INDEPENDENT ASSESSMENT OF SOCIAL AND ECONOMIC CONDITIONS IN THE BASIN

This investigation has been commissioned by the Panel for the Independent Assessment of Social and Economic Conditions in the Murray-Darling Basin. The Panel has made this document available for public scrutiny as part of its commitment to transparency. The views in this report do not necessarily represent the views of the panel. This is part of a series of literature reviews and research investigations that will help inform the Panel's eventual findings and recommendations.

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Wellbeing, resilience and adaptive capacity

A review of current knowledge of social conditions in the Murray-Darling Basin

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Summary

While the importance of understanding social conditions in the Murray-Darling Basin (Basin) is well recognised, there is often a lack of agreement about what is most important to measure and how to measure it. Available information is not always easy to find, and does not always cover the entire Basin.

The Basin is not a single 'community': it is a large and diverse region that includes cities, towns, and rural areas with a wide range of characteristics. Different places within the Basin will have differing levels of wellbeing and resilience at any given point in time, as will different people and groups within any community. We reviewed current understanding of social conditions in Murray-Darling Basin (Basin) communities, and gaps in data and knowledge, focusing on what current knowledge of social conditions tell us about the wellbeing and resilience of Basin communities. It is increasingly accepted that societal progress should be measured based on quality of life, rather than solely on measures of economic growth/production; and that quality of life relies on having positive wellbeing and resilience. This has led a growing number of organisations and regions internationally to implement measures that monitor wellbeing and resilience, from the United Nations to the Organisation for Economic Cooperation and Development, New Zealand, and most recently within Australia, the Australian Capital Territory government.

A community has high wellbeing if it is able to provide its residents a high quality of life, which in turn requires good living standards, a heathy environment, availability of health, education and other services, positive social interactions, good governance and positive leisure opportunities. Being able to provide these things and support a healthy, happy population in turn requires communities that are resilient. Resilience is the ability of a person, household or community to successfully adapt to adversity and to capitalise on opportunities. Resilient communities can cope with and adapt to change in ways that enable them to maintain good quality of life for their residents.

We reviewed the factors typically measured to understand the level of wellbeing and resilience of a community and the people living in it. A review of multiple Australian and international frameworks for measuring wellbeing and resilience of communities, including examples of both urban and rural communities, identified 12 factors considered important across all context. To understand the wellbeing and resilience of a community, it is important to measure (i) health of residents (physical and mental), (ii) education, knowledge and skills, (iii) social capital (the social networks in the community, and how well people support each other), (iv) standard of living (e.g. income, cost of living, quality of housing), (v) employment availability and working conditions, (vi) quality of built infrastructure and access to services e.g. roads, health, education, government services, (vii) quality of governance, institutions and community leadership, (viii) experience of (dis)advantage and (in)equality; (ix) citizen participation in community life and decision making processes, (x) security and safety of residents, (xi) ability to safely express cultural identity, (xii) level of subjective wellbeing reported by residents, (xiii) environmental health, and (xiv) economic performance. The last two of these – environmental health and economic performance – were not reviewed for this report, as it focuses on social conditions.

We examined existing reports and data sets available on social conditions in the Basin, to identify the extent to which resilience and wellbeing of Basin communities is understood. We found that almost no information is available on the aspirations, visions and objectives of Basin communities, or on the self-rated challenges being experienced. This limits understanding of wellbeing and resilience, and of social conditions more broadly, as there is not a good understanding of the things Basin residents value most for their wellbeing and

resilience. The exception to this rule is several local governments and regional bodies that have invested in visioning processes that have identified local aspirations and challenges. The top issues raised by Basin residents when asked what was having a positive impact on wellbeing of their communities as part of the annual Regional Wellbeing Survey were good social connections and networks, community activities and events such as festivals, good local facilities and services, good outdoor spaces, and good governance. The top issues raised when asked what was having a negative impact on their local community were poor quality services and infrastructure, drought, poor governance and institutions, high cost of living, poor employment opportunities, antisocial behaviour, lack of social connection, negative impacts of water reform and poor farming conditions. This suggests that Basin residents prioritise many of the 12 topics identified in the review of frameworks as being locally important.

We then reviewed the findings of 50 studies examining wellbeing and resilience in the Basin or rural and regional Australia more broadly. This review confirmed that the 12 topics identified in the review of frameworks are important to wellbeing and resilience in the rural Australia and Basin context. The 50 studies provide important insight into the wide range of methods that can be used to measure and analyse different aspects of wellbeing and resilience. However, they do not provide insight into how wellbeing and resilience varies across the Basin, and do not cover the whole Basin, meaning they provide limited insight into current social conditions affecting wellbeing and resilience of Basin communities. The review identified that context matters: when understanding resilience in particular, the historical factors influencing current conditions need to be understood in addition to current conditions. Most studies highlighted the importance of social capital, and quality services, infrastructure, and functioning organisations (both government and private sector) to both wellbeing and resilience of local communities. The review identified that there are important gaps in knowledge related to (i) how different aspects of wellbeing and resilience affect each other and interact across the Basin, (ii) how wellbeing and resilience vary amongst different groups of people, with a lack of specific examination of wellbeing and resilience of Traditional Owners and those not working in agriculture in particular; (iii) lack of validation of many of the measures proposed in many studies (usually due to lack of opportunity to empirically test proposed methods), (iv) gaps in understanding of what factors are most effective in governance and leadership, what works better to develop future visions for communities, whether participatory approaches confer improved wellbeing and resilience, and the contribution of local businesses and community and non-government organisations.

Finally, we reviewed the extent to which existing data can be drawn on to measure social conditions related to the 12 key topics identified. Where data were available, we examined whether it has been drawn on to analyse social conditions in the Basin. We found that while multiple reports have examined demographic changes occurring in Basin communities (for example, how the total size of the population and age of people living in different communities is changing), much of the data available has not been used to systematically examine social conditions that influence wellbeing and resilience of Basin communities. In particular, there are large data sets that could be used to examine the following, but have not been used to do so to the extent that is possible: health, education knowledge and skills, standard of living, employment conditions, advantage and equality, and to a lesser extent subjective wellbeing and security and safety. There are significant gaps in availability of data examining social capital, quality of infrastructure and access to services, governance institutions and leadership, citizen participation and cultural identity. To fully understand social conditions across the Basin, further data would ideally be collected in these areas, in addition to analysing existing data sets in more depth.

Background

This review examines current understanding of social conditions in Murray-Darling Basin (Basin) communities, and gaps in data and knowledge. It does this with a focus on what is known about the wellbeing and resilience of Basin communities, in relation to two questions:

- *What are the visions and hopes of Basin people for themselves and their communities?*
- *What has been the social and economic experience of Basin communities, relative to other regional communities in Australia?*

We focus on identifying the current state of knowledge, identifying key gaps, and recommend approaches for addressing these gaps. Communities are defined as place-based communities, although it is important to recognise that communities can take many forms, with people often forming communities that are not placed-based, for example communities based around shared beliefs, hobbies, or activities.

Wellbeing and resilience as useful lenses for understanding social conditions

Many reviews of social conditions focus on understanding demographic trends in communities. A more meaningful approach is to focus on social conditions that most influence the quality of life of people living in the Basin – and quality of life can be understood by examining the wellbeing and resilience of Basin residents.

It is increasingly accepted that societal progress should be measured based on quality of life, rather than solely on measures of economic growth/production such as Gross Domestic Product. Economic growth measures have many limitations as measures of progress: in particular, economic growth can occur at the expense of wellbeing and quality of life (for example, disasters such as bushfires can trigger economic growth while causing significant loss of wellbeing).

This has led a growing number of organisations and regions internationally to shift to measuring social progress based on the wellbeing of the population, in preference to measuring economic growth, with more than 40 countries and regions now measuring progress based on the wellbeing of their citizens. This includes countries such as New Zealand, Canada, international organisations such as the Organisation for Economic Cooperation and Development (OECD) and the United Nations (Stiglitz 2010, OECD 2011, Helliwell et al. 2016, Unanue et al. 2017). Within the Basin, the Australian Capital Territory government recently announced the development of a wellbeing index to measure progress in the ACT (part of the Basin) (Schirmer et al. 2019), while the Department of Infrastructure and Regional Development (DIRD) has for several years measured wellbeing in all Australian regions including the Basin (DIRD 2016), and the University of Canberra's Regional Wellbeing Survey has examined quality of life and resilience in rural and regional communities since 2013 (Schirmer et al. 2015, 2016). From 2004 to 2016, the Australian Government Treasury had a wellbeing framework that defined wellbeing as a person having the 'substantive freedom to lead a life they have reason to value' and considering this as being related to the set of opportunities available to people, distribution and sustainability of those opportunities, and risk and complexity of choices faced by individuals and community (Gorecki and Kelly 2012).

In parallel, it is increasingly recognised that wellbeing of a community depends on its resilience – meaning its ability to cope with and adapt to changing conditions (McCrea et al. 2014, McCrea et al. 2016). Measurement of resilience often focuses on the ability of people

and communities to cope with natural disasters, climatic variability, economic variability (e.g. market downturn), and health risks (Sharifi 2016) whereas measurement of wellbeing typically focuses on the extent to which people and communities are experiencing a high quality of life at a given point in time (Forgeard et al. 2011, Dodge et al. 2012).

'Wellbeing' is a broad term. Whether it is about people or communities, it broadly means asking the question 'do you have a good quality of life', and finding out whether quality of life is improving or declining over time. Quality of life incorporates a wide range of things, from being able to lead a healthy life, to having good quality housing, a decent income, good opportunities in life, positive social connections, safety at home and in the community, pleasant places to spend time in, and being able to achieve the things you want to in life.

When defining what a person with high wellbeing looks like:

> *"There is no consensus around a single definition of well-being, but there is general agreement that at minimum, well-being includes the presence of positive emotions and moods (e.g., contentment, happiness), the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfillment and positive functioning. … In simple terms, well-being can be described as judging life positively and feeling good."* (CDC 2018)

Increasingly, definitions of wellbeing include recognition that wellbeing depends on a person having resilience. For example, the World Health Organization defines mental health as:

> "*a state … in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community"* – World Health Organization, 2013

Being able to cope with stresses requires resilience. Similar to wellbeing, there are a plethora of definitions of resilience, and of the related concepts of vulnerability and adaptive capacity. Almost all definitions of resilience define it as being about *the ability of a person, household or community to successfully adapt to adversity and to capitalise on opportunities* (Luthar et al. 2003, Magis 2010). For example, ODI and Resilience COP (2016, p.3) found that most definitions of resilience emphasised that resilience should 'enable systems to function and flourish in the face of shocks and stresses'. In most frameworks, a person's adaptive capacity – the resources they have to draw on that enable them to adapt to adversity and capitalise on opportunities – is considered key to resilience. Adaptive capacity can means having access to a wide range of resources (also often called capitals), including financial resources, social connections (social capital), human capital in the form of skills and leadership, natural capital in the form of environmental health and access to resources such as water and healthy, productive soil, and physical capital in the form of local infrastructure and services, amongst others. Vulnerability, meanwhile, is sometimes defined as the extent to which a person or community is vulnerable to experiencing loss as a result of challenging circumstances, and is often considered to be a function of both the extent to which a community is exposed to challenges, and of its adaptive capacity. To some extent, higher resilience in the form of having capacity to adapt reduces vulnerability, although not all agree on this, or on definitions of vulnerability (Gallopín 2006): to avoid confusion, this document principally uses the term 'resilience'.

Importantly, being resilient is about more than trying to maintain current characteristics of a community when a challenge occurs: it is about being able to actively change or transform a community over time so it maintains a positive quality of life for its residents. For example, if a community that currently depends largely on one or two industries for employment (for example, mining and agriculture) values maintaining employment opportunities, it may invest in attracting new industries to maintain employment when mining enters a downturn (for example, tourism or a new manufacturing industry). While this may result in ongoing change in this community, the changes will enable the community to maintain its key

objective of providing strong employment opportunities for residents. Importantly, this definition focuses on maintaining quality of life, rather than maintaining a particular population level.

Resilience is both a process and a state: people and communities are continuously adapting to change, learning from their experience of adaptation, and applying that learning to the next changes they experience. For this reason, understanding resilience requires understanding the capacity of people and community to adapt to change (adaptive capacity).

A key feature of resilience frameworks is their emphasis on understanding system-wide interactions across scales. This means they focus on identifying how different factors affecting a community interact, and when these different factors will come together to trigger a threshold or 'tipping point'. For example, a community may be able to cope with an extended period of drought, but if combined with experiencing downturn in commodity prices for locally produced goods, this may trigger loss of employment high enough to trigger substantial migration of people out of that community to live in other areas. Examining the impact of drought or commodity downturn as factors on their own would not identify the vulnerability of that community to population loss: it requires analysing how these interact to identify the extent to which that community has low resilience and is vulnerable to population decline (see for example Schipper and Langston 2015, Carpenter et al. 2001, Walker et al. 2006, Walker and Salt 2006, Broderstad and Eythorsson 2014).

Wellbeing and resilience are strongly inter-related. This is perhaps best put by Schipper and Langston (2015), when they describe the importance to resilience of having a diversity of options and choices for the future:

> *"… having a diversity of options ensures that there is a greater chance that people will cope and do well when an event occurs. … this includes having choice and option to modify behaviour … such as being able to switch crops or seeds, finding new income sources or changing physical location, which are all identified as important resilience building options. … These all require knowledge, entitlements, wealth and access, which are fundamental enabling characteristics, thus linking resilience to sustainable livelihoods, capacities and capabilities" (Schipper and Langston 2015 p. 14)*

The wellbeing of a community is more than the sum of the individuals living in that community. When challenging events such as drought or a downturn in a key industry occur, having a population with high individual wellbeing can help the community cope – but only if those individuals choose to use their resilience resources to stay in the community and help it cope through those challenging times, rather than using the same resources to shift to a new community.

Given this, it is important to understand what is important to the resilience and wellbeing of communities, as well as of individual people. Frameworks that measure the wellbeing of communities, regions or nations typically include both measures of individual wellbeing *and* measures of the wellbeing of the community overall such as strength of government institutions, quality of public transport, health of the local environment, access to services, and standard of living, amongst others. When this broader approach is used, definitions of wellbeing broaden from a focus on how well an individual is, to defining community wellbeing as:

> *The presence of the highest possible quality of life in its full breadth of expression focused on but not necessarily exclusive to: good living standards, robust health, a sustainable environment, vital communities, an educated populace, balanced time use, high levels of democratic participation, and access to and participation in leisure and culture. (Canadian Index of Wellbeing 2016 p. 11)*

Put another way, in a healthy community:

> *… all systems function as they should, and work together to make the community function well … a healthy community is one in which all citizens can be assured of a decent quality of life – economically, physically, environmentally, socially, and politically.* - KU Work Group for Community Health and Development (2014)

The *Progress in Australian Regions* yearbook, which focuses on measuring wellbeing in Australia's regional communities, simplifies this further by measuring social progress in communities based on answering the question *"is life in your region getting better?"* (DIRD 2016).

When evaluating availability of information on social conditions in the Basin, it is important to consider whether the available information enables an appropriate understanding of the diversity of social conditions across the Basin. There is no single set of social conditions in the Basin: the Basin is made up a diversity of communities that overlap each other in terms of scale, location and composition, and these different communities can vary substantially in their wellbeing and resilience. For example, a person may identify as living in a specific local community within the broader Riverina region of NSW, and may also identify as belonging to the community of irrigators in their local irrigation district, and to their local sports team that represents a large district. They thus belong to many communities, and those communities can overlap each other geographically (Sharifi 2016). Within each of these communities, wellbeing and resilience will vary for different people.

Understanding social conditions requires being able to identify this diversity of experience – who is 'winning' and 'losing' or, in the language of resilience and wellbeing, who is experiencing a better or poorer quality of life, and who is more or less able to cope with challenges and take advantage of emerging opportunities.

Wellbeing and resilience are both processes that are ongoing, and influenced by a wide range of factors: any attempt to measure social conditions should examine the multiple factors that influence wellbeing and resilience (Cimellaro et al. 2016). The wellbeing and resilience of a community depends on its history and the amount of types of stresses experienced in that past, as well as on its access to a range of resources and opportunities at a given point in time, and the range of stresses being experienced at different scales at that point in time (ODI and Resilience COP 2016).

Factors influencing a person or community's wellbeing are typically called determinants of wellbeing, or sometimes capacities, capabilities, or capitals. Factors that contribute to a person or community's resilience are often labelled 'adaptive capacity', 'capitals', 'capacities' or 'resilience resources'. These various terms are, put more simply, the socio-economic and environmental conditions and processes that influence wellbeing and resilience. Very similar sets of social conditions, characteristics and processes are important to both wellbeing and resilience, in sometimes differing ways.

For example, having good access to services and infrastructure is important to enable wellbeing: people tend to be healthier if they have access to health services, and can maintain income streams better if transport systems function well and consistently, to give two examples. Having good access to services and infrastructure is also important for resilience, but when examining resilience the focus tends to be on identifying whether available services and infrastructure can provide suitable support to people experiencing difficulty, or withstand impacts of events such as floods or drought (National Research Council 2015).

Measuring wellbeing and resilience

How should social conditions influencing wellbeing and resilience be measured – and to what extent is information available about social conditions in the Basin? This is a critical question, as monitoring changes in wellbeing and resilience is essential to identifying what is needed to support communities:

> *"without numerical means of assessing resilience, it would be impossible to identify the priority needs for improvement, to monitor changes, to show that resilience had improved, or to compare the benefits of increasing resilience with the associated costs"* (National Research Council 2012, cited in National Research Council 2015).

There are two important aspects to examine when reviewing current knowledge of wellbeing and resilience in the Basin:

1. Is information available for different aspects of wellbeing and resilience of Basin communities, and have these data been analysed in ways that shed light on conditions in the Basin? What are the gaps in information?
2. Is there agreement on what the hopes and visions of Basin communities are, and have communities had input into identifying the factors that are important to their wellbeing and resilience?

Common measures of wellbeing and resilience

To help answer these questions, we first identified the factors typically measured to understand the level of wellbeing and resilience of a community and the people living in it. We then examined the extent to which these factors have been analysed for Basin communities and regional Australia more broadly.

To identify common measures of wellbeing and resilience, we reviewed indicators used in multiple Australian and international wellbeing and resilience frameworks, including those used by the OECD United Nations, and Rockefeller Foundation, those developed for regional Australia, and some developed by non-government organisations such as the Red Cross (see reference section and Appendix 1). The key finding of this review was that there is a set of common factors included in almost all measures of the wellbeing and resilience of communities (see Appendix 1 for detailed analysis). In particular, the following are included in all or almost all measures of wellbeing and resilience of communities:

1. **Health – physical and mental**: The health of residents is a critical component of both wellbeing and resilience of individuals and the communities they live in. Health of residents is an important predictor of not only demand on health services, but also the capacity of residents to contribute to their community and to adapt to change.
2. **Education, knowledge and skills:** Communities in which residents have high levels of education, knowledge and skills (formal and informal) often adapt more successfully to change.
3. **Social capital**: People and communities with strong and positive social networks that enable good communication, social support and social interaction between people have higher wellbeing and resilience.
4. **Standard of living:** People who have a good standard of living – meaning having access to adequate income, being able to afford living costs in their community, and

having good quality housing – have better wellbeing, and better capacity to adapt to change.

5. **Employment:** Availability and quality of jobs available in a community was identified as important to both wellbeing and resilience in almost every framework; the measures used range from proportion of the population unemployed, to measures examining how satisfied people are with their working conditions.
6. **Built environment and access to services**: A community with high wellbeing and resilience will have good quality built infrastructure such as roads, communications networks, public buildings and parks that function well, including in difficult times, as well as ready access to a wide range of services including emergency, health, transport, internet and phone plans, education, government, professional and retail services.
7. **Governance, institutions and leadership**: The level of democracy, transparency, openness, quality, effectiveness and honesty of government and non-government organisations directly affects wellbeing and resilience of communities. In particular, effectiveness of community leadership is often identified as critical to community wellbeing and resilience (e.g. Schirmer et al. 2016).
8. **Advantage and equality**: Communities in which some groups have poorer access to opportunities, experience high levels of discrimination, or experience high social disadvantage typically have lower wellbeing and resilience.
9. **Citizen participation**: The extent to which residents are able to have meaningful input into and participation in decision making processes affecting their community and their household is a common measure of wellbeing and resilience.
10. **Security and safety:** The extent to which a community or a person's home is a safe place to live are well-recognised predictors of wellbeing, and measures such as incidence of crime rates, fear of crime, domestic violence rates and confidence in police are often included in wellbeing and resilience frameworks
11. **Cultural identity:** Ability to safely express cultural identity, sense of cultural identity, and participation in cultural activities
12. **Subjective wellbeing** (included in majority of wellbeing and resilience frameworks): this means asking residents to self-assess their overall quality of life, and subjective wellbeing measures are increasingly recognised internationally as important indicators of overall wellbeing, and used by organisations from the UN to the OECD and multiple nations to measure social progress (see for example Diener 2000, Cummins et al. 2003, Dolan and Metcalf 2012, Krueger and Stone 2014).

In addition to the aspects listed above, environmental health and economic performance are often recognised as important contributors to wellbeing and resilience; while critical, these are not reviewed in this report which focuses on social conditions rather than on environmental and economic conditions in the Basin. While other measures such as work/life balance and time use, preparedness for specific events such as natural disasters, spiritual wellbeing, access to human rights, ability to connect to nature, and effectiveness of communication networks are also included in some measures of wellbeing and resilience, the 12 aspects above are included in almost all frameworks, and form a good basis for reviewing what is currently known about wellbeing and resilience in the Basin.

When examining the 12 dimensions of wellbeing and resilience listed above, wellbeing and resilience frameworks will often have a different focus to each other. To understand resilience, measures of the 12 aspects will often focus on how diverse, flexible and redundant a community's systems are, as this helps identify how well that community will cope if systems are stressed by events like drought. For example, having more than one road that can be used to transport produce is an example of flexibility and redundancy: if one road is cut off during a flood, having another that can still be used provides resilience. Similarly, having multiple sources of household income provides resilience when one source of income is reduced (for example if farm income is reduced due to drought, having an off-farm income source can help a household cope). Wellbeing measures, in contrast, often focus on *how much* of something a community has, and how it is distributed – for example, what the typical household income is, and the distribution of income across a community.

Ideally all the measures above should be measured not simply at a single point in time, but over time, and their interactions with each other should be understood (Sharifi 2016), with many wellbeing and resilience frameworks focusing on understanding how different parts of a system interact with each other to affect wellbeing and resilience. This means it is not only important to have data available, but to identify whether it is being analysed in ways that enable an understanding of processes of wellbeing and resilience in the Basin, and how they are changing over time.

What is known about social conditions in the Basin?

We examined existing reports and data sets available on social conditions in the Basin, to identify the extent to which resilience and wellbeing of Basin communities is understood. We found that:

- **Aspirations and challenges:** Almost no information is available on the aspirations, visions and objectives of Basin communities, or on the self-rated challenges being experienced. This limits understanding of wellbeing and resilience, and of social conditions more broadly, as there is not a good understanding of the things Basin residents value most for their wellbeing and resilience. The exception to this rule is that several local governments and regional bodies have invested in visioning processes that have identified local hopes and aspirations; this type of process has not, however, been replicated at a Basin-wide scale and so existing information sheds light on a limited number of Basin communities.
- **Basin-wide data on social conditions:** Much of the social condition data currently available at a Basin-wide scale has not been analysed to shed light on wellbeing and resilience of Basin communities. There is substantial opportunity to build understanding by using existing data and analysing it using processes that involve collaboration between data analysts and representatives of Basin communities. There are gaps in availability of Basin-wide data. Addressing these gaps should ideally occur after a process of prioritising what is most important with input from Basin residents, ideally drawing on information already provided by Basin residents through multiple public enquiries into conditions in the Basin.
- **Specific studies on wellbeing and resilience of communities:** Multiple studies provide insight into wellbeing and resilience in specific communities in regional Australia, and many of these are located in the Basin. These provide important insight into how wellbeing and resilience can be measured and analysed, but do not provide Basin-wide insight into how wellbeing and resilience varies across the Basin.

These can be drawn on to identify methods and approaches to better monitoring wellbeing and resilience of Basin communities in future Basin-wide monitoring efforts.

Aspirations and challenges in the Basin

To understand wellbeing and resilience in the Basin, it is important to first identify (i) the things Basin residents value about their communities, and (ii) the things they are finding most challenging. A person and a community's wellbeing will depend on whether they are fulfilling or achieving things they value most – which means measuring wellbeing meaningfully requires understanding what aspects of their communities people value most, and what they aspire to have available to them. Meanwhile, understanding challenges is critical to measuring resilience. In the resilience literature, this is sometimes called the 'resilience to what' question, as different measures of resilience may be needed depending on what the community needs to be resilient to (Sharifi 2016).

There is very little available information on aspirations and challenges of people living in different Basin communities at the Basin scale. However, this does not mean there is a lack of information: multiple local and regional organisations within the Basin have engaged in collaborative exercises to identify local hopes, visions, challenges and priorities for the future, and to identify how best to track progress towards these. These represent a large existing resource that has not been consistently reviewed and drawn on to understand social conditions in the Basin, and how they vary. Reviewing the large body of work undertaken in local processes was not within the scope of this review, however Appendix 2 lists some examples of the wide range of local processes that have done this, and how they have identified aspirations and challenges and used these to inform measurement of progress. These should be drawn on in future to identify successful processes for engaging local communities in understanding wellbeing and resilience in their communities.

To better understand what is known about aspirations and challenges of Basin residents, we drew on data from the Regional Wellbeing Survey. This annual survey of 10,000 to 13,000 people living in regional Australia typically includes anywhere from 4,000 to 6,000 Basin residents and a further 6,000 to 9,000 outside the Basin. Each year, participants are asked at the start of the survey to write as much or as little as they wish in response to the following questions:

- At the moment, what things are having a POSITIVE effect on the wellbeing or quality of life of people in your community?
- At the moment, what things are having a NEGATIVE effect on the wellbeing or quality of life of people in your community?

The responses to these questions give insight into what Basin residents value most about their community and aspire to have for a good quality of life, as well as the challenges they are experiencing and needing to be resilient to. Figures 1 and 2 show findings at the scale of the Basin: it is important to recognise that there would be high variability between different communities within the Basin that is 'hidden' by the presentation of Basin-wide data.

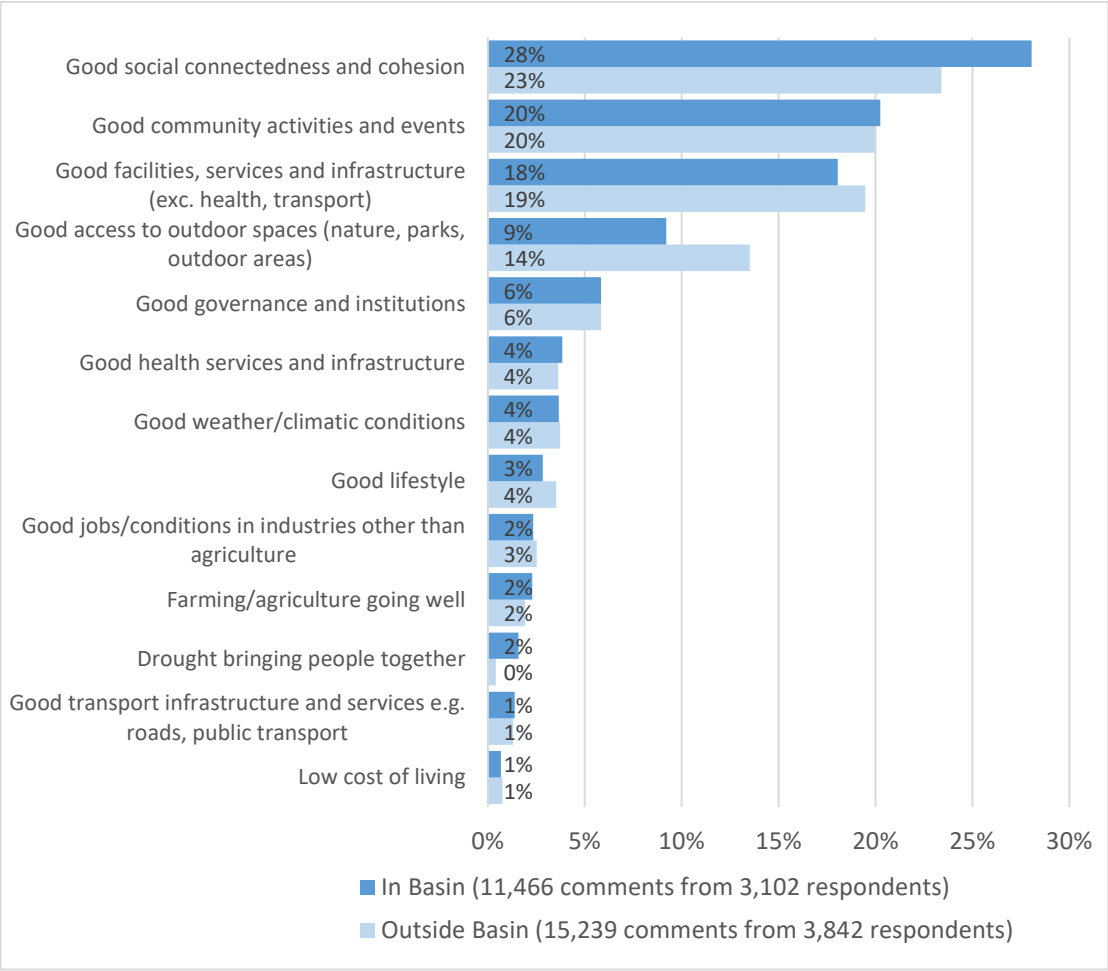

Figure 1 At the moment, what things are having a POSITIVE effect on the wellbeing or quality of life of people in your community? Findings from the 2018 Regional Wellbeing Survey

When asked what was positively impacting wellbeing, 28% of Basin residents felt their community had good social connections and networks, 20% good community activities and events such as festivals, 18% that it had good facilities or services other than health and transport, 9% rated their outdoor spaces highly, and 6% of comments related to good local governance and community organisations. Other positive comments made up less than 5% of responses. Basin residents were less likely than those outside the Basin to report having good access to outdoor spaces, and more likely to report high levels of social connectedness and cohesion.

The challenges most commonly reported in the Basin, meanwhile, were poor quality services and infrastructure other than health and transport (13%), poor health services and infrastructure (6%), poor transport infrastructure (5%), drought (13%), poor governance and institutions (12%), high cost of living (11%), poor jobs/conditions in local industries (8%), antisocial behaviour (7%), poor social connectedness (5%), negative impacts of water reform (5%) and poor conditions in farming/agriculture (5%), with the last often related to drought. In the Basin, drought, water reform and poor conditions in agriculture were much more often raised as challenges than they were in communities outside the Basin, while other issues were raised at similar levels to communities outside the Basin. Appendix 3 provides more detail about the content of each theme shown in Figures 1 and 2

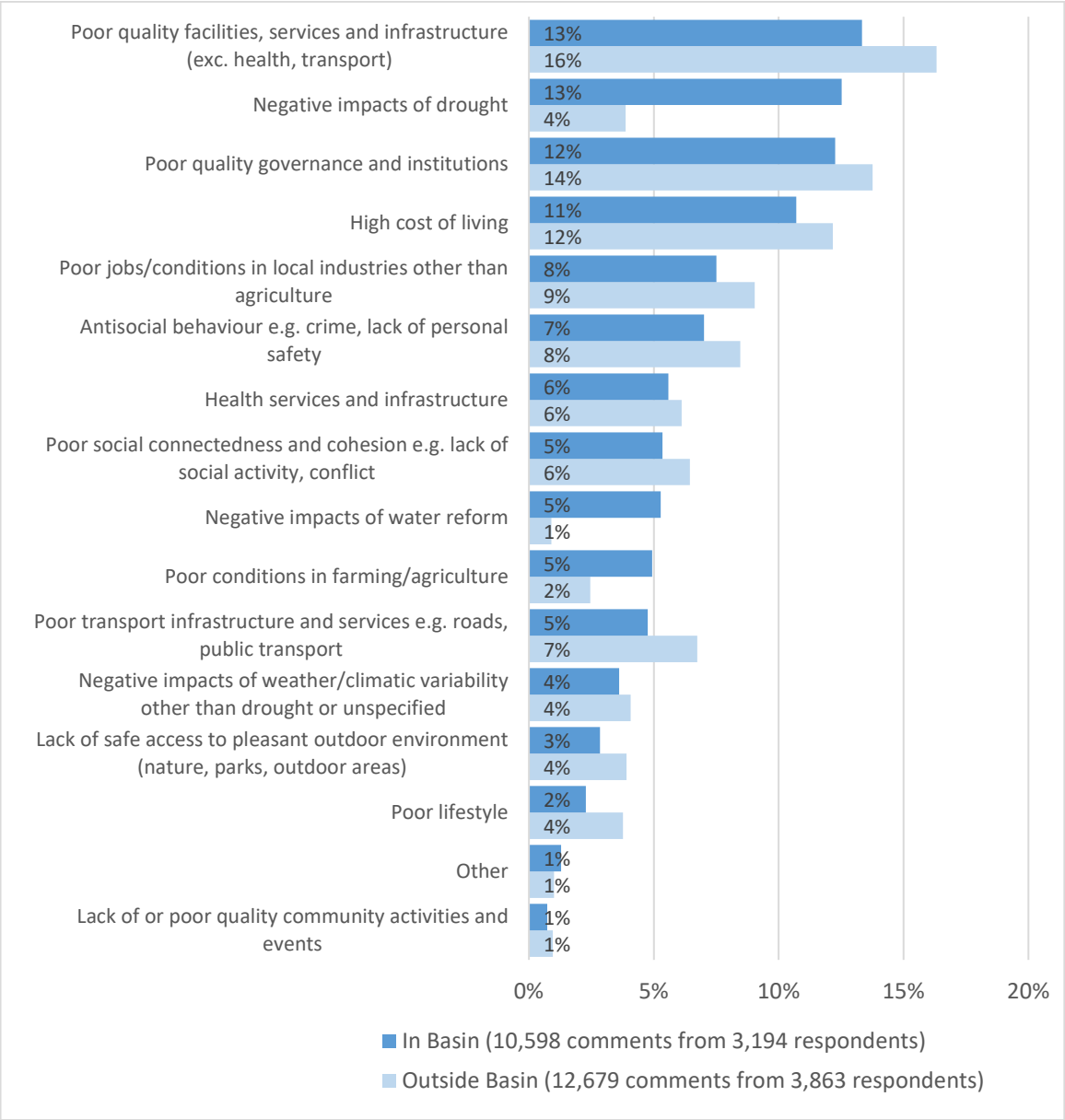

Figure 2 At the moment, what things are having a NEGATIVE effect on the wellbeing or quality of life of people in your community? Findings from the 2018 Regional Wellbeing Survey

The findings highlight the importance of the social wellbeing of communities, particularly ability for people to interact socially in positive ways, as measures of wellbeing, together with access to infrastructure and services, access to highly liveable landscapes, and being able to build resilience to experiences of drought, water reform and stress to agricultural industries.

Overall, our review of data on hopes and visions shows that (i) there is relatively little consistent information on hopes and visions of people across the Basin; (ii) the information that is available has often been collected at a localised scale to inform development of local or regional planning processes, and it may not represent the views of all people living in those communities, and (iii) that the limited information available suggests many similarities in the wellbeing and resilience needs of regional communities located within and outside the Basin, as well as some specific differences in challenges faced. There is therefore a large gap in both consistent collection of information in ways that reflect the hopes, visions and aspirations of all Basin residents, and in analysis of the data that are available. This limits the

usefulness of existing information on social conditions, as it cannot be easily analysed based on what social conditions are most valued by people living in different parts of the Basin, and their aspirations regarding these conditions.

Social conditions in the Basin – review of recent studies

The following section presents a brief synthesis of recent studies into the social conditions of the Basin, and rural and regional Australia more broadly. We reviewed a total of 50 studies: this is a small sample of the studies conducted on social conditions in rural and regional Australia in recent years.

Studies were selected for inclusion in the review if they specifically focused on resilience, wellbeing or related concepts such as adaptive capacity; were published after 2007; and focused on community conditions rather than individuals or households. Studies whose focus included part or all of the Basin were also prioritised. See Appendix 4 for a list of the 50 studies and summary of their key areas of focus. While our focus was not on identifying studies examining water reform, we did include several studies that sought to evaluate water reform in our review, as several of these explicitly sought to define and report on overall wellbeing, resilience or social conditions in the Basin in addition to then using this information to examine the impacts of water reform.

Review of the studies focused on identifying (i) lessons for measuring social conditions, (ii) extent of current knowledge about social conditions and (iii) gaps in knowledge. The 50 studies used a divergent range of methods to examine resilience and wellbeing; despite this, some common themes emerged about appropriate processes for measuring, and measures, of wellbeing and resilience:

1. *Context matters* – individual, local and regional differences significantly affect the social conditions experienced and the wellbeing, resilience and adaptive capacity of the community (eg. climate, farm types, resource mobilisation plus others). Conditions vary both spatially and temporarily and hence ongoing monitoring of social conditions requires understanding differences in the experiences of different Basin communities. This highlights a need to monitor change at a relatively small geographic scale, and to understand not only the current state of a community but the historical factors contributing to this state, and how this history may facilitate or create barriers to achieving change in future.
2. *Importance of social capital for resilience and wellbeing:* A common findings across all studies was the importance of social connectedness (eg. relationships, networks, social assets/activities) for resilience in times of crisis, and for wellbeing more broadly. This emphasises the importance of being able to monitor changes in social capital as well as changes in more tangible social assets such as infrastructure, services, formal education and household income. Despite being regularly emphasised as a critical component needed for resilient and well communities in the studies reviewed, and in most wellbeing and resilience frameworks, little regularly collected data examines any aspects of social capital (see next section).
3. *Importance of a range of services, infrastructure and functioning organisations in rural and regional communities:* Many studies emphasised the importance for resilience and wellbeing of having assets and organisations that were functioning well. This corresponds with the key aspirations and challenges articulated in Regional Wellbeing Survey data, in which services, infrastructure and institutions

were critical aspects of wellbeing highlighted more commonly than most other topics.

4. *Importance of governance:* Multiple studies identified low trust in government and policy delivery as a key challenge for communities both within and outside the Basin, the complexity of rural socio-ecological systems as requiring good governance, and the importance of local leadership for resilience. All of these themes emphasise the importance of good governance at multiple levels, and reinforce that when governance is ineffective wellbeing and resilience decline, with Basin residents highlighting poor governance as a key challenge in many of their contributions to the 2018 Regional Wellbeing Survey reported above.
5. *Other key drivers and determinants of resilience and wellbeing* – a number of studies identified and/or measured determinants of resilience and wellbeing, and the determinants identified encompassed the full range of those in Appendix 1, with most identifying some but not all of the determinants shown in Appendix 1 as being relevant in the individual situations in the Basin they were examining. However, some concepts such as security and safety and employment opportunity – which feature prominently in many frameworks for measuring resilience and wellbeing, and in data on how Basin residents feel about their communities – were not well represented in the studies. This highlights that many studies provide a partial picture of wellbeing and/or resilience in one part of the Basin or for a specific group; and that not all determinants of wellbeing and resilience are important in every community. Several studies emphasised the importance of developing localised understanding of factors influencing resilience and wellbeing, while others used similar indicators across different communities. This suggests there remain gaps in knowledge about how much 'localisation' of measures is needed when examining the wellbeing and resilience of communities, versus the extent to which the same indicator can be used across communities to understand differences between them.

Many studies focused on farmers, or on Basin and other rural communities dependent on agriculture, with less focus on regional cities and towns, and on communities that depend on other industries.

Key gaps identified in the review were:

1. *A need for integrated studies examining multiple aspects of wellbeing and resilience:* While many studies called for greater use of integrated analysis that understands how social, economic and environmental conditions interact to produce different levels of wellbeing and resilience, almost all studies focused on only one or two of these conditions. At a minimum, there is a need for synthesis of economic and social conditions to improve understanding of overall wellbeing and resilience, and to examine the whole community rather than only some parts of it such as farmers.
2. *A need to better understand distribution of wellbeing and resilience within communities and be inclusive of all groups:* Most studies focused on examining the whole population of a given community. Many also noted the limitations of this, identifying a need to better analyse the variation in wellbeing and resilience amongst different groups within any given community. This highlights a gap in understanding of the diversity of experiences of different groups living in the Basin, including Traditional Owners, different genders, those living in different types of communities in more and less remote locations, and many others. While some work

has examined diversity of experience, this work remains disjointed and limited in scope.

3. *Lack of empirical testing of models and frameworks:* Many of the 50 studies reviewed propose new models, measures, indices and frameworks for understanding wellbeing and resilience. Most were able to provide limited or in some cases no empirical validation of these proposed approaches. The large amount of intellectual capital that has gone into developing proposed ways of understanding wellbeing and resilience in the Basin and rural and regional communities more broadly should be drawn on. This means that rather than develop further new frameworks and approaches, future measurement should draw on extensive existing proposals, and focus on producing empirical assessments of conditions, and on reviewing and improving these frameworks to best improve knowledge of social conditions.
4. *Improved understanding of governance and leadership:* Many studies identify leadership and governance as two key components of resilience. However, relatively few studies of local leadership and governance have been undertaken (although many studies of Basin meta-governance have been completed). An improved understanding of the various social, political and institutional contexts across the Basin and their role and influence on social conditions is needed. This should include a focus on the mobilisation of community resources, and a critical review of the real outcomes of implementing different types of collaborative and participatory governance approaches. Despite strong calls for use of collaborative and participatory approaches, there are few empirical studies exploring the implementation and outcomes of collaborative governance in Basin communities. A better understanding of governance across Basin communities would help design, support and deliver improved place-based solutions that enhance trust, local social conditions and have local support (a social license).
5. *Visioning processes:* Many studies emphasised the importance of having collaborative processes to develop innovative new pathways for community development. However, few identified processes for achieving this in practice or evaluated the effectiveness of the processes they used. Understanding the resilience of communities in ways that assist them to develop effective pathways for future development requires better understanding of which communities have used effective processes for vision development that then led to good outcomes. The experiences of the multiple local government authorities across the Basin, as well as many regional organisations and non-government organisations, could be reviewed to better understand this.
6. *Understanding the contributions of local businesses, NGOs and community organisations:* Local businesses, non-governmental organisations, and formal and informal community organisations are critical to the functioning of communities, including to their wellbeing and resilience. However, few studies have examined the varied contributions of these sectors to social conditions across the Basin. Understanding the current and potential contributions of the broader community is important to enable efficient delivery of government policy and programs, including the support for the ongoing development and maintenance of such community assets.

The review of studies highlights that (i) there is agreement that the aspects of wellbeing and resilience summarised on pages 5 to 6 and in Appendix 1 are relevant to Basin communities, and (ii) that there is not comprehensive understanding of these different aspects of social conditions across different Basin communities, and in particular there is a lack of understanding of diversity of social conditions experienced across different communities and groups.

Social conditions in the Basin – availability of regularly collected data

Having identified a number of factors important to understanding social conditions in the Basin related to wellbeing and resilience, based on both factors typically included in frameworks measuring these concepts, and factors included in studies of social conditions undertaken in the last decade, we then examined the availability of data on different social conditions. Table 1 identifies the types of data collected in data sets that can be used to examine social conditions in the Basin, including:

- How regularly data are collected
- The scale at which data can be analysed (local communities or regions)
- Whether the data are already being used to understand social conditions in the Basin and the potential to do so if this is not yet occurring
- The types of social conditions the different data sets provide insight into, to help identify gaps in availability of data on social conditions contributing to wellbeing and resilience of communities.

We found that there are both large volumes of data that have not yet been analysed to understand social conditions in the Basin, as well as some gaps in availability of data:

1. Health – physical and mental: Despite the collection of large volumes of data across different data sets, there is relatively little analysis of health of people living across different Basin communities, and there is considerable scope to further analyse existing data to provide insight
2. Education, knowledge and skills: There are available data sets that identify formal educational attainment of adults, and literacy and numeracy of school children, which could be further analysed for Basin communities. There are gaps in knowledge of the extent to which skills are sufficient to cope with changes being experienced by Basin communities
3. Social capital: Despite the central importance of social capital identified both in past studies and by Basin residents themselves, there are very few existing data sets that provide any insight into social capital and most of the six data sets identified that shed light on social capital do so in limited ways (for example, the ABS Census of Population Housing examines only participation in volunteering and not any of the many other aspects of social networks). Available data has not been fully analysed to examine social conditions in the Basin, and further data could be collected to provide better insight into whether available social capital is sufficient to support wellbeing and resilience.
4. Standard of living: Multiple data sets provide insight into standard of living, but several of these have not been analysed to provide insight into the experiences of Basin communities.

5. Employment: Multiple data sets provide insight into employment conditions and these have been drawn on in several studies of social conditions in the Basin. The key gap identified was that most studies examine quantity of employment available, but do not provide insight into the quality of employment in terms of income, working hours and working conditions.
6. Built environment and access to services: While eight data sets contained some information, it was often limited, with a need for better definition of the types of services and infrastructure and what aspects of their condition should be monitored to understand their contribution to wellbeing and resilience.
7. Governance, institutions and leadership: Despite being identified as core to community wellbeing, very few data sets (four) collect data on this, and all four have only limited data that does not provide a comprehensive overview. There is both a need to better analyse existing data and to collect more relevant data.
8. Advantage and equality: While many data sets can give insights into advantage and equality, as noted earlier most analyses that draw on these do not explicitly analyse them to understand advantage and equality. There is considerable scope to analyse existing data sets for better understanding of this.
9. Citizen participation: While several data sets had some measures of citizen participation, similar to other themes, this data is often limited in scope. There is both a need to better analyse existing data and to collect more relevant data.
10. Security and safety: Despite the high importance of security and safety in many Basin communities, there is limited readily available data. While crime statistics are collected by different states and territories, national level databases are not readily accessible.
11. Cultural identity: Similar to citizen participation, there is limited collection of data on cultural identity and expression, and this is a gap.
12. Subjective wellbeing: Relatively few data sets collect data that identifies how Basin residents self-rate their quality of life. However, data does exist, and could be analysed in much more depth than it has been to give insight into social conditions in the Basin.

Overall, there is both considerable scope to further analyse existing data, as well as several areas in which there is are gaps in knowledge and understanding.

Table 1 Availability of data that can be used to provide insight into social conditions in the Basin

Data source	How often are data produced?	Are Basin data currently available?	Could Basin data be reported?	Is data being used currently to assess social conditions in the Basin? At what scale? Could it be used this way if not already occurring?	Which aspects of wellbeing and resilience does this data set provide insight into?[1]											
					1	2	3	4	5	6	7	8	9	10	11	12
Australian Bureau of Statistics Census of Population and Housing	5-yearly (most recent 2016)	Yes	Yes	Yes, by a wide range of organisations to scales smaller than local government areas; this is the main data source used to profile social conditions in the Basin currently. However there is not widespread agreement on how to interpret data or consistency in use of it to analyse social conditions across the Basin.		✓	✓	✓	✓			✓	✓		✓	
Regional Wellbeing Survey	Annually	Yes	Yes	Data are produced for RDA and NRM regions, and for some LGAs where sample size large enough. Used by a number of State and Federal government agencies, some local government and regional organisations, as well as by some agricultural organisations to track social conditions in the Basin. However, has not been used comprehensively to examined social conditions in the Basin.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Australian Bureau of Statistics Agricultural	Census – 5-yearly Survey – annual	Yes	Yes	Census – small area data are produced. Survey - NRM region is the smallest scale Widely used to understand agricultural production and value of agricultural production,					✓							

[1] The numbers refer to the following themes: (1) Health – physical and mental; (2) Education, knowledge and skills; (3) Social capital, (4) Standard of living; (5) Employment; (6) Built environment and access to services; (7) Governance, institutions and leadership; (8) Advantage and equality; (9) Citizen participation; (10) Security and safety; (11) Cultural identity; (12) Subjective wellbeing.

Data source	How often are data produced?	Are Basin data currently available?	Could Basin data be reported?	Is data being used currently to assess social conditions in the Basin? At what scale? Could it be used this way if not already occurring?	Which aspects of wellbeing and resilience does this data set provide insight into?[1]											
					1	2	3	4	5	6	7	8	9	10	11	12
Survey and Census				as well as engagement in some land management practices												
ABARES Farm Surveys	Annual	Yes	Yes	Sample size does not permit small area analysis. Widely used to understand economic performance of farming sector; sometimes collects data relevant for social indicators as well.				✓	✓							
Household Income and Labour Dynamics in Australia (HILDA) survey (sample size 17,700)	Annual	No	No	While data can be analysed to compare those living in the Basin with those outside, the sample living in the Basin is small (typically <600 people each year for the Basin)	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
ABS National Health Survey (sample size 21,000 people) and Health Survey	Three-yearly (most recent 2017-18)	No	Yes – requires special data order and permission to access data set	While data are released by State and Territory, and for key health network districts, publicly released data does not enable comparison of communities within and outside Basin; however special data orders from the ABS can enable this. Not currently used to monitor social conditions in the Basin. Data by region are reported in *Progress in Australian Regions*.	✓										✓	✓

Data source	How often are data produced?	Are Basin data currently available?	Could Basin data be reported?	Is data being used currently to assess social conditions in the Basin? At what scale? Could it be used this way if not already occurring?	Which aspects of wellbeing and resilience does this data set provide insight into?[1]											
					1	2	3	4	5	6	7	8	9	10	11	12
Australian Longitudinal Study on Women's Health (sample size 57,000 women)	Three-yearly	No	Yes – requires permission to access data set	Has not been used to examine social conditions in the Basin; has substantial data on women's health and safety, time use, and key events in their lives. Could be used in future to examine social conditions relevant to women in the Basin.	✓		✓			✓		✓	✓	✓	✓	✓
Progress in Australian Regions (PAR)	Indicators updated based on available data	No	Yes, potentially (underlying data sets would in many cases enable analysis of Basin)	Data are produced at SA3 and SA4 scale; this enables some approximation of Basin conditions, however does not align to boundaries of Basin. PAR analyses a wide range of data sources by region to produce measures of progress; they have invested in custom data orders that often analyse these data sets at smaller geographic scale than is available publicly from the source data set, and provide some of the only available data on Australia's regions at small scales, including many regions within the Basin.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Australian Early Development Census/ Australian Early	3-yearly (most recent 2018)	No	Yes - Can be produced through analysis of	Data can be analysed for different Basin communities; while this has been done for some, there has not been Basin-wide analysis of this data to identify social conditions experienced by Basin children.		✓						✓				

Data source	How often are data produced?	Are Basin data currently available?	Could Basin data be reported?	Is data being used currently to assess social conditions in the Basin? At what scale? Could it be used this way if not already occurring?	Which aspects of wellbeing and resilience does this data set provide insight into?[1]											
					1	2	3	4	5	6	7	8	9	10	11	12
Development Index (approx. 300,000 children)			microdata set													
National Aboriginal and Torres Strait Islander Social Survey (NATSISS) (sample of 11,000 Aboriginal and Torres Strait Islander people)	6 yearly (most recent 2015)	No	Yes - can be analysed for Basin by special data order	The NATSISS has a sample large enough that it would be possible to analyse social conditions for Aboriginal and Torres Strait Islander people living in different regions of the Basin; this would require special data order from the ABS. To our knowledge, this type of analysis has not been done.	✓	✓		✓	✓	✓		✓		✓	✓	✓
Mayi Kuwayu (National Study of Aboriginal and Torres Strait Islander Wellbeing, Australian	First full wave conducted in 2019	No	Basin data expected to be available; requires applying for permission	Mayi Kuwayu will produce the largest data set examining wellbeing of Aboriginal and Torres Strait Islander people in Australia, with the first survey sent to 180,000 people in early 2019 and expected to result in a large data set. This will be able to be analysed by geographic location in the Basin, but analysis requires applying for access to the dataset.	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Data source	How often are data produced?	Are Basin data currently available?	Could Basin data be reported?	Is data being used currently to assess social conditions in the Basin? At what scale? Could it be used this way if not already occurring?	Which aspects of wellbeing and resilience does this data set provide insight into?[1]											
					1	2	3	4	5	6	7	8	9	10	11	12
National University)			to access data set													
ABS – Labour Force Survey (26,000 households) and Small Area Labour Market (SALM) series	Monthly (labour force data)	Yes	Yes	Labour Force Survey (LFS) data can be reported to a reasonable level of geographic detail. The SALM data set, available publicly, reports LFS data for small geographies and enables analysis of different Basin communities over time				✓	✓							
ABS – Multipurpose Household Survey (MHS) (26,000 households)	Varies	No	Yes, requires special data order (PAR includes examples of what is possible)	The Multi-Purpose Household Survey is a monthly survey delivered with the Labour Force Survey, with rotating topics. The topics vary each month, and sometimes there is a large enough sample that use of micro-data sets can identify Basin-wide characteristics on topics such as cultural activities, crime victimisation, workplace injury, participation in sport, engagement with environmental activities, and others. This dataset has not been explored in past studies to compare social conditions within and outside the Basin, or to compare regions within the Basin. PAR produces some data by regions from the MHS, but not by Basin regions.	✓			✓		✓		✓	✓	✓	✓	

Data source	How often are data produced?	Are Basin data currently available?	Could Basin data be reported?	Is data being used currently to assess social conditions in the Basin? At what scale? Could it be used this way if not already occurring?	Which aspects of wellbeing and resilience does this data set provide insight into?[1]											
					1	2	3	4	5	6	7	8	9	10	11	12
Australian Curriculum Assessment and Reporting Authority	Annual (some aspects 3-yearly)	No	Yes, requires special data order	The ACARA reports on results from nationwide testing of overall literacy, numeracy, science literacy, civics and citizenship, information and communication technology for different school year levels. This provides potential to analyse education outcomes in different parts of the Basin and outside the Basin.		✓										
Workplace injury	Annual	No	Yes		✓							✓				
Road safety – State and Territory agencies	Varies	Not publicly available	Yes, requires work obtain and analyse data	Data on road safety are typically collected at State and Territory level; BITRE provides some national-scale reporting on road safety, but not by localised region	✓											
ABS Counts of Australian Businesses	Annual	Yes	Yes	Provides data on number of business entries and exits by business employment size, turnover and industry. Can provide useful data on changing availability of job opportunities and economic diversity relevant to measuring resilience in particular.					✓							
Australian Electoral	By election	No	Yes – requires	AEC data on elections can be analysed to identify the extent of non-participation in voting, and the							✓		✓			

Data source	How often are data produced?	Are Basin data currently available?	Could Basin data be reported?	Is data being used currently to assess social conditions in the Basin? At what scale? Could it be used this way if not already occurring?	Which aspects of wellbeing and resilience does this data set provide insight into?[1]											
					1	2	3	4	5	6	7	8	9	10	11	12
Commission (AEC)			additional analysis	extent of informal voting, by region (see PAR for examples of this)												
National Centre for Social and Economic Modelling	Range	Yes	Yes	NATSEM produces the Child Social Exclusion Index, and the Small Area Indicators of Wellbeing for Older Australians. These draw on many of the data sources listed in this table and produce data for small areas not available elsewhere.	✓			✓	✓			✓				
Other ABS surveys	Varies (every 4 to 6 years, sample sizes 11,000 to 20,000)	No	Potentially	Key surveys include Household Expenditure Survey and Survey of Income and Housing – 6 yearly; General Social Survey – 4-yearly; Waste Management Transport and Motor Vehicle Usage Survey. Usually can be analysed only at relatively large spatial scales, however data orders can enable examination of different parts of the Basin to some extent.				✓	✓	✓		✓			✓	

Conclusions – key gaps and recommendations

Our review highlights that while there is growing consensus about the factors that are most important to the wellbeing and resilience of communities, many of these factors have not been examined in-depth for Basin communities. As a result, current understanding of social conditions in the Basin is limited primarily to an understanding of how Basin communities are changing in terms of their demography, with very limited understanding of the wellbeing and resilience of communities.

In particular, there are gaps in:

- Understanding of aspirations and key challenges of different Basin communities; there is both capacity to better analyse existing data and to more systematically identify this across the Basin using collaborative processes
- Understanding of the diversity of experience across different Basin communities and across different groups of people in the Basin
- Understanding of social systems, with most studies examining only one or two aspects of wellbeing or resilience and not identifying how different factors are interacting with each other to affect overall wellbeing and resilience of communities.
- Analysis of existing data: large volumes of data exist on social conditions that have not been analysed in depth
- Availability of some data: there is very little data available to analyse some key factors known to influence wellbeing and resilience, particularly social capital and effectiveness of government and local organisations in Basin communities

Overall, current knowledge of social conditions in the Basin is characterised by (i) in-depth social profiles that highlight demographic change but not necessarily including factors influencing wellbeing and resilience, (ii) studies that examine aspects of wellbeing and resilience in-depth for specific areas of the Basin but do not have a Basin-wide perspective or provide examination of all dimensions of wellbeing and resilience, (iii) multiple data collections that have not been used to the fullest extent possible to examine social conditions in the Basin and (iv) gaps in availability of some types of social data. Where there is consistent data available, it is also typically limited either in terms of time (much of the available data identified is collected only once every few years), geographic scale (many data sources cannot be used to examine local communities due to low sample sizes), or scope (there is limited data available for a number of aspects of wellbeing and resilience).

To address these gaps, we recommend:

1. Better identification of the aspirations of different Basin communities and groups and challenges they are experiencing, to better understand which aspects of wellbeing and resilience are most important to them. Processes used to achieve this need to actively engage with all types of Basin residents, rather than using passive engagement methods that are likely to achieve only a limited perspective on the range of experiences in the Basin.
2. Analysis of existing data to better understand current social conditions affecting wellbeing and resilience in the Basin. There are substantial amounts of data available that have not been utilised to the extent they could be to understand social conditions in Basin communities. These should be analysed in more depth, to

provide those living in Basin communities better information to inform discussions about their communities. Ideally, Basin communities should be engaged in analysing and interpreting these data: doing this is the most effective way to achieve a shared understanding of the wellbeing and resilience of their communities and agreement on the meaning of social data (Schirmer 2013)

3. Collection of additional data where gaps exist. In several areas, there are gaps in availability of data. Ideally, additional data should collect information on these areas, and enable more detailed analysis at smaller scales. However, this is a lower priority than improving utilisation of existing data that is already available, and enabling communities to have a role in discussing and interpreting that data. Ideally analysis of existing data, and collection of data on aspirations and challenges, should occur before collecting additional data on wellbeing and resilience. This is because analysing existing data and understanding aspirations and challenges may better identify whether and what types of additional data are needed to fully understand social conditions in the Basin.

Meaningful future analysis of social conditions should ensure appropriate processes of community consultation and engagement in identifying aspirations and challenges, and in interpreting meaning of data to better enable Basin residents to achieve shared understandings of conditions in their communities, and use these to develop strategies for achieving aspirations for the future.

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Appendix 1

This appendix reviews multiple wellbeing and resilience frameworks to identify what types of factors are considered important to measuring wellbeing and resilience. Ten wellbeing frameworks (including 3 Australian and 8 international frameworks) and five existing documents reviewing a large number of resilience frameworks were used to identify the 'domains' of wellbeing and resilience considered important to measure in different frameworks. The wellbeing frameworks examined were:

1. Measures of Australia's Progress (Australian Bureau of Statistics) and the Progress in Australian Regions (Department of Infrastructure and Regional Development), with the latter drawing on the former and publishing an annual report on changing social and economic conditions in Australia's regions, including the Basin
2. Gross National Happiness Index (Bhutan) (Ura et al. 2012, CBH 2016)
3. Canadian Index of Wellbeing (Canada) (Canadian Index of Wellbeing 2016)
4. German National Wellbeing framework (Germany) (Die Bundesregierung 2017)
5. New Zealand Living Standards Framework (King et al. 2018, New Zealand Government 2018)
6. How's Life initiative (OECD) (OECD 2018)
7. Sustainable Development Goals (UN) UN 2015
8. Social Progress Index (Social Progress Imperative 2018)
9. National Outcomes for Scotland (Scottish Ministers 2018)
10. Australian National Development Index (ANDI 2019)
11. National Strategic Framework for Aboriginal and Torres Strait Islander Peoples' Mental Health and Social and Emotional Wellbeing (NSF), and (Commonwealth of Australia 2017)
12. Regional Wellbeing Survey (University of Canberra) (Schirmer et al. 2015, 2016)

Five resilience frameworks and reviews of resilience measurement approaches were examined:

1. IFRC framework for community resilience: developed by the Red Cross, this examines what factors are important for predicting resilience of communities in a wide range of circumstances, particularly under challenging circumstances (IFRC 2014) (R1)
2. A review of 39 resilience frameworks that critically examined what was important to measure for resilience across these, produced by the ODI and Resilience Measurement Evidence and Learning Cop (2016) (R2)
3. Outcomes of a workshop at which participants with experience in measuring resilience discussed common lessons learned about best practice measurement (National Research Council 2015) (R3)
4. A review of 17 resilience frameworks by Schipper and Langston (2015) (R4)
5. A review of 36 community resilience assessment tools by Sharifi (2016) (R5).

Together these provided comprehensive insight into the factors important to understand about social conditions when investing in measuring wellbeing and resilience.

However, Table A1 is limited in its representation of the resilience literature, as it lists different factors separately without considering how they interact in systems. As noted in the main body of the report, a critical and central feature of socio-economic resilience frameworks is their emphasis on understanding system-wide interactions across scales. While the concepts in Table A1 are relevant, a true analysis of resilience will bring this information together to understand systems dynamics and thresholds of change – as noted in the main body of the report, this is something that is missing in most available data and reports on social conditions in the Basin. Resilience frameworks also often focus on understanding the flexibility, robustness, resourcefulness, recovery capacity and redundancy of different aspects of a community, as well as sometimes on the inclusiveness, integration and reflectiveness of a community (National Research Council 2015, ODI and Resilience COP 2016), whereas wellbeing frameworks focus on measuring how 'good' they are in terms of supporting quality of life and on inclusiveness, without necessarily examining flexibility, robustness or redundancy – meaning that similar measures are sometimes evaluated in very different ways.

Table A1 Summary of domains commonly included in wellbeing frameworks

Domain	Description	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	R1	R2	R3	R4	R5
Subjective wellbeing	Subjective measures of wellbeing ask a person to self-rate their overall satisfaction with aspects of their life. They are increasingly recognised as important measures of both wellbeing and of resilience, as satisfaction with life is an important predictor of ability to cope successfully with challenges and take advantage of opportunities.		✓	✓		✓	✓			✓	✓	✓	✓		✓	✓		✓
Human health	Indicators of health (physical and mental) from life expectancy, rate of prevalence of different health problems, access to health services, quality of care, and equity of health opportunity. Resilience frameworks often focus on identifying groups with poor health or disabilities that may create challenges adapting to change.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Employment	Availability and quality of employment, with indicators including unemployment rate, employment rate, underemployment, real wages/salaries, job satisfaction, and access to employment opportunities). Sometimes subsumed into 'Standard of living' (e.g. CIW). In resilience frameworks, often examined in relation to diversity of opportunity.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Education, knowledge, skills	Access to and uptake of educational opportunities, including equity of access, proportion population achieving specific levels of attainment, educational mobility across generations, access to training opportunities, and to formal and informal skills development opportunities. Sometimes broadened to include knowledge, research, innovation and development related indicators.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Access to information/ communi-cation	Resilience frameworks often focus on awareness of risks and skills to adapt to change, and availability of information such as risk information (risk of bushfire, for example, or weather information), as well as on effectiveness of communication in a given region or community.												✓	✓	✓	✓	✓	✓
Work-life balance/ Time use /	Extent to which population has an appropriate balance between life and work, including comparing actual to preferred working hours, commuting time, satisfaction with work-life balance. Can also examine whether sufficient sleep hours are being achieved.		✓	✓	✓	✓	✓			✓	✓		✓					

Domain	Description	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	R1	R2	R3	R4	R5
leisure / recreation																		
Standard of living/ Living standards	This domain measures some or all of standard of living (relative income to cost of living), with indicators such as security and sufficiency of household income, equivalised household income, Gini coefficients, poverty rates, self-rated prosperity, cost of living indexes. Typically focuses on measuring material comfort related to financial security, quality of housing and assets, and income of households. In resilience literature, this is often examined in relation to flexibility (see later row in this table 'Flexibility').	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Social capital/ social connections / community vitality	Measures of strength of household and community social networks, measuring using indicators such as time spent with family and friends, engagement in volunteering, engagement in community and sporting groups, broader civic engagement, access to help from others, sense of belonging. Also referred to as 'social attachment' (MAP) and 'community vitality' (GNH, CIW). Resilience frameworks often focus on the quality of communication as well as support provided through social networks.	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓
Environ-mental health	Includes a wide range of measures of environmental health, often focused on action to address climate change, greenhouse gas emissions, air quality, biodiversity, energy use, soil health, water quality and quantity, land clearance, land degradation rate, health of marine environment, waste management, and invasive species. Sometimes also measures environmental resilience, and experience of natural disasters (GNH), and engagement in environmental stewardship (MAP, GNH). Some have multiple domains for environmental health (SDGs).	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environ-mental appreci-ation, steward-ship, time outdoors	This examines whether people have pleasant landscapes to live in, are able to spend time outdoors, have nature connection, and/or are able to contribute to taking care of environmental health through appropriate engagement in stewardship activities.											✓	✓		✓			

Domain	Description	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	R1	R2	R3	R4	R5
Connection to land, connection to Country	This domain is rarely included, but focuses on human connections to their land and the natural environment, ability to fulfil identity and responsibilities through this connection, and wellbeing benefits of connecting to nature in meaningful ways.											✓	✓					
Spiritual/ religious wellbeing	This domain focuses on having a sense of purpose and meaning through spirituality or religious beliefs and practice.											✓						
Built environment and access to services	Quality and liveability of the built environment including access to suitable housing, vulnerability of infrastructure to damage in events such as drought and high rainfall, exercise opportunity, public transport, access to private transport, reliable high speed internet, electricity/gas, entertainment and retail services, access to service and cultural facilities). Resilience literature often emphasises access to emergency services, and availability of critical infrastructure.	✓		✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
Cultural identity	Sometimes included as a separate domain, and sometimes included in other domains such as citizen participation and work-life balance, this focuses on opportunities for fulfilling cultural identity and/or leisure/recreational opportunities. This may for example include proportion of people speaking Indigenous languages and participation in arts and cultural activities, and sense of cultural identity. In some frameworks, cultural identity is separated as a domain from leisure/arts related activity (e.g. NZ, NSF).	✓	✓	✓	✓	✓				✓	✓	✓	✓		✓	✓		✓
Economic performance	Health of the region's economy, measured using indicators such as regional income, regional wealth, real GDP per capita, consumption, saving, inflation rate, investment rate, public and private debt, public and private investment in R&D, productivity. Sometimes broadened to include measures of economic competitiveness, openness of economies to trade.	✓			✓			✓		✓	✓			✓	✓	✓	✓	✓
Security and safety	How secure a safe a region or community is, measured using indicators such as crime rates, fear of crime, sense of personal safety, domestic violence rates, confidence in police	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓
Citizen participation	Opportunities for citizens to be actively engaged in government and community decision making processes and to have their voice heard, measured using indicators such as (in countries with non-	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓

Domain	Description	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	R1	R2	R3	R4	R5
	compulsory voting) voter turnout, perceived ability to influence political decision making, confidence in having voice heard, extent and quality of community processes.																	
Governance and institutions	Level of democracy, transparency, openness, quality, and honesty of government processes and services, measured using indicators such as confidence in government. Some also include indicators identifying whether all citizens have access to key sets of rights; others examine these separately. Resilience frameworks often specifically focus on presence of effective systems for responding to change and to stressful events, with the quality of decision making and action processes the focus.	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Leadership and strategy	Presence of strong and effective leadership that enables development of effective strategies and policies to adapt successfully to change and cope with difficult times (sometimes included in governance and institutions).												✓	✓	✓	✓		✓
Rights and respons-ibilities	Whether citizens all have access to appropriate rights and participate in enacting their responsibilities as citizens.	✓			✓			✓	✓	✓				✓	✓			
Advantage and equality	Ensuring equal rights and access to opportunities for all people, measured based on relative access to opportunities of different groups, relative rates of arrest and incarceration, average income and education for different groups in society, economic disadvantage and inequality. Many domains listed above can have specific measures of equality/inequality embedded in them and measuring equity is often considered a 'cross-cutting' theme that should be embedded in every domain.	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Prepared-ness and response	Specific to resilience frameworks, this focuses on preparedness for events that may cause stress or risk to wellbeing or safety, and adequacy of response capacity. Not typically included in wellbeing frameworks.												✓	✓	✓	✓		✓
Diversity, flexibility and system redundancy	Having a diversity of options and choices is often emphasised as a measure of resilience in socio-economic resilience frameworks. Communities which provide a greater range (diversity) of options and choices, for example in terms of livelihoods, social networks, and forms of support, are considered more resilient than others. Flexibility and system redundancy refers to the idea that												✓		✓	✓	✓	✓

Domain	Description	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	R1	R2	R3	R4	R5
	communities are able to achieve key objectives via a range of means and can flexibly choose between them when one becomes less viable: for example, having more than one road that can be used to transport produce, so that if one is cut off during a flood, the other can still be used; having multiple sources of household income or having reserves of key resources such as income, food and fuel for use in times when normal supply is disrupted.																	
System interdep-endencies and cumulative stresses	This refers to understanding how one part of a community's socio-economic wellbeing and performance depends on others, including across scales and between different sectors of the economy and of groups within the community. Cumulative stresses refers to understanding the interactions between different stresses experienced by a community, and is a feature of some resilience frameworks, but rarely examined in wellbeing frameworks. A community that is experiencing multiple stresses simultaneously can be expected to												✓		✓	✓	✓	✓

Appendix 2 Examples of local and regional processes that have identified aspirations and challenges of Basin residents or other parts of regional and rural Australia

The following table outlines Strategic Plans and report developed for a range of Regional Development Australia (RDA) regions, most located within the Basin as well as a selection of 10 individual local government reports and plans. These are all examples of processes in which

Details	Type of document	Geographic scope	Stakeholder engagement/ consultation undertaken in developing the plans?	Time-frame	Short description
Murraylands and Riverlands RDA 2020 Strategic Plan https://rdamr.com.au/wp-content/uploads/2018/02/RDAMR_2020-Strategic-Plan_FINAL-1.pdf	RDA report	Murraylands and Riverlands RDA, SA	'The issues faced by the region identified through strategic plan consultation'	2012-2016	The Strategic Plan includes a detailed social and economic profile for the region, and the visions and hopes for the region moving forward. Number one priority is water and energy efficiency.
Limestone Coast RDA 2019-2022 Strategic Plan https://www.rdalc.org.au/wp-content/uploads/2019/07/RDALC-Strategic-Plan-2019.pdf	RDA report	Limestone Coast RDA, SA	'The plan is informed by ongoing consultation with partners'	2019-2022	The Strategic Plan uses the 'five capitals' framework.
Loddon Mallee Regional Strategic Plan 2015-2018 https://www.rdv.vic.gov.au/__data/assets/pdf_file/0005/1159241/Loddon_Mallee_RSP-1-Web.pdf	RDA report	Loddon Mallee RDA, Victoria	'This Plan outlines Aspirations and Strategic Directions based on extensive consultation'	2015-2018	The aspirations set out in the Strategic Plan include having a diverse and robust economy; a thriving and sustainable agriculture; prosperous, connected and resilient communities; vibrant regional cities and centres; and enhanced natural and cultural heritage. The document also includes social and economic experiences. While the document outlines various challenges met by the agricultural industry, there is little mention of water availability or water trade. One of the last priority area for infrastructure is to continue modernisation of irrigation infrastructure.

Hume RDA Regional Plan 2010-2020 https://www.rdv.vic.gov.au/__data/assets/pdf_file/0006/1147794/HumeStrategy-2010-2020.pdf **Central Hume Sub Regional Plan** **Goulburn Valley Sub Regional Plan** **Lower Hume Sub Regional Plan** **Upper Hume Sub Regional plan** https://www.rdv.vic.gov.au/regional-development-australia/hume	RDA report	Hume RDA, Victoria	Includes a consultation and engagement schedule in Appendix 3 to the Hume RDA Regional Plan.	2010-2020	The Strategic Plans outline social, economic and environmental challenges and opportunities. There are five main themes presented, in this order: Environment, community, economic, transport and land use.
Murray RDA Regional Plan 2016-2019 https://www.rdamurray.org.au/assets/Uploads/RDA-Murray-Doc-LOW-RES-for-website.pdf?	RDA report	Murray RDA, NSW	'Stakeholder input and involvement have been critical in developing the Regional Plan' - Stakeholder and consultation partnerships are outlined in Attachment 2	2016-2019	The Strategic Plan includes an overview of the social and economic experience of the region, and the challenges and opportunities it faces. The strategic areas include planning for a changing population demographic; embracing the changing nature of industry and commerce; adapting to climate change and water availability (including water allocation restrictions); collaborating to enhance education and skills development; and supporting infrastructure development.
Riverina Regional Profile https://static1.squarespace.com/static/59ae4a2a6f4ca38d47990cd8/t/5a794441419202954df358c1/1517896799100/RDA001-Riverina-Profile-S3V1-DIGITAL.pdf **Riverina RDA Regional Plan 2013-2016** https://static1.squarespace.com/static/59ae4a2a6f4ca38d47990cd8/t/59b08f70ccc5c56aaeba197d/1504743302432/Regional-Plan-2013-2016-011.pdf	RDA report	Riverina RDA, NSW	Stakeholder engagement and consultation is included in Appendix 2 to the Regional Plan.	2013-2018	The Regional Profile gives an overview of social and economic experiences in the region. The Regional Plan includes the following goals: To proactively encourage greater economic growth, diversity and industry innovation; to nurture the development of a sustainable environment for future generations including the development of an innovative response to the water challenge (with specific reference to supporting the Murray Darling Basin Plan); to support education and skill development initiatives that enable all people to have the capacity & confidence to contribute to the region's growth; to facilitate a collaborative approach between all tiers of government,

					business and community to solving the challenges of the region; to encourage a proactive approach to health and living.
NSW Central West Regional Economic Profile https://rdacentralwest.org.au/wp-content/uploads/2015/03/NSW-Central-West-Regional-Economic-Profile-2015.pdf **Central West Strategic Planning Framework 2017-2020** https://rdacentralwest.org.au/wp-content/uploads/2014/12/RDACW-Strategic-Planning-Framework_web.pdf	RDA report	Central West RDA, NSW	Not specified	2015	The Economic Profile includes a detailed social and economic overview for the region. The Strategic Planning framework includes 5 main themes: Regional competitiveness, human capital, sustainable communities, connectivity and partnerships.
RDA Orana Annual Business Plan 2019 https://documentcloud.adobe.com/link/track?uri=urn%3Aaaid%3Ascds%3AUS%3Aaac0fffd-5d1b-41a7-92f8-79a93c56ee9a	RDA report	Orana RDA, NSW	Not specified	2018/19	The Regional Plan gives a broad overview of the social and economic conditions of the region, highlighting opportunities and challenges (including water security), but is very business focussed.
Far West RDA Regional Plan 2013-2023 http://rdafarwestnsw.org.au/wp-content/uploads/2015/03/FINAL-RDAFW-Regional-plan-Final-version-21-October-2013.pdf	RDA report	Far West RDA, NSW	Stakeholder consultation and partnerships included in Annexure 2	2013	The Far West RDA Vision is to be economically diverse, prosperous, socially inclusive, environmentally sustainable, innovative and creative. The Plan includes an analysis of the social and economic experiences of the region, but is now a bit dated at 2013.
Northern Inland Regional Plan 2016-2019 http://www.rdani.org.au/files/pages/our-region/regional-plan/RDANI_Regional_Plan_V4___Web.pdf	RDA report	Northern Inland RDA, NSW	Four consultation methods used: a series of community meetings throughout the region to learn of	2016	Provides a broad overview of social and economic experiences, as well as community strengths and challenges. Key priority areas for the region include community regeneration and sustainable population growth; industry diversification, job creation, capacity building and resource

			the aspirations of residents, analysis of existing RDANI plans and projects, demographic research, and review of Local, State and Federal plans.		efficiency; investment in regional infrastructure, education and skills.
Marsden Jacob Associates. 2012. Darling Downs and South West Economic and Social Development Strategy. Prepared for RDA Darling Downs and South West Inc. **https://www.rda-ddsw.org.au/fileadmin/user_upload/DDSW_Economic___Social_Development_Strategy_-_Marsden_Jacobs_.pdf**	RDA report	Darling Downs and South West RDA, QLD	Consultation meetings used to identify future directions and activities	2012	The Strategy was motivated by potential impacts of the MDB Plan, however, the strategy also targets regional issues wider than the Basin Plan as it is considered only one issue in the region. The report provides a baseline social and economic state of the region, and assesses potential impacts of the MDB Plan on the region.
CQ University. 2015. Community Satisfaction. Results of the 2014 survey of residents. Central Highlands Regional Council. **Central Highlands Regional Council Community Profile, QLD** **Central Highlands Regional Council Economy Profile, QLD** **http://www.centralhighlands.qld.gov.au/about-central-highlands/living-in-the-region/community-profile/**	Council reports	Central Highlands Regional Council, QLD	Community satisfaction survey. Extensive public consultation was an important part of developing the Murweh Shire Long Term community Plan.	2014-2016	Website for detailed community profile and economic profile for the council. Community satisfaction Report summarises findings of the biennial Central Highlands Regional Council Community Survey, examining community perceptions of CHRC and satisfaction levels with existing services and facilities along with issues relating to general community wellbeing The regional profile gives an overview of the social and economic conditions of the region.
Murweh Shire Council. Long term community plan 2012-2022.	Council plan	Murweh Shire Council, QLD		2012-2022	The community plan includes a community profile for the region, as well as shared community visions and plans for the council

https://www.murweh.qld.gov.au/documents/17328/43005003/Community%20Plan%202012-2022					
South Burnett Regional Council Annual Report 2017/18. http://www.southburnett.qld.gov.au/documents/ 41153986/42951224/2017-18%20%20 Annual%20Report%20-%2013%20-%20Full%20Report	Council report	South Burnett Regional Council, QLD	A series of workshops and various consultation platforms were provided in developing the report and Plans	2017/18	The Annual report includes a section on the community vision and priorities, including building vibrant, healthy, supportive and inclusive communities; building a strong and sustainable regional economy supported by diverse sectors; building a sustainable environment etc.
Maranoa Economic and Community Plan http://www.mymaranoa.org.au/residents/community-feedback/Documents/Economic%20and%20Community%20Development%20strategy%2026%20Oct%2017%20-%20v7.pdf **Maranoa community profile** http://www.mymaranoa.org.au/residents/our-community/demographics-statistics	Council reports	Maranoa Regional Council, QLD	Not specified	2017/18	The Economic and Community Plan outlines main objectives, but each community has it's own set of objectives, targets and implementation strategies. The Council website provides a community profile section on social and economic conditions in the local region.
Western Downs Annual Report 2017/18 https://www.wdrc.qld.gov.au/wp-content/uploads/2018/11/WDRC-Annual-Report-2017-2018.pdf **Western Downs Economic Development Strategy** https://www.wdrc.qld.gov.au/wp-content/uploads/2017/05/Economic-Development-Strategy-2017-2022.pdf	Council reports/plans	Western Downs Regional Council, QLD	Yes, but limited details	2017/18	Documents relating to both social and economic experiences in the years 2017/18 as well as economic and social visions.
IRIS Research. 2017. Toowoomba Regional Council Community Satisfaction Survey 2017. Prepared for Toowoomba Regional Council.	Council reports	Toowoomba Regional Council, QLD	Community telephone survey. The community vision statements within the	2017	Results of a telephone survey of 822 residents show that overall Toowoomba region residents have a strong sense of community, and are driven to feel a part of the community, but that council needs to play an important role in creating that sense of community in the region. They generally value

http://www.tr.qld.gov.au/about-council/council-governance/plans-strategy-reports/various-documents/13200-community-survey-2017 **Toowoomba Regional Community Plan** http://www.tr.qld.gov.au/about-council/council-governance/plans-strategy-reports/various-documents/3092-community-plan			Community Plan are the result from community engagement processes and reflects the words of the community.		the Council's vision for the future and find it important to have policies in place to protect and manage the region's natural resources. They also highlight a difference in needs and hopes between different communities, for example between urban and rural communities. The Community Plan includes a regional profile, and the shared vision for the community.
Wentworth Community Strategic Plan 2017-2027 http://www.wentworth.nsw.gov.au/f.ashx/2027-Community-Strategic-Plan-FINAL.pdf **Wentworth Shire Council Annual Report to the Community 2017/18** http://www.wentworth.nsw.gov.au/f.ashx/Wentworth-Shire-Council-Annual-Report-2017-18.pdf	Council reports	Wentworth Shire Council, NSW	Extensive community consultation was conducted in developing and updating the Community Strategic Plan. Direct quotes are included throughout the document to highlight community concerns and visions.	2017	The Community Plan provides a brief summary about the community. Their vision is to have 'a thriving region, supported by a robust economic base, distinctive open spaces, and strong local governance and leadership'. The Annual Report provides some social and economic experience information, but limited.
Mildura Community and Council Plan 2017-2021 file:///C:/Users/s428393/Downloads/Community-and-Council-Plan-2017-2021.pdf **Mildura Annual Report 2017/18** file:///C:/Users/s428393/Downloads/Annual-Report-2017-2018.pdf	Council reports	Mildura Rural City Council, VIC	An extensive consultation process was conducted in developing the Community and Council Plan in 2017	2017	The Annual Report gives a brief community profile. In developing the Community Plan, 1155 residents completed a survey, 131 engagement activities and events were held, and 28 drop in stalls were held. The Plan details their vision and goals in 4 main areas: Community, environment, economy and council.
The Coorong Annual Report 2017/18 http://www.coorong.sa.gov.au/webdata/resources/files/2017-18%20Annual%20Report,%20final.pdf	Council reports	The Coorong District Council, SA	Issues raised and visions heard from the consultation process included in the Social Plan.	2017/18	The Annual Report and Social Plan summarise community profiles, social and economic conditions in the region, including outcomes on key actions and projects in community wellbeing, infrastructure, township, prosperity and sustainability, leadership and collaboration. The report also

The Coorong Social Plan http://www.coorong.sa.gov.au/webdata/resources/files/Social%20Plan,%20adopted%2025%20June%202013.pdf					includes sections on environmental management, agricultural aspects, and community development.
Alexandrina Council Community Strategic Plan 2014-23 http://alexandrina.sa.gov.au/webdata/resources/files/2014-23%20Our%20Community%20Strategic%20Plan.pdf	Council reports	Alexandrina Council, SA	Consultation processes in place as part of the Community Strategic Plan	2017/18	Summary of community visions and plans

Appendix 3 Explanation of themes presented in Figures 1 and 2

Appendix 3 provides more detail about the content of each theme shown in Figures 1 and 2, identifying the types of comments that were included as being part of each theme.

Table A32.1 Positive contributors to community wellbeing identified by residents

Theme - Positive	**Positive comment description**
Good social connectedness and cohesion	Dominated by descriptions of different types of social interactions, such as comments about the people in the community (great people, like minded people, contributing members of the community, involved people, participation etc) as well as social groups, sporting groups, volunteering, charities and fundraisers, closeness to family and friends, various organisations, groups and clubs, community members and neighbours helping and supporting each other, community spirit and pride, working together for a common goal or coming together to enjoy social events, feelings of safely, and having young people and families in the community
Good community activities and events	Positive comments about various activities, events, festivals, concerts, markets, arts/music/cultural events, entertainment, gatherings etc often with additional comments indicating that the opportunity to engage in these events bring the community together to socialise, as well as brings money into the community.
Good facilities, services and infrastructure (exc. health, transport)	Generally in reference to good facilities, services and amenities, including aged care facilities, public centres and venues, schools, city areas, shopping facilities, cafes, restaurants, coffee, swimming pools, gyms, playgrounds, recreational areas, galleries and police. It also includes comments about new facilities or services being built.
Good access to outdoor spaces	Many positive comments about parks and open spaces, or access to national parks, but also some general use of the work including things like 'festivals in the park' etc. Positive comments about the general environment, natural areas, bush, and scenery, as well as specific mention on beaches, gardens, rivers, lakes, trees, water and fishing opportunities.
Good governance and institutions	Generally positive references to local government/council, government services and amenities and positive government support. Some more specific comments about having a good mayor, and general positive attitude to recent or upcoming elections/positive feedback on electorate. Also includes positive comments about the local government being progressive, and being inclusive and creating opportunities not only to socialise but also opportunities for employment.
Good health services and infrastructure	Positive comments about mental health facilities/services/support, high wellbeing in the community, good facilities and services that promote wellbeing, good health care facilities and services, hospitals, medical centres, a healthy community, good access to doctors and good access to exercise facilities.
Good weather/climatic conditions	Comments about good/needed rainfall, good weather, good seasons, pleasant climate, warm weather and the springtime.
Good lifestyle	Positive comments about the 'country/rural lifestyle', including low crime rates, a pleasant place to live, peaceful, relaxed, quiet, low traffic.
Good jobs/conditions in industries other than agriculture	Positive comments about various local industries such as mining and tourism, as well as general comments about employment contributions by local industries and contribution to the local economy.

Farming/agriculture going well	Positive comments were mainly about how the community get together to help struggling farmers, but also some positives around good commodity prices and conditions.
Drought bringing people together	Usually in relation to the community coming together to support farmers in 'drought'
Good transport infrastructure and services	Positive comments about the quality of, investment in or access to infrastructure such as transport services, busses, roads, tracks, trails, rail/trains. It includes comments about upgrades, improvements and redevelopments.
Low cost of living	Generally referring to low cost of housing as a positive.

Table A3.2 Negative contributors to community wellbeing identified by residents

Theme - negative	**Negative comment description**
Poor quality facilities, services and infrastructure (exc. health, transport)	Dominated by the lack of access to, inadequate, or low quality facilities and services offered by the town, including internet, NBN, aged and disability care services, schools, education, shopping facilities, footpaths, bike paths, poor streets, policing and parking. It also includes comments about closing businesses or empty shops. Many of the comments were specific to public facilities and services such as public schools, public streets and open spaces.
Negative impacts of drought	Drought, dry conditions, dry season, dry summer, dry periods.
Poor quality governance and institutions	Negative comments in relation to both local and federal government, with reference to general uncertainty, policies, decisions, legislation, interference etc. Comments about high council rates were common. Comments were also made about financial stress, financial inequity, uncertainty over future financial situation. Several comments were also made about homelessness in the community.
High cost of living	Dominated by comments about high cost of living in rural areas, in particular referring to general lack of affordable housing, rentals, property, fuel/petrol, utilities (electricity, gas, power). Also in this theme are some overlaps with other themes, for example, sometimes 'property' is referred to when talking about damage to property, 'gas' and 'power' are referred to when talking about greenhouse gasses or power stations, and 'money' is referred to when talking about wasting money. Additionally, sometimes comments were made more about the price of rentals being so low that it attracts unemployed families to the town.
Poor jobs/conditions in local industries other than agriculture	Focussed mainly on general downturn in various industries, instability of industry, lack of suitable employment in various industries, economic hard times and lack of employment. Some specific negative comments about mining, coal, and tourism.
Antisocial behaviour e.g. crime, lack of personal safety	Comments about various antisocial behaviour including crime, theft, vandalism, drugs, alcohol, violence, and abuse.
Health services and infrastructure	Comments about lack of decent access to medical services, hospitals, mental health services, quality doctor services, specialist doctors or the distance needed to travel to these specialists, as well as high mental health issues, health care issues, lack of access to various issues causing stress in the community (such as housing, crime, unemployment, industry)

Poor social connectedness and cohesion	Dominated by comments focussing on the lack opportunities to be social, social isolation, limited activities for youth to keep entertained, the struggle of attracting new people to the community, being unsettled by particular group or the difficulty of breaking into different groups, and general fear about what is happening in the community.
Negative impacts of water reform	Negative comments about water availability, water prices, water allocation, water diversion, lack of water, loss of irrigation water, no water for irrigators, no irrigation allocation, irrigators fighting over water, irrigation trade, some comments against irrigation taking water from the system but not many. Also negative comments about the Basin Plan.
Poor conditions in farming/agriculture	Generally about poor farming season, struggling farms/farmers, the struggling agricultural industry mainly due to drought, and difficulty in feeding livestock or sourcing feed, again mainly due to drought.
Poor transport infrastructure and services e.g. roads, public transport	General comments about poor transport services, including public transport and busses, and the lack of required infrastructure, unsustainable infrastructure, or the lack of investment needed in infrastructure, in particular road and other transport infrastructure such as rail.
Negative impacts of weather/climatic variability other than drought or unspecified	Comments relating to the lack of rain, bad or extreme weather conditions, uncertain weather conditions, dry or tough seasons (overlaps with drought), climate change, hot summers, heat and heat waves.
Lack of safe access to pleasant outdoor environment	Focus on environmental degradation, pollution, rubbish, air quality, noise and loss of nature. Some specific comments about barking dogs, unleashed dogs, dogs not cared for, dogs in certain areas, and also about insufficient walking or biking tracks.
Poor lifestyle	Negative comments about the 'country/rural lifestyle', including long travel distances for necessities such as health care or shopping, traffic congestion, trucks (logging, livestock, B doubles) on small country roads causing damage, and noise (development, trucks, windfarms, traffic).
Other	Several comments about fearful media, negative media and social media
Lack of or poor quality community activities and events	General comments about the lack of events that bring the community together.

Appendix 4 Summary of 50 studies reviewed for project

No	Reference	Why include?	Focus of study (scope)	Focus of study (concept)	Limitations of study	Key points	Identified gaps (from article and/or by review synthesis)
1	Greenhill, J., King, D., Lane, A., MacDougall, C. 2009. Understanding resilience in South Australian farm families. *Rural Society 19*(4), 318-325.	Highly cited Specific focus on resilience as a process rather than trait, partly in Basin	SA (partial MDB) Farmers	Resilience	• Focussed on drought effects to resilience only • Small geographic scope • Farmer only focus • Qualitative hence limited number (n=148)	• Regional differences matter (eg. climate, farm types) • ID farmers resilience factors (eg. financial security, education/research, community networks, individual capital, health and wellbeing) • Gendered experiences • Differences of impacts by age • "resilience is a complex process and needs to be understood in the context of wider social and economic systems." P.324	
2	Maybery, D., Pope, R., Hodgins, G., Hitchenor, Y., Shepherd, A. 2009. Resilience and well-being of small inland communities: Community assets as key determinants. *Rural Society 19*(4), 326-339.	Well cited Focus on small inland MDB communities, focus on resilience and wellbeing	MDB NSW	Resilience (community) (more as trait than process) Outcome/determinant of personal wellbeing with notions of social capital and cohesion	• Small survey hence limited number (n=102) and not generalisable • Self-selecting participants with obvious bias to community service	• Importance of social assets (resources such as strong relationships/capital built on shared values and trust, often enabled through community centres/facilities) for community resilience and personal wellbeing (social capital) • Importance of connectedness to others	
3	McCrea, R., Walton, A., Leonard, R. 2014. A conceptual framework for investigating community wellbeing and resilience. *Rural Society 23*(3), 270-282.	Well cited Good comprehensive descriptions of concepts and their potential interactions	Western Downs QLD	Community wellbeing Community resilience (as a process) – iterative relationship rather than correlation	Limited empirical testing, including understanding how interactions/processes vary across segments of communities.	• Dimensions of community wellbeing (from literature) • Dimensions of community resilience (from literature) • 7 community capitals (resources) • Understanding that community response will differ within/by communities depending on resource mobilisation.	

No	Reference	Why include?	Focus of study (scope)	Focus of study (concept)	Limitations of study	Key points	Identified gaps (from article and/or by review synthesis)
						• "Wellbeing and resilience are presented as distinct constructs, and we argue that they can be related in different ways in different situations." P.279 (depending on how community resources are mobilised)	
4	Winterton, R., Warburton, J. 2011. Does place matter? Reviewing the experience of disadvantage for older people in rural Australia. *Rural Society 20*(2), 187-197.	Well cited. Explicitly includes consideration of how resilience may differ in rural/regional areas	Older rural residents	Personal resilience and subjective wellbeing	Literature review	• Social connectedness/cohesion/social capital often found in rural areas positive for wellbeing when able to be accessed • Positive and negative effects of resilience • "As well as contributing to social isolation, the resilience of older people residing in rural communities can also mask forms of disadvantage." p.194	
5	McManus, P., Walmsley, J., Argent, N., Baum, S., Bourke, L., Martin, J., ... & Sorensen, T. 2012. Rural Community and Rural Resilience: What is important to farmers in keeping their country towns alive?. *Journal of Rural Studies 28*(1), 20-29.	Highly cited. Focus on rural communities	Two rural NSW regions (at least one in MDB)	Interactional community of place Rural resilience (as a system)	Qualitative (n=115)	• Variation between localities due to different circumstances • Social connectedness, cohesion & social capital important for resilience • Economy and environment important for resilience • "Resilience is not based on a single factor, nor is it related to economic issues or social issues separately. Rather, this analysis has suggested that perceptions of the local economy, environment and community are inter-related and resilience is dependent on all three simultaneously." P.28	
6	Tonts, M., Plummer, P., Argent, N. 2014. Path dependence, resilience and	Well cited. Under utilised economic theory	While not in Basin, taps into concepts	"Evolutionary economic geography "		• Variation between localities due to different circumstances (multiscalar processes)	Points to the insufficient integration of economic

No	Reference	Why include?	Focus of study (scope)	Focus of study (concept)	Limitations of study	Key points	Identified gaps (from article and/or by review synthesis)
	the evolution of new rural economies: Perspectives from rural Western Australia. *Journal of Rural Studies 36*, 362-375.		of regime shift that are important in thinking about Basin futures	- Path dependence - Resilience (economic) - hysteresis		• Potential for path dependency inhibits new development trajectories • "All of this points to the importance of multiscalar processes that manifest themselves locally as distinctive development pathways."	resilience in many current studies
7	Wilson, G. 2010. Multifunctional 'quality' and rural community resilience. *Transactions of the Institute of British Geographers 35*(3), 364-381.	Highly cited. Consideration of the multiple functions of rural communities	Non MDB	Multifunctional l qualities - Economic, Social, Enviro resilience - Vulnerability - Bourdieu capitals	Conceptual only	• Role/importance of multi-functionality for resilient and 'sustainable' rural pathways of change / development hence rural communities • Variation in resilience based on driving forces and available capitals	• Consideration of alternative economic concepts in the exploration and interpretation of the diversity of MDB economic contexts
8	Buikstra, E., Ross, H., King, C. A., Baker, P. G., Hegney, D., McLachlan, K., Rogers-Clark, C. 2010. The components of resilience—Perceptions of an Australian rural community. *Journal of Community Psychology*, *38*(8), 975-991.	Highly cited Comprehensive empirical study	Stanthorpe – single community	Bridging community resilience and individual resilience Resilience as a process	Single case study Strong participatory action research approach	• Resilience dimensions include: social networks and support; positive outlook; learning; early experiences; environment and lifestyle; infrastructure and support services; sense of purpose; diverse and innovative economy; embracing differences; beliefs; and leadership.	• Proposed holistic approach to community development and interventions is common across the studies – but empirical studies of such process are limited
9	Steiner, A., Atterton, J. (2015). Exploring the contribution of rural enterprises to local resilience. *Journal of Rural Studies 40*, 30-45.	Well cited Few studies on local business contributions to social conditions	Non-basin case (Whyalla and surrounds)	Private sector contributions to community resilience	Qualitative, non-generalisable	• Local businesses make direct and indirect contributions to local resilience • Context matters • Local businesses are agents of change, supporting/enhancing rural resilience through the modification of existing structures/ seeking of solutions to challenges.	• Given the importance of local business for resilience, further studies across the basin would help understand the differences of context to inform policy development. Similarly the role of the 3rd sector should be further studied.

No	Reference	Why include?	Focus of study (scope)	Focus of study (concept)	Limitations of study	Key points	Identified gaps (from article and/or by review synthesis)
						• A balanced approach supporting integrated economic, social and environmental resilience is required.	
10	Keys, N., Bussey, M., Thomsen, D.C., Lynam, T., Smith, T.F. 2014. Building adaptive capacity in south east Queensland, Australia. *Regional Environmental Change 14*(2), 501-512	Medium cites Good description of AC and its methods to determine AC, AC determinants and mechanisms to build AC	Non basin	Adaptive Capacity (as learning)	Small n qualitative although inductive approach Outside basin	• AC influenced not only by physical resources but more by dominant regional social, political and institutional cultures • Identifies potential resilience and wellbeing connections with improved AC	• Gap in understanding of social/political and institutional contexts across basin and influence on community conditions
11	Ross, H., Berkes, F. 2014. Research approaches for understanding, enhancing, and monitoring community resilience. *Society and Natural Resources* 27(8), 787-804.	Well cited Focus on methods to research community resilience	Non basin but provide good methodological understanding	Community resilience Methods of study	Literature review	• Scope for alternative methods including greater use of cumulative studies, historical studies, participatory (action) research methods, and systems approaches • "Indeed, given the significant overlap between adaptive capacity (a potential) and resilience (when that capacity becomes used in a process of overcoming adversity), it may well be that studies that set out to explore community resilience have actually identified adaptive capacity—or both." P.799	• Need for more methods/research that explore the coupling of social and ecological dimensions. • Need to also identify methods/analytical frameworks for connecting across the panarchy, for understanding the influences from the higher levels, how community resilience interacts other levels.
12	Stebbing, M.S., Carey, M., Sinclair, M., Sim, M. 2013. Understanding the vulnerability, resilience and adaptive capacity of households in rural Victorian towns in the context of long-term water insecurity. *Australasian Journal of*	Empirical study of small rural towns	Basin communities, Western Victoria	Vulnerability, resilience and adaptive capacity of rural communities at the household scale.	Qualitative and small n – more cases required for comprehensive understanding	• Gender differences in the way people identified, communicated, and dealt with drought impacts • Community culture/institutions, connectedness, communication and governance determine resilience to water security threats small rural towns. • Context matters - "The conservative natures of some	• Role of gender is important and needs further exploration? LD • More understanding of how social and cultural dynamics influence adaptation approaches/outcomes required

No	Reference	Why include?	Focus of study (scope)	Focus of study (concept)	Limitations of study	Key points	Identified gaps (from article and/or by review synthesis)
	Water Resources 17(2), 193-201.					small towns can be a barrier to change, but can also support a culture of resilience." P.199	
13	Scott, M. 2013. Resilience: a conceptual lens for rural studies?. *Geography Compas* 7(9), 597-610.	Well cited Overview of alternative forms of resilience for economic development	N/A	Resilience as a bridging concept - Equilibrium resilience - Evolutionary resilience	Literature review	• Equilibrium resilience appears conservative/ 'business as usual' • Evolutionary resilience potentially provides a more transformative and empowering agenda.	• Potential for evolutionary resilience approaches to push transformative change – further empirical studies required • Need a research focus examining governance practices that enable resilience, including the role of governance institutions and the role of social innovation. • More research is needed to understand the mobilisation of local resources • A better understanding of the integration of environmental concerns into rural development practices is also required.
14	Keogh, D.U., Apan, A., Mushtaq, S., King, D., Thomas, M. 2011. Resilience, vulnerability and adaptive capacity of an inland rural town prone to flooding: a climate change adaptation case study of Charleville, Queensland, Australia. *Natural Hazards* 59(2), 699-723.	Well cited Notions of personal responsibilities not often explored	Non basin single community	Adaptive capacity Resilience Vulnerability	Historical case study Small n qualitative/quant survey	• Strong sense of personal responsibility to protect themselves and reduce their vulnerability and increase resilience • High levels of social capital in the way their community responds to crisis • The strength/quality of connections and relationships within and between social and institutional networks impacts AC and resilience	

No	Reference	Why include?	Focus of study (scope)	Focus of study (concept)	Limitations of study	Key points	Identified gaps (from article and/or by review synthesis)
15	Alston, M., Whittenbury, K. 2011. Climate change and water policy in Australia's irrigation areas: a lost opportunity for a partnership model of governance. *Environmental Politics* 20(6), 899-917.	Governance based study/findings	3 basin communities	Governance impacts on community conditions	2009 qualitative study with 79 participants	• Uneven and perverse water policy outcomes for people in rural areas calls for alternative policy development processes. • Perceived poor policy processes, programs affect rural people vulnerability, resilience and AC. • Context matters • "The importance of place-shaping cannot be underestimated when communities are in crisis. A governance approach which enables and empowers local people to re-vision their communities, industries and landscapes is essential to people feeling in control of their destiny, and thus enhancing their individual and community resilience to work with change through positive adaptations." P.914	• There are many proposals for more collaborative governance yet few empirical studies (historical or contemporary) on the actual outcomes of such approaches, if indeed they are being implemented at all.
16	Rao, M., Tanton, R., Vidyattama, Y. 2015. Modelling the economic, social and ecological links in the Murray-Darling Basin: A conceptual framework. *Australasian Journal of Regional Studies* 21(1), 80.	Modelling approach to mapping impacts	Basin wide	Modelling impacts	Modelling (multiple linked models), with little recent empirical testing/review	• Modelling can provide insights into impacts of shocks on SES across significant scale • Modelling can provide opportunity to consider holistic SES	• Need to review/update models using known data over MDB implementation and community histories. • Need to incorporate contextual differences in models through synthesis of modelling and improved quantification of contextual understandings
17	ABARES. 2010. *Indicators of community vulnerability and adaptive capacity across the Murray-Darling Basin—a focus*	Integral early analysis of community conditions that informed Basin	Basin wide	Measurement of vulnerability, resilience and adaptive capacity	Quantitive analysis and modelling	• Community vulnerability to changes in water availability varies widely across the Basin depending on the different adaptive capacities and	• Review of measures and indices to ensure best practice and learn from historical data to improve measure and indices where appropriate

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	on irrigation in agriculture, ABARE–BRS Client Report, Canberra, October.	Plan development		Sensitivity analysis Development of measures and indices		sensitivities of particular communities.	
18	Hogan, A., Tanton, R., Lockie, S., May, S., 2013. Focusing resource allocation-wellbeing as a tool for prioritizing interventions for communities at risk. *International journal of environmental research and public health* 10(8), 3435-3452.	Quantitative study of correlations between wellbeing and resilience	Basin – 3 communities	Wellbeing Resilience Adaptation	Survey n=2100	• The capacity of individuals to work with others and to adapt to change are important to maintain wellbeing. • Wellbeing may serve as a useful and parsimonious proxy measure for resilience and adaptive capacity.	• Longitudinal studies are needed to further explore and verify understanding of the links between wellbeing, resilience, and adaptive capacity
19	Addison J. 2013. *Impact of climate change on health and wellbeing in remote Australian communities: a review of literature and scoping of adaptation options.* CRC-REP Working Paper CW014. Ninti One Limited, Alice Springs.	Remote community focus	Non Basin – remote communities including Indig	Liveability Adaptive capacity Climate change impacts on SES	Literature review	• Sensitivity to CC varies - Context matters • "Reducing sensitivity to these factors by targeting the institutional and socio-economic context that maintains people in disadvantage may be the most effective tool for minimising sensitivity, and increasing resilience and adaptive capacity to climate change." P.44	• Further research on remote contexts is required including the larger institutional context that facilitates adaptive capacity in remote Australia; the institutional and cultural capacity of local communities to respond to new (crisis) situations; the economic transformation of focal areas and the likely impact of such transformations on adaptive capacity; and the relationship between mobility and adaptive capacity. (p.45)
20	Alston, M. 2012. Rural male suicide in Australia. *Social science and medicine* 74(4), 515-522.	Highly cited Exploration of gender is important	Basin based	Rural male health	Qualitative studies undertaken from 2004-2009	• Understanding the health and well-being of rural men requires an understanding of the cultural context, inequitable gender	

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						relations and dominant masculine hegemony (culture/institutions).	
21	Wilson, S., Pearson, L., Kashima, Y., Lusher, D., Pearson, C. 2013. Separating adaptive maintenance (resilience) and transformative capacity of social-ecological systems. *Ecology and Society* 18(1).	Well cited Alternative economic development approach	Basin communities (2)	Resilience Transformation Adaptive maintenance	Proof-of-concept research Developed measures using quant/qual and literature review but only 2 cases empirically tested	• Rural communities with vulnerable social-ecological systems (SES) must transform to achieve sustainability, not just be resilient	• Further empirical testing of the measures ands metrics required to understand/measure capacity for transformative change • Economic development based studies focused on alternative development pathways have been undertaken, but are disjointed. A review of such studies/approaches would help to understand their connections and potential contributions to an innovative place-based research and practice agenda.
22	Alston, M. 2013. Women and adaptation. Wiley Interdisciplinary Reviews: *Climate Change* 4(5), 351-358.	Gender focus	Non-basin but draws on Basin research	Adaptation Gender	Literature review/synthesis	• Genders experience and respond to challenges differently which needs to be considered when considering adaptation • "A systematic awareness of the social systems, power differentials, and inequitable resource allocation is necessary if we are to avoid assuming that adaptation is possible for all people in all circumstances with effort, funding, and careful planning." P.356	
23	Berry, H.L., Hogan, A., Ng, S.P., Parkinson, A. 2011. Farmer health and adaptive capacity in the face of	Focus on health and AC	National survey	Adaptive capacity	Survey n=4000	• Pre-existing health problems are a very important factor to consider when designing adaptation programs and policies	

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	climate change and variability. Part 1: Health as a contributor to adaptive capacity and as an outcome from pressures coping with climate related adversities. *International Journal of Environmental Research and Public Health* 8(10), 4039-4054.					• Farmers with greater social support, sense of belonging, trust and reciprocity also reported better health than did their less-connected peers.	
24	Vidyattama, Y., Pearson, L.J., Tanton, R., Mohanty, I. 2017. Assessing adaptive capacity during the drought period in the Murray–Darling Basin. *Asia-Pacific Journal of Regional Science* 1(1), 155-170.	Measure of adaptive capacity	Basin (subset)	Adaptive Capacity	Modelling, empirically tested with mixed results	• Adaptive capacity varies spatially and temporally in response to contextual conditions • Measure uses publicly available data to model AC which is useful to help prioritise policy and programs	
25	Schirmer, J., Hanigan, I. 2017. Understanding the resilience of NSW farmers Findings from the 2015 Regional Wellbeing Survey. University of Canberra, Canberra	Empirical study of resilience and development of measures	NSW farmers	Resilience Measuring resilience	Survey data, national	• Provides descriptions on measuring resilience using available survey data • Provides descriptions of resilience of NSW farmers, including analysis by farm type etc	
26	Rance, A., Fünfgeld, H. 2014. Rural People: Resilient Futures – Social vulnerability to climate change in rural contexts. Centre for Urban Research, RMIT University, Melbourne.	Literature review of social vulnerability	Outcomes VIC based	Social vulnerability Resilience	Literature review	• Vulnerability occurs at multiple spatial and temporal scales which makes it complex to manage. • Vulnerability is dependent on contextual factors, such as geographic location, social and institutional factors, as well as economic opportunities.	
27	Hamparsum, J., O'Neil, C., Walker, D. 2016. Landcare's Role in Building Adaptive Capacity and Resilience, Department of Agriculture	Landcare and building capacity	National	Adaptive Capacity Resilience NRM	Case studies	• Adaptive capacity and resilience empowers farmers, landholders and their communities.	• Finding existing networks to leverage off when building capacity and resilience is core to effective transformative

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	and Water Resources, Canberra, March. CC BY 3.0.					• Landcare is an established framework which aims to build adaptive capacity and resilience. • Landcare networks can potentially help to increase capacity for transformative changes.	change. More research is needed to identify such networks, their existing capacity and resource needs to support additional community development aspirations.
28	Mohanty, I., Tanton, R. 2012. A wellbeing framework with adaptive capacity, NATSEM Working Paper 2012/17 NATSEM, Canberra	Framework of the connections between wellbeing, resilience and adaptive capacity	MDB	Wellbeing Resilience Adaptive Capacity Vulnerability Capitals	Literature based, no empirical testing	• Framework for resilience which includes wellbeing and adaptive capacity • Indicators of wellbeing dimensions and capitals based domains • Capitals affect wellbeing differently across time and context	• Further empirical testing of framework and development of quantitative measures required
29	Larson, S. 2013. Wellbeing assessment for climate change. The Cairns Institute, Cairns, Australia	Method for generic interactive wellbeing assessment (climate change oriented)	Individual based Generic location	Wellbeing	Literature Review/report Participatory action research based Basic description with no empirical testing	• Provides basic outline on how to do a wellbeing analysis with affected citizens	• Empirical testing of the utility and challenges of such PAR based approaches is lacking, despite the potential of such integrative approaches.
30	Berkes, F., Ross, H. 2016. Panarchy and community resilience: Sustainability science and policy implications. *Environmental Science and Policy* 61, 185-193.	Well cited Raises important governance challenges and concepts	Non basin, generic but of direct value to Basin governance	Community resilience Panarchy	Literature review, no direct empirical testing	• Community resilience is influenced by internal processes at that level, actions at lower levels of organization (eg individuals, households), and by drivers of change originating at higher levels (eg national level policies, globalized market forces). • Panarchy helps to understand resilience by drawing attention to cross-scale relationships. • Varied and complex interactions including the capacity for direct vertical jumps from local to	• Further governance-based research is needed to identify opportunities and challenges of panarchy in Basin policy development and implementation, and how it affects resilience.

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						global, and also of horizontal processes within the same level, makes governance complex	
31	Alston, M., Clarke, J., Whittenbury, K. 2018. Limits to adaptation: Reducing irrigation water in the Murray-Darling Basin dairy communities. *Journal of Rural Studies* 58, 93-102.	Recent publication Focus on dairy farmers adaptation capacity	Basin Dairy farmers	Adaptation Social justice	Large qualitative project 2014-2017	• MDB changes have resulted in significant uncertainty and social destabilisation not adequately addressed through existing, economic focused policies. • Transformative adaptation is critically dependent on equal recognition of SES elements, including power differentials, equity and justice.	• Raises issues of social justice in MDB outcomes. There is some work on this but more deliberate and structured research could be done to ensure its integration into community resilience thinking
32	Cummins, T., Frontier Economics. 2017. Social and economic impacts of the Basin Plan in Victoria. Victorian Government.	Recent study of Basin Plan impacts, although limited socio-economic impact assessment presented	Victoria (predominantly)	Economic impact assessment	Economic assessment Social impacts assessment based on 2011 Census due to timing of report RWS 2015 also used	• Economic benefits offset other commodity challenges • Changes in risk profile for different types of farms	• Social impacts need to be updated with new Census and other data
33	RMCG. 2016. Basin Plan - GMID socio-economic impact assessment Final Report. A report to the GMID Water Leadership Forum.	Recent economic impact assessment	GMID-Victoria	Economic impact assessment with basic socio-economic impact assessment (eg population, employment, demographics)	Limited data for social impacts	• The changes triggered by the Basin Plan have also had impacts on the regional community. • Irrigation communities have a far greater resilience than comparable dryland farming areas … context matters • Any assessment of future Basin Plan options needs to consider wider regional (aggregated) issues rather than looking solely at the scale of the individual property.	• Need for aggregated impact analysis not focus on individual farm or farming sector.
34	McGowan, R. 2017 Social Research Project: Assessing the Social Impacts of the Murray Darling Basin Plan on	Recent social impact assessment.	Murray Irrigation District (GMID) and	Wellbeing+	Qualitative n=24	• Positive and negative impacts on communities and individuals identified (eg economic, health, environmental)	• More research needed to record the perceptions of community members across the basin to identify

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	the Communities of Northern Victoria. Report to the Murray River Group of Councils.		the Sunraysia irrigation district.			• Employment decline is having significant effects including reduced business confidence and 'social capital' as people socialise and volunteer less • Reported low trust in government generally and water authorities in particular. • Perception that women are working harder and experiencing more stress and less leisure time. • "given the current and future implementation of the Basin Plan depends on it having predominantly neutral or positive social and economic impacts, there appears to be a need to do more to mitigate against negative Basin Plan impacts and facilitate a wider distribution of Plan benefits." P.2	differences and similarities to inform mitigation policy and activities LD
35	EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish, 2011, Community impacts of the Guide to the proposed Murray-Darling Basin Plan. Volume 1: Executive Summary. Report to the Murray-Darling Basin Authority, May. Commonwealth of Australia, Canberra.	Original social impact assessment	Basin – community scale	Socio-economic impacts	Large scale qualitative assessment with additional quantitative analysis	• Detailed community concerns regarding impacts and engagement	
36	ABARES, BRS, 2010. Environmentally sustainable diversion limits in the	Original economic analysis	MDB	Economic impacts	Economic modelling analysis of SDLs	• Potential economic and production impacts identified	

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	Murray–Darling Basin: Socioeconomic analysis. Commonwealth of Australia, Canberra.						
37	Marsden Jacob Associates, RMCG, EBC Consultants, DBM Consultants, Australian National University, Geoff McLeod and Tim Cummins. 2010. Synthesis report. Economic and social profiles and impact assessments in the Murray-Darling Basin. A report to the Murray-Darling Basin Authority, Canberra.	Original social impact analysis	MDB	Vulnerability Adaptive Capacity	Quantitive data informed profiles Qualitative interviews (n=250) and survey of key stakeholders	• Context matters "Moreover, farmers and communities of the Basin are not homogenous, and policy prescriptions may be ineffective or inefficient if they are treated as such." P.iii • Potential farm, sector and regional impacts identified	
38	Walker, B., Abel, N., Anderies, J., Ryan, P. 2009. Resilience, adaptability, and transformability in the Goulburn-Broken Catchment, Australia. *Ecology and society* 14(1).	Highly cited. Comprehensive overview of env resilience and nexus within the SES	Goulburn-Broken	Resilience Transformation	Literature based	• Interventions for managing resilience are constrained by current governance, need to understand/manage the roles and capacities of the various institutions. • Transformational change in the region should be seriously considered. • Need for integrated consideration of the 3 'scales' of SES (env, econ, social) -looking at only 1 is bound to fail	• Need for more research with a governance focus at varying scales and empirical approaches to provide an understanding of governance role, influence and best practices across the diversity of MDB contexts LD
39	Sobels, J. 2011. Life After Less Water: A Social Assessment of The Lower Murray, 2011. Commonwealth of Australia, Canberra.	An initial report focusing on community perceptions of change	Lower Murray	Community impacts	Qualitative	• Broad description of likely response to changes in water availability • Reflections on lack of trust in government and risk adversity which inhibits effective delivery	
40	Stenekes, N, Reeve, I, Kancans, R, Stayner, R, Randall, L., Lawson, K. 2012. Revised indicators of	Development of vulnerability indices	MDB	Community vulnerability	Modelling	• Measuring the vulnerability, resilience and adaptive capacity of Basin communities to changes in water availability	• A study testing the validity of these indices given contemporary data and experiences would help to

No	Reference	Why include?	Focus of study (scope)	Focus of study (concept)	Limitations of study	Key points	Identified gaps (from article and/or by review synthesis)
	community vulnerability and adaptive capacity across the Murray–Darling Basin: a focus on irrigation in agriculture, ABARES report to client prepared for the Murray–Darling Basin Authority, Canberra, December. CC BY 3.0.					• Context matters with vulnerability changing across communities based on adaptive capacities etc	improve indices where required.
41	Clarke, J, Alston, M., Whittenbury, K. 2017. Social sustainability in dairying communities impacted by the Murray-Darling Basin Plan: Short Report on research findings, Gender, Leadership and Social Sustainability Research Unit, Department of Social Work, Monash University.	Recent study of social impacts of MDB Plan 2014-2017.	Dairy farmers MDB	Social sustainability Justice and equity Livelihood Health and Wellbeing Participation Adaptive capacity	3 dairy communities VIC Qualitative study RWS survey n=128	• Key findings: • Issues of fairness, trust, uncertainty and equity • Need for continuous adaptation resulting in coping and wellbeing issues • Concerns about water governance and reform • Changing role of farms and farmers highlights the evolving relations with water • Farmer and rural community supports and support needs • Gender equity issues	• Water reform policy processes should integrate equity for the environment with policy support for place-based industry and communities p.5 • Need for further gender research and analysis to inform policy and program development. • Need for more progressive governance research across the basin to support the development of place-based adaptive capacity
42	MDBA 2011 Socioeconomic Analysis and the Draft Basin Plan	Original socioeconomic analysis	Basin	Community impacts Adaptive capacity	Dated information	• Basic description of impacts and potential mitigation approaches	
43	Deloitte Access Economics. 2012. Benefits of the Basin Plan for the fishing industries in the Murray-Darling Basin. Commonwealth of Australia, Canberra.	Initial analysis of impacts on fishing sector	Fishing industry MDB	Economic impacts	Economic analysis based on literature review	• Description of potential economic impacts of MDBP on fishing industries	• Acknowledged gaps in data and literature. More research required for this sector
44	Jackson, S., Moggridge, B., Robinson, C.J. 2010. Effects	Original research into potential impacts of the	Indigenous people across Basin	Indigenous	Literature review 3x Basin case studies	• Consistency in Indigenous aspirations, acknowledging the critical importance of the Basin's	• Social impact assessment of changes in water availability, is seriously

No	Reference	Why include?	Focus of study (scope)	Focus of study (concept)	Limitations of study	Key points	Identified gaps (from article and/or by review synthesis)
	of changes in water availability on Indigenous people of the Murray – Darling Basin: a scoping study, Report to the Murray Darling Basin Authority.	MDBP on Indigenous people				river systems to social, cultural and economic life and the need for balance in meeting the needs of other stakeholders. • The desire for restoration of environmental systems and the relationships Indigenous people have maintained with their countries is a key motivation behind Indigenous participation; • Indigenous people have diverse and interrelated interests in water and are responding in varied ways across their customary estates. • There is still further work to be directed towards the development of water governance systems that can integrate Indigenous water management aspirations and institutions.	constrained by the lack of knowledge and technical capacity as well as the diversity of Indigenous interests in water across this vast region. The severe lack of quantitative data on Indigenous water uses and values prohibits effective impact analysis. P9 • Review of Indigenous governance projects and activities undertaken as part of the MDBP and associated water governance activities (eg EWAGS) is warranted to determine the outcomes, learning and pathways forward.
45	DELWP. 2018. Socio-economic impacts in the southern Murray-Darling Basin. ISBN 978-1-76077-361-8, The State of Victoria Department of Environment, Land, Water and Planning. Victoria	Recent impact analysis (synthesis)	Southern Basin	Socio-economic impacts – community level	Literature review	• A summary of the socio-economic impacts that have been identified from Basin Plan water recovery so far and socio-economic criteria which address those impacts to ensure neutral or positive socio-economic outcomes from additional water recovery.	
46	EY. 2018. Analysis of efficiency measures in the Murray-Darling Basin. Independent Report to the Murray-Darling Basin Ministerial Council	Recent socio-economic impact study. Socio-economic analysis – predominantly farm based	Basin	Socio-economic impacts	Comprehensive literature review, qualitative interviews and economic analysis of secondary data	• Potential socio-economic impacts arising from efficiency measures at a range of scales, including socio-economic concerns that go beyond the specific legal requirements of the Basin Plan • The extent to which adverse socio-economic impacts could be	• Little synthesis of mitigation measures/future program design with understandings of (community and individual) resilience and adaptive capacity – more

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						negated through further refinements to efficiency measures program design, existing Commonwealth programs and further opportunities for Commonwealth-funded activities in support of broader regional development. • Stakeholders are experiencing fatigue from multiple consultation streams and have expressed a desire to discuss Basin Plan issues on a holistic basis and for deeper two-way engagement. To move forward there is a need to better engage with community and industry leaders, build greater trust and develop a social license.	holistic approaches required
47	Aither 2017.A review of socio-economic neutrality in the context of Murray-Darling Basin Plan implementation. A Final Report prepared for the New South Wales Department of Primary Industries – Water	Recent critical review of socio-economic neutrality in basic with focus on aggregated impacts	Basin Conceptual	socio-economic neutrality	Literature/conceptual review Some key informants	• The current provision in the Basin Plan, that voluntary individual participation equals neutrality, does not meet the overarching intent of the Basin Plan to consider the socio-economic impacts of 'upwater' programs. P.1 • Socio-economic effects need to be considered at the cumulative or aggregate level.	• Need to consider: 1. Impacts on people who are not directly participating in the program; 2. Impacts that are a result of the cumulative or aggregate implementation of entire programs; 3. The distribution of impacts across stakeholders.
48	Wheeler, S., Loch, A., Zuo, A., Bjornlund, H. 2014. Reviewing the adoption and impact of water markets in	Well cited	Basin	Impacts of water markets	Literature review	• Exploration of the social, economic and environmental impacts that have arisen from the	

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	the Murray–Darling Basin, *Australia. Journal of Hydrology* 518, 28-41.					implementation of water markets. • A variety of institutional, policy and informational changes are identified to increase the benefits from water markets in the future. • Managing the impact of climate change and water scarcity are intertwined, suggesting that policy, institutional and governance responses should be similarly structured and coordinated.	
49	MDBA 2017 Understanding change in Basin communities	Understanding change in Basin communities – Community Profiles.	Series of community profiles across the basin	Economic analysis Economic impact	Secondary data Qualitative Interviews	• Southern basin profiles are generic economic changes • Northern basin profiles include a community narrative that identifies community challenges	
50	Arche Consulting. 2012. Assessing the socio-economic impacts of sustainable diversion limits and water for the future investments: An assessment of the short-term impacts at a local scale. Final report. Report prepared for MDB Authority. Commonwealth of Australia, Canberra.	Early report that focused on local scale impacts at local government level	MDB	Economic impacts	Economic analysis via modelling of 12 case studies from across the Basin	• Context Matters – "LGAs within a region can be very different in terms of the crops that are grown and the structure of the local economy. This means that aggregated assessments at a catchment or Basin scale may mask pockets where there is likely to be a higher level of reduction in GVIAP and employment." P.xix • Need to consider citizens not directly affected - Offsetting effects "may affect different stakeholders to those directly affected by the reform. Hence, while on aggregate effects are reduced, effects on specific stakeholders may not be." P.xx	• Need to ensure analysis of aggregate impacts are undertaken