

PARKES, FORBES AND LACHLAN

# Regional Drought Resilience Plan



### Acknowledgement of Country

We acknowledge the Wiradjuri people as the Traditional Custodians of the region's lands and waters, and pay our respected to Elders past and present.



We value the vital involvement of members of the primary production, service industries, community groups, health and education, First Nations, cultural and arts, and broader communities of the Parkes, Forbes and Lachlan Shires to the formulation of this plan and extend our thanks to those who contributed.



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# Glossary

Key terms used throughout this plan are defined below.

<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 socio-economic changes.
<b>ADAPTIVE GOVERNANCE</b>	Coordinating iterative, flexible and responsive interactions between systems when designing interventions and for their implementation and evaluation.
<b>COPING CAPACITY</b>	Communities that may be constrained in their capacity to use available resources to cope with adverse events and to prepare for, absorb and recover.
<b>DROUGHT</b>	Drought means acute water shortage. Drought is a prolonged, abnormally dry period when the amount of available water is insufficient to meet our normal use.
<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.
<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>PATHWAYS</b>	Understanding the future range of potential scenarios and the various pathways for adaptation relative to the systems that can be influenced.
<b>RESILIENCE</b>	The ability of a system to absorb a disturbance and reorganise so as to maintain the existing functions, structure and feedbacks. Also see general resilience, specified resilience, economic resilience, environmental resilience and social resilience.
<b>RISK</b>	The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems.
<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'.
<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.
<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.
<b>TRANSFORM</b>	The process of radically changing or building a new system with different structure, functions, feedbacks and identity.
<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.
<b>VULNERABILITY</b>	The propensity to be adversely affected by a hazard, including elements of sensitivity and susceptibility, or differential patterns of capacities to cope or adapt.

# Introduction

**This Regional Drought Resilience Plan (RDRP) is a collaboration between Parkes, Forbes and Lachlan Shire Councils, developed alongside the community with a focus to advance the region's resilience to the impacts of drought. The program is one of five focus areas under the Commonwealth Government's Future Drought Fund<sup>1</sup> and is jointly funded by the NSW Government to plan pragmatically and proactively for drought resilience.**

<sup>1</sup> Other focus areas under the Future Drought Fund include farm business resilience, roll-out of the Drought Resilience Self-Assessment Tool, and better land management practices that support landscape resilience.

Drought is a recurring and challenging experience in Australia. While a feature of the Australian landscape, the impacts are far-reaching, influencing the economic, social, and environmental characteristics of the community. The effects are felt both on-farm and across communities, and often amplify existing challenges or bring new issues to light. Even when drought ends the effects on people, businesses, and communities can persist for some time.

The Parkes, Forbes and Lachlan region plays an important role in connecting the Central West region of NSW. The region's location is a key strength, located at the juncture of major state and national transport connections with access to rich agricultural land, and linking to nearby regional centres. Opportunities for economic development in the region continue to evolve through investment in major projects and the flow on opportunities associated. Whilst each shire has their own vision, strengths, attractions, and challenges, they share strong connections and aspirations which support the regional identity of the Central West. The existing partnerships between these shires is a particular strength of the region.

The region of Parkes, Forbes and Lachlan has long experienced periods of drought, and reduced rainfall and soil moisture, set between cycles of good years. These cycles have been punctuated by other natural hazard events like floods, including the devastating 2022 floods, which come with their own impacts and recovery cycles. These events compound across the community and make community and economic recovery processes both harder and longer.

The boom-and-bust cycles of flood and drought can move so swiftly in this region that it affects the ability to prepare for the next event. The result is increasing vulnerability, requiring a strategic approach in response. For the Central West, it is important that drought is not considered in isolation of broader systems and cycles.

Across the region, residents and business already demonstrate strong foundations of resilience. Drought preparedness planning seeks to further support this through a roadmap of actions, which ensures amidst other challenges and changing priorities, we are ready for the next drought when it happens.

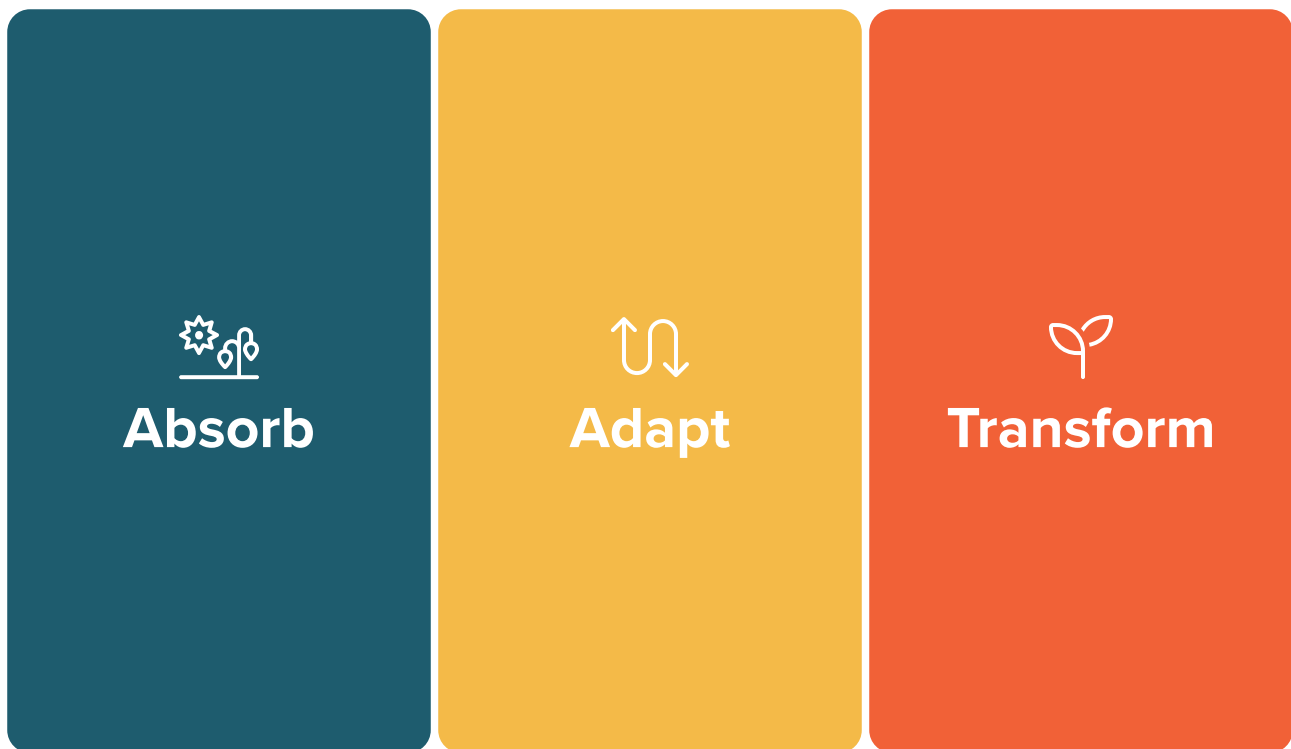
**It is acknowledged that the pathways and actions identified by this plan are dependent upon collaborative, whole-of-community efforts, resourcing and funding availability. It is not the responsibility of any one party to deliver. Instead, it seeks to serve many stakeholders in partnership, who can use this plan to guide action, effort and investment as an evidence-based for local and region drought resilience needs.**

## A framework for drought resilience

### Drought resilience, as described by the CSIRO (2022):

*'will ensure regional Australia can endure deeper, longer droughts, and recover from them sooner. This will help Australia's agricultural industries maintain national farm income, increase food security, and protect the regional jobs that rely on agriculture during the toughest years. Importantly, it will also increase the resilience of rural and regional communities and improve environmental outcomes.'*

Building a shared understanding of the issues that emerge or are exacerbated through drought, and the past interventions which have worked to mitigate local impacts serves as a valuable guide for our future efforts. Through this framing, we can recognise the symptoms and understand the signals to support action. These actions can be scaled and directed under several pathways:



These areas of absorptive capacity, adaptive capacity and transformational capacity provide a view of the priorities identified by this plan relative to different components of the drought cycle, effort and/or costs associated. Some opportunities are short-term and more immediate, whilst others are more transformative in nature and require long-term effort to generate change.

This concept forms part of a resilience 'theory of change' model<sup>2</sup> which helps to break down and consider the complex elements of drought resilience and interlinkages across issues. This makes clear both how and why its impacts run so deep, and why an integrated and adaptation-driven approach is required. This framing also helps to inform decision-making for enhanced resilience and adaptation as conditions and circumstances change over time.

<sup>2</sup> The Parkes, Forbes and Lachlan RDRP integrates the 'Resilience, Adaptation Pathways and Transformation Approach' (RAPTA) developed by CSIRO which provides a framework to map resilience interventions. For more information on RAPTA, visit <https://research.csiro.au/eap/rapta/>

## Types of resilience

To establish a holistic approach to planning for drought resilience, systems of resilience must be considered, including social resilience, economic resilience and environmental resilience.

### Economic

Focuses on the ability to adapt to and recover from the economic shocks caused by drought. This may include diversifying the local economy, supporting business to be drought resilient and providing financial resources to mitigate economic losses during drought events.


### Community

Supports 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.

## Purpose of this plan

 **“Drought has a strangulation effect. It creeps in and breeds uncertainty that makes it really difficult to make decisions.”**  
**Parkes Shire primary producer**

The Regional Drought Resilience Plan for Parkes, Forbes and Lachlan builds upon local resilience initiatives, and community and economic development strategies to support an integrated approach to drought planning across the region. Alongside shifts in broader economic conditions, the region and its communities have endured the impacts from compounding natural hazards and other events over recent years. This plan works to ensure that drought preparedness remains a priority, even during wetter periods, to strengthen how we prepare for drought and position us to respond and recover.

The plan recognises the role of healthy Country and waters in supporting the region’s economic and social functions, and the cultural connection to the lands and waters which the region’s First Nations population, the Wiradjuri people, have maintained for tens of thousands of years.

The chronic and insidious nature of drought distinguishes it from other climate and natural hazards. The uncertainty attached with drought is a major contributing factor to on-farm stress which also spreads across communities. Attached to this uncertainty can often be a feeling of decision paralysis, about what to do and when. This plan provides some direction across the region at the community and economy scale to address some of the challenges faced by drought and to ensure long-term support and capacity for those that already play a role in drought resilience.

## Parkes, Forbes and Lachlan RDRP objectives

Build an understanding of what supports drought resilience in the region, formed around economic, environmental and community characteristics

- Share these features of drought resilience to build an appreciation of the strengths of the region, its people, communities and industries
- Identify what the drought priorities are across communities, and how to address these
- Identify a suite of actions across the short-term to far-term, which builds upon what has been done well, addresses gaps and opportunities, and directs focus towards transformational change
- Provide a platform and evidence-base to support public and private drought preparedness, response and recovery investment in the region, in a meaningful and impactful way.

## A local plan for drought resilience

Understanding the past impacts of drought in the region needs to be considered alongside the changing pressures on communities and the potential changes under future climate scenarios and projections. This paints a picture of the pressures we may have into the future and enables a strategic view of what is needed to better position us when the next drought period occurs.

Examining how issues have persisted and then building upon what has worked well in the past, is a useful guidepost around what needs to be done to alleviate drought impacts moving forward. This plan emphasises the role of risk reduction, acknowledging the need for clear governance in the management of drought and its impacts. A focus is led through:

- Prevention / mitigation efforts to reduce the severity of potential impacts
- Strengthening preparedness for drought to alleviate the negative effects of drought
- Having a clear picture of what is needed in response to drought, when we are in it, based on what has worked and what has not worked so well from the past
- Understanding the broader needs for recovery, to ensure we are best positioned after drought.

The above is based on the ‘prevention, preparedness, response and recovery’ or ‘PPRR’ cycle, a commonly-used disaster management framework that is also applicable to how we think about the types of actions to address drought impacts. For the purposes of this plan, this framework is adapted to centre around our preparation, endurance and recovery.



**Figure 1** — Focus areas of the regional drought resilience plan

Implementation funding is available from the longer-term annual investment across Australia under the Commonwealth Government’s Future Drought Fund, as well as other funding and grant assistance opportunities. This is a foundational RDRP which provides the framework for implementation and identifies practical ways the community and businesses of the region can prepare for and respond to drought impacts.

Typical subsidies and relief programs will still play a role, particularly through the response period, but this local plan is about bolstering our preparedness with a clarity on direction, and a readymade guide once we are in drought so that we can quickly act based on what has worked and advocate with conviction for what is needed.



## Taking proactive action

There are many different approaches that can contribute to enhanced drought resilience in the short and longer term, including those which are on-farm and those which are off-farm.

A core aspect of this plan is informing when to invest and the nature of activities to invest in. This was a particular gap identified through the stakeholder consultation process. The model below (figure 2) provides a blueprint for the action plan, framed around the influence of the drought cycle. It also highlights the need to remain aware of the influence of other trends, stressors and shocks which can impact community wellbeing and resilience more broadly, thereby affecting ability to focus on or invest in drought preparedness.

The 'intervention differential' is the difference sought to be achieved by the implementation of this plan and other drought preparedness and resilience measures to alleviate the impacts of drought and minimise the extent of community and economic downturn over time.

The focus of this plan is to minimise the effects that drought can have on the region's future prosperity and growth aspirations. This concept can equally be applied to planning for other natural hazards in the region. Consistent planning and support is required before during and after drought, and the difference at each stage is the scale. The focus for preparation and recovery includes 'big picture' considerations for trade, industry growth and strategic opportunities. During drought, when we are enduring its effects, the scale is more focused and requires agility in action to address the issues around mental health, income and family and community stability.

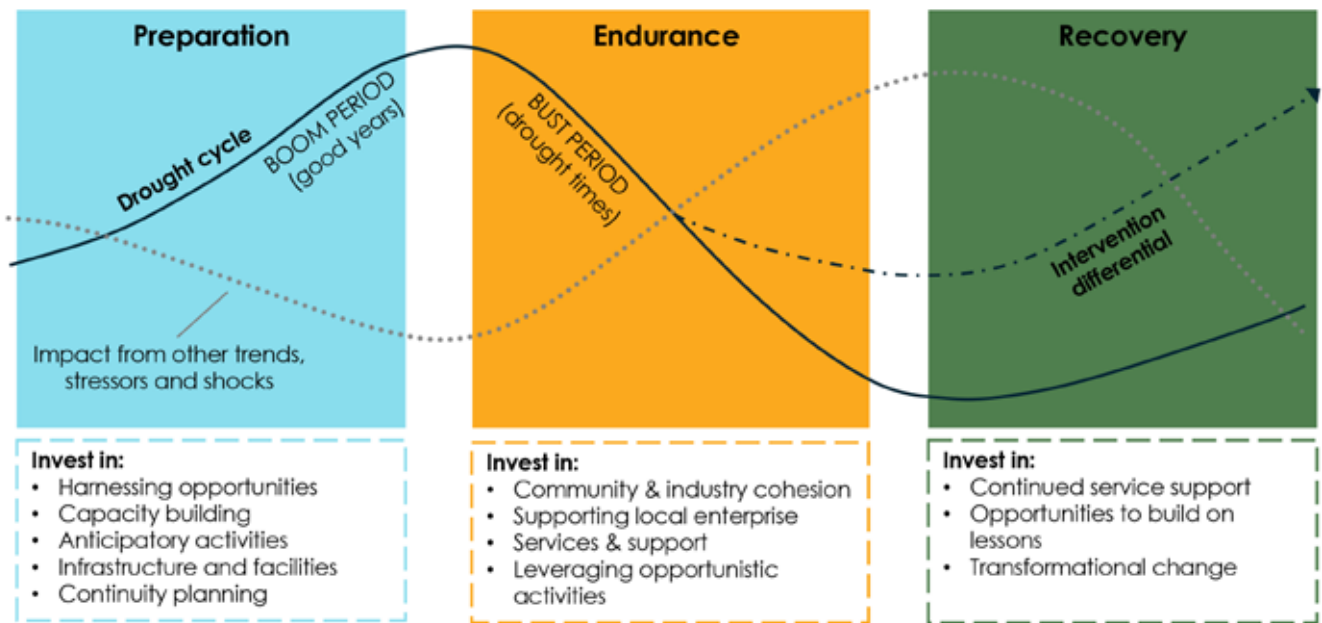


Figure 2 — Parkes, Forbes and Lachlan region's drought action approach (Source: Meridian Urban, 2024)

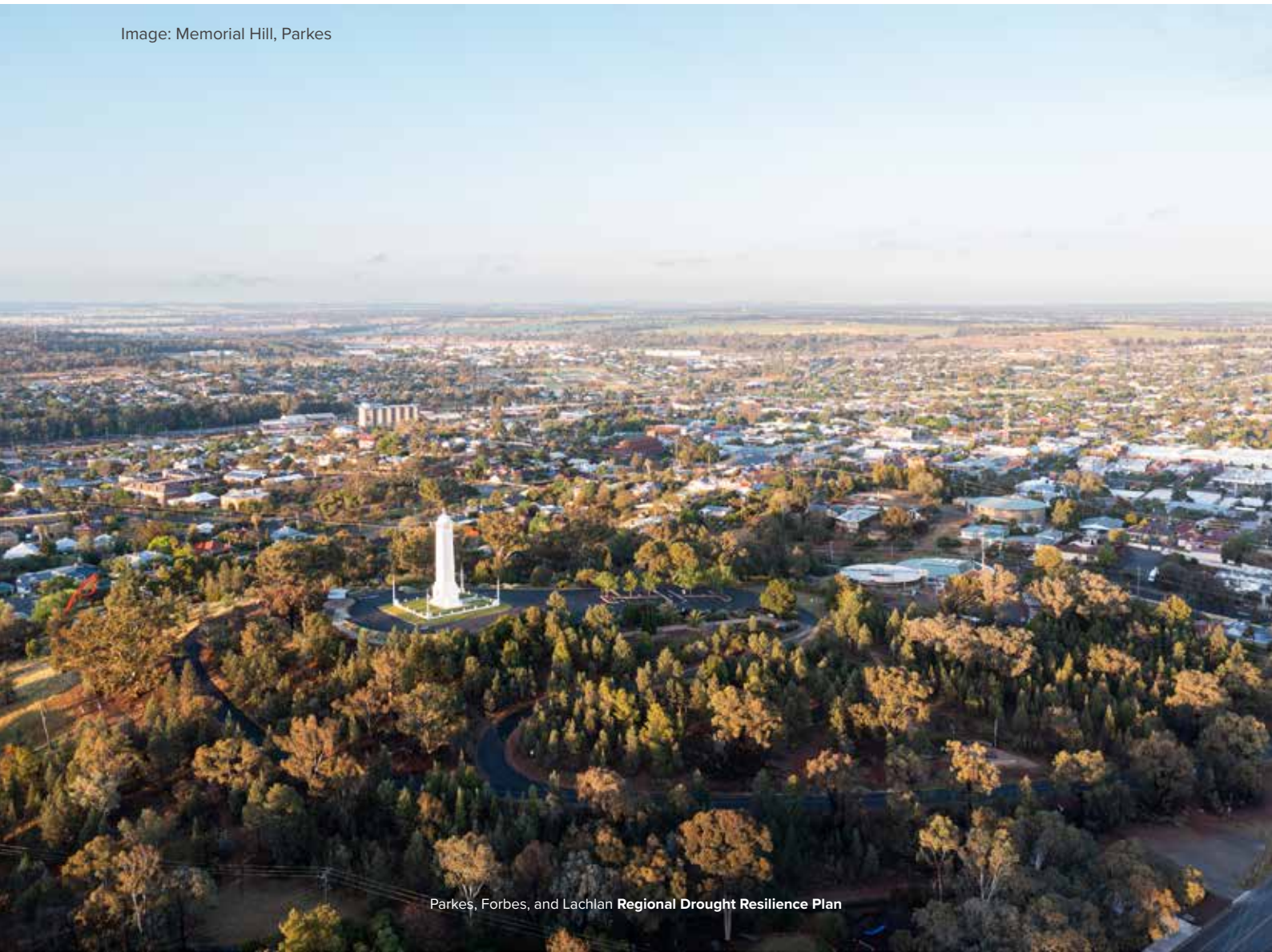
## Strategic alignment

This plan provides strategic alignment with international-scale goals and commitments including the United Nations Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction, along with national-scale strategic frameworks and state-level strategic and policy instruments. This alignment demonstrates how working locally contributes to broader sustainability and resilience outcomes.

Key documents to which this plan aligns includes (but is not limited to):

- NSW State Disaster Mitigation Plan 2024 – 2026
- NSW Climate Change Adaptation Strategy
- Central West and Orana Regional Plan 2041
- Mid-Lachlan Regional Economic Development Strategy (2023 update) and associated industry plans
- NSW water strategies (Lachlan Region (draft), NSW Water Strategy, NSW Aboriginal Water Strategy, NSW Groundwater Strategy)
- Murray-Darling Basin Plan
- Lachlan Water Resource Plan
- Southern NSW Drought Resilience Adaptation and Innovation Hub research
- Department of Primary Industry and Regional Development's DroughtHub
- Department of Primary Industry and Regional Development's Regional NSW Drought Signals Dashboard
- Commonwealth Government's Drought Resilience Self Assessment tool
- Department of Primary Industry and Regional Development's Climate Vulnerability Assessment
- Local government strategies and plans
- Industry group studies, plans, strategies and reports.

Image: Memorial Hill, Parkes



# Region snapshot


Information sourced from: ABS 2021 Census data, Regional Development Australia, and AgTrack - Agricultural and Land Use Dashboard



**30,044**  
Population



Median age  
**41**  
(NSW average 39)



First Nations population  
**14.1%**  
(NSW average 3.4%)



**GROSS REGIONAL PRODUCT**  
Parkes: \$1,023m  
Forbes: \$597m  
Lachlan: \$329m



**LOCAL BUSINESSES**  
**3,470**



**TOTAL EMPLOYMENT**  
**12,569**





**UNEMPLOYMENT**  
Parkes: 5.1%  
Forbes: 3.8%  
Lachlan: 5.4%

## Largest industries (by employment)

**PARKES**

-  Copper Ore Mining
-  Aged Care residential
-  State Government

**FORBES**

-  Education (Secondary and Primary)
-  Grain-Sheep or Grain-Beef Cattle Farming

**LACHLAN**

-  Grain-Sheep or Grain-Beef Cattle Farming
-  Other Grain growing
-  Local Government



**VOLUNTARY WORK**  
(for organisations)  
**18.1% — 23.8%**  
(NSW average 13.0%)



**ASSETS**


- Country Universities Centre
- TAFE NSW campuses
- Central West Livestock Exchange
- Parkes Special Activation Precinct
- Parkes Regional Airport






**AREAS OF SIGNIFICANCE**

- Lachlan river
- Gum Swamp and Bird Hide
- Goobang National Park
- Sculpture down the Lachlan trail

## AGRICULTURAL COMMODITY GROSS VALUE

-  Parkes \$215.8m
-  Forbes \$285.4m
-  Lachlan \$419.8m

## PRINCIPAL AGRICULTURAL COMMODITIES

-  Broadacre cropping
-  Livestock (meat and products)
-  Hay

# About our region

**The three shires form part of the broader Central West area of NSW, situated at the geographic heart of the state and within the lands of the Wiradjuri nation.**

The region spans 25,561km<sup>2</sup>, connected by the Lachlan River, Australia's fourth longest river, running east to west across communities as part of the Murray-Darling system. Fertile alluvial soils dominate areas of the region and supports a strong agricultural industry, alongside natural resource strength in areas founded on the potential of the Macquarie Arc geological formation.

The location of the region is a key strength, connecting to nearby regional centres, and situated at the juncture of major rail lines, including the Sydney to Perth Rail and the Inland Rail. Established and future planned infrastructure are facilitating the growth of the freight and logistics sector, supporting traditional agricultural strengths and mining. Major investment is set to continue to leverage these locational benefits through several major projects, anchored by the Parkes Special Activation Precinct.

The region's population is spread across a network of centres in each of the shires, alongside rural localities and villages which support the dominant primary production surrounds. Parkes Shire contains the Parkes township as the main population centre and alongside the Forbes township they play a role as a strategic centre in the broader land use framework of the Central West and Orana region. In addition to Parkes are the villages of Peak Hill, Trundle, Tullamore, Bogan Gate, Gunningbland, Alectown and Cookamidgera.

Similarly, the Forbes township plays a central role for the Forbes Shire which includes the smaller villages of Bedgerabong, Garema, Wirrinya, Warroo, Corinella, and Ootha. Forbes features a rich tapestry of heritage buildings throughout its main centre, alongside local service provision and a community core around Lake Forbes.

The Lachlan Shire retains a strong connection to the Lachlan River which meanders the region, and its primary administrative centre in Condobolin, providing a valued natural resource and recreational focal point for the community. Smaller centres are located at Lake Cargelligo and Tottenham, as well as rural localities in Tullibigeal, Burcher, Derriwong, Albert, and Fifield, and the Aboriginal community of Murrin Bridge.



## People and communities

The region is characterised by tightknit communities, exhibiting significantly higher volunteer rates relative to state averages and evident in the strong community groups which support the functioning of the villages. The local schools act as their own community hubs, playing their own unique roles in times of need led by inspiring educators and staff.

Sport and recreation play a major role across the shires, with local sports teams bringing people together and fields and courts forming recognisable social points within towns and villages. These fields are set amongst the rich landscape with backdrops of the Lachlan River in Condobolin, Lakes Forbes in Forbes and a major multi-purpose sporting precinct in Parkes situated on the fringe of local environmental assets like Memorial Hill. These places support not only physical health, but also provide space for community to connect and socialise across ages and backgrounds and over shared hobbies, passions and a touch of local rivalry.

Similarly, the arts and culture sector is a strength across the Central West often operating out of heritage buildings, rejuvenating their use and activity in the shires. This sector is not only crucial for the local communities but plays a unique role in telling the stories of the Central West to those outside the region. Physical evidence of this is the Sculpture Down the Lachlan, a permanent, inland public art trail between Forbes and Condobolin along the Lachlan River.

As a destination, Parkes' major event is the Elvis Festival. The longstanding festival draws an annual influx to the town that headlines a diverse community events calendar and tourist attractions like 'The Dish'. This is supported by additional calendar events like the Abba Festival in Trundle.

Forbes has a bustling events calendar, connecting to both environmental and cultural assets. The township is centred around a major community asset in Lake Forbes. Parks and community infrastructure are dotted around the lake, playing a role in connecting the community at major events and linking to a main street lined with heritage buildings and cafés acting as point for community connection.

Lachlan Shire supports several strong communities across its centres. Organically grown attractions such as the Utes in the Paddock, borne out of the local arts scene, are now a permanent fixture in Condobolin located amongst a range of community infrastructure link by the Lachlan River.

Lake Cargelligo, a huge natural inland lake, offers recreation through water skiing, bird watching, and Aboriginal art and culture.

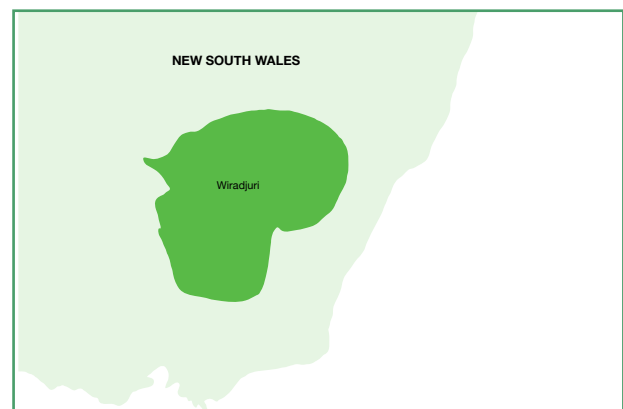
## The Wiradjuri and First Nations People

The Traditional Owners and Custodians of the Parkes, Forbes and Lachlan Shires predominantly identify as Wiradjuri. The Wiradjuri nation is the largest Aboriginal group in Central New South Wales, and they possess a deep and enduring connection to their ancestral land and waters. Recognising the deep connection of First Nations peoples with these lands, their involvement is essential in developing a holistic and sustainable approach to drought resilience.

The Wiradjuri people have a rich cultural heritage that is closely linked to the land and waterways, through traditional practices such as hunting, fishing, and farming. Their cultural landscape includes significant sites such as Wiradjuri Ngurambang in Parkes, and their heritage is modernly acknowledged through local exhibitions like the Wiradjuri Ngurambang Exhibition at the Henry Parkes Centre in Parkes. Similarly, Forbes contains the Wiradjuri Dreaming Centre and Lachlan the Wiradjuri Study Centre in Condobolin.

The Lachlan River is deeply significant to the Wiradjuri people, with cultural practices tied to its seasonal flows and wetlands. Lake Cargelligo and Gum Bend Lake are culturally important wetlands that historically served as resource-rich areas for Indigenous communities. Traditional knowledge of these areas can offer valuable insights into sustainable water use during droughts.

The peoples of Murrin Bridge, which was previously part of the Cobar Shire, are mostly of Ngjiyampaa and Barkandji descent and the community is seen as a 'Koori place' rather than that of one particular Nation.



## Economy and industries

Parkes, Forbes and Lachlan Shires form the Mid-Lachlan Functional Economic Region. This region supports 12,659 jobs with a Gross Regional product of \$1.89b in 2020. Agriculture produces the highest economic output and is the major employment sector with core specialisations in sheep, beef, grains and dairy cattle. Mining is the second largest industry, notable in Parkes, which benefits from a strong supply of metal ore, with potential from significant critical mineral deposits.

A number of key projects anchor significant economic growth, such as the Parkes Special Activation Precinct (SAP), major transport infrastructure upgrades, and water security programs. This builds on strengths in the transport, logistics and warehousing sectors which are expected to support significant growth into future years. This is in addition to expansion and value-add processing relating to agriculture and mining. Manufacturing also produces significant output in the region which will be furthered under the Parkes Special Activation Precinct, and nearby industrial estate development such as that in the northern areas of Forbes.

The region supports a growing visitor economy, benefitting from environmental assets, and destination festivals. A range of other events support these events, such as Grazing Down the Lachlan and regular farmers markets. An emerging industry in the Mid-Lachlan is the energy sector, bolstered by infrastructure investments and environmental strengths in this area.

## Environment

The natural environment consists of lakes, meandering waterways, and red soil plains. The expansion of pastoralism, mining, and the introduction of feral animals to the region has modified much of the vegetation and landscapes within the region. Remnant locations remain however, through a number of State forests and parkland reserves. Bordering the Parkes Shire is the Goobang National Park, an area of cultural significance to the Indigenous peoples of the region.

The region connects across a range of important river systems and catchments. To the north, the Bogan River links to the towns of Tottenham, Tullamore and Peak Hill and forms one of the many tributaries of the Darling-Barwon River. The region mostly falls within the Lachlan River catchment, a long river which flows across the lands of the Nari Nari, Ngijampaa, Wiradjuri and Yita Yita Nations. The Lachlan plays a key role in water security across the region through regulated supply of the

major rural centres including Parkes, Forbes and Condobolin, and provides natural, recreational and cultural values across the region. The Great Cumbung Swap lies at the end of the Lachlan system, consisting of a number of important wetlands (located outside the region).

As a result, part of the region's agricultural activity relies on surface water and irrigation, whilst dryland cropping and livestock rely on rainfall harvesting and storage as well as groundwater accessed via bore networks.

## Water in the region

The Lachlan catchment's headwaters are formed to the immediate east of Crookwell and Gunning in the Upper Lachlan LGA, with the upper catchment area's complex system of waterways flowing into Wyangala Dam which is situated south-east of Cowra. The river flows downstream past Cowra where it is joined by the Belubula River which flows west from Carcoar Dam.

The Lachlan River flows past Gooloogong, joined by Mandagery Creek which caused major flash flooding in Eugowra in the floods of 2022. Major flooding also affected the town of Forbes and broader areas of Forbes Shire in this event, before floodwaters continued downstream through the Lachlan Shire. The 2022 flood event affected many properties across all three LGAs.

Lake Cowal is an important Ramsar wetlands in the mid part of the catchment. It is also in this area, to the south of Condobolin, where the Lachlan catchment divides into a series of channels and lagoons. The Lachlan River continues through the townships of Kiacatoo and Eubalong where it turns south. Past the Cargelligo weir are the waterbodies of The Sheet of Water, Curlew Waters and Lake Cargelligo which are natural features of landscape, however with regulated water levels. These waterbodies have and do run dry in severe drought events. The Lachlan River continues west beyond the Lachlan Shire, Lake Brewster and to Hillston before eventually discharging to a series of wetlands in Balranald Shire, in the State's far south-west.

The Lachlan River is connected to the Murray-Darling basin only when both the Lachlan and Murrumbidgee Rivers are in flood.

Township water in the region is drawn from a combination of river water and borefields located along the river's length, with irrigated areas in the Forbes and Lachlan Shires. Water supply across the dryland areas of the region is largely sourced from rainwater harvesting and private bores.

# How this plan was prepared

The Regional Drought Resilience Plan is underpinned by a detailed 'Resilience Assessment' that offers the technical evidence base for the plan. This assessment documents the impacts of drought in the region, past and future climate trends and details the local context that may influence specific vulnerabilities through drought. While informed by this large evidence base, the core of the plan, has been developed with the valuable input of community members, representatives and organisations, producers, industry representatives, service agencies, non-profit organisations, local businesses, and both local and state governments.



## Resilience Assessment

- Literature analysis
- Review of plans, policies and strategies
- Regional characteristics
- Data on past drought and projected impacts
- Drought resilience indicators assessment.



## Stakeholder engagement

- Online community and business surveys
- Community workshop sessions in Parkes, Forbes and Condobolin
- Community drop-in sessions in Peak Hill, Tottenham, Trundle, Lake Cargelligo, Bedgerabong
- Targeted consultations and discussion with community, industry and local service representatives.

An understanding of local context and drought impacts was built around economic, natural environment and social characteristics, realising however that impacts are not felt in isolation. The plan takes a systems-based perspective to capture the complex challenges of drought which compound when they interact. While this formed the basis of the resilience assessment, supporting this was the consultation and engagement process which aimed to:

## Engagement aims

- Build a story for the region for what drought resilience entails, and how this should be portrayed to those outside the region particularly in metropolitan areas
- Leverage the local knowledge and experience of past droughts across the centres and villages in the region to understand what worked, and what could have been done better
- Identify the commonalities and difference across the region which influence the effectiveness of future actions
- Understand where the pressures come from across the drought cycle, and within the broader cycles of hazards and economic changes
- Discuss how the region can be best positioned to address drought resilience in an integrated manner and build upon this over time.

## A stakeholder-driven approach

The consultation program that informed the preparation of this regional drought resilience plan involved a number of approaches which allowed the project to tap into key stakeholder representatives of large segments of the local population.



“I can’t hope and pray anymore. I have to have a good business plan in place.”

**Lachlan Shire primary producer**

A focal point of the engagement process centred on targeted workshops, community drop-in sessions and online surveys, collating experiences, insights and views from a broad cross section of community members. We spoke with livestock graziers, crop growers, service providers, industry and community group representatives, First Nations organisations, subject matter specialists, local and state government agencies and more.

This stakeholder input was used to develop a shared understanding of local drought resilience strengths and opportunity for continuous improvement, both on-farm and off farm. This was achieved through discussion on personal drought experiences, on previous practices and approaches that worked and those which were less effective. Discussion was had on what was needed into the future to better position the region collectively when the next dry period is upon us. This discussion focussed on actions and initiatives that were required in preparation for drought, the needs during drought and then recovery.

This input was used to identify actions, projects and programs for enhanced drought resilience, contained in this plan.



### 6 workshops across July and October 2024

Parkes

Condobolin

Forbes

### 5 Drop-in sessions

Peak Hill

Tottenham

Trundle

Lake Cargelligo

Bedgerabong

### Online survey

Community

Business owners / operators

**77 survey responses**

**40 workshop and drop-in session attendees.**





Image: Tottenham Water Tower

## Engagement outcomes and key community insights informing the plan



**The rising cost of farming is adding to pressures outside of drought.** Similarly to the cost of living felt by the rest of the nation, this cost of farming is rising, and this impacts decision making processes and capacity to prepare. While equity of farm enterprises may be strong, concerns around rate of return with the ability to service the debt is changing. Rising input costs, amidst uncertainty, is a key component of this and can impact capabilities to plan.



**The compounding impacts from consecutive events, including flooding.** Following the last drought there were several flood events experienced across the region. The cyclical nature of these hazards, and the pace at which they are occurring, creates a strain on communities and businesses. It also makes preparedness for drought more challenging. The compounding nature of hazard impacts our proactive planning capabilities and makes it difficult to create those buffers needed for times of drought.



**The difference in decision making and perceptions across livestock and cropping.** The region contains a mixture of enterprises, and there are differing views to how each is viewed through times of drought. This includes both inter-industry perceptions as well as perceptions of those outside the region. Both are critical elements as part of the state and nation's food supply.



**Everyone has different circumstances and operating conditions which influence options and decision making.** Whilst there are a range of on-farm alleviation measures that are commonly deployed when conditions start to change, like de-stocking or reducing the amount of seasonal crop put in, the unique circumstances and business operating conditions of individual enterprises may add or remove some options from being viable at a given point in time. What works for one will not necessarily work for another.



**The intrinsic link between impacts felt on-farm and the ripple effects across communities and the local economy.** The concept of 'shutting the cheque book' during the first signs of drought is a known sentiment. Many primary producers may reduce spending, which cascades across other businesses more broadly. When the farmers are doing well, the towns and villages are doing well and this relationship is symbiotic.



**Community initiative is a cornerstone for the region.** With smaller populations, the local community often steps up to drive its own initiatives and support in times of need. There are demonstrated instances of this in drought; however, a recurring community view is that it is increasingly difficult to be proactive given ever-increasing administrative burden placed on those seeking to drive change or outcomes. This is represented in regard to administrative matters, associated insurance and liability of hiring spaces and venues, or supplying transport, for example.



**The role of connection — most importantly, informal and organic socialising.** Community events, or industry events with informal opportunities to socialise and chat are invaluable, particularly for mental health and general wellbeing. The approach may not necessarily be to communicate an event as specifically for mental health, but rather look to organically grow and provide a service add-on to events for people to chat to each other, or create awareness of service providers.



**A desire to own some of the messaging through drought, and portray the positives of the region.** Commonly felt was that primary producers, and the region more broadly, are often portrayed as struggling, a result of poor decision-making or with no control of their operations under drought. While drought is clearly a significant challenge, many consider this as part of their usual business planning, demonstrating not only resilience but business acumen in how to respond. Similarly, how the region itself is portrayed can be damaging across sectors, particularly tourism. Arts and culture can play a role in supporting some of the messaging out of the region, with touring exhibitions from the organisation, Arts OutWest, just one example of community-led initiatives to address this.



**End of the line vulnerability.** Communities located on the B-section line for water supply which runs north from Forbes, through Trundle, Tullamore to Tottenham, are reliant upon it for water supply. Pressures are placed on users along the line, with vulnerability increasing the further north it runs. Its age, design and capacity affects water security across these communities.



**The paperwork, and navigation of some subsidy and support programs, creates additional resource and emotional burden.**

There is a feeling that some programs in the past, which were set up to support farmers through accessing funds and subsidies, were not user friendly. The time taken and stress of trying to navigate complex forms creates its own stressors, at times when capacity is already stressed. However, there was also some highly useful subsidy programs identified, like the transport subsidy. Limited subsidy or relief programs for in-town businesses also under stress was also an issue. Some of the services and programs that work need to be offered in perpetuity, or with assurance of local access when needed.



**The decision on Wyangala Dam.** The majority of those engaged feel the decision to not raise the dam wall creates a gap regarding water security. There is also a perceived lack of transparency of this decision.



**Many farming enterprises are implementing resilience through their own business planning and risk management approaches.**

This includes clear feed budgets, underground storage of grain and fodder, business planning and networking of information.

# How our region is impacted by drought

Stakeholder discussions, local historical literature, research sources and survey feedback across the region identified the following key drought impacts:

## People and community impacts

- Tendency to withdraw more from community or perceived disconnection
- Health and wellbeing put aside to manage on-farm needs
- Pressures associated with decisions on stocking and cropping rates
- Difficulties retaining certain professions, and skilled staff
- Retention of youth in the region
- Maintaining sport and recreational facilities, and difficulties fielding local sports teams
- Impacts on women
- False narratives within the media
- Children and youth missing out on activities
- Disproportionate socio-economic impacts on First Nations peoples

## Economic impacts

- Reduced on-farm production and income
- Maintaining cash-flow and debt servicing
- Fodder and water availability, cost and quality
- Reduced discretionary spending in towns and villages
- Unemployment and under-employment
- Costs of water and rising demand
- Rising cost of inputs
- Business closure
- Meeting the eligibility thresholds for subsidies and relief arrangements
- Employment losses which cascade into service and community losses
- Pressure and cost of infrastructure maintenance
- Interoperability of drought and flood relief and eligibility issues

## Environmental impacts

- Groundcover loss
- Dust storms
- Soil erosion and topsoil loss
- Tree and vegetation dieback in centres, and associated biodiversity impacts
- Reduced root zone soil moisture
- Weed spread for low quality fodder provided or other external movements
- Water and food availability for wildlife
- Impacts on or loss of fauna and flora, including from disease
- Surface water and groundwater availability
- Animal / stock nutrition
- Biosecurity and pest outbreaks

## Compounding external challenges

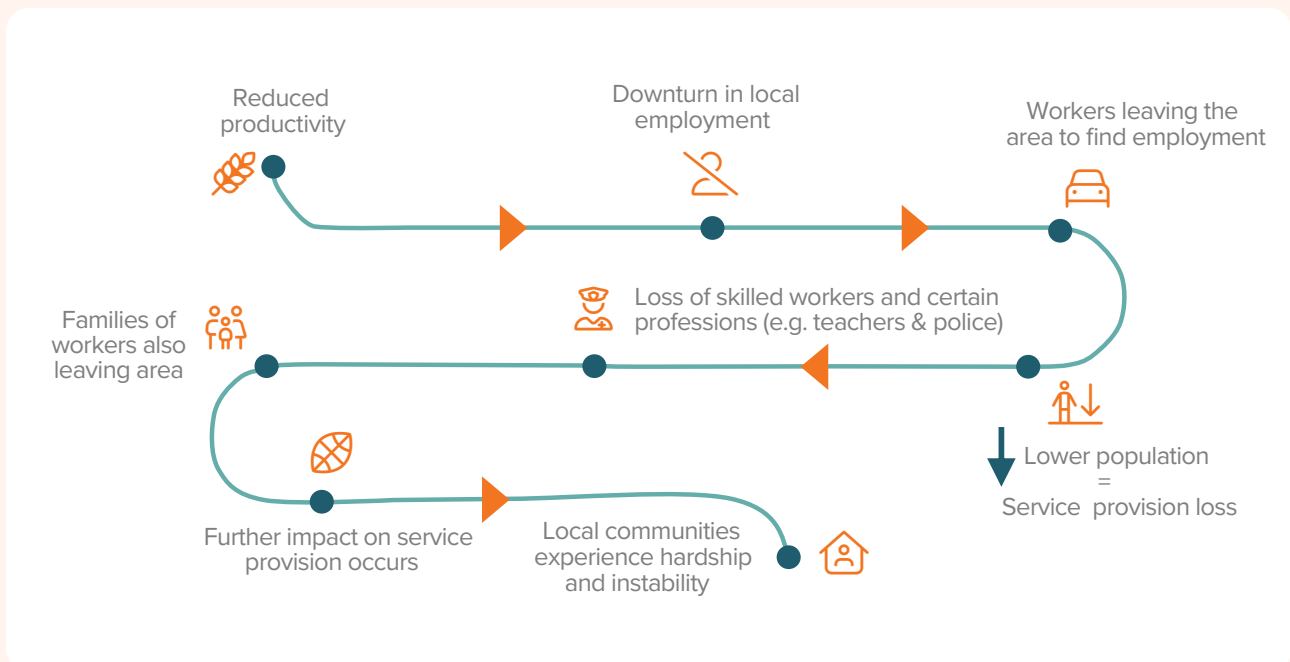
- Cost of farming from rising inputs
- Reduced telecommunication connectivity
- Reduced access to or reliability of electricity network
- Insurance access and flexibility
- Larger policy and infrastructure decisions
- Farm and property amalgamations
- Cost of living pressures, which also can affect population mobility
- Housing pressure.

## Interconnected and cascading drought impacts

The impacts of drought don't occur in isolation. Instead, they are interconnected across community and economic functions. This is intrinsically linked to the health of landscape, and the natural environment, from which agricultural production is generated. The value of agricultural and resource commodities to the local regional economy is significant. Communities and industries are water dependent at different scales. Emerging industries are also reliant on attracting visitors to region, and skilled professionals which can be impacted by direct or perceived impacts, or understanding of drought.

Service provision in the region can both influence drought resilience, and its withdrawal can exacerbate its effects. Where centralisation of government services occurs and are anchored by services located in Dubbo or Orange, the ability to access services cascades into other socio-economic issues due to distance. Where services are retained in region, socio-economic benefits are derived during drought in terms of greater community stability.

When we consider the linkages of key impacts, we can see how inter-dependent systems can be, and how impacts in one system can amplify or exacerbate impacts elsewhere. In the case of Parkes, Forbes and Lachlan, community consultation highlighted the strong inter-dependencies between drought impacts.



**Figure 3** — Interconnected community and economic impacts that are exacerbated by drought

Similar cascading impact relationships can be observed for other issues. Decreasing greenery in public spaces and reduced streamflow in creeks and rivers can impact on community through loss of access to recreation, and overall decreased wellbeing. Other cultural impacts are also associated, particularly for First Nations communities, with impacts on ability to partake in cultural activities and practices.

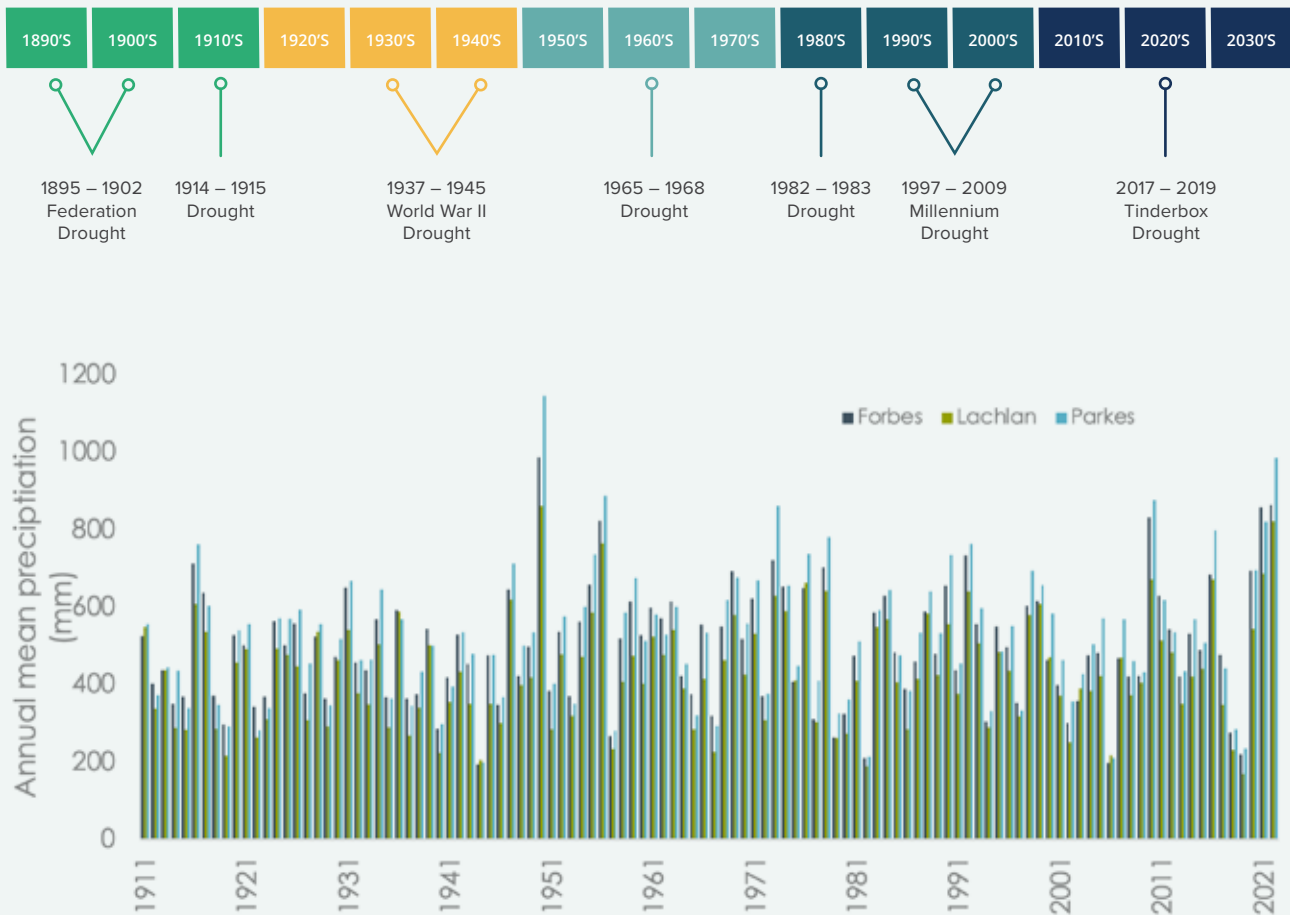
Likewise, the impact of feeding and watering of livestock means many farmers endure high workloads on-farm which reduces ability to remain involved in other activities, including recreational activities, volunteering, attending events or tending to health care needs.

The relationships between drought impacts and their causes is an important consideration as part of the development of this plan, aiming to focus on the causes rather than just addressing cascading symptoms.

# Drought history

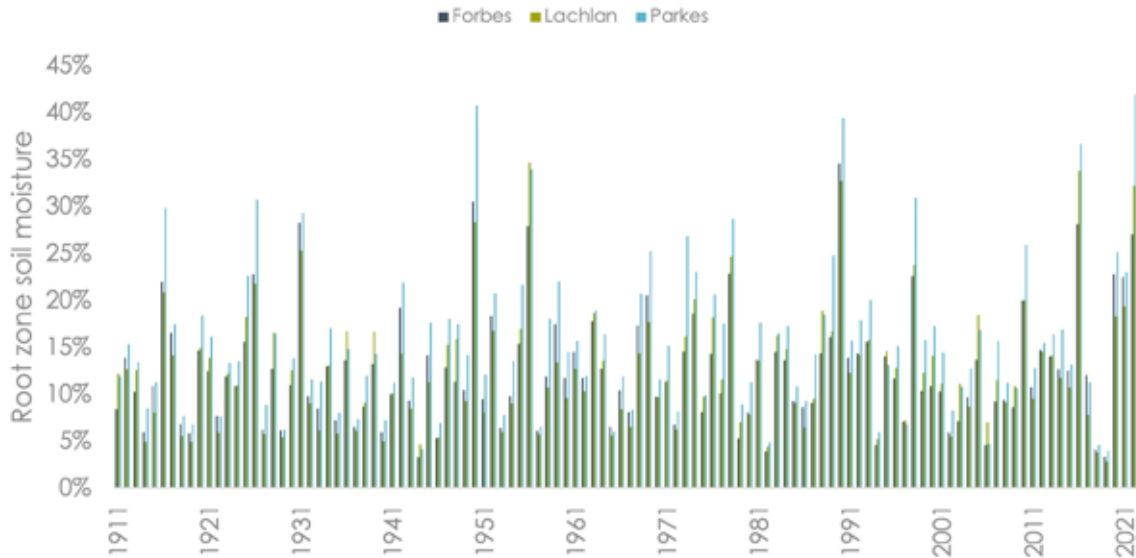
No two droughts are the same. The impacts vary across the community, weather conditions, and there are often different macro influences and trends at play. Importantly individual circumstances also differ. What precedes and follows drought can also compound pressures, often the result of the compounding effect of other hazards.

Major droughts in Australian history have affected the Parkes, Forbes and Lachlan region, characterised by periods of low rainfall, leading to low soil moisture. The timeline below outlines these occurrences, and the referenced graph displays conditions over the past 100 years.



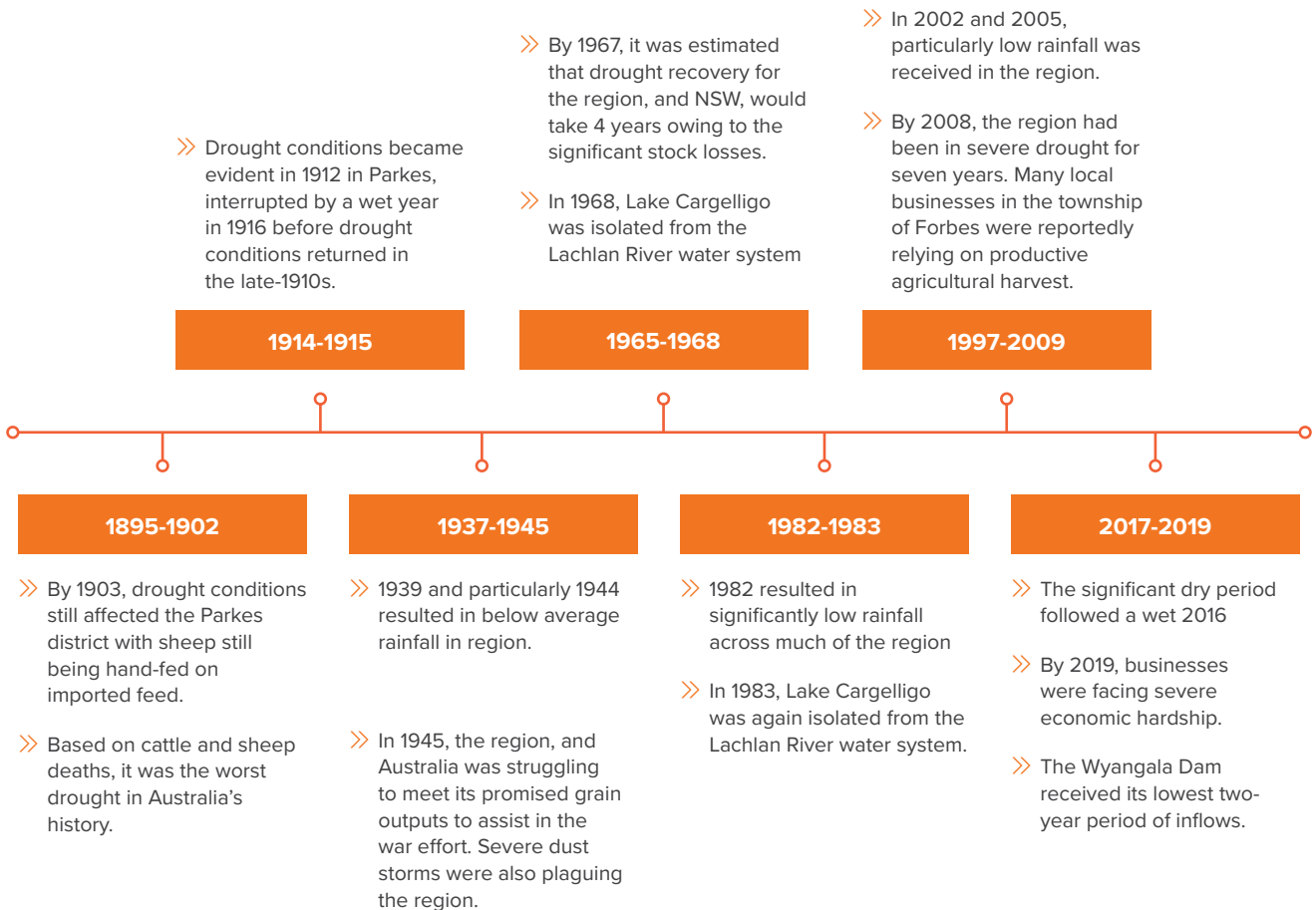
**Figure 4** — Annual precipitation average across shires. Major historical drought coincide with periods of lower than average rainfall





**Figure 5** — Soil moisture across each shire. Major historical droughts align with lower soil moisture levels

The below timeline illustrates the more localised impacts during the identified major drought periods. A comprehensive history of drought is located at **Appendix A** and within the Resilience Assessment. This data was drawn from historical climate records and weather events, as well as analysis from a variety of news sources that provided commentary on these events demonstrate that droughts and the history of the area are effectively intertwined.



**Figure 6** — Drought timeline, regional impacts of note for each drought period.

History indicates the region experiences year-to-year fluctuations in soil moisture and precipitation with drier years often followed by significantly wet years, which has seen flooding. The late 1980s and 2010-2011 feature significant rain, whereas 1944, 1982, 2006 are some of the periods of unusual dryness, with the recent events of 2017-2019 displaying distinct drying, particularly for soil moisture.

A comprehensive synthesis of historic drought climate data specific to the region is included at **Appendix A**. An analysis of this was undertaken as part of the Resilience Assessment reporting that informs this plan.

## A focus on the Millenium drought (1997-2009)

The region experienced a prolonged dry period, with particularly low rainfall averages in 2002 and 2005 leading to water scarcity and agricultural challenges in the region. The drought is arguably the most scientifically studied drought in Australian history owing to the significant economic effects.

The Millenium Drought's severe effects on the entire Lachlan Valley exposed the lack of water security in the region. During the drought, all three shire councils were required to impose severe restrictions on domestic, commercial and industrial uses. Water dependent economic activities including mining and agricultural businesses were also severely impacted.

Image: CSIRO Parkes Observatory





# Future drought

**Agricultural commodities are the main driver to the regional economy, providing the highest contribution to employment and output across sectors. Other industry strengths like mining are also water dependent, though in different ways and to different degrees.**

Drought impacts the livestock industry across the inputs and values through the drought cycle, and ongoing decisions on stock management. Croppers' decisions on planting are highly dependent on weather conditions and the associated input costs and opportunity costs that are linked to this. Because of these dependencies, and the many other interlinkages across the system, it is important to consider the projected impact of future climate changes to help us plan now for potential uncertainty.

The further in advance we plan, build capacity in our response and put in place redundancy measures, the more options we will likely have available to address issues down the track.

## Future climate scenarios





According to the Intergovernmental Panel on Climate Change (IPCC) reporting, under all emissions scenarios considered, global surface temperature will continue to increase until at least the mid-century. Increasing temperatures and energy within the climate system are projected to result in widespread changes to weather and climate patterns including all elements of the water cycle, including drought.

Data is presented below for each shire, displaying drought related metrics that have been calculated from the regional climate model projections for two scenarios. These climate scenarios are based on the IPCC representative concentration pathways (RCPs) and are designed to explore a range of possible futures relating to greenhouse gas emissions, land use, and air pollution. The analysis is focused on projections to the near-term (2050) and mid-range (2070); with change shown relative to present day climate.

The highest Greenhouse Gas Emission (GHG) scenario is RCP8.5 and represents a high emissions scenario where GHG emissions continue to increase, and global mean temperature increase exceeds 4°C. RCP4.5 is a moderate GHG emissions scenario where some mitigation of GHG emissions occurs, and global mean temperature increase is between 2-3°C. RCP4.5 is currently considered by the IPCC to be our most likely scenario.

Current climate models do not account for global climate tipping points. This means that the effects of tipping points are typically not included in climate projections and impact assessments. Breaching global climate tipping points represents significant risks on top of the changes typically described in climate assessments. The effects of breaching certain tipping points may include abrupt changes to the El Niño Southern Oscillation, rainfall patterns, and rainfall variability that are not represented in climate model projections.

### Drought climate indicators:

-  Variable rainfall patterns, amplified under higher emission scenarios
-  Small decrease in root zone soil moisture
-  Increasing temperatures are likely to be the primary driver of increased frequency and severity of evapotranspiration and drought conditions
-  Other climate and weather-driven events like heatwaves and bushfires / grass fire may compound broader impacts from drought events.

On average, annual precipitation is projected to increase, with higher quantities in the near term before smaller quantities expected in the far term. Soil moisture is generally expected to decrease across scenarios, and shires.

This small trend of an increase in rainfall for the region is not shared with other parts of NSW which will see much larger shifts and decreasing availability.

Frequency of hot days (>35°C) and frequency of high fire danger days (Forest Fire Danger Index (FFDI) > 25) do not directly describe drought

however, they are climate hazards which typically occur in conjunction with drought. Both extreme heat and bushfire weather risk are projected to increase by 2070 compared to the present day. This will increase the likelihood of compound events such as severe drought occurring in conjunction with heatwaves and bushfire/grassfire.

Given that average annual rainfall is not decreasing as much as the rest of the state, the increase in drought severity will likely be driven by increased evapotranspiration due to increasing temperatures.

The below tables display projected variables under Representative Concentration Pathway (RCP) of 4.5 and 8.5, under timeframes into the near and far term.

<b>Parkes</b>		<b>2050</b>		<b>2070</b>	
<b>Variable</b>	<b>Climate model reference period</b>	<b>RCP4.5</b>	<b>RCP8.5</b>	<b>RCP4.5</b>	<b>RCP8.5</b>
Root soil moisture	17%#	↑ 0.004 mm <sup>^</sup>	↓ 0.010 mm <sup>^</sup>	↓ 0.008 mm <sup>^</sup>	↓ 0.020 mm <sup>^</sup>
Annual total precipitation (mm)	522 mm	↑ 11 mm	↓ 1 mm	↑ 3 mm	↓ 14 mm
Days above 35°C	31	49 ↑ <sup>18</sup>	56 ↑ <sup>25</sup>	Data unavailable	
Days with FFDI above 25	47	59 ↑ <sup>12</sup>	69 ↑ <sup>22</sup>		

<b>Forbes</b>		<b>2050</b>		<b>2070</b>	
<b>Variable</b>	<b>Climate model reference period</b>	<b>RCP4.5</b>	<b>RCP8.5</b>	<b>RCP4.5</b>	<b>RCP8.5</b>
Root soil moisture	14%#	↓ 0.004 mm <sup>^</sup>	↓ 0.008 mm <sup>^</sup>	↓ 0.006 mm <sup>^</sup>	↓ 0.017 mm <sup>^</sup>
Annual total precipitation (mm)	478 mm	↑ 11 mm	↑ 3 mm	↑ 9 mm	↓ 7 mm
Days above 35°C	32	49 ↑ <sup>17</sup>	57 ↑ <sup>25</sup>	Data unavailable	
Days with FFDI above 25	47	58 ↑ <sup>11</sup>	67 ↑ <sup>20</sup>		

<b>Lachlan</b>		<b>2050</b>		<b>2070</b>	
<b>Variable</b>	<b>Climate model reference period</b>	<b>RCP4.5</b>	<b>RCP8.5</b>	<b>RCP4.5</b>	<b>RCP8.5</b>
Root soil moisture	14%#	↓ 0.003 mm <sup>^</sup>	↓ 0.007 mm <sup>^</sup>	↓ 0.004 mm <sup>^</sup>	↓ 0.017 mm <sup>^</sup>
Annual total precipitation (mm)	436 mm	↑ 10 mm	↑ 5 mm	0 mm	↓ 9 mm
Days above 35°C	36	55 ↑ <sup>19</sup>	63 ↑ <sup>27</sup>	Data unavailable	
Days with FFDI above 25	61	73 ↑ <sup>12</sup>	84 ↑ <sup>23</sup>		

# Mean water content as a percentage of capacity.

^ Change (mm/yr) in relative soil water content of the 1976-2005 reference period's relative soil water holding capacity.

### Changing rainfall patterns and variability

Annual precipitation remains variable into the future, though trends indicate that average annual rainfall may not be decreasing as significantly in the Central West as compared to other areas of the state.

Despite a projected increase in average annual rainfall under RCP4.5, the Parkes, Forbes and Lachlan Shires will continue to be susceptible to drought, and ongoing rainfall variability with a major driver of drought being a projected increase in temperatures including very hot days.

This increase in temperatures, both as averages and hot days can influence increased evaporation across the catchment. Although grain growers are skilled in managing in lower rainfall environments, profitability of these agricultural enterprises is greatly affected by frequent and more severe drier seasons.

This was evidenced by the 2017-2019 drought which was one of the hottest and driest periods on record in NSW. Changes to heatwave frequency and intensity led to higher vulnerability across the community and the environment. Earlier onset heat events (or 'flash droughts') commencing in the spring time are likely to be more damaging when combined with low soil moisture. This could make even moderate heat events more damaging, with severe impacts on pulse crops for food and stock feed amongst other crops.

In addition to rainfall amounts, the timing of rain is critical to different stages of agricultural production.

### Annual Precipitation

The following figures show the precipitation across the region using the reference period of 1976-2005 and then to two timescales 2036 to 2065 (2050) and 2056 to 2085 (2070) under the moderate emissions scenario of RCP 4.5. The region is coloured to represent annual precipitation changes from dark brown (reduced) to dark green (increase).

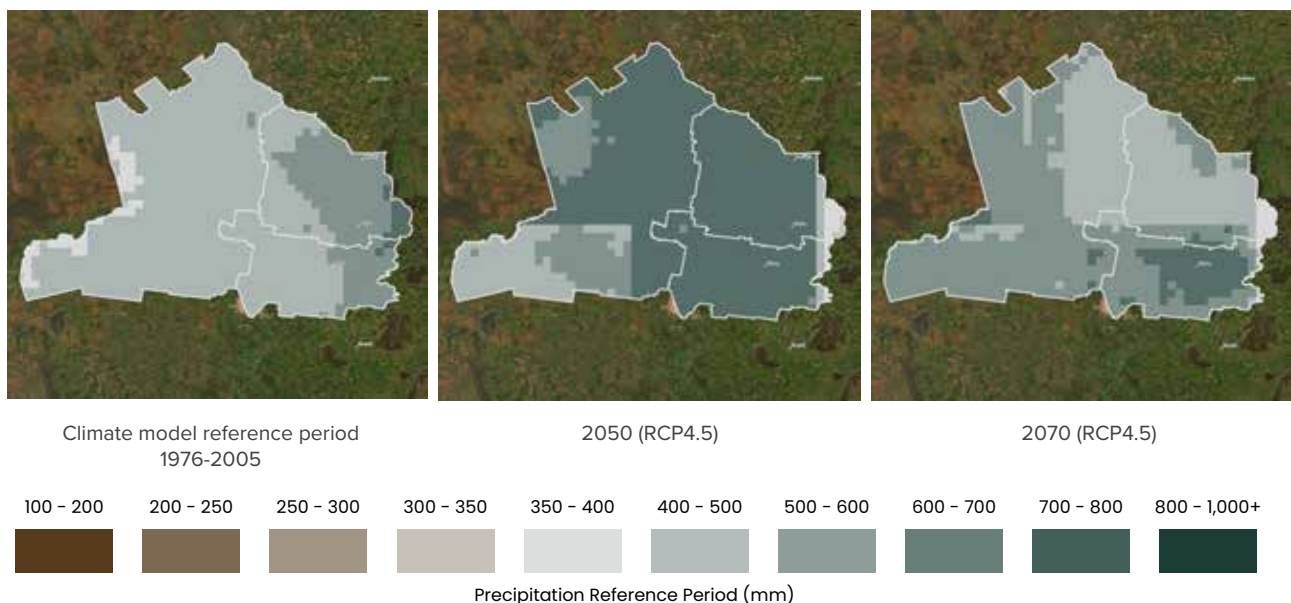
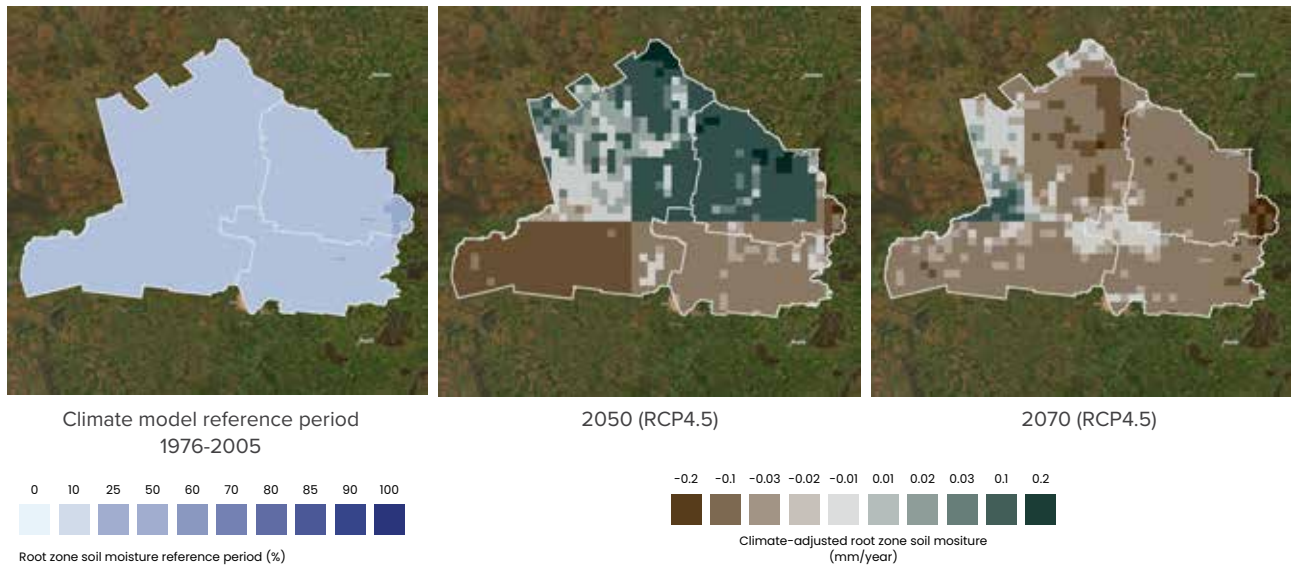


Figure 7 — Annual precipitation changes across the region. Reference period to 2050, and 2070

## Root zone soil moisture

Root zone soil moisture (RZSM) is presented as a percentage of total capacity during the baseline reference period and as a change of millimetres per year of the climate adjusted scenarios.

During the reference period, both Forbes and Lachlan Shires had a root zone soil moisture capacity of around 14%, while Parkes was slightly higher at 17%. Under a moderate emissions scenario, Parkes may see a slight increase in soil moisture in the short term (2050), but this will not continue in the longer term (2070). Forbes and Lachlan will see slight decreases under the same scenario and timescales. As for a high emissions scenario, all LGAs will see a reduction in soil moisture each year, the rate of which increases over the longer term.



**Figure 8** —Soil moisture changes across the region. Reference period to 2050, and 2070

## What does the climate data tell us?

The region will continue to be susceptible to the impact of drought. Major historical droughts over the past 120 years have occurred in conjunction with low values of commonly used drought indicators including rainfall and soil moisture percentiles.

Climate projections indicate an increase in drought risk, which worsens under long term trends. The higher emissions scenario presents potential for lower precipitation and notably lower soil moisture. However, compared to other areas in NSW, the region is potentially less impacted by declining precipitation rates, at least in the mid term.

There are the drivers of increased frequency and severity of drought conditions, especially towards the latter part of this century. This is largely driven by temperature, evapotranspiration and reduced soil moisture.

Recent events, and historical trends in rainfall patterns show sharp extremes with dry years followed by significant rainfall, which has seen significant flood events.

Image: Forbes main street

## Trends, stressors and shocks

To support preparedness and planning for drought, we must also consider other trends, stressors and acute shocks, beyond the climate, that may amplify drought impacts into the future. This can influence our resilience to different conditions, circumstances and scenarios. It is also important in terms of governance arrangements and strategic priorities, to ensure broader actions are cognisant of interaction with drought in our communities.



### Economic

- Cost of farming with rising inputs
- Commodity prices, market volatility and interest rates
- Fuel prices and transport costs
- Rapid cycles between flood and drought
- Impacts of road quality on market access
- Policy changes between government, and assurance of certain funding
- Major project investment decisions, both private and public
- Changing farm enterprise ownership models and their scale



### People and community

- Service availability, particularly health and community services
- Workforce shortages, and worker attraction, skills development and retention
- Demographic shifts in population (ageing population and youth retention)
- Loss of population
- Housing availability and new dwelling supply
- Costs of living pressures and local discretionary spending
- Urbanisation and population mobility trends



### Environmental

- Cumulative events across drought, flood and fire, as well as biosecurity
- Widespread invasive species
- Feral animal numbers
- Land use conflicts, particularly on primary production areas
- Water management within the Murray-Darling Basin
- Water infrastructure projects and funding decisions
- Water licensing arrangements



# Drought resilience in the region

There are many examples of individuals and communities in the region showing what it is to be drought resilient, whether through pre-planning on-farm, or community members stepping up to support others in smaller villages and across the main centres. While resilience is a feature of the region and its people, it remains useful to frame drought resilience factors to ensure how we plan and respond to drought covers all aspect of the system.

Drought resilience can be considered against three macro indicators, each with their own respective factors. Considering how this plan can address all these factors ensures we can address all aspects of the system.



## Economic

Continuity  
Employment  
Diversity



## Environmental

Infrastructure and built assets  
Natural processes  
Land management



## Social

Personal wellbeing  
Decision making capacity  
Community wellbeing

## A snapshot of vulnerability and resilience to drought

The Australian Bureau of Agricultural and Resource Economics and Sciences' (ABARES) has developed an index that ranks remote, rural or regional agriculturally dependent communities (at the LGA level) according to their potential to be adversely affected by drought.

The result is a snapshot based on drought exposure and drought sensitivity at the farm level (farm sensitivity), the reliance on employment in agricultural production industries (community sensitivity), the adaptive capacity of an LGA to drought based on economic diversity, and a final combination of the potential drought impact.

It is important to note the data comprises data variables and indicators which have been combined and ranked. Scores are not necessarily representative of the magnitude of impact, rather it positions the sensitivity with respect to other LGAs assessed. There is a strong link to employment in agricultural production, particularly for community sensitivity which may not be representative of broader community sensitivity detailed throughout this plan.

### ABARES CVRDI scores - (based on data from ABS Census of Population and Housing 2021)

(measured from 0 [lowest] to 1[highest])

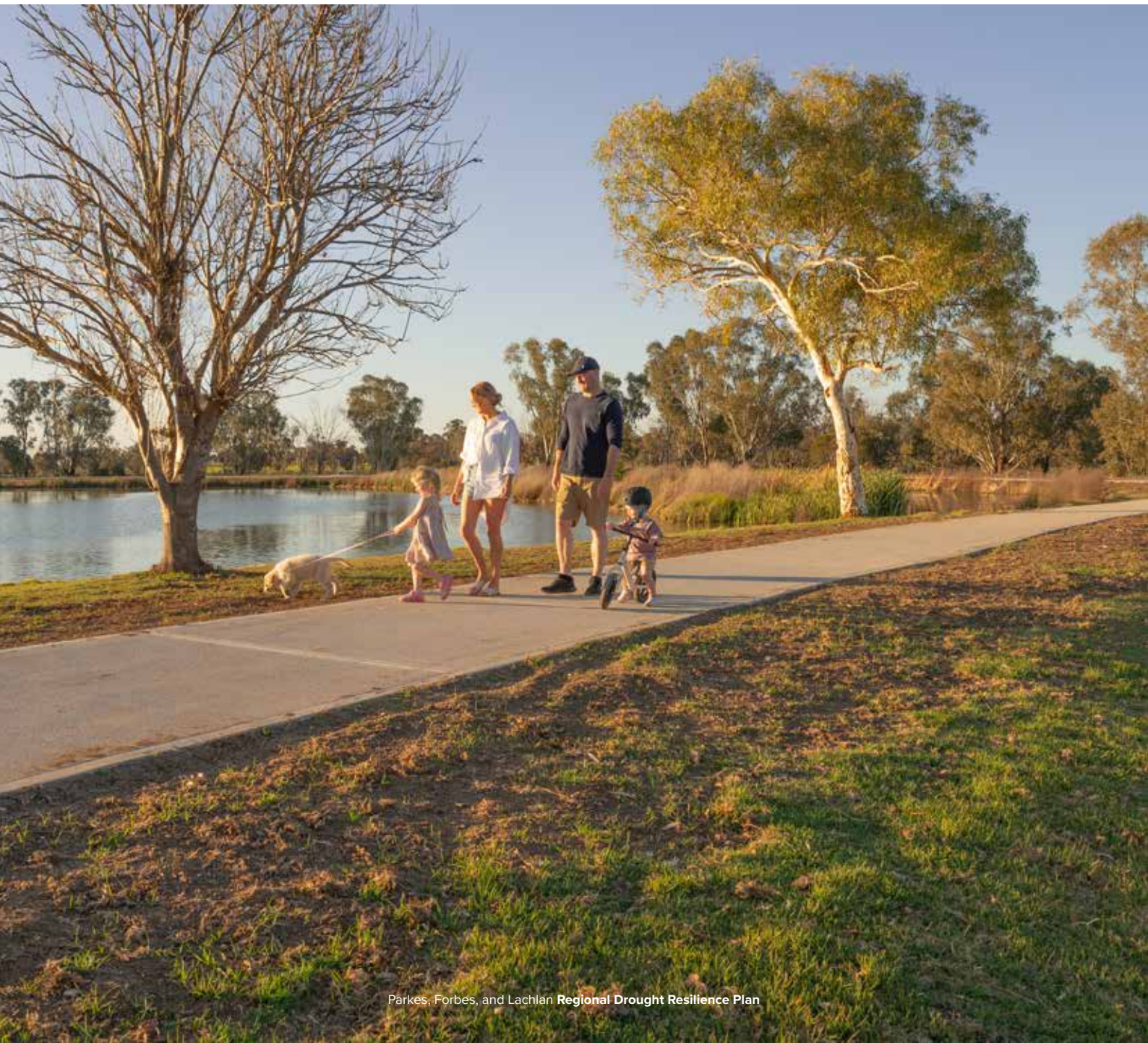
LGA	Farm sensitivity	Community sensitivity	Economic diversity	Potential drought impact
Parkes	0.28	0.17	0.61	0.30
Forbes	0.65	0.27	0.46	0.62
Lachlan	0.62	0.45	0.24	0.72

The ABARES CVRDI scores indicate for the region:

- A range of lower to moderate farm based exposure, which is linked to both exposure to climate variability, and the effects that has on farm outcomes
- A low to moderate level of community dependence on agricultural activity in terms of employment.
- Some demonstrated economic diversity, particularly in Parkes, highlighted by strong mining industry and economic output
- A low to higher level of overall potential drought impact, particularly in Lachlan Shire noting it has a particularly strong agriculture sector

with high value agriculture commodity output (while potential drought impact measures farm sensitivity and community sensitivity, whether there is lasting loss or harm depends on a community's adaptive capacity).

While the region is susceptible to future drought impacts, and this is more apparent in the west for Lachlan Shire compared with the east, its economic diversity supports a level of adaptive capacity in some areas of the region. Levels of community connection and social capital, along with diversified economic development opportunities, offer key opportunities to aid immediate as well as long-term drought resilience.



# Drought resilience action plan

The drought resilience action plan for Parkes, Forbes and Lachlan has regard to:

- Stages of the drought cycle (which guide timing of investment across type of activity)
- Level of intervention (absorb, adapt or transform)
- The type of resilience capital (people and community, economic, environmental, infrastructure and governance).

It outlines specific and pragmatic actions that:

- Are drawn from local knowledge insights from consultation participants
- Provide the basis for anticipating, acting and advocating for drought resilience needs
- An approach that serves multiple stakeholders and supports opportunities for advocacy and funding and grant applications.

A program logic approach was used to match drought resilience needs highlighted through the engagement process with pragmatic and realistic actions to achieve change, at various scales. The resilience 'theory of change' approach is used to identify the degree of change achieved by the implementation of the action plan to help measure our continuous drought improvement journey.

This scale also helps us to understand the level of effort and the potential timeframes associated with different actions, noting that many rely on future funding allocation. This action plan articulates those activities which are candidates for future drought resilience and drought relief funding by government, charity, philanthropic and industry bodies.

Timeframes for implementation is dependent on resourcing and funding availability. This plan is a ten-year plan to be reviewed after five years.





# Preparedness and recovery actions

ID	ACTION	STAKEHOLDER(S)	IMPLEMENTATION PATHWAY
<b>People and Community</b>			
PR1	Identify public assets which serve to bring people together during drought times and identify facility upgrades, additions and equipment needed. Leverage grant funding for such upgrades where available	Councils	<b>Absorb</b> through immediate opportunities to maintain services and build support networks/ infrastructure
PR2	Advocate for and support the ongoing funding for the Country University Centre located in Parkes	Councils	
PR3	Continue to support family support services across the region with a focus on early intervention programs	Councils	
PR4	Continue to deliver the school attendance, academic development and meal preparation program in Lachlan Shire, as well a First Nations songs with youth programs to re-connect Indigenous youth with country and culture	Lachlan Shire Council	
PR5	Deliver grant writing training for community groups across the region and support a dedicated grant writing resource for Lachlan Shire Council	Lachlan Shire Council	<b>Adapt</b> to strengthen community capacity
PR6	Develop and deliver capacity-building and support programs for persons aged 50-90 years including digital skills and access to digital support or assistance	Councils Community organisations	
<b>Economic</b>			
PR7	Invest in opportunities for one-on-one business continuity planning for rural enterprises and for in-town businesses, which include drought preparedness	Business owners and operators	<b>Absorb</b> to ensure business preparedness, and retain effective services
PR8	Advocate for improved funding cycle certainty for the Rural Financial Counselling Service	Industry groups Councils	
PR9	Invest in succession planning processes for rural enterprises and land ownership	Farm business owners	
PR10	Obtain funding for shire or regional drought support officers to assist with navigating subsidy, relief and assistance applications, or support by the Rural Assistance Authority	Councils	<b>Absorb</b> to ensure business preparedness, and retain effective services
PR11	Work with Training Services NSW to develop and implement strategies to attract and retain skilled workers, in contribution to limiting staff turnover and reducing loss of knowledge continuity over time	Councils State government	
PR12	Invest in training programs to support accreditation of farmers and farm workers to enhance opportunities for supplementary work during drought periods (i.e. machinery accreditation, etc.) and to build capacity	State government	
PR13	Advocate for investment in telecommunications and technology environment to expand coverage and network access across the region	Councils Federal government Telecommunications providers	
PR14	Support small business owners to get online and develop websites for online sales, broadening their markets. Supplement this with training in social media marketing, advertising and design	Chamber of commerce Business owners and operators	
PR15	Explore university partnerships in agtech, research and processing to expand new ways to adapt to changing conditions	Industry groups Tertiary education institutions	
PR16	Work with the Bureau of Meteorology to re-instate seasonal information sessions on forecast outlooks and the data that informs it. In a climate likely to experience greater variation, the need for greater communications of localised weather and climate projections and data is essential to help industries and communities be better prepared and grow capability and capacity in interpreting information and data.	BoM Farm business owners and operators	
PR17	Continue to expand economic diversification opportunities across mining, agricultural value adds, arts and culture, tourism through implementation of the Mid-Lachlan Regional Economic Development Strategy and Parkes SAP	Councils State government	<b>Transform</b> by building on existing strategic direction that supports community and economic resilience

# Preparedness and recovery actions

ID	ACTION	STAKEHOLDER(S)	IMPLEMENTATION PATHWAY
<b>Environment</b>			
PR18	Prepare drought management plans for key recreational water bodies in the region and advocate for water allocations as part of the regional water strategy	Councils	<b>Absorb</b> through preparing our environmental assets
PR19	Support groundwater studies to examine aquifer attributes of the Lachlan Alluvium Groundwater water resource plan area	Councils	<b>Adapt</b> through proactive measures that support environmental processes
PR20	Invest in water efficiency, treatment, water saving, recycling, storage and smart water approaches to support sporting fields and key recreational reserves, to maintain groundcover to support community activity for as long as possible during water deficient periods. Integrate these into Council's IP&R documentation	Councils	
PR21	Implement groundcover and canopy management and enhancement initiatives to reduce top soil loss, alleviate impacts of dust storms and flow-on health effects and heatwave mitigation, both on-farm and in urban communities	State government & Councils Farm business owners and operators	
PR22	Establish drought lots or smaller fenced paddock areas to manage stock rotation during drought	Farm business owners and operators	
PR23	Support proposals for the conjunctive use of surface and ground waters that will maximise water availability during times of drought and low water availability. It is acknowledged the Lachlan Regional Water Strategy is under final development and will focus on improving the understanding of groundwater resources, including the interaction and connectedness between ground and surface waters for sustainable water use	Councils Industry groups State government	<b>Transform</b> through strategic planning and policy shifts
<b>Infrastructure</b>			
PR24	Invest in on-farm fodder and water storages during good years and ensure storage is secure. Expand this to include on-farm water reticulation infrastructure, drought feedlots, and agtech	Farm business owners and operators	<b>Absorb</b> through immediate opportunities to strengthen preparedness
PR25	Investigate and invest in enhanced township and village water security needs including reservoirs and water storages, pumping and conveyance infrastructure, water recycling and / or bore field or bore improvement programs	Councils	<b>Adapt</b> through projects delivering improved water security and efficiencies
PR26	Enhance water security for townships served by the B-Section Line in Parkes and Lachlan, supplied from Forbes, which experience water restriction in summer months when not in drought, the Albert reservoir being an example. This may include a stages refurbishment or replacement of the infrastructure. A revision of project costs and business case should be undertaken	Councils	
PR27	Undertake upgrades to the Condobolin Water Treatment Plant	Lachlan Shire Council	
PR28	Prepare a business case to expand the Recycled Water Rising Main to cater for additional commercial customers in Parkes Shire	Parkes Shire Council	
PR29	Implement groundcover management initiatives to reduce top soil loss, alleviate impacts of dust storms and flow-on health effects and heatwave mitigation, both on-farm and in communities	State government Farm business owners and operators	
PR30	Parkes, Forbes and Lachlan Shires support continued consideration of the raising of the Wyangala Dam wall to aid drought resilience for the catchment	Councils State government	
<b>Governance</b>			
PR31	Develop, implement and continuously refine a spontaneous volunteer (and donations) management plan for each shire	Councils	<b>Absorb</b> with preparing coordination support
PR32	Explore options for planning proposals to amend Local Environmental Plans to incentivise rural value-add activities and opportunities for multiple on-farm income streams	Councils	<b>Adapt</b> through policy shifts advocated and led through government
PR33	Continuously improve community value capture policies which guide private sector civic investment into legacy projects and activities including community facilities, funded positions and programs	Councils	

# Endurance actions

ID	ACTION	STAKEHOLDER(S)	IMPLEMENTATION PATHWAY
<b>People and Community</b>			
E1	Support establishment of local community food pantries	Community	<b>Absorb</b> through proven programs and addressing key barriers in the community
E2	Build awareness of the health impacts of dust storms and options to alleviate effects, and how to prepare for and clean up following dust storms	Councils State government	
E3	A focus on community events which are free and family friendly. Leverage these opportunities to increase awareness of local services that are available for support	Councils Community	
E4	Support targeted events like field days, programs like Active Farmers, which focus on shared knowledge and learning, or physical activity, with opportunity for casual socialisation. These events can be utilised to share information on support and assistance available	Industry groups Community	
E5	Deliver mental health first aid programs for organisational staff who serve in frontline roles	Community groups	
E6	Support transport costs for access to primary and allied health services to mitigate risk of deferral of health needs during drought	Community groups	
E7	Subsidise or waive upfront costs for access to telehealth mental health services during drought to ensure ready access to critical support and mental health clinicians	Councils State government	
E8	Continue to implement the 'Why Leave Town' programs that are in place to encourage and support local spending in each Shire	Councils	
E9	Identify rainwater-dependent localities for in-town clothes washing and shower facilities for surrounding farming communities and invest in communal facilities to help on-farm preservation of rainwater supplies for drinking and cooking	Councils Community	<b>Adapt</b> through broad action support direct community needs and maintaining of community functioning
E10	Provide places of respite (green spaces) in town and explore options such as free coffee and food on occasion to activate spaces and casual socialisation. Leverage these opportunities to increase awareness of local services that are available for support	Councils	
E11	Direct funding for different forms of community events at different times of drought cycle and for individual cohorts (i.e. men, women, children, etc.)	Councils Community	
E12	Invest in arts and culture programs including travelling exhibitions both within and external to the region to share messages of drought that are designed by and for the region's communities	Councils State government Not-for-profits Community	
E13	Invest in, support and/or promote arts and culture programs for children and youth in the region including visiting performances, workshops and events	Councils State government Not-for-profits Community	
E14	Consider initiatives to support community use of assets and facilities like (free access to) local pools and libraries for relief during droughts and heatwaves, and as an opportunity for casual socialisation	Councils	
E15	Support school excursion costs through available drought funds to support children and youth during drought periods	Councils	
E16	Support the coordination of drought assistance and support services. The influx of services into the region during drought can lead to duplication of services, lack of clarity with regard to support available and by whom, how to access assistance and referral processes	Service providers Councils	

# Endurance actions

ID	ACTION	STAKEHOLDER(S)	IMPLEMENTATION PATHWAY
<b>Economic</b>			
E17	Support implementation of evidence-based animal nutrition to strengthen livestock health and resilience	Farm business owners and operators	<b>Absorb</b> by immediate opportunities to inform business outcomes
E18	Develop and/or continue 'spend local' programs for each shire, which can guide spending cards/vouchers back into local centres and villages through approved retailers	Councils Industry groups	
E19	Promote access to drought preparedness tools and resources to support business decision-making processes and trigger points	Industry groups	
E20	Increase support to local business chambers to enhance support available to local and small businesses during drought times. This support includes networking opportunities, training delivery and a focus on financial planning and continuity planning	Councils	
E21	Plan for and implement arrangements required for Council saleyards and their operations during drought, particularly with regard to taking animals in poor health to care for them with veterinary support (including burial pits which comply with biosecurity requirements). Fodder supply continuity for the saleyards must form part of pre-planning arrangements	Councils	<b>Adapt</b> through opportunities across sectors and supporting cash flow through local economy
E22	Explore the opportunity to establish local fodder banks drawn from locally sourced fodder in locations across the region	Community	
E23	Develop a shared tourism communications plan, including the entire Central West region, to encourage and activate tourism opportunities during dry periods by promoting the region's assets and endowments	Councils CENTROC	
E24	Implement a plan for water cartage for communities across the region, and advocate for subsidies water carting for stock and domestic supply	Councils	
E25	Promote and continue to support the Culture Maps Central NSW as a key tourism opportunity during drought periods	Councils CENTROC	
E26	Advocate for the simplification and streamlining of application processes for drought relief. Advocate for extension of selected relief to in-town businesses	Councils	
E27	Explore opportunities for a road maintenance bore program across the shires to support road maintenance activities during drought periods, given the economic value of road access for stock and freight movement during drought	Councils	
E28	Seek funding for community infrastructure projects and legacy projects during drought times to maximise funding benefit and as a potential local employment opportunity source	Councils	<b>Transform</b> through new programs and projects during drought
E29	Explore options to employ local farmers, contractors and labourers on a casual basis to deliver civic projects or works during drought periods, supplementing income (e.g. Forbes Farm to Trade Scheme)	Councils	
E30	Advocate for a new contractor subsidy to maintain critical farm employees during drought, as an opportunity to stem a range of cascading on-farm and off-farm impacts from drought-driven employment downturn on properties	Industry groups Councils	
E31	Consider establishment of Central West Farm Sitter program to enable property owners and managers to travel for medical visits, holidays, personal needs, etc. Social media platforms may assist	Community Not-for-profits	

# Endurance actions

ID	ACTION	STAKEHOLDER(S)	IMPLEMENTATION PATHWAY
<b>Environment</b>			
E32	Advocate for increased transparency and information sharing regarding operations of Wyangala Dam	Councils	<b>Absorb</b> to build community understanding
E33	Work with Local Lands Services, Department of Primary Industries and Regional Development and Landcare to invest in weed and pest management on private lands during drought to supplement on-property incomes and improve environmental outcomes	Farm business owners and operators State government	<b>Transform</b> through partnerships
<b>Infrastructure</b>			
E34	Identify community asset and ancillary facility upgrade needs, and implement enhancements to key public assets identified to support community cohesion	Councils	<b>Adapt</b> through opportunities to reinforce community support
<b>Governance</b>			
E35	Develop a region-wide water consumption efficiency and restriction policy for towns and villages, in solidarity with the region's production areas, in a manner that is consistent for all communities across the region, unless departure is required. Where this is the case, specific messaging should be developed to appropriately communicate why certain communities require a different approach. Triggers to enact the various stages of the policy are required	Councils	<b>Adapt</b> for consistent and coordinated governance for community



# Implementation

## The Parkes, Forbes and Lachlan Regional Drought Resilience Plan relies on collaborative implementation approaches.

The action plan for drought resilience spans different functions of government, and guides stakeholders with actions that can make a difference. This includes short, medium and long term opportunities.

The action plan has been drawn together through community expression, existing initiatives and background data. It is noted that:

- actions are purposefully listed with multiple stakeholders, and unspecified timeframes or funding to acknowledge that delivery is dependent on a range of variables
- implementation will occur through participation of all stakeholders over time as priorities, resources and funding arise
- as a regional plan, the actions are collective and collaborative
- roles and responsibilities are flexible, including for local government role: the plan is owned by the region, and any stakeholder can start an action within their capacity; and
- some actions are indeed underway by various stakeholders, the purpose of maintaining them in the action plan, is that the community has advised that the action is integral to drought resilience.

### Governance structure

Implementation of the regional drought resilience plan is to be driven by a collaborative and multi-disciplined drought resilience project control group (PCG). Membership will be deliberately broad to provide an integrated and coordinated approach to drought resilience efforts. Representatives from across community and industry will form part of the PCG. An elected representative from each Shire will form part of the PCG, alongside Council officers.

This group will operate using a status system tied to the 'prepare, endure, recover' framework to transition priorities in lock-step with the transition of drought cycles. This framework approach is to be triggered by drought indicators.

## ROLES DESCRIPTION

An **advocate** actively supports a position, action or policy. The task is outside the advocate's jurisdiction, capacity or resourcing and advocacy is required to engage with those parties with capacity to deliver. For example, telecommunications advocacy.

A **partner** joins others in a common cause or action where roles and responsibilities are shared across areas of expertise. Each partner brings an element to the action for joint delivery. For example, region-wide strategic initiatives.

A **lead** is in control of an action. The action may still involve partners or other roles, but the action is reliant upon a lead party due to their technical or other expertise. E.g. Health or counselling matters.

An **owner** is the only party that can undertake or permit the action. E.g. local government as public asset owners.

A **supporter** is united with others in the need or benefits of the action but potentially does not have a major role. The action is led or owned by others. E.g. A supporter may provide assistance in kind, technical advice or donations to action leaders.

A **stakeholder** is anyone who has an interest in the project, program or action. Stakeholders will have varying degrees of involvement from owner to advocate and all points between.

A **deliverer** is responsible for implementation and outcomes of an action or funded program. e.g. Community agency delivering social aid programs.

A **funder** provides the funding arrangements. The party is not involved with scoping, executing or delivering the program but may require some outcome reporting or evidence. e.g. the government agency providing grant funding for programs and projects.

The NSW Government's 'Drought Signals', BoM, Farming Forecaster or other tools / indicators should be selected by the PCG for this purpose, in consultation with the Department of Primary Industries and Regional Development.

This will enable the PCG to adopt agile approaches and change priorities as needed depending on changing circumstances. For example, when drought indicators suggest a dry period has commenced, the status of actions to be implemented will move from 'preparedness' to 'endurance'. Despite this, all actions remain relevant in terms of maximising funding opportunities. This status-based approach simply enables the PCG to consider those actions which will generate more immediate outcomes, when needed.

A Chair of the PCG will be selected.

A PCG Terms of Reference is to be prepared for its membership to guide its function. The Terms of Reference could include:

- Role and purpose and connection to the RDRP
- Stakeholder and membership lists
- Meeting arrangements, (potentially quarterly) and responsibilities of attendees
- The circumstances of a quorum and decision making protocols
- The election or rotation of a chair person
- An action plan for the first 60 days or 12 months including delivery of the priority actions with the implementation funding; and
- A process for reflection and nominating next priority actions.
- A Memorandum of Understanding may also be required.

PCG meetings should be held in different localities across the region over time.

### Monitoring, evaluation and learning framework

Whilst the drought action plan incorporates a large suite of projects, activities and actions, some offer immediate opportunity, some are medium-term items and others are longer-term transformational opportunities. Not all actions can be focused on or delivered at once. The 'prepare, endure, recover' framework and status system approach, which will guide the PCG in terms of its implementation and coordination of activities and funding pursuits, will enable a flexible and agile approach as drought conditions change, guiding the focus.

This system will:

- Maintain a focus on preparation as appropriate
- Provide regular opportunities to define when conditions are changing locally
- Catalyse a change in focus to respond to the needs of the changing conditions.

This ensures a level of agility is adopted with regard to the implementation approach.

Also, as immediate efforts in response to the action plan are delivered, broader efforts across collaborators is guided in its approach, underpinned by this plan which enables stakeholders to work towards and contribute to regional drought resilience outcomes, including those at the local and property level.

The drought resilience action plan also requires that a 'lessons learned' culture is adopted, ensuring new information, knowledge, approaches and science is rolled into implementation delivery as a guiding principle. This will mean that over time, the drought resilience action plan may be adapted to reflect new learnings and the adjustment of intervention pathways as required. The PCG is responsible to conduct an annual lessons learned review, with changes to inform action moving forward.

The drought resilience action plan has been thoughtfully designed to not only guide collective effort and action but to enable adaptation through ongoing monitoring, evaluation and learning.

The regional drought resilience plan is a ten-year plan, to be reviewed after five years.

An annual monitoring program to inform adaptive learning is outlined below. Addendums to this plan can be made, to reflect these learnings over time and ensure the document maintains pace with changing circumstances and maturation of drought preparedness activities.

## Tracking progress and reporting

Action-based project tracking against the drought resilience action plan, the principles and objectives of the plan should be undertaken on an annual basis. This tracking and reporting shall be the responsibility of the implementation PCG chair, unless otherwise delegated.

Likewise, an annual evaluation process will be conducted by the PCG, guided by the evaluation questions that follow.

### Key evaluation and learning questions

These key evaluation questions are high level questions designed to frame the analysis of progress and performance of the Parkes, Forbes, and Lachlan Regional Drought Resilience Plan against the above framework. These key evaluation questions may help to structure annual tracking and reporting.

PROPERTY	EVALUATION
<b>Effectiveness and Outcomes</b>	What have been the outcomes (intended, unintended, positive and negative) of the plan implementation process and progress?
	To what extent has progress contributed to or furthered the principles and objectives of the regional drought resilience plan?
	Has the plan been used for or otherwise supported successful funding and grant applications?
	To what extent have stakeholders outside the PCG responded to the plan's content?
	Have any barriers or challenges been identified throughout the implementation of plan, and what solutions to address these have been identified?
<b>Drought resilience maturation</b>	To what extent has efforts in implementing the plan contributed to:
	<ul style="list-style-type: none"> <li>a. Creating stronger connectedness and greater social capital within communities, contributing to well-being and security?</li> <li>b. Empowering communities and businesses to implement activities that improve their resilience to drought?</li> <li>c. Supporting more primary producers and land managers to adopt whole-of-system approaches to natural resource management to improve the natural resource base, for long-term productivity and landscape health?</li> </ul>
<b>Stakeholder engagement</b>	In what ways are the PCG and other stakeholders collaborating and collectively contributing to efforts outlined by the action plan?
	In what ways has the plan provided inclusive involvement across sectors, disciplines and communities?
	In what ways has the plan been able to support individual stakeholder goals, objectives and aspirations with regard to drought resilience?



The reporting may be undertaken using a range of tools to capture experiences and perspectives from across the PCG, allied stakeholders as well as the communities of the Parkes, Forbes and Lachlan Shires more broadly. These tools may include:

- Meetings and event data capture
- Targeted meeting / interviews with stakeholders
- Survey data
- Case studies and data from the PCG
- Media, including social media
- Funding and grant applications.

### Achieving the plan's outcomes

A further opportunity for the PCG to measure the contribution to or achievement of the plan's outcomes is by using local data to assess specific outcomes. The data sources / indicators will need to be selected by the PCG, and can provide insights as to how the plan is tracking against the resilience theory of change.

Outcomes include:

THEME	OUTCOME
<b>Social and community</b>	Community connection and wellbeing is maintained
<b>Economy</b>	Reduced decline of gross regional product relative to: <ul style="list-style-type: none"> <li>→ Non-drought periods</li> <li>→ Previous drought periods</li> <li>→ Other regions in NSW</li> </ul>
<b>Environment</b>	Environmental degradation of landscapes and waterways is reduced throughout and emerging from drought
<b>Governance</b>	Drought resilience priorities are embedded across each Council's Integrated Planning and Reporting Framework and informs the plans, strategies and efforts of allied stakeholders

### Learning

Regular (annual) monitoring provides the ability for reflection and learning. The progress tracking and reporting methodology, using key evaluation questions, will present specific insights in terms of those opportunities to build in 'lessons learned' through engagement across stakeholders with a role in drought resilience. This can then be translated into opportunities for adaptive learning, as they arise.

These lessons should, on an annual basis, be contemplated with regard to the drought action plan to determine any relevant updates, new insights, intelligence and technologies that can be integrated to ensure the action plan keeps pace with a growing drought resilience maturation across systems and sectors.

This process will ensure the action plan remains a 'living document' that appropriately supports and services the needs of all stakeholders and importantly, those of the Parkes, Forbes and Lachlan Shire communities in preparation for, endurance of, and recovery from drought.

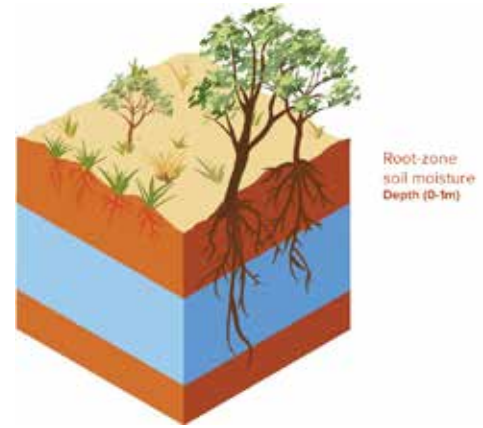
Concepts to guide adaptive learning as part of plan implementation are included at **Appendix B**. These items will help navigate maturation of this plan over time.

# Appendix A – Drought history

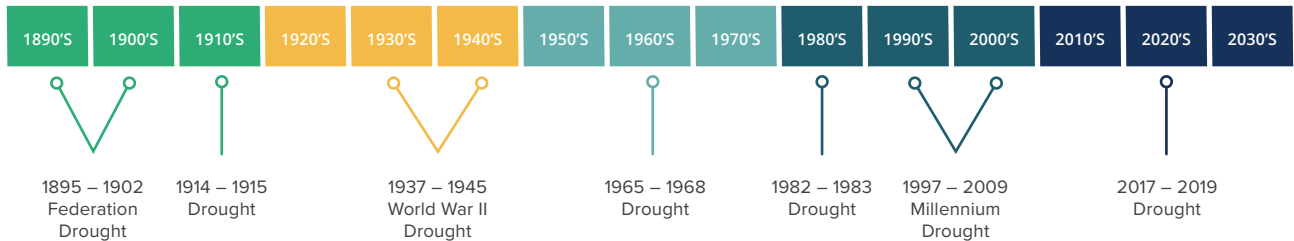
Precipitation and root zone soil moisture are considered as indicators of drought according to the Bureau of Meteorology's Australian Water Resources Assessment Landscape (AWRA-L) service. Root zone soil moisture is a calculation of the upper and lower soil layers in the AWRA-L, which represents the water-holding capacity of the top one metre of soil. Root zone soil moisture and precipitation rates are each useful indicators of future drought potential.

Past records for the region demonstrate a year-to-year fluctuation in precipitation and soil moisture across the region. The late 1980s and 2010-2011 feature significant rain, whereas, 1944, 1982, 2006 are some of the periods of unusual dryness, with the most recent events of, 2017-2019 displaying distinct drying, particularly for soil moisture.

In all cases these drought events were characterised by protracted periods of low rainfall, leading to low soil moisture as illustrated below.



\*Note that the data does not go back to the Federation drought of 1890-1902



**Figure 9** — Australian drought history timeline

In the below figures, these droughts are considered against a present-day baseline of 2002 to 2022.



### 1914 to 1915

Nationally, this drought was short but notable, primarily due to the failure national wheat crop. This drought was driven by a strong El Nino, with drought conditions first becoming evident in 1913. Rainfall rates were lower in 1914 and 1915. Rains improved in 1916 but began to decrease again over the subsequent years.

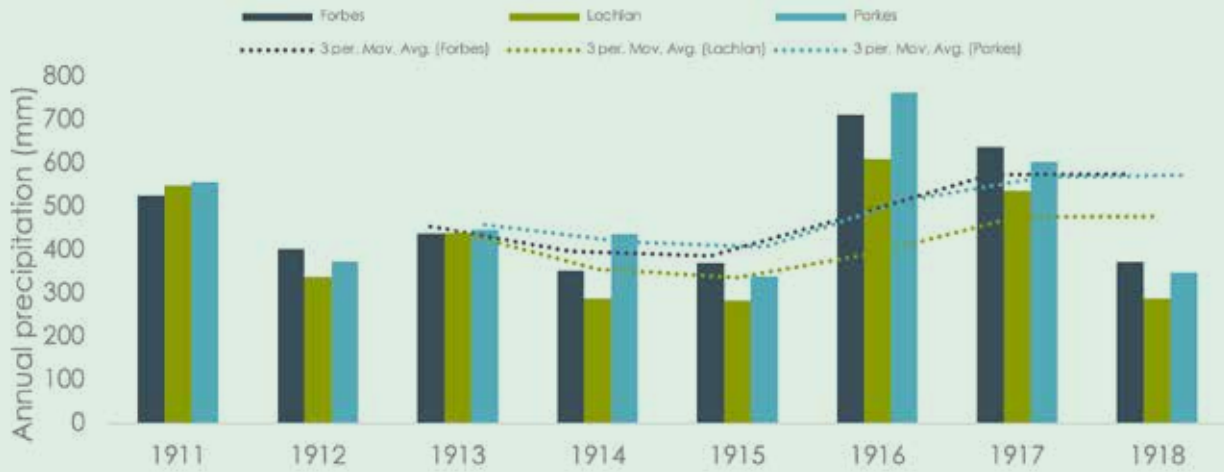
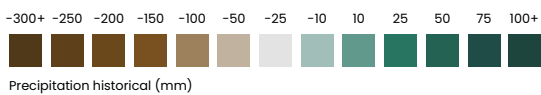
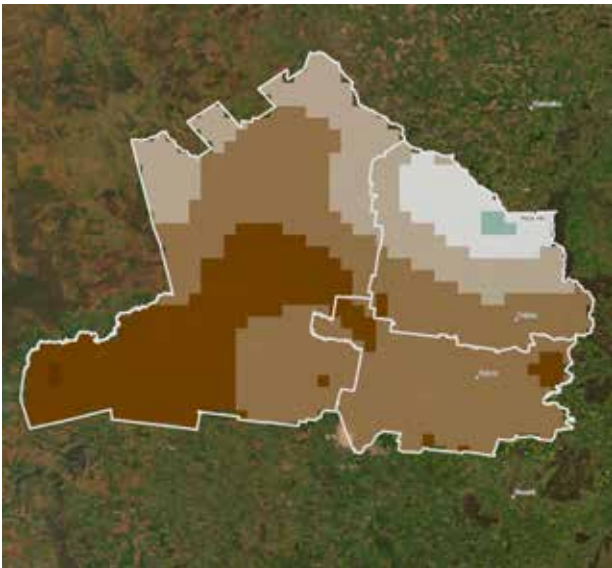
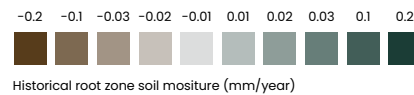
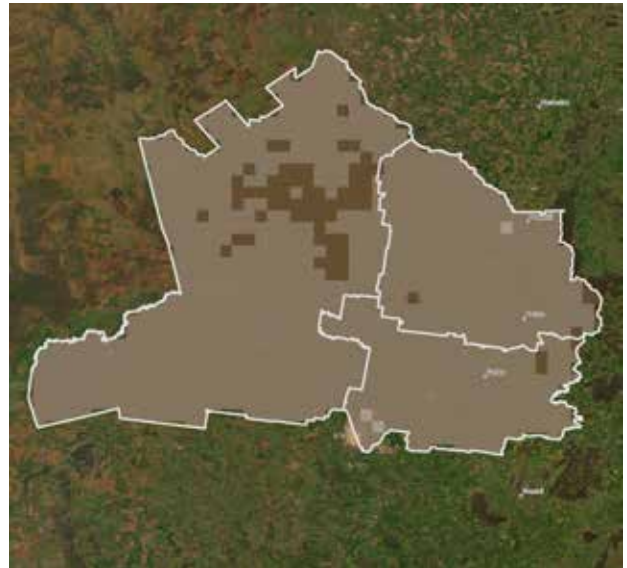


Figure 10 — Yearly precipitation (absolute), by LGA (1910 to 1918)

### Precipitation



### Soil moisture



### 1937 to 1945 (World War II drought)

This drought period was characterised by several breaks, but significant periods of dryness. Rainfall rates were lower in 1937-1938 and 1940-1941. 1944 was the most notable year, with extremely low rainfall totals across the entire region.

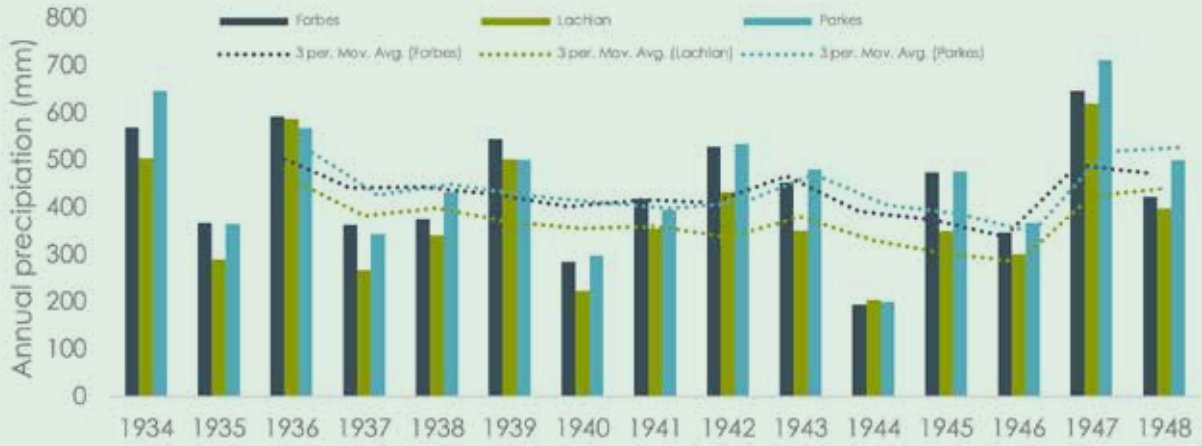
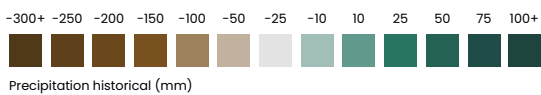
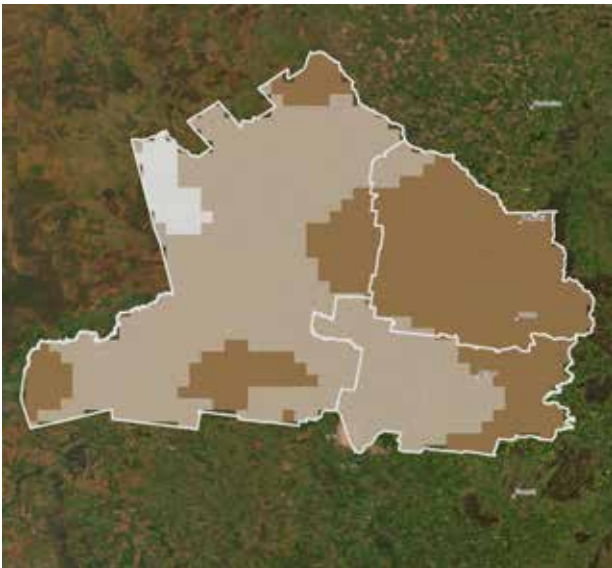
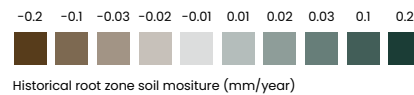
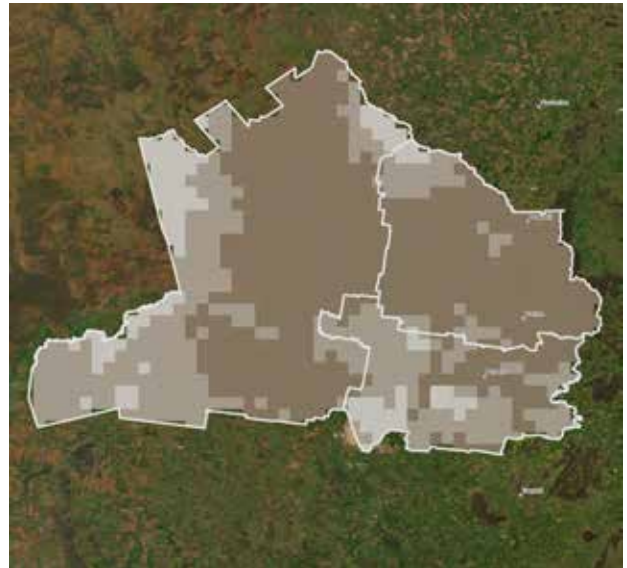


Figure 11 — Yearly precipitation (absolute), by LGA (1934 to 1948)

### Precipitation



### Soil moisture



### 1965 to 1968

The 1960s was generally dry across the continent. Drought developed in 1964 in northern New South Wales and had extended across most of the country by the following year. This was evident across the region, with lower rates of rainfall and soil moisture across much of the region.

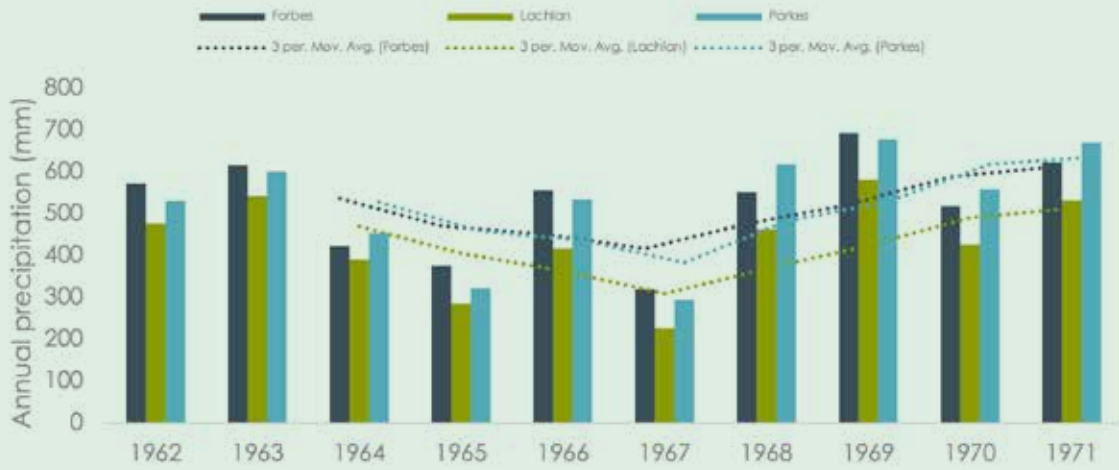
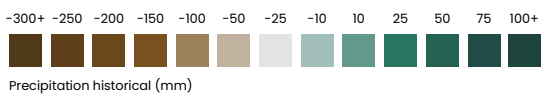
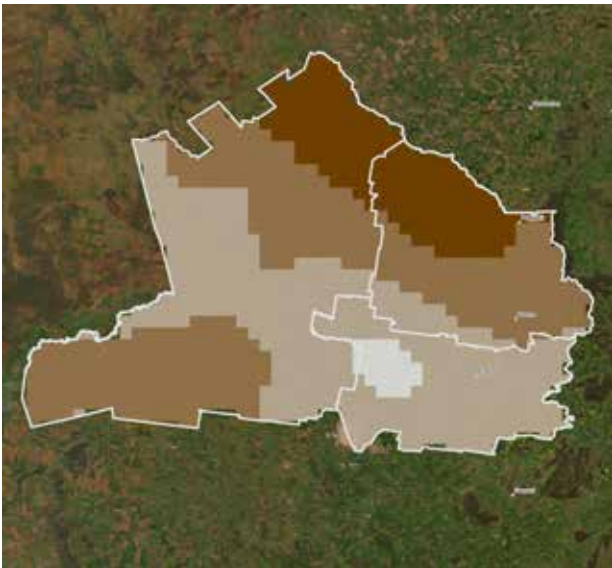
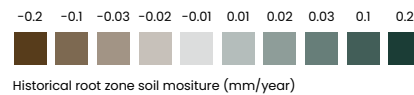
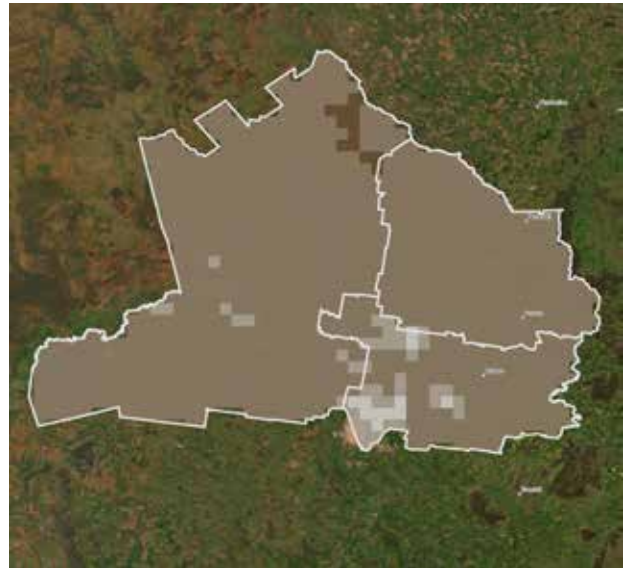


Figure 12 — Yearly precipitation (absolute), by LGA (1962 to 1971)

### Precipitation



### Soil moisture



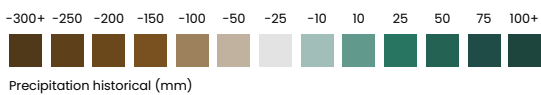
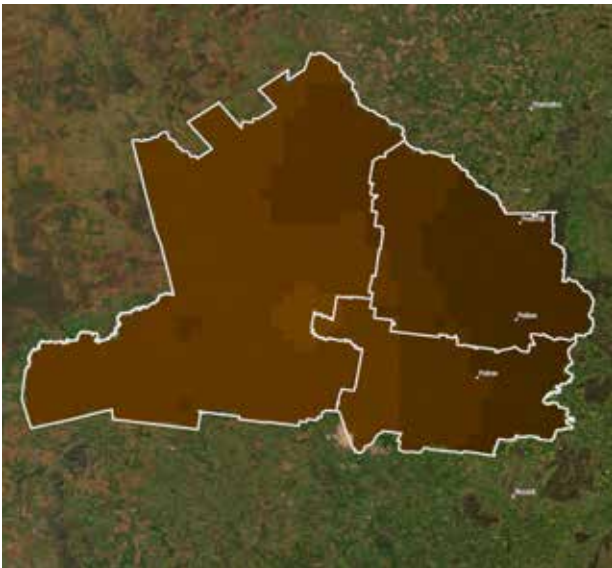
### 1982 to 1983

Despite only being a year long, this was one of Australia’s most severe droughts in the 20th century. A very strong El Nino led to these drought conditions. The region experienced widespread dryness.

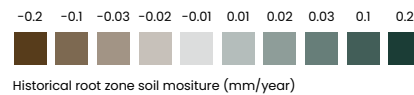
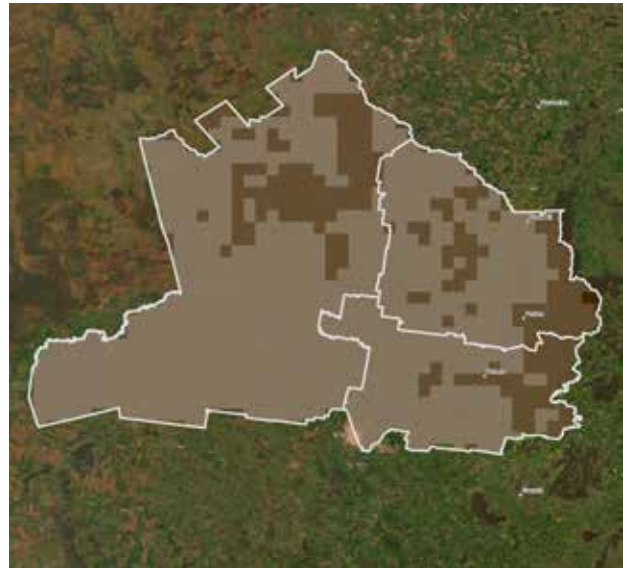


Figure 13 — Yearly precipitation (absolute), by LGA (1979 to 1986)

### Precipitation



### Soil moisture



### 1997 to 2009 (Millennium drought)

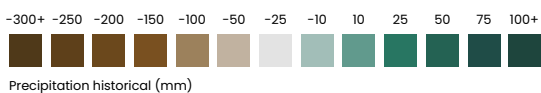
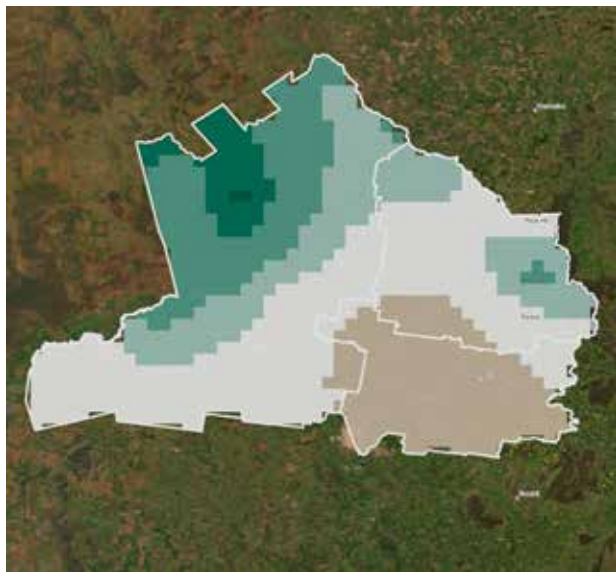
The Millennium drought was a long-lasting period of dryness, most severe in densely populated areas of the south-east and south-west of the country. For the Parkes region, the beginning of this period is relatively unimpactful, as from lower levels in 1997, based on rainfall and soil moisture figures. It is not until 2001 when there is a dry spell into 2005, and then a severe dry year in 2006.



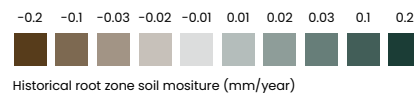
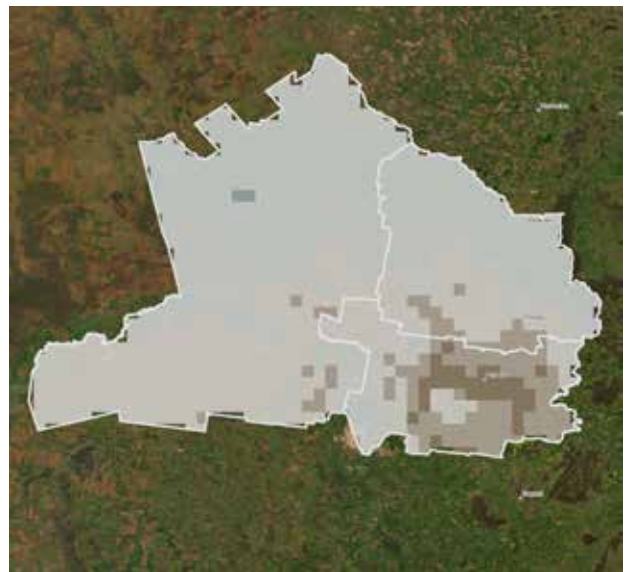
Editor’s note: The maps below show significant rainfall and higher soil moisture over this period, despite it being identified as a drought. This discrepancy is likely due to the reference period used to produce these maps (2002 – 2022) and that there was significant dryness in the latter half of that period. This result is then compounded by the short-lasting periods of rainfall decline during this long drought period (1997 – 2009). Therefore, leading to the appearance of increased rainfall and soil moisture compared to the reference period.

Figure 14 – Yearly precipitation (absolute), by LGA (1994 to 2012)

#### Precipitation



#### Soil moisture



2017-2019

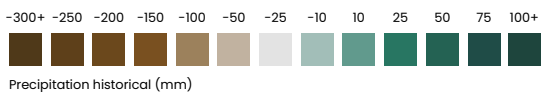
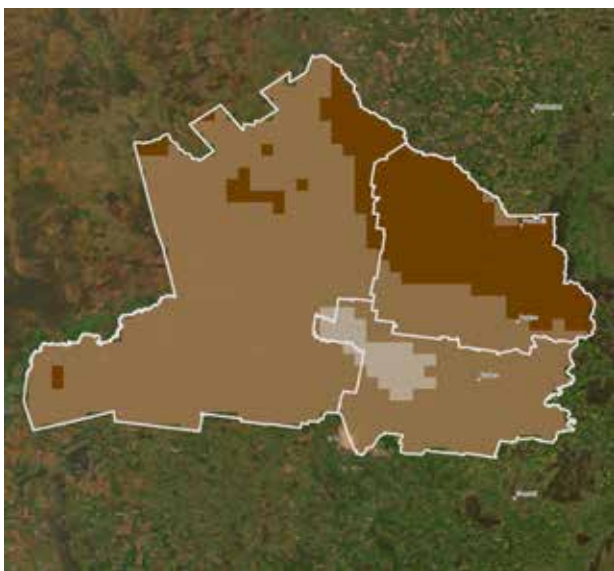
Following a wet 2016, dry conditions returned in 2017 across south and eastern Australia. This was a sustained multi-year period of dryness, unprecedented in recorded history.<sup>1</sup> A strong Indian Ocean Dipole was a significant contributor to dry conditions the second half of 2019, leading into significant 2019/2020 bushfire season. The region was similar affected during this period, with widespread low rainfall and low soil moisture.



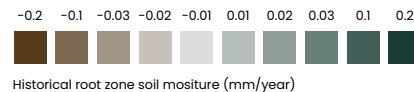
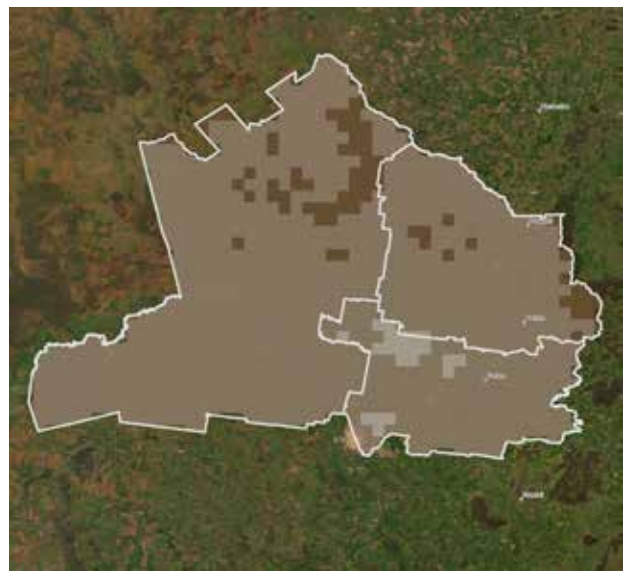
Figure 15 — Yearly precipitation (absolute), by LGA (2017-2019)

1 Bureau of Meteorology 2020, Special Climate Statement 70 update—drought conditions in Australia and impact on water resources in the Murray–Darling Basin, 13 August 2020, <http://www.bom.gov.au/climate/current/statements/scs70.pdf>

Precipitation



Soil moisture





# Appendix B – Concepts to guide adaptive learning

This appendix provides key aspects for consideration as part of learning processes throughout implementation of this plan, to guide further iterations and amendments to this RDRP. As drought resilience processes mature, the ability for further robust adaptation pathways to be implemented will emerge.

The table below captures specific items identified for integration as part of future plan iterations.

ASPECT FOR CONSIDERATION	
<b>Expansion of drought resilience relative to diverse stakeholder groups</b>	
1	<p>Future plan updates should continue to seek engagement across the community, and build in and on top of existing processes to engage with less represented groups through implementation of the plan (including non-agricultural sectors and First Nations groups).</p> <p>Stakeholder engagement could be expanded to include direct participation of different drought vulnerable groups including gauging their capacity to participate and how best to engage with them moving forward. This information could be used to better target vulnerable residents and ensure adequate supports are in place to involve different community segments.</p>
<b>Expansion of resilience adaptation pathways</b>	
2	<p>Further develop the theory of change to aligns the plan's objectives and actions towards reaching its intended outcomes, including the degree to which the proposed actions contribute to adaptive and transformative actions. Subsequent plans may focus on opportunities that address adaption and transformation.</p>
3	<p>Expand on the interrelationships between economic, social and environmental factors across existing and updated documents, plans and strategies, and describe how these relationships influence potential cascading impacts of drought. There could be opportunity to link actions within the plan to these interrelationships to demonstrate multiple benefits from singular actions.</p>
3	<p>Future plan updates could develop a suite of plausible future scenarios through a participatory process and based on climate, drought and other drivers of change. The development of future scenarios could consider how trends, shocks or stresses (including drought) will interact with and likely affect the region's economic, social and environmental characteristics, and the implications for diverse stakeholder groups. This exercise will also assist these stakeholders to explore and identify actions and pathways that assist with building resilience under different plausible future scenarios.</p>
<b>Resilience action planning</b>	
4	<p>Future updates to the plan could provide more additional details in the actions to enhance accountability and direction (next steps, responsibilities, measures of success)</p>
5	<p>Future updates to the plan could provide further links to key actions within the plan and how they address specific indicators of vulnerability and adaptive capacity.</p>

6	Future updates of the plan could identify potential interactions or interdependencies between actions to provide more guidance for sequencing actions.
7	Future plan updates could provide additional detail to how actions, if implemented successfully, are likely to be effective in achieving specific resilience outcomes. Pursuing this may require shift in current action plan layout, to consider priorities or groups of actions which address an overarching outcome.
<b>Implementation and governance</b>	
8	As implementation advances, expand the implementation content of the plan with respect to its governance arrangements and the function / operation of the PCG. Future updates of the plan could provide further detail on roles and responsibilities under working partnerships.
9	Future plan updates could provide more explicit descriptions of what external support is required for successful implementation, including resourcing.
10	Future plan updates could further define and build upon established structured learning processes, and utilise monitoring and reporting to inform any changes to priorities. A focus on the program logic, and the implementation pathways can underpin this focus.
<b>Monitoring, evaluation and learning framework</b>	
11	<p>Further develop structured approaches to capturing lessons from performance measures, linked with monitoring in addition to lessons from annual evaluations currently identified in the MEL. Integrate lessons learned from the plan's existing evaluation questions back into the plan's actions.</p> <p>Continue to enhance and mature the plan's MEL processes over time as the plan transitions from foundational into a performance posture.</p>
12	Further develop performance indicators tied to actions in the plan's MEL plan. This will improve accountability by showing the degree to which proposed priorities and actions contribute to the plan's articulated vision and outcomes. This could include using quantitative and empirical evidence for key economic and social variables over time.
<b>Resilience assessment</b>	
13	Ensure future iterations of the plan are qualified by a review of the Resilience Assessment components to identify key circumstantial changes which have occurred.
14	Continue to build upon and refine the program logic approach embedded within the Resilience Assessment that supported the development of the current plan, into a well-developed theory of change

