WENTWORTH AND BALRANALD

Regional Drought **Resilience Plan**

Wentworth SHIRE COUNCIL

BALRANALD SHIRE COUNCIL

March 2024

We acknowledge the Traditional Custodians of the land and pay respects to Elders past and present.

We value the vital involvement of members of the primary production and broader communities of Wentworth and Balranald Shires to the formulation of this plan and extend our thanks to those who contributed.

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Contents

Glossary

Key terms used throughout this plan are defined below.

ADAPTATION	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.
ADAPTIVE CAPACITY	The ability of individuals and groups to adjust and respond to environmental and socio-economic changes.
ADAPTIVE GOVERNANCE	Coordinating iterative, flexible and responsive interactions between systems when designing interventions and for their implementation and evaluation.
COPING CAPACITY	Communities that may be constrained in their capacity to use available resources to cope with adverse events and to prepare for, absorb and recover.
DROUGHT	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.
ECONOMIC RESILIENCE	The ability of the economy to absorb the economic impact of shocks and stressors without changing the economic status or outcomes.
ENVIRONMENTAL RESILIENCE	The ability of the natural environment to cope with a diverse range of shocks and stressors while maintaining natural processes and ecosystem services.
GOVERNANCE	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.
INTERVENTION OPTIONS	Alternative or complementary actions, projects, programs, policies, initiatives and investments that are planned to bring about change in the system.
LOCAL KNOWLEDGE	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.
RESILIENCE	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.
RISK	The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems.
SHOCK	Sudden, short-term events that threaten a city (or region). Examples include: major storms, floods, bush fires, heatwaves, disease outbreaks, terrorism and cyber-attacks'.
SOCIAL RESILIENCE	The ability of the human society to cope with a diverse range of shocks and stressors while maintaining existing social and community functions.
STRESSOR	An event that occurs gradually over a timeframe that causes an adverse effect, e.g. drought.
SYSTEMS	The interaction of processes, networks and inter-dependencies across a complex 'whole'.
THEORY OF CHANGE	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.
TRENDS	Major global or regional influences that have driven change in the past and are expected to shape change into the future.
THRESHOLD	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.
TRANSFORM	The process of radically changing or building a new system with different structure, functions, feedbacks and identity.
TRIGGER POINT	A pre-agreed situation or event, that when met, activates a management intervention. Trigger points are usually defined in the planning phase.

Introduction

This Regional Drought Resilience Plan is a collaboration between Wentworth Shire Council and Balranald Shire Council, local industry and community, working together to advance the region's focus on its resilience to the impacts of drought.

Of all of the climate and weather-related conditions that affect Australia, drought is often the most challenging, not just on-farm but for entire communities and regions. The costs of drought are spread across economic, social and environmental factors. The toll is enormous and the impacts can linger for decades.

Far south western New South Wales (NSW) is prone to periods of persistent drought with downward trends in rainfall and streamflow documented. We know droughts will come again. Climate projections for the Wentworth and Balranald region indicate continued susceptibility to variable rainfall periods, reduced average rainfall and higher temperatures into the future.

The most effective response to rising uncertainty is to plan for greater drought resilience through a range of actions. Sustainable and functional economies and connected communities provide a strong foundation for us to reduce our vulnerability and mitigate potential impacts, with the benefit of enhancing natural environmental values.

The Regional Drought Resilience Planning (RDRP) program is one of five focus areas[1] of the Commonwealth Government's Future Drought Fund. These plans focus on innovative ways to build regional drought resilience, taking steps to plan now to stem the impact of future drought on our region.

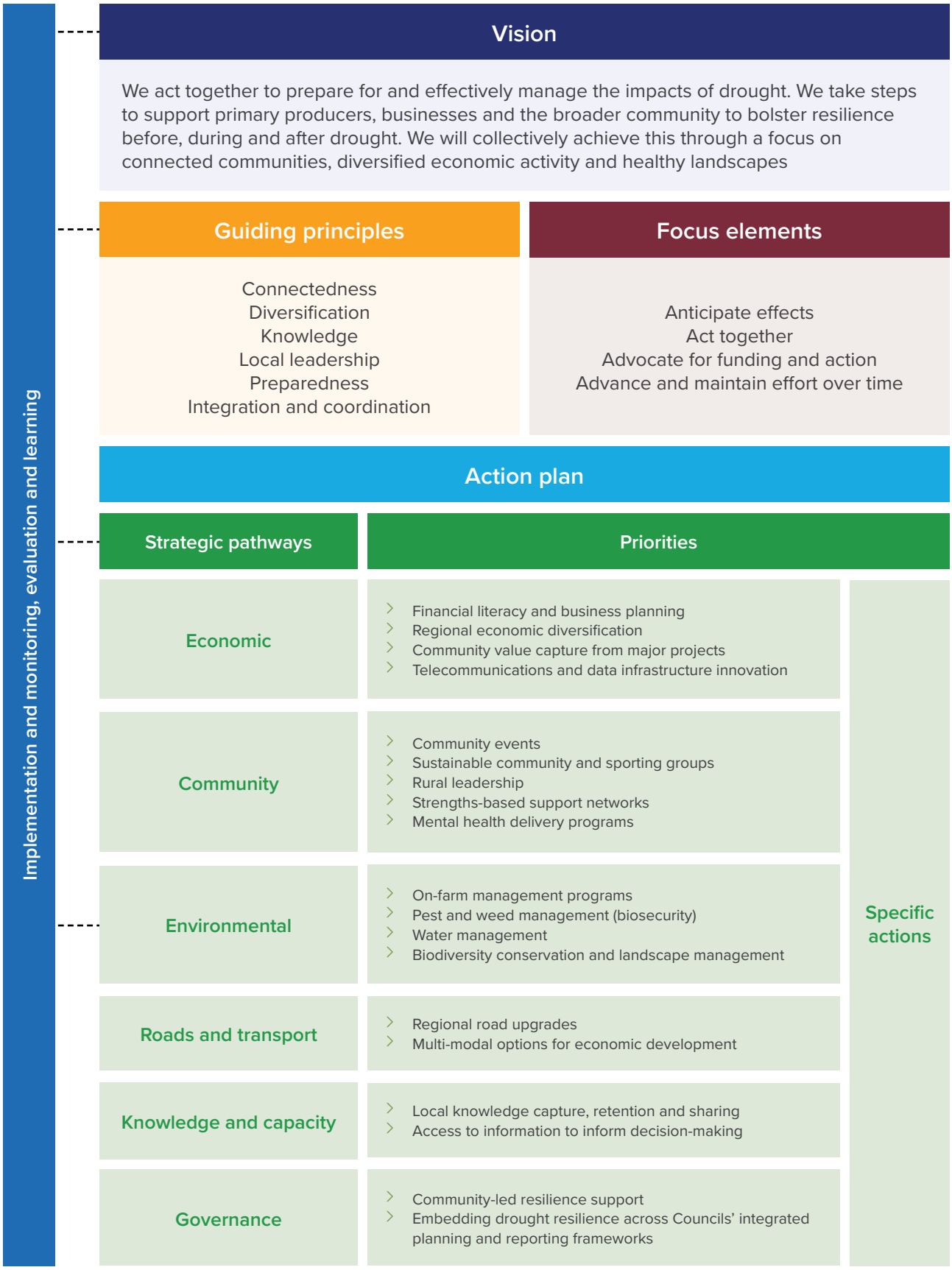
The NSW RDRP program is jointly funded through the Commonwealth Government's Future Drought Fund and the NSW Government, supporting local governments to work together regionally to plan for drought resilience proactively and pragmatically.

1 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.

Photo: Wentworth Shire

Plan framework

The framework of the Wentworth and Balranald regional drought resilience plan is illustrated below.



Purpose of this plan

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'.

The Wentworth and Balranald Regional Drought Resilience Plan provides locally-relevant pathways, priorities and actions as options to deal with the stresses of drought, from primary producers, to businesses, and community – and how Wentworth and Balranald Shire Councils can support this.

Importantly, this approach recognises the role of ecosystem and biodiversity health in supporting the region's economic and social functions. Healthy landscapes support our social and community interactions and our economic activities.

The objectives of the Wentworth and Balranald regional drought resilience plan seeks to provide:

- A baseline understanding of the local / regional context of drought – past, present and future across social (community), economic and environmental factors
- Consideration of drought against community aspirations for the future, working from a regional perspective to co-design the plan alongside community
- Clarity of opportunities available in the short, medium and long-term
- Identified pathways and actions to improve drought resilience, mitigate risks and adapt to change
- The ability to better position our region to pursue and implement strategic actions and take advantage of opportunities as they arise
- A platform and evidence-base to inform business as usual and transformational change, as well as support future Commonwealth, state, local government and private sector investment in the region in a meaningful and impactful way.

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 foundational regional drought resilience plan provides the framework for implementation and identifies practical ways the community and businesses of the region can prepare for and respond to drought impacts.

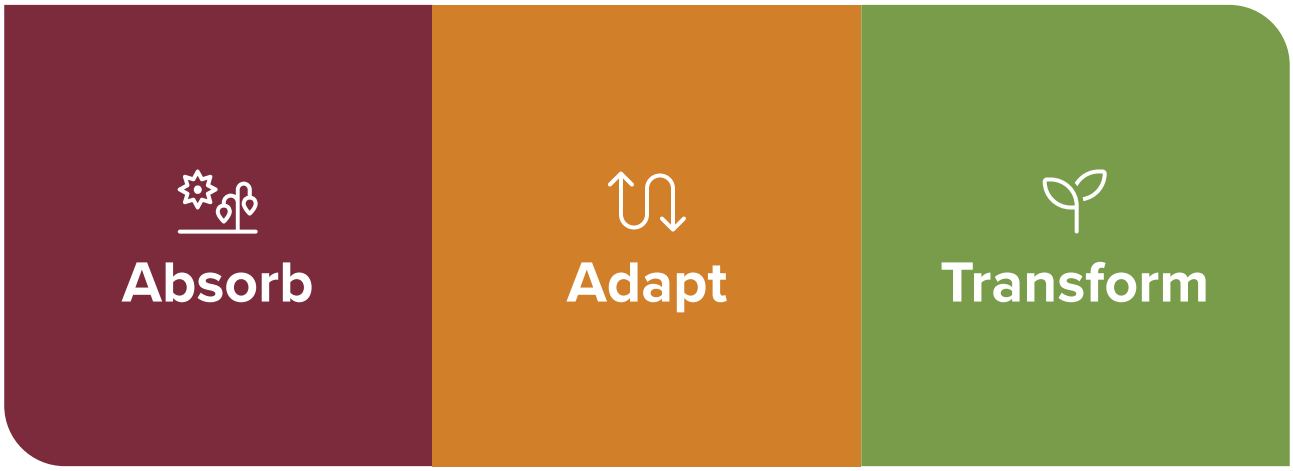
A local plan for drought resilience

The Wentworth and Balranald regional drought resilience plan looks back in time to understand historic events and their impacts, in order to anticipate what drought might look like into the future. Whilst we don't have a crystal ball to predict the future, this plan addresses drought resilience by considering different drought futures.

How issues have persisted, and 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, learning from our past experiences to make change. This supports a focus on outcomes through:

- Prevention of potential impacts
- Increased preparedness and resilience
- What is needed in response
- What is needed for recovery.

The 'prevention, preparedness, response and recovery' or 'PPRR' cycle is a commonly-used disaster management framework that is also applicable to how we think about the types of actions to address drought impacts.



The identified actions in this plan can be scaled across 'absorb, adapt to and transform' opportunities which provide a view of the priorities relative to different components of the drought cycle, effort and/or costs associated. Some are short-term and more immediate opportunities whilst others are more transformative in nature and require long-term action to generate change.

This concept forms part of a resilience 'theory of change' model[2] which helps us 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. This approach also helps to inform decision-making for enhanced resilience and adaptation as conditions and circumstances change over time.

Why the need for a plan?

Having a plan enables us to think and act strategically, rather than on an ad hoc basis once the pressure of drought is upon us. Ad hoc approaches tend to be limited in the options or opportunities that can be considered, and are often too late. A regional drought resilience plan helps us coordinate and direct effort, resourcing, funding and investment to actions that offer maximum benefit.

The stakeholder engagement process that informed this plan has highlighted the resilience of primary producers, and communities of the region. This consultation also identified that the independence of the community needs to transition to an interdependence on one another, with heightened connections and support to continue to build resilience to drought cycles.

The Wentworth and Balranald regional drought resilience plan adopts a focus to:

- Anticipate effects
- Act together
- Advocate for funding and action
- Advance and maintain effort over time.

The 2017-2019 drought was NSW's worst drought on record. Future droughts may become more frequent and intense across NSW. We want to learn from the past to be better prepared for next time. Key ways this drought resilience plan seeks to achieve this is through:

- Understanding the abilities for different people, businesses and organisations to act in building grassroots resilience and continuing to develop and identify drought resilience actions in an on-going manner
- Better resourcing, better tasking, better funding, better advocacy
- Having projects ready for pre, during and post drought implementation and taking advantage of funding opportunities with projects that have already been thought through (ensuring they are relevant and of maximum benefit).

The Wentworth and Balranald regional drought resilience plan is about taking a local view for local benefit. A plan can't bring rain, but it can work to make things a bit easier in its absence.

2 The Wentworth and Balranald drought resilience plan 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/

Vision and principles

During community conversations, local stakeholders identified the following vision and guiding principles that underpin the region's drought resilience:

Wentworth and Balranald drought vision

We act together to prepare for and effectively manage the impacts of drought. We take steps to support primary producers, businesses and the broader community to bolster resilience before, during and after drought. We will collectively achieve this through a focus on connected communities, diversified economic activity and healthy landscapes.

Guiding principles

Connectedness

Supporting enhanced water and environmental connection, community connection and economic connectivity. This exists in all forms, from infrastructure to support economic activity, to river systems, ecosystem connectivity and human and social connection.

Diversification

Capitalising on the region's unique economic development opportunities to build different income and economic streams which provide long-term advantage, from on-farm options through to regional-scale activities.

Knowledge

Developing skills, harnessing experience and information, and learning from others to inform decision-making across sectors and community.

Local leadership

Working and acting together, collaborative approaches to drought programs are adopted to ensure the delivery of drought programs and relief is community led and leverages existing trusted networks. Good governance processes provide a strong foundation.

Preparedness

Anticipating the region's rainfall and soil moisture patterns, investment is made in the good times to be ready for dry spells and drought. This is necessary for farming operations and businesses from an economic perspective, for infrastructure, for the environment and for community.

Integration and coordination

Embedding the principles of drought resilience across the region's policies, plans, and strategies to advance enhanced drought resilience across all activities and contributing to coordination and continuous improvement over time.

Outcomes

The outcomes sought from the Wentworth and Balranald regional drought resilience plan are outlined below. The monitoring, evaluation and learning framework to guide plan implementation sets out a range of criteria against which implementation can be measured against these outcomes in order to test growth in drought resilience attributes over time.

THEME	OUTCOME
Social and community	Community connection and wellbeing is maintained
Economy	Reduced decline of gross regional product relative to: › Non-drought periods › Previous drought periods › Other regions in NSW, Victoria and South Australia
Environment	Environmental degradation of landscapes and waterways is reduced throughout and emerging from drought
Governance	Drought resilience priorities are embedded across Council's Integrated Planning and Reporting Framework and informs the plans, strategies and efforts of allied stakeholders

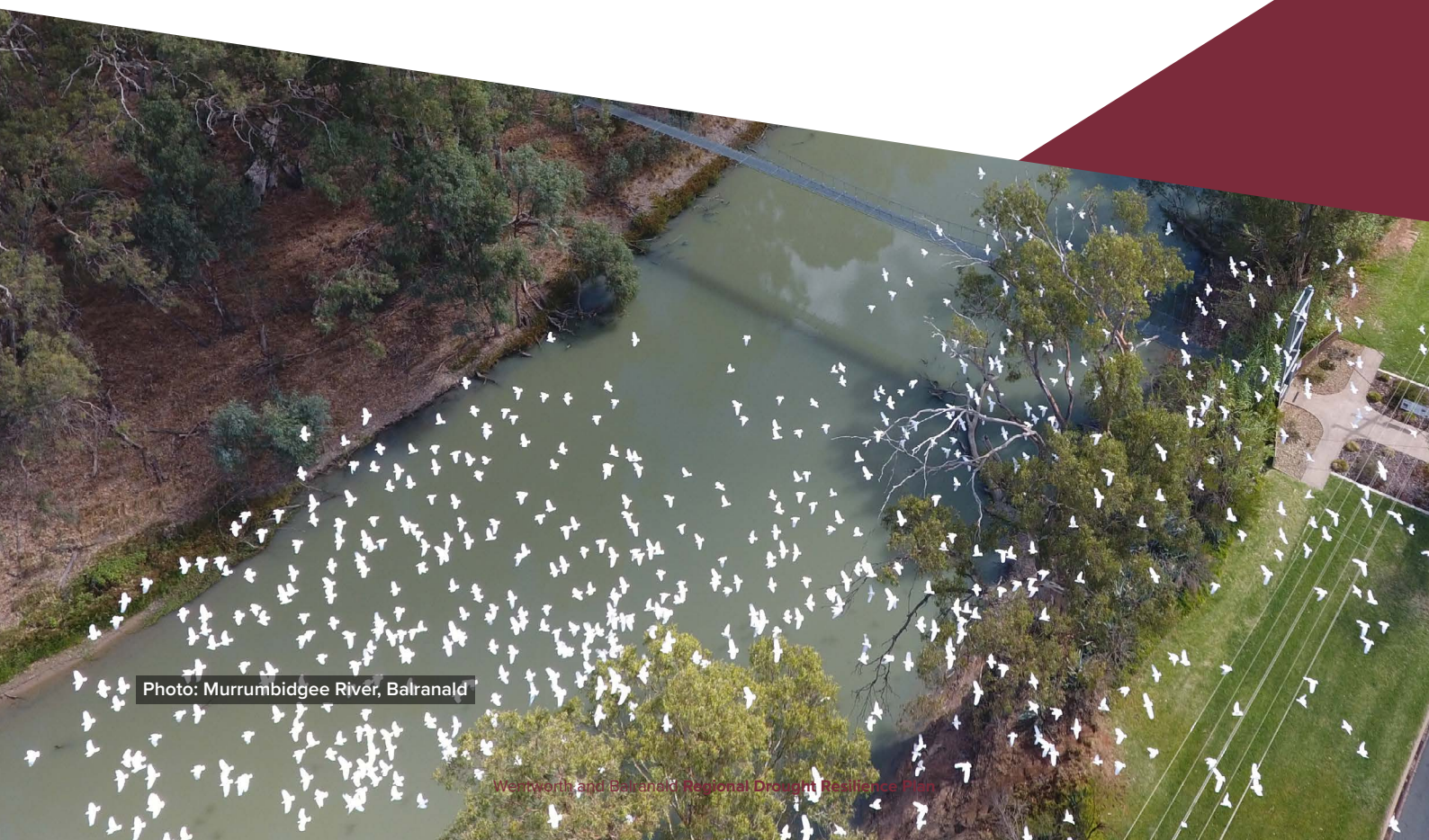


Photo: Murrumbidgee River, Balranald

Region snapshot

Information sourced from ABS 2021 Census data and Regional Development Australia'

Population 2022
9,753

First Nations population
7.3%
(3.4% NSW average)

Population aged 65+
20.6%
(17.7% NSW average)

Median age
43
(39 NSW average)

Gross Regional Product 2022
$799m

Agricultural Commodity Gross Value
$450.1m

Largest industries (by employment)

Agriculture, Forestry, Fishing and Mining

WENTWORTH

- Sheep farming
- Primary education
- Health
- Citrus fruit growing
- Grape growing

BALRANALD

- Grape growing
- Sheep farming
- Other fruit and nut growing
- Health
- Local government administration

Local businesses
1,124

Local jobs
4,037

Key agricultural land uses and commodities

- Grazing (wool, sheep/ lamb and beef)
- Horticulture (dryland and irrigated)
- Table and wine grapes
- Almonds
- Citrus

About our region

The region's geography is dominated by arid and semi-arid landscapes ranging from the 'outback' semi-arid salt bush plains to rich farmlands, rangelands and wetlands. The Wentworth and Balranald Shires occupy the Lower Darling, Lower Lachlan, Lower Murrumbidgee Rivers and is adjacent to the mid Murray River. The township of Wentworth is located at the confluence of the Darling and Murray Rivers, with the Balranald area surrounded by five iconic river systems.

Water supply arrangements are vital to any conversation about drought and the management of water within the river systems that flow through Wentworth and Balranald Shires is complex.

How river systems operate with and without rainfall is a critical element in understanding the local context of drought impacts. These impacts are unique for different activities, whether for rangeland or dry land grazing, irrigated agriculture and horticulture, floodplain grazing, river-based tourism, industry or township-based purposes. Likewise, the drought resilience opportunities of each of these is different.

Drought drives the call for better planning for human, industry and environmental water needs. One of the overarching vehicles to manage water needs is the Murray-Darling Basin Plan which gives all water users a framework for working together toward a healthy, working Basin.

The Basin Plan sets limits on how much water can be taken for:

- Irrigation supply
- Town use
- Industrial uses
- Drinking water supply.

State government regional water strategies are also developed to guide water needs and objectives for the river systems within the Murray-Darling Basin.

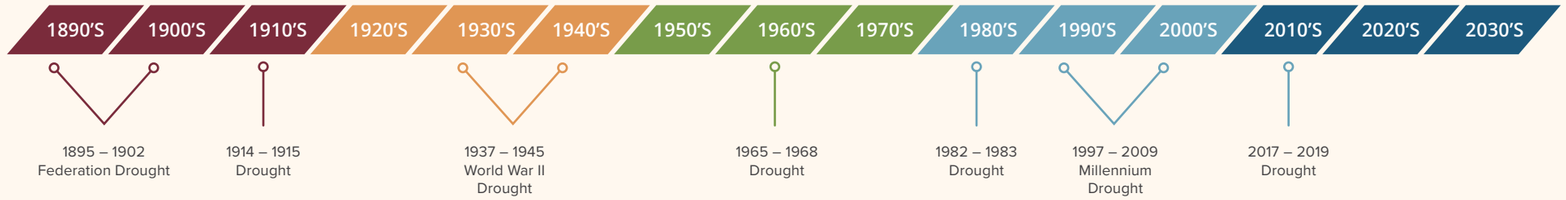
In both Wentworth and Balranald Shires, people rely on the basin for drinking water in the townships and for thriving agricultural production including intensive horticulture, irrigated crops and grazing along floodplains benefiting from riparian flows. Rainfall remains the predominate water source across the region's extensive rangeland areas where dryland grazing and cropping occurs. Water also meets great cultural and spiritual needs for Traditional Owners and First Nations people. Food production and tourism contribute significantly to Wentworth and Balranald Shires' economies. Abundant and diverse animal and plant life rely on this complex system to survive.

The region is part of the traditional lands and waters of the Ngyiampaa, Paakantji (Barkindji or Barkandji) and Mutthi-Mutthi people, whose physical, spiritual and cultural connection with Country extends over many tens of thousands of years and continues to this day.

How we collectively rely upon and use water spans many parts of how we live, work and play which underscores why we need to plan ahead for times of reduced water access and availability.

Credit Spatial Services 2022

Major Drought Timeline (Decades)



People and communities

Key centres in the region include Wentworth and Balranald and are supported by a network of villages and localities. In Wentworth Shire these include Buronga, Gol Gol, Dareton, Pomona, Ellerslie and Pooncarie. In Balranald Shire they include Euson, Hatfield, Kyalite, Penarie, Clare and Oxley.

Centres, townships and villages across the region provide important access to social and economic services, retail, medical services and infrastructure. They are destinations for residents, workers and visitors. They are also home to the majority of the region's non-agricultural enterprises. The rural main street character each offers is unique and highly dependent on functional, flourishing trade and business activity.

Economy

The key economic areas of focus across the region include the 'engine industry' of primary production (agriculture and horticulture) and emergent industries of tourism, mining, renewables, services and retail. Opportunity exists to support value-added activities that link with leverage from these activities. When our local farmers do well, our towns do well.

The region is also located in proximity to the growing regional city of Mildura, across the Murray River in Victoria. This presents both opportunities and challenges. The region maintains strong links with Sydney, Canberra, Melbourne and Adelaide via the national road transport network and Mildura Airport, important for logistics, supply chains and accessing markets.

Irrigated farming along the region's river systems and tributaries provides a level of water security however, this is not the only attribute that needs consideration during drought times. Diversified primary production is a unique attribute of the region, along with tourism, mineral sands mining deposits and the emergent South West Renewable Energy Zone. Leveraging these with value-add industry expansion will underpin long-term economic opportunity.

Environment

Since European colonisation, vegetation and landscapes in the Far West region have been substantially modified through the expansion of pastoralism and the introduction of feral animals to the region. Despite these impacts, it is recognised these ancient lands are home to some of the most culturally significant areas in the country, including Aboriginal heritage sites such as Lake Mungo in the state, national and world heritage listed Willandra Lakes Region. Mungo National Park is home to Mungo Man and Mungo Lady – the earliest evidence of humans outside of Africa and the oldest known cremation in the world. These incredible sites are part of a rich Indigenous history with records of human occupation dating back over 40,000 years. Mungo National Park and the Willandra Lakes Region attracts more than 27,000 tourist visitors every year, adding substantially to the regional and local economies.

Wentworth Shire is home to other National Parks (including the Mallee Cliffs and Tarawi National Parks) and State Parks and Reserves that are managed by the National Parks and Wildlife Service. Balranald Shire is home to Yanga National Park, and more broadly the Shire provides habitats for 28 threatened species, including a variety of native birds, frogs, mammals, fish, reptiles and plants.

Photo: Balranald Shire

How this plan was prepared

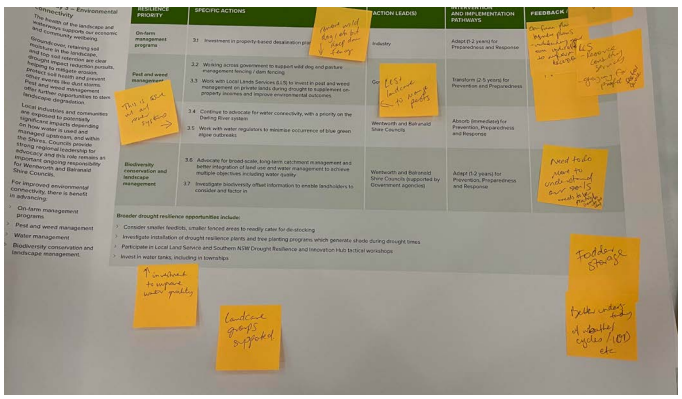
The Wentworth and Balranald regional drought resilience plan was prepared with the valued contribution of a broad group of stakeholders, coupled with an evidence-based resilience assessment. These inputs have drawn together technical analysis with local knowledge and insight.

Resilience Assessment

- Literature analysis
- Plans, policies and strategies review
- Regional characteristics
- Trends and projections for drought impacts
- Drought resilience indicators assessment.

Stakeholder engagement

- Online community and business surveys surveys, open for almost 5 months
- Four Community, industry and government workshops in Buronga and Balranald
- Community drop-in sessions in Balranald, Hatfield and Clare
- Targeted consultations and discussions with community, industry and services representatives involving over 60 individuals and over 100 hours of consultation interactions.



The Wentworth and Balranald regional drought resilience plan focuses on the consideration of complex drought challenges from a systems-based perspective where economic, natural environment and social capacity to endure, respond and evolve through drought are enhanced.

How groups or segments of the region's community adapt and transform to respond to drought, and continuously build resilience, is different and requires different approaches given the diversity of the region. From an industry perspective, drought resilience involves different approaches for the horticultural industry versus the region's dryland cropping and rangelands grazing enterprises. This is different again for agricultural and horticultural activities located on floodplains. The same applies for youth cohorts, the region's First Nations peoples, the aged, and persons with disability. All have unique resilience needs when it comes to drought and therefore, there can be no 'one size fits all' approach.

Alignment

This provides strategic alignment with international-scale goals including the United Nations sustainable development goals, the Sendai Framework for Disaster Risk Reduction, with national-scale strategies and frameworks and state-level strategic instruments. This alignment demonstrates how working locally contributes to broader sustainability and resilience outcomes.

Key plans and strategies contributing to this alignment and the preparation of the drought resilience plan has included (but is not limited to):

- Draft Far West Regional Plan 2041
- Western Murray Regional Economic Development Strategy (2023 update) and associated industry plans
- Western regional water strategies
- Draft Lachlan, Murrumbidgee and Murray regional water strategies
- NSW Climate Change Adaptation Strategy
- Southern NSW Drought Resilience Adaptation and Innovation Hub research
- NSW Government Department of Primary Industries DroughtHub
- Department of Regional NSW Drought Signals Dashboard
- Commonwealth Government's Drought Resilience Self Assessment tool.
- Department of Primary Industries Climate Vulnerability Assessment
- Various local government and industry group studies, plans, strategies and reports

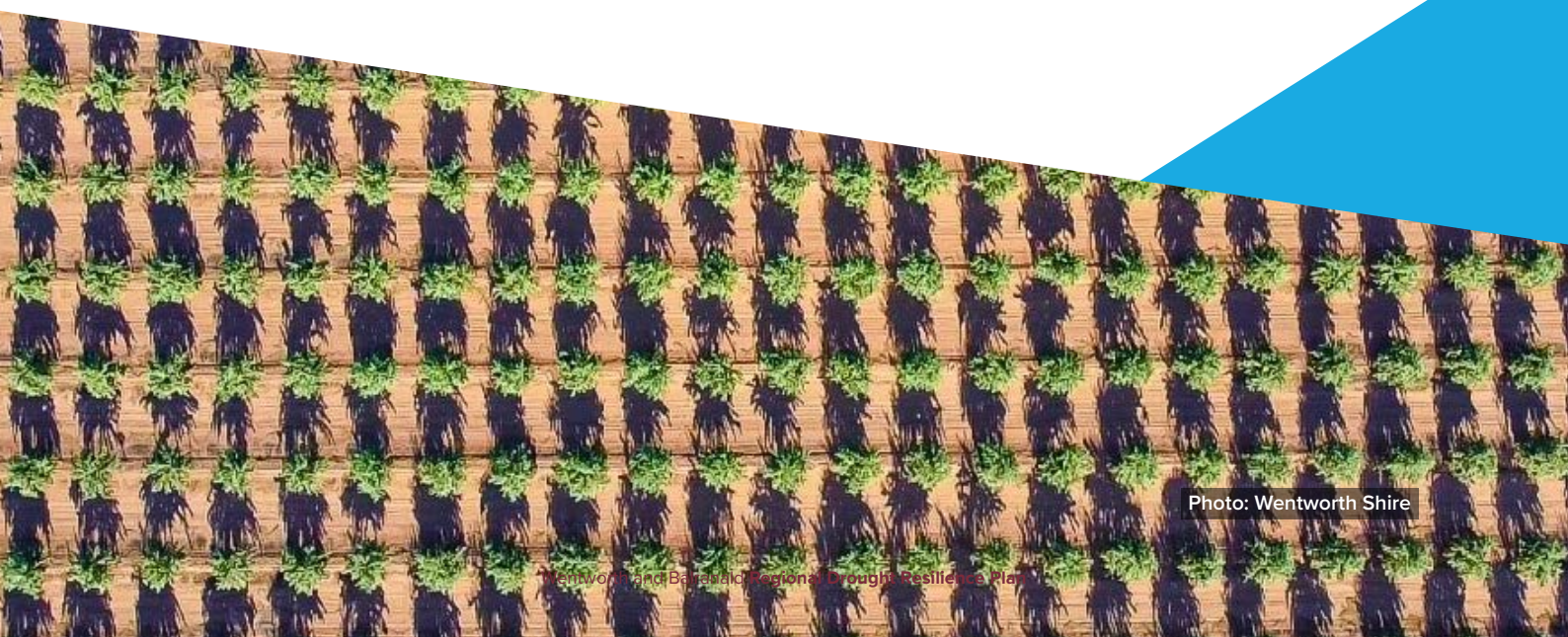


Photo: Wentworth Shire

Stakeholder engagement, participation and partnerships

The consultation program that informed the preparation of this regional drought resilience plan involved a number of approaches. This included linking in with existing events in the region. This allowed the project to tap into key local service providers, representing large segments of the local population.

Key representatives involved in the engagement process, outside of the Councils and individuals, include:

- Local primary producers (sheep, cattle, viticulture, wheat, both dryland and irrigated)
- Local town residents
- Advisory group representatives (Balranald)
- Youth representatives (Wentworth)
- Community group representatives
- Rural Financial Counselling Service
- National Emergency Management Agency
- Department of Regional NSW
- Department of Primary Industries
- Rural Adversity Mental Health Program (RAMHP)
- Foundation for Rural and Regional Renewal (FRRR)
- Salvation Army
- Red Cross
- State Emergency Service
- Southern NSW Drought Innovation and Resilience Hub
- Pastoralists' Association of West Darling
- Local Land Services
- Destination NSW Riverina Murray
- Department of Education and Training
- One Basin CRC
- Mallee Regional Innovation Centre
- Culpra Station Landcare Group
- Mallee Sustainable Farming
- Euston Landcare Group
- South West Water Users Group
- Anabranch Water
- Lower Anabranch Sporting and Landcare group
- Pomona Irrigation Trust
- Isolated Children's Parents' Association

Key insights

Key insights communicated from the community engagement process informing the preparation of this plan included that:

- The power of connection underpins and drives drought resilience locally – including interpersonal connection, connection to place and across the landscape, telecommunications connectivity, connection with markets and importantly, environmental connectivity and flows.
- Drought periods place significant added pressure on the region's farmers, families, businesses and communities, in different ways and to different degrees depending on circumstance. This makes it difficult to balance priorities on-farm, and for one's self.
- When the region's farmers do well, our communities and townships do well. The same relationship also exists during drought – we are all in it together.
- Looking after our mental health and wellbeing, and that of those around us is important to us.
- Access to information is key to supporting early decision-making, de-stocking, the projects that should be pursued at different times in the drought cycle. Having farm-based plans can be useful to identify trigger points for decisions across different events and circumstances.
- Improvements in water efficiencies and water security is key, particularly to maintain stream flows. Cease to flow events have a major impact on the region, alongside lack of rainfall.
- Effective land management offers the ability to manage groundcover and top soil, reducing erosion and maintaining environmental connections that service economic productivity.
- Because the region's major centres are located on rivers, the effects of drought are first felt elsewhere in the Shires which isn't widely recognised. Any indicators that consider the towns and not the broader area can be misleading and don't reflect what is going on for the rural localities of the region.

Interconnected drought impacts

Drought resilience research, local historical literature, newspaper articles and community conversations and survey feedback across Wentworth and Balranald Shires identified the following drought impacts associated with previous events:

Economic

- Reduced agricultural and horticultural productivity, outputs and income
- Reduced gross regional product
- Business closures
- Unemployment and under-employment
- Ability to attract workers
- Reduced discretionary spending in town with local businesses
- Fodder availability
- Market volatility and dynamic commodity prices
- Impact of temporary short-term economic activities (like construction) that are not long lasting
- Increasing costs of living
- Housing affordability and availability
- Electricity and water pricing
- Maintaining cash flow and debt management

Community & Social

- Social isolation and loneliness due to increased on-farm responsibilities
- Increased mental health concerns (anxiety, depression)
- Reluctance to seek support
- Family and relationship breakdown
- Domestic violence and substance abuse
- Pressures associated with inability to get a crop off, changes in commodity prices and de-stocking
- Impacts on young people
- Pressure of seeking alternative employment / income
- Increased demand on access to services and timely access to services
- Increased load on people
- Declining volunteerism
- Physical health including respiratory issues and skin conditions

Environmental

- Changes to land use and land cover over time
- Loss of top soil
- Increased soil and groundwater salinity
- Water turbidity
- Cease to flow periods of the Barwon-Darling system and allocation reductions in the Murray system
- Blue-green algae outbreaks
- Dust storms
- Effectiveness of water conservation and efficiencies
- Increased pest impacts
- Impacts on biosecurity
- Weed spread from truck movements
- Increased weed prevalence (amplified once the rains come)
- Impacts on or loss of fauna and flora due to boom and bust cycles
- Increased kangaroo populations which presents cascading risks

Drought impacts don't happen in isolation, they are often interconnected which is reflective of the systemic issues that drought generates and amplifies.

Community and social impacts

One of the key impacts on people and communities identified by participants through the consultation process was that of mental health. The burden of increased physical workloads under adverse circumstances, impacts on family stress, financial circumstances and the prolonged nature of drought, all contribute to social isolation and declining mental health. Reluctance to seek support was one of the highest ranked issues identified by the community survey process.

Impacts on young people was also a common point of discussion. Whilst children are often protected and shielded from family and business stresses, they are intuitive and susceptible. Several participants of the engagement process remarked on behavioural signs of stress and anxiety in young people, witnessed during the last drought.

Access to services, particularly, allied health, was a clear community impact expressed by engagement participants, at a time when increased demand is placing pressure on these critical services.

Economic impacts

Reduced productivity was the highest ranked economic impact by the survey participants. Reduced productivity cascades into a number of other economic drought impacts such as reduced income, increasing debt and less discretionary spending which spread through the broader local economy. This can trigger a chain reaction of reduced employment and business closures. The last drought may not have had this level of impact, as noted by several engagement participants, however this was largely due to the range of diverse but temporary economic activities taking place at that time. Project construction is one of these temporary activities and whilst adding economic advantage for a period, the long-term operations of projects and businesses is more critical.

Many people who contributed to the engagement process to prepare this plan spoke about how hard the last drought was, and the toll it took on everyone. The impact on dryland farming was routinely noted as the most affected. Fodder and water scarcity made it difficult to maintain cash flow and manage debt. These conditions also make it difficult to leave the property given heightened workloads, even only for a short period. The interplay between economic and social impacts is therefore clear to see.

Environmental impacts

Water quality remains a core environmental focus across the community, as established by the range of engagement and consultant activities undertaken to inform this plan. This relates to everything from the ephemeral flow of the Darling system through to blue green algae outbreaks, both in the Darling and Murray systems, and their damaging impacts. These impacts don't just have an environmental dimension but an economic one, on agricultural and horticultural activities and also from a tourism perspective. Drinking water quality also requires management.

Effective land management and regenerative activities were identified through the engagement process as a formative opportunity to address a suite of environmental issues from top soil loss, erosion, weed and pest management. Biosecurity concerns were noted to increase in the region during previous drought periods, largely because their impacts amplify and exacerbate already challenging landscape and economic conditions.

Murrumbidgee River, Balranald Shire

Drought history and impact

No two droughts are ever the same, and the impacts are not the same. Conditions are different, our circumstances are different and the climate and weather factors are different.

Some of the most impactful droughts in Australia history have affected Wentworth and Balranald Shires including:

- 1895 to 1902 Federation drought
- 1914 to 1915 drought
- 1937 to 1945 World War II drought
- 1965 to 1968 drought
- 1982 to 1983 drought
- 1997 to 2009 – Millennium drought
- 2017 to 2019 drought

In all cases these drought events were characterised by protracted periods of low rainfall, leading to low soil moisture as illustrated at Figures 1 and 2.

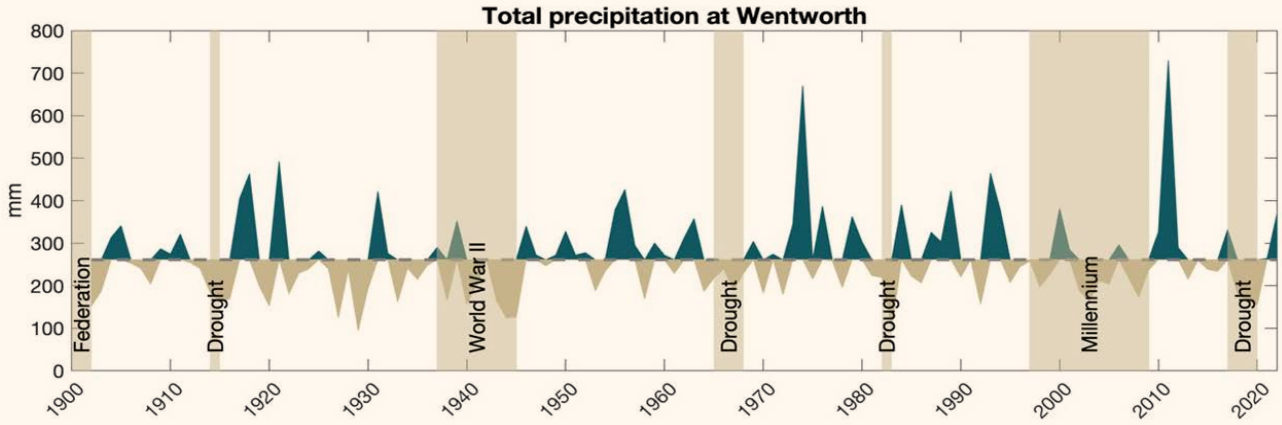


Figure 1 — Total annual rainfall at Wentworth show significant year to year variability. Major historical droughts coincide with periods of lower than average rainfall.

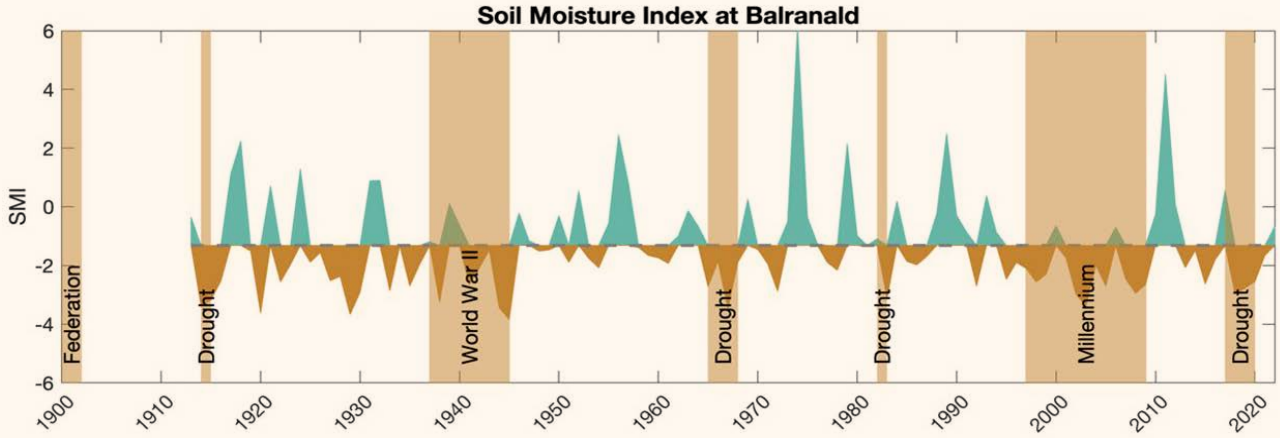


Figure 2 — Annual mean soil moisture index (relative to 2001-2020) at Balranald. Major historical droughts coincide with periods of low soil moisture (Source: Risk Frontiers, 2023)

This data, when considered against locally recorded data collated by Balranald local, Ken Spinks, shows obvious consistencies, including dry spell cycles and reduced soil moisture periods between drought periods.

The timing of rain is important in the region, more so than volume. The region already receives low average annual rainfall. When it falls is critical.

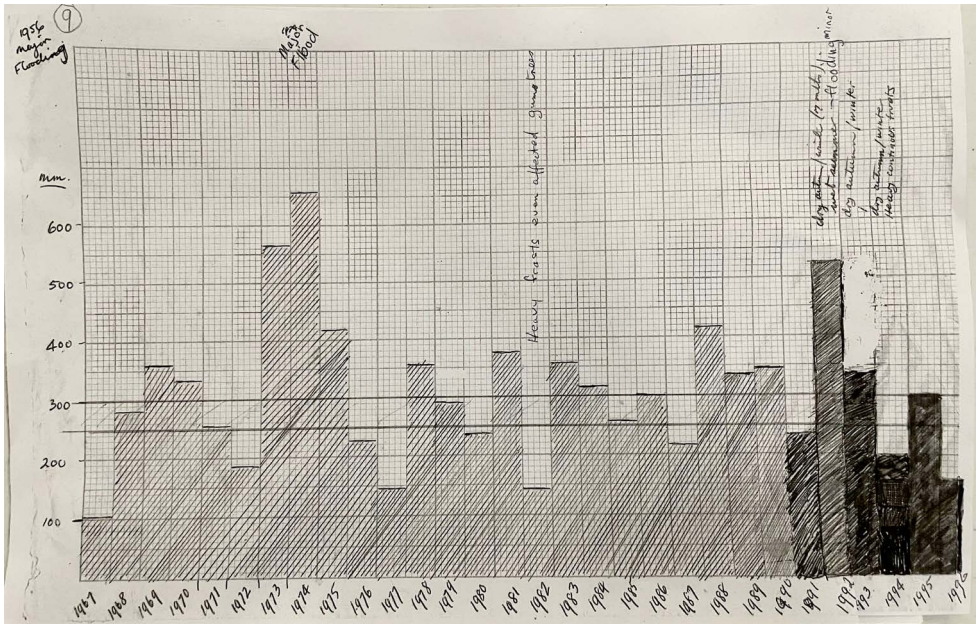


Figure 3 — Locally recorded rainfall history for Balranald township from 1967 to 1996 relative to 250 to 300 millimetre average (Published with the permission of Ken Spinks)

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

The region experiences low rainfall, receiving an average of between 250 to 300 millimetres (10 to 12 inches) per year, with total annual rainfall for Wentworth and Balranald Shires (Figure 4 (left)) generally lower than for other parts of south-east NSW and in Victoria. This contributes to this region being prone to drought (Figure 4 (right)).

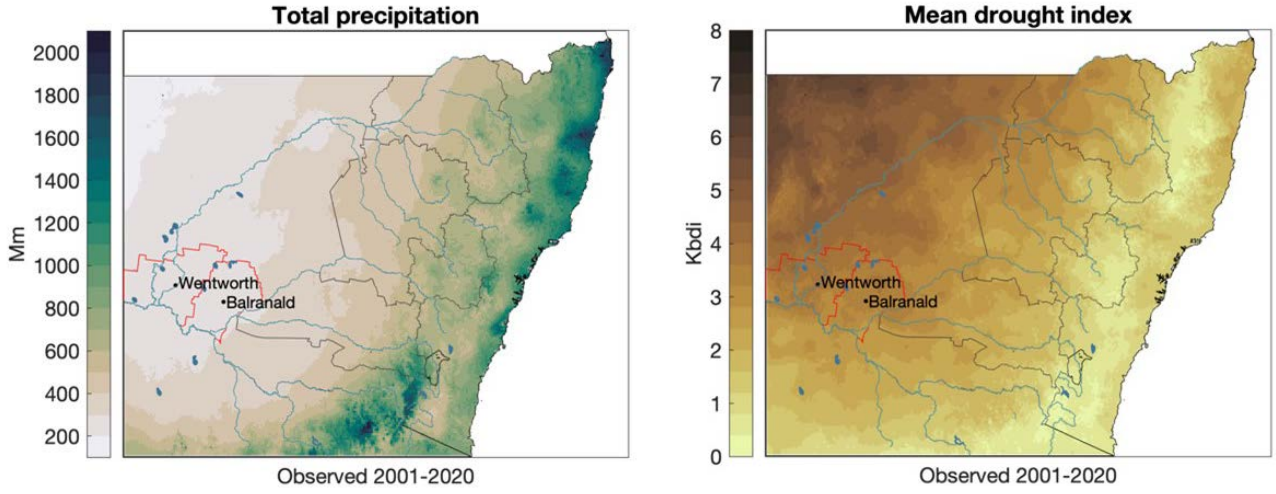


Figure 4 — Total annual rainfall for Wentworth and Balranald is lower than for most other regions in southeast Australia. Average annual drought index values indicate Wentworth and Balranald are also more prone to drought than most other locations in southeast Australia (Source: Risk Frontiers, 2023)

In addition to low average rainfall, there is significant year-to-year variability in rainfall amounts, with dry years such as 2003 receiving less than one third the rainfall of wet years. Reduced streamflow and cease to flow periods in the Darling system has a profound impact, particularly for the northern areas of Wentworth Shire. Drought conditions are often accompanied by more frequent and intense heat extremes and bushfire weather as was experienced across much of NSW in the 2017-2019 drought. An increased frequency of dust storms was also an identified occurrence during the 2017-2019 drought in Wentworth and Balranald.

A focus on the 2017-2019 drought

Rainfall for much of Australia and, in particular, in most of the Murray–Darling Basin, was substantially below average during this period. The three years from January 2017 to December 2019 was the driest on record for any 36-month period starting January, when averaged across the Murray-Darling Basin and NSW. Average rainfall for the basin was over 100 millimetres lower than the second driest period (January 1965 to December 1967), and NSW received around 170 millimetres less rainfall than the next driest period (the Federation drought, the 36 months January 1900–December 1902).

A notable feature of the rainfall deficiencies of these three years is that they were concentrated in the cooler seasons. Both 2018 and 2019 were especially dry. The period was the driest and hottest on record for the basin as a whole. These record warm temperatures exacerbated dry conditions, at times rapidly drying soils in a matter of months. This led to periods in 2017 and 2019 that researchers have termed ‘flash drought’.

For Wentworth and Balranald Shires, rainfall and soil moisture percentiles in 2019 were in the lowest 15-30 per cent range (Figure 5).

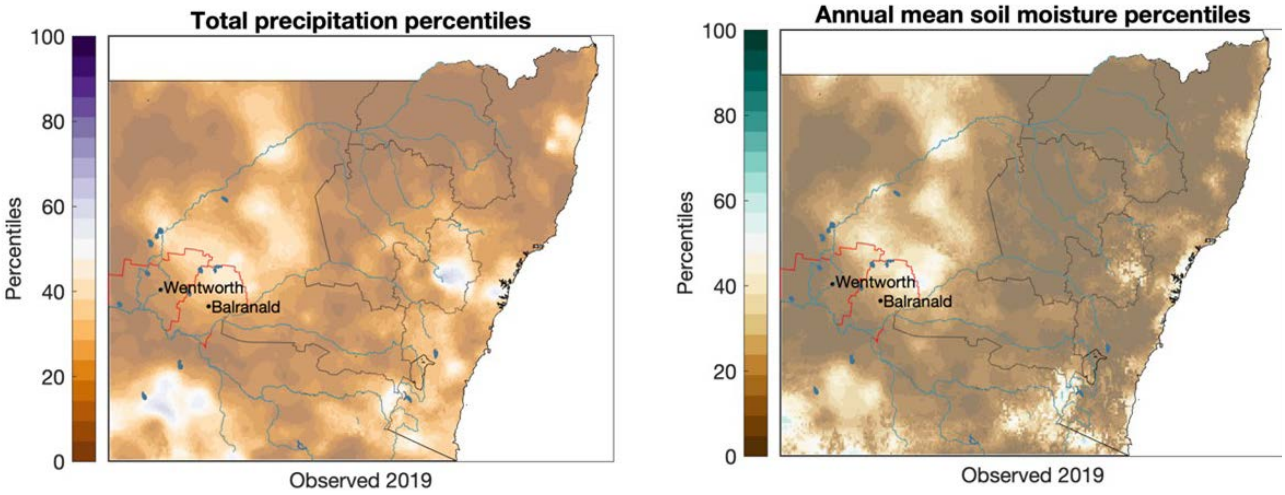


Figure 5 — Total annual rainfall and soil moisture percentiles for 2019 from the AWRA for Wentworth Shire, Balranald Shire and the Murray-Darling Basin (Source: Risk Frontiers, 2023)

Citrus growing, Wentworth Shire

Future drought projections

The value of agricultural commodities as part of the regional economy is significant, and highly water dependent – in different ways and to different degrees. This extends beyond agricultural and horticultural production to broader industries, business and the community. Because of this, it is important to consider the projected impact of future climate changes, to help us plan now for potential increased rainfall uncertainty.

The further in advance we plan, build awareness 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.

Projections of drought conditions for Wentworth and Balranald over the 21st century are assessed across two possible future scenarios using the latest generation of regional climate model ensemble simulations (ESCI and NARCliM1.5). The climate scenarios are based on the IPCC representative concentration pathways (RCPs) and are designed to explore a range of possible futures in terms of greenhouse gas (GHG) emissions, land use and air pollution.

The highest 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 middle-of-the-road 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.

For Wentworth and Balranald Shires, key drought related metrics have been calculated from the regional climate model projections for two scenarios, with data presented below. The analysis is focused on three time periods - present (2020), near-term (2050) and mid-range (2070); with change shown relative to present day climate[3].

3 In order to minimize the impacts of year-to-year natural variability and focus on the climate change signal, each time period is represented by a 20-year average, so 2070 is the mean of 2061 to 2080; for present day climate 2020 is the average of 2001 to 2020. In order to account for uncertainties associated with individual models projections are based on the on the ensemble mean output from three different models.

Yanga Lake, Balranald Shire

Drought climate indicators

Summary:

- A small decreasing trend in rainfall by 2070 is projected for Wentworth and Balranald Shires
- Drought climate indicators show a general increasing trend, largely driven by increasing temperatures
- Other climate and weather-driven events like heatwaves and bushfires / grassfire may be compounded by drought events.

Total annual rainfall gives an indication of the overall water availability, projections for both scenarios show a small overall decreasing trend by 2070, with large multi-decadal variability consistent with historical observations. This small decreasing trend for the Wentworth and Balranald region is not shared with other parts of NSW which will see much larger shifts. However, any decrease in rainfall in a region with an average of only 10 to 12 inches a year, presents challenges.

Consecutive dry days provides an indication of the longest spell each year without any rainfall and can provide an indication of rainfall reliability throughout the year. Projections show an increase in consecutive dry days under both scenarios.

The Keetch-Byram drought index provides an estimate of soil moisture and water availability where 0 indicated no drought, and 10 is the maximum possible drought. Drought index average provides an indication of overall soil moisture deficit, while drought index maximum provides an indication of drought intensity. Projections for both Wentworth and Balranald show a consistent, 10-27 per cent increase in both average and maximum KBDI at 2070 compared to present for both scenarios.

Frequency of hot day (>35°C) and frequency of high fire danger days (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 present day. This will increase the likelihood of compound events such as severe drought occurring in conjunction with heatwaves and bushfires/grassfire.

WENTWORTH	2020	2050		2070	
		RCP4.5	RCP8.5	RCP4.5	RCP8.5
Total precipitation (mm)	254	285 +12%	235 -7%	211 -17%	230 -9%
Consecutive dry days	59	59 +0.6%	61 +3%	66 +12%	67 +14%
Drought index average (0-10)	3.5	3.5 +1.1%	4.4 +26%	4.6 +31%	4.8 +38%
Drought index maximum (0-10)	7	7 +3%	7 +11%	7 +11%	8 +16%
Soil Moisture Index (SMI)	-1.4	-1.3 +8%	-1.5 -7%	-1.8 -33%	-1.9 -41%
Days above 35°C	50	58 +16%	66 +33%	64 +28%	75 +51%
Highest maximum temperature (DegC)	45	46 +1.1C	46 +1.5C	46 +1.5C	47 +2.1C
Days with FFDI above 25	102	101 -0.5%	116 +14%	120 +18%	124 +22%

Drought Related Climate Projections

Table 1 — Projections for drought related climate parameters for Wentworth Shire derived from regional climate model simulations for RCP4.5 and RCP8.5 scenarios. Values are the 20-year average ensemble mean.

BALRANALD	2020	2050		2070	
		RCP4.5	RCP8.5	RCP4.5	RCP8.5
Total precipitation (mm)	276	305$^{+11\%}$	253$^{-8\%}$	231$^{-16\%}$	257$^{-7\%}$
Consecutive dry days	54	57$^{+4\%}$	56$^{+4\%}$	60$^{+11\%}$	59$^{+8\%}$
Drought index average (0-10)	3.2	3.3$^{+3\%}$	3.9$^{+23\%}$	4.2$^{+30\%}$	4.5$^{+41\%}$
Drought index maximum (0-10)	6	7$^{+3\%}$	7$^{+10\%}$	7$^{+11\%}$	7$^{+17\%}$
Soil Moisture Index (SMI)	-1.5	-1.4$^{+7\%}$	-1.6$^{-10\%}$	1.7$^{-17\%}$	-2$^{-37\%}$
Days above 35°C	49	57$^{+17\%}$	65$^{+34\%}$	63$^{+30\%}$	74$^{+52\%}$
Highest maximum temperature (DegC)	45	46$^{+1.1C}$	46$^{+1.5C}$	46$^{+1.5C}$	47$^{+2.2C}$
Days with FFDI above 25	95	95$^{+0.2\%}$	110$^{+15\%}$	113$^{+19\%}$	116$^{+22\%}$

Drought Related Climate Projections

Table 2 — Projections for drought related climate parameters for Balranald Shire derived from regional climate model simulations for RCP4.5 scenario. Values are the 20-year average ensemble mean.

The long-term picture of rainfall for the Wentworth and Balranald region shows that it has been strongly influenced by multi-decadal variability and will continue to be so into the future. Projections indicate an overall small reduction in rainfall compared to the past 70 years. While some individual models are simulating periods in the future with substantially lower rainfall than has been experienced in the past 70 years. This suggests that rainfall deficits of equal or greater magnitude than historical events are likely to occur in the future.

Seasonal rainfall variability over the past 20 years shows that most rainfall has occurred during the Spring and Summer, with less during Autumn and Winter. The largest inter-annual variability is during Summer and Autumn. Projections show a possible increasing trend in summer rainfall with large interannual and multi-decadal variability. Decreasing trends are projected for Autumn, Winter, Spring and total annual rainfall.

This is likely an important consideration for primary producers in the region given the need for rainfall at the right times of the year.

Given the weak trends in rainfall, the increase in drought severity will likely be driven by increased evapotranspiration due to increasing temperatures.

Murray-Darling river confluence, Wentworth Shire

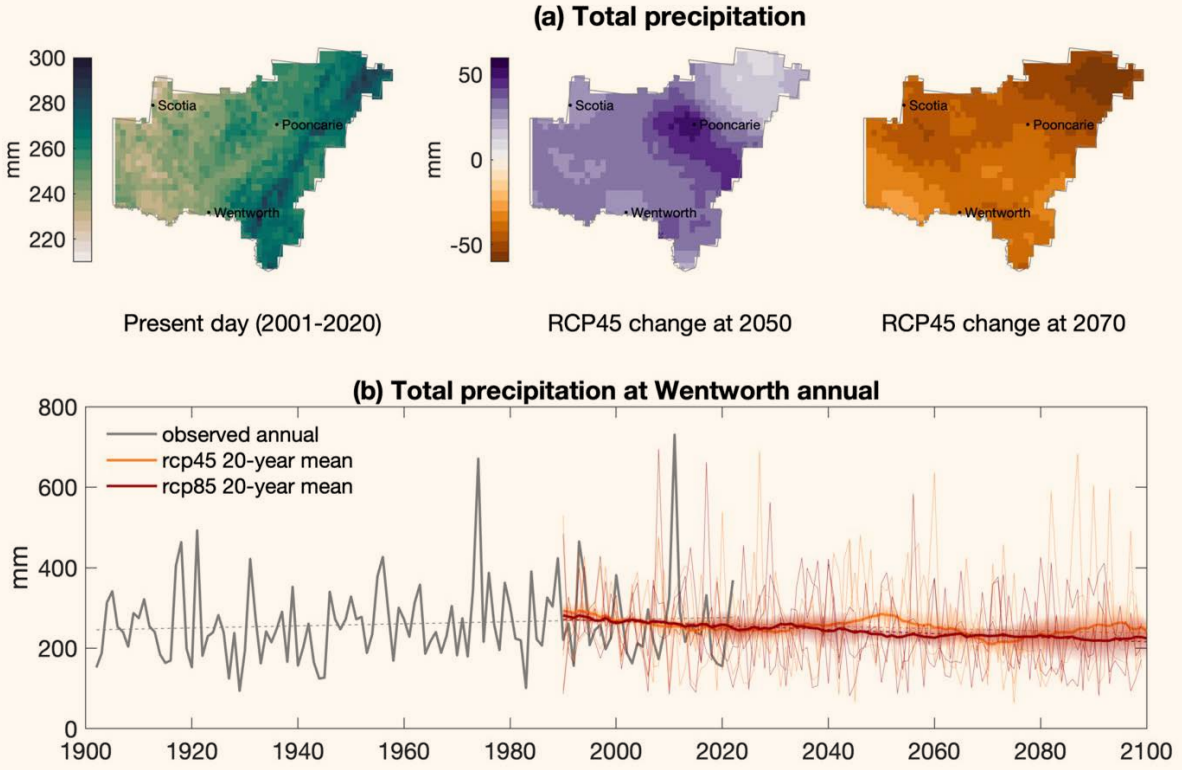


Figure 6 — Historical and projected annual rainfall for Wentworth Shire. Observed values are annual. Future values thin lines show annual output for RC4.5 and RCP8.5 scenarios from each of the 3 ESCI models, bold lines are the 20-year averaged ESCI ensemble mean for each scenario. Shading shows 1 standard deviation of the multi-model mean and is indicative of variability between individual models (Source: Risk Frontiers, 2023)

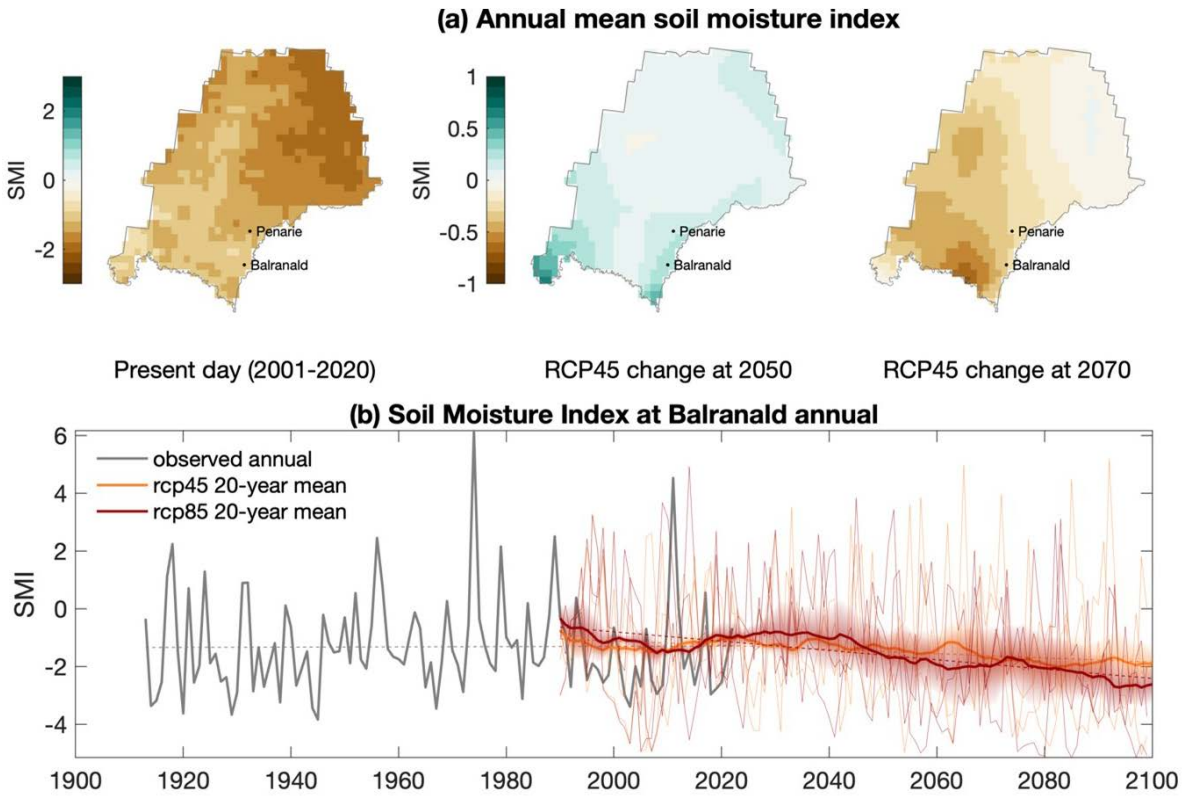


Figure 7 — Historical and projected soil moisture index (SMI) for Balranald Shire. Observed values are annual. Future values thin lines show annual output for RC4.5 and RCP8.5 scenarios from each of the 3 ESCI models, bold lines are the 20-year averaged ESCI ensemble mean for each scenario. Shading shows 1 standard deviation of the multi-model mean and is indicative of variability between individual models (Source: Risk Frontiers, 2023)

What does the climate data tell us?

Wentworth and Balranald Shires 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. Droughts can be protracted events spanning more than 10 years, such as the Millennial drought, or relatively shorter time periods, such as the recent 2017-2019 drought.

Climate projections indicate an increase in drought risk by 2070 and beyond under both RCP4.5 and RCP8.5 scenarios however, they do not indicate a significant change in long term rainfall patterns. Rather, increasing temperatures are likely to be the primary driver of increased frequency and severity of evapotranspiration and drought conditions, especially towards the latter part of this century.

Our resilience to future drought impacts requires early planning and early intervention, which is the focus of this regional drought resilience plan. This will help us stand in good stead to deal with the impacts of a changing climate.

Balranald Discovery Centre Precinct

Trends, stressors and shocks

In addition to climate scenarios, we must also consider the range of other stressors and trends that may amplify drought impacts into the future, beyond the climate. This is an important consideration for our resilience to different conditions, circumstances and scenarios. It is also important in terms of the Councils' governance arrangements and strategic priorities.

Key trends and stressors that may interface with drought resilience in Wentworth and Balranald include:

Economic

- Commodity prices, market volatility and interest rates
- Water pricing and water security
- Fuel prices and transport costs
- Changing and evolving technologies
- Rapid cycles between flood and drought
- Impacts of road quality on market access.

Social & Community

- Distance to access services and service availability (including health and allied health)
- Reduced spending in local centres
- Population changes (i.e. ageing population and retention of young people)
- Housing affordability and availability
- Rising costs of living
- Growing urbanisation.

Environmental

- Water management within the Murray-Darling Basin
- Decreases to water quality
- Increasing pest impacts
- Widespread invasive species
- Land use conflicts.

Yanga National Park, Balranald Shire

Resilience to drought is therefore not just about water and stretches beyond the farm gate in terms of the systems at play which influence social, economic and environmental pressures and outcomes. This however does not take away from the fact that on-farm impacts and impacts for producers, their businesses and their families is the most harshly felt.

Planning for our drought resilience, in the specific context of Wentworth and Balranald Shires, requires a holistic and inclusive approach. This recognises and respects that different groups have different needs and aspirations when it comes to drought resilience, and that we all operate in different parts of the same systems.

Measuring our drought resilience

Drought resilience can be considered against three macro indicators[4]:

- Economic resilience
- Environmental resilience
- Social resilience.

The Australian Bureau of Agricultural and Resource Economics and Sciences' (ABARES) Community Vulnerability and Resilience to Drought Index is the first stage of a comprehensive body of work to measure the potential impact of drought on communities.

ABARES has prepared a national index that ranks remote, rural or regional agriculturally dependent communities (at the Local Government Area (LGA) level) according to their potential to be adversely affected by drought. These indicators account for both agriculture industry exposure and sensitivity and community sensitivity, using ABS Census of Population and Housing 2021 data to represent the level of community dependence on agriculture.[5]

The figures below are averaged figures for the region, and it is important to note that the 'economic diversity' indicators includes the broad range of agricultural and horticultural industries in the region, from open rangeland grazing to high intensity irrigated cropping, as well as non-agricultural economic activity.

Averaged ABARES CVRDI scores for Wentworth and Balranald Shires
(measured from 0 [lowest] to 1 [highest])

Farm sensitivity	Community sensitivity	Economic diversity	Potential drought impact
0.29	0.38	0.34	0.45

4 Commonwealth Government, 2021, 'Future Drought Fund: Regional Drought Resilience Planning Program', Available at https://www.agriculture.gov.au/agriculture-land/farm-food-drought/drought/future-drought-fund/regional-drought-resilience-planning#daff-page-main
5 ABARES, 2022, 'Community Vulnerability and Resilience to Drought Index – Stage 1', Available at https://www.agriculture.gov.au/abares/research-topics/climate/drought/resilience#community-vulnerability-and-resilience-to-drought-index-cvrdi_2

Mungo National Park

The ABARES CVRDI scores indicate for the Wentworth and Balranald region:

- A lesser level of farm-based exposure and sensitivity to drought
- A moderate level of community dependence on agricultural activity in terms of employment
- A low to moderate level of economic diversity
- A moderate level of overall potential drought impact.

The above is somewhat reflected by the region's gross regional product figures during the 2017 to 2019 drought period, which was less impacted by drought compared with other regions of NSW. Future additions to the ABARES CVRDI framework will provide more granular detail to help measure vulnerability and resilience to drought at the local level.

The Australian Disaster Resilience Index, developed by for the former Bushfire and Natural Hazards Cooperative Research Centre, now Natural Hazards Research Australia, considers broad measures of community coping capacity and adaptive capacity. It identifies the region's resilience strengths to include its social character, community capital and community and social engagement.

Whilst the region is susceptible to future drought impact, its diverse opportunities can improve capacity to manage and mitigate risks. The region's 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.

Importantly, the Wentworth and Balranald regional drought resilience plan identifies that needs and outcomes are different across geographical parts of the region and for primary producer, business groups and communities.

Drought resilience action plan

The drought resilience action plan for Wentworth and Balranald Shires incorporates:

- Priorities for drought resilience across the following:
  - Systems and sectors
  - Level of intervention
- Discernible and pragmatic actions that:
  - Are drawn from science, research as well as local knowledge insights
  - Provide the basis for anticipating, acting and advocating for drought resilience needs across contexts
  - An architecture which supports different stakeholders to identify priority actions either for individual or collective interest.

Many of the actions included were identified directly by community members as part of the engagement and consultation process to inform this plan.

A program logic approach was used to match the drought resilience needs illuminated by the consultation and engagement feedback with pragmatic actions, and the degree to which the actions contribute to our movement along the resilience 'theory of change' journey. This is about whether the actions 'absorb, adapt or transform' how we collectively prepare for and grow our resilience to drought effects. More detailed information on this process is included in the separate Resilience Assessment document.

This scale also helps us to understand the level of effort and the timeframes associated with each action.

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

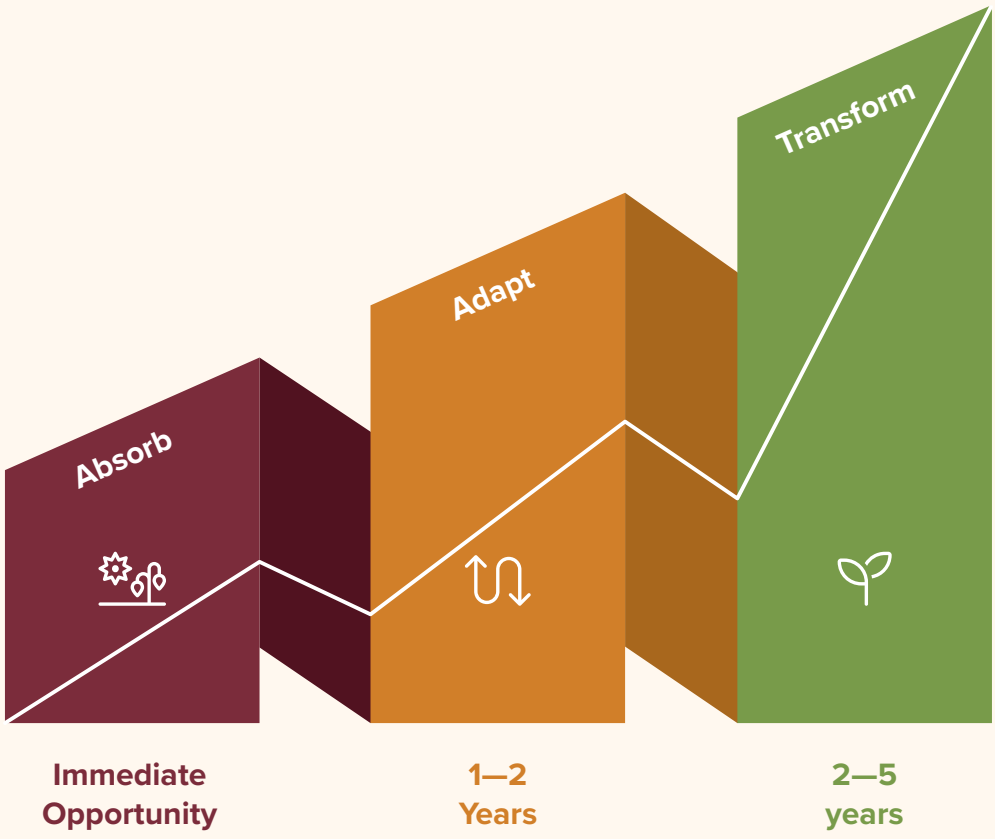


Figure 8 — Resilience 'theory of change' intervention pathways and implementation timeframes

Taking proactive action

There are many different approaches and opportunities that can contribute to enhanced drought resilience, both in the short and long term. Part of this is on-farm and part of it is off-farm.

What can work well from an on-farm perspective:

- Investing in farm maintenance and improvements during the good times
- Farm management deposits (FMDs)
- Diversified investments (off-farm) or in other geographies
- Multiple on-property income streams
- Increased financial literacy, looking holistically across operations
- Informed decisions on actions and trigger points to de-stock, buying fodder when cheap, investing in fodder storage, etc.
- Agility in business as cycles become more rapid
- Strong asset base to enable entry to market
- Sustainable land management practices
- Having a farm plan in place.

What can work well off-farm, from a broader regional perspective:

- Capitalising on diversified economic development opportunities
- Incentivising value-add industries
- Investment in the sealed road network to support economic activity across industries
- A focus on water quality and water management for the Murray-Darling Basin across all levels of government
- Local government providing advocacy and day-to-day support to enhance resilience that recognises the different needs of different parts of the community
- A focus on maintaining community connections and participation, a key strategy for managing mental health
- Continuing to support the region's Landcare groups, as well as community, industry and sporting groups.

The power of connection

The key to enhanced drought resilience across Wentworth and Balranald Shires is 'connection'. Community, economic and environmental connectivity drives our capabilities to prepare for, withstand and recover from drought. The power of connection underpins out strategic drought resilience pathways.

Drought resilience pathways and actions

This drought resilience action plan establishes a framework to guide focus and efforts in response to community need, highlighted by community engagement.

The action plan spans six strategic pathways around different systems, each of which reflect different attributes of 'connectivity' as it applies to drought resilience for Wentworth and Balranald Shires. These strategic pathways include:

- Pathway 1 – Economic connectivity
- Pathway 2 – Community capacity and connectivity
- Pathway 3 – Environmental connectivity
- Pathway 4 – Roads and transport connectivity
- Pathway 5 – Knowledge and capacity connectivity
- Pathway 6 – Governance capacity and delivery.

These strategic pathways and their associated priorities provide a suite of actions which in combination, provide implementable activities to drive toward enhanced drought resilience.

Priority activities

Key priority areas identified by this regional drought resilience plan to support economic and community development opportunities include:

- Investment in dedicated resourcing to advance the actions of this plan
- Continued support for:
  - community events
  - community health and wellbeing opportunities
  - information sharing networks
- Regional road network strategy to leverage diverse economic development opportunities
- Working alongside community groups to develop community plans and identify community facility upgrade and enhancement needs
- Development of value capture (benefits policies) to ensure community benefit from large-scale projects in each LGA

Murrumbidgee River, Balranald Shire

Pathway 1 – Economic connectivity

The region's economic resilience to drought underpins almost all other activity.

Community consultation has identified that financial literacy and business planning for both on-farm and in-town businesses is critical to being able to anticipate changing circumstances driven by drought, and the ability to act to avoid or prevent drought impacts.

Off-farm, the region boasts many economic development opportunities which over time, will offer varied income and productivity opportunities.

As an agriculturally-based economy, there is benefit in advancing:

- Financial literacy and business planning
- Regional economic diversification (tourism, mining and energy)
- Community value capture from mining and energy projects
- Telecommunications and data infrastructure innovation.

DROUGHT RESILIENCE PRIORITY	SPECIFIC ACTIONS	ACTION LEAD(S)	INTERVENTION AND IMPLEMENTATION PATHWAYS	FUNDING OPTIONS
Support financial literacy and business planning	1.1 Monitor the delivery of business and farm-based succession planning 1.2 Monitor the delivery of stronger business planning and enterprise risk management 1.3 Promote access to drought preparedness tools and resources (i.e. Rural Financial Counselling Services, DroughtHub, etc.) to prepare a property / business-based drought plan which sets clear triggers for decision-making 1.4 Support First Nations economic enterprise, including infrastructure servicing	Business and industry (supported by Wentworth and Balranald Shire Councils)	Absorb (immediate) for Preparedness	Adapt into business as usual functions
Foster economic diversification in tourism, mining and energy	1.5 Leverage from the new Lightstate project to diversify and establish new tourism offerings 1.6 Scope the potential for a dedicated space in the new Wentworth Shire Council building to celebrate the confluence of the Murray-Darling system as an additional tourism opportunity 1.7 Work with local service providers to continue to support for local buy requirements as part of Council procurement processes and grow local capability 1.8 Identify South West REZ and Transgrid interconnector opportunities through value-added industries	Wentworth and Balranald Shire Councils	Transform (2-5 years) for Preparedness	Combination – business as usual functions supported by external funding and grant programs
Facilitate community value capture from mining and energy	1.9 Develop a renewable energy and mining benefit policy in each local government to compensate adverse social and economic impacts and support betterment of community 1.10 Facilitate pathways to upskill and use local resident workforces for new mining and renewable energy activities	Wentworth and Balranald Shire Councils	Transform (2-5 years) for Preparedness	NSW Government funding and grant programs
Enhance telecommunications and data infrastructure innovation	1.11 Develop a strategy to drive 'no-regrets' investment opportunities through a rapidly changing telecommunications and technology environment to expand coverage and network access across the region 1.12 Maintain UHF networks and assets to provide telecommunications redundancy	Wentworth and Balranald Shire Councils	Adapt (1-2 years) for Preparedness	Australian Government: Regional Australia – Regional and Community Programs

Broader drought resilience opportunities include:

- Advocate for the roll-out of the Farms for the Future pilots (funded until 2025)
- Work with the State government to advance Aboriginal business development and closing the gap on Aboriginal unemployment in the region
- Continue to implement 'spend local' programs to support businesses in town, and support from residents to spend money locally
- For on-property resilience for graziers, consider splitting up water ports to reduce the distance for stock to walk, reducing impact on groundcover
- For growers, consider pulling out dry patches to reduce investment in poor health crops, and re-plant when drought breaks
- Support circular economy (water minimisation) opportunities on-farm

Pathway 2 – Community capacity and connectivity

A key drought resilience opportunity for the Councils is a strategy to secure funding for community events of all scales and types, for different demographic cohorts and communities across the region to drive community connection and support during drought.

This was one of the clearest priorities identified by community through the plan engagement process, recognising that community connection, participation and identity are already strong resilience attributes of the region that need to be maintained and fostered.

Existing funding tends to be ad hoc and opportunistic in nature, but pre-planning for opportunities to utilise funding for this purpose is likely to meet a clear need in times when connection is even more valuable.

This pathway seeks to focus on community connectedness as a routine activity so as to support social and community fabric and morale during drought times through meaningful opportunities to boost sense of self. Having a plan in place to guide options, with flexibility to take advantage of emerging ideas and opportunities is key.

Community connection can continue to be fostered through:

- Community events
- Sustainable community and sporting groups
- Rural leadership
- Strengths-based support networks
- Mental health delivery programs.

DROUGHT RESILIENCE PRIORITY	SPECIFIC ACTIONS	ACTION LEAD(S)	INTERVENTION AND IMPLEMENTATION PATHWAYS	FUNDING OPTIONS
Investment in community events	2.1 Develop and deliver a program to support community events and field days across the region 2.2 Explore community recreation opportunities, including facility upgrades and activities 2.3 Host and link to existing art and photography exhibits and competitions to share drought messages and provide a creative outlet, also invigorating tourism and opening conversations	Wentworth and Balranald Shire Councils	Absorb (immediate) for Preparedness, Response and Recovery	Combination – business as usual functions supported by external funding and grant programs
Support sustainable community and sporting groups	2.4 During drought, support children being involved in and getting to and from sport training and matches. 2.5 In partnership with community, identify and deliver community facility upgrades and enhancements across the region including fridges, kitchen and toilet upgrades for community halls, water tanks, playgrounds, etc. 2.6 Support young people to engage with community groups	Wentworth and Balranald Shire Councils (supported by community groups)	Absorb (immediate) for Preparedness, Response and Recovery	State, Commonwealth and community grants funding
Harness rural leadership	2.7 Continue to roll out resilience programs in local schools 2.8 Link to existing youth ambassador program and options to enhance youth retention in-region through diversified work and social opportunities, and support frameworks during drought that recognise the different impacts of drought on youth on farms as well as youth in town 2.9 Include multi-cultural groups in drought programs	Local schools network and youth groups (supported by Wentworth and Balranald Shire Councils)	Adapt (1-2 years) for Preparedness, Response and Recovery	State and community grants funding
Mobilise strengths-based support networks	2.10 Support continued delivery of mental health first aid training across diverse sectors of the community 2.11 Ageing in place options / transition off the land but remaining in community	Service providers	Adapt (1-2 years) for Prevention, Preparedness, Response and Recovery	NSW Government funding and grant programs
Coordinate mental health delivery programs	2.12 Seek out opportunities and work in partnership to enhance access to services locally 2.13 Support and advocate for delivery of different styles of mental health support that cater for different cohorts and needs of the community (identify and tailor to needs of different people)	Service providers	Absorb (immediate) for Prevention, Preparedness, Response and Recovery	NSW Government funding and grant programs

Broader drought resilience opportunities include:

- Working with the regional emergency management officer on rural addressing
- Working with public services agencies to encourage workers relocating to the region to get involved with community groups and sports

Pathway 3 – Environmental connectivity

The health of the landscape and waterways supports our economic and community wellbeing.

Groundcover, retaining soil moisture in the landscape, and top soil retention are clear drought impact reduction pursuits, helping to mitigate erosion, protect soil health and prevent other events like dust storms. Pest and weed management offer further opportunities to stem landscape degradation.

Local industries and communities are exposed to potentially significant impacts depending on rainfall and how water is used and managed upstream, and within the Shires. Councils provide strong regional leadership for advocacy and this role remains an important ongoing responsibility for Wentworth and Balranald Shire Councils.

For improved environmental connectivity, there is benefit in advancing:

- On-farm management programs
- Pest and weed management (biosecurity)
- Water management
- Biodiversity conservation and landscape management.

DROUGHT RESILIENCE PRIORITY	SPECIFIC ACTIONS	ACTION LEAD(S)	INTERVENTION AND IMPLEMENTATION PATHWAYS	FUNDING OPTIONS
On-farm management programs	3.1 Investment in property-based desalination plants, development of on-property indicators of dryness that are locally relevant to inform business strategy, soil moisture monitoring and fodder storage	Industry	Adapt (1-2 years) for Preparedness and Response	Combination – business as usual functions supported by external funding and grant programs
Pest and weed management (biosecurity)	3.2 Working across government to support pasture management fencing / dam fencing 3.3 Work with Local Lands Services (LLS), Department of Primary Industries and Landcare groups to invest in pest and weed management on private lands during drought to supplement on-property incomes and improve environmental outcomes	Landcare groups	Transform (2-5 years) for Prevention and Preparedness	State and Commonwealth grants funding
Advocate and influence water management policies and plans	3.4 Continue to advocate for water connectivity across all river systems, including cultural water 3.5 Work with water regulators to minimise occurrence of blue green algae outbreaks	Wentworth and Balranald Shire Councils	Absorb (immediate) for Prevention, Preparedness and Response	Combination – business as usual functions supported by external funding and grant programs
Biodiversity conservation and landscape management	3.6 Advocate for broad-scale, long-term catchment management and better integration of land use and water management to achieve multiple objectives including water quality 3.7 Investigate biodiversity offset information to enable landholders to consider and factor in to property management	Wentworth and Balranald Shire Councils (supported by Government agencies)	Adapt (1-2 years) for Prevention, Preparedness and Response	Combination – business as usual functions supported by external funding and grant programs

Broader drought resilience opportunities include:

- Consider smaller feedlots, smaller fenced areas to readily cater for de-stocking. Maintaining an astuteness to and maintaining ground cover conditions
- Investigate installation of drought resilience plants and tree planting programs which generate shade during drought times
- Participate in Local Land Service and Southern NSW Drought Resilience and Innovation Hub tactical workshops
- Invest in water tanks, including in townships — building on the Balranald ‘Secure and Safe Domestic Water Supply’ report dated 2021 and potential expansion to or application to Wentworth Shire
- Link to One Basin Cooperative Research Centre (CRC) and Mallee Regional Innovation Centre in Victoria to promote cross-border opportunities for collaboration, particularly for the horticultural industry
- Advocate for more fine-tuned weather observation networks for drought management, and provision of information that supports modelling
- Investigate through partnerships a program that incentivises landholders to undertake sustainable land management practices, offering an additional source of on-farm revenue linked to biodiversity outcomes
- Support First Nations cultural land management practices and access to cultural water

Pathway 4 – Roads and transport connectivity

Roads and transport networks are vital to the region's economic development. All-weather roads support economic diversification needs, as well as enhancement of community safety, animal welfare and improved drought response.

Over 27,000 visitors per year travel to Mungo National Park, along with thousands of other drive-tourists and passers-through, traversing unsealed roads and often unaware of road conditions. These unsealed road conditions also impact the region's agricultural and horticultural sectors, often resulting in inability to transport fodder in, or product out, and this is true in both dry and wet periods as trucks become easily bogged in both mud and bulldust. This cascades into rising transport costs which are unsustainable, particularly during drought periods.

Greater road and transport connectivity will aid drought resilience through:

- All weather road access
- Multi-modal options for economic development.

DROUGHT RESILIENCE PRIORITY	SPECIFIC ACTIONS	ACTION LEAD(S)	INTERVENTION AND IMPLEMENTATION PATHWAYS	FUNDING OPTIONS
Invest in regional road upgrades (including sealing) for tourism, mining and flood resilience and drought response	4.1 Undertake an audit of the region's road network with consideration in relation to suitability for existing and emerging industries, economic need (i.e. for stock and product movement, supply chains, etc.), and resilience needs, confirming hazards, risks and benefits 4.2 Prepare a business case for upgrades to priority roads based upon the audit 4.3 Identify and implement a roadside bores program to assist with road construction and maintenance before and during drought, ensuring water availability	Wentworth and Balranald Shire Councils	Transform (2-5 years) for Prevention, Preparedness, Response and Recovery	State and Commonwealth grants funding
Multi-modal options for economic development	4.4 Enhance roadside vegetation management for road and rail before, during and after drought to better manage weed dispersion and risk of fire to precious available fodder 4.5 Undertake a study to examine the potential for rail freight options as a supply chain alternative, which may be particularly bolstered by value-add industries from agriculture, mining, tourism and renewables	Government agencies	Transform (2-5 years) for Prevention, Preparedness, Response and Recovery	State and Commonwealth grants funding

Pathway 5 – Knowledge and capacity connectivity

Access to information is another clear priority of the community, expressed through the consultation process that informed this plan. Enabling access to more data is a key opportunity to allow triggers for timely and informed decision-making (for example, to de-stock early rather than later).

At a strategic level, loss of local knowledge over time is occurring as long-term residents leave the region for various reasons. It is important to harness opportunities to capture and record valuable local knowledge, providing insights into past events, successes and ordeals. This knowledge can help inform how we process information in the present day.

Knowledge and capacity can be grown through:

- Local knowledge capture, retention and sharing
- Access to information to inform decision-making.

DROUGHT RESILIENCE PRIORITY	SPECIFIC ACTIONS	ACTION LEAD(S)	INTERVENTION AND IMPLEMENTATION PATHWAYS	FUNDING OPTIONS
Local knowledge capture, retention and sharing	5.1 Capture local knowledge of the land, landscape and its climate and weather interactions in innovative ways as a tool for local knowledge retention over time as well as a tool to communicate the landscape's functions 5.2 Record local history over time using a variety of means including storytelling by local knowledge holders	Community groups (supported by Wentworth and Balranald Shire Councils)	Absorb (immediate) for Preparedness	State, Commonwealth and community grants funding
Access to information to better inform decision-making	5.3 Leverage Department of Primary Industries Climate Vulnerability Assessment data prepared for 28 commodities and 14 biosecurity risks, by industry to support and further enhance commodity and industry-based drought resilience 5.4 Using the Department of Regional NSW's 'Drought Signals' dashboard, publish / share critical dry condition triggers 5.5 Use Council social media platforms to post and share important information, contacts, events and information that may assist sectors of the community 5.6 Check with end users to ensure information is accessed and used 5.7 Undertake climate adaptation planning, potentially as part of local government disaster adaptation plans	Wentworth and Balranald Shire Councils	Absorb (immediate) for Preparedness and Response	Combination – business as usual functions supported by external funding and grant programs

Broader drought resilience opportunities include:

- Undertake community upskilling programs for computer literacy
- Share messaging and information about the potential effects (i.e. asthma) of dust storms when forecasts indicate elevated potential
- Lead by example and encourage sensitive reporting by media
- Facilitate opportunities for education and training using Bureau of Meteorology products
- Advocate for the simplification of grants and subsidies application processes
- Support Council customer services teams to have access to drought relief and support information to direct any enquiries relating to drought assistance
- Continue to support community group skills development in relation to grant writing

Pathway 6 – Governance capacity and delivery

Across all sectors of the community and industries within the region, sustained support for grass-roots drought resilience, capacity building and advocacy is needed. A range of actions exist which require coordinated effort. These actions provide a work plan for dedicated implementation resourcing.

Embedding drought resilience considerations across all aspects of Council's integrated planning and reporting framework sets in place the opportunity for focus of service delivery which has regard to the cyclical nature of dry and wet periods, which are commonplace for Wentworth and Balranald Shires.

To bolster governance capacity and delivery, there is benefit in advancing:

- Community-led resilience support
- Embedding drought resilience across Councils' integrated planning and reporting frameworks.

DROUGHT RESILIENCE PRIORITY	SPECIFIC ACTIONS	ACTION LEAD(S)	INTERVENTION AND IMPLEMENTATION PATHWAYS	FUNDING OPTIONS
Invest in a dedicated resource to coordinate resilience efforts (across hazards and across community) and seek funding for plan implementation	6.1 Explore partnerships through regional approaches, including cross-river collaboration with Mildura, including via the Mallee Regional Innovation Centre 6.2 Establish a farming community of practice to share knowledge and insights 6.3 Research and scope a rural leadership program and seek funding 6.4 Undertake ongoing work in exploring the specific resilience needs of different agricultural and horticultural groups across the region (i.e. dryland farming, irrigated farming, floodplain grazing, youth, the aged and Indigenous peoples) 6.5 Preparation of community plans for the localities of each Shire, where they do not currently exist. This should include contacts for local support services and actions to enhance broader community wellbeing. These plans will assist local capacity building and community participation within each community- 6.6 Provide 'how to' workshops and support to enable landholders to consider new accommodation options (like farm stays and glamping) 6.7 Build volunteerism base, as a key attribute of strong mental health and connected communities by matching skills and interests with tasks	Wentworth and Balranald Shire Councils	Absorb (immediate) for Prevention, Preparedness, Response and Recovery	State and Commonwealth grants funding
Embed drought resilience considerations across Council's integrated planning and reporting framework	6.8 Invest in Council workforce capacity building 6.9 Work across government to better integrate future strategic land use and water planning to consider water resources upfront in future land use planning processes. This action would also consider projected population and industry growth trends and identify water-related gaps in the current land use planning framework 6.10 Strategically plan for satellite accessibility to Mildura, supporting the region's growing population. Ensure planning achieves strategic balance between retention of quality agricultural land and land required for residential subdivision, commercial activity and renewables 6.11 Continue to build local emergency management officer capabilities, and publish or share local emergency management arrangements 6.12 Continue to build capability and knowledge to improve disaster recovery funding arrangements 6.13 Invest time and resources in de-briefing, understanding lessons learnt and building continuous improvement 6.14 Integrate triggers for Council actions from this plan into Council's annual plans	Wentworth and Balranald Shire Councils	Adapt (1-2 years) for Prevention and Preparedness	Adapt into business as usual functions

Broader drought resilience opportunities include:

- Advocate for more consistent government funding streams and cycles for drought assistance
- Invest in more resources in the water and land management space locally
- Prepare for flood, heatwave, bush fire and other hazards, to build resilience across event cycles which further bolsters drought resilience and limit potential for overlapping recovery
- Invest in multi-purpose spaces within Council buildings to provide heat relief during heatwaves and support drought preparedness and relief through providing community groups and service providers with space to use free of charge

Implementation

The Wentworth and Balranald regional drought resilience plan relies on collaborative implementation approaches.

The action plan for drought resilience spans the PPRR cycle, providing the framework to embed implementation across the different functions of local government, as well as a guide to other stakeholders (including other levels of government, community and industry groups, service providers, not-for-profits, primary producers and local communities) with actions that can make a difference. This includes short, medium and long term opportunities.

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.

This group will operate using a status system tied to the PPRR framework to transition priorities in lock-step with the transition of drought cycles. The PPRR status system is to be triggered by drought indicators. 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 Regional NSW.

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 'prevention' and likewise when drought conditions are declared, the actions for 'response' become an area of focus. 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.

Both Councils will co-chair the PCG.

A PCG Terms of Reference is to be prepared for its membership to guide its function. 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 PPRR 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 Wentworth and Balranald Regional Drought Resilience Plan against the above framework. These key evaluation questions may help to structure annual tracking and reporting.

Effectiveness and outcomes:

- 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?
- Have any barriers or challenges been identified throughout the implementation of plan, and what solutions to address these have been identified?

Drought resilience maturation:

- To what extent has efforts in implementing the plan contributed to:
  - Creating stronger connectedness and greater social capital within our communities, contributing to well-being and security?
  - Empowering our communities and businesses to implement activities that improve their resilience to drought?
  - 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?

Ongoing stakeholder engagement:

- 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 Wentworth and Balranald 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.

Wentworth township and Murray-Darling confluence

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
Social and community	Community connection and wellbeing is maintained
Economy	Reduced decline of gross regional product relative to: › Non-drought periods › Previous drought periods › Other regions in NSW, Victoria and South Australia
Environment	Environmental degradation of landscapes and waterways is reduced throughout and emerging from drought
Governance	Drought resilience priorities are embedded across 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 Wentworth and Balranald 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.

Balranald Art Gallery

Appendix A

Historical drought climate data (pre-2017)

Some of the most impactful droughts in Australia history have affected Wentworth and Balranald Shire. These include:

- 1895 to 1902 Federation drought
- 1914 to 1915 drought
- 1937 to 1945 World War II drought
- 1965 to 1968 drought
- 1982 to 1983 drought
- 1997 to 2009 Millennium drought
- 2017 to 2019 drought

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

1895 to 1902 Federation drought

The six years leading up to Federation, in January 1901, saw intermittent dry spells over most of Australia, particularly in 1897 and 1899. The "Federation" drought reached its peak in 1901 and 1902, with very dry weather setting in across eastern Australia by spring 1901. The following figure shows rainfall percentiles for 1902 relative to 1991-2020. For much of Wentworth and Balranald rainfall was in the lowest ~10% range, and for most of the Murray-Darling Basin rainfall was close to the lowest on record.

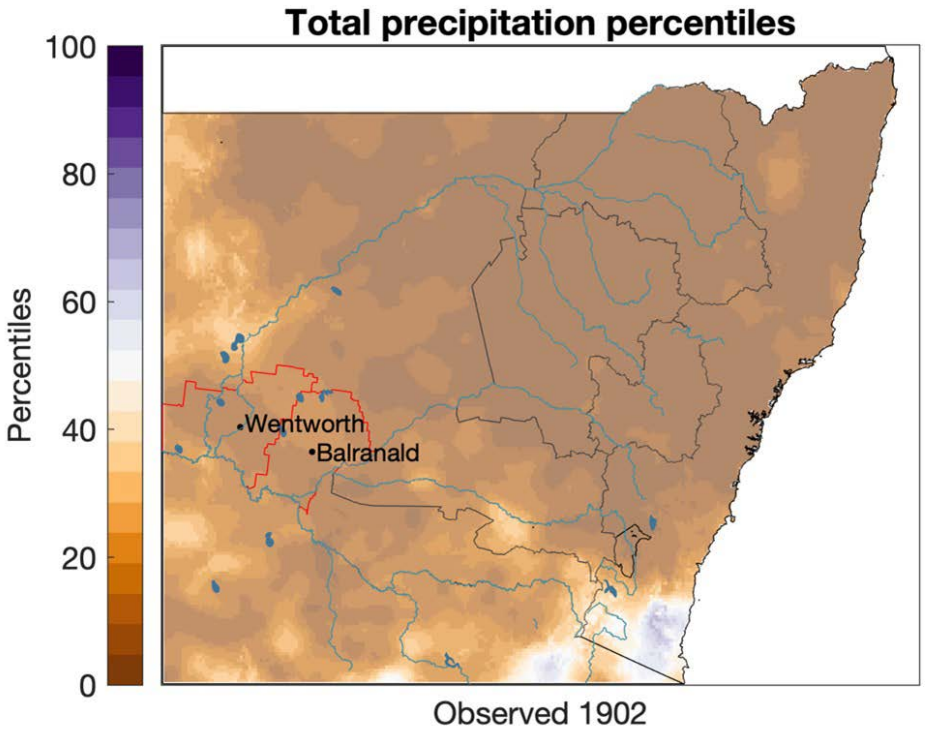


Figure 9 — Total annual rainfall percentiles for 1902 (relative to 1991-2020) from AWRA for Wentworth, Balranald and the Murray-Darling Basin. Soil moisture data are not available prior to 1911.

1914 to 1915 drought

The 1914 to 1915 drought, although of relatively short duration, affected the whole nation and was one of the most memorable, primarily due to the failure of the national wheat crop, with the rare occurrence of severe drought conditions occurring simultaneously in south-eastern and south-western Australia. Drought became widespread and severe between July and October 1914. For Wentworth and Balranald Shires, rainfall and soil moisture percentiles were in the lowest ~10-25% range (Figure 10), with dry conditions throughout the Murray-Darling Basin.

1937 to 1945 World War II drought

Dry conditions occurred frequently from 1937 to 1945 over eastern Australia. Compared with the Federation and Millennium droughts, the World War II drought had more respites. However, it also had more periods of intense dryness. For Wentworth and Balranald Shires, rainfall and soil moisture percentiles averaged over this 8-year period were in the lowest ~30% range (Figure 11).

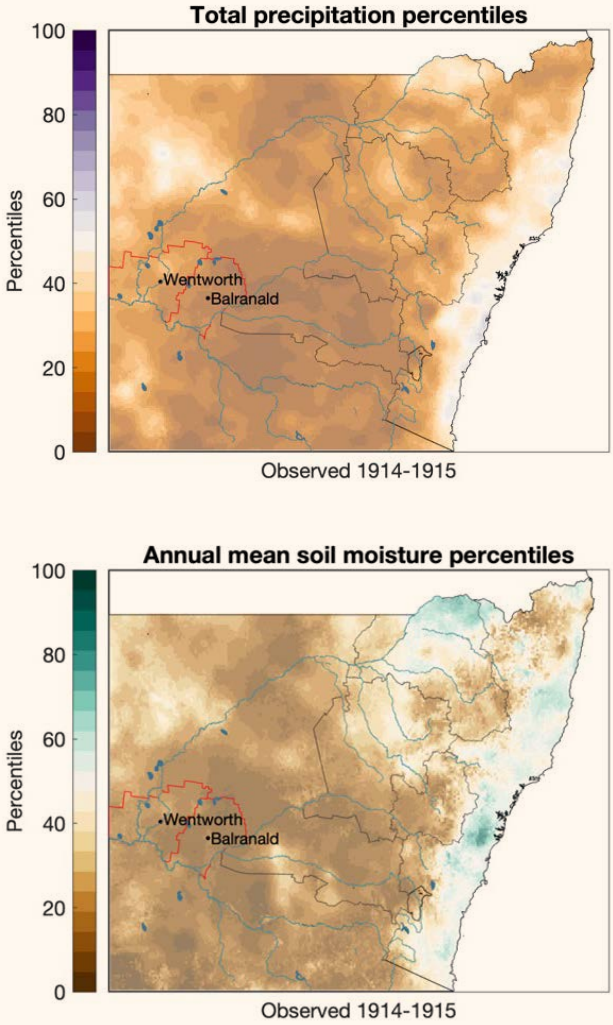


Figure 10 — Total annual rainfall and soil moisture percentiles for 1914 to 1915 (relative to 1991-2020) from AWRA for Wentworth, Balranald and the Murray-Darling Basin.

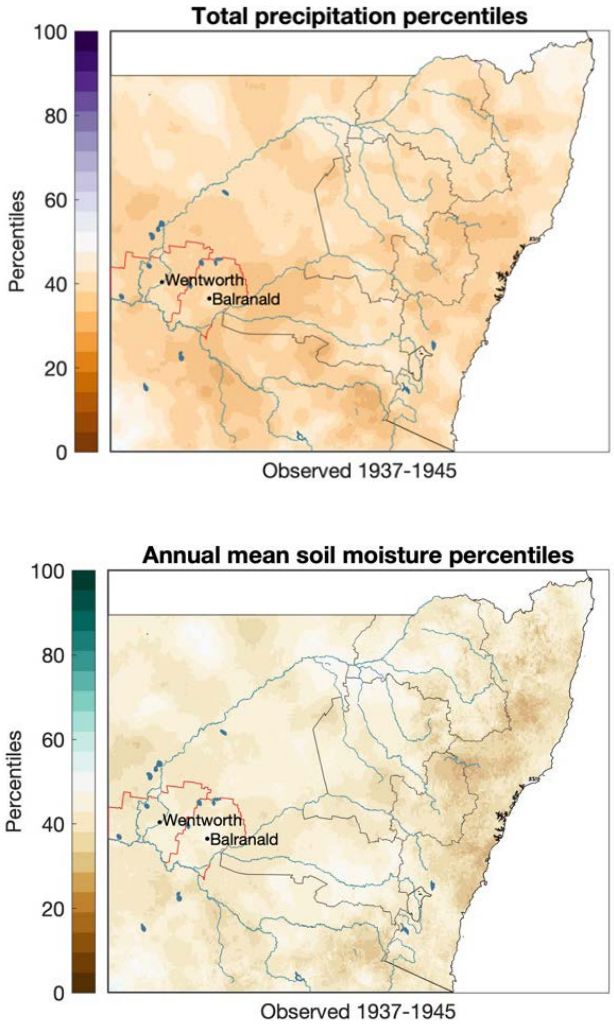


Figure 11 — Total annual rainfall and soil moisture percentiles for 1937 to 1945 (relative to 1991-2020) from AWRA for Wentworth, Balranald and the Murray-Darling Basin.

1965 to 1968 drought

The decade from 1957 was generally dry, and comparable with the 1895-1903 and 1937-1945 droughts in area and severity. Large areas of central Australia and, to a lesser extent, northern Australia, were affected between 1957 and 1964. However, Eastern Australia suffered less up to 1964, but was greatly affected from 1965 to 1968. For Wentworth and Balranald Shires, rainfall and soil moisture percentiles averaged over this 3-year period were in the lowest ~30-40% range. Over this period Wentworth and Balranald Shires appear to have experienced less severe drought conditions than LGAs further south.

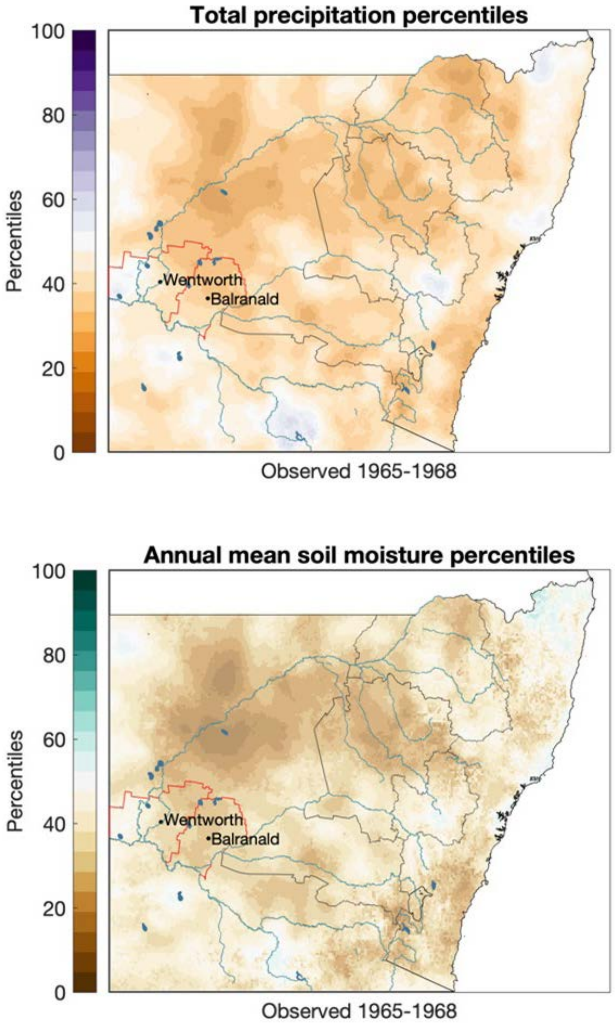


Figure 12 — Total annual rainfall and soil moisture percentiles for 1965 to 1968 (relative to 1991-2020) from AWRA for Wentworth, Balranald and the Murray-Darling Basin.

1982 to 1983 drought

In many respects the drought of 1982-83, across eastern Australia, was regarded as a major national disaster, with some observers calling it the worst in the southern and eastern parts of the country in more than a hundred years. Very dry conditions persisted through spring 1982 over eastern Australia, except in coastal areas of northern NSW. Only north-eastern NSW and south-eastern Queensland truly escaped the drought. The lowest point was reached in February 1983, when bushfires occurred in Tasmania and then Victoria and South Australia.

For Wentworth and Balranald Shires, rainfall and soil moisture percentiles averaged over this 2-year period were in the lowest ~10-25% range).

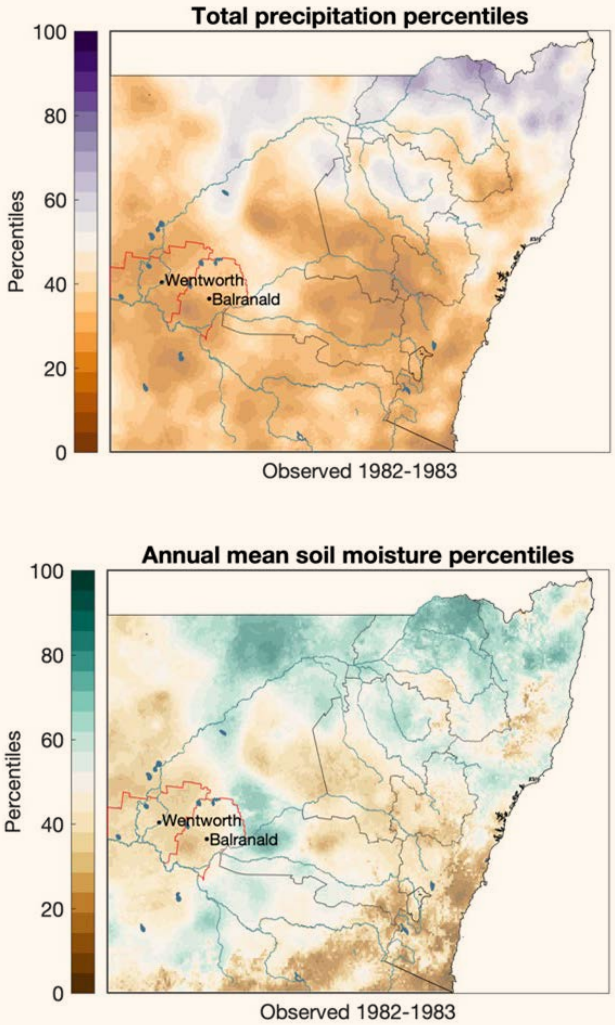


Figure 13 — Total annual rainfall and soil moisture percentiles for 1982 to 1983 (relative to 1991-2020) from AWRA for Wentworth, Balranald and the Murray-Darling Basin.

1997 to 2009 – Millennium drought

The Millennium drought was essentially a cool-season drought in southern mainland Australia, with conditions particularly severe in the densely populated south-east and south-west. A feature of the drought was a prolonged period of dryness, with no major wet episodes. While 2002 and 2006 were the only years which were severely dry over large areas, there were very few periods of sustained above-average rainfall. The early stages of the drought were largely confined to Victoria and Tasmania, but from 2001 onwards it extended to most remaining areas of eastern Australia south of the tropics, as well as to the south-west. All capital cities except Darwin were affected by persistent, or periodic, drought episodes.

For Wentworth and Balranald Shires, the Millennium drought was particularly severe, with rainfall and soil moisture percentiles during the peak of the drought in 2002-2003 in the lower ~20% range.

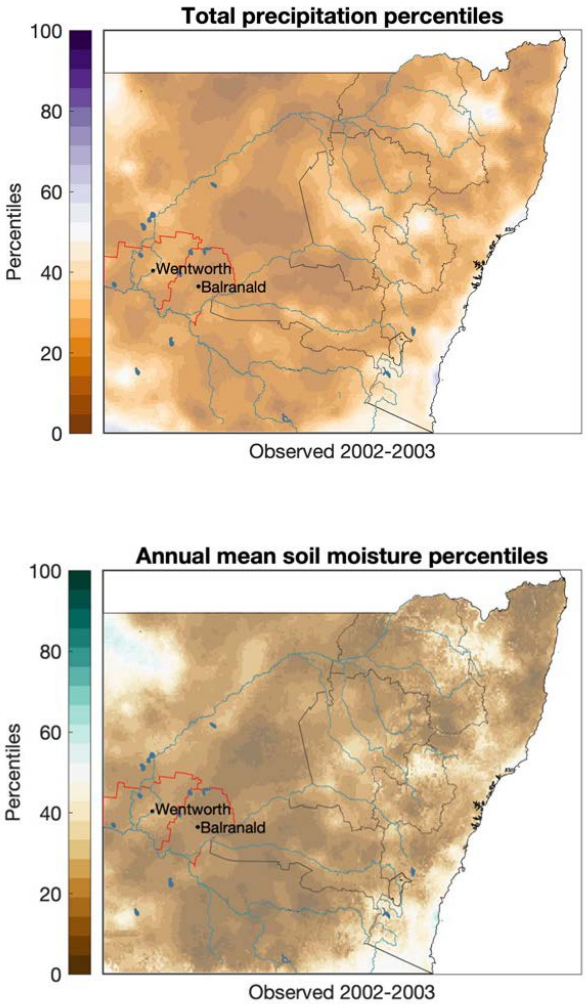


Figure 14 — Total annual rainfall and soil moisture percentiles for 2002 to 2003 (relative to 1991-2020) from AWRA for Wentworth, Balranald and the Murray-Darling Basin.

Appendix B

Concepts to guide adaptative 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.

Table 1 - Key aspects of consideration to guide future plan iterations

NO.	ASPECT OF CONSIDERATION
Expansion of drought resilience relative to diverse stakeholder groups	
1	Expand on what drought means to different segments of the region's community and industries, and adaptation pathways to 'absorb', 'adapt' and / or 'transform' to grow drought resilience. As implementation of this foundational RDRP occurs, and monitoring, evaluation and learning processes are undertaken, opportunity will arise to advance the concepts of resilience theory, and make more clear how the adaptation pathways are continuously improving and escalating to underpin drought resilience maturation.
2	Continue to engage with diverse community and industry groups to advance implementation of the plan. Future plan updates could capitalise on the community's desire to be engaged and involved in the plan's delivery by acknowledging the role that key knowledge holders could play. 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.
Expansion of resilience adaptation pathways	
3	Use diverse quantitative and empirical evidence on the potential impact of the interaction of historical and projected drought with key economic and social variables over time, such as demographic changes, shifts in the diversity of businesses, and livelihoods and employment opportunities for different community segments, in emergent versus declining types of industries, and in labour mobility among different industry and sectors.
4	Expand on the interrelationships between economic, social and environmental factors, and describe how these relationships influence potential cascading impacts of drought.
5	In future plan updates, it would be beneficial to clearly and extensively analyse root cause-and-effect relationships, thresholds and cascading impacts to inform effective priorities and actions. Furthermore, it would be useful to understand the different types and magnitudes of impacts of drought on different drought-vulnerable community groups and sectors beyond agriculture, such as town water supply arrangements, town businesses, tourism, mineral sands mining and health care.

6	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.
Resilience action planning	
7	Establish resilience indicators for each of the plan's 'priority areas', using baseline observations drawn from the MEL process within the initial years of plan implementation.
Implementation	
8	As implementation advances, expand the implementation content of the plan with respect to its governance arrangements and the function / operation of the PCG.
Monitoring, evaluation and learning framework	
9	Further develop structured reflection and learning moments 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. Continue to enhance and mature the plan's MEL processes over time as the plan transitions from foundational into a performance posture.
10	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. This could include evidence that helps to track demographic shifts, changes in the diversity of businesses, livelihoods and employment opportunities for different community segments in emergent versus declining types of industries. It could further include evidence of labour mobility among different industry and sectors in order to assess actions focused on economic diversification.
Resilience assessment	
11	Ensure future iterations of the plan are qualified by a review of the Resilience Assessment components to identify key circumstantial changes which have occurred.
12	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 that provides a detailed and explicit causal mechanisms and valid assumptions by which the plan, through its implementation, will deliver the desired outcomes and impact.

Wentworth
SHIRE COUNCIL

BALRANALD
SHIRE COUNCIL