

# Regional Drought Resilience Plan

Southern Riverina



Australian Government  
Department of Agriculture,  
Fisheries and Forestry



Future  
Drought  
Fund

Supported by



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## Abbreviations

Term	Definition
ABS	Australian Bureau of Statistics.
BoM	Bureau of Meteorology.
CDI	Combined Drought Indicator.
CSIRO	Commonwealth Scientific and Industrial Research Organisation.
DCCEEW	Department of Climate Change, the Environment, Energy & Water New South Wales (see DPE).
DDI	Drought Direction Index.
DPE	Department of Planning and Environment (former DCCEEW).
EDIS	Enhanced Drought Information System.
FDF	Future Drought Fund.
LGA	Local Government Area.
NSW	New South Wales.
PCG	Project Control Group.
RDRP	Regional Drought Resilience Plan.
SPI	Standardised Precipitation Index.
SRG	Stakeholder Reference Group.
SSMI	Standardised Soil Moisture Index.
WUE	Water use efficiency.
YACTAC	Yanco Creek and Tributaries Advisory Council.

## Key Terms

Term	Definition
<b>Absorptive capacity</b>	The ability of individuals and groups to continue without adapting or changing their behaviour in response to environmental and socioeconomic changes (Béné et al., 2012).
<b>Adaptation</b>	Adjustment or modification in natural and/or human systems in response to actual or expected shocks and stresses to moderate harm, reduce vulnerability and/or exploit beneficial opportunities.
<b>Adaptive capacity</b>	The ability of individuals and groups to adjust and respond to environmental and socioeconomic changes).
<b>Adaptive governance</b>	Co-ordinating iterative, flexible and responsive interactions between systems when designing interventions and for their implementation and evaluation.
<b>Co-design</b>	The process of partnership to develop and formulate project delivery and agreed objectives and needs, using participatory methods. A process of working together utilising generative and explorative processes.
<b>Climate Change</b>	Global, long-term shifts in average weather conditions, such as becoming warmer, wetter, or drier over several decades or longer.
<b>Drought</b>	Drought in general means acute water shortage. Drought is a prolonged, abnormally dry period when the amount of available water is insufficient to meet our normal use (BoM, n.d). Drought is complex and multi-dimensional and impacts society, the environment and the economy. There are many types of drought including meteorological, agricultural, hydrological and socioeconomic. Definitions are provided within the report.
<b>Drought declaration</b>	A drought declaration is the responsibility of State and Federal Governments which must consider other factors apart from rainfall, however the Bureau of Meteorology's Drought Statement assists by providing rainfall information. In NSW, drought declarations are supported by data confirmed through the Enhanced Drought Information System.

Term	Definition
<b>Economic resilience</b>	The ability of the economy to absorb the economic impact of shocks and stressors without changing the economic status or outcomes.
<b>Environmental resilience</b>	The ability of the natural environment to cope with a diverse range of shocks and stressors while maintaining natural processes and ecosystem services.
<b>Governance</b>	Governance is the structures and processes by which individuals, groups and agencies in a society share power and make decisions. It can be formally institutionalised, or informal.
<b>Intervention options</b>	Alternative or complementary actions, projects, programs, policies, initiatives and investments that are planned to bring about change in the system (Maru et al., 2018).
<b>Local knowledge</b>	Local knowledge and First Nations knowledge incorporates elements of lived experience within a landscape, bearing witness to the operation of systems. It includes aspects of people, landscape, culture – how people interact with surroundings and as part of communities and processes.
<b>Preparation</b>	Action taken to reduce the impact of an event that occurs and accelerate the recovery period.
<b>Recovery</b>	A return to longer term viability.
<b>Resilience</b>	The ability of a system to absorb a disturbance and reorganise so as to maintain the existing functions, structure and feedbacks (Walker et al., 2004). Also see general resilience, specified resilience, economic resilience, environmental resilience, social resilience, adaptation and transformation. Resilience may also require a change in structure, function and identity to adapt to change.
<b>Risk</b>	The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems (Reisinger et. al, 2020).

Term	Definition
<b>Shock</b>	Sudden, short-term events that threaten a city (or region). Examples include: major storms, floods, bush fires, heatwaves, disease outbreaks, terrorism and cyber-attacks' (City of Sydney, 2018).
<b>Social resilience</b>	The ability of the human society to cope with a diverse range of shocks and stressors while maintaining existing social and community functions.
<b>Stressor</b>	An event that occurs gradually over a timeframe that causes an adverse effect, e.g. drought.
<b>Systems</b>	The interaction of processes, networks and inter-dependencies across a complex 'whole'.
<b>Theory of change</b>	Refers to theories, causal mechanisms and assumptions that explain how and why outcomes and impacts will be achieved through use, implementation and production of proposed inputs, activities and outputs (Maru et al., 2018).
<b>Trends</b>	Major global or regional influences that have driven change in the past and are expected to shape change into the future.
<b>Threshold</b>	The point at which a change in a level or amount a controlling variable causes a system to shift to a qualitatively different regime. Also referred to as a tipping point (Folke et al., 2010).
<b>Transformation</b>	The process of radically changing or building a new system with different structure, functions, feedbacks and identity (Folke et al., 2010).
<b>Trigger point</b>	A pre-agreed situation or event, that when met, activates a management intervention. Trigger points are usually defined in the planning phase (Wise et al., 2014).

# Acknowledgements and Appreciations

We recognise the central Murray area, which we now call the Southern Riverina, has supported populations for thousands of generations. This country is now being asked to support new economic systems with regulated water systems.

In compliance with the United Nations Declaration of the Rights of Indigenous Peoples (2007), we wish to ensure that, while we continue to support the towns and villages in our region, maintain our communities and build viable futures for our next generations, we also ensure the Rights of Indigenous people are respected.

Current water management systems have created risks to Aboriginal cultural values with the pressure of water flowing through the catchment. In some instances, riverbank slumping has led to the relocation of Aboriginal burials.

While political decisions are being made, we recognise some past issues remain unresolved for example, Aboriginal Water Entitlements. A successful implementation of this project would enable Aboriginal communities to be fully involved in advocating for good cultural, environmental and economic outcomes.

We also recognise the Commonwealth is investing in the Flow Mer 2 program researching the impact of the delivery of Commonwealth water on environmental values and that all measures are interconnected. We recognise other parts of the Basin are in urgent need of support with our partner community in Walgett reporting they have no fresh water for drinking, that it is not healthy for their children to swim in the River and they are forced to set up filtered water for the public.

In making decisions we ask Governments take care to manage impacts on local communities and work in partnership with them to create sustainable practices.

The Regional Drought Resilience Planning (RDRP) program is one of the four focus areas of the Commonwealth Government's Future Drought Fund (FDF). These plans focus on innovative ways to build regional drought resilience, taking steps to plan how to stem the impact of future drought on our region.

The NSW RDRP program is jointly funded through the Australian Government's FDF and the NSW Government, supporting local governments to work together regionally to plan for drought resilience proactively and pragmatically.

*This Acknowledgement was provided by Yarkuwa Indigenous Knowledge Centre.*

# A note from the Mayors

We, as the Mayors of this region, are proud to present the Southern Riverina Drought Resilience Plan (the Plan). The Plan has been developed through the collaboration of Berrigan Shire, Edward River, Murray River and Federation Councils' communities. We have worked closely with the Department of Regional NSW and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to deliver this Plan.

The project was jointly funded by the Australian and NSW Governments under the FDF. We thank them for the opportunity that funding has provided our communities.

We firmly believe this document highlights not only the synergies between our four communities, but the fact our Councils are often called upon to assist each other in times of crisis and as such, we have developed highly effective working relationships. This Plan is our ongoing commitment to that collaboration.

With recent droughts and floods, all Councils acknowledge the need to prepare our communities for our changing climate conditions. This Plan outlines the work we need to take as a larger community to become more resilient to that change and more adaptable to the climate conditions we face.

This Plan reflects the desires of our community for us to achieve the following, even in the face of drought:

- sustainable landscapes
- connected people, cultures and improved community wellbeing
- diverse and resilient local businesses and regional economies
- resilient built infrastructure and complimentary technologies, and
- good governance models that share knowledge and promote skills development.

*All Councils acknowledge we cannot deliver this Plan alone. We will need our communities and all levels of government to work together to deliver the outcomes presented in the Southern Riverina Drought Resilience Plan. It is through these strong partnerships and working together that we can deliver the results outlined in this Plan.*





**Edward River Council**

**Murray River Council**

**Berrigan Shire Council**

**Federation Council**

Proposed  
Murray  
River Park  
(part)

Yanga  
National  
Park

Kalyarr  
National  
Park

Yanga  
State  
Conservation  
Area

Oolambeyan  
National  
Park

Murrumbidgee  
Valley National  
Park

South West  
Woodland  
Nature  
Reserve

Nyah West

Moulamein

Swan Hill

Jerilderie

Urana

Wakool

Deniliquin

Oaklands

Barham

Koondrook  
State Forest

Finley

Berrigan

Oaklands

Warricoota  
State Forest

Mathoura

Murray  
Valley National  
Park

Tocumwal

Cobram

Mulwala

Corowa

Gunbower

Barmah

Barmah  
National  
Park

Cobram

Yarrowonga

Rutherglen

Moama

Echuca

Goulburn  
River Heritage  
River

Shepparton

Warby-  
Ovens National  
Park

Chiltern-  
Mt Pilot  
National  
Park

Albury  
Wodonga

Greater  
Bendigo  
National  
Park

Lake Hume

01 Drought Resilience

02 Southern Riverina Region  
and Communities

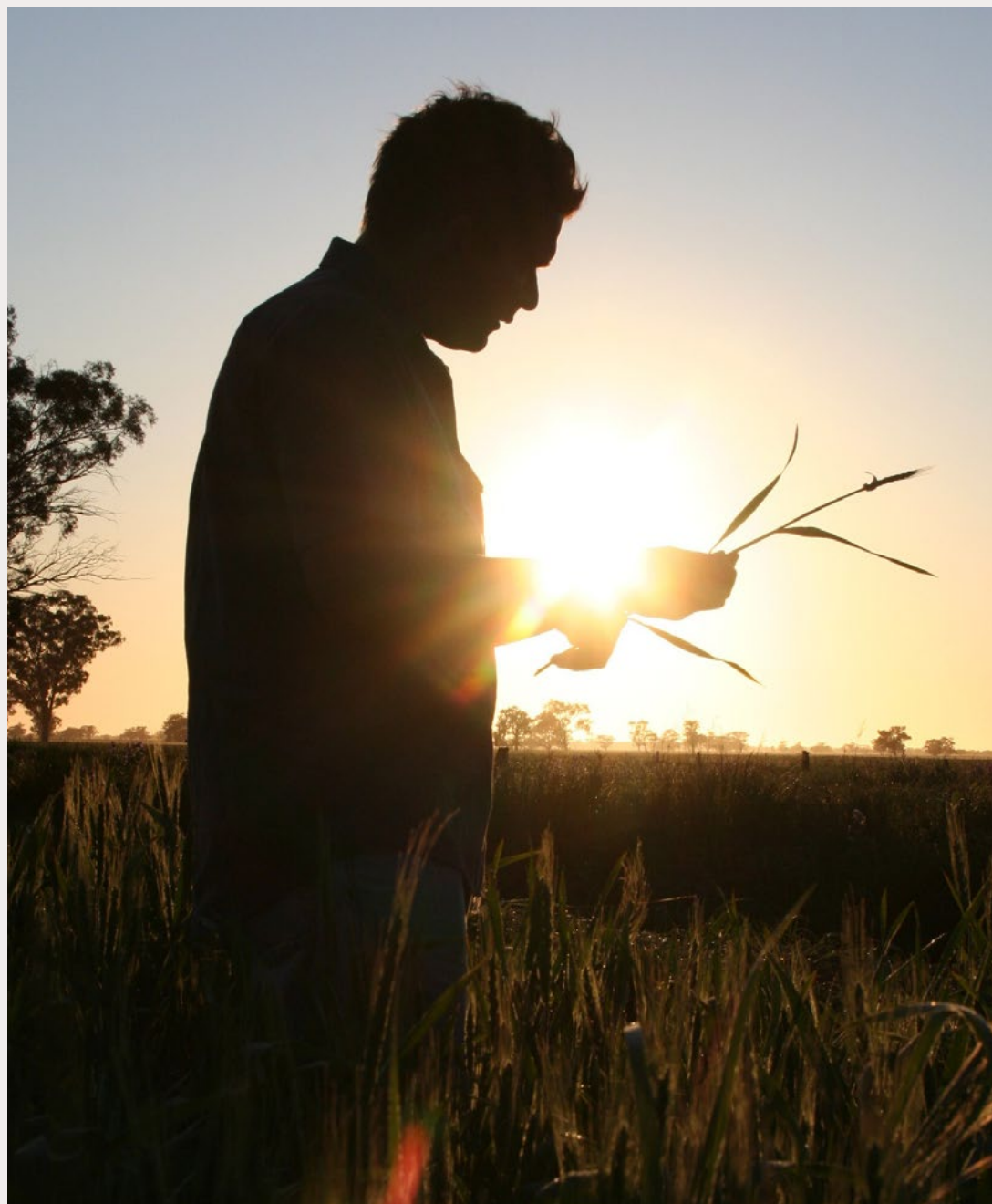
03 History of Drought Impacts

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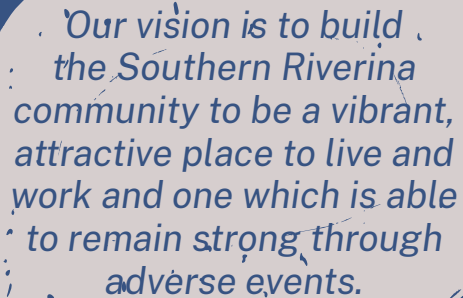




01

Drought Resilience

# Southern Riverina Regional Drought Resilience Plan



*Our vision is to build the Southern Riverina community to be a vibrant, attractive place to live and work and one which is able to remain strong through adverse events.*

## Background

Drought is expected and will continue to impact the Southern Riverina into the future. Drought affects all aspects of the community, resulting in major social, environmental and environmental impacts. Our regional Councils recognise the importance of preparing for and developing a robust community in good times to lessen the impact of drought and accelerate the recovery period. This Plan looks at how the whole of the community can benefit from working together to strengthen resilience.

The FDF is intended to deliver against three inter-connected strategic priorities:

- economic resilience for an innovative and profitable agricultural sector
- environmental resilience for sustainable and improved functioning of farming landscapes
- social resilience for resourceful and adaptable communities.

This Plan focuses on the community as a system where economic, environmental and social capacity to endure, respond and evolve through drought are enhanced.

The 20-Year Economic Vision for Regional NSW (NSW Government, 2018) sets out the NSW Government's priorities and plans to achieve long-term social and economic success for regional communities across the state.

Implementation funding will be available across Australia under the Commonwealth Government's FDF.

The purpose of this Southern Riverina Drought Resilience Plan (the Plan) is to help support our region to better plan for, and become more resilient to, the impacts of drought over time. Resilience is important in rural and regional communities. It reinforces the connectedness of community members and their ability to manage through seasonal conditions (that create uncertainty and present a challenge to their businesses and way of life). The Plan has been co-designed between the four Councils and our respective communities in a collaborative, partnership approach that has drawn on the experience and input of those who live and work in our region.

This Plan provides an opportunity to identify actions that will directly assist the region to strengthen social, economic and environmental resilience, supporting communities in future droughts. It builds on the wealth of effort, research and planning, that has been, and continues to be delivered in drought.

The FDF seeks to enhance the public good by building drought resilience in Australia's agricultural sector, the agricultural landscape and communities. The intent of its eight interrelated foundational programs is to have an innovative and profitable farming sector, a sustainable natural environment and adaptable rural, regional and remote communities, all with increased resilience to the impacts of drought and climate change (DAFF, 2023).

## Key inputs to the Plan

The following documents were considered through the development of this Plan and incorporated into the stakeholder engagement activities.

- Murray Darling Basin Authority Plan and related documents
- Other regional documents including:
  - Council strategic planning documents
  - Local economic development strategy
  - NSW Water Strategy
  - Draft Regional Water Strategies – Murray and Murrumbidgee
  - Riverina and Murray Joint Organisation (RAMJO) Water Position Paper
- Resilience Principles: Infrastructure Australia's approach to resilience
- QLD Government: Investment Logic Mapping Guide
- CSU Southern Innovation Hub Baseline Drought - Developing a baseline understanding of farmer and community perceptions of drought
- Drought Resilience, Adaptation and Management Policy (DRAMP) Framework 2018
- Economic Development Study – Murray Region (2018)
- Future Ready Regions – supporting resilient communities and economies.
- Government organisation publications including Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), Commonwealth Scientific and Industrial Research Organisation (CSIRO), Rural Industries Research and Development Corporation (RIRDC), Grains Research and Development Corporation (GRDC) and others

Additionally, contributions from a broad range of community and stakeholders, including community organisations, First Nations, businesses, service industries, producers and volunteers, were instrumental in the co-design of this plan.

It is intended for this Plan to be a living document and to be considered and factored into a range of other plans and strategies by local government, state government, non-government organisations, not-for-profits, businesses and others.

## A Plan for drought resilience

Of all climate and weather-related conditions affecting Australia, drought is often the most challenging, with the Southern Riverina region being prone to periods of persistent drought with downward trends in rainfall and streamflow being well documented.

Drought is a defining feature of the climatic cycle of the Australian landscape. In a large part this owes to our geography. Our continent spans the latitudes of the subtropical high pressure belt. This is an area of sinking, dry, stable air and usually clear skies. The far north and south of the country come under the influence of reasonably regular rain-bearing systems for at least part of the year. The east coast is normally well watered by moisture from weather driven by the Tasman and Coral Seas. However, over most of the country rainfall is low and erratic. Even in the wetter areas, very dry years can disrupt normal activities and lead to water shortages (BoM, n.d.).

As such, droughts will come again, and they are anticipated to get worse in parts of the country as a result of a changing climate. Droughts are challenging times, not just for each farm, but beyond the farm gate for entire communities and regions.

The costs of drought are spread across economic, social and environmental factors. The toll taken on regions and their communities has been enormous and the impacts often linger for decades.

The most effective response to rising uncertainty is to plan for greater drought resilience. This can be achieved by building sustainable and diverse regional economies, reducing the vulnerability of communities to changing economic conditions and accelerating recovery, as well as enhancing thriving natural environments.

# Drought Resilience at a glance

When it comes to drought, “our best defence against the shocks of drought is to prepare. Planning for greater drought resilience across all aspects of regional and remote communities, not just for primary producers, will have the greatest impact. Resilience can be achieved by building sustainable and diverse regional economies, reducing the vulnerability of communities to changing economic conditions, accelerating recovery, and enhancing the natural environment” (DRNSW, 2022).

The impact of multiple events such as the Black Summer bushfires, floods of 2021 and 2022, mice plagues, and COVID-19 related supply chain and labour force disruptions, are likely to compound drought recovery challenges in the short term (DRNSW, 2022).

The journey for developing this Plan for the Southern Riverina is illustrated in Figure 1. The process recognises communities in the Southern Riverina have been consulted about drought previously; this Plan builds on this work. Figure 1 provides a graphical representation that represents the insights previously gathered on the topics of drought and enhancing resilience in the Southern Riverina. It captures the voices, ideas, and aspirations expressed by the residents and stakeholders who live, work, and form these communities.

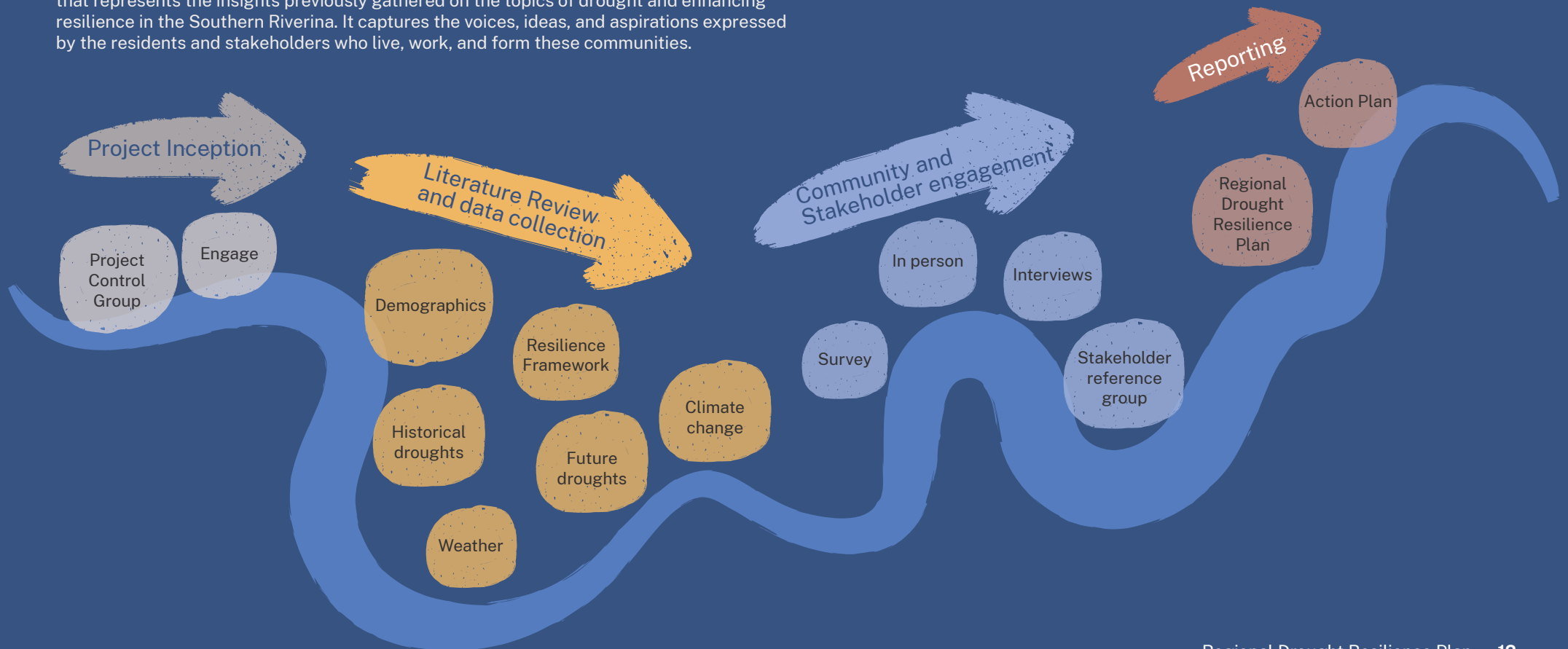


Figure 1 The Drought resilience journey

### 1. Secure water supply

- Water management and infrastructure
- Water efficiency - water restrictions
- Priority of drinking water versus other uses

### 2. Governance

- Clear leadership e.g. understanding drought response and being prepared
- Clear messaging around drought signal e.g. translating climate change/ weather
- Tracking of effectiveness of drought measures

### 3. Agriculture

- Resilient farm and agriculture businesses i.e. production flexibility
- Mental resilience to stressors of drought e.g. decision making, deteriorating landscape
- Are financial drought measures and grants effect? i.e. farm household allowance

# What was previously heard

### 4. Prosperous economy

- Diversity of income outside of agriculture
- Industry within LGA that is less reliant on agriculture e.g. manufacturing
- Maintaining diverse skills within the community

### 5. Connected and resilient community

- Communities that pull together in times of hardship e.g. festivals
- Fatigue from living through disasters e.g. bush fires to drought to flood
- First Nations communities impacted by food source shortage

### 6. Reliable assets and infrastructure

- Reliable and available facilities when required e.g. emergency water supplies
- Assets are fit for purpose when they're needed
- Maintenance of roads from increased traffic (stock, fodder, water, freight)

Figure 2 What was previously heard – at a glance

# Drought resilience framework

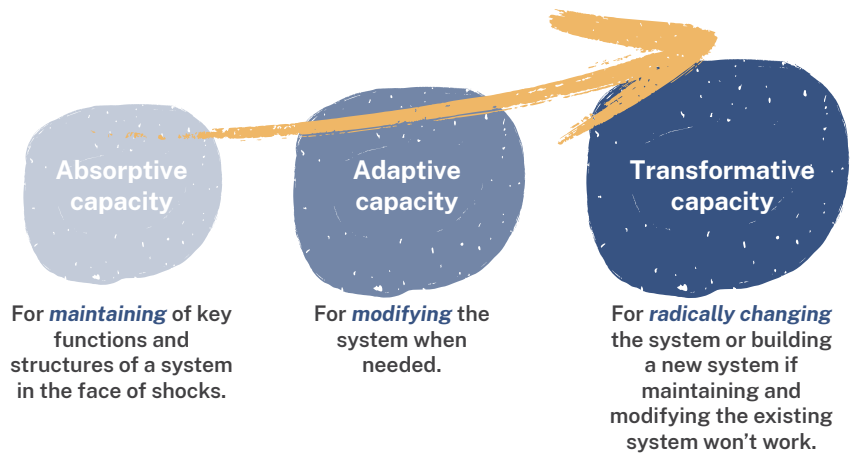
## Defining resilience

The United Nations General Assembly defines resilience as: The ability of a system, community or society that is exposed to hazards to resist, absorb, accommodate and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions (DPIE, 2021). However, it is important that the system maintains options to develop and remains open to transformative and non-linear change (Nelson, 2011).

## Resilience thinking

Absorptive capacity is often described in traditional resilience terms as the ability to absorb shocks or to 'bounce-back' (Haider and Cleaver, 2023). Adaptive capacity is often the next step on the resilience journey and entails having the necessary resources to learn and adapt the system (Haider and Cleaver, 2023). However, it is increasingly being recognised that adaptation is insufficient to deal with large-scale environmental issues like climate change. Transformation, which is the shift to a new system including change in priorities and leading to changes across multiple scales, is sometimes the best way to deal with large scale issues. However, transformation is not always needed or 'good' and in certain circumstances adaptation is the best course of action (Haider and Cleaver, 2023). These three concepts are used in Section 5 to indicate how the proposed resilience action may contribute to resilience building in the region.

Resilience thinking incorporates the notions of absorption, adaptation, and transformation into a unified approach. It offers a structured framework for developing strategies aimed at enhancing resilience (Folke et. al., 2010). These different capacities are vital components of building resilience, and this holistic perspective acknowledges resilience is not a one-size-fits-all concept and tailored approaches are necessary to address the diverse and dynamic challenges communities, ecosystems, and organisations / businesses face.



### Resilience thinking scale

- Absorptive
- Adaptive
- Transformative

## Types of resilience

To establish a holistic approach towards resilience, a broad range of systems must be considered, including social resilience, economic resilience and environmental resilience.



### Economic

Focuses on the ability of local economies to adapt to and recover from the economic shocks caused by drought. This may include diversifying the local economy, supporting businesses that are drought-resistant, and providing financial resources to mitigate economic losses during drought events (DPIE, 2021).



### Social

The ability of individuals and communities to withstand the psychological and social impacts of drought. It involves fostering strong social networks, community cohesion, and mental health support systems to help people cope with the stress and challenges associated with water scarcity.



### Environment

Centres on the capacity of natural ecosystems and water resources to endure and recover from the ecological impacts of drought. This may involve protecting and restoring habitats, improving water conservation practices, and preserving biodiversity to maintain ecosystem services during and after drought.

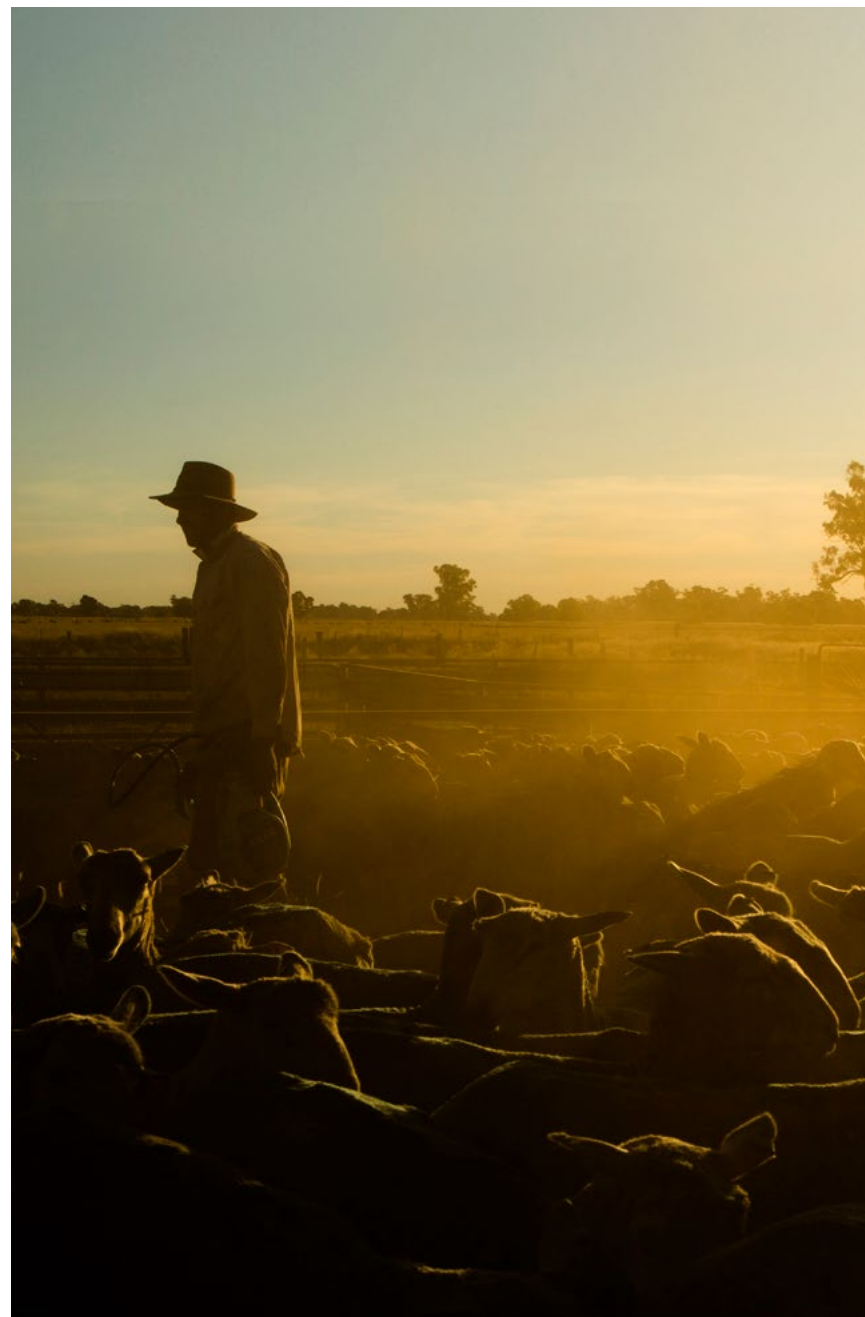
## Shocks and stresses

Episodic shocks are sudden, large-scale disasters that disrupt and threaten communities. In the context of drought, some significant shocks may include:

- Sudden water shortages
- Extreme weather events (storms, bushfires, landslides, earthquakes, heatwaves)
- Infrastructure failure.

Chronic stressors can be thought of as slow-moving disasters that affect the community. In the context of drought, stressors may include:

- Food and water shortages
- Climate change
- Drought
- Aging infrastructure.



## Development of the Plan

This Plan was developed through a three phased approach, focussed on community-led development of themes, vision and actions.

### Phase 1: Understanding the community profile, what is known about drought in the region, the lessons learnt and the region's greatest risks

Phase 1 involved the formation of a Project Control Group (PCG) which consisted of members of the four Councils, Department of Regional NSW, stakeholders (including from Yarkuwa Indigenous Knowledge Centre and Western Murray Land Improvement Group) and consultants. The PCG provided inputs and guided the development of the Plan. They also assisted with arrangements for community and stakeholder engagement activities. This phase of the project also included a review of literature to better understand the community profile, what we currently know about drought in the region, the lessons learnt from previous droughts and where the greatest risks lie. Some of the sources utilised are outlined in Section 1. The literature review informed future phases of the project including identification of plan themes and ensures the plan is built on past work and programs.

### Phase 2: Community and stakeholder engagement to identify, test and understand the regional opportunities

Phase 2 comprised the delivery of the engagement approach. A review of documentation from the consortia of Councils resulted in the development of five common themes, these comprised:

1. Prosperous agricultural landscape and water security.
2. Connected people, cultures and improved community wellbeing.
3. Diverse and resilient local businesses and regional economies.
4. Built infrastructure and technology improvements.
5. Good governance, knowledge sharing and skills development.



#### Community Engagement Sessions

Consulted with 100 community members at eight in-person drop-in sessions between Saturday 7 October 2023 and Saturday 14 October 2023, at different locations. A factsheet and poster were developed to inform the community about the Regional Drought Resilience Program. Through undertaking relaxed and informal drop-in style information sessions, attendees were asked a series of questions which were developed through integrating the key themes of this project.



#### Stakeholder Reference Group (SRG) Meetings

Three SRG sessions were held between Monday 16 October and Wednesday 25 October 2023. They comprised of representatives from the local government areas, community subject matter experts, project team members, and other stakeholders. Fifteen members were invited to provide ideas, insights and feedback.



#### Targeted interviews with stakeholders

Targeted interviews with 8 industry and community members to obtain more detailed input on the drought work already undertaken in the region.



#### Online Survey

Using digital tools and publishing a survey enabled engagement of a broader audience and made participation more convenient for community members. Survey responses were received and formed part of the feedback that informed the recommendations included within this Plan.



#### Online Meetings and phone calls

Phone calls and hosting online meetings provided the opportunity to bridge geographical gaps, ensuring a wider array of stakeholders could provide insights without the constraints of location. This method enabled in-depth discussions, capturing the communities' perspectives, and concerns. A total of 10 PCG meetings were held.



#### Email Communication

Employing email outreach provided an additional channel for engaging with stakeholders. It enabled targeted stakeholders, in remote areas, to share their insights in a convenient manner. This approach not only facilitated the collection of valuable data but also allowed for a thoughtful, well-documented exchange of ideas and feedback.

Figure 3 Summary of engagement



These themes were initially tested and refined through the stakeholder reference groups to make sure they were a sound representation of the region's key areas of focus. The PCG also provided input on the themes and the plan's vision statement. These themes were then used for categorising and analysing the community feedback, providing a summary of the region's strengths and needs. The outputs from Phase 1 and the eight in-person community engagement sessions were utilised to conduct a series of resilience workshops with identified regional stakeholders to test these findings and identify strategic opportunities. These workshops were held online with a targeted group of stakeholders. Key drought related impacts (pages 30-31) were discussed and identified for each of the themes, with major impacts rated as low, medium or high. Initial ideas for actions were encouraged from the stakeholders and developed through discussion within the group.

Community engagement was designed with the communities' diverse needs and perspectives in mind. Engagement allowed people to express information in their own words so that local voices and needs were highlighted. The engagement combined the use of in-person and digital methods, ensuring inclusivity and transparency throughout the process. An overview of the engagement activities is provided in Figure 3.

The engagement activities were designed to encourage meaningful conversations and insights from the broad range of community. It is noted that the region is suffering some engagement fatigue and therefore targeted interviews and the SRG meetings were the most engaging.



Figure 4 Five key themes

### Phase 3: Prioritise and develop the Plan

Phase 3 consisted of prioritising the opportunities (through the SRG and PCG) and documenting each in this Plan. The investment logic framework (Section 4) was applied to the long list of actions to better identify priority actions. These opportunities are organised using the thematic framework shown in Figure 4. The themes highlight the public sentiment that improving drought resilience in the broader community and region, along with diversifying and value-adding to the agricultural industry, will benefit the region's response to drought. The Plan identifies actions that can be progressed now that align with the consortia of Councils' ability to influence and will improve outcomes for the community.

The communities of the Southern Riverina have initiated several actions within their communities, developed through successive droughts. Those actions have been built on in this Plan in an effort to improve the region's drought resilience. These actions include innovative farming and production practices, advocating for improved water security and reliability, community health and well-being, protecting landscape health and natural resource management, investing in the region's people in various sectors, and sharing information and knowledge for the benefit of all. Building and extending this work is the foundation of this Plan. The PCG provided final review of the plan before it was sent to CSIRO for review. The PCG was also involved in the final updates before the plan was published and publicly available.



02

Southern Riverina  
Region and Communities

# Introduction to the region

The consortia of Councils of the Southern Riverina include Berrigan Shire, Edward River, Federation and Murray River Local Government Areas (LGA). The region covers approximately 28,500 km<sup>2</sup> and is home to 42,870 people (ABS, 2022a). Moama, Deniliquin and Corowa are the largest towns in the region and the primary locations for health, cultural, education, and administrative infrastructure and services. The Index of Socio-Economic Advantage and Disadvantage (IRSAD) summarises information about the economic and social conditions of people and households. Three of the LGAs have a relatively greater level of disadvantage (lower score) as seen in Figure 5.

Prominent First Nations Peoples within the Southern Riverina are the Wiradjuri, Yorta Yorta, Bangerang, Perrepa Perrepa, Wamba Wamba/Wemba Wemba, Wadi Wadi and Nari Nari Peoples (Yarkuwa, n.d.), with strong connections and responsibilities to Country for over 60,000 years and making up 3.4% of the region's population (ABS, 2022a).

Berrigan and Federation are bordered to the south by the Murray River which forms the NSW -Victorian border. Murray River LGA is bordered by the Murray and Murrumbidgee Rivers and is close to their junction. Edward River is positioned between the Murray and Murrumbidgee Rivers and although not bordering either the Edward River forms its southern boundary. These river systems, including wetlands and creeks throughout these LGAs, perform a multifaceted role in the well-being and prosperity of these communities. Some aspects of importance include cultural significance to the First Nations Peoples, water resource for agriculture, tourist attraction, recreational hub, ecological vitality, along with overall Murray-Darling Basin health.

The region is well known for its agricultural production and is considered a part of the 'nation's food bowl'. The fertile soils, aided by irrigation, have made this a key region for Australia's agricultural production. Agriculture also has the highest level of employment across the region. Health care and social assistance, construction and manufacturing also play important roles in the region's employment (ABS, 2022a).



Largest economic sector being agriculture (including forestry) with an estimates output of \$1.7 Billion in 2021/22 which is 32.8% of the region's total economic output followed by manufacturing at \$942m



In 2021/22 the main agricultural production was wheat, canola, and livestock products



Rice was the largest user of irrigated water at 36%

Source: (ABS, 2022c).



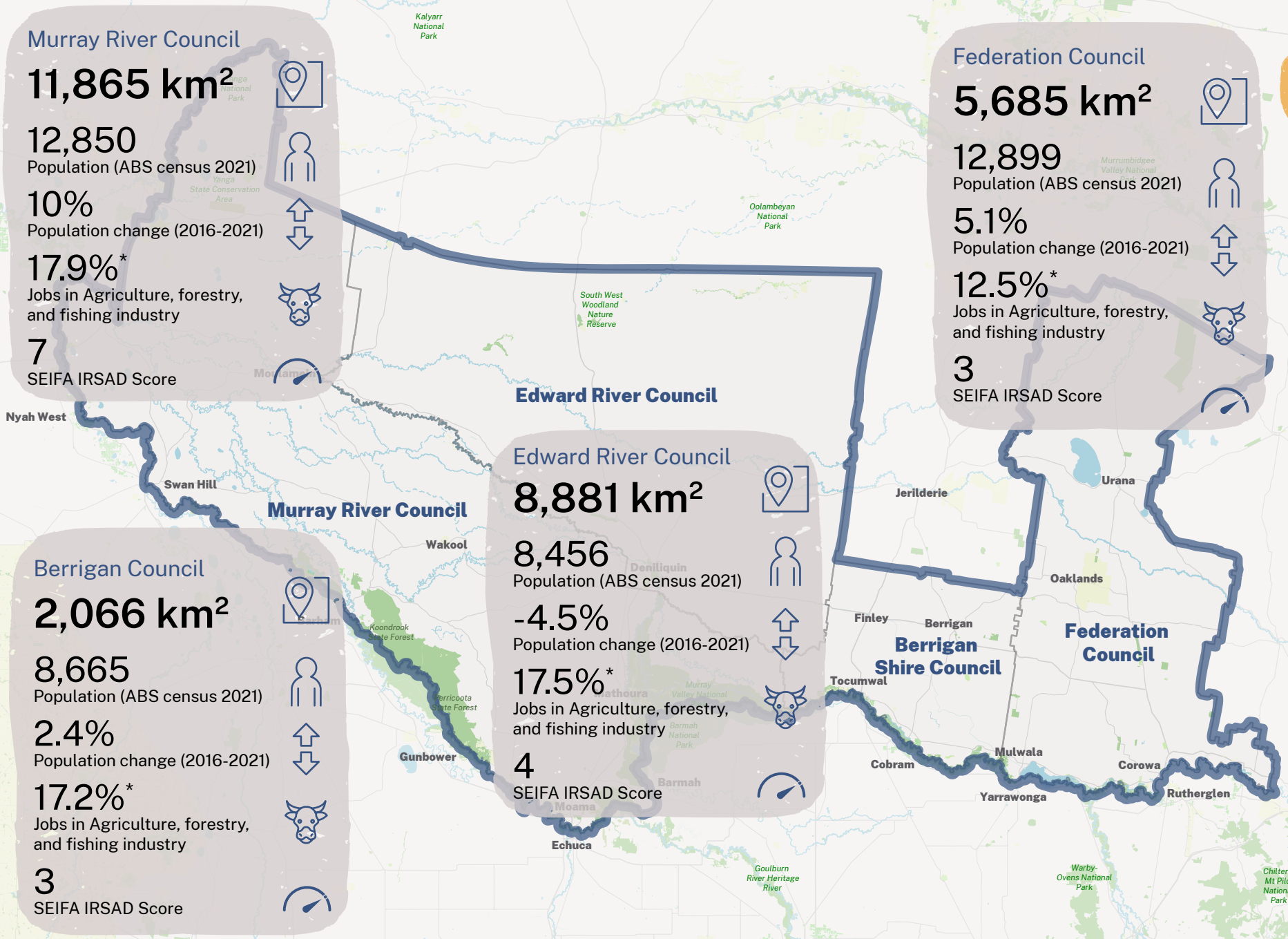


Figure 5 Socio-economic summary of the Southern Riverina region (ABS, 2022; ABS, 2022a; ABS, 2023)

\* % of total employment

## Land use

The region's land use is governed by its soil quality and access to irrigation, water making it a successful area of agricultural activity. In the 2021 census, grazing was the largest land use at 1.6 million hectares, while cropping claimed a substantial 0.8 million hectares (Figure 6). Despite the larger area utilised for grazing, cropping, especially where irrigated, is of greater economic value and the region is well-known for its cropping produce (ABS, 2022b).

The towns, and other dwellings, take up a relatively small component of overall land use which is reflected in there being approximately 1.5 people per square kilometre.

The Murray River also hosts 63,000 hectares of conservation area, an important aspect of Australia's biodiversity including the Barmah-Millewa Forest established on the Murray River, which is the largest continuous stand of river red gums in Australia (VEWH, 2022). Along with various wetlands and other protected areas in the Murray-Darling Basin, these areas support significant birdlife and other wildlife. This area is not only a biodiversity asset to the region, it plays a vital role in tourist attraction for the region.

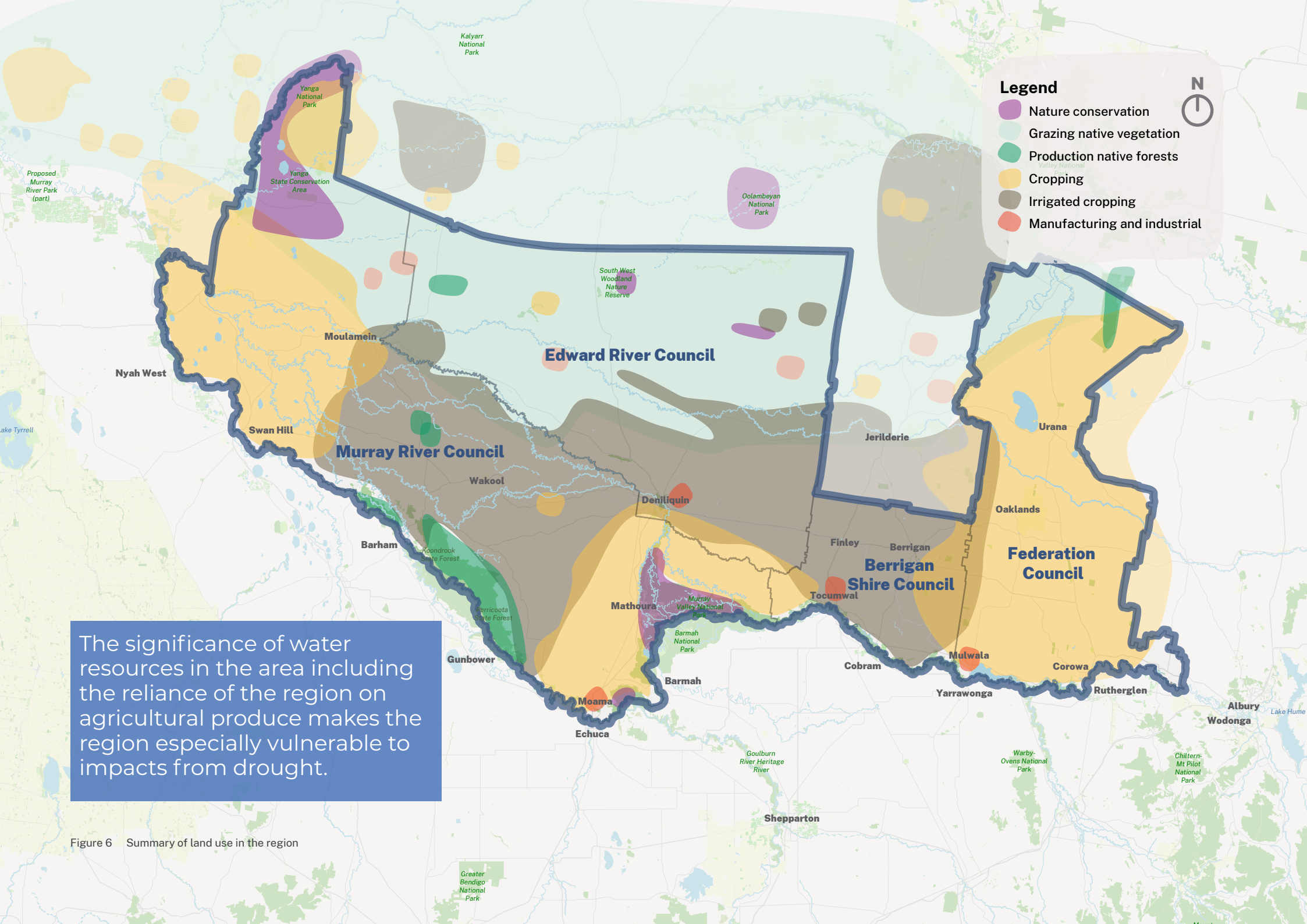
## First Nations Peoples

First Nations Peoples have a long and proud history in the region and their affinity with the natural environment runs deep. Prominent First Nations Peoples with strong connections and responsibilities to Country in the area include the Wiradjuri, Yorta Yorta, Bangerang, Perrepa Perrepa/ Wamba Wamba/ Wemba Wemba, Wadi Wadi and Nari Nari Peoples (Yarkuwa, n.d.). The Yarkuwa Indigenous Knowledge Centre (based in Deniliquin) is one example of how First Nations Peoples within the region are connected to country. The group, formed in 2003, aims to ensure the preservation of Traditional Owner knowledge for future generations. The aims of the organisation are (Yarkuwa, n.d.) to:

- collate and maintain cultural, heritage and environmental information as it relates to Wamba Wamba and Perrepa Perrepa country.
- provide an educational service to the wider community including schools and community groups.
- engage in negotiations with local, state and federal and other agencies on matters relating to culture, heritage and the environment.
- provide the means for members to develop skills that will allow them to be involved in the provision of educational and research services.
- provide a centre to facilitate the transfer of knowledge from one generation to the next.
- acquire and hold title to land and water for the purposes of economic and cultural development.

Yarkuwa worked over many years to gain management and ownership of 12,000 ha of Werai Forest, under the Werai Land and Water Aboriginal Corporation. This transfer of the Werai Forest back to the Traditional Custodians shows the local Aboriginal People's strong connection to the Ramsar site (Hearn, 2021).





**Legend**

- Nature conservation
- Grazing native vegetation
- Production native forests
- Cropping
- Irrigated cropping
- Manufacturing and industrial

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The significance of water resources in the area including the reliance of the region on agricultural produce makes the region especially vulnerable to impacts from drought.

Figure 6 Summary of land use in the region

## Agriculture and irrigation

The Southern Riverina's rich natural resources, along with improvements in research and technology, has made the region a vital contributor to Australia's agricultural produce. As of the 2021 ABS Census, the agricultural produce (including forestry) from the region was valued at \$1.7 billion (Figure 7) (ABS, 2022b).

The Agriculture, Forestry and Fishing sector is the highest in both value (economic output) and employment for the Southern Riverina (ABS, 2022a). However, the percentage employed in this sector has been decreasing since the last census.

The diversity of production includes wheat, canola and barley, fruit and nuts, vegetables, irrigated rice to livestock of sheep, cattle and pigs along with intensive dairy and poultry production. This showcases the region's focus on building absorptive capacity to shifts in conditions. This resilience is supported by its natural resources including fertile soils, favourable climatic conditions and access to available water for irrigation. Along with the extensive infrastructure and applied technology, the region has created long term increased levels of production for the region. However, the reliance on drought-prone natural resources, including water from the Murray-Darling Basin, along with rainfall and coupled with agriculture forming a major contributor to the total economic output of the region, leaves the Southern Riverina in a vulnerable position to drought impacts. This reduction in production impacts consumers and is often met with increased retail prices and general inflationary pressure.

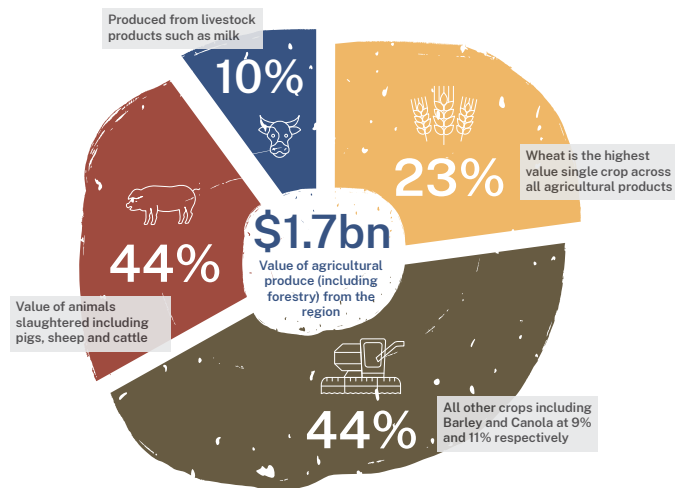


Figure 7 Value of agricultural produce from the region (ABS, 2022b)

Irrigation water is essential to sustain a strong agricultural sector. Since European settlement, there have been large infrastructure projects to link farms to irrigation schemes. The Murray River Irrigation scheme supplies water to over 740,000 hectares of farmland (Murray Irrigation, 2023), continuing to interact directly with the region's wellbeing economically, socially and environmentally. The scheme is a reliable water source for the irrigation of a diverse range of crops which has been essential to the agricultural success of the region. Therefore, this system is vital to the local economy. The increase in production created through the use of irrigation systems has a multiplying economic impact.

Overall, the four LGAs use 477,000 ML of water annually for agricultural production. Rice production is the most significant user of water for irrigated agricultural production, at 36%. Cereals for grains or seed utilise 24% and pastures for grazing 21% (ABS, 2022d). The community has observed an increase in more intensive production industries of dairy and horticulture with a notable increase in nut production.

The Murray-Darling Basin is home to diverse ecosystems and plays a vital role in the overall wellbeing of Australia's environment. The local irrigation schemes interact directly with this system and hence, environmental outcomes. The region is in a period of uncertainty surrounding the issue of water allocations and the best use of the water in the Murray-Darling Basin.

Irrigation infrastructure is shown to increase reliability and overall production output in both cropping and livestock industries with irrigation corporations in the region recognising the importance of maintaining and upgrading infrastructure to mitigate water losses in the system. If the Murray-Darling Basin is in drought, there is less irrigation water available for on-farm use and hence the farms are limited to non-irrigated options. Further, a decrease in local rainfall during droughts impacts rain-fed crops along with livestock operations.

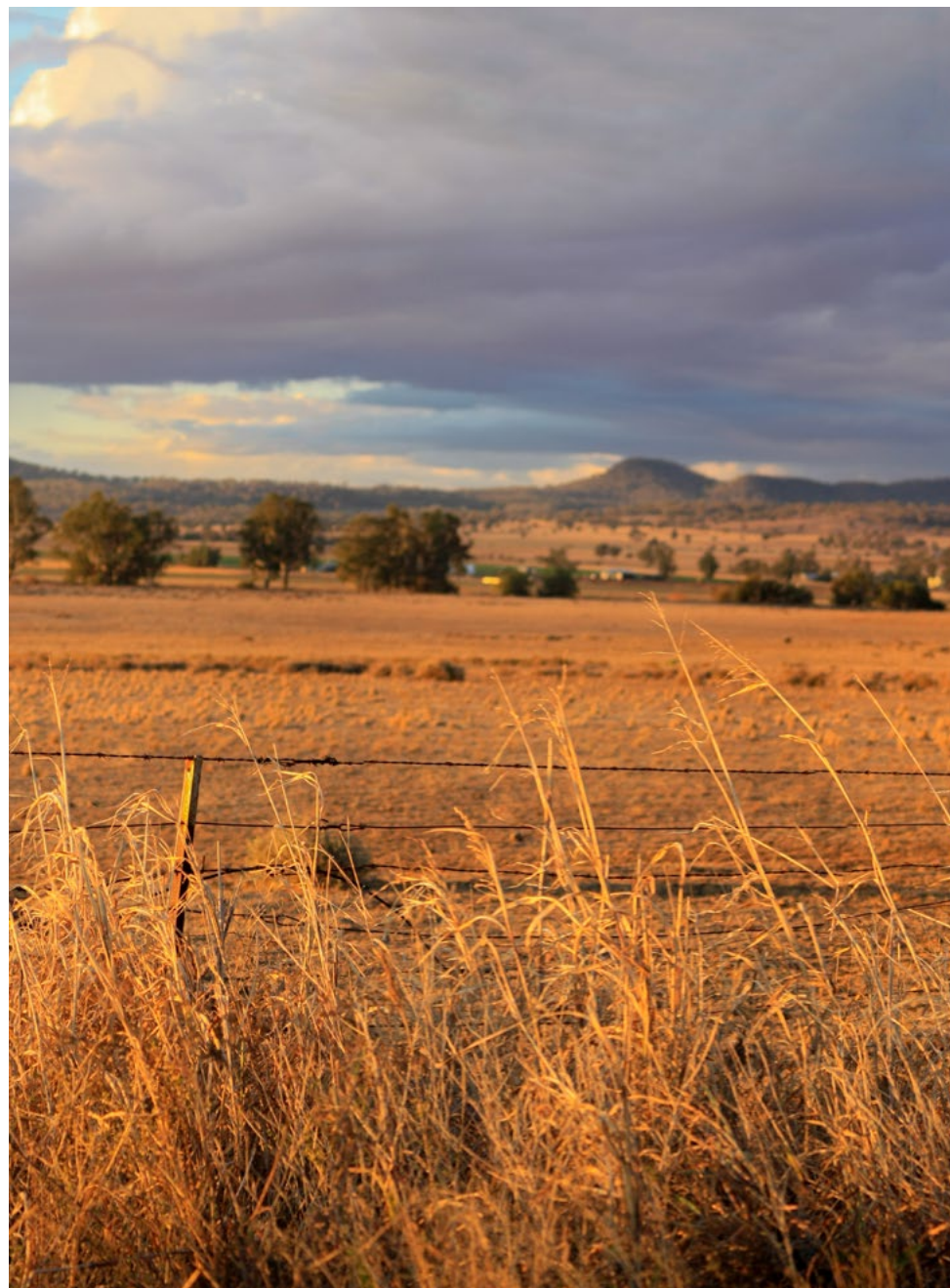
## The Region's Industry

Edward River has a number of industrial areas; specifically around Deniliquin there are manufacturing and light industrial areas focused on engineering products for the rural and agricultural sector (NSW Department of Planning and Environment, 2023). They also have a growing warehousing area (NSW Department of Planning and Environment, 2023). Federation Council has a piggery feedlot and abattoir, munitions factory, Uncle Toby's and freight companies (Federation Council, 2024).

Corowa and Deniliquin have airports, with both planning for an upgrade/expansion (RAMJO, 2022; Federation Council, 2022). Tocumwal also has a popular Aerodrome following recent investment and upgrades (Berrigan Shire, 2024). There are saleyards at Corowa, Deniliquin, and Finley (Federation Council, 2020; Edward River Council, 2024a; Berrigan Shire, 2023). The Corowa Saleyard were recently upgraded and has a training facility attached (Federation Council, 2020).

There are ongoing discussions regarding the development of Tocomwal Intermodal Facility and how upgrades can support the businesses in the surrounding precinct (NSW Department of Planning and Environment, 2023). As part of Edward River Council's Advocacy Plan to promote economic growth and create competitive advantage for regional industries, the council has committed \$1.175 million towards the development of the Deniliquin Intermodal Freight Hub (Edward River Council, 2024b). The development is a partnership with Deni Industrial Park Pty Ltd and will comprise rail terminal infrastructure and loading facilities that will connect regional businesses to the Melbourne Port (Edward River Council, 2024b). It will improve regional connectivity and attract new businesses, industry, and employment opportunities (Edward River Council, 2024b).

The Councils combined own and manage numerous community facilities, including preschools, across the region and there are many parks, open spaces and recreation reserves.







# 03

## History of Drought Impacts

# Drought, climate and impacts

Drought as a natural hazard is pervasive, recurring, and distressing. It is difficult to determine a start and end, or identify when the landscape has recovered. As for other disasters, they are difficult to predict or compare, with differences in seasonality, extent, duration, severity, among other variables all contributing to the drought experience. Drought affects all parts of the community from agricultural producers and suppliers to industry, First Nations Peoples and the broader community. The impacts range from financial to health and wellbeing and the physical decline of the environment.

## What is drought

Australia has highly variable rainfall records and in contrast also has highly variable periods of low rainfall. Both the Bureau of Meteorology and Kirono et. al. (2020) define four types of drought (Figure 8): meteorological, agricultural, hydrological and socio-economic.

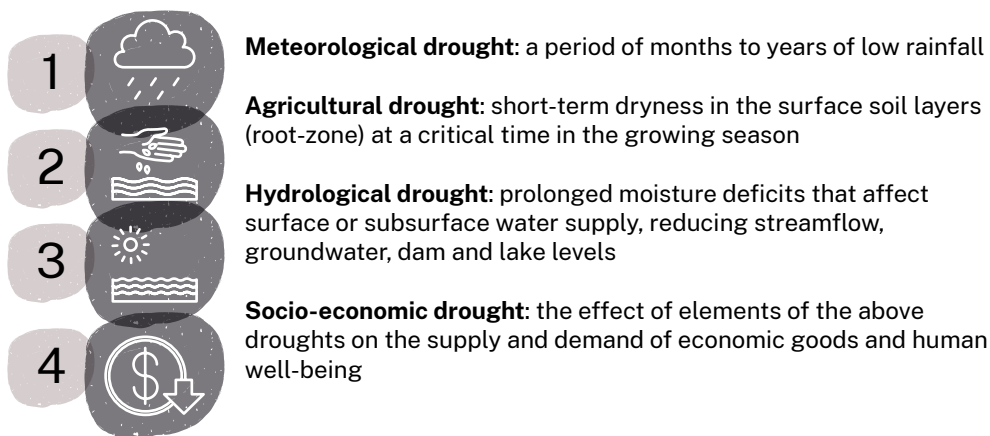


Figure 8 Types of drought (Source: BoM, 2023)

## Drought monitoring in NSW

Drought monitoring over the years has become increasingly complex. The most common means of currently monitoring drought is through the Enhanced Drought Information System (EDIS) which is a publicly available drought monitoring tool that monitors seasonal conditions across NSW. EDIS was launched in March 2018 and is used across government and farming stakeholders to build drought risk awareness, emphasise drought preparedness and improve confidence in drought monitoring and early warning. A key feature of EDIS is the development of the NSW DPI Combined Drought Indicator (CDI).

The CDI combines meteorological, hydrological and agronomic definitions of drought (above) using indexes for rainfall, soil and water, and plant growth. From these, a fourth index, drought direction (DDI), is developed. EDIS is undergoing redevelopment to provide farmers with world-leading weather and climate data to enable better business decisions.

## Stages of drought

Used together, the indexes of the EDIS indicate the stage of drought.

The six stages progress from a non drought category where all indicators suggest good conditions for production to recovery, through to a Drought Affected (weakening or intensifying) category, a Drought category and into Intense Drought. The six stages are shown in Figure 9.

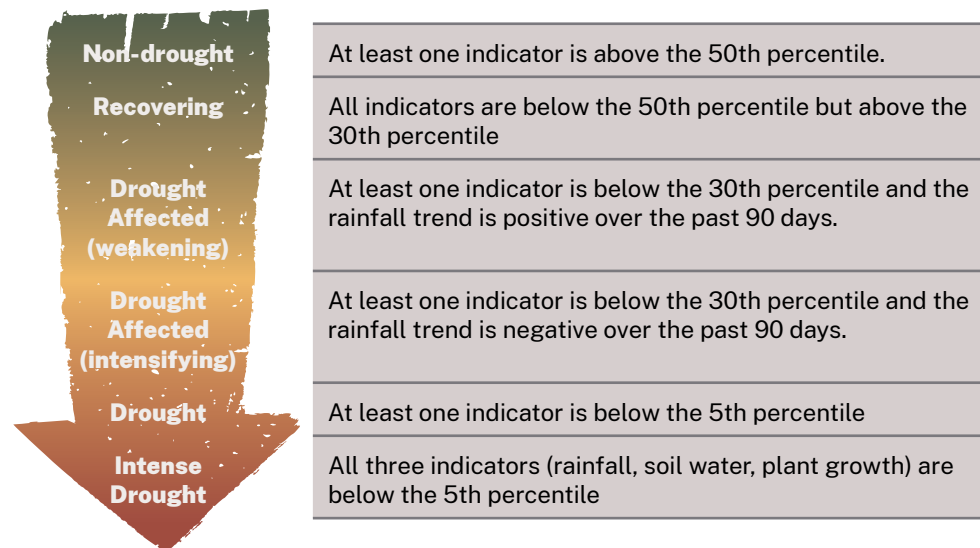


Figure 9 Stages of drought in NSW (DPI, 2023)

Complementing the stages is detailed information on:

- the technical and on-the-ground description of typical field conditions.
- a suggested on-farm response and
- a suggested advisory or policy response.

## Historical droughts in the Southern Riverina

Climate anomalies, such as drought, are regularly observed occurrences in inland Australia and the Southern Riverina is no exception. Throughout the years, the area has experienced a range of droughts with differing durations and intensities, as outlined below.

Table 1 Historical droughts which effected the Southern Riverina (BoM n.d.)

Drought Period	Duration	Characteristics
<b>The Federation Drought</b>	1895-1902	One of Australia's worst droughts. It had far-reaching implications for agriculture, water availability, and the economy.
<b>World War I Drought</b>	1914-1915	Although relatively short, it had a significant impact because the severe drought conditions were occurring simultaneously in both southeastern and south western Australia.
<b>World War II Drought</b>	1937-1945	Occurred frequently over eastern Australia, characterised by intense dry spells and breaks, similar to the Federation drought, but with more intermittent dryness. Major driver of the Black Friday bushfires in January 1939.
<b>1965-1968 Drought</b>	1965-1968	Generally dry conditions for Australia, especially severe in NSW.
<b>1982-1983 Drought</b>	1982-1983	One of Australia's most severe droughts in the 20th century, associated with a strong El Nino event.
<b>The Millennium Drought</b>	1997-2009	The region experienced a prolonged dry period which led to water scarcity and agricultural challenges in the Murray-Darling Basin. This drought event was particularly significant because of the contrast with a wet period in northern Australia and its absence of major wet episodes. Figure 10 displays this contrast.  This may have been the first major Australian drought that was impacted by the changing climate, with temperatures higher than ever seen before. The Millennium Drought ended with two of the wettest years
<b>The 2017-2020 Drought</b>	2017-2020	Following a wet period in 2016, this drought impacted the Murray-Darling Basin, with substantially below-average rainfall in 2017, 2018, and 2019. Soil moisture levels in different regions hit unprecedented lows during this time.

The last two droughts have had a significant impact to the Southern Riverina due to both the duration of the Millennium Drought shown in Figure 10 and the significant period of below average rainfall to the area in the 2017-2020 drought shown in Figure 11 which place the region in the very much below average and lowest on record rainfall ranges. Some of the initiatives and tools the region has been able to build and utilise in response to these past drought events and to help adapt and build resilience to future drought events are outlined in the case studies in Section 4.

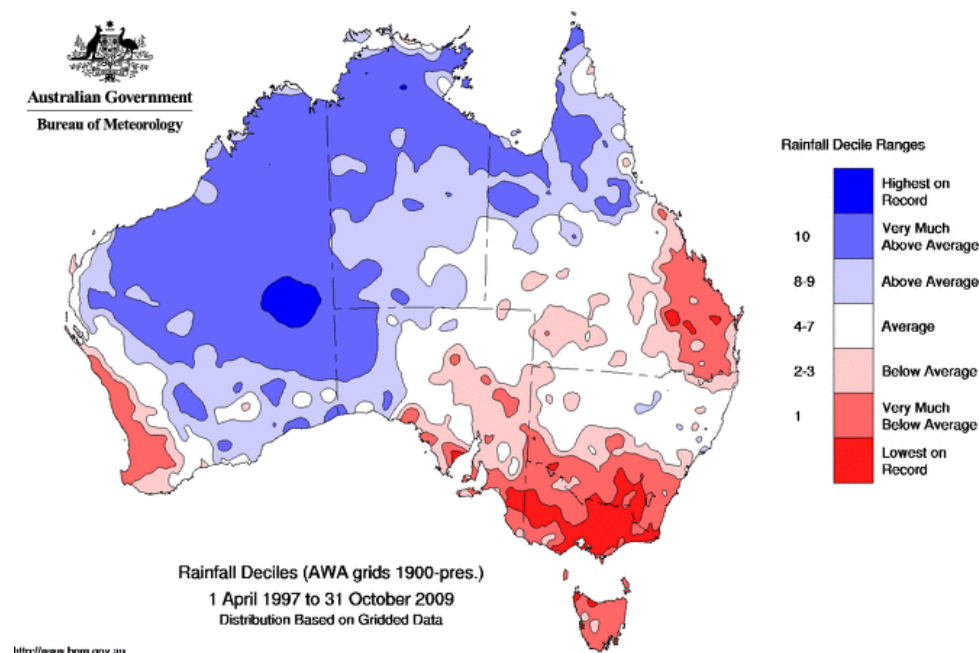


Figure 10 Rainfall deciles in Australia during the Millennium Drought (1997 –2009) (BoM, 2022)

## Regional weather and climate

The Southern Riverina, along the border of NSW, is characterised by a dynamic and influential climate that significantly shapes its landscape, agriculture, and water management practices.

The Southern Riverina is characterised by the Köppen climate classification as a region of "grassland warm" climate. This classification speaks to the prevailing conditions of consistent warmth and aridity. The distribution of rainfall throughout the year is skewed towards the winter months, signifying a winter-dominant precipitation regime. In the last 30 years, annual rainfall has been relatively stable, while spring frosts have been more common and have been occurring later (BoM, 2023).

Temperatures have increased, along with more consecutive days above 38°C. The highest temperatures are experienced in January with an average maximum temperature of 32°C, while the lowest temperatures are experienced in July with an average minimum temperature of 3°C. Figure 12 shows historical seasonal rainfall and temperature data at the Tocumwal Airport Weather Station between 1970 and 2022 (BoM, 2022).

These climatic conditions contribute to the occurrence of droughts, which have become an integral part of the region's identity. Droughts in Southern Riverina are not isolated incidents, being a significant part of the region's history.

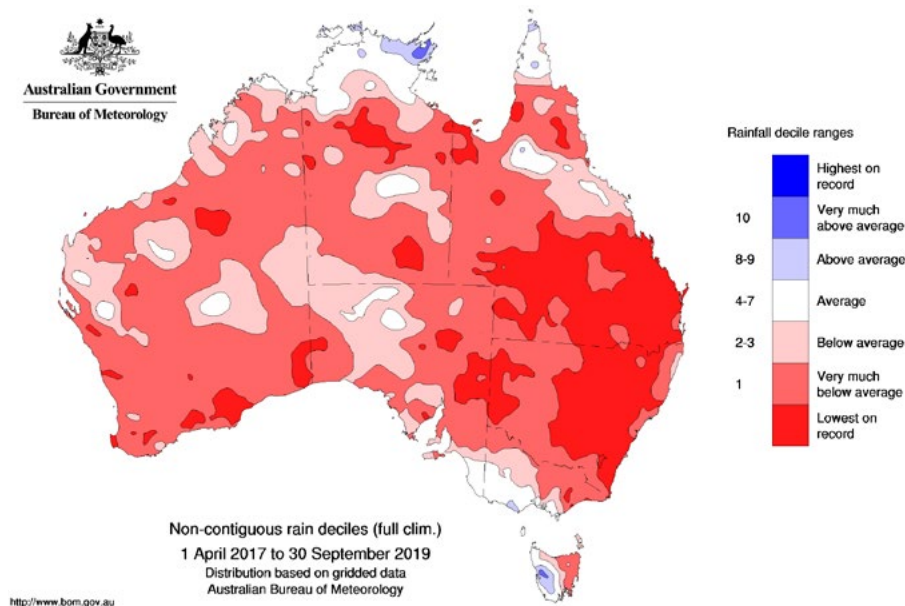


Figure 11 Rainfall deciles in Australia during the Drought (2017–2019) (BoM, 2022)

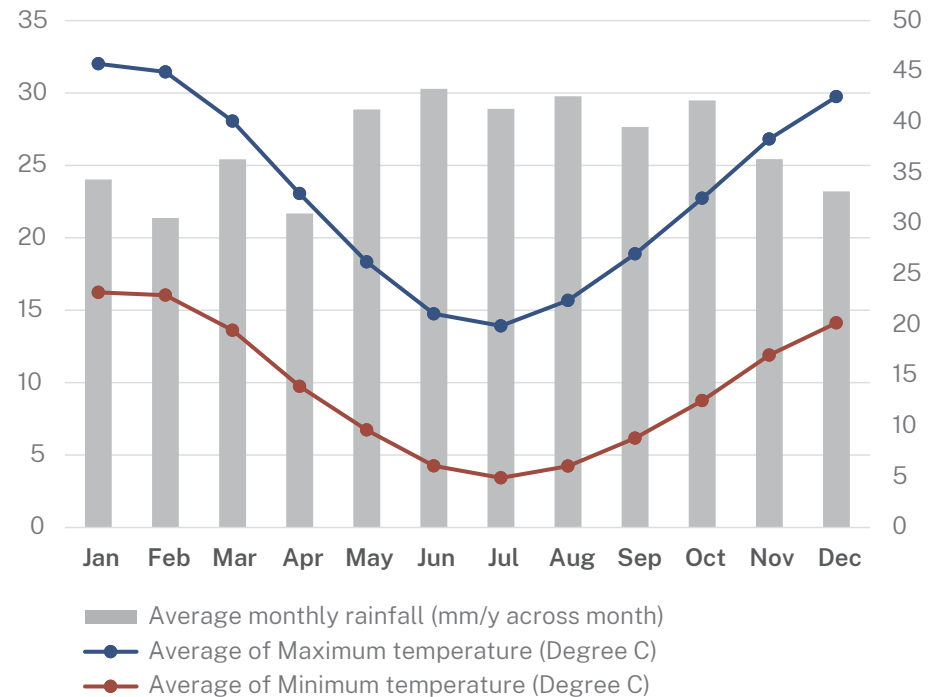


Figure 12 Seasonal rainfall and temperature variations (averaged baseline from 1970–2022) at Tocumwal Airport Weather Station (BoM, 2022)

## Climate change impacts

Climate change refers to global, long-term shifts in average weather conditions, such as becoming warmer, wetter, or drier over several decades or longer. There is a growing body of evidence that shows Australia's climate has changed and continues to change significantly, particularly driven by the work of the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Bureau of Meteorology (BoM), and Department of Climate Change, the Environment, Energy & Water NSW (DCCEEW); formerly Department of Planning and Environment (DPE). Temperatures in Australia have risen by about 0.9 °C since 1910 and there is a high level of scientific confidence that anthropogenic greenhouse gas emissions are a major driver of this increase in temperature (State of the Climate, 2018).

Drought projections in Australia are developed using climate simulations which are used to estimate the response of regional climates to anthropogenic change. The latest national drought projections (CSIRO and BoM, 2023) are based on the Standardised Precipitation Index (SPI) with input of monthly rainfall simulated by 21 CMIP5 GCMs and Standardised Soil Moisture Index (SSMI), a key indicator of agricultural drought.

Future median projections suggest that the region will experience more time in drought, longer duration of drought and more intense drought (Kirono et al., 2020). An increase in the number of days over 35°C and 40°C is predicted (see Figure 13). There is high confidence in decreasing soil moisture in the southern regions (particularly in winter and spring) driven by the projected decrease in rainfall (see Figure 14 for further breakdown) and higher evaporative demand (CSIRO and BoM, 2015). Additionally, the projected increase in drought metrics is consistent with projected decreases in seasonal mean of soil moisture, across the region.

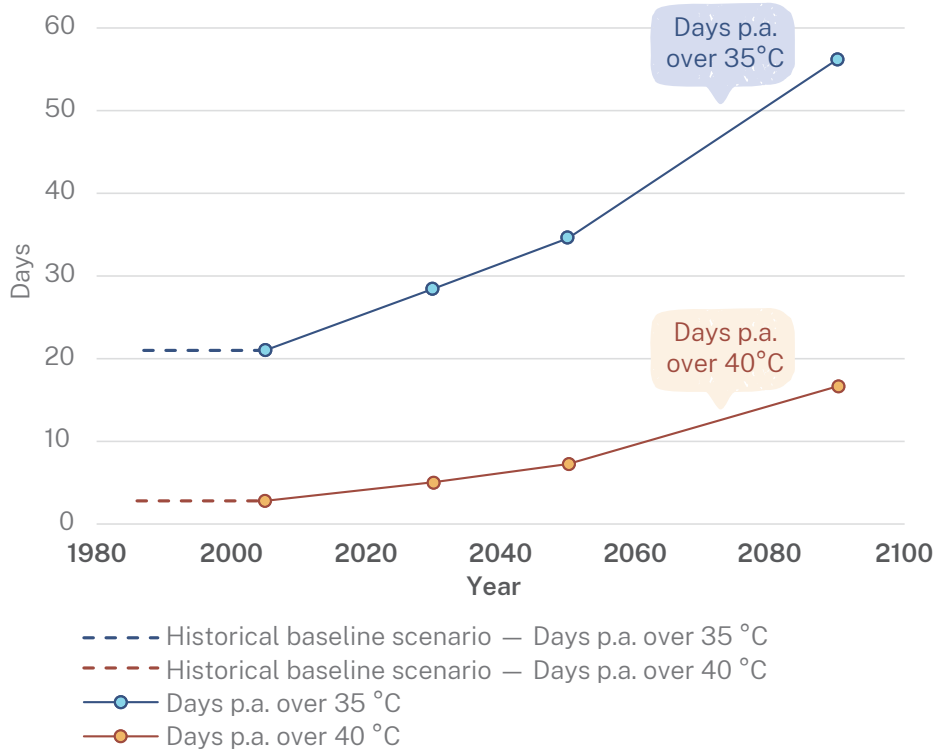


Figure 13 Baseline and projection data for days over 35°C and days over 40°C at Tocumwal Airport (074106) (BoM, 2022)

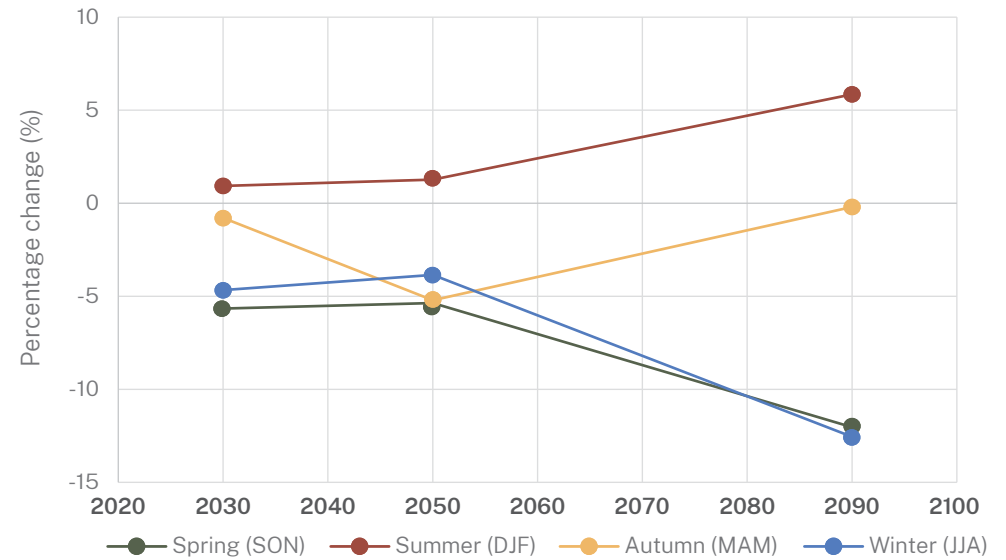


Figure 14 Seasonal changes (%) for rainfall under RCP 8.5 (using AR5 data)

The changes in key climate variables outlined above were considered in the context of impacts on cropping by GRDC to develop understanding of the vulnerabilities of the industry (Hayman, 2020). Table 2 outlines the impacts climate change may have on crops in the grain belt, so is a general reference and not specific to Southern Riverina. Key findings for the residual vulnerability after feasible management changes are considered in Table 2.

There are some changes such as increase in mean temperature where the confidence from both climate science on projections and agricultural science on impacts are high (Hayman, 2020). This contrasts with changes to rainfall where the confidence in the projections is lower, but the impacts on cropping of changes to rainfall are very well understood (Hayman, 2020). The interaction between these six aspects of climate change is important but uncertain. For example, elevated carbon dioxide is likely to partially offset some of the impacts of a decline in rainfall, but it is less clear how a drier, but carbon dioxide enriched future will respond to a heat wave (Hayman, 2020).

Table 2 Components of climate change and commentary regarding increased mean temperature, exposure and changes to heatwaves, frost, rainfall, and carbon dioxide in the Australian grain belt (Hayman, 2020).

Change	Vulnerability
<b>Increased mean temperature</b>	Low vulnerability to warming over coming decades provided that grain growers have access to crops with appropriate development. Vulnerability to warmer seasons will be greatly increased if growing season rainfall was to decline, and warming is associated with heat waves.
<b>Changes to heatwave frequency and intensity</b>	High vulnerability to an increase in spring heat events for all dryland winter crops but especially pulse crops. Spring heat events are more damaging when combined with low soil moisture. In cooler than normal Springs, water use efficiency (WUE) tends to be higher than expected. This suggests moderate heat events might be imposing a cost in most years.
<b>Changes to frost frequency and intensity</b>	Although there is less confidence on the likelihood, there is high vulnerability to any increase in frost severity and frequency for many parts of the grains belt. Agronomists working with frost affected farmers refer to both a direct cost of frost damage and an indirect psychological impact on decision making.
<b>Changes to seasonal rainfall</b>	Very high vulnerability. Although grain growers are highly skilled at managing low rainfall environments, the ongoing profitability of enterprises relies on capturing good seasons and are strongly affected by drier seasons. In medium to higher rainfall parts of the southern grains belt, a substantial increase in drier than average growing seasons would greatly reduce confidence in management of input levels. Drier conditions would also reduce the amount of higher return and higher risk broadleaf crops.
<b>Changes in the intensity of rainfall</b>	Low vulnerability. A modest increase in the intensity of rainfall will be beneficial. There are risks of water erosion but these can be managed with stubble retention which has high levels of adoption and co-benefits of reducing wind and water erosion risk and increasing productivity.
<b>Elevated levels of carbon dioxide</b>	Changes in CO <sup>2</sup> cannot be considered separately from temperature and water supply, and plant breeding advances cultivars suitable to present day conditions by default. In the future there is likely to be deliberate selection of varieties that respond more positively to elevated CO <sup>2</sup> . Monitoring of changes to pests and disease and revising nutrition will be essential.

## Drought related impacts

Drought impacts were identified through the drought literature reviewed as a part of the plan development. This long list of drought impacts was then tested with members of the stakeholder reference group who were asked to rate each of the impacts in relation to the effect on their community which produced a priority ranking for each. This provided a customised view of the impacts that most greatly affect the communities within which the plan operates. These impacts were then categorised into three components of social, economic and environmental. When considered together, these components form the foundations of drought resilience. It is important when considering impacts to note that droughts are difficult to predict in their duration and severity and due to these differences, impacts differ between drought events.

## Social



- Increased burden on mental health services.
- Increased isolation within communities.
- Impacts on children having lived through drought and being involved with agricultural activities including death of livestock.
- Reduced access to recreational space for exercise and activities, especially associated with water e.g. water skiing.
- Negative impact on local sporting clubs.
- Some towns with reduced access to drinking water, leading to increased anxiety and mental health impacts.
- Emotional repercussions due to loss of stock and crops.
- Changing demographics due to out-migration for work, less work available.
- Increased wear on roads and other assets.
- Seeing countryside in poor health is a source of distress for First Nations Peoples.
- On-going decision-making fatigue and paralysis.
- Mental stress on the farming community from rising financial pressure and increasing debt levels.

## Economic



- Reduced numbers of tourists visiting the region.
- Greater strain on the local economy due to lower levels of spending.
- Reduced demand for some services and lack of business confidence.
- Increasing fodder prices.
- Increased need for loans, increased farm and small business debt.
- High water prices (>\$1,000/LM) and cost of water carting.
- Reduced access to water for agricultural production and industry.
- Reductions in skilled labour in the region.
- Loss of skills, knowledge and business from the region.
- Reduced on-farm income and increased costs.

## Environment



- Rainfall deficit leading to loss of crops, fodder supplies, shelter belts and native vegetation (resulting in loss of biodiversity).
- Reduced groundcover leading to increased erosion and loss of soil carbon.
- Increased runoff into rivers caused issues with river health e.g. decrease in dissolved oxygen.
- Drying of the regional landscape.
- Increased presence of local wildlife and invasive species in regional communities, aggravating the impact of drought.
- Additional pressure on water resources including increased pressure on wetlands and stream beds leading to riparian damage.
- Reduced maintenance on Council assets such as parks and gardens (due to water constraints).
- Decline in locations of cultural importance.
- Decreased river health.
- Increased frequency of fires and associated negative impacts on ecosystems, community health and wellbeing and water quality.
- Increased animal welfare concerns.
- Migration of species to and from the region which create challenges to the management of the ecosystem.

Figure 15 Key impacts of drought on the region



# 04

## Listening to Local Experience

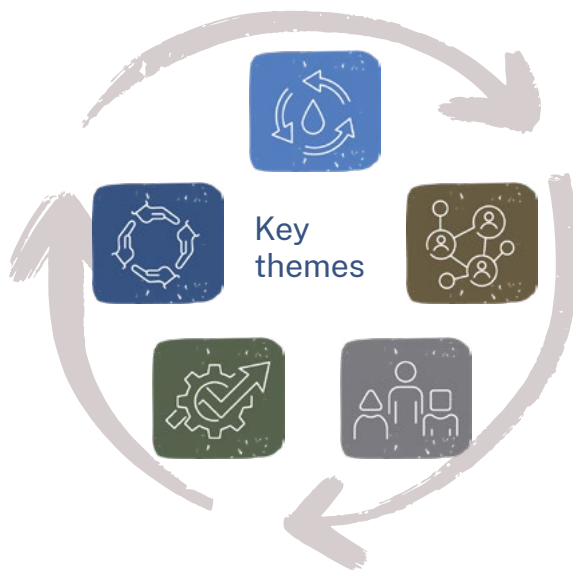


# Building from local experience

The outcomes of this Plan are born from community voice, which will support locals in their journey towards drought resilience. As drought impacts every facet of regional communities, extending far beyond the farm gate.

## What we heard

It is clear the community of the Southern Riverina wish for a resilient and prosperous future. The voices of the community echo their commitment to maintaining a thriving agricultural landscape, fostering interconnected communities, supporting diverse local businesses, and advancing critical infrastructure and governance. A concise explanation of the feedback received during consultation for each theme is provided.



## Prosperous Agricultural Landscape and water security

- **Diversification for Resilience:** Recognition of the importance of mixed farming (both crops and livestock) and alternative drought tolerant production options were emphasised as essential tools for economic resilience during drought and to weather market volatility.
- **Balancing Environmental and Agricultural Water:** The balance between environmental flows and agricultural water is critical concern for many of these communities. Access to water and maintaining water security is essential for continued agricultural success. There are significant concerns centred around transmission losses of water and the potential degradation of the river, emphasising the importance of responsible water usage and management throughout the river system.
- **Streamlined Funding and Forward Planning:** Clear funding processes and long-term planning are seen as critical for maintaining agricultural prosperity. There was continued backing for support mechanisms during drought periods, including tax relief, low-interest loans for infrastructure, and containment areas, reflecting a determination to bolster the local agricultural sector.



## Connected People, Cultures, and Improved Community Wellbeing

- **Role of Community Clubs and Social Projects:** Local clubs and social initiatives play a pivotal role in fostering community wellbeing and cultural cohesion.
- **Bridging Generational Gaps:** Initiatives focusing on mutual respect and learning between different age groups are considered important. Addressing the challenges posed by an aging population and the importance of healthcare services were also emphasised, revealing communities keen on improving the quality of life for its members.
- **Mental Health Services:** Accessible mental health services are vital for community wellbeing.



## Diverse and Resilient Local Businesses and Regional Economies

- **Economic Diversification:** Investment in industries beyond agriculture and support for local markets is a priority for growing the local economy and building resilience into the system. Economic initiatives aimed at countering the slow decline of smaller townships and villages by investing in smaller communities appropriately are valued by community.
- **Holistic Approach to Regional Development:** Infrastructure, healthcare, educational facilities, and tourism development are important components of a resilient regional economy.
- **Collaborative Efforts:** Partnerships with educational institutions and businesses are deemed essential for building diverse and resilient local businesses and regional economies. The potential for renewable energy was also discussed as a means to generate employment opportunities and bolster the local economy.



## Built Infrastructure and Technology Improvements

- **Sustainable Housing:** There is a desire for sustainable housing and long-term quality in infrastructure. There is a call for more than traditional housing development, with a focus on creating a range of housing options to suit different needs which are environmentally friendly, water-efficient, and technologically advanced living spaces.
- **Industrial Estates:** Development of industrial estates with modernised technology is seen as crucial for creating employment opportunities that are not tied to farming or agriculture to attract young adults and families to live and work in the region.
- **Water Resource Management:** Water reservoirs, recycled water, and efficient infrastructure are key considerations for both water security and sustainability. Enhancements to water capture and storage were advocated for.



Considering these insights, the Southern Riverina community's vision for the future revolves around enhancing water management, fostering a diversified, resilient economy, and building stronger community bonds. Simplifying funding application processes, boosting educational initiatives, and strengthening cross-border collaboration are crucial steps towards achieving these goals. By addressing these key areas, the region can work toward securing its agricultural prosperity, nurturing community wellbeing, and fostering economic resilience, ultimately creating a more sustainable and vibrant future for all residents.

## Good Governance, Knowledge Sharing, and Skills Development

- **Streamlined Support Processes:** Simplifying funding applications and enhancing community engagement are seen as ways to make support more accessible during droughts.
- **Improved Governance:** Active involvement from the local Council and clearer communication processes are essential during drought and is viewed as an essential step to building better trust between local government and the community.
- **Collaboration for Transformation:** The community recognises the importance of working together, both among themselves and with local government and external organisations and businesses. This collaboration can lead to transformative changes and improved access to resources, which is crucial to build resilience.



This feedback collectively conveys a community working to secure its agricultural prosperity, deepen social bonds, and broaden economic horizons to ensure its long-term resilience in the face of drought and other challenges.

The feedback also highlights a forward-looking community that desires improvements in built infrastructure and technology. The shift towards online engagement following COVID-19 was acknowledged, suggesting an openness to technological advancements.



## Volunteer program



The Corowa Business Chamber has invested in a Volunteer Certified Course for the Corowa, Wahgunyah and Rutherglen regions to assist community members in becoming well skilled and capable volunteers, which in turn fosters a sense of community.

The program is focused on skills enhancement and will empower volunteers within the region develop essential skills, certifications, and benefits, cultivating a strong and inclusive volunteer community. The program is jointly funded through the business chamber and local businesses who collaborate with TAFE on program content.

The program is targeted at participants aged 18 to 80+ and provides opportunities to learn from and gain mutual respect for each generation. Keeping older volunteers actively learning and engaged in community life, while also helping younger community members to enhance their skills and establish links to Corowa. The program aims to either keep volunteers in town or have them return in the future is a major driver of the program.



## Food desert in a food bowl



The local IGA in Urana burnt down at Easter in 2022. Since then, the community of 330 has not had a supermarket open in town, and locals must either make a one-hour round trip to Lockhart or choose home delivery on only one of two days available each week.

The consequence of this is not just inconvenience for the local community, it directly impacts on the town's 'other' biggest industry, tourism. The local caravan park is located on the banks of the Urana Aquatic Centre and attracts visitors all year round.

However, locals have identified that the constraint of no local supermarket has been detrimental, as the appeal of a local weekend away is interrupted with the limitation and inconvenience of not having any local groceries available close by.

This loss of an essential service has severely impacted the community of Urana and its ability to remain resilient in the face of future droughts.



## Agriculture and Wellness Group



The Agriculture and Wellness Group is a voluntary group who originally formed in 2019 from the Deniliquin Drought Support Officer and the District Community Mental Health Drug and Alcohol Manager who identified an opportunity for government agencies, agriculture and community groups to come together in a collaborative and wholistic setting.

This group is open to anyone who wants to join and assembles those working across the community towards similar and/or related outcomes to assist with better co-ordination of projects and initiatives in the future. The group has evolved to have an ongoing focus on business support-viability and general mental health and wellbeing of agricultural community.

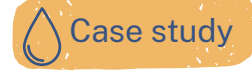
Participants within the group include: Rice Growers Association, Murray Irrigation, Murray Local Land Services, Rural Financial Counselling Service, Centrelink, Red Cross, Resilience NSW, National Emergency Management Agency, Murrumbidgee Health network, Regional Development Australia, Salvation Army, Deniliquin mental health alliance, Murray Land Care Collective, as well as individuals who wanted to join.

This initiative was successful throughout the last drought. The group led by The Rice Growers Association and the Yarkuwa Indigenous Knowledge Centre have obtained funding through the Foundation for Rural Regional Renewal to expand their work via a Community Impact Project.

The grant will be used bring together all groups including landholders, cultural knowledge holders, youth and seniors, to work with community connectors to ensure that all sectors of the community are supported during periods of drought, adapting to the economic challenges of the Murray-Darling Basin Plan implementation and other periods of crisis.



## Anemeka



Anemeka or Oldman Saltbush is a drought and salt tolerant shrub that is native to arid areas of Australia. Anemeka is successfully providing supplementary forage to fill annual feed gaps for livestock, which in turn, supports rural communities through periods of drought.

Typically, a shrub's ability to grow in dry, saline and nutrient deficient conditions leaves the plant less palatable and appealing, as well as decreasing its nutritional value for livestock.

Researchers at the CSIRO identified the need for a plant that was both resilient to challenging growing conditions, and capable of improving livestock productivity and health (CSIRO, 2021). Anemeka was recognised for its higher nutritional value and improved palatability for livestock as well as its potential to regenerate the topsoil of land that is too saline or infertile.

Anemeka is a summer active plant, meaning it can be used as a tool to fill the late summer to early winter feed gap period, which can reduce supplementary feed costs. Once established, this shrub has been described as a "living haystack" for stock, and if managed correctly, can continue to survive for 20+ years (CSIRO, 2021).

As well as reducing supplementary feed costs, Anemeka has also shown to increase wool production in sheep and meat production in cattle.

The addition of Anemeka on farms throughout rural Australia is proving to have significant positive environmental and social impacts on communities through improved landscape function, and biodiversity, improved visual amenity of saline lands, as well as improved drought resilience in rural communities.

Currently, there is only one nursery on the eastern side of Australia that can grow and supply this variety of Anemeka.



Photo: Anemeka™ – Tulla Natives

## Initiatives refinement

Following community consultation, the ideas and initiatives from both the literature and consultation were collated into a long list.

The investment logic used included a:

1. problem statement
2. key questions
3. assessment
4. validation

### Problem Statement

Regional economies will continue to be impacted by droughts, which are predicted to become more frequent and severe into the future. Drought Resilience Plans are required to identify the steps which communities should take to mitigate these impacts.

Drought Resilience Plans should be developed by small consortia of local governments working together so they are actionable and relevant to individual communities.

### Key Questions

#### Impact

How is Southern Riverina impacted by Drought? Which impacts are most acute?

#### Actions

What actions or initiatives can provide support to build the region's drought resilience? Which of the actions deliver the greatest benefit to the region?

#### Concept

What is the anticipated scope of the identified action?

#### Benefit

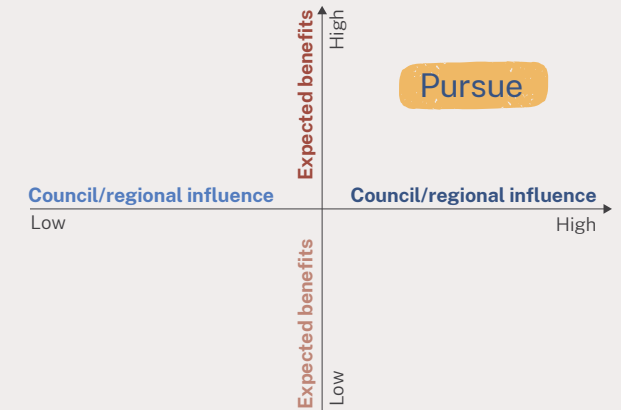
How will the region benefit?

#### Prioritise

How well do the actions address the three pillars of resilience? How feasible is the action and is there a level of shovel-readiness? Do Councils' have the capacity / influence to undertake the action?

## Assessment

Through the SRG, the most severe drought impacts under each theme were confirmed and rated as low, medium or high impact to their respective LGAs. Each idea and initiative (potential actions) were coded with this information. A score relating to the relative level of Council influence, benefit to the community and the feasibility of implementation (how shovel-ready the idea was) was given. In this way, each initiative had a score which enabled the prioritisation of ideas.



Initiatives were considered where the benefit of the action was high and Councils have the greatest level of influence.

## Validation

Following initial assessment, a number of questions were considered to further refine the initiatives and prioritise them.

#### Alignment

Does the identified action/initiative align with Councils' general strategic direction?

#### Beneficiaries

What are and who receives the expected benefits of the action?

#### Ease of implementation

Is there a need for significant regulatory, political or legal changes?

#### Timeliness

How long will the action take to complete?

#### Financial

Is there funding available and what is the cost, including transactional costs? What is the source of funding and who will pay?

The SRG was involved in validating the assessment and prioritised actions.

## Climate Resilience



The Murray River agricultural community is greatly dependent upon water from the Murray-Darling Basin. Water insecurity from years of drought, followed by the pandemic, saw the population in the Murray River Council area decline. This population decline spurred the Council to launch their Adverse Event Plan to build the resilience of the community and grow the regions social capital.

With the help of funding from Increasing Resilience to Climate Change Program, via Murray River Council and Local Government NSW. Western Murray Land Improvement Group (WMLIG) developed a plan in collaboration with farmers, local businesses, Landcare groups, and health and crisis support specialists to “plan in the good times to be prepared for the bad times”.

The Building Our Community in Advance banner was created for a series of ground trials, pilots and workshops to find opportunities in climate adaptation with projects that grow jobs, enhance agricultural productivity, protect biodiversity, and build social capital. Some of the scoping studies and workshops explored included: soil aerator trial and environmental assessments, water market and water trading information sessions, farm questionnaires, organic waste circular economy pilot, and community energy. These pilots and workshops helped identify priority areas for adaptation.

The program builds on Murray River Council’s resilience principles of encouraging community-led recovery, building resilience with adaptive methods, and diversifying the economy and capturing value at home. This program takes a community-led, bottom up approach helping the Murray River community survive, adapt and grow, regardless of chronic stresses and acute shocks.



## Industrial Hemp Project



The Western Murray Land Improvement Group (WMLIG) established in 2003 is focused on enriching community through the power of innovative thinking and knowledge sharing.

The WMLIG engage in projects that build on the community’s resilience, and their capacity to harness and utilise their skills and knowledge encouraging industry diversification in the local agricultural sector, to prepare the industry and community for the changing climate. One such industry diversification initiative is the Industrial Hemp Project.

Beginning in 2021, WMLIG began a feasibility trial, engaging a number of partners and consultants to determine if industrial hemp could be a viable summer crop inclusion in the Western Murray region. Hemp crops sequester more carbon than other crops, Biomass crops can grow 5m in 5 months, and the grain is processed into high value products (WMLIG, n.d.).

First crops were sewn in late 2021 to mark the beginning of a two-year trial. Crops are sampled at the onset of male flowering to catch the crop with optimal fibre levels prior to the crop producing seeds. Hemp does require a significant irrigation and fertiliser investment compared to conventional cereal crops.

A pre-feasibility study is currently being developed by The Wedge Group to consider aspects of production and processing, including: a market demand assessment, hemp preprocessing, governance, sales and marketing, financial considerations, and project SWOT analysis (WMLIG, n.d.).

Farming communities have a long history producing and utilising Hemp crops, and the Murray River community could soon be added to the long list of farmers rotating these crops through summer.



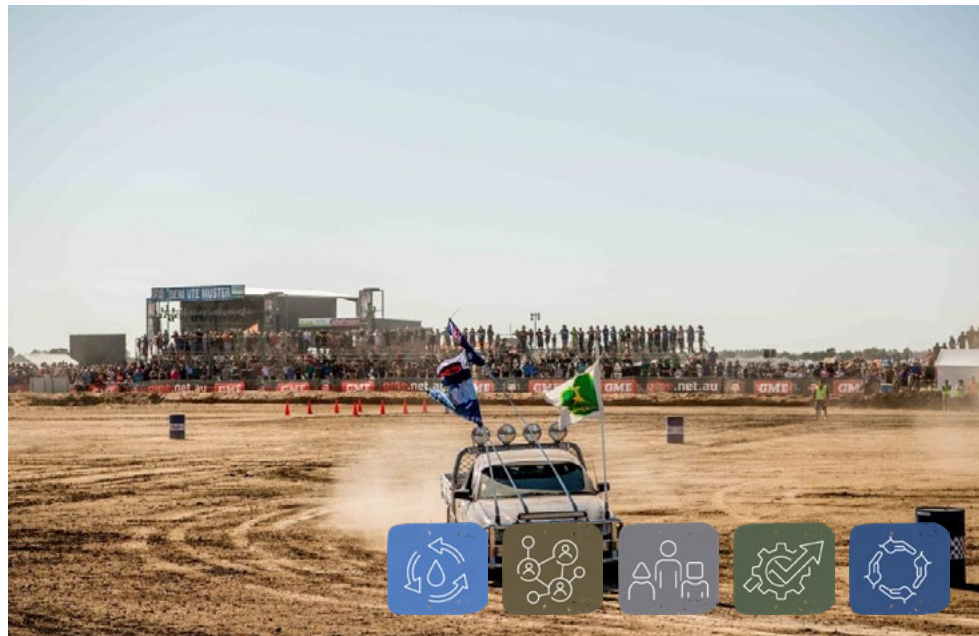
## Deniliquin Ute Muster



The iconic Deniliquin Ute Muster was a concept derived in 1999 when the region was in the depths of drought and a group of community minded people came together to put on a festival to bring visitors to the region to bolster the economy which is largely dependent on agriculture.

The festival is still going strong some 24 years later and has resulted in Deniliquin being known as the Ute Capital of the World. The festival now attracts upwards of 20,000 people to the region each year, with a team of 1,000 volunteers mobilised to support the event and \$100,000 being donated back into community groups (DUM, n.d.).

The event has evolved to include two night time concerts featuring Australian country and rock musicians, as well as offering free camping as a part of entry to the event. In addition to this approximately \$1 million is spent in businesses to put on the event each year and \$6 million is spent within the region by patrons of the event (DUM, n.d.).



## Southern Riverina Wellbeing Collaborative

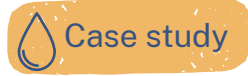


The Southern Riverina Wellbeing Collaborative was formed in early 2022 from members of the communities within their communities. The Collaborative recognised the challenges with access to services due to both geographical factors and recent child safety concerns that were exacerbated by the pandemic and were found to be impacting the mental health and community connection within the Southern Riverina. Some of their successful initiatives to date include:

1. The delivery of mental health first aid course that focus on providing skills to support adults and young people to seek appropriate professional help and to support them if they are in a crisis.
2. Burn Bright program has been delivered to 260 students in the region. The program is focused on supporting wellbeing and building positive relationships in help in creating a positive impact on the world.
3. Live4Life is a mental health education and youth suicide prevention program designed for rural and regional communities.



## Strawberry Fields



Founded in 2009 by a desire to acknowledge the traditional owners of the land and to facilitate opportunities for First Nations artists. The annual festival has grown to attract more than 10,000 visitors to the region for displays of art, music and camping. The festival seeks to provide a unique experience and has established a permanent site about 15 minutes from the town of Tocumwal. The Wildlands property that hosts the event has been customised with sustainable infrastructure and a focus on minimising the impact of the festival on the environment. The Strawberry Fields Festival has become a celebration of the Australian bush, and it provides a platform for young, local and upcoming talent to showcase their work. The festival invests into the local community through a Community Grants fund that is directed to those organisations that would otherwise struggle to obtain funds.



Photo: ©Flickr, ACAB Collective





05

Drought Resilience  
Actions

# What has already been done to build drought resilience

The communities of the Southern Riverina know what they require to be more drought resilient over successive droughts. They have sought to solve their own problems and find solutions. This has resulted in numerous programs and initiatives orchestrated by a number of organisations which support the pillars of social, economic and environmental resilience to drought. Much of the effort has come from individuals who are community minded and have sought to implement action to help themselves and their communities during these challenging times.

One of the identified resilience actions includes the iconic Deniliquin Ute Muster born out of a united community looking for ways to improve their economic resilience in the face of the 1999 drought (see case study). Additionally, the Agricultural and Wellness Group is a liked-minded collective of individuals working across the community towards similar and/or related outcomes to assist with better coordination of projects and initiatives in the future. The group has evolved to have an ongoing focus on business support-viability and general mental health and wellbeing of agricultural community. These are both examples of building absorptive capacity.

Recent funding through the Foundation for Rural & Regional Renewal is also set to deliver resilience improvements to the region. Some examples include: the Holbrook Landcare Group who have received funding to strengthen drought preparedness and drive local action in the Murray region. This is through the co-ordination of Community Impact Program activities and evaluation administration or the Cultural Awareness Training and Cultural Tour. The Corowa District Landcare Group are implementing country culture walks, cultural awareness workshops and information sharing drought preparedness events. These activities are designed to deepen social connection, provide a shared sense of purpose and longer-term community belonging.

There are numerous strategies that have been developed for the region including Riverina and Murray Joint Organisation (RAMJO) Water Position Paper (2020), Murray Regional Water Strategy, Riverina Murray Regional Plan 2041 (2022) and Western Enabling Regional Adaption Report (OEH, 2017). These are in addition to the LGA corporate documents, Local Land Services and the Department of Primary Industries resources, which are all key reports that have been developed with actions in mind to benefit the region.

The following sub-sections describe the opportunities to test and the identified current and potential actions to progress, arranged by the five themes. The need, the action and the expected outcomes are provided, along with how these contribute to building resilience and the responsible parties involved. Additional details regarding assumptions and metrics to measure progress towards these actions are provided in this section.



## Opportunities to test

Throughout the consultation process a long list of ideas were identified from the community as to how the impacts of drought could be lessened, or have been in the past. These are a mix of absorptive, adaptive and transformational resilience actions. Some of these include:

1. Continued relief for Primary Producers via Freight/ Hay subsidies in drought.
2. Low interest/ 100% tax deductible loans for infrastructure (storage/power/troughs); then the only issue is ongoing maintenance costs. Income averaging and Farm Management Deposits need to be made tax deductible so they can be utilised during drought.
3. The Government previously funded stock containment areas. This was identified as a good investment as it protects soil and pasture resources.
4. Look for methods to lessen the burden on farmers as they are mentally and emotionally exhausted.
5. The Rotary Clubs provided support during drought via \$500 credit cards.
6. The aging populations is more reliant on others and community, and can place more pressure on medical services, however this demographic are also prepared to educate and be part of initiatives.
7. Being able to see green sporting fields during drought is important for mental health of the community and in particular for children. They are also important to maintain social bonds though recreation activities.
8. Capitalise on possible opportunities for renewable energy (wind farms/ solar) in the region. These investors will choose to establish themselves in areas that already have the amenities and services to support their business. They also have money to invest in the regions they choose.
9. Diversification of industries is needed to maintain the attractiveness for people to re-locate to the area.
10. Promote tourism in Moulamein based on it being the oldest town in the Riverina. However, this requires changes to existing infrastructure including roads and designated areas for Caravans to Park along with service improvements.
11. In Wakool, a syndicate of farming families have joined together to own and operate the local pub. This offers a place for the community to gather. They also invested in accommodation on-site. This provides people a place to stay and offers them the opportunity to work on-farm and supplement their income with bar work.
12. In Moulamein, to attract business to the town, office space is being modified with the purpose of offering it rent-free for 24 months to attract health services to the region. Attracting a doctor to the town would also provide options for chemists and other supporting services to establish. This is currently being funded from private investment.
13. Local Councils to continue to advocate for increased flexibility to state planning legislation to enable the provision of housing diversity and typology (multi-dwelling housing/ large lifestyle blocks, on/off grid, sustainable (green) development) to accommodate key workers/ young professionals/ couples/ retirees/ young families on infill and new sites. Increased housing provision will attract skilled workers to relocate to the region.
14. There is an opportunity for Councils to become a better support system for the community during drought.
15. Increased support to projects such as Murray Connect and Barham Agri-Innovation Precinct which will realise benefits for agriculture and the communities within the region.

This Plan seeks to capitalise on this previous work and ideas and support actions that will benefit the broader region.

### Absorptive capacity

For ***maintaining*** of key functions and structures of a system in the face of shocks.

### Adaptive capacity

For ***modifying*** the system when needed.

### Transformative capacity

For ***radically changing*** the system or building a new system if maintaining and modifying the existing system won't work.

## Theme 1

# Prosperous agricultural landscape and water security



**The Need:** A resilient agricultural sector is at the forefront of improved drought resilience in this region. Agriculture in the Southern Riverina is the main industry and source of revenue. This is supported by irrigation corporations which supply water for production. Continuing to have a strong agricultural industry requires support from having by up-to-date knowledge of water availability and security to allow producers to make the most informed choices regarding production and adapt or transform their systems as required.

There is a lot of on-going effort in the region focused on driving efficiencies in new technology, improved water efficiency and alternate production models. This action focuses on the connection and co-ordination of the region with other dynamic and innovative work being conducted.

Increasing resilience in agriculture will be supported by improving the exchange and distribution of information within the sector, along with supporting leaders to foster connections within the community to provide better knowledge sharing.



## Water

Current actions	Led by
<ul style="list-style-type: none"> <li>Improve strategic decisions around allocation of irrigation water and optimise efficiency in delivery and use.</li> <li>Optimise the efficient capture, storage and use of surface water for agricultural production.</li> <li>Balance agricultural water requirements with landscape and cultural water needs.</li> </ul>	Southern Innovation Hub
<ul style="list-style-type: none"> <li>Statement of Strategic Regional Priorities 2022-2026 and Water Position Paper 2020.</li> </ul>	RAMJO
<ul style="list-style-type: none"> <li>Significant research and initiatives are already completed and being implemented across the Southern Riverina area. Understanding and collating the breadth and depth of those works will be essential to responding more fully to the impacts of drought on the agricultural landscape in particular. For example, some One Basin CRC initiatives include:                             <ul style="list-style-type: none"> <li>Future governance for water limited communities.</li> <li>Unlocking collaborations for transformation: towards a platform for data and knowledge sharing.</li> <li>Understanding future leadership needs.</li> <li>Reducing uncertainties and enabling multiple benefits in water delivery operations.</li> <li>Improved Approaches to securing and Delivering Water Resources in a Changing Climate.</li> <li>Incentivising and Investing in Climate Adaptation and the Adoption of Sustainable Basin Mana</li> </ul> </li> </ul>	WMLIG and other similar bodies

## Water Actions

### Priority Action

Consolidate the existing social and economic studies that have been conducted on the impacts of water buy-backs on the Southern Riverina region. This will enable a more streamlined approach to advocacy for water rights by Councils and other organisations and highlight any alternative options. While this may be absorptive capacity building in its infancy, it may lead to adaptive or transformational change.

### Other Actions

1. Continue to advocate to State and Federal Governments to provide input to water policies that reflects the issues and concerns of their region and ensures that policies implemented at both levels consider the costs to community, particularly where water buy backs are concerned and that other complimentary improvements such as investments in improved water infrastructure and changes to water management are considered.
2. Utilising the information from the priority action, investigate means by which to support communities to understand and adapt to the future state of the region.
3. Support the actions and updates of the RAMJO water position paper.
4. Encourage learning from First Nations Peoples about the importance of water to their community and their connections to the local landscape.
5. Investigate opportunities to improve town water supply performance through the DPE Water.
6. Work with MDBA to improve river management and manage flows and water access, seeking opportunities to promote the social and economic impacts of water management on communities. Two of the main concerns are transmission losses of water and the degradation to the riverbanks.
7. Consider the benefits of 'water banks' to keep water in the local area rather than losing to other regions. Investigate reconnecting River Country projects that improve connectivity for fish and environmental water to key assets like wetlands.
8. Advocate for emergency water allocations being unlocked during drought, drawing from the environmental bucket, to ensure green spaces can be maintained by Council.
9. Investigate the potential to transition more people onto town water to improve their water security. This will require enhanced water treatment and water infrastructure and could only be achieved through full government funding.

● Absorptive ● Adaptive ● Transformative

## Key Outcomes

- The priority action will act as an input to the regional diversification strategy (see Theme 3) and will also assist the consortia of Councils to lobby the state government against any detrimental impacts to the community from pursuing high levels of water buy-backs. This is vital to understand whether the current agricultural systems will be sustainable into the future or whether transformational change and uptake of new methods/ crops i.e. Hemp or Anameka (see case studies) is required.
- Other actions will increase the understanding of access to water and support improved relationships with other groups and agencies.
- The actions assist to integrate and align the importance of water for the region. It will be important that advocacy and education actions utilise climate change predictions to ensure an evidence base is used for business cases.

## Pillars of Resilience



### Social

Better mental health outcomes from improved water security.

Integrates cultural awareness of First Nations People's connection to water and the environment..



### Economic

Assist in quantifying the potential financial impacts to the region of future water-buybacks. Allows planning for adaptation and/or transformation of industry to occur.

Seek opportunities for environmental markets to support natural capital improvement. As stewards of the land, farmers can access environmental markets to diversify incomes, even during adverse events.



### Environmental

Improved outcomes for agricultural properties and the river(s).

## Implementation Steps




### Priority Actions

1. Consolidate the existing economic and social impact studies in the region (addressing any gaps in the current studies and ensuring it represents the Southern Riverina) with the assistance of a consultant or Council resource (if available).
2. Utilise the impact study as an input to the regional diversification strategy (Theme3).
3. Utilise the outputs of the study to support communities to adapt to the impacts of water-buybacks.
4. Communicate findings in a clear and succinct manner that is engaging for both farmers and the general community.
5. Use the findings to advocate for better water security, management and policy.

### Other Actions

1. Continue to utilise RAMJO to advocate on water issues to State and Federal government.
2. Engage with First Nations Peoples (e.g., Yarkuwa Indigenous Knowledge Centre) on how best to support and integrate First Nations knowledge and learnings into Council activities and education.
3. Establish and strengthen working relationships with external agencies.
4. Research the benefits and drawbacks of a community water bank. Make findings available to the community.

## Delivery model

Suggested Lead Agency	Potential Partner/s
<p>Consortia of Southern Riverina Councils with the support of RAMJO will lead the priority action.</p> <p>The balance of the theme actions will be a collaborative effort with program partners.</p>	<p>The region's industry including:</p> <ul style="list-style-type: none"> <li>• Ricegrowers Association of Australia</li> <li>• National Farmers Federation</li> <li>• Department of Planning and Environment (Water)</li> <li>• Murray-Darling Basin Authority</li> <li>• WaterNSW</li> <li>• Water users and associations within the region – NSW Irrigators Council, Southern Riverina Irrigators, YACTAC, Murray Irrigation Limited.</li> </ul>
<p>Finance</p> 	<ul style="list-style-type: none"> <li>• FDF to fund the consolidation of the economic and social assessment of water buy-backs.</li> <li>• Investigation of options to fund any further identified actions.</li> <li>• Cost: Estimated \$50K to \$150K to have economic and social studies consolidated.</li> </ul>
<p>Timeframe</p> 	<ul style="list-style-type: none"> <li>• Short-term to deliver the economic and social assessment as described above.</li> <li>• The other actions can be commenced in the short-term but would be on-going to deliver outcomes.</li> </ul>
<p>Measure of Success</p> 	<ul style="list-style-type: none"> <li>• Consolidated economic and social assessment with findings communicated.</li> <li>• Ongoing (regular) engagement with, and learning from, First Nations Peoples (may be workshops or signage).</li> <li>• Improvements to water infrastructure and meeting water performance measures, reduced complaints.</li> </ul>

## Agriculture

Current actions	Led by
Six LLS Drought Adoption Officers (funded from the Southern Innovation Hub) and a boost to the Regional and Local Landcare Co-ordinator positions	NSW Government
In previous drought periods there have been freight and hay subsidies as well as low interest/ 100% tax deductible loans for infrastructure (storage/power/troughs), income averaging and FMDs, 100% tax write off for machinery/infrastructure.	NSW Government
Adoption of agricultural practices that optimise production benefits whilst managing risk to farm business and landscape assets	Southern Innovation Hub
Wakool Agri-Innovation Program, natural capital / biodiversity and carbon farming pilots, industrial hemp, Agri-innovation Precinct, Murray Connect and other pilots/ programs aiming to build-in resilience against adverse events by providing access to novel markets.	Western Murray Land Improvement Group
Murray Landcare Regional Landcare Plan for the Murray is to enable collaborations and strategic action towards sustainable land management, environmental conservation and empowering communities.	Murray Landcare Collective
Sustainable Agriculture Facilitators (SAFs) (formerly Regional Agriculture Landcare Facilitators) support farmers, industry, and community groups to adopt new and innovative sustainable agriculture practices. SAFs are funded under the Australian Government's National Landcare Program. They connect people and information and are out on the ground as the key contacts for sustainable agriculture in their community.	Sustainable Agricultural Facilitator

## Agriculture Actions

### Priority Action:

Secure on-going funding to support a regional climate change coordinator across the four LGA's on a shared service basis. This will assist to build absorptive, adaptive and transformative capacity across the region.

- Engage a local provider on a part-time basis to act as a co-ordinator of information and facilitator of connections for agriculture and the community. There are organisations within each of the LGA's that could be sought as providers for this service. Examples of these providers include Western Murray Land Improvement Group, Yanco Creek and Tributaries Advisory Council and other private consultants in the region. The role would entail establishing relationships with other programs and organisations that are delivering drought resilience work and bringing this knowledge back to local communities, as well as facilitating connections between different groups to enable knowledge sharing. The officer may also suggest opportunities where Councils can support other agencies / organisations (research and programs e.g., Biochar pilot, micro abattoir, Food Producers Collective).
- Being a conduit for connecting the agricultural industry with other service providers eg RFCS, LLS, OneBasin CRC, Landcare and producer groups, Southern Innovation Hub including existing programs / workshops which focus on diversifying income, forward planning, succession planning and education regarding stocking rates and technology advancements.
  - Being a conduit for information to the local community on early drought indicators and support services available.
  - Assisting farmers with understanding and applying for funding.

### Key Outcomes

- Improves connection and exchange of information for both the agricultural sector and the community with key messages and information prior to, and during, drought by providing a dedicated contact for the community.
- Connects Council directly with improvement activities being conducted by the Southern Innovation Hub, Western Murray Land Improvement Group, LLS Drought Adoption Officers and Landcare Co-ordinators that will bring benefit to their community.
- Provides a connection to drought and general assistance information for both the community and agricultural sectors. Can support the community response to flood, bushfire and climate change, being a conduit to information, funding and resources.
- Promotes and builds on existing resilience activities being undertaken across the state.
- Provides additional employment to the region from the creation of the new role.

## Pillars of Resilience



### Social

Use of a common language and understanding of drought impacts and indicators of when the region is moving into drought.

Increased access to resources that support planning and delivery of mental health services.



### Economic

Will assist the community with financial planning and improve farmers understanding and access to financial support.



### Environmental




Provides greater sharing of knowledge on agricultural management practices that improve biodiversity and natural resource management.



## Implementation Steps

1. Secure funding and develop job brief.
2. Appoint someone to the role.
3. Conduct evaluation on effectiveness of position.
4. Assess whether to continue position.

## Delivery model

Suggested Lead Agency	Potential Partner/s
<p>Consortia of Southern Riverina Councils will work with local agricultural and natural resource service providers in the LGA to identify a suitable service provider for the priority action.</p>	<ul style="list-style-type: none"> <li>• Southern Innovation Hub</li> <li>• Murray LLS</li> <li>• NSW Department of Primary Industry</li> <li>• Canberra University</li> <li>• Agricultural and natural resource service providers in the LGA eg WMLIG</li> </ul>
<p><b>Finance</b></p> 	<ul style="list-style-type: none"> <li>• FDF / Disaster Recovery Funding Arrangement to fund the position. Dedicated on-going state or federal funding would need to be secured for the role to remain a permanent position in the region, otherwise the funding burden falls to local Councils and communities.</li> </ul>
<p><b>Timeframe</b></p> 	<ul style="list-style-type: none"> <li>• Engaging a service provider can occur in a relatively short period of time. Implementing the co-ordinator will allow a dedicated focus on preparing for future climate change events in the region.</li> </ul>
<p><b>Measure of Success</b></p> 	<ul style="list-style-type: none"> <li>• Establish a baseline figure of visits to Councils' and service providers websites for climate change information.</li> <li>• Service provider to report on the number of users of the service, introductions made or information sessions delivered.</li> <li>• Partners to be surveyed on the benefit created from the role.</li> </ul>



## Theme 2

# Connected people, cultures and improved community wellbeing



This theme is based on the desire to maintain and promote a community that is well connected, resilient and cohesive in times of challenge; where a strong social fabric exists that supports and maintains the wellbeing of its members.

This priority is focused on providing services that are delivered to the community to support health and connectedness in times of hardship and provide support where it is most needed. The provision and embedding of health services in the community in good times is a pre-emptive means of improving resilience in the longer term especially during and after drought.

**The Need:** We heard through the regional consultation that selected individuals within the community are increasingly looking for drought solutions and messaging and that the demand for mental health services were not aligned with the demand from the community during 'good' times, let alone during crisis.

Current actions	Led by
Agriculture Wellness Group (see case study)	Rice Growers Association
Southern Riverina Wellbeing Collaborative and mental health first aid training	Berrigan Shire Council
PhD and student internships in the region	One Basin CRC
Naponda Store: local initiative established in 2012-13 as a result of women struggling with mental health due to lack of jobs during drought. A way for women to work on their hobby crafts. Profits go to the store and local hospital.	Naponda Store (community not-for-profit)
Murray Connect Office; a coworking space and community hub in Barham. A community initiative that aims to provide a central hub for the purpose of connecting people, industry and research for the purpose of facilitating adaptation within the community to grow economic sustainability within the region.	Western Murray Land Improvement Group

Current actions	Led by
Feast, Forest, Farm: two-day event with seminars, events on local farms, local dining experiences to draw people to the area. This will utilise the local accommodation and facilities and help guests gain an understanding of the wealth of produce that is within the region and showcase its cultural history.	Western Murray Land Improvement Group

## Actions

### Priority Action:

Develop a Regional Community Resilience Program. This would directly address the need identified by community for greater mental health support. It would help to build absorptive capacity in the community. The program could include:

- Identify and develop relationships with health and well-being service providers including but not limited to Active Farmers and the Red Cross.
- Advocate for access to improved mental health services for the community to better meet the demand for such services in times of need. Advocate for district health nurses and mental health services.
- Partner with agencies and service providers to provide mental health first aid training to supporting industries.
- Improve collaboration and connection with local health providers such as the Murrumbidgee Local Health District and the work being undertaken by the Southern Innovation Hub on "identifying mental health indicators and service structures that can be sustainable for small communities" can be capitalised in the region.
- Provide information and support for leadership and volunteer programs such as the Corowa Business Chamber Volunteer Program.
- Support and promote educational and training opportunities within the region such as the Regional University Study Hub, which encourages students to stay and study in the region, and Deniliquin Business Chamber - Chamber Riggall Fellowship.
- Develop and promote a program of events for the region that can be drawn upon during times of hardship to promote social connectedness. This includes utilisation of the mobile Finley Community BBQ Trailer (funded through the FRRR).
- Publish and share information with the community on the health support options accessible to them.
- Publish and share the community events information and community groups such as the Men's Shed to demonstrate opportunities available within the region for people to become involved. Provide support for co-hosting family wellbeing days.

- Promote the existing work of external organisations providing support services e.g., mental health services, programs for farmers (tackling tough times, agritech innovations, drought resilient species, innovation/diversification strategies).
- Support and advocate for community gardens and heat refuges.

### Other actions

- 1. Continue to support local shows which provide opportunities for the community to gather and contributes to tourism.
- 2. Support diverse range of uses for recreational areas (e.g. Moulamein lake used as emergency water supply but also recreation managed by 355 committee).
- 3. Encourage more volunteering by appealing to the youth within the community via means that engage and attract them. This will assist to mitigating volunteer fatigue.
- 4. Councils ensure basic services are available and work with the community to keep clubs open.
- 5. Investigate feasibility of (additional) public transport options to assist elderly to move around and encourage town growth.
- 6. Berrigan Shire, Edward River and Murray River Councils apply as a consortium for Regional University Centre funding across the three Council areas to encourage youth to stay and learn in the region.

### Key Outcomes

- The priority action will improve access to, and delivery of, community support services which will build the baseline health of the community and promote social cohesiveness. These services and supports will be in place when hardship arises and will aid in the support and recovery of the community.
- Other actions provide benefits to the local economy through assisting tourism and help to improve social supports.
- All actions utilise and build upon existing knowledge, initiatives and support services in the region while providing support and services that reflect the needs of the region.

● Absorptive ● Adaptive ● Transformative

## Pillars of Resilience



### Social

Improves community connectedness and supports positive health outcomes.

Reduces isolation and provides skill development in the community.

Strengthens community mental health to improve overall resilience to stress.

Encourages students to stay and learn in the region. Overall, aims to improve mental health which will assist individuals and community withstand the psychological and social impacts of drought.



### Economic

Reduces the amount of lost production time due to ill health.

Encourages local spending on community events.



### Environmental

NA

## Implementation Steps

### Priority Actions




Components of the program can be progressed individually or as a collective.

1. Develop the program with the assistance of a consultant or council resource (if available).
2. Form partnerships with providers and establish the relationships with other collaborators.
3. Identify and seek any other funding to support the program.
4. Publish the program and partner details on the councils' websites.
5. Review the program regularly to ensure components remain relevant for the community.

## Other Actions

1. Listen to and provide support to volunteers and committees
2. Survey community interest and conduct needs analysis.
3. Investigate sources of funding and resources to implement programs.

## Delivery model

Suggested Lead Agency	Potential Partner/s
Consortia of Southern Riverina Councils to oversee the priority action. Support from partners will be required to deliver the actions.	<ul style="list-style-type: none"> <li>• Agriculture and wellness group meetings</li> <li>• Red Cross</li> <li>• Active Farmers</li> <li>• Local Health District</li> <li>• Southern Innovation Hub</li> <li>• Men's shed</li> <li>• Other organisations</li> </ul>
<b>Finance</b> 	<p>FDF to fund the program development.</p> <p>As part of program development, investigate options to fund any further identified actions.</p> <p>Cost – Estimated \$50K to develop, document and publish the priority action program and its components. This cost maybe avoided if the consortia have resources that can develop the program.</p>
<b>Timeframe</b> 	<p>Short-term – to commence developing program components and fund those that are 'shovel-ready'.</p> <p>Medium term – to develop and expand the program, build partnerships and implement delivery.</p>
<b>Measure of Success</b> 	<ul style="list-style-type: none"> <li>• Establish a baseline figure in year 1 of visits to Councils' websites for program information.</li> <li>• Review of reportable figures on users of services.</li> <li>• Review of plan events against actual events held and participation levels.</li> </ul>



## Theme 3

# Diverse and resilient local businesses and regional economies



**The Need:** *The community cited their main concerns regarding the local business economy as the reduction in tourism resulting in less visitors for the region and a lack of adequate housing, services and infrastructure to support the existing community needs and attract new families and investors to the area.*

Diversity in the local economy will build resilience to drought, reduce the impacts on the community, and make the region more appealing for employment, business development and population relocation. In this case it also reduces the burden on agriculture if there are other industries that can independently sustain and contribute to the region's economic prosperity despite declining seasonal conditions. This builds the region's absorptive capacity.

Whilst all the Councils have a series of planning documents that establish their priorities, there is an opportunity for the region to build on this work through approaching the diversification of industry and economy at a region level.

Current actions	Led by
Rural regional community social research into pre-drought indicators in communities.	Southern Innovation Hub
Building resilience of businesses and social networks that underpin regional communities and service surrounding areas.	
Identifying mental health indicators and service structures that can be sustainable for small communities.	
Renewable Energy Zone (REZ) will connect multiple generators and storage in one location, capitalising on economies of scale to deliver cheap, reliable and clean electricity.	South West REZ, EnergyCo

Current actions	Led by
Murray River crossing projects include the second Echuca-Moama Bridge, Barham-Koondrook and Tooleybuc Bridge restorations and plans for the Swan Hill and Yarrawonga Mulwala Bridge replacement.	Transport for NSW
These projects will address heavy vehicle access to support economic and industry diversification and cross border relations.	
Enhancing regional assets will sustain and increase tourism including eco-tourism, agritourism, recreational opportunities, cultural heritage to diversify the regional economy.	Riverina Murray Destination Network

## Actions

### Priority Actions:

The Development of a Regional Economic Diversification Strategy that will include elements of absorptive, adaptive and transformational resilience building. The Strategy could include:

- A view of the region as a whole that provides the opportunity for Councils to improve collaboration and co-ordination.
- Improving connectivity with cross border communities to support economic growth and diversification.
- Consideration and improved planning for how to better utilise the existing infrastructure within the region to benefit the whole, this can include how to repurpose existing underutilised infrastructure within the region to support investment in other industries, that are appropriate, as well as modifications / improvements to better suit the regions changing demographic and community needs and boost employment e.g., making pools more accessible for elderly, re-vitalisation / private investment of airports/ aerodromes, childhood centres, tertiary and learning spaces, medical spaces.
- Building on regional tourism planning that seeks to enhance the local economy and promote the region as a place to stay, play and spend in. This needs to be considered in terms of cost of maintenance, reliability of volunteers, employment viability and the casualisation of the workforce. Supporting services and amenities also need to be available to encourage people to stay. The region's tourism plans should be aligned with both the Destination Management Plan and the Local Area Plans.

- Advocating for buying local and support local production of commodities and community owned businesses. This could occur through alignment with Buy from the Bush.
- Encouraging diverse baseline economic activity and roles for women and First Nations Peoples.
- Investigation and planning for where potential funding from green energy project investment would best benefit building resilience in the community.
- Renewing and implementing economic development plans.
- Investigation of where best to place new industrial estates to encourage investment and growth in employment.
- Exploration of where there is potential to value-add to existing industry and business. This may be place-based investment projects with other impact investors and venture capital.
- Listening to local community as to what social events and facilities will attract people to town.

## Key Outcomes

- Identified opportunities for industry diversification in the region that can be supported by the community and create new streams of income.
- Includes the community voice in creating the future vision of the region.
- Supports good governance and decision-making in the region.
- Demonstrates the desire for ownership and input into the region's future.

## Pillars of Resilience



### Social

These actions will increase regional collaboration with Councils and community through a joint vision.

Outcomes are seeking to grow regional populations and provide for more community activities and opportunities that will increase resilience through challenging times.



### Economic

Growing the regional economy and making it more prosperous, through new business and increased tourism.

Diversifying the economy is an important step in building overall community resilience.






### Environmental

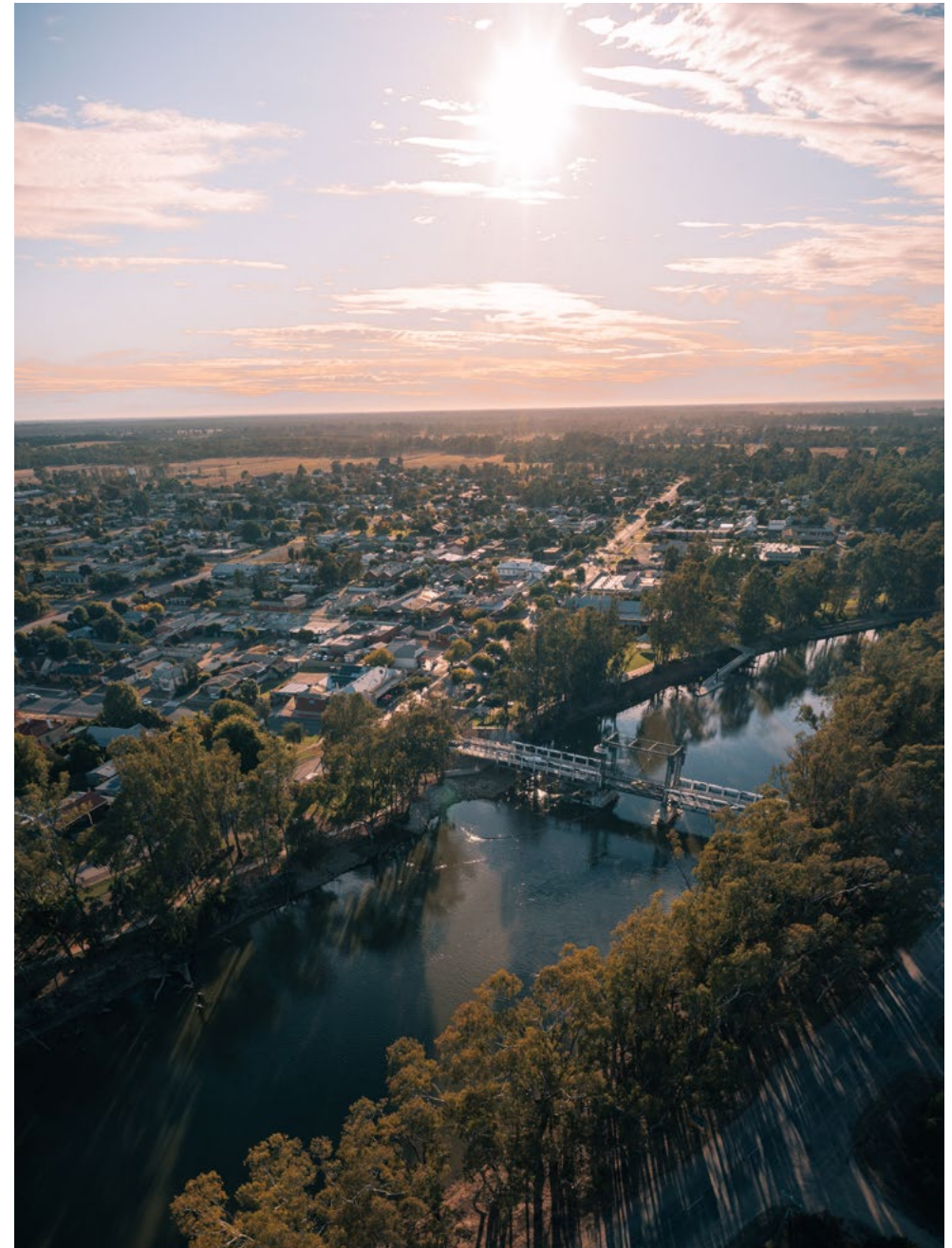
Sustaining and promoting local cultural heritage.

## Implementation Steps

1. Work collaboratively with stakeholders to identify regional economic and employment generating opportunities with cross border localities.
2. Identify regional economic opportunities based on agriculture and value add manufacturing.
3. Continue to grow and support the regional tourism industry through local economic initiatives.
4. Collaborate with key service providers to retain and sustain key employment foundations. i.e. health and educational services.
5. Promote the cultural heritage and character of the region. i.e. Murray River, agricultural sector.

## Delivery model

Suggested Lead Agency	Potential Partner/s
<p>Consortia of Southern Riverina Councils in partnership with RAMJO would lead the priority action. Partners would provide valuable input and assistance with delivery of actions.</p>	<ul style="list-style-type: none"> <li>• Business communities of Berrigan, Edward River, Federation and Murray River</li> <li>• Chambers of commerce</li> <li>• Identified investors in the region</li> <li>• Cross boarder partners and co-collaborators</li> <li>• Department of Regional NSW</li> <li>• Regional Development Australia Murray</li> </ul>
<p><b>Finance</b></p> 	<ul style="list-style-type: none"> <li>• FDF to fund the program development.</li> <li>• As part of program development, investigate options to fund any further identified actions.</li> <li>• Cost – Estimated \$100K-\$200K to deliver the Regional Economic Diversification Strategy.</li> </ul>
<p><b>Timeframe</b></p> 	<ul style="list-style-type: none"> <li>• Short-term to develop the Regional Economic Diversification Strategy.</li> <li>• Medium to long-term to implement actions from the plan and seek additional funding.</li> <li>• Several of the individual components such as shop local can be promoted by Council independently.</li> </ul>
<p><b>Measure of Success</b></p> 	<ul style="list-style-type: none"> <li>• Increased private investment in industry.</li> <li>• Stabilisation of tourism numbers over time.</li> <li>• Increased local production.</li> <li>• Increased and / or stable population in the region.</li> <li>• Increase in women and First Nations Peoples in employment, through implementation and measurement of the regions Diversity and Reconciliation Action Plans.</li> </ul>



## Theme 4

# Built infrastructure and technology improvements



This theme is focused on ensuring the Southern Riverina has in place the appropriate infrastructure to support the needs of the community and, into the future, be a point of attraction for new industry and residents. This has direct links with Theme 3. The Southern Riverina is significant for its freight and logistics and its cross border connections, with agribusiness relying heavily on transport infrastructure to efficiently move products.

**The Need:** Improvements with built infrastructure aligned with utility infrastructure will drive future economic competitiveness while diversifying the economy and industry. Future investment will ensure the region is not beholden to the shocks of drought in this predominantly agricultural region.

The community engagement identified there were opportunities to offer improved support to the existing industry and attract new industry to the region however, a lack of enabling infrastructure was identified as an issue. It was also identified that a stronger community will come with increased access to education, employment and health services.

Current actions	Led by
Work with partner agencies (VLine) to upgrade Tocumwal Intermodal area	Berrigan Shire Council
Freight connections and dedicated land for industrial uses and logistics. ie Deniliquin	Edward River Council
Workshops on improvements in agtech	Landcare, WMLIG

## Actions

1. Raise the community's awareness of alternative telecommunications and internet connectivity options for the region.
2. Explore options to use existing facilities such as saleyards as a community hub for agriculture-related education sessions and potentially generate income as an events facility. Promote the new Corowa saleyards training facility.
3. For the agricultural sector, encourage construction of silage storage facilities and work with partners to promote new technology / efficiencies in infrastructure.
4. Ensure new infrastructure is co-designed with the community to ensure it meets the requirements and will be utilised.
5. Invest in and repurpose infrastructure to attract, sustain and retain the local population. This includes health care services, educational opportunities, recreational facilities and housing that supports the needs of a diverse (and aging) population. This will require working with partners like Murrumbidgee Local Health District.
6. Investigate water augmentation ideas for further off river storage.
7. Plan maintenance and improvement works so activities are completed at a time when there is reduced use of infrastructure e.g., table drains cleared before La Nina.

## Key Outcomes

- Stronger communities through infrastructure that supports community.
- Increased connection for communities.
- Adapting and repurposing existing assets and designing new infrastructure to meet the community need.
- Improved infrastructure will support other diversification activities.

## Pillars of Resilience



### Social

Technology and infrastructure developments will have positive impacts on the attractiveness of the regional communities and benefit community wellbeing and connectivity.



### Economic

Improvements in infrastructure, services and investor activity will improve stimulation of the economy. Attraction of new investors results in business diversity and improved community resilience.



### Environmental

New investor activity has the potential to create positive environmental outcomes as investors seek to balance infrastructure investments with improved social licence and ESG commitments.

## Implementation Steps

1. Existing Council corporate documents provide an opportunity to identify options to build infrastructure and technological advancement. Future population projections are to be used to identify any gaps in infrastructure capacity.
2. The economic diversification strategy (see Theme 3) will provide an opportunity to identify infrastructure and service improvement opportunities for the region.
3. Funding for new or upgraded infrastructure will need to be identified

## Delivery model

Suggested Lead Agency	Potential Partner/s
Consortia of Southern Riverina Councils working closely in collaboration with partners.	<ul style="list-style-type: none"> <li>• Industry Partners</li> <li>• Chambers of commerce</li> <li>• Identified investors in the region</li> <li>• Cross boarder partners and co-collaborators</li> <li>• Department of Regional NSW</li> <li>• RAMJO</li> <li>• State government agencies</li> </ul>
<b>Finance</b> 	<ul style="list-style-type: none"> <li>• Improvements in infrastructure will require funding to be identified to progress.</li> </ul>
<b>Timeframe</b> 	<ul style="list-style-type: none"> <li>• Medium to Long-term</li> </ul>
<b>Measure of Success</b> 	<ul style="list-style-type: none"> <li>• Reduced telecommunications constraints in the region. Measured by an increase in adoption of alternate network options.</li> <li>• Lower levels of de-stocking during drought.</li> <li>• Increased use of community facilities.</li> <li>• Reduced complaints.</li> </ul>



## Theme 5

# Good governance, knowledge sharing and skills development



**The Need:** One of the main themes voiced by the community was the challenges faced in co-ordinating and connecting all the innovative drought work that is being conducted in the region. This will mainly be addressed by the co-ordinator role in Theme 1. However, there are many other opportunities to improve knowledge sharing and increase local skills base.

Generally, governance is well developed, with the Joint Organisation assisting with across region governance and leadership. Each of the LGA's has developed a series of corporate documents and plans that support the future vision for their community.

Current actions	Led by
Research project into leadership and skills development	One Basin CRC
Research into early indicators of resilience loss	University of Canberra and Southern Innovation Hub

### Actions

- 1. Utilise the Joint Organisation framework to strategically target focus areas and continue to build on the RAMJO Strategic Regional Priorities 2022-2026.
- 2. Seek opportunities to collaborate on initiatives and actions with various organisations that benefit the region.
- 3. Promote business and social networks within the community.
- 4. Continue efforts to educate the public regarding water efficiency measures, importance of abiding by water restrictions, what the stages of drought are and how they affect water security.
- 5. Investigate (partner with research organisations) how best to engage with the community post COVID where more people may want a combination of in-person and online engagement or digital formats such as podcasts.

● Absorptive ● Adaptive ● Transformative

- 6. Support and help build the network of community connectors, encourage place-based work and explore how to incorporate more First Nations roles within the region.
- 7. Invest in educational programs that develop skills and expertise within the region and incentivise professionals to the area.
- 8. Investigate ways to increase partnerships with local professionals and businesses such as career talks and internships to demonstrate to the next generation future opportunity and career progression available by remaining in the region.
- 9. Support community leadership and volunteer training programs to increase community cohesion and organisation.
- 10. Ensure opportunities for development are supported by Councils through changes to state and local legislation and policy e.g., housing provision, employment generating lands.
- 11. Examine opportunities to share resources between Councils or alternate employment models (job share/remote workers) to enable the region to resource hard-to-fill roles like town planners.
- 12. Investigate opportunities to partner and learn with Councils in Victoria who face the same challenges of having a population that is mobile between the States.

### Key Outcomes

- Develops trust between the community and local government which improves social unity within the community.
- Demonstrates innovative and cohesive leadership across Councils to solve challenging community issues.
- Builds expertise and skills within the region and increases community strength and education.

## Pillars of Resilience



### Social

Increased educational, job and housing opportunities within the community helps grow the region and diversify social networks.



### Economic

Increased efficiency in use of Council resources through collaboration; this also provides some buffer against harder times.

Increased opportunity within the region through support of connectors; more diverse jobs and economic base.



### Environmental

Improvements in efficient water use and water literacy results in better environmental outcomes (water availability and ecological health).



## Delivery model

Suggested Lead Agency	Potential Partner/s
Consortia of Southern Riverina Councils in collaboration with RAMJO.	<ul style="list-style-type: none"> <li>Chambers of Commerce</li> <li>Business community</li> <li>Group Training Organisations such as Murray Mallee Training Co and Pointer Remote</li> <li>Ricegrowers Association and Yarkuwa Indigenous Knowledge Centre (connects initiative)</li> <li>Co-ordinator role (Theme 1)</li> </ul>
<b>Finance</b> 	<ul style="list-style-type: none"> <li>Department of Planning and Environment – Safe and Secure Water Program.</li> <li>As part of program development, investigate options to fund any further identified actions.</li> </ul>
<b>Timeframe</b> 	<ul style="list-style-type: none"> <li>These actions are a range of short-medium terms actions.</li> </ul>
<b>Measure of Success</b> 	<ul style="list-style-type: none"> <li>Report on number of joint initiatives progressed by the consortia in the calendar year.</li> <li>Reported number of joint training programs supported by the consortia each year.</li> <li>Improvements in efficiency of town water usage year on year.</li> <li>Increased engagement in Council activities / events.</li> <li>Report on the Key Performance Indicators (KPI's) associated with Councils corporate plans.</li> </ul>

# Monitoring, Evaluation and Learning

To drive improved drought resilience in the region, this plan has identified the steps required for change to meet the needs of the region. These include the identified priority and related actions to be implemented; the outcomes that could be achieved as a result and specifically how each would relate to building resilience. The plan also includes steps required to implement the change, and identifies a delivery model to do so.

To ensure this Plan delivers on the actions identified, a Monitoring, Evaluation Learning (MEL) Framework should be adopted. The FDF MEL Framework will be used to assess the effectiveness of implementing this Plan (DAWE, 2020).

## Impact

Do the drought impacts identified in the plan represent those of greatest impact to the region?

## Rationale

Do the current actions and those proposed in this plan align to the strategic priorities of Social, Economic and Environmental?

## Outputs

Does the implementation of the plan deliver the outputs detailed in this Plan?

## Outcomes

Do the benefits of implementing the actions improve resilience across the three strategic priorities for the Southern Riverina? If not, what can be adjusted to improve the outcomes?

The four consortia of Councils working together with the delivery partners including NSW State Government, not-for profit organisations, industry and community organisations will need to collaborate on the implementation of this Plan.

The Councils have been nominated as the lead agency for the delivery of actions within this plan. This is due to both the allocation of implementation funding via the FDF and the ability of Councils to lead and advocate for the resilience needs of their communities. However, it is expected that many of the initiatives will be delivered as a collaborative effort.

Initial Plan measures of success have been identified for the first year of the plan (Section 5). This establishes a starting point to measure the effectiveness and progress of each of the actions.

When identifying the measures of success for each of the actions, the metrics should where possible have quantifiable terms to enable data to be gathered to support a clear monitoring and review process. Ideally, they should follow the SMART criteria: Specific, Measurable, Achievable, Relevant and Time-bound.

Where possible, metrics have been adopted from existing data and systems such as the Australian Bureau of Statistics, census data and existing reporting that could be obtained through Council. The metrics would need to be monitored and reported to establish a baseline level with future years measures of success and metrics to be identified.

Critical to regional-level monitoring of, and improvement to, the Plan will be an on-going project control group comprising of the four Councils with external stakeholders as needed. This group would have the role of initiating actions in line with the plan, reviewing progress against the plan objectives.

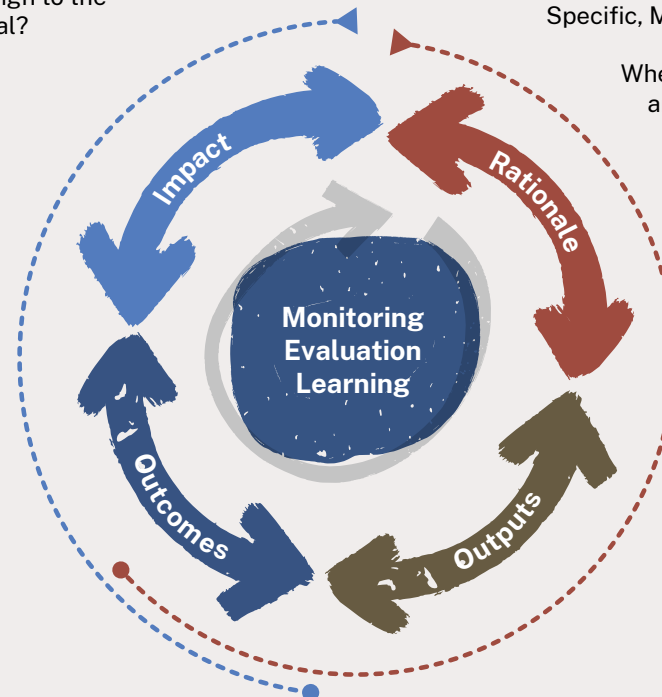


Figure 16 FDF MEL Framework

The Plan is a snapshot in time and requires regular update to ensure the overall actions still align with the region's requirements. A short progress review should be published annually as part of the individual Councils Annual Report (as part of their Integrated Planning and Reporting processes), highlighting any issues in implementation, and reporting using the metrics described. A review and update of plan should be scheduled every 4 years. This should include community consultation to ensure the needs, actions and outcomes are still relevant and to ensure local ownership of the plan. The consortia of Councils will continue to meet bi-annually to assess plan progress. This may include inviting other stakeholders and delivery partners to provide progress updates. Aside from this, the consortia of Councils would be involved in other implementation groups for specific actions.

Some of the key parameters assumed in the implementation of the plan include:

- Effective cooperation between delivery partners.
- Capacity of consortia of local Councils to lead and coordinate other stakeholders.
- Capacity and engagement of other stakeholders to lead and coordinate actions where required.
- Capacity of other stakeholders and the community to participate and actively engage in implementation activities.
- The ability to record and share plan outcomes.
- The integration of the Plan with other local planning activities.
- Stakeholders' willingness to share knowledge and work with each other.
- On-going funding to support implementation of plan actions.
- The remit of delivery partners/stakeholders will not fundamentally change.
- Implementation targets past the short-term can be defined and agreed.
- That the region is not moving directly into another drought and has some lead time to commence plan activities.
- Other agencies continue to deliver drought work that is being leveraged as a part of this plan.

Some of the longer-term factors that may impact plan outcomes include:

- Ability to effect meaningful and longer-term behaviour change.
- Legislative and regulatory change required to implement the actions.
- Regular review and update of the plan.



## Monitoring progress and plan outcomes

The following table contains a mix of plan-specific and FDF MEL Framework indicators. Additional details regarding lead agency, partners and measures of success can be found in Section 5. This table highlights the indicators/ metrics to be used in the short-term. Further expansion of the metrics and indicators for medium to long-term actions will need to be addressed in plan evaluations/ revisions.

Table 4 Initial MEL framework

Theme	Outcome / priority	High-level Indicator / Metric	Timing
<b>Theme 1</b> Prosperous agricultural landscape and water security	(FDF) Sustainable and improved functioning of agricultural landscapes.	Year 1: Completion of consolidated existing social and economic studies including consultation with First Nations.	Short-term to deliver Priority action.
	Water	(FDF) Partnerships and engagement is built between stakeholders managing natural resources.  Greater understanding of the impacts of reduced water.	Other actions to be commenced in the short-term but would be ongoing to deliver.

Theme	Outcome / priority	High-level Indicator / Metric	Timing
<b>Theme 1</b> Prosperous agricultural landscape and water security  Agriculture	(FDF) Primary producers and businesses have improved access to new and existing knowledge and technology to enable more effective responses to risks such as drought.  (FDF) Primary producers' awareness of new and existing NRM practices is increased, and lessons from experimentation are shared.  (FDF) Innovative and profitable agriculture sector.	Year 1: Job brief developed and funding secured for climate change co-ordinator position.	Engaging a service provider can be short-term but would be an ongoing action.

Theme	Outcome / priority	High-level Indicator / Metric	Timing
<b>Theme 2</b> Connected people, cultures and improved community wellbeing	Community that remains socially connected and supported.	Year 1: Confirm lead Council and Develop Resilience Program scope / brief.	Short-term to commence developing program components and fund those that are 'shovel-ready'.
	(FDF) Stronger connectedness and greater social capital within communities, contributing to wellbeing and security.		
	(FDF) The number of, and participation in, local networks and programs to enhance drought resilience increases.		Medium term to develop and expand the program, build partnerships and implement delivery
<b>Theme 3</b> Diverse and resilient local businesses and regional economies	(FDF) Agricultural communities are resourceful, adaptable and thriving.	Year 1: Development of stakeholder engagement approach / plan and commence consultation for the Regional Economic Diversification Strategy.	Short-term to develop the Regional Economic Diversification Strategy.
	Local produce and businesses are highlighted and local community has a strong voice in future vision for the region		
			Medium to long-term to implement actions from the plan and seek additional funding.

Theme	Outcome / priority	High-level Indicator / Metric	Timing
<b>Theme 4</b> Built infrastructure and technology improvements	Adapting and repurposing infrastructure to meet the needs of the community, driven by community voice.	Year 1: Review of existing infrastructure (its usage, potential other uses) and new infrastructure needs identified.	Medium to Long-term.
	(FDF) Improved access to, and greater utilisation of community infrastructure	Review of maintenance and improvement works across the region undertaken.	
<b>Theme 5</b> Good governance, knowledge sharing and skills development	(FDF) Communities better understand their resilience to drought.	Year 1: Research partner for community engagement identified.	Short to medium-term.
	(FDF) Communities implement transformative activities that improve their resilience to drought.	Report on number of joint initiatives progressed by the consortia in the calendar year.	
	(FDF) Communities build their local leadership, networks and social support.		

CSIRO reviewed this initial plan. There were a number of suggestions for changes/ updates for future plan revision. To ensure these are considered in the next revision, a summary is listed below.

- Identify what drought resilience means in the regional context through greater stakeholder engagement, and form more locally-relevant resilience principles for drought planning.
  - Introduce the concepts of transition and transformation to ensure that resilience thinking extends beyond the plan's current primary focus on maintaining current farming and rural systems.
  - Consider developing a stakeholder map of groups vulnerable to drought (for example under-represented groups). This information could be used to better target participants and ensure adequate supports are in place to involve different community segments.
  - Provide more information about each collaboration and partnership, measures of quality and identifying ways to enhance existing relationships and determine where new relationships are potentially required.
  - Clearer articulation of a structured learning process across its various components for adaptive governance of the plan's implementation so that it is more responsive to learning.
  - More nuanced interpretation and use of adaptive governance principles.
  - More explicitly draw on a greater diversity of plans and policies (from across government, research sectors and local community organisations) to provide perspectives on the region's existing priorities in relation to future climate change impacts and associated adaptation strategies.
  - Better characterise interrelationships between economic, social and environmental factors, and explain how these relationships mediate cascading impacts of drought.
  - Conduct a baseline resilience assessment that covers economic, social, cultural and environmental dimensions.
  - Develop a suite of plausible future scenarios through a participatory process with a diverse range of stakeholders.
  - Prioritise, sequence and link proposed actions into alternative and complementary pathways.
- Assess the type and nature of change needed to the region's sectors, farming systems, non-farm businesses and value chains for building resilience to drought and related stresses and shocks.
  - Expand the criteria used to assess how proposed actions are expected to contribute to resilience-building goals.
  - Include a well-developed, evidence-based theory of change with explicit assumptions, mechanisms and impact pathways by which the plan is intended to bring about regional drought resilience.
  - Include an expanded set of MEL indicators, drawing on those suggested by the Future Drought Fund's MEL framework, that could be tracked with Australian Bureau of Statistics (ABS) Census data (i.e. Socio-Economic Indexes for Areas (SEIFA) index and population change). Other more specific economic, social and institutional or governance indicators may also assist in monitoring changes resulting from drought and the plan actions implemented, such as agricultural employment, employment shares of other sectors, household incomes, and segment-specific measures for youth, women and First Nations people.
  - Strengthen the interactions and linkages among its different components more explicitly, and this could be done by developing cross-cutting components such as active learning and governance, a theory of change and a MEL component.



# Conclusion

This Plan was developed through a bottom-up approach by the region which capitalises on earlier efforts made by the community to improve its response to drought and the community should be congratulated for taking control and driving improvement.

This Plan has been designed with the Consortia of Councils being the main leader of actions to ensure the plan is actionable. The delivery of the plan will require other agencies including state government, industry, not for profit organisations and the community to be partners in the delivery of the plan.

This Plan has identified a parcel of actions that can be funded through the FDF Implementation Funding and those that will require further investigation into alternate funding options.

This Plan illustrates the key areas for the region at this point in time. These areas are not static and will require review and update continuously.





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The Regional Drought Resilience Planning Program is being delivered with joint funding from the Australian Government's Future Drought Fund and the NSW Government.

The Regional Drought Resilience Planning Program provides support to identified Local Government Areas in NSW to develop drought resilience plans that can be implemented by councils and their communities.



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