductions in water availability as a result of implementing the reforms proposed in this Agreement.

i) States and Territories will consult with affected water users, communities and associated industry on possible appropriate responses to address these impacts, taking into account factors including:

a) possible trade-offs between higher reliability and lower absolute amounts of water;

b) the fact that water users have benefited from using the resource in the past;

c) the scale of the changes sought and the speed with which they are to be implemented (including consideration of previous changes in water availability); and

d) the risk assignment framework referred to in paragraphs 46 to 51.

ii) The Commonwealth Government commits itself to discussing with signatories to this Agreement assistance to affected regions on a case by case basis (including set up costs), noting that it reserves the right to initiate projects on its own behalf."

Partly as a consequence of NWI commitments, in 2007 the Water Act 2007 (Cwlth) was passed in the Australian Parliament, and the Murray–Darling Basin Authority (MDBA) was established and required to develop the Murray–Darling Basin Plan (the Basin Plan or the Plan). The Basin Plan came into effect in 2012. To date, the Plan's delivery has reduced water available for consumptive use by 20%.

NWI reforms have fundamentally altered the operating environment of water users in the Basin and across Australia. They have led to changes in how and where water is used in the Basin, with flow-on effects on Basin communities closely connected with water. On the one hand, the reforms have improved the competitiveness, resilience, adaptive capacity, and development potential of some groups, industries and regions. But, for other groups and regions, the reforms and their impacts have increased communities' vulnerability and reduced their development potential.

Our assessment attempts to separate reforms (and associated impacts and outcomes) related to entitlement frameworks, planning and water markets, and to water recovery.

3.1. What we heard from communities

When speaking about water recovery, many people told us the reduction in the water available in the consumptive pool exacerbates the effects of drought and climate change. They noted it removes a buffer to drought conditions, and reduces the scope for post-drought recovery. Many believe future climate change will worsen these cumulative impacts of water recovery. We heard significant community concerns too about the distributional impacts of water recovery, which people believe have advantaged some communities and disadvantaged others.

People told us water markets had led to a transfer of wealth between regions, and this transfer is leading to growth in some regions and decline others. They also further suggested, while irrigators often have the ability to buy and sell assets (including their water entitlements), those providing services to irrigators and people living in irrigation dependent communities are less well positioned to adapt.

Stakeholders noted concerns too about the social and economic impacts from the pace of change. They say the speed of change is caused by the pace of water recovery reducing the consumptive pool since the late 2000s, and by water markets accelerating the movement of water to different regions.

Beyond community or other impacts, community members we spoke with questioned whether off-farm programs are valid or effective in achieving their aim to recover water. A significant number of stakeholders suggested many off-farm infrastructure programs do not generate real water savings because they take water from (for example) return flows to groundwater aquifers and rivers.

We spoke with a number of people who were fearful for their town water supplies and for the security of water for critical human needs. There were (before the February 2020 rain) communities that have run out of water and needed to truck in water, while others have issues with water quality and are on water use restrictions. People noted the flow-on impacts on amenity, health, wellbeing, tourism and investment.

We were concerned to learn of people who feel let down by a lack of government planning to manage town water supplies during extreme water scarcity, including when the need for such planning has been evident for a long time. But other people suggested town supply security has actually increased through better planning and management.

Communities recognise the importance for environmental flows, but many people struggle to see the intended benefits and are concerned about the declining health of rivers, floodplains and wetlands. We heard this view from environmental groups, First Nations groups, dryland farmers and irrigators, and recreational users. On the other hand, there are people who have seen improved environmental outcomes, and feel the improvements are contributing to better social and economic outcomes for communities. This feedback was particularly true in South Australia.

First Nations stakeholders participating in this Review felt their needs are not being met, and the ability of First Nations peoples to participate in water access, planning and management decisions is inadequate. Reforms focused on First Nations water are generally considered a positive step forwards by these stakeholders, but are generally viewed as not having yet translated into improved outcomes.

These issues raised by Basin communities with which we spoke helped inform our following analysis of the impacts of different water reforms.

3.2. Water reforms have had different impacts across Basin communities

This section looks at water reforms over the past two to three decades. It talks about the impacts of entitlement, market and planning reforms (section 3.2.1), and the impacts of water recovery (section 3.2.2).

3.2.1. Entitlement, market and planning reforms

The Basin has benefited from water entitlement, market and planning reforms, but the benefits have not been evenly spread across communities.

Irrigated agriculture has benefited from entitlement, market and planning reforms... ...

Previous Basin water reform evaluations concluded that water entitlement, market and planning reforms have improved water resource security, management and use in the Basin. These reforms have improved communities' resilience and adaptive capacity, and provided certainty for development and investment.

While water sharing plans are still being developed, and are subject to ongoing debate about how water is allocated between competing uses, the Panel considers statutory water sharing plans have generally led to more public confidence in planning decisions, and in resource allocations. This confidence has certainty for development and investment. Having clear rules for suspending water sharing plans has also given people confidence.

Markets and trade have allowed growth and investment in higher value enterprises over time. They have increased the resilience, adaptive capacity and development potential in many regions where they operate. In some cases, they have allowed water owners to sell water and achieve higher financial returns, particularly during drought. In 2008–09 at the height of the millennium drought, the National Water Commission estimated the ability to trade had substantial net benefits to society and generated an additional $220 million that would have not been realised.

Draft finding 14

Water entitlement, planning and market reforms have delivered substantial and important benefits.

...but there have been distributional impacts and changes

While we recognise the benefits above, we are concerned with how certain reforms have affected Basin communities negatively, and thus increased communities' vulnerability and reduced their adaptive capacity and development potential. There is clear evidence that market reforms have had uneven impacts, with some communities feeling like the collateral damage of improved outcomes in another region. We consider these negative impacts are underacknowledged and often overlooked.

We consider sustained water trading of water out of a region can and has reduced economic activity in Basin communities, and reduced their development potential. Irrigation generates more economic activity in regions than does selling water and either leaving land fallow or using the land for dryland operations. The work that we commissioned for this assessment (section 4.2) backs up this finding.

We heard from stakeholders that water being traded in and out of regions influences social and economic outcomes, and development potential. People noted this fact is a significant and often overlooked impact or change. In regions where water is being sold, many irrigators who own entitlement and farmland have some capacity to adapt or exit, but dependent businesses (such as local irrigation hardware suppliers) and workforces (such as farm labourers) are often less able to adapt to change.

Similarly, irrigators and irrigation regions that rely on the temporary market for water are more exposed to market dynamics than are entitlement holders (particularly those with higher security entitlement). Water recovery is reducing water availability, which is creating more risk for these irrigators.

We consider businesses are responsible for their choices about owning entitlement or sourcing water through temporary markets. This choice is a normal commercial decision, just like a decision to own or lease farmland. The Australian Government should not be held responsible for farmers who are caught on the wrong side of the market when prices rise or fall, except when government interference in the market causes the price change.

Draft finding 15

Water markets and trade have led to changing patterns of water use in Basin communities, such as water moving to different crop types and locations (predominantly in the southern Basin, where water trade is widespread).

Draft finding 16

Sustained trading of water into a region increases economic activity in that region and leads to reductions in economic activity in regions from which the water is traded.

Draft finding 17

Water entitlement owners that sell allocations are exposed to the upside risk of rising allocation prices. Irrigators relying on allocation markets to meet their water needs are the most exposed to downside risk. A shrinking consumptive pool is elevating these risks over time.

We also heard concerns from community members about the degradation of waterways. In the southern Basin, we heard from people who believe degradation is being caused by increased water demand downstream, and delivery or system management issues. They are concerned about environmental damage and erosion, and that the system is not being managed effectively. Other reviews have also identified the emerging risks of third party impacts (including environmental impacts) from increased trade, including whether water sold downstream can be delivered. We understand work is occurring to address these issues (see, for example, Water Delivery Assurances for Victorian Irrigators).

In the northern Basin, people raised the need for transparency and evidence based management of environmental flows, and for consideration of broader natural resource management objectives in delivering environmental outcomes. People spoke of benefits of the 2019 northern fish flow, and emphasised the benefit to communities of this flow, but many raised concerns about environmental flow management decisions (in some cases, they felt the decisions possibly degraded wetland ecosystems through water logging), flow patterns causing erosion, and the lack of evidence at a catchment community level about the benefits of environmental flows in improving riverine health. People are concerned that current reforms are still failing to improve low flow outcomes through the Darling system.

Draft finding 19

The Panel is concerned stakeholders remain inadequately informed about environmental conditions, management objectives, and the results of environmental flows at the catchment level. Building and communicating the evidence base for the scientific link between environmental flow regimes and ecological outcomes—along with the limitations, uncertainties and complementary natural resource management considerations—is a key factor in improving community support for, and trust in, the ongoing implementation of reforms.

We spoke with many people who are also worried about the potential for market manipulation, and many raised concerns about compliance and enforcement. These issues are beyond the scope of this review, but the ACCC's inquiry into water markets in the Murray–Darling Basin and the newly appointed Interim Independent Inspector General of Murray–Darling Basin Water Resources should help improve understanding of these areas.

Draft finding 18

Stakeholders continue to raise issues about water markets and the operation of the river system. Until resolved, those issues will undermine confidence in markets and water reform more generally. This situation potentially increases Basin communities' vulnerability and reduces their development potential.

First Nations communities are still waiting for improved outcomes from water reforms...

First Nations peoples' relationship with water encompasses many things, including economic, spiritual, customary, educational, social and ecological values. But traditional institutional systems of state based land and water management have not reflected these needs and values enough.

The NWI and the Water Act 2007 sought to capture the needs of, and secure the participation of, First Nations peoples in water access, planning and management. These reforms have increased awareness of and participation in First Nations water programs by government and non-government organisations.

But, in the 15 years since the NWI, not all jurisdictions have fully committed to advancing their recognition of First Nations water needs. And only more recently has this recognition translated into First Nations representation in water plans. The volume of water held by First Nations peoples remains relatively small.

Planning processes have ostensibly supported increased participations of First Nations groups. But the extent to which First Nations objectives and needs are embedded and mainstreamed in government policies and legislation could be bolstered. Additionally, there are concerns that First Nations' participation in water planning processes will wane following the completion of Water Resource Plans, and there is a not a clear pathway beyond.

First Nations stakeholders participating in this Review feel their needs are not being met. They also feel the ability of First Nations peoples to access water and participate in planning and management decisions is inadequate. They generally consider reforms focused on First Nations water are a positive step, but one that has not yet translated into improved outcomes.

The commitment of $40 million under the Basin Commitments Package is an important step that can support investment in cultural and economic water entitlements. However, First Nations groups indicated this is an arbitrary number and will not provide desired outcomes (MLDRIN submission). There are also concerns about the delineation between water entitlements for cultural use and economic use, and the potential limitations that this delineation places on First Nations values, interests and rights in caring for Country.

Draft finding 19

First Nations people in the Basin are yet to experience substantively improved outcomes from water entitlement, planning and market reforms.

Draft finding 20

First Nations access to Basin water for economic and cultural uses remains minimal, and slow moving in South Australia, New South Wales and Queensland.

Draft finding 21

First Nations participation in planning processes and decision making has increased but remains patchy across different jurisdictions, and it is not yet embedded in water resource policy and management across the Basin.

Securing safe and reliable town supplies requires more attention

Total urban water consumption across the Basin is small relative to agricultural use of water: it is less than 4% of total water consumption (a total including agricultural consumption). But urban supplies are critical for the 2.8 million people who call the Basin home, and for lower Murray communities.

Water reforms have sought to enhance arrangements for human needs, including town supply. Work that we commissioned summarises these reforms and some of their impacts. For example, the Water Act 2007 requires consideration and prioritisation of critical human water needs. Other reviews found provisions for critical human water needs are supporting Basin communities well, and Water Resource Plans should help to resolve issues and alleviate concerns (particularly in the Lower Darling region).

Despite planning and management requirements to prioritise water for critical human water needs, there are communities that face water shortages and, in severe cases, that have run out of water due to extreme dry conditions across much of the Basin. These water shortages have significant social and economic consequences, and limit communities' development potential.

Beyond supply volumes, regional town water suppliers face a number of challenges, including often small and dispersed customer bases. Compared with other urban water suppliers, they have fewer customers to pay for the infrastructure required to deliver services. Where it is unfeasible for users to fund services, Australian and state governments have often provided funding support (usually through grants) to support investment in infrastructure. Governments took this step recently in both Queensland and New South Wales. However, the funding is often done poorly, and previous reviews found scope to make investments in a manner that is more consistent with the NWI, and to promote more efficient investment decisions. Such change would improve water security for remote and regional communities across the Basin.

The Panel notes Infrastructure Australia's February 2020 infrastructure priority list specifically identifies town and city water security as a new High Priority Initiative. We also recognise the National Water Grid Authority and the National Water Infrastructure Development Fund will be instrumental in securing town and regional centre water supply in the future.

Draft finding 22

There are Basin communities facing critical urban water supply and quality issues, as well as restrictions on water use. This situation has significant social and economic impacts, including costs from having water restrictions and accessing alternative supplies; reduced amenity and green open space; and poorer health and wellbeing outcomes from quality issues.

Draft finding 23

There is scope to improve investment in urban water infrastructure, including opportunities to secure town water supplies by investigating non-rainfall dependent sources, as well as investigating increases to the existing capacity of water infrastructure and alternative supply options. The National Water Grid Authority and the National Water Infrastructure Development Fund will be instrumental in securing town and regional centre water supply in the future.

3.2.2. Water recovery programs

Water recovery is a key Basin water reform, and it has occurred in different ways. The Panel found the ways in which water is recovered has had significant and varied implications for Basin communities, their comparative and competitive advantages, and their long term adaptive capacity and development potential. This section covers the three different types of water recovery under the Basin Plan: on-farm and off-farm infrastructure, and buybacks.

Draft finding 24

The way in which water is recovered has had significant implications for Basin communities, their comparative and competitive advantages, and their long term adaptive capacity and development potential.

Investments into Basin regions to restore the balance have acted as a regional economic stimulus

The Australian Government has committed more than $13 billion to implement the Basin Plan and associated water reform activities in the Basin. Around $8 billion of this investment is committed to on-farm and off-farm irrigation investments to achieve water efficiency improvements. At December 2019, approximately 2,100 GL has been recovered under the updated New South Wales, Victorian, South Australian or accredited water resource plan long term average annual yield (LTAAY) factors.

We found these infrastructure and water efficiency investments have created regional economic stimulus during the construction stage. This stimulus means jobs, salaries and local business profits for Basin communities. Estimates for the southern Basin suggest around 40–50% of infrastructure construction expenditure remains in local economies as 'first round' local value added (that is, the estimate excludes dynamic flow on-effects through the economy). The remaining half of goods and services are sourced from outside the investment area. Using this rule of thumb, first round impacts of on- and off-farm infrastructure investment (approximately $6 billion has been spent to date) has resulted in $1.6– 2 billion of regional economic stimulus during the infrastructure construction stage.

Draft finding 25

Infrastructure investment has resulted in $1.6– 2 billion of regional economic stimulus in Basin communities during the infrastructure construction stage.

There have been impacts associated with the total volume of water recovered on Basin communities

Combined, the different forms of water recovery have reduced the consumptive pool by around 20% across the Basin. Along with drought, water recovery has thus compounded impacts of other trends and drivers.

Draft finding 26

Water recovery has significantly reduced the consumptive pool for Basin communities, and this reduction has compounded the impacts of other trends and drivers (including drought).

The combined overall water reduction, and some specific types of water recovery, have put upward pressure on water prices. This pressure benefits people who own water rights and trade in market, but creates additional costs for irrigators and others who purchase temporary water.

Draft finding 27

Water recovery that has reduced the Basin's consumptive pool has contributed to higher water prices, which has increased risks for farmers purchasing water on temporary markets, particularly during dry and very dry years.

On-farm infrastructure programs have improved the productivity and viability of most participants but left non-participants at a comparative disadvantage

The weight of evidence suggests irrigators and regions that have received on-farm water infrastructure grants have received a comparative advantage over irrigators and regions where on-farm infrastructure grants were used less to recover water. This outcome resulted for several reasons:

Infrastructure programs (both on- and off-farm) have typically paid multiples higher than the market value of the water recovered, whereas buybacks were at market rates. So, irrigation regions participating in upgrades received a larger economic stimulus than did communities where buybacks dominated.

Farm survey analyses provided to the Panel shows southern Basin farms that have received on-farm upgrades perform significantly better than the same types of farm that do not receive upgrades. This disparity is particularly true for mixed broadacre farms, where upgrades result in farm gate production value increasing by 15% on average, irrigated area increasing by more than 15% on average, and water use increasing by more than 20% on average. Grant recipients improve irrigation productivity and efficiency, and do other things that lead to higher incomes and profits, and that put the farms at a competitive advantage. The communities around these farms benefit from this increase in agricultural activity. On the other hand, irrigators and communities that have not received upgrades are at a relative disadvantage.

Water demand on Basin farms receiving on-farm upgrades increases after the upgrade, as noted above. This demand change has been observed in other work, and often happens because farms use on-farm infrastructure grants to increase their irrigation area. This increased water demand can lead to increasing water market prices. The Panel understands this price pressure can potentially have negative impacts on both program participants (who, because they gave up a portion of entitlement in return for the infrastructure, now rely more on allocation markets), and non-participants (who did not achieve any profitability improvements from upgrades, so may be relatively more affected by price increases).

In short, we found strong evidence that on-farm irrigation infrastructure upgrades create a comparative advantage for irrigators and irrigation communities receiving the upgrade grants. At the same time, these grants put other irrigators and irrigation communities at a comparative disadvantage. For this reason, distributional impacts may arise from this form of recovery.

These upgrade investments can be considered as a form of offset or adjustment assistance, and even as an attempt to address the negative consequences of water recovery reducing the consumptive pool. But the benefits of this expenditure seem to have largely accrued largely to participating irrigators and their local communities rather than all irrigators and Basin communities more generally.

Draft finding 28

Water recovery through on-farm infrastructure has helped participating farmers increase their water use efficiency and output while adjusting to greater water scarcity. This increase in agricultural intensity also helps support communities in which these irrigators live and work. Farmers receiving on-farm grants also increased their overall water use, on average. This increase is particularly true for mixed broadacre on-farm grant recipients.

As a result, there is now less water for irrigation, higher water prices (benefitting owners of water entitlements and sellers of allocations, but hurting those buying allocations), and reduced output by farmers who have sold permanent or temporary water, with consequences for local economies.

There is little evidence of the outcomes of off-farm infrastructure programs

Off-farm programs seek to reduce water losses from irrigation networks. Under the Australian Government programs, more than 900 kilometres of irrigation network delivery channels have been upgraded. Off-farm programs preceded on-farm programs in some systems such as the Goulburn Murray Irrigation District. In other systems, off-farm and on-farm programs ran in parallel.

Impacts from off-farm water recovery can differ from those of on-farm recovery and buyback, mainly because the off-farm programs do not require the handover of entitlements from the consumptive pool, and do not involve individual irrigators. The advantage of recovering water by enhancing off-farm infrastructure is that this approach does not diminish the consumptive pool.

However, the recent review by the Productivity Commission reported no clear evidence that off-farm investments are improving productivity for irrigators or irrigation infrastructure operators (IIOs). Nevertheless, it did identify evidence that off-farm projects are typically more expensive per megalitre and more complex than on-farm works. While upgrades reduce water utility labour force requirements, they may also create future depreciation and maintenance liabilities that need to be funded through IIO fees and charges.

The Panel considers Basin communities need to be better informed about governments' financial contribution to the provision of irrigation infrastructure. Where IIOs provide services to government through their assets, these services should be stated, together with the expectations of the level of service, and the government's contribution to the maintenance of those services. Setting out this information each year in a transparent community service obligation statement that is subject to performance evaluation would provide greater clarity. In this way, it would improve longer term decision making on asset renewal and price determinations.

Draft finding 29

There is little evidence to suggest water recovery through off-farm infrastructure investment has helped Basin communities adapt. This issue—including potential implications for future IIO fees and charges—deserves more investigation, with the cooperation of IIOs.

Buybacks have had mixed impacts on Basin irrigators and communities

Buybacks have had mixed impacts on irrigators and irrigation communities, and those impacts have been more clearly observed during drought. The impacts depend on when the buybacks occurred, and whether the buybacks were large strategic purchases or part of a buyback rounds of restoring the Balance. While we note annual variations in water allocations and prolonged droughts are the most significant drivers of reductions in the consumptive pool, buybacks have also contributed to reductions. This effect worsens the price impacts on irrigators and irrigator communities, particularly in drier years.

While buybacks have reduced the consumptive pool, we also reviewed evidence that buyback participants have benefited by providing funds that were used to improve farm efficiency, pay down debt, transition from a sector, exit or retire. Most of this evidence is from work looking at buyback impacts before the drought, and without thinking about future water recovery. For this reason, some of it may be dated. Few studies have looked at the delayed impacts on irrigators and their communities of selling water entitlements. The few studies that examined this issue found, at best, very weak evidence of delayed negative impacts from selling water entitlements on net farm income.

Many farms that sold water to the Australian Government have continued to irrigate, and have made a business decision to rely more heavily on the allocation market. The risks of these positions were smaller when water was abundant. However, in the dry period to the end of 2019, many irrigators were effectively priced out of the allocation market. While having the upside at the time of providing new capital to the farm business and income to the household, a new business risk (one that is sometimes overwhelming and irreversible) has come about as the general consumptive pool has fallen, and generally drier conditions have prevailed.

While this situation is difficult for those affected, farm business choices always have upsides and downsides, and responsibility for the farm level outcomes lie with those making decisions on the farm. The Panel's concern is with the scale of this phenomena, and with its effects on others in Basin communities. We have seen this problem most clearly in northern Victoria. There, large numbers of dairy farmers took these positions in the water market, and water trade constraints are leading to further water price differentials across regions, helping create significant regional adjustment pressures.

Draft finding 30

Buybacks helped participants in buyback programs and contributed to productivity and efficiency improvements. But they also led to increased reliance by some farmers on the allocation market. In drought conditions, these farmers face higher costs to meet their water requirements.

As we noted, community impacts from buyback depend on when the buybacks occurred, and whether the buybacks were large strategic purchases, or part of a Restoring the Balance competitive open tender round.

The Panel understands from previous work and experience that large 'strategic' purchases can have significant negative impacts on communities around the irrigation area. The Productivity Commission cited Collarenebri as an example of where this happened: the largest employer sold all its water holdings and moved to dryland farming, which contributed to falling agricultural employment in the community, and other negative social impacts.

Draft finding 31

Buybacks have contributed to downside impacts in some irrigation dependent communities, particularly when they have been strategic purchases that removed a large proportion of water from a region's consumptive pool.

Buybacks helped participants in buyback programs and contributed to productivity and efficiency improvement

3.3. Water reforms have been significant, and the effects are still flowing through communities

The cumulative effects of the water reforms have flowed, and will continue to flow, through communities. In aggregate, the reforms outlined in this chapter have been significant and have considerably changed the operating environment since the 1990s. Further, the effects of this reform are still playing out across the Basin.

Water reforms have changed the operating environment and expedited change

Water reforms have paved the way for more efficient allocation of scarce water resources to higher value uses. But they have also led to significant changes in how, where and for what irrigation water is used. In many cases, these changes have exposed previously more protected and stable areas or regions of production (such as dairy in the Goulburn Murray Irrigation District) to competition with other agricultural sectors. Water trade has accelerated farming and structural changes that would likely have occurred anyway, but not with the same speed or regional intensity. Further, water recovery has added additional pressure to this transition, by making less water available.

Stakeholders we met often discussed the pace of change and the volatility as major challenges. In the space of 10–15 years, they have experienced drastic changes. Many feel there has not been sufficient time, support or systems for them to deal with this significant change and adapt.

Draft finding 32

Water reforms over the past few decades have led to major changes in how water is managed, and in the operating environment for water users and communities.

Draft finding 33

The pace of reform and the changes that it has facilitated has been rapid, and many stakeholders feel systems and communities have not been able to keep up.

The outcomes of the current suite of reforms are still yet to fully materialise

While the pace and scale of change have been significant, the impacts of current reforms are yet to play out in full across the Basin. Reforms are still being implemented, and there will continue to be lagged effects from reforms already implemented.

Irrigation farms are continuing to intensify, mostly becoming larger and more capital intensive. The movement of water is changing as the balance between annual production and permanent production swings strongly to permanent plantings, increasing economic risk in times of commodity downturns and drought.

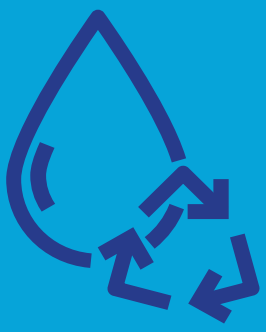
Water reforms have fuelled this trend. Investments in on-farm water saving are also inherently labour saving, and as the consumptive pool shrinks and water prices rise, farms are pursuing economies of scale and scope more vigorously. In some cases, these investments are also enabling farm systems to become more flexible and adaptive to changing intra- and inter-seasonal conditions. Off-farm water recovery has also invested in relatively fixed irrigation footprints in an environment where changing sectoral fortunes and water trade are dramatically affecting patterns of water use. For these reasons, on and off-farm investments in recovery are generally resulting in greater asset fixity and exposure to risk, particularly when their costs rise, commodity prices fall, exchange rates rise, and water availability shrinks in very dry years. How these risks play out over time will determine the value of these investments.

Additionally, there may be issues with over allocating water, finalising water resources plans, and managing growing deliverability risks. Work is underway to address these issues in coming years. This work is critical in giving confidence to for communities to be confident about the effectiveness of water resource management across the Basin.

Draft finding 34

Water recovery through infrastructure is increasing risk as water prices rise and farms intensify. This risk exposes farms to the impacts of reduced water allocation and water moving to other sectors/regions in response to other drivers of change. In dry periods, the impacts could be more severe and will flow onto communities.

Longer term costs associated with running, maintaining and renewing infrastructure funded by water recovery may offset or exceed the benefits of these investments in some regions and for some sectors, depending on the technologies used.



Draft finding 35

The movement of water is changing as the balance between annual production and permanent production swings strongly to permanent plantings, increasing economic risk in times of commodity downturns and drought.

3.4. Social and economic effects on communities of water recovered to enhance environmental and working river outcomes

Basin water reforms aim to enhance environmental outcomes, working river systems and social outcomes. Governments assume that achieving these outcomes will make Australians living inside and outside the Basin better off, over time. The Panel agrees with these objectives and the assumption that healthy, resilient rivers, wetlands and floodplains can deliver significant benefits to Basin regions and communities, and to people living outside the Basin. Potential benefits include:

- healthy ecosystems that can bring economic and health benefits to local communities from recreation, tourism, fishing and education. They also reduce algae blooms and other water pollution (including salinity) that undermines the productive base and affects human health.
- better water quality in a working river, which can reduce costs, improve production for agricultural uses, and reduce the costs of importing water and treating polluted water
- increasing cultural strength and economic wellbeing for First Nations, which can help address Australia's Closing the Gap commitment
- improved soil fertility and pasture grazing for farmers (including floodplain graziers)
- conserved biodiversity, to give future generations the same opportunities as the present, to underpin the productive base of the Australian economy in general, and of tourism in particular
- the upholding of our national and international obligations to preserve high value ecosystems (Ramsar sites) for system and species preservation.

There is some evidence that Basin water reforms and environmental water have:

- improved water quality by, for example, helping export around 1 million tonnes of salt per year in the Basin. This improvement reduces the costs of salt interception works.
- improved ecosystem health in many Ramsar wetlands, including the Coorong and Lower Lakes. These sites support a vibrant tourism industry.

As discussed earlier in this section, the Panel's commissioned case studies looked at the benefits of environmental water for recreation and tourism in the Basin. The commissioned studies also found evidence of environmental water improving the condition of ecosystems, and of these improved conditions being likely to have positive economic flow-on effects on tourism, and recreational fishing and boating, in principle.

However, these case studies concluded there is not enough evidence to say Basin water reforms are leading to increased tourism or much better recreation outcomes. They suggest most tourism and recreational activity is driven by things other than Basin water reforms. Based on this finding, we consider urgent effort is needed to better quantify the social and economic benefits of Basin water reforms and water recovery, to give communities confidence that the costs incurred from reducing the consumptive pool are worthwhile.

The fish death events in December 2018 and January 2019 led the Australian Government to establish the Water and Environment Research Program (WERP), which is a $20 million commitment to new applied research to support Basin Plan implementation. We consider the WERP must include research that clearly demonstrates how enhanced environmental and working river outcomes impact on social and economic conditions in Basin communities, now and in the future.

This work should demonstrate the links between enhanced environmental and working river outcomes of water reform, and their impact on tourism and recreation, liveability, human health and wellbeing, and cultural values. This demonstration is critical, and communities should be more involved in the design of the WERP than they were in previous efforts. If funding is not allocated through WERP, then additional funding should be provided for this critical work.

The Panel also notes we are not the first people to identify the urgency of better establishing links between water recovery, flow regimes and enhanced ecological outcomes. For example, the 2016 Northern Basin Advisory Committee report concluded that the then current scientific evidence did not convincingly support a direct relationship between flows and enhanced ecological, working river or social benefit outcomes, and that uncertainties and limitations needed to be explained. The report noted this relationship is a fundamental underpinning of the Basin Plan, and the most common science related question asked by communities. The Panel notes it still is today.

Draft finding 36

There is some evidence that environmental watering delivers social and economic benefits to communities through improved recreational, community liveability and tourism opportunities in the Basin. But, at the moment, there is limited data and understanding of these benefits in the Basin, particularly around economic impacts of increased tourism.

Draft finding 37

The Basin governments must collectively do more to make credible information available and accessible to Basin communities about the beneficial impacts of enhanced environmental and working river outcomes. A lack of credible evidence showing how these enhanced outcomes support Basin communities reduces confidence that the costs of environmental water recovery are worthwhile.

3.5. Basin water reform social and economic impacts continue to be partially managed

In the previous sections, we looked at the different ways in which water reforms have impacted Basin communities. This section focuses on how these impacts have been managed in the past and are being managed now.

Water recovery through on-farm and off-farm infrastructure modernisation programs has partly offset adjustment pressures in some communities

Evidence in section 3.2 shows how water reforms—and water recovery through on-farm irrigation infrastructure modernisation programs in particular—have supported transitions and economic development in regions receiving them. On-farm irrigation investment, for example, has:

- recovered water at significant premiums to going water market prices. Prices paid for water through irrigation infrastructure were also at significant premiums to prices that the Australian Government paid through competitive open tender buybacks.
- enabled irrigators receiving on-farm irrigation upgrades to increase production, become more competitive, and use more water on their farms. It has helped improve and secure economic activity. This increased and secured farm activity has a flow-on effect on regional towns and value chains, and provides longer term benefits and security for these communities.

Draft finding 38

On-farm infrastructure modernisation programs have supported transitions and economic development in regions receiving them. They have done so by recovering water at prices well above market rates, by stimulating local economies through infrastructure investment, and by increasing competitiveness and water use on farms participating in the programs. This increased and secured farm activity has a flow-on effect on regional towns and value chains, and provides longer term benefits and security for these communities.

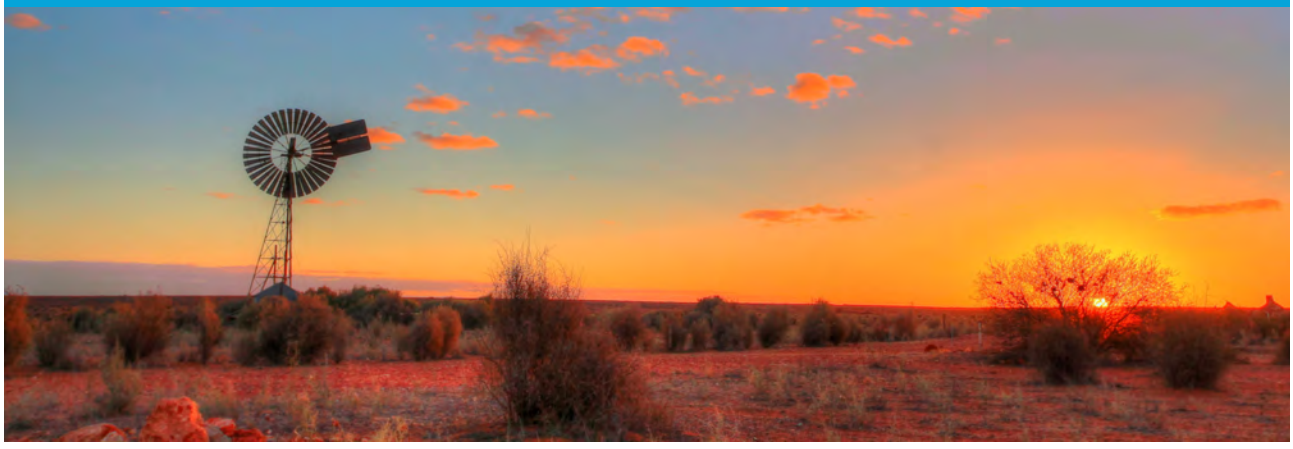
Recovering water through on-farm infrastructure programs has created pressures in other communities. Some of these pressures are under-acknowledged or under-addressed

Irrigation regions or individuals that did not participate in on-farm infrastructure water recovery programs are now facing increased pressure from government investment decisions. This pressure is also on regions and individuals that mainly transferred water to the Australian Government through competitive open tender buybacks designed to recover water cost-effectively.

The government investment decision to fund on-farm irrigation infrastructure upgrades has resulted in water moving to regions where these investments have occurred. It also means water prices are higher than they would otherwise be. As a result, there is less water in productive use in regions where upgrades have not occurred as water is traded out. Trading water out of regions will benefit entitlement holders that have water to sell. But it will mean less farm output in regions where water is being traded out. It also means irrigators relying on the temporary water market for their water will pay more for water. This situation may supress water use in those regions. All of these outcomes will affect communities and agricultural supply chains, and we do not consider there has been enough recognition and management of these impacts in Basin communities.

Draft finding 39

Water recovery through on-farm infrastructure programs has created pressures in communities where farmers have not participated and where water has been traded out to meet the increased demand for water. Those pressures are largely unaddressed.



Compensation / community transition assistance has been partial and has not supported those impacted

Governments have committed more than $260 million since around 2008 to support Basin communities to adapt to futures with less water, and to undertake Basin water reforms. This commitment is additional to the approximately $6 billion that governments have invested in water through on- and off-farm infrastructure (section 2.3). Core programs include the following:

- The Strengthening Basin Communities program (2009–11) provided grants to local governments for urban water saving initiatives, and to help communities plan for reduced water availability ($64 million spent).
- The South Australia River Murray Sustainability Program (2013–unknown) supports regional economic development ($25 million allocated).
- The Murray–Darling Basin Regional Economic Diversification Fund (2013–19) assisted Basin communities to increase their economic diversification and adjust to a more water constrained environment ($73 million spent).
- The Murray–Darling Basin Economic Development Program (2019–23) provided up to $24.4 million (round 1) to 42 projects over four years. Round 2 will provide up to $15million to support 31 communities impacted by water recovery.
- The Basin Plan Commitments Package (2019–ongoing) allocated $40 million to support investment by Basin First Nations people in cultural and economic water entitlement and planning activities, and $20 million for economic development projects for First Nation communities most impacted by the Basin Plan.

Based on available evidence and community consultation, the Panel is concerned that much, and probably most, past funding to support Basin communities impacted by water reform has not been effectively targeted. We are also concerned that current funding is not sufficient to support communities to transition through water reforms in ways that will help sustain and develop those communities. We note:

- the Strengthening Basin Communities program has supported regional communities and towns through capital investment. However, investment to deliver safe, reliable and fit for purpose town water supply is part of the fundamental right to an adequate standard of living, to which Australia is a signatory. The Panel's view is that it is not appropriate to consider this program funding as transition support for Basin water reforms. Rather, the program simply meets an obligation on government to maintain safe and affordable town water supply as Australia moves towards a drier future.

- the Productivity Commission's five year assessment of the Basin Plan found little evidence that the $100 million of transition assistance provided through the Murray–Darling Basin Regional Economic Diversification Fund and the South Australia River Murray Sustainability Program were well targeted to communities deserving the funding. The Productivity Commission also found little evidence that the programs were effective in supporting regional communities to transition through Basin water reforms. Programs believed to have provided community assistance have not done so.

- the design of the $40 million Murray–Darling Basin Economic Development Program may address problems with earlier programs, but the Panel considers:

  - $40 million is not sufficient support for communities transitioning through Basin water reform impacts. This view accounts for the ineffectiveness of the earlier $100million of government funding. The Panel is very concerned about Australian taxpayers having funded $100 million in poorly targeted and ineffective investment.

  - the program should be extended beyond 2023, given Basin water reform impacts will continue past this date

  - investment priorities should be given to irrigation communities that have more water recovered through open tender buybacks, or that did not receive on-farm irrigation upgrades, given evidence that these communities are competitively disadvantaged.

Some communities we spoke with agreed with our view, citing examples of grants that had been spent in their region which provided little support for communities. Many said projects would have benefitted from greater community input early on.

Draft finding 40

The effectiveness and targeting of community economic development funding are improving. Current funding needs to be extended, and can be better targeted to offset Basin reform impacts.

4. Future conditions and challenges

A core part of our Panel's work is to improve understanding of social and economic conditions in the Basin. We also needed to look at how water reform will affect different Basin communities (positively and negatively) into the future.

We consider several forward-looking issues could have significant impacts on northern and southern Basin communities over the next decade. We heard from many community members who see these risks, but opportunities too. To help us identify ways to stimulate, support and promote healthy and sustainable Basin communities, we commissioned work to assess outcomes under a range of water availability scenarios.

The Panel also commissioned several case studies to help inform our findings and recommendations. These case studies looked at how communities and agricultural value chains may respond to changing water availability. Importantly, they show that many communities and value chains are already preparing for a future with less water.

Further, we commissioned a literature review, which summarises a large body of work that has modelled the social and economic impacts of national water reforms in the Basin.

Adding to the context of our review, we recognise further on-farm water efficiency measures are not supported and the Victorian Government has said it will not further pursue such measures because they are seen to have a negative economic impact. The Panel also recognise the December 2019 neutrality criteria agreed for efficiency measures tightly limit the types of investment that may occur to recover water in the future.

While the consultations, modelling results, case studies and literature discussed in this chapter helped shape our draft findings and recommendations on how to stimulate, support and promote healthy and sustainable Basin communities, they have not determined them. And they do not reflect Australian Government policy. No simulation, case study or consultation can fully and accurately reflect communities, their social and economic conditions, or their possible futures. For this reason, the material in this chapter shows what could occur in the future if certain things happen. It is not a forecast or a reflection of what will actually happen.

4.1. What we heard from communities

Many people we met, particularly in outer regional parts of southern NSW, northern Victoria, and smaller communities in the northern Basin, are highly stressed and worried about the future. While we did hear from communities that are more optimistic, there was often a shared sense of mounting pressure and growing uncertainty.

People are worried about the impacts of future recovery, and the pace of change in regional and rural towns. These worries include changing sectors, demographics and populations, climate change, and whether the next generation will have opportunities. They are concerned about withdrawing services and declining infrastructure. Often, people we met said they had not been listened to and expressed little trust or faith in politicians and government to deliver.

While many communities we spoke with share challenges, their ability to cope with and adapt to these challenges varies greatly. While many of the people we spoke with share similar challenges, their ability to cope with and adapt to these challenges varies greatly. We heard local leadership and empowerment are key ingredients if communities want to secure more positive futures. We heard local leadership and empowerment are key ingredients if rural and regional communities want to secure more positive futures. We also heard communities want greater policy certainty, and to better understand the likely scenarios and challenges that they face, so they can take charge of their futures. Understanding the potential impacts of reform, and of trends such as agricultural sector change and climate change, is critical for communities to thrive and adapt.

This same information is also needed to show governments and politicians the challenges facing Basin Communities, and to highlight where support and assistance are needed. To build understanding of the impacts of reform, we commissioned modelling of the impacts of different future water availability scenarios. The impacts include those of water reform, climate change, and changes in irrigated agricultural production.

4.2. Insights from scenario studies of future water use

To inform our work, we commissioned new scenario studies to explore potential implications of different challenges faced by Basin communities, including the implications of further water recovery. This work also helps inform communities about the outlook for their future, particularly in relation to water use and the economic implications of key trends and drivers, so they are better positioned to manage future risks and opportunities.

The analysis uses recognised model-based scenario approaches, based on the best available data. The scenario modelling:

- **assesses the implications of implementing the committed water recovery in full**, including water not yet delivered and the further 450GL required under the Basin Plan, and explores the effects of achieving this recovery by 2024 in the Basin
- **assesses the implications of recent perennial plantings**, particularly almonds, that will require more water as these plantings come to maturity
- **explores the implications of potential drier seasonal conditions over the period to 2035.**

The Panel considers the commissioned work discussed in this chapter provides robust and reliable insights. We note, however:

- **As stated earlier at the beginning of this chapter, the scenarios analyses are not predictions of the future, and do not explore all possible – or likely – future developments**, such as shifts in relative international prices of different irrigated agricultural commodities, or different to the patterns of seasonal conditions seen in the last 15 years. The scenarios were developed to help the Panel form our understanding of the potential direction and order of magnitude of shifts resulting from water reforms, changing climate, and changing irrigated production across the Basin.
- **The studies and analysis are not yet final.** Additional analysis will be completed over the coming weeks to inform the final report. Some of the results included in this report are subject to further work, and final reports will be published once the work is complete.

4.2.1. Frameworks

The Panel commissioned analyses using the ABARES water trade model, and Victoria University (VU) TERM-H20 regionally detailed whole economy model. The commissioned ABARES report and VU working paper are available on the Panel website.

The ABARES water trade model covers irrigated water use and trade in the southern connected Murray–Darling Basin, but not water use in the Northern Basin. The Victoria University modelling covers all basin regions, providing insights into economic activity across all sectors (including irrigation, dryland farming, and other sectors) in the northern and southern Basins.

The ABARES water markets modelling provides results for water use by industry and region, prices of water allocations, water trade between regions, and the gross value of irrigated agricultural production. This analysis assumes no changes to fixed assets, such as land available for irrigation, and does not allow land use to shift between sectors or irrigated and dryland sectors.

Also note the ABARES analysis:

- is based on current irrigation farms using current capital and technology, and do not allow for long-term adaptation or structural adjustment.
- assumes historical climate conditions for the Current market and Future market scenarios that match 2006-2018 but that are drier that the average for the longer historical record.
- assumes trade rules and commodity prices match observed values in 2018–19, and does not account for forthcoming changes to the Goulburn Inter-Valley Trade (IVT) limit or potential future shifts in commodity prices.

The Victoria University modelling provides additional results for regional economic activity, sector output and value added, employment, and investment. It also provides insights into interactions between sectors, including the potential for activity to shift between dryland and irrigated agriculture. The analysis allows for trend improvements in productivity, and shifts in activities and inputs across sectors and regions. The VU work does not currently account for the effect of maturing almonds on water demand and use. This will be addressed in the next VU report.

Both models draw on available evidence and analysis of the impacts of water recovery on water demand and prices (section 3.2.2).

4.2.2. Scenarios and issues assessed

The work compares simulations of what could happen in the future under water recovery and with climate impacts. The key assumptions that define the modelling scenarios are set out in Table 2:

- **Current market** is the 'base case' that scenarios are compared to. This scenario assumes current irrigation development (including horticultural plantings), current trade rules and commodity prices, and accounts for environmental water recovery to date under the Basin Plan. The base case also assumes current water management arrangements across the Basin, such as current limits to inter-valley transfers (IVT).

- **Future market** scenario assumes two key changes from the Current scenario (1) existing almond plantings mature and require more water, and (2) full implementation of future water recovery to meet Basin Plan requirements (3,200 GL target) via on-farm infrastructure upgrades by 2024.

- **Future market (dry)** assumes a drier climate future than observed in recent decades. The scenario assumes Basin rainfall is 3% lower and inflows and water supply is 11% lower, based on CSIRO (2008) assessments of future water availability.

The analysis does not provide a prediction of future prices or irrigation activity. Results are presented for representative 'dry', 'average' and 'wet' seasonal conditions, and are not forecasts for specific future periods. The ABARES analysis simulates a range of water supply conditions for each scenario, to provide a picture of water market and irrigation outcomes across representative 'dry', 'average', and 'wet' years.

Table 2: Scenario assumptions for ABARES analysis

Name	Rainfall	Allocation volume	Southern MDB water recovery	Recovery mechanism	Water demand (b)
Base					
Current (c)	No change (2006-2018)	No change	Current	NA	Current
Scenarios					
Future	No change (2006-2018)	No change	Approx. 410 GL future recovery	On farm programs (c)	Modelled increase (a,d)
Future (dry)	3% decrease	11% increase	Approx. 410 GL future recovery	On farm programs (c)	Modelled increase (a,d)

Notes: (a) Water demand refers to irrigators' willingness to pay for water. The volume of water use is a given period is determined by the balance of water demand and water supply. (b) Current Market reference case assumes current farms, rules and arrangements, and so results differ from observed historical water use and irrigated production. (c) ABARES analysis assumes on farm investment, while Victoria University modelling assumes a mix of on-farm and off-farm modelling. (d) Water demand increases due to maturing of current almond plantings, and the effect of increased water use efficiency associated with on farm infrastructure investments to achieve water recovery.

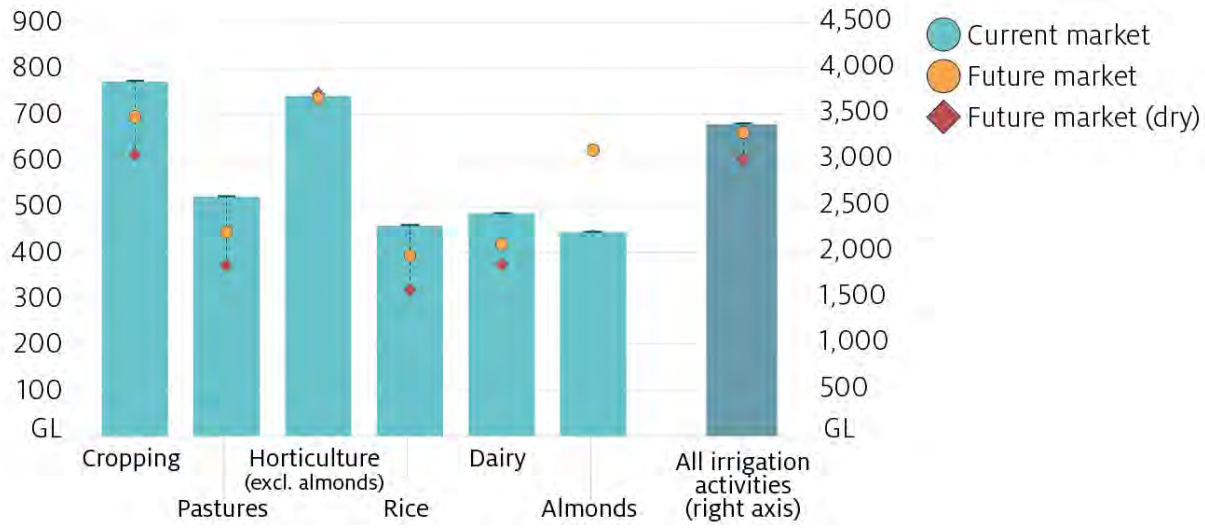
4.2.3. Key insights from the ABARES scenario analysis

The ABARES scenario modelling provides insights into the potential future operating context of irrigated agriculture in the Basin. **Under their assumptions and scenario modelling, ABARES simulations estimate that:**

- **Water use will continue to shift between regions and locations, even with no further changes in land use.** Compared to the base case, the simulations suggest almond water use is expected to increase in the future by around 180GL (41%) as these plantings mature, resulting in water use by all other sectors other than horticulture falling (Figure 9). Water use in the dairy and rice sectors is modelled to decrease on average by 14% and 15% respectively in the future market scenario (relative to the current market scenario). In dry years, more significant decreases are predicted for these sectors in order to meet horticultural water demand.

- **There would be enough water to meet future horticulture demand in the scenarios modelled, including in dry years, even if Millennium drought conditions occur again.** In all scenarios, water supply (including both surface water and other sources such as groundwater) is sufficient to meet demand from horticultural plantings (fruits, nuts and grapevines) even under a repeat of millennium drought water supply conditions. Horticultural plantings are estimated to use around 1,276 GL on average each year in the future scenarios. In practice there remains some risk of supply shortfalls within each water year, particularly if future conditions are drier than modelled or trade constraints are tightened.

Figure 9: Water use, by industry activity and for all irrigated activity in the southern Murray–Darling Basin



Source: ABARES, commissioned by Panel

Water recovery and increased demand from maturing almonds is estimated to result in average water prices increasing significantly across all outlooks. Compared with the Current Market scenario, allocation prices in the Future Market scenario are estimated to be an average of 28% higher, and above $200 per ML in eight out of 10 years in the southern Murray–Darling Basin (Figure 10). Under drier conditions in the Future Market (dry) scenario, allocation prices in the southern Basin are 50% higher on average than in the Current Market scenario. It is important to note the structure of the ABARES model means it is likely to overstate prices to some extent, because it does not account for adjustment and adaptation by farmers, including potential future changes in irrigated land use in response to these pressures.

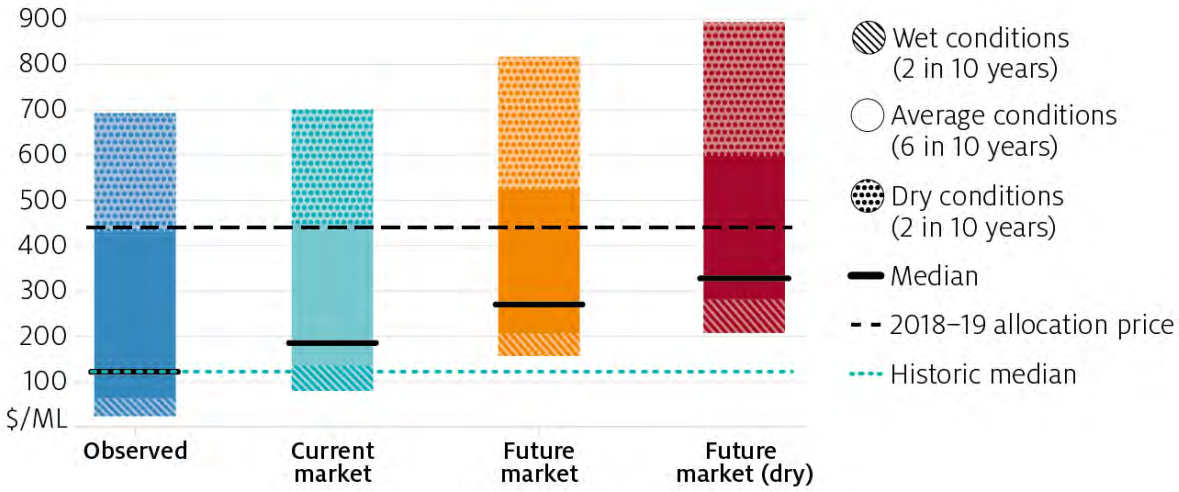
Water prices are extremely sensitive to small shifts in average rainfall. In the Future scenario, the ABARES analysis suggests a 3% change in average rainfall results in 17% increase in temporary water market prices in the southern Basin. Reduced rainfall decreases supply and increases demand (as irrigators are willing to pay more for water required to offset lower on-farm rainfall).
Almost all of this effect is a result of the non-linear relationship between 3% lower rainfall and 11% lower streamflow, based on CSIRO assessments of future water availability. This sensitivity highlights that (1) specific price estimates from the modelling should be treated with caution (2) small changes in average rainfall is expected to have very substantial impacts on water prices.

Net water trade between regions would be projected to increase (Figure 11). Maturing of recent plantings and higher water prices result in increased net trade out of the Murrumbidgee system and above the Murray Choke in New South Wales and Victoria to supply horticultural water use below the Choke.

Inter-regional trade limits would have larger effects on water prices. Growth in water demand in the lower Murray due to maturing almond trees (particularly in NSW and SA Murray), leads to greater pressure for inter-regional water trade, more frequently binding trade limits and larger differences in prices between regions. Particularly in dry years, inter-regional trade limits lead to significantly higher prices in the Murray below Barmah region (between $955 per ML and $1075 per ML) compared to the Murrumbidgee (between $665 per ML and $712 per ML).

Inter-regional trade constraints are more likely to bind, and price differentials across trading zones are likely to widen. Increased water demand and use below the Choke would lead to IVTs being triggered more often, particularly in dry conditions. This would create larger price differences above and below the Barmah Choke than has occurred under equivalent historical conditions. Assuming IVTs continue to operate as they do now, existing inter-regional trade limits would lead to significantly higher prices in the Murray River below the Barmah region in dry years.

Figure 10: Weighted average allocation prices in the southern Murray–Darling Basin



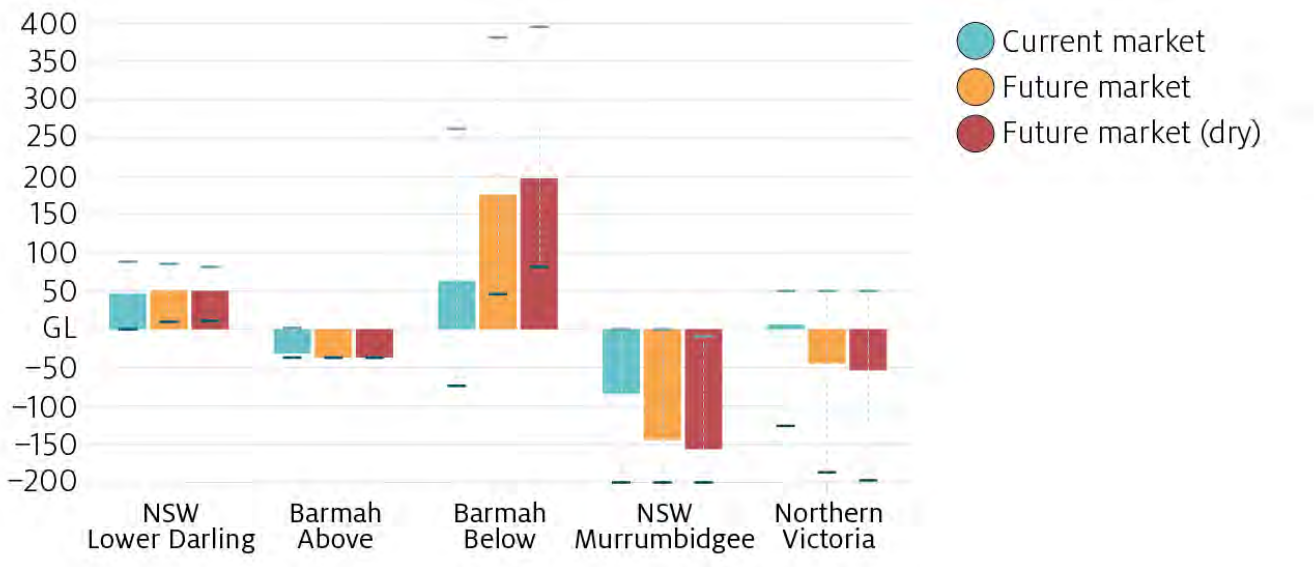
Source: ABARES, commissioned by Panel

Water recovery results in significantly lower consumptive water use. The value of irrigated output rises marginally in the southern Basin if there is no change in future rainfall and falls by around 4% in dry conditions (Figure 12). In the Future market scenario with no change in rainfall, this happens because (1) water moves to higher value almond production and (2) reductions in surface water extractions are partially offset by water being taken from groundwater and other supply options.

The gross value of output (GVIAP) from traditional irrigation sectors declines. The value of dairy and rice sector output is modelled to be 9% and 13% lower respectively in the Future Market scenario relative to the Current Market scenario.

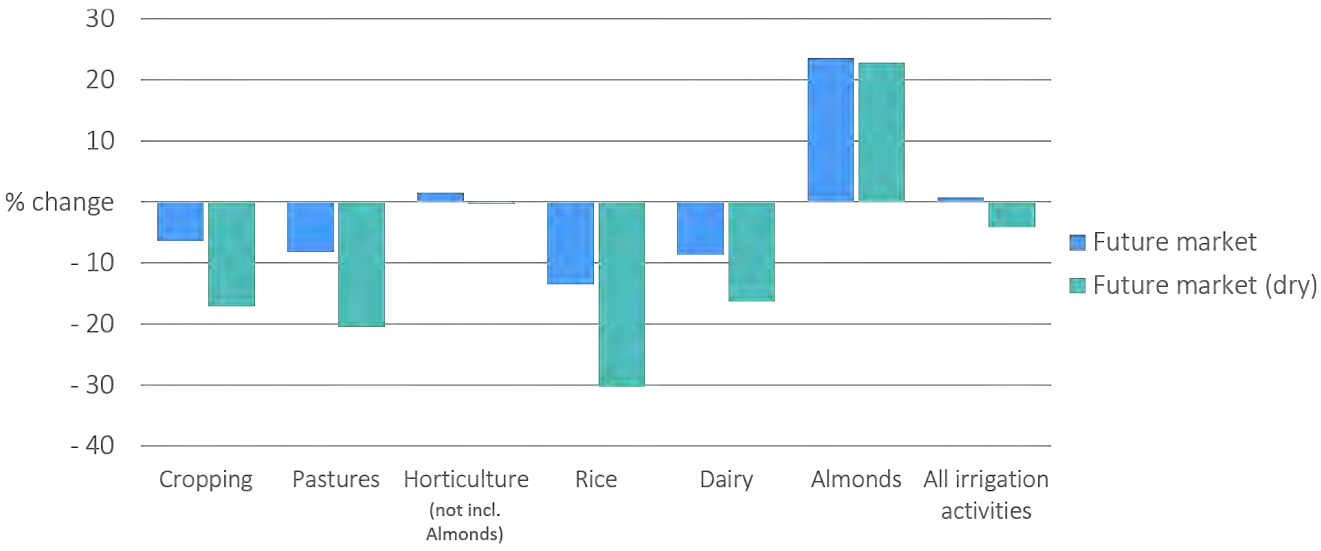
In contrast, existing almond plantings, assumed to be fully mature in the future, drive a substantial increase in production and gross value (around 23%) for the almond sector. The decrease in other sectors is partially offset by an increase in farm productivity, through on-farm infrastructure upgrades. The dairy sector is also able to reduce the effect of high water prices by substituting water for fodder. Overall, the total GVIAP across all sectors is modelled to increase on average by 0.8% in the future market scenario and decrease by 4.1% in the future market (dry) scenario. As noted earlier, these results assume trade rules and commodity prices match observed values in 2018–19, including the high almond prices observed in 2018-19. Results will differ if rules and prices differ.

Figure 11: Average net trade, by trading zone in the southern Murray–Darling Basin



Source: ABARES, commissioned by Panel

Figure 12: Changes in the gross value of irrigated agricultural output in the southern Murray–Darling Basin



Source: ABARES, commissioned by Panel

Draft finding 41

Previous water reforms, particularly the introduction of water trading across regions, will continue to drive changes in water use across commodities and regions. This will provide economic benefits, but will exacerbate pressures on communities and industries in some locations.

Draft finding 42

A drier or more variable future climate will increase water trade. Trade helps manage the effects of extreme dry years, by enabling water to move to its highest value economic use over time. Water prices are extremely sensitive to average rainfall and water availability. In the future with additional water recovery, water trade may amplify water price related adjustment pressures on communities and sectors if the Basin climate continues to dry.

Draft finding 43

Scenario modelling suggests water recovery of around 410 GL in the southern Basin, drier conditions and increased almond water use may collectively result in small overall decline in the total gross value of irrigated agricultural production across the southern Basin, assuming trade rules and commodity prices match observed values in 2018–19. However, these factors will increase adjustment pressures on some sectors and regions.

The effects of future water recovery will depend on the pace, extent, locations, and mechanisms used to recover water. Water recovery through investments to improve on and off-farm water use efficiency has the advantage of boosting the agricultural value added and the gross value of output. But it will also boost water demand, and this will put upward pressure on water prices.

4.2.4. Key insights from the Victoria University scenario analysis

This subsection summarises the results from the scenario analysis undertaken by Victoria University.

Understanding the impacts of water recovery requires better information on the enhanced environmental, working river and other benefits achieved

Commissioned Victoria University scenario work suggests investing $4 billion to recover water through on-farm irrigation infrastructure would provide economic benefits equivalent to $2.9 billion to the Australian economy over the period assessed. Victoria University's scenario modelling looks at impacts of recovery across the southern and northern Basins.

The scenario results suggest that the long term benefits of managed environmental water, such as improved amenity, recreation and tourism outcomes, would need to provide at least $1.1 billion in long term value to communities inside and outside the Basin in order to deliver a net benefit nationally.

This shortfall reflects both the reduction in water used for irrigated agriculture, and that other potential investments would provide higher economic return. It is important to note that the shortfall estimate does not account for any economic benefits of water recovery, such as enhanced tourism activity, recreation opportunities, or working river benefits like salinity impacts.

The scenario results reinforce Panel findings (section 3.4) that evidence of benefits achieved to date appears weak, and that there is an urgent need to better understand and assess future environmental benefits of managed environmental water, and the flow on social and economic benefits (and possible costs) for Basin communities, economies and industries.

Draft finding 44

Investing in on-farm irrigation infrastructure takes resources away from other parts of the Australian economy and reduces water use for irrigation, which together may lower incomes and the value of economic activity nationally and within the Basin.

To understand the full impacts on communities and regional economies, credible information is required about the impacts (positive and negative) of enhanced environmental, working river and social outcomes.

Water recovery infrastructure benefits in the north are likely to be small

This is because recovery in the north are smaller compared to the South. This reflects lower levels of water recovery and fewer opportunities for productive infrastructure investment in the north.

Draft finding 45

Northern Basin impacts from future water recovery will be smaller than in the southern Basin, reflecting lower levels of water recovery and fewer opportunities for productive infrastructure investment in the north.

Changes in relative water scarcity affect water trade and real disposable income

Changes in relative water scarcity may result in some regions increasing net water sales and decreasing farm output in the Southern Basin. Other regions may increase net water purchases and increase farm output. In either case, regions increase their real disposable income

For example, in the water exporting Griffith – Murrumbidgee region, farmers sell water and reduce farm output in all years. The largest water sales income and farm output reductions relative to base are in drought years when water prices soar. The water importing Murray River – Swan Hill region increases farm output relative to base. In both regions, disposable income reflected in real household consumption increases in all years relative to base.

Draft finding 46

Net water exporting regions are more likely to perform poorly economically than net water importing regions under future water recovery.

Irrigation infrastructure delivers short term economic stimulus in regional communities, but much of the economic activity passes over communities

Policy decisions to use investment in irrigation infrastructure to recover water generally emphasise a desire to maintain the total value of irrigated agriculture, and associated regional employment and supply chains. Available assessments of on farm infrastructure confirms policy has been generally successful in achieving these objectives.

Economic modelling finds this investment can also have significant positive effects on local economies as contractors and suppliers undertake works during the construction phase. But this economic stimulus falls sharply once the infrastructure projects finish.

Our commissioned work suggests $4 billion of investment in irrigation infrastructure upgrades may add around 1,000 jobs in the Basin in each of the five years when the upgrades occur. Most of these jobs are created in the southern Basin. After the construction phase, Basin jobs would be up by around 100 people across the entire Basin, relative to job numbers if there were no upgrades. Those 100 additional jobs would mostly result from on-farm productivity gains that the upgrades create, and from water being shifted into increasing higher value almond production. Most of these jobs will be in the southern Basin.

The gains of infrastructure projects thus include the employment and income that the projects bring to the region, and the region's services for which the projects pay. But not all of these benefits stay in the region. The level of local benefit depends on the types of good/service purchased.

Complex manufactured goods and capital equipment, for example, are generally made elsewhere and imported to the region. On the other hand, more labour intensive services are often sourced from within the local economy.

Draft finding 47

Investment in irrigation infrastructure to recover water can have significant positive effects on local economies as contractors and suppliers undertake works during the construction phase. This economic stimulus falls sharply when infrastructure project finishes, but regional employment remains above levels achieved without infrastructure investment.

Investing more broadly in regional communities can achieve more employment than can investing in irrigation infrastructure alone

Investing in different ratios can achieve greater employment outcomes and benefits in the Basin. To stimulate discussion and thinking about alternative futures, the Panel asked Victoria University to simulate what could happen in regional Basin economies if $1.5 billion was spent on water recovery and $2.5 billion was spent in Basin communities to fund additional services in things like health, education and community care between 2020 to 2029.

The Panel emphasises this scenario was investigated to look at how different expenditure in Basin regions supports economic activity and jobs. The scenario is a simulation. It does not reflect Government policy. The Panel recognises that current water market prices and policy settings mean it is unlikely that the $1.5 billion allocated through the Water for Environmental Special Account would be enough to recover the 450 GL upwater.

The key findings from this scenario are:

- Each dollar spent on health, education and community care services creates four times as many jobs within the Basin as infrastructure upgrades spending. In this simulation, employment rises by 1,500 to 1,600 jobs across the Basin for the period from 2020 to 2029, as a joint result of water recovery investment and expenditure on services in Basin communities. Note these employment results are not directly comparable to other results reported above due to differences in assumptions across the different simulations.

- The net economic loss to the Australian economy is smaller than it would be in scenario involving investment in infrastructure upgrades alone, with larger indirect economic benefits to non-agricultural sectors and smaller indirect benefits to agricultural producers. Note these results are not directly comparable to other results reported above due to differences in assumptions across the different simulations. Note again, these economic impacts do not account for benefits of enhanced environmental, working river, or tourism, recreation or social benefits from water recovery.

The Panel also notes that broader spending could also lead to lasting flow-on benefits for Basin communities, such as improved health, training, and education outcomes.

In terms of the national net economic impact and additional jobs created in the basis, what this scenario suggests to the Panel is that spending across the economy may create more jobs in Basin regions than spending on infrastructure alone. Such expenditures would do little to maintain the value of agricultural output or supply chain activity however.

Draft finding 48

Expenditure on regional economic and community development programs (to improve the quality of community services) could lead to more jobs in regions than if governments spent the same amount on irrigation infrastructure alone. Such expenditures would do less to maintain the value of agriculture.

4.3. Overall modelling perspectives

The ABARES and VU modelling has helped inform Panel deliberations. The scenarios and methods used bring a range of insights and draw elements of other analysis into further focus. It is not the exact numbers that matter here - it is and more about helping to understand the direction of change, the orders of magnitude and the drivers of outcomes that are important. The approaches used demonstrate that a range of lenses are need to investigate, begin to understand and prepare for uncertain futures. We are not predicting the future. Rather we are developing our thinking to help prepare for a range of possible futures. Scenarios are one way to are one way to do this.

Modelling possible scenarios does not mean they will happen—we have chosen rather challenging scenarios because they help us test the boundaries and find the general lay of the land of yet uncharted territory. The modelling demonstrates that competitive pressures will continue to shape the Basin. Further water recovery will be an important element of future change. More scarcity and risk will lead to further distributional impacts. Investment in regions will help regional economies but care is required on how this is done.

Appendix 1: Reviews and inquiries

Five major reviews are in progress that touch on aspects connected with our Review. They are:

- The Australian Competition and Consumer Commission's (ACCC) water markets inquiry is examining options to improve markets for tradable water rights, including ways to enhance their operations, transparency, regulation, competitiveness and efficiency (interim report on 31 May and final on 30 November 2020).
- The Keelty review of management of Murray–Darling Basin water resources is examining the impact of changing distribution of inflows to the southern Basin on state shares under the Murray–Darling Basin Agreement. It is also examining how reserves required under the Murray–Darling Basin Agreement may affect state water shares (reporting 31 March 2020).
- The Water for the Environment Special Account review is examining whether current resources are adequate to achieve the Murray–Darling Basin Plan target of 450 GL of additional environmental water and whether to ease or remove constraints by 2024 (reporting in February 2020).
- The Senate Select Committee Inquiry into the Multi-Jurisdictional Management and Execution of the Murray–Darling Basin Plan is examining the responsibilities for Commonwealth, state and territory governments arising out of the Murray–Darling Basin Plan. It is also considering the effects of the different approaches Basin states use to manage water resources in the Basin (reporting in November 2020).
- The Review into the risks and challenges of delivery shortfall in the southern Murray–Darling Basin will report to the next Ministerial Council. An initial report was delivered in December 2019, with further work and timeframes subject to change.

Appendix 2: Data tables

Table 3: Local government area data for different dimensions of community wellbeing

2018 LGA Name	State	Basin region	Remoteness classification	Population, 2016	Overall comunity wellbeing	Population size, ageing & health	Economy, employment & standard of living	Community & social connection	Physical amenity	Services & infrastructure
Albury (C)	NSW	Southern	Inner regional	51,080	3	2	2.2	3	2.7	2.5
Alexandrina (DC)	SA	Southern	Inner regional	25,871	2.5	2.3	2	2	2	2.2
Alpine (S)	VIC	Southern	Inner regional	12,335	3	2.3	2	3	3	2.5
Ararat (RC)	VIC	Southern	Inner regional	11,599	2	2	1.8	1.8	2.7	1.7
Armidale Regional (A)	NSW	Northern	Inner regional	29,451	1.5	2.3	1.7	2	2.7	1.5
Ballarat (C)	VIC	Southern	Inner regional	101,689	3	2.3	2.3	2.3	2.7	2.8
Balonne (S)	QLD	Northern	Remote/v remote	4,378	1.5	2	1.7	2.3	1	1.5
Balranald (A)	NSW	Southern	Outer regional	2,290	2.5	1.5	2.2	3	2.7	1.8
Barossa (DC)	SA	Southern	Inner regional	23,560	2.3	2	1.5	2	2.7	1.2
Bathurst Regional (A)	NSW	Southern	Inner regional	41,301	2.3	2.5	1.8	2	2.3	2.7
Benalla (RC)	VIC	Southern	Inner regional	13,863	2.5	2.3	1.7	2	2.3	2.2
Berri and Barmera (DC)	SA	Southern	Outer regional	10,545	3	1.8	2.2	2	2.7	2.2
Berrigan (A)	NSW	Southern	Inner regional	8,462	2.8	1.5	1.5	2.3	2.7	2.2
Blackall-Tambo (R)	QLD	Northern	Remote/v remote	1,903	1.5	1.8	1.7	2	1.7	2.2
Bland (A)	NSW	Southern	Outer regional	5,958	2.5	1.5	1.3	2.8	2.3	1.3
Blayney (A)	NSW	Southern	Inner regional	7,259	2.3	2.3	2	2.3	2.3	2.7
Bogan (A)	NSW	Northern	Remote/v remote	2,689	1	1.3	1.5	2	1	1
Bourke (A)	NSW	Northern	Remote/v remote	2,633	1	1.8	1.5	2.3	1	1
Brewarrina (A)	NSW	Northern	Remote/v remote	1,645	1	2	1.7	2.3	1	1

2018 LGA Name	State	Basin region	Remoteness classification	Population, 2016	Overall comunity wellbeing	Population size, ageing & health	Economy, employment & standard of living	Community & social connection	Physical amenity	Services & infrastructure
Broken Hill (C)	NSW	Southern	Outer regional	17,709	1	2	1.7	2.3	1	1
Bulloo (S)	QLD	Northern	Remote/v remote	352	1.5	1.5	2.2	1.8	2	2
Buloke (S)	VIC	Southern	Outer regional	6,202	1.8	1.8	1.7	2.3	2	1.8
Cabonne (A)	NSW	Southern	Inner regional	13,391	2.5	2	2	2	2.3	2.8
Campaspe (S)	VIC	Southern	Inner regional	37,054	3	2	2.3	2	2.3	2.5
Carrathool (A)	NSW	Southern	Remote/v remote	2,723	2.5	2	1.8	2.3	2.3	1.3
Central Darling (A)	NSW	Southern	Remote/v remote	1,831	1	1.3	1.5	2	1	1
Central Goldfields (S)	VIC	Southern	Inner regional	12,993	3	1.5	2.2	2	3	2
Cobar (A)	NSW	Northern	Remote/v remote	4,650	1	2	1.8	2.3	1	1
Coolamon (A)	NSW	Southern	Inner regional	4,313	2.8	2.3	2	2	2.7	2.3
Coonamble (A)	NSW	Northern	Remote/v remote	3,919	1	1.8	2	2	1	1
Cootamundra-Gundagai Regional (A)	NSW	Southern	Inner regional	11,144	2.8	1.8	1.8	2	2.7	2.3
Cowra (A)	NSW	Southern	Inner regional	12,464	1.5	2	1.7	2	1.7	1.8
Dubbo Regional (A)	NSW	Northern	Inner regional	50,075	2.8	2.3	2.2	2.8	1.3	2.3
East Gippsland (S)	VIC	Southern	Outer regional	45,041	2.3	1.8	2	1.5	2.7	1.2
Edward River (A)	NSW	Southern	Inner regional	8,847	2.5	1.5	2.2	2.8	2.7	1.8
Federation (A)	NSW	Southern	Inner regional	12,279	2.8	1.8	1.7	2.5	2.7	2.2
Forbes (A)	NSW	Southern	Outer regional	9,589	1.5	1.8	2	2	1.7	1.8
Gannawarra (S)	VIC	Southern	Outer regional	10,548	1.5	1.8	1.8	2.3	1.3	1.3

2018 LGA Name	State	Basin region	Remoteness classification	Population, 2016	Overall comunity wellbeing	Population size, ageing & health	Economy, employment & standard of living	Community & social connection	Physical amenity	Services & infrastructure
Gilgandra (A)	NSW	Northern	Outer regional	4,234	2.8	1.5	2.3	2.3	2.3	1.8
Glen Innes Severn (A)	NSW	Northern	Outer regional	8,832	1.5	2	1.8	2.3	2.7	1.5
Goondiwindi (R)	QLD	Northern	Outer regional	10,628	2	1.8	1.7	2.3	2	1.8
Goulburn Mulwaree (A)	NSW	Southern	Inner regional	29,608	2.5	2.3	2.2	2	2.7	2.3
Goyder (DC)	SA	Southern	Outer regional	4,134	2	2.3	2	2	2.7	2.2
Greater Bendigo (C)	VIC	Southern	Inner regional	110,479	2.3	2.5	2	2.3	2.3	2.8
Greater Hume Shire (A)	NSW	Southern	Inner regional	10,357	2.8	1.8	1.8	2.3	2.7	2.2
Greater Shepparton (C)	VIC	Southern	Inner regional	63,839	1.8	2	2.2	2.3	1.7	2.7
Griffith (C)	NSW	Southern	Outer regional	25,635	2.3	2.3	2.5	2	1.7	2.2
Gunnedah (A)	NSW	Northern	Outer regional	12,214	1.8	2	1.7	2	1.7	1.3
Gwydir (A)	NSW	Northern	Outer regional	5,255	1.8	1.5	1.5	2.3	1.7	1.3
Hay (A)	NSW	Southern	Outer regional	2,945	2.5	1.8	1.7	2.5	2.3	1.3
Hepburn (S)	VIC	Southern	Inner regional	15,327	2.8	2	2.2	2.8	2.7	2.3
Hilltops (A)	NSW	Southern	Inner regional	18,497	2.5	1.8	1.8	2	2.7	2.3
Hindmarsh (S)	VIC	Southern	Outer regional	5,725	2.5	2	2	2.3	2	1.7
Horsham (RC)	VIC	Southern	Outer regional	19,641	2	2.3	2	2	2.7	1.7
Indigo (S)	VIC	Southern	Inner regional	15,953	3	2	2	2.8	3	2.7
Inverell (A)	NSW	Northern	Outer regional	16,485	1.5	1.8	1.7	2.3	2.7	1.5
Junee (A)	NSW	Southern	Inner regional	6,295	2.8	2.3	2	2	2.7	2.3

2018 LGA Name	State	Basin region	Remoteness classification	Population, 2016	Overall comunity wellbeing	Population size, ageing & health	Economy, employment & standard of living	Community & social connection	Physical amenity	Services & infrastructure
Karoonda East Murray (DC)	SA	Southern	Outer regional	1,088	2	1.3	2	1.8	2.3	2.2
Lachlan (A)	NSW	Southern	Outer regional	6,195	1.5	1.5	2	1.8	1.7	1.8
Leeton (A)	NSW	Southern	Outer regional	11,167	3	2.3	2	2.3	2.7	2.7
Lithgow (C)	NSW	Southern	Inner regional	21,090	2.3	1.8	1.7	2	2.3	2.7
Liverpool Plains (A)	NSW	Northern	Outer regional	7,689	1.8	1.8	1.8	2.3	1.7	1.3
Lockhart (A)	NSW	Southern	Outer regional	3,121	2.5	1.8	1.2	2.3	2.3	1.3
Loddon (S)	VIC	Southern	Outer regional	7,512	1.5	1.8	1.7	2	1.3	1.3
Loxton Waikerie (DC)	SA	Southern	Outer regional	11,481	3	1.8	2.2	2	2.7	2.2
Macedon Ranges (S)	VIC	Southern	Inner regional	46,103	3	2.3	2.3	2.3	3	2
Mansfield (S)	VIC	Southern	Outer regional	8,589	3	2	2	2.8	3	1.7
Maranoa (R)	QLD	Northern	Outer regional	12,664	1.5	2.3	1.7	2.3	1	1.5
Mid Murray (DC)	SA	Southern	Inner regional	8,641	2	1.8	1.7	1.5	2.3	2.2
Mid-Western Regional (A)	NSW	Northern	Inner regional	24,079	2.8	2	2.3	2.3	2.3	1.8
Mildura (RC)	VIC	Southern	Outer regional	53,878	2	2	2.5	2	1.7	2.2
Mitchell (S)	VIC	Southern	Inner regional	40,916	2.3	2	2	2.5	2.7	1.2
Moira (S)	VIC	Southern	Inner regional	29,108	2.8	2	2	2.3	2.3	1.8
Moree Plains (A)	NSW	Northern	Outer regional	13,158	1.8	1.8	1.7	2.3	1.7	1.3
Mount Alexander (S)	VIC	Southern	Inner regional	18,762	3	2.3	2	2.3	3	2
Mount Barker (DC)	SA	Southern	Inner regional	33,394	2.8	2.5	2	2	2.7	2.5

2018 LGA Name	State	Basin region	Remoteness classification	Population, 2016	Overall comunity wellbeing	Population size, ageing & health	Economy, employment & standard of living	Community & social connection	Physical amenity	Services & infrastructure
Murray Bridge (RC)	SA	Southern	Inner regional	20,862	1.8	2	2.3	1.5	1.3	2.8
Murray River (A)	NSW	Southern	Inner regional	11,682	2.5	1.8	1.8	2.8	2.7	1.8
Murrindindi (S)	VIC	Southern	Inner regional	13,730	3	2	2.2	2.8	3	1.7
Murrumbidgee (A)	NSW	Southern	Outer regional	3,838	2.8	2	1.7	2.3	2.7	2.2
Murweh (S)	QLD	Northern	Remote/v remote	4,309	1.5	2	2.3	1.8	2	2
Narrabri (A)	NSW	Northern	Outer regional	13,083	1.8	1.8	1.7	2.3	1.7	1.3
Narrandera (A)	NSW	Southern	Outer regional	5,853	2.5	1.5	1.7	2.5	2.3	1.3
Narromine (A)	NSW	Northern	Outer regional	6,444	2.8	2	2.5	2.5	2.3	1.8
Northern Grampians (S)	VIC	Southern	Inner regional	11,436	2	1.8	2	2	2.7	1.7
Oberon (A)	NSW	Northern	Inner regional	5,301	2.3	2	1.8	2	2.3	2.7
Orange (C)	NSW	Southern	Inner regional	40,348	2.5	2.3	2.3	2	2.3	2.8
Parkes (A)	NSW	Southern	Outer regional	14,611	1.5	2.3	1.8	2	1.7	1.8
Paroo (S)	QLD	Northern	Remote/v remote	1,642	1.5	1.8	1.8	1.8	2	2
Peterborough (DC)	SA	Southern	Outer regional	1,678	2	2.3	1.8	1.8	2.7	2.2
Pyrenees (S)	VIC	Southern	Inner regional	7,240	2	2	1.8	1.8	2.7	1.7
Renmark Paringa (DC)	SA	Southern	Outer regional	9,475	3	2.3	2.5	2	2.7	2.2
Snowy Monaro Regional (A)	NSW	Southern	Outer regional	20,216	1.8	2.3	1.8	2	2.7	1.2
Snowy Valleys (A)	NSW	Southern	Inner regional	14,398	1.8	2	1.8	2.3	2.7	1.2
South Burnett (R)	QLD	Northern	Inner regional	32,186	1.5	1.5	1.7	1.3	2	1.8

2018 LGA Name	State	Basin region	Remoteness classification	Population, 2016	Overall comunity wellbeing	Population size, ageing & health	Economy, employment & standard of living	Community & social connection	Physical amenity	Services & infrastructure
Southern Downs (R)	QLD	Northern	Inner regional	35,115	2	2	1.7	2	2	1.8
Southern Mallee (DC)	SA	Southern	Remote/v remote	2,028	2	1.8	2.2	1.8	2.3	2.2
Strathbogie (S)	VIC	Southern	Inner regional	10,272	2.5	2.3	2.2	2	2.3	2.2
Swan Hill (RC)	VIC	Southern	Outer regional	20,587	1.8	2	2	2.3	2	1.8
Tamworth Regional (A)	NSW	Northern	Inner regional	59,662	2	1.8	1.8	2	1.7	2
Temora (A)	NSW	Southern	Outer regional	6,110	2.8	1.8	2	2	2.7	2.3
Tenterfield (A)	NSW	Northern	Outer regional	6,624	1.5	1.8	1.7	2.3	2.7	1.5
The Coorong (DC)	SA	Southern	Outer regional	5,386	2	1.5	1.8	2	2.3	2.2
Toowoomba (R)	QLD	Northern	Inner regional	160,779	2.3	2.5	2.3	1.5	2	2.8
Towong (S)	VIC	Southern	Outer regional	5,986	3	2.3	2.3	2.8	3	2.5
Unincorporated NSW	NSW	Northern	Remote/v remote	1,054	1	1.5	1.7	2	1	1
Unincorporated SA	SA	Southern	Remote/v remote	3,524	2	1.5	1.7	2.5	2	1
Upper Lachlan Shire (A)	NSW	Southern	Inner regional	7,694	2.5	2	1.8	2	2.7	2.3
Uralla (A)	NSW	Northern	Outer regional	6,049	1.5	1.8	1.7	2.5	2.7	1.5
Victor Harbor (C)	SA	Southern	Inner regional	14,661	2.8	1.8	1.8	1.5	2.7	2.5
Wagga Wagga (C)	NSW	Southern	Inner regional	62,383	2.3	2.3	2.3	1.5	1.7	2.5
Walcha (A)	NSW	Northern	Outer regional	3,090	1.5	1.5	1.5	2.5	2.7	1.5
Walgett (A)	NSW	Northern	Remote/v remote	6,112	1	1.3	1.7	2.3	1	1
Wangaratta (RC)	VIC	Southern	Inner regional	28,310	3	2	2.2	2.8	3	2.7

2018 LGA Name	State	Basin region	Remoteness classification	Population, 2016	Overall comunity wellbeing	Population size, ageing & health	Economy, employment & standard of living	Community & social connection	Physical amenity	Services & infrastructure
Warren (A)	NSW	Northern	Outer regional	2,730	1	1.5	1.8	2.3	1	1
Warrumbungle Shire (A)	NSW	Northern	Outer regional	9,380	2.8	1.3	2	2.5	2.3	1.8
Weddin (A)	NSW	Southern	Outer regional	3,660	1.5	1.8	1.7	2.3	1.7	1.8
Wentworth (A)	NSW	Southern	Outer regional	6,798	2.5	1.8	2.2	3	2.7	1.8
West Wimmera (S)	VIC	Southern	Outer regional	3,905	2.5	1.8	2	2.8	2	1.7
Western Downs (R)	QLD	Northern	Outer regional	33,444	1.5	2.3	2	1.8	1	1.5
Wodonga (C)	VIC	Southern	Inner regional	39,347	3	2.3	2.2	2.8	3	2.7
Yarriambiack (S)	VIC	Southern	Outer regional	6,675	2.5	2.3	2	2.3	2	1.7
Yass Valley (A)	NSW	Southern	Inner regional	16,143	2.3	1.5	1.8	2.5	3	1

Table 4: Relationship between population size, remoteness and economic diversity

	LGA location1	Overall community wellbeing	Population size, ageing and health	Economy, employment & standard of living	Community and social connection	Physical amenity	Services and infras-tructure
Population size of community (higher population)	In MDB	0.151	.381**	.313**	0.103	0.12	.438**
	Not in MDB	0.008	-0.119	0.059	-.356**	0.029	.230**
Remoteness of community (more remote)	In MDB	-.582**	-.430**	-.254**	0.065	-.471**	-.687**
	Not in MDB	-.666**	-0.061	-0.029	-.168**	-.648**	-.369**
Months of drought experienced 2006 to 2018 (more drought)	In MDB	.233*	0.167	0.114	-0.006	0.143	0.12
	Not in MDB	.410**	-0.045	0.042	.195**	.443**	.403**
Economic diversity (% jobs dependent on top three industries)	In MDB	-.373**	-.551**	-.288**	0.03	-.327**	-.445**
	Not in MDB	-.137*	-.210**	-0.114	.164*	-.178**	-.201**
% agricultural businesses who irrigate	In MDB	.398**	0.13	.262**	0.148	0.161	.249**
	Not in MDB	-0.012	.190**	0.064	-.407**	.137*	-0.011
% employment dependent on agriculture	In MDB	-.310**	-.585**	-.309**	0.042	-.278**	-.431**
	Not in MDB	0.116	-.322**	-.167**	.343**	0.086	-0.075

*Indicates correlation is significant at the 0.05 level; ** indicates correlation is significant at the 0.01 level
1 Analysis was conducted for LGAs, rather than based on population size. There are 114 LGAs in regional MDB; 240 in regional areas outside MDB.
Cells have been shaded to provide easier interpretation: yellow means higher/more positive levels of the factor predicted more positive community outcomes, while red means higher or more positive levels predicted more negative outcomes.