2025

Regional drought resilience plan for Central Orana

Australian Government | Future Drought Fund | NSW Government | Dubbo Regional Council | Narromine Shire Council

Acknowledgement of Country

We the authors and contributors to the Central Orana Regional Drought Resilience Plan acknowledge and pay our respects to the Wiradjuri peoples as the traditional owners and custodians of the lands encompassing the Dubbo and Narromine local government areas.

We acknowledge their Elders, the communities and representatives who play a vital role in continuing their connection to the land, and sharing their knowledge, culture and history with all people of the Central Orana region.

Further, any and all actions identified within this plan for further consideration and implementation are subject to securing external funding for council facilitation. This project received funding from the Australian Government's Future Drought Fund.

Contents

1 Message from the region's Mayors

Drought is a harsh and at times, cruel and unforgiving force of nature.

As a largely agricultural region, we see drought's most obvious impacts in our agricultural industries, with loss of stock, failed crops, downturns in agri-business and other associated services.

But our residents feel the impacts of drought in less obvious ways right throughout our communities.

There is the mental stress of trying to keep your businesses viable. The worry that you won't have enough spare cash to buy footy boots for the kids or take them to the pool for a swim on a hot day. It's having to lay-off an employee as work dries up as quickly as the riverbeds, and it's about wondering when the drought will end, and then wondering when it will come back.

The need to build resilience around drought is a given.

We want to be stronger, recover quicker, and learn from our past experiences. This opportunity, provided by the State and Commonwealth governments, to partner together and develop a regional drought resilience plan has gifted us with a blueprint to build our resilience.

Built on the ideas from our community, our volunteers, our farmers, our businesses and industry, the Central Orana Regional Drought Resilience Plan is about practical and achievable actions that will help us adapt and work with whatever the environment throws our way.

Thank you to our community members who took the time to help shape this plan, and contribute your ideas, experiences and thoughts.

Our experiences shape us, and it is our people who are both our greatest strength and potential.

As Mayors of Dubbo Regional Council and Narromine Shire Council, we are pleased to support the Central Orana Regional Drought Resilience Plan.

Cr Joshua Black
Mayor, Dubbo Regional Council

Cr Ewen Jones
Mayor, Narromine Shire Council

2 Introduction

Drought is a defining feature of the climatic cycle of the Australian landscape, largely due to our geography. Our continent spans the latitudes of the subtropical high-pressure belt, an area of sinking, dry, stable air and usually clear skies. The far north and south of the country come under the influence of reasonably regular rain-bearing systems for at least part of the year. The east coast is normally well watered by moisture from weather driven by the Tasman and Coral seas. However, over most of the country rainfall is low and erratic. Even in the wetter areas, very dry years can disrupt normal activities and lead to water shortages (BoM, 2004).

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

The Australian Government's Future Drought Fund provides secure, continuous funding for drought resilience initiatives, including the development of Regional Drought Resilience Plans (RDRP) across all states and territories. RDRPs focus on innovative ways to build regional drought resilience across the agricultural sector, its supporting industries, and local communities, through a collaborative and evidence-based approach which promotes the triple bottom line concept of social, environmental and economic benefit.

A key strength of the RDRP process is the enabling of fundamental behavioural and cultural change at a regional scale whereby the whole community drives and sustains its own pathway for self-reliance against the worsening impacts of drought.

The costs of drought are spread across economic, social and environmental factors. The toll taken on regions and their communities has been enormous and the impacts often linger for decades. The most effective response to rising uncertainty is to plan for and implement strategies that increase drought resilience. This can be achieved by building sustainable and diverse regional economies, reducing the vulnerability of communities to changing economic conditions and accelerating recovery, as well as enhancing thriving natural environments.

2.1 Objectives

Consistent with the strategic priorities and objectives of the Future Drought Fund, the objectives of the RDRP process are to:

- grow self-reliance and performance of the agricultural sector
- improve the natural capital of agricultural landscapes for better environmental outcomes
- strengthen the wellbeing and social capital of rural, regional, and remote communities.

Core objectives of the NSW Government are strong communities and diverse regional economies, which are both key to providing short-term and long-term opportunities to strengthen drought resilience.

2.2 Expected benefits

The RDRPs will deliver projects and initiatives to targeted stakeholder groups and the broader community within the Central Orana region. As the initiatives are co-designed with the community and stakeholders, these bespoke projects will deliver benefits directly aligned to the resilience values and priorities of the community.

Benefits may also come from:

- fostering collaboration between multiple stakeholder groups in the delivery of projects
- integration with existing council planning and operational processes
- cross regional collaboration.

2.3 Strategic alignment

The Future Drought Fund's 8 interrelated foundational programs aim to build an innovative and profitable farming sector, a sustainable natural environment and adaptable rural, regional and remote communities, all with increased resilience to the impacts of drought and climate change.

The 3 inter-connected strategic resilience priorities of the Future Drought Fund are:

- Economic resilience for an innovative and profitable agricultural sector
- Environmental resilience for sustainable and improved functioning of farming landscapes
- Social resilience for resourceful and adaptable communities.

The *20-Year Economic Vision for Regional NSW* (2018) details state government's priorities and strategies to achieve long-term social and economic success for regional communities. The Regional Economic Development Strategies (REDS) and NSW State and Regional Water Strategies are also critical to contributing to drought resilience.

Other relevant drought resilience resources include:

- The Australian Government's *Drought Resilience Adoption and Innovation Hubs* – (i) the Southern NSW and (ii) Southern QLD and Northern NSW Drought Resilience Adoption and Innovation Hubs.
- *DroughtHub*, an online drought assistance and information portal for NSW primary producers.
- *AdaptNSW* website, to inform and empower communities, businesses, households and government to adapt to climate change.

A key resilience planning methodology underpinning program delivery and the quality and consistency of RDRPs released Australia-wide is the CSIRO 'RAPTA' model and process (Figure 4). Independent CSIRO review of each RDRP ensures the applied resilience framework allowed for consideration of:

- maintenance of those existing strategies which in the past have proven to absorb drought impacts – absorptive capacity
- promotion of modification to a system which ultimately results in enhanced future resilience to drought impacts - adaptive capacity
- addressing existing system failure by facilitating radical change which transforms a system agilely and entirely, through interventions which remain effective against the impacts of successive future drought events – transformative capacity.

The Central Orana RDRP has adopted the phrase 'maintain to absorb, modify and enhance, or implement to transform' to reinforce the linkage between intervention actions and desired change.

3 About the Central Orana region

The Central Orana region encompasses the Dubbo Regional and Narromine Shire Local Government Areas (LGAs) covering over 12,500km^2 with a combined population of 61,282.

It is home to the Wiradjuri people as the Traditional Owners and original natural resource managers of the lands and waters. Key population centres are the city of Dubbo and townships of Wellington and Narromine.

Figure 1. Regional scope of the Central Orana RDRP

	Dubbo Regional	Narromine Shire
Area	7,534 km²	5,262 km²
Population	54,922	6,360
Observed Mean Annual Population Growth Rate (2016-2021)	+1.9%	-0.02%
Forecast population growth 2021-2041 (Council data)	+20.7%	+7.1%
Aboriginal and/or Torres Strait Islander peoples	16.6%	20.4%
Unemployment rate (September 2023)	2.2%	2.7%
Gross Regional Product (2023)	$4.6B	$0.49B
Value of Agricultural Production (2020/21)	$198.8M	$313.8M
Land area used for agricultural production	82%	95%
Land area of State Significant Agricultural Land	40%	57%
No. of groundwater bore records	4,140	1,739
Salinity concentration 80%-ile	2,820 µS/cm	2,660 µS/cm
Digital Connectivity Score - “On the move”	51/100	29/100
“Stationary ”	57/100	31/100

3.1 Population

The Central Orana region median population age of 37 years is below the New South Wales median age of 39 years. This observation is weighted by the much larger population of the Dubbo Regional LGA (54,922 population) and its median age of 36 years, compared to the less populated Narromine Shire LGA (6,360 population) with a median age of 41 years, which is due to the consistently higher population proportions within the 55 to 89 years cohorts.

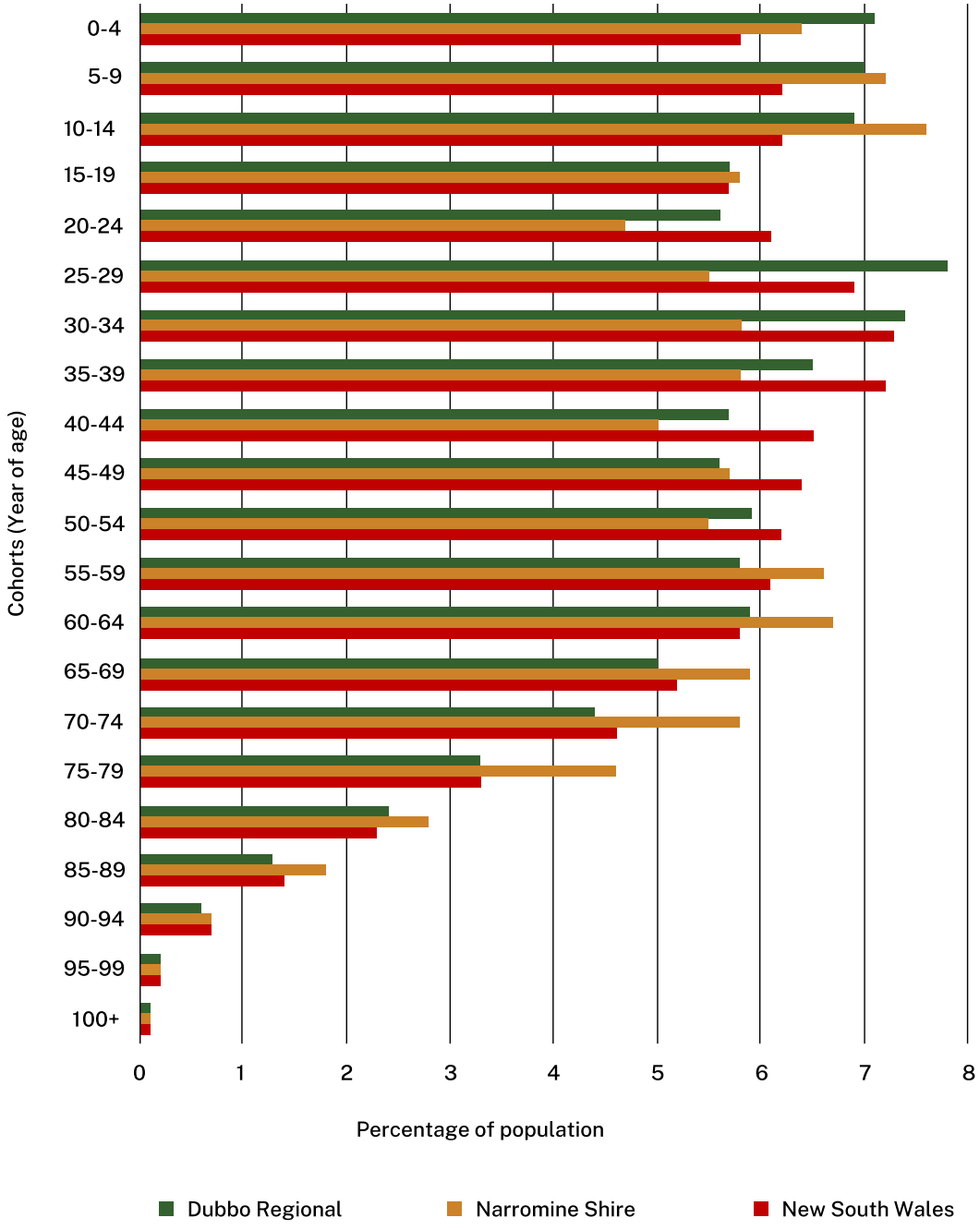


Figure 2 - Population age distribution at the 2021 Census of the Dubbo Regional and Narromine Shire LGAs compared to the whole of New South Wales.

3.2 Economy

The 2 LGAs comprising Central Orana have distinct economies in terms of diversification. In terms of economic contribution, the construction industry ($1.59B) is the single largest industry in the Dubbo LGA, yet the health care and social assistance industry is by far the largest employer (20% of workforce), employing nearly twice that of the construction industry (10% of workforce).

The agriculture, forestry and fishing industry employs 4% of the workforce and its economic contribution ($580M) is about one-third that of the construction industry. These key characteristics denote a diversified economy for what is a predominantly rural region (86% agricultural land use).

In the Narromine LGA, the agriculture, forestry and fishing industry ($326M) and the mining industry ($323M) are near equal top economic contributors. The agriculture, forestry and fishing industry are by far the largest employer (31% of workforce), which is more than the next 3 largest industries combined education and training industry (11%), health care and social assistance industry (10%) and mining industry (8%). These key characteristics of the Narromine LGA indicate an economy heavily dependent on agricultural production.

3.3 Climate

Monthly maximum and minimum temperatures are similar at approximate east-west extremities of the Central Orana region (Trangie-Wellington) and indicate prevailing cool winters and hot summer conditions. Temperature extremes, both hot and cold, occur infrequently and can have considerable impacts on health, infrastructure and our environment.
The number of hot days per year, where temperatures exceed 35°C, is higher in the west than in the eastern parts of the region.

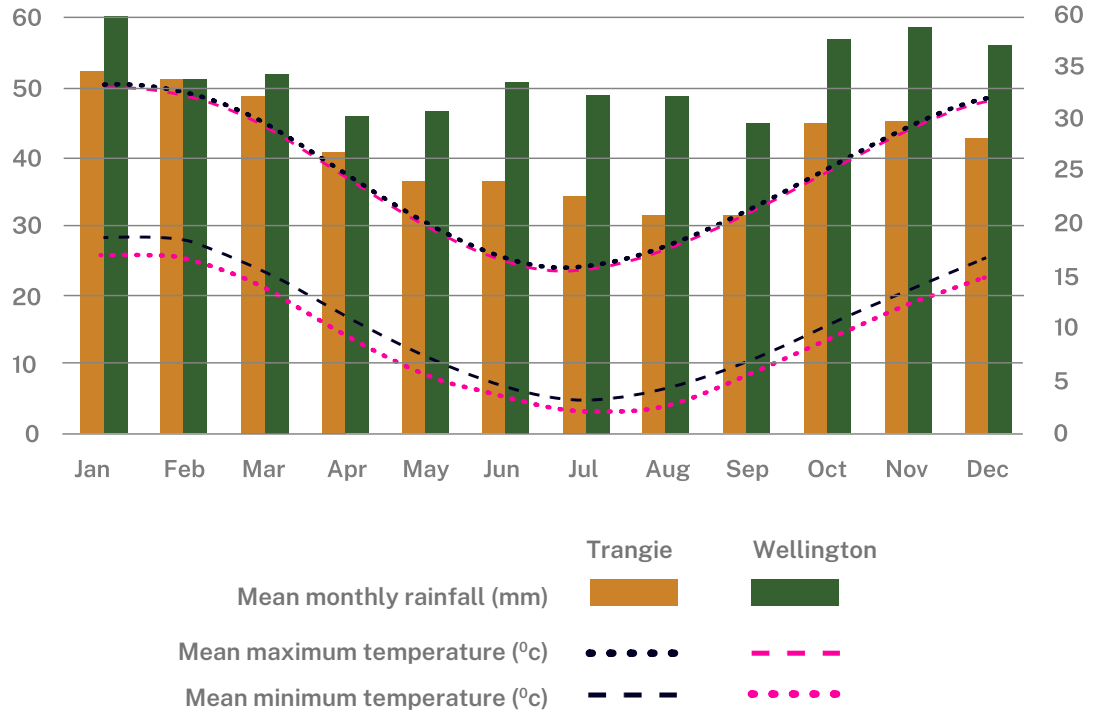


Figure 3: Observed seasonal rainfall and temperature variations at Trangie Research Station AWS (1922-2024) and Wellington D&J Rural (1881-2024).

Rainfall varies considerably in both space and time across the Central Orana region. This variability is due to the complex interactions between weather patterns and topography across the region combined with the influence of large-scale climate patterns such as El Niño/ Southern Oscillation (ENSO). Much of the region experiences annual average rainfall in the range of 450–600 mm, with the gradient decreasing from east to west.

During most of the first half of the 20th century the region experienced drier conditions. There was greater year-to-year variability in rainfall during the 1950s to 1990s. The first decade of the 21st century was characterised by below average rainfall during the Millennium Drought. This dry period ended with 2 of the wettest years on record for Australia (2010–2011), and 2010 the third wettest year on record for New South Wales. Drought conditions returned for the Central Orana region from 2018-2020 followed by wetter than average years (and flooding) in 2021 and 2022.

3.4 Summary of the Central Orana region

Area

Dubbo Regional
7,534 km²

Narromine Shire
5,262 km²

Population

Dubbo Regional
54,922

Narromine Shire
6,360

Observed mean annual population growth rate (2016 -2021)

Dubbo Regional	Narromine Shire
+1.9%	**-0.02%**

Forecast population growth 2021-2041 (Council data)

Dubbo Regional	Narromine Shire
+20.7%	**+7.1%**

% Population living in townships

Dubbo Regional	Narromine Shire
82%	**68%**

Economy

Real gross regional product (2023)

Dubbo Regional	Narromine Shire
$4.6B	**$0.49B**

Gross value of production of agricultural commodities

Dubbo Regional	Narromine Shire
$198.8M	**$313.8M**

Agriculture output (% of total sales)

Dubbo Regional	Narromine Shire
6.1%	**28.2%**

Agriculture

Land area use for production

Dubbo Regional	Narromine Shire
82%	**95%**

% State Significant Agricultural Land (SSAL)

Dubbo Regional	Narromine Shire
40%	**57%**

Groundwater resources

No. of groundwater bore records

Dubbo Regional	Narromine Shire
4,140	**1,739**

Salinity concentration 80%-ILE

Dubbo Regional	Narromine Shire
2,820 µS/CM	**2,660 µS/CM**

Infrastructure

Digital connectivity score

	Dubbo Regional	Narromine Shire
On the move	**51/100**	**29/100**
Stationary	**57/100**	**31/100**

4 Our vision

Our vision for drought resilience reflects the power of adaptability and community unity. It is people and potential centric and reflects our holistic aspirational view for our region's future.

The values of the community and their perception of barriers and enablers to resilience as well as the long term goals embodied within each council's Community Strategic Plans, provide an aspirational framework for this vision statement.

The vision statement was developed following the series of workshops, meetings with stakeholders and following analysis of feedback across all communication and engagement channels. Common themes, sentiment and language were identified from our consultation when exploring stakeholder's thoughts on what makes a resilient community.

These common threads were then crafted together to form our vision statement.

> ***A region that is strong and adaptable, where our people, businesses and industries have the resilience to seize opportunity and overcome challenges.***

5 Snap shot of drought resilience

To facilitate better understanding of drought resilience, a drought resilience index was developed using data from regional and national datasets. The index is designed to track the temporal and spatial changes to drought resilience and recognises overall drought resilience as the outcome of interacting exposure, sensitivity and adaptive capacity.

Drought resilience status (index based)

Index category	Indicators	Index value
Drought exposure	1. Current drought exposure 2. Future drought exposure 3. Change in drought frequency (past - 40 years)	**3.1** **Dubbo Regional**
Drought sensitivity	4. State significant agriculture land 5. Agriculture employment dependence	
Drought adaptive capacity	6. Percentage unemployment 7. NSW digital connectivity index 8. Likely groundwater salinity 9. Land and soil capability	**3.2** **Narromine Shire**

Regional strengths

- Stakeholder feedback indicates communities of the Central Orana region respond collectively during drought and other naturally occurring emergencies.
- A very high proportion of the region is mapped as State Significant Agricultural Land (SSAL), indicating the landscape has capacity to withstand impacts of drought due primarily to existing reserves of land with beneficial biophysical attributes for agricultural enterprises, including large tracts of land dedicated to irrigation cropping (primarily cotton). Resilience to drought is further enhanced, particularly in the Narromine LGA, by >70% of area having moderate to very high land and soil capability.
- Good to high quality groundwater across most of the region generally presents no burden to livestock drinking, meaning access to this resource underpins drought risk management for many agri-businesses.
- Unemployment rate is low (2-3%) within both LGAs, which translates to high adaptive capacity.
- The Dubbo LGA has a highly diversified economy in which agricultural practices rank as only the sixth highest industry in terms of economic output, which limits the impact of dry periods on the majority of key industries.
- Dubbo Regional Council already has diversified raw water supply options including both Macquarie River regulated surface waters and local groundwater. The July 2024 announcement that a new advanced wastewater treatment facility would be built at Dubbo Sewerage Treatment Plant through a public private partnership allows for exploration of recycled water substitution and subsequent reduced raw water demand.

Regional vulnerabilities

- Current drought exposure is high based on historical frequency of past growing seasons facing intense drought conditions.
- Future drought exposure is high based on frequency of future growing seasons facing intense drought conditions when projected impacts of climate change are applied to historical data.
- Change in drought frequency levels (1981-2000 versus 2001-2020) indicate recent (over the last two decades) increases to the already high exposure to drought impacts.
- Across digital connectivity elements of access, affordability and demographics, the region exhibits average to below average adaptive capacity which compromises the ability of the population to communicate to fellow community members and limits access to knowledge regarding available assistance services.
- The Narromine Shire LGA has high dependence on agriculture, which heightens vulnerability to reduced commodity production when surface water availability is compromised in the regulated Macquarie River, and demand for groundwater threatens long-term sustainability thresholds in licensed water sources.

5.1 Past drought analysis

Since 1990, drought has impacted the Central Orana region socially, economically and environmentally.

Annual rainfall has been relatively stable.

14 Dry years have occurred

9 Wet years have occurred

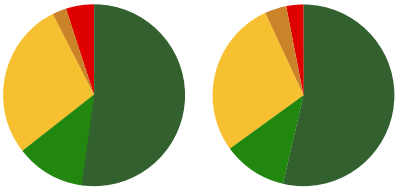
Summer rainfall has been reliable; autumn has been unreliable.

Rainfall has decreased in the autumn and spring months.

Spring frosts have been more common and have been occurring later.

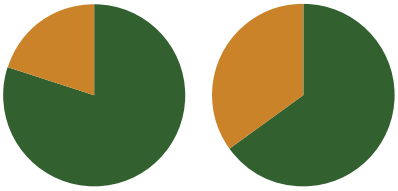
There have been more hot days, with more consecutive days above 38°C.

% Time in CDI Drought Phase 1900 - 2023



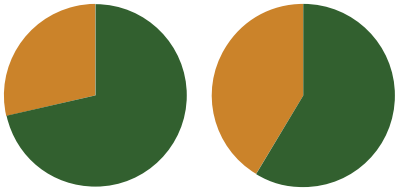
Dubbo Regional LGA | Narromine Shire LGA

% Time Combined CDI Drought Phase Dubbo Regional LGA



1981 - 2000 | 2001 - 2020

% Time in Combined CDI Drought Phase Narromine Shire LGA



1981 - 2000 | 2001 - 2020

Key: Non-drought | Recovering | Drought affected | Drought | Intense drought

Social impacts

Volunteer burnout

Mental health decline

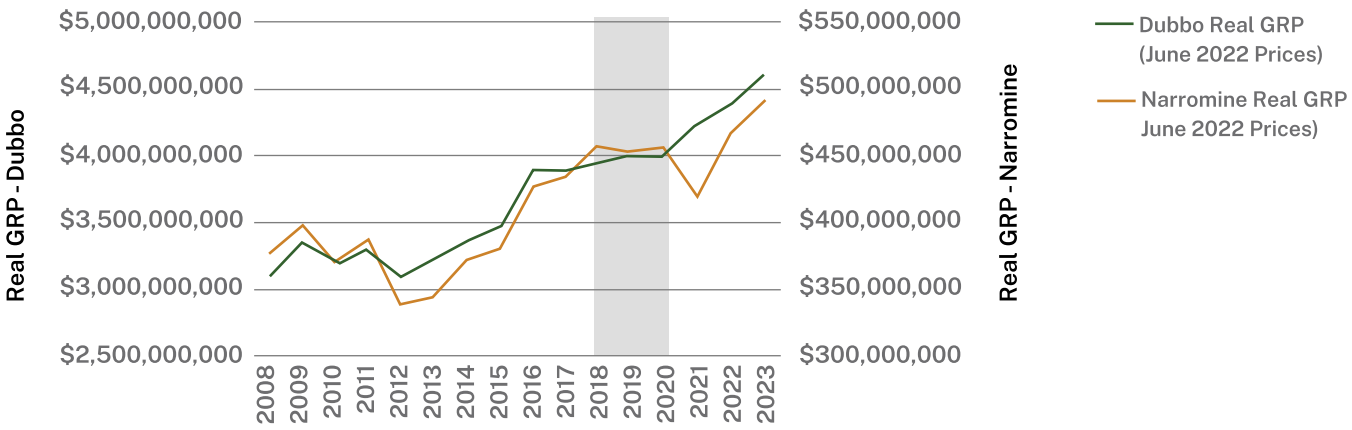
Physical health decline

Reduced levels of employment

Young generation moving to city centres for work

Social Isolation

Economic impact



Environmental impacts

- Reduction in soil health / increased soil erosion risk
- Surface water quality decline and shortages
- Reduction in water/moisture availability (e.g. in surface water storages, in groundwater storages, in the soil, in the vegetation etc.)
- Groundwater quality decline
- Biodiversity impacts
- Increase of fire risk

5.2 Future drought projections

In the future, it is projected that drought will continue to be a regular occurrence in the Central Orana region with possible increases in the frequency and severity of drought impacts. The best available climate modelling results project the following changes to drought-related-variables in the Central Orana region.

- Average temperatures projected to increase in all seasons (very high confidence).
- Increased intensity of extreme rainfall events (high confidence).
- Number of hot days and warm spells projected to increase (very high confidence).
- Average winter/spring rainfall projected to decrease (high confidence).
- Changes in summer autumn rainfall are possible but magnitude of change is unclear and varies by location.
- A harsher fire-weather climate in the future (high confidence).
- Fewer frosts are projected (high confidence).

5.3 Resilience initiatives

Recommended project	Project objectives overview	Key benefits overview
Narromine Shire digital engagement platform hub to enable improved community engagement.	Narromine Shire Council to purchase access licences to a digital engagement hub that coordinates and supports communications with the community.	Having a one-stop-shop easy to access single source of truth will build trust between the council and the community and remove barriers to resilience.
Provide expert education to the community on the science of drought, including patterns, trends and forecast.	Provide a series of science-based education sessions, on what is happening locally regarding drought. The series should be presented by relevant experts, providing 'plain English' information and include data for each region forecast changes or impacts as well as historical context.	Access to trusted expert information on the future impacts of drought will facilitate greater planning and mitigation management.
Strengthen the access and promotion of mental health resources available.	Promote messaging for community members regarding the extent and availability of mental health support servicing options during crisis and also ongoing to build preparedness and capacity. Lobby for programs to: • map availability of local mental health support services • determine service adequacy against predicted demand for regional community support during future drought • determine future service capacity expansion.	Improved visibility of drought support mechanisms increases social resilience through self-reliance management of health and wellbeing issues. Enhanced understanding of mental health service capacity reveals improvement needs and ultimately boosts wellbeing and resilience. The community recognises that support was available during the drought and felt providers offered meaningful assistance. However, local services were sometimes duplicated or missed. The community desires better coordination of these services from all providers at the local level.

5.3 Resilience initiatives

Develop a Drought Communications Strategy including media, social media and community engagement.	This should include preparing for, during drought and post drought. Include media and social media strategy and community and stakeholder engagement across multiple channels and methods.	Improved coordination and consistency of messaging with internal and external audiences. Media and social media will provide avenues to correct misinformation rapidly. Consistent and authoritative messaging will reduce community fears, rumour and frustration, building resilience.
Enhance and continue to invest in programs that encourage and support the local economy.	Investigate initiative similar to the Dine and Discover initiative, expand local gift card programs and marketing activities that promote support locally.	Economic diversification and the introduction of vouchers to encourage and facilitate regional investment, will have a positive impact on economic and social wellbeing and resilience.
Implement existing Regional and Local Economic Development Strategic Plans.	Implementation and leveraging of opportunities in the Central Orana Regional Economic Development Strategy and Local Economic Plans and Strategies.	Continuing to have a proactive approach to growing and diversifying the local economy, provides resilience to the economic impact of drought.
Implement a business resilience program to enhance capacity to deal with economic challenges presented by drought.	As part of normalising drought, an education series for businesses should be delivered, focusing on preparing for, during and after drought.	Businesses are vulnerable to multiple variables and providing bespoke education programs and initiatives that focus on strategies to optimise positive outcomes, will have a far-reaching positive impact.
Agriculture industry education needs-analysis and development of training program focused on drought management.	Conduct a needs analysis of local farmers and agriculture sector to determine knowledge gaps on topics such as sustainable farming, diversification, drought farming. Use this information to then work with industry partners to establish and deliver education programs.	Bespoke education results in the identification of opportunities for improvement and potential for improved economic, social and environmental outcomes.

6 About this plan

This RDRP is a collaboration between Dubbo Regional Council and Narromine Shire Council on behalf of the more than 61,000 residents who live across the rural areas, city, townships, and villages who collectively call this Central Orana region their home.

The economic, environmental, and social impacts of drought are real and capable of serious harm to individuals and to the community. This Central Orana RDRP is intended to be a practical and applicable resource that can be used by communities, local governments, industry groups and government agencies to inform decision making, attract funding and guide investment in projects that have recognised potential to deliver relief from severe drought.

The insights outlined in this RDRP can embolden the Central Orana region to take advantage of emerging opportunities to continue to build sustainable agri-businesses and to grow communities which embrace diversification and innovation. The intervention actions required to affect genuine change for the existing community, and to attract prospective workers and their families to the region, must be implemented in partnership between industry, local government, regional organisations and the communities they support.

The Central Orana RDRP also outlines key priorities which community stakeholders have identified as crucial to further addressing drought resilience in the region. Associated actions to address these priorities have been developed which capture local and regional initiatives, industry innovations and diversification, and best-practice initiatives from outside the regions.

6.1 Our purpose and goals

The Central Orana RDRP provides support to help our region better plan for and become more resilient to the impacts of drought over time. It has been developed in a collaborative, partnership approach, drawing on locally led inputs provided by those who live and work in the region.

The purpose of this plan is to provide a clear roadmap for building resilience for the Central Orana region.

This plan outlines practical, achievable actions that have been identified by the community, businesses and industry, as contributing to improving the Central Orana drought resilience.

Our goals are to:

- Identify shared values and priorities for building resilience
- Empower our Aboriginal communities, individuals and organisations to identify and leverage opportunities for education and development on drought resilience
- Educate and inform the community on the science of drought and influence in our region
- Identify and prioritise practical and impactful actions collaboratively with the community, businesses and industry to build drought resilience
- To act as a catalyst for greater integration and building stronger social support networks across the region.

6.2 Our planning process

The Department of Primary Industries and Regional Development (DPIRD) facilitated the development of the RDRP, with responsibility for managing and supporting the co-design and development processes maintained under the guidance of a Project Control Group (PCG), consisting of representatives from each council, consultant technical experts and the DPIRD.

The Resilience, Adaptation Pathways and Transformation Approach (RAPTA) was developed to design, implement and evaluate interventions for achieving sustainability goals within highly uncertain and rapidly changing decision contexts. The RAPTA is able to meet different intervention needs, building on and challenging familiar design, implementation and evaluation processes from a systems perspective to put concepts of resilience, adaptation pathways and transformation to work. Outputs such as models or plans are valuable, however the processes of participating, appreciating new perspectives, and learning to design and implement agile and effective interventions are of equal importance.

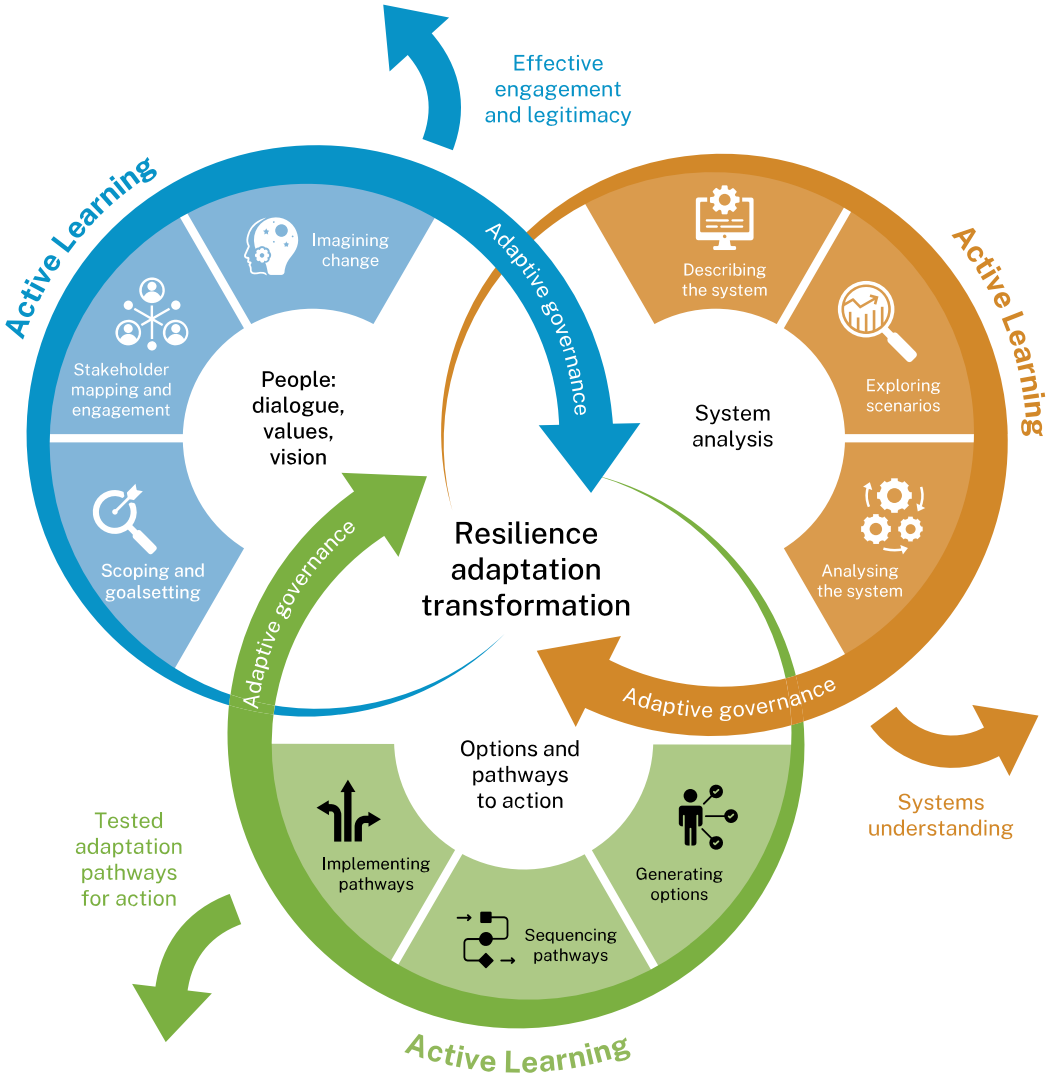


Figure 4: RAPTA processes, modules and outcomes.

The Central Orana RDRP approach involved processes across 3 defined phases:

1. Systems analysis – completion of a preliminary literature review using the latest scientific knowledge accessible to facilitate a desktop assessment of initial drought resilience understanding of the region.
2. People, dialogue, values, vision – mapping and consultation with key stakeholders and the community, identifying values and priorities, co-designing the development of a Drought Resilience Assessment.
3. Options and pathways to action - development of RDRP which provides (i) a high-level summary of the findings from the Drought Resilience Assessment, (ii) subsequent identification and development of actions and interventions to mitigate drought impacts in the region based on the 'maintain to absorb, modify and enhance, or implement to transform' theory of change model, and (iii) an Investment Framework which applies evaluation to potential projects across the economic, social and environmental pillars and prioritises projects within funding constraint conditions.

Phase 1 – Systems analysis – process and outcomes

Data sharing was facilitated by the PCG to maximise the knowledge base available to the literature review. This resulted in a greater understanding of what is already known about the impacts of drought regarding aspects of exposure, sensitivity, impact and adaptive capacity and the ways in which each of these relate to and inform vulnerability and resilience to drought. Council and state plans, strategies and policy provided an understanding of current thinking and strategic direction. Socio-economic and land utilisation profiles of the region were achieved by describing the population, age structures, employment and labour force characteristics, major land uses and their economic activities, water resources and established regional infrastructure. The LGA focussed assessment allowed for benchmarking of both Dubbo Regional and Narromine Shire Councils.

Past and projected drought impacts were reviewed to identify strengths/weaknesses of past drought management and to explore the suitability of existing and new drought management options for dealing with projected drought impacts.

The literature review informed the desktop assessment of drought impacts in the Central Orana region, which in turn identified and analysed competitive advantages, disadvantages, and opportunities which presently exist. Identification of gaps that exist between the current situation and future potential then enabled recognition of sectors (including agri-business and visitor economy) that should be targeted for assistance as a means of diversifying income for the region.

Phase 2 – People, dialogue, values, vision - process and outcomes

The PCG approved a Stakeholder and Community Engagement Plan which followed the RDRP conceptual framework, exploring aspects of exposure, sensitivity, impact and adaptive capacity in relation to drought resilience. A stakeholder mapping process identified groups and individuals who would be key in the development of the RDRP.

Consultation gathered feedback and commentary from the community and stakeholders on impacts of past droughts at a local and regional level, as well as identifying barriers and enablers of building resilience. The details and outcomes of the engagement are captured in the *Central Orana RDRP Stakeholder Engagement Report*.

To inform the development of the RDRP, a drought resilience index was developed by applying 9 interacting drought exposure, sensitivity, and adaptive capacity parameters. The approach utilised publicly available datasets to achieve quantifiable drought resilience at the LGA spatial scale.

In accordance with the drought vulnerability and resilience conceptual framework, the stakeholder engagement and technical review processes were then captured in the *Central Orana Drought Resilience Assessment* report, which presents a summary of drought resilience as a function of drought exposure, sensitivity and adaptive capacity. The likely impacts of future drought are defined using the latest available information, including climate change projections, against the key social, environmental and economic pillars.

Phase 3 – Options and pathways to action – process and outcomes

As a result of effective engagement, the community and stakeholders identified a wide and diverse range of actions to improve resilience. These related to agri-business, land management, health and wellbeing, communication and community networks, drought assistance programs and their coordination, water security and infrastructure and knowledge/information sharing.

Five distinct thematic areas emerged and advised by stakeholder input and supplemented by consultant technical experts' understanding and advice, a systematic process led by the consortia was applied to identify projects which fit either of the maintain to absorb, modify and enhance or implement to transform change categories:

- maintenance of those existing strategies which in the past have proven to absorb drought impacts – adsorptive capacity
- promotion of modification to a system which ultimately results in enhanced future resilience to drought impacts - adaptive capacity
- addressing existing system failure by facilitating radical change which transforms a system agilely and entirely, through interventions which remain effective against the impacts of successive future drought events – transformative capacity.

As part of the co-design process, community and stakeholders assigned a priority to resilience building focus areas and this, combined with consideration of the funding constraints, guided the consortia and PCG in the selection of 8 priority projects to advance drought resilience in the region.

In partnership with participating stakeholders, a monitoring, evaluation and learning (MEL) framework was developed and adopted to define reporting processes, mechanisms and requirements to track the progress of RDRP actions over time, and to ensure they are contributing to improved drought resilience.

6.3 Key inputs to this plan

The Central Orana RDRP is consistent with the National Framework for Drought Policy (National Drought Agreement) and Australian Government Drought Response, Resilience and Preparedness Plan, which has a focus on long-term resilience and preparedness. This RDRP has strong alignment with relevant national, state, regional and local plans, strategies, and policies, including:

National:

- Australian Government Future Drought Fund
- Southern NSW and Southern QLD and Northern NSW Drought Resilience Adoption and Innovation Hubs

State:

- NSW Regional Health Strategic Plan 2022-2032
- NSW Water Strategy 2021
- NSW Network Infrastructure Strategy A 20-year strategy to transform the NSW electricity network 2023
- NSW DPIRD Strategic Plan 2022-2030

Regional:

- Central West and Orana Regional Plan 2041
- Central Orana Regional Economic Development Strategy 2018-2022
- Regional Water Strategy - Macquarie–Castlereagh 2023
- Country and Outback NSW Destination Management Plan 2022-2030

Local:

- Dubbo Draft Drought Contingency and Water Emergency Response Plan 2020
- Dubbo Regional Council Drought Management Plan 2019
- Dubbo Regional Council ‘Towards 2040’ Community Strategic Plan
- Narromine Community Strategic Plan 2032

7 Understanding drought

Drought as a natural hazard is pervasive, recurring, and distressing. It is difficult to determine when a drought starts or ends, and even more challenging to determine if/when environmental and socioeconomic conditions have recovered after a drought has occurred. Due to the multifaceted nature of drought, assessing drought impacts requires a triple-bottom-line approach (i.e. environmental impacts, economic impacts, social impacts).

7.1 Defining drought

The simplest definition of drought is a deficit of water compared with normal conditions However, droughts are more than just a lack of rainfall and have a wide range of cascading impacts that may be caused or exacerbated by different factors (Figure 5). Five commonly used drought categories or types are:

- **Meteorological drought:** extent and severity of drought in terms of deficits in precipitation from average conditions, possibly combined with increased potential evapotranspiration.
- **Soil moisture (or agricultural) drought:** deficit of soil moisture (mostly in the root zone), emphasising availability of soil moisture to support vegetation growth (usually crop or pasture growth, meaning the terms soil moisture drought and agricultural drought are often used interchangeably).
- **Ecological drought:** prolonged and widespread deficit in soil moisture, or biologically available water, which imposes multiple stresses in terrestrial and aquatic ecosystems.
- **Hydrological or water resources drought:** departure in surface or sub-surface water supplies from average conditions.
- **Socioeconomic drought:** the impacts of one or more of the other types of droughts on humans, communities and/or the economy, defined based on social expectations, perceptions and other measures (e.g. employment levels, income and debt levels, mental and physical health).

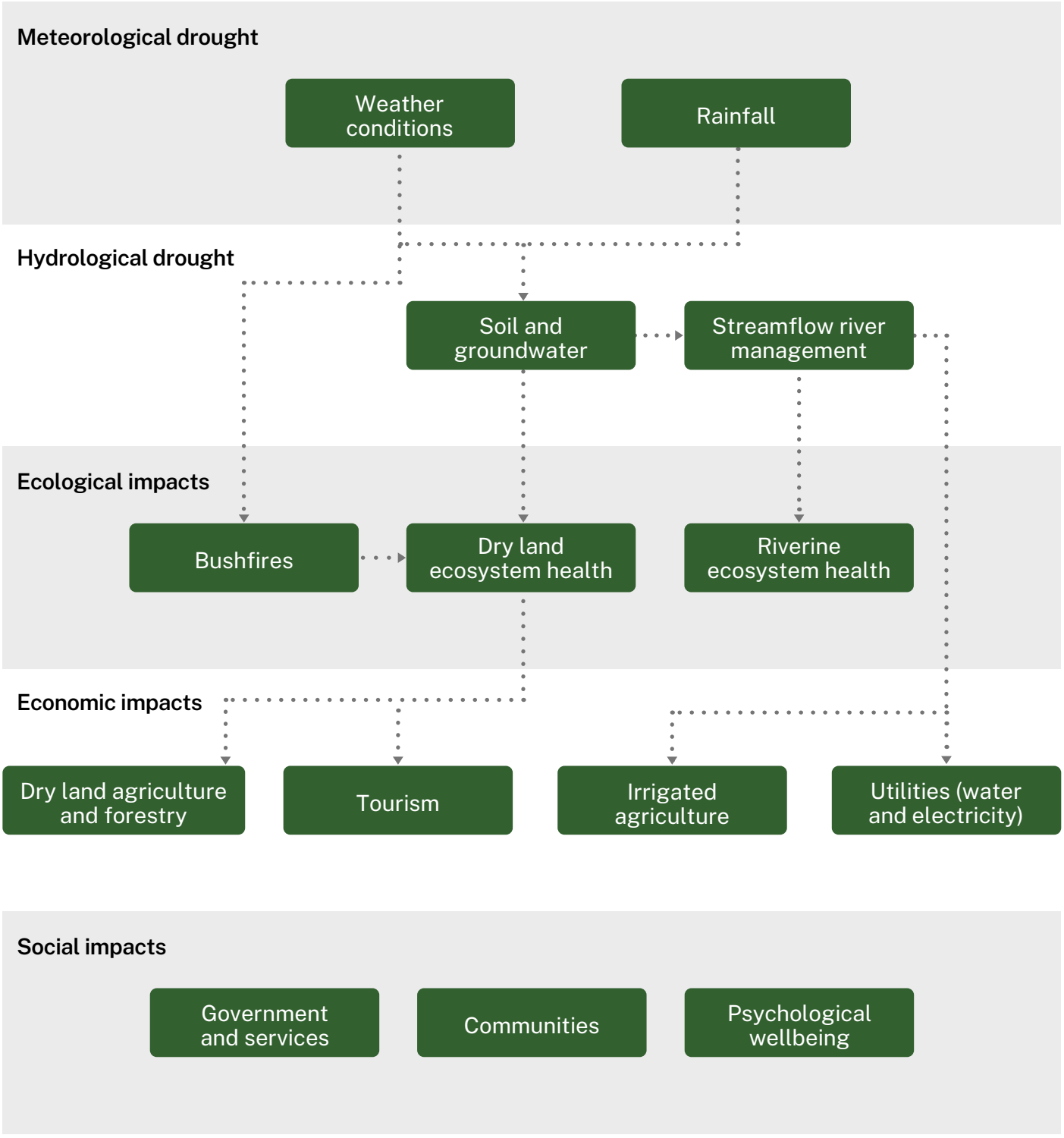


Figure 5: Drought propagation from meteorological drought (i.e. lack of rainfall) through the hydrological cycle and associated environmental, economic, and social impacts[1]

[1] *van Dijk AIJM, Beck HE, Crosbie RS, de Jeu RAM, Liu YY, Podger GM, Timbal B, Viney NR (2013) The millennium drought in Southeast Australia (2001–2009): natural and human causes and implications for water resources, ecosystems, economy and society. Water Resour Res 49:1–18.*

7.2 Drought monitoring in NSW

In addition to the different types of droughts to consider, compared to other natural hazards droughts are unique in their timing with drought impacts usually only becoming apparent months or years after a drought has started developing (compared with minutes to days for other natural hazards) and once a drought is occurring it typically takes unusually wet conditions to return to normal circumstances. Consequently, drought characteristics such as onset and duration are less clearly defined compared to other natural hazards which only persist while extraordinary meteorological conditions continue (i.e. rarely for more than a week).

To address these issues, the NSW government developed the Enhanced Drought Information System (EDIS)[2]. The EDIS is a publicly available drought monitoring tool that monitors seasonal conditions across NSW. The EDIS was launched in March 2018 and is used across government and farming stakeholders to build drought awareness, emphasise drought preparedness, and improve confidence in drought monitoring and early warning. Drought declarations for NSW are supported by data confirmed through the EDIS.

A key feature of the EDIS is the development of the Combined Drought Indicator (CDI). The CDI combines meteorological, hydrological, and agricultural definitions of drought (Figure 5) using indices for rainfall, soil, water, and plant growth. Table 1 shows the 6 drought phases defined by the EDIS using the CDI and provides technical and on-the-ground description of typical field conditions.

The 6 drought phases progress from a non-drought category where all indicators suggest good conditions for production to recover, through to drought affected categories (either weakening or intensifying), a drought category and into intense drought.

[2] *NSW Department of Primary Industries. (2024). Enhanced Drought Information System (EDIS). State of New South Wales. <https://edis.dpi.nsw.gov.au>*

CDI phase	Technical definition	Description - typical field conditions
Intense drought	All three indicators (rainfall, soil water, plant growth) are below the 5th percentile.	Ground cover is very low, soil moisture stores are exhausted and rainfall has been minimal over the past 6-12 months.
Drought	At least one indicator is below the 5th percentile.	Conditions may be very dry, or agronomic production is tight (low soil moisture or plant growth). It is possible to be in Drought when there has been some modest growth, or a few falls of rain.
Drought affected (intensifying)	At least one indicator is below the 30th percentile and the rainfall trend is negative over the past 90 days.	Conditions are deteriorating; production is beginning to get tighter. Ground cover may be modest, but growth is moderate to low for the time of year. When indicators are close to the Drought threshold drought conditions are severe.
Drought affected (weaking)	At least one indicator is below the 30th percentile and the rainfall trend is positive over the past 90 days.	Production conditions are getting tighter, but there have been some falls of rain over the past month. It is rare to enter the Recovering phase from the Non-Drought category; Usually there is a quick (1-2 week) transition into Drought Affected or Drought. When indicators are close to the Drought threshold drought conditions are severe.
Recovering	All indicators are below the 50th percentile but above the 30th percentile.	Production is occurring but would be considered 'below average'. Full production recovery may not have occurred if this area has experienced drought conditions over the past six months.
Non-drought	At least one indicator is above the 50th percentile.	Production is not limited by climatic conditions.

Table 1: Phases of drought defined by the Enhanced Drought Information System (EDIS).

7.3 Historical drought in the Central Orana region

The Central Orana region endured a severe and prolonged period of drought from 2018-2020 (Figure 6). Primary producers were heavily impacted, with many farmers suffering severe financial hardships, and forced into making difficult decisions related to reducing herd sizes or not planting crops.

While the impacts of the 2018-2020 drought were undoubtedly serious, Figure 7 shows some recent (since 1980) droughts that have occurred in the Central Orana region that had similar (or worse) impacts to the 2018-2020 drought (the most recent 2018-2020 drought is also included in Figure 7 to enable comparison with earlier droughts). An important point to note from Figure 6 and Figure 7 is the spatial variation in how drought impacts (i.e. rainfall deficits) are experienced across the Central Orana region – it is rare for the whole region to be experiencing the same level of drought, and sometimes (e.g. 2001-2004) parts of the region are in drought while others are not. This is consistent with anecdotal evidence obtained from engagement with local stakeholders from the local region who consistently highlighted the need for drought impact/resilience assessments to consider location-specific (i.e. at a sub-LGA) differences in the way drought is experienced across a region.

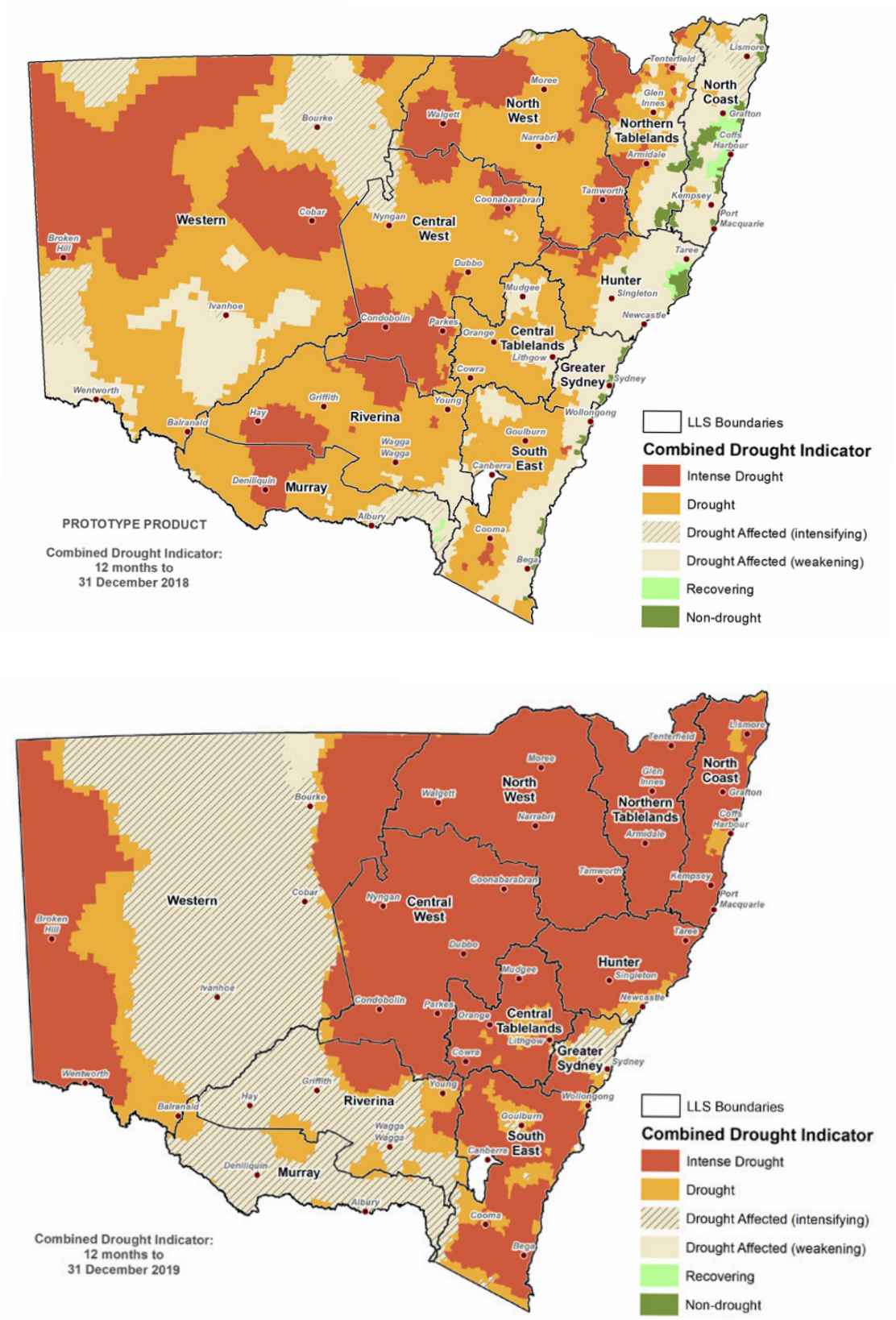
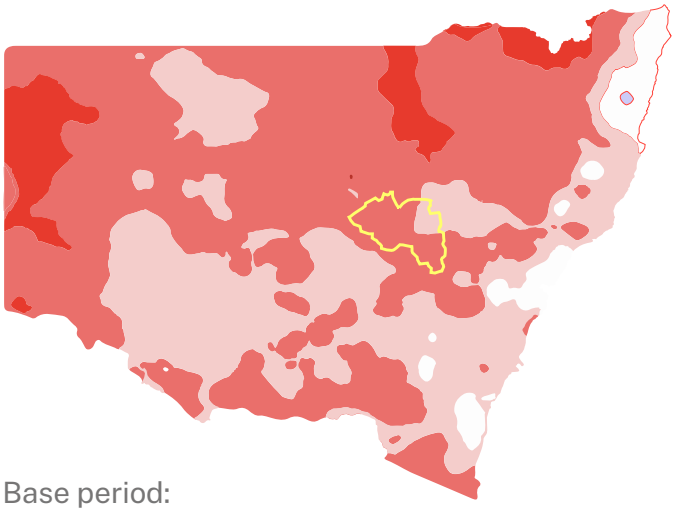


Figure 6: Combined Drought Indicator (CDI) for 12 months to (top) December 2018 and (bottom) December 2019.[3,4]

[3] *Department of Primary Industries. NSW State Seasonal Update - December 2018, Accessed 24 January 2024. <https://www.dpi.nsw.gov.au/climate-landing/ssu/december-2018>*

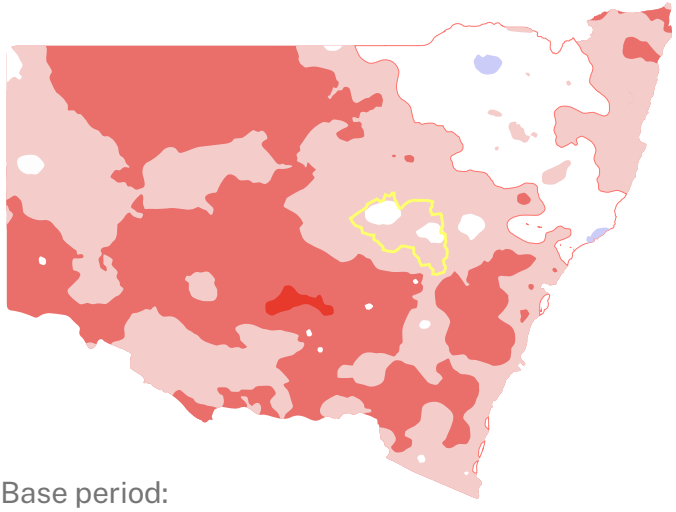
[4] *Department of Primary Industries. NSW State Seasonal Update - December 2019, Accessed 24 January 2024. <https://www.dpi.nsw.gov.au/climate-landing/ssu/december-2019>*

NSW rainfall deciles: 1 Jan 2017 to 31 Dec 2020



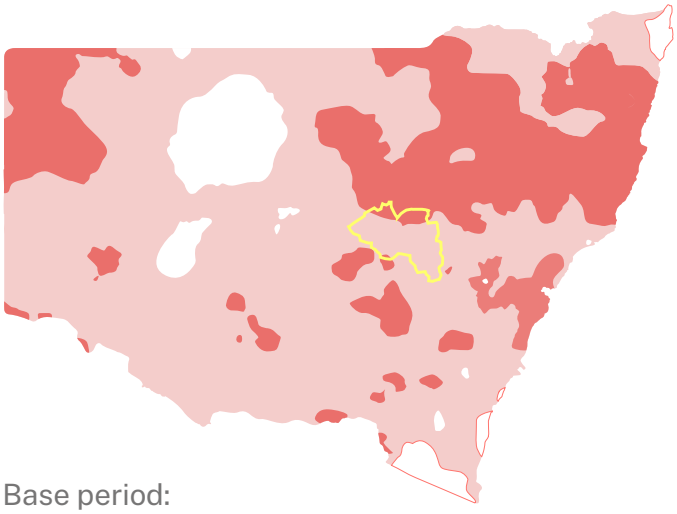
Base period:
Jan 1900-Dec 2020

NSW rainfall deciles: 1 Jan 2017 to 31 Dec 2004



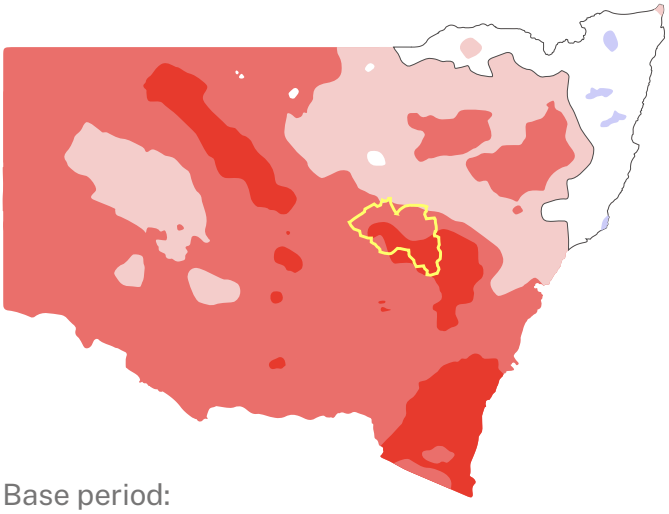
Base period:
Jan 1900-Dec 2020

NSW rainfall deciles: 1 Jan to 31 Dec 1994



Base period:
Jan 1900-Dec 2020

NSW rainfall deciles: 1 Jan to 31 Dec 1982



Base period:
Jan 1900-Dec 2020

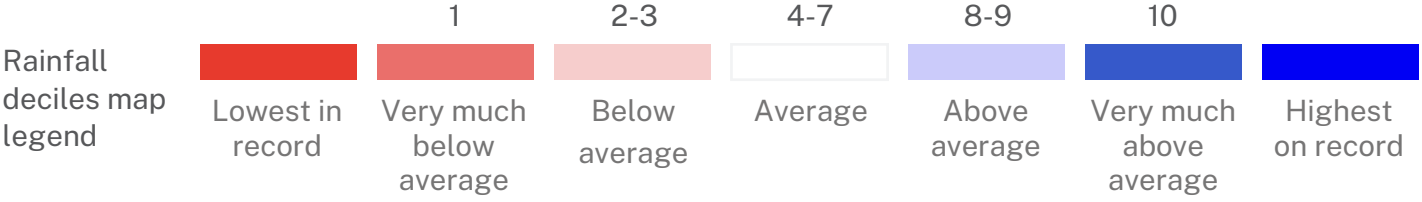


Figure 7: Periods since 1980 associated with drought in the Central Orana region (yellow boundary)

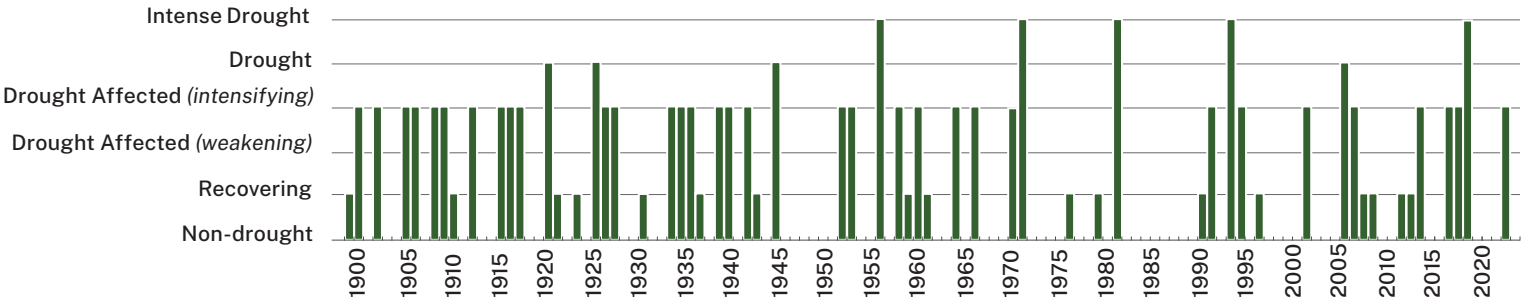
The long-term (1900-2023) historical drought status across the region was determined at representative locations in the Dubbo Regional LGA (Figure 8) and Narromine Shire LGA (Figure 9) for the Drought Resilience Assessment for Central Orana report. Drought status is calculated based on growing season (April to October) meteorological data (from SILO) and plant growth data obtained from Grains Research and Development Corporation (GRDC) Harvest Reports.[5]

It is clear drought has regularly occurred within the Central Orana region (Figure 8 and Figure 9).

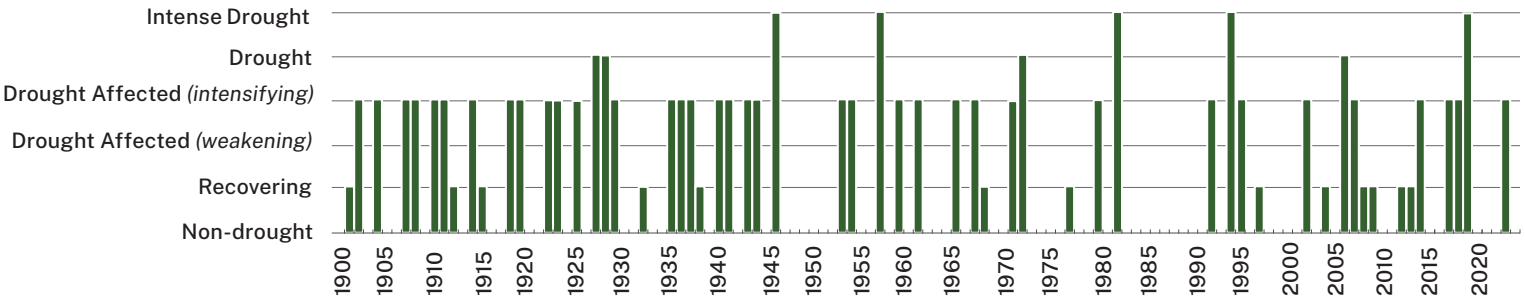
The number of droughts in recent decades (e.g. 2001-2020) is typically higher than it was in the previous two decades (i.e. 1981-2000) (Table 2). Whether this is due to natural decadal-scale climate variability or evidence that anthropogenic climate change is already increasing drought frequency in the region (or both) is currently unclear because drought dominated decades have occurred earlier in the 1900s (e.g. 1927-1946). Irrespective of the cause, increased drought frequency in recent decades has caused significant environmental, economic, and social impacts and this has been considered and addressed when developing this Central Orana RDRP.

[5] *Grains Research and Development Corporation (GRDC) Harvest Reports, Accessed 25 January 2024. <https://nvt.grdc.com.au/harvest-reports>*

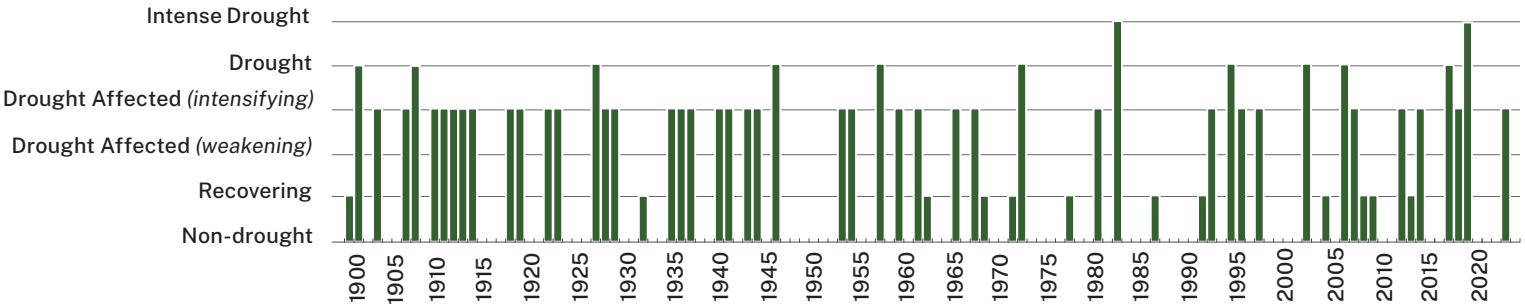
Emungerie - North Dubbo Regional LGA



Gollan - East Dubbo Regional LGA



Minore - West Dubbo Regional LGA



Stuart Town - South Dubbo Regional LGA

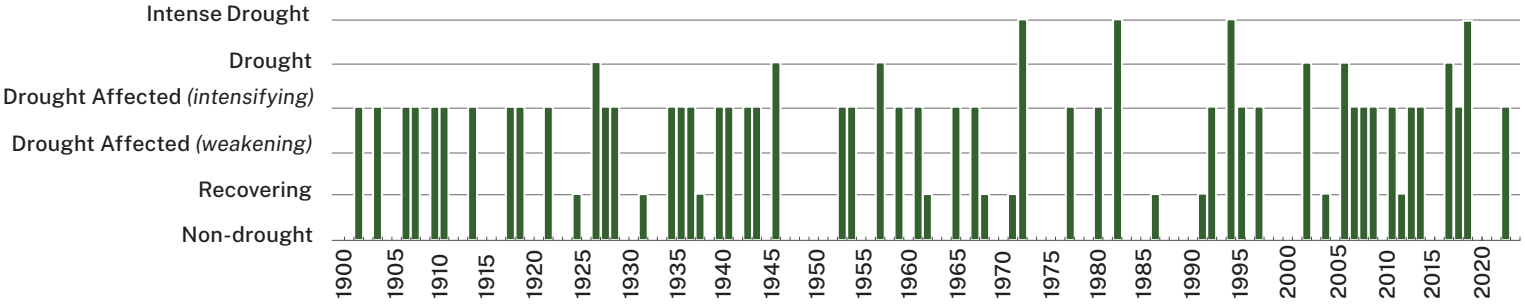
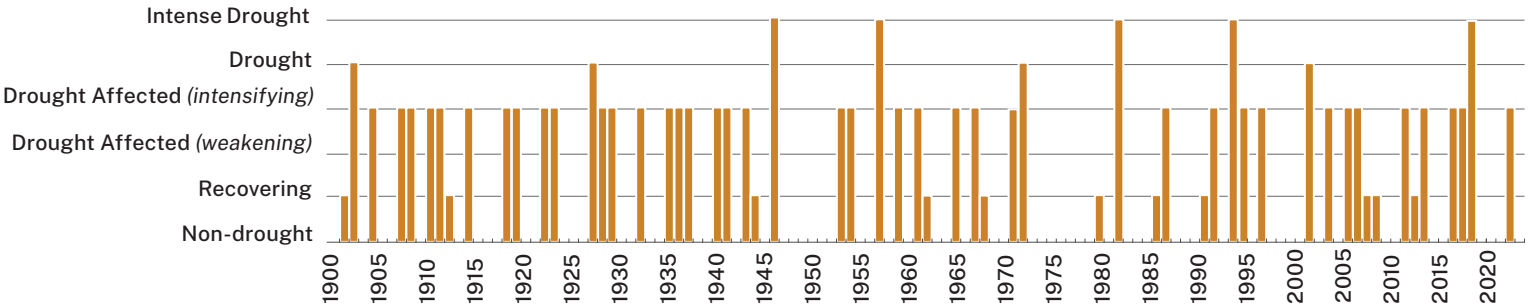
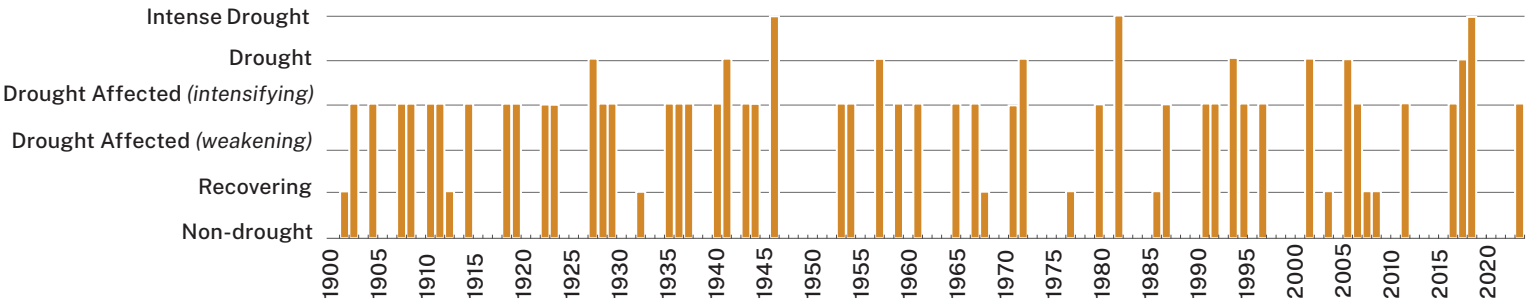


Figure 8: Historical (since 1900) drought phases (as defined in Table 1) at representative locations in the Dubbo Regional LGA (see map in Figure 1).

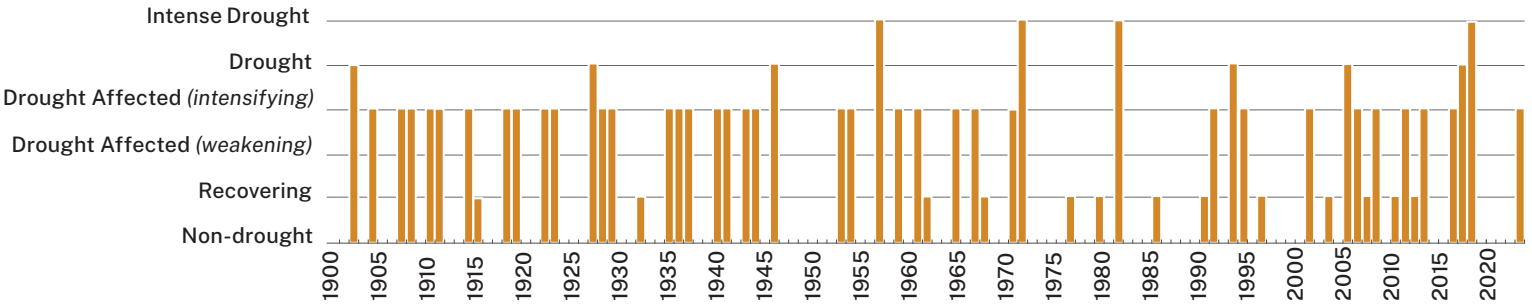
Trangie - North Narromine LGA



Narromine - East Narromine LGA



Dandaloo - East Narromine LGA



Tomingley - South Narromine LGA

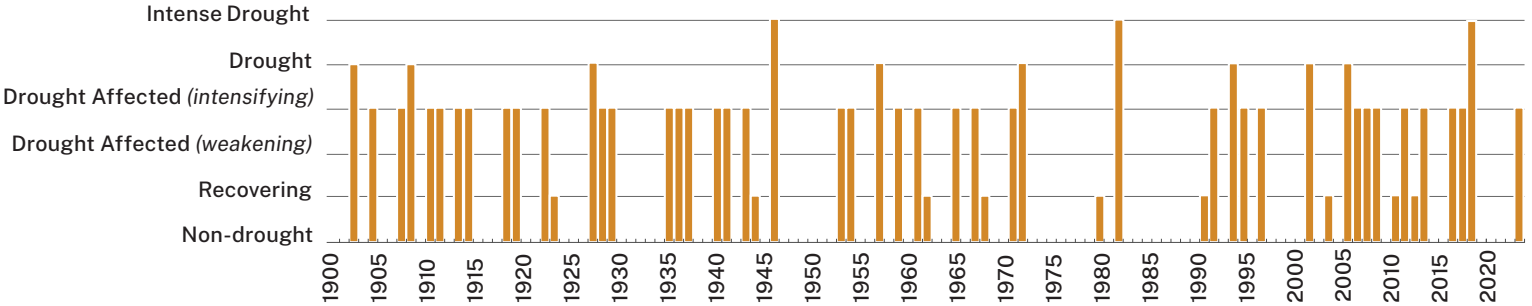


Figure 9: Historical (since 1900) drought phases (as defined in Table 1) at representative locations in the Narromine Shire LGA (see map in Figure 1).

LGA	Township location	Number of growing seasons classed as Drought Affected, Drought, or Intense Drought for 1981-2000	Number of growing seasons classed as Drought Affected, Drought, or Intense Drought for 2001-2020	Change (2001-2020 minus 1981-2000)
Dubbo Regional	Eumungerie	4	7	3
	Gollan	4	7	3
	Minore	5	8	3
	Stuart Town	5	11	6
Narromine Shire	Trangie	6	9	3
	Narromine	7	7	0
	Dandaloo	4	9	5
	Tomingley	5	10	5

Table 2: Number of growing seasons classed as Drought Affected, Drought, or Intense Drought during 1981-2000 compared with during 2001-2020.

7.4 Future drought in the Central Orana region

In the future, it is projected that drought will continue to be a regular occurrence in the Central Orana region with possible increases in the frequency and severity of drought impacts. The best available climate modelling results project the following changes to drought-related-variables in the region:

- Average temperatures projected to increase in all seasons (very high confidence).
- Number of hot days and warm spells projected to increase (very high confidence).
- Average winter/spring rainfall projected to decrease (high confidence).
- Changes in summer/autumn rainfall are possible, but magnitude of change is unclear and varies by location.
- Increased intensity of extreme rainfall events (high confidence).
- A harsher fire-weather climate in the future (high confidence).
- Fewer frosts are projected (high confidence).

Table 3 shows the change in the number of growing seasons associated with different drought phases when the projected impacts of climate change (as listed above) are applied to historical data to infer plausible future drought conditions for the Central Orana region. At all locations the number of growing seasons not associated with drought is projected to decrease. The magnitude of drought (e.g. number of Intense Droughts) is also projected to increase at every location.

LGA	Township location	1. Non-drought	2. Recovering	3/4. Drought Affected	5. Drought	6. Intense Drought
Dubbo Regional	Eumungerie	-2	-3	3	1	1
	Gollan	-3	-2	3	1	1
	Minore	-1	-5	5	-1	2
	Stuart Town	-3	-2	4	0	1
Narromine Shire	Trangie	-2	-2	2	1	1
	Narromine	-3	0	2	-2	3
	Dandaloo	-1	-6	4	1	2
	Tomingley	-1	-4	3	-1	3

Table 3: Change in the number of growing seasons associated with different drought phases when the projected future (2030-2063) is compared with that of 1990-2023.

8 Our drought resilience journey

The Central Orana RDRP benefits the people of this region by developing a prioritised list of actions and pathways to build drought resilience. Co-design with the community and key stakeholders is critical for not only establishing a shared understanding of the local strengths within the combined population, but also in realising the challenges faced under drought conditions.

8.1 Co-designed with our community

Everyone experiences drought differently and no one person's experience is more important or valid than another's. In co-designing this plan with our community and stakeholders, we heard many deeply personal and harrowing stories, and we also heard stories that were inspirational and courageous.

Our community and stakeholders shared that they felt fatigued with the constant demands for their time and consultation -consultation fatigue. With activities such as the Central-West Orana Renewable Energy Zone, Inland Rail, and other council projects all pressing for community involvement, consultation fatigue was a significant challenge in the development of this plan.

Despite these challenges, our community identified impactful initiatives for building resilience around drought preparation, response and recovery. This successful co-design means this plan is built on shared values and priorities, and by the very nature of co-design, supports community understanding and ownership of the initiatives and actions.

Our communication and engagement activities were guided by an integrated communication and engagement strategy, which ensured information about the project and opportunities to get involved were shared across multiple communication channels including radio, newspapers, social media, council webpages, email and printed flyers. Direct engagement with community members occurred via online survey, theme-focused in-person and virtual community workshops, interviews with industry and community stakeholders and briefings to council and Members of Parliament.

Each stakeholder has a unique viewpoint formed by personal experiences faced during drought conditions and it is possible that two individuals or organisations may hold opposing opinions or views on a particular issue. Divergent stakeholder feedback is considered equally valuable, and engagement was delivered in alignment with the International Association of Public Participation (IAP2) Core Values.

A separate Central Orana RDRP Stakeholder Engagement Report details the extent of consultation achieved.

Engagement statistics:

2 Media releases
for estimated audience of
180,000

Radio engagement
campaign for estimated audience of
70,000

2 Social media campaigns
total impressions of
55,986

5 Newspaper adverts / articles for estimated audience of
125,000

Reached via **email**
> 5,000

Survey with total response of
94

3 Community events

4 Focused workshops

1 Drop-in
information session

4 Briefings
to MPs and councils

14 In-person
meetings

8.2 The impacts of drought

During our consultation and engagement, the impacts of drought were explored with a diverse cross section of the community and their representatives including the elderly, First Nations people, business owners, pastoralists, environmentalists, new residents, and charitable organisations. Participants in the co-design process were not asked to identify against prescribed criteria of employment or income status as this was identified as a potential barrier to involvement.

From the consultation, most people indicated they were somewhat to extremely impacted by drought over the past 5-10 years. The impacts of drought identified from our consultation have been aligned to the 3 key areas of social, economic and environmental impact.

Social impacts

- Isolation
- Anxiety – particularly on how to get assistance and access to information
- Confusion around who is in-charge and who is leading the recovery
- Inadequate coordination and not easy to find single source of information
- Demand for assistance from community service organisations increases but there is a delay in funding flowing down
- Support organisations not working collaboratively or communicating
- Donation coordination and management puts a burden on volunteer resources
- Grief at loss of ecosystem
- Poorly coordinated mental health services and resources
- Non digital groups – like the elderly – do not have access to all the information
- Volunteer fatigue and lack of recognition
- Negative media – causes a negative mindset

Economic impacts

- Having to reduce staff
- Employees leaving the township to get more secure employment
- Subsidies confusing and hard to get
- People are asset rich but cash poor
- Financial assistance model is flawed
- Change in spending patterns
- Droughts are regular occurrences but there is always a delay in financial assistance
- Cumulative impact of floods, bushfires and droughts on businesses
- Negative media drives away tourism

Environmental impacts

- Agricultural sector not sharing key environmental information with each other
- Health of the Burrendong dam
- Death of trees and established community gardens
- Unclear role for First Nations people in preparing for and managing drought
- Poor crop yields
- Loss of stock and de-stocking financial losses

8.2.1 Barriers to resilience

When exploring the barriers to resilience with the community and stakeholders, the greatest barrier was seen to be the lack of recognition that the impact is not just on agriculture. Other identified barriers include:

- Overall community fatigue. The impact of various development activities, cost of living pressures, floods, droughts, has taken a toll on the community
- The perception that drought just impacts the farmers
- That drought is not something new, yet every time there is a drought, new policies, funding, systems and processes are implemented
- Accessing information during drought is hard. Information is predominantly digital, requiring access to the internet, is in multiple different sites and is not intuitive to the target audience
- Leadership. The lack of a single leading local authoritative voice or one central coordination was seen as a significant barrier
- Confusing and conflicting relief support programs generate community frustration, anger and despair within the community.
- Securing water supply for domestic use and agriculture and industry.
- Address misinformation about the impacts of drought directly in the media.
- Collaboration and sharing knowledge.
- Normalising drought in the way the community, businesses, media interact.
- Investing in critical infrastructure that meets future needs and demands.
- Help the community to be more educated on drought, its patterns, trends and forecast so they can understand and anticipate future impacts.
- Communication methods, frequency and messages.
- Proactive management of donations and the equitable distribution of resources.
- Tourism and making sure the media aren't having a negative impact on tourism to the region.

The community and stakeholders all acknowledged that drought is part of life in the Central Orana region, and yet each time there is a drought, the activation of support and service coordination does not seem to happen in a timely or progressive way. Many stakeholders recognised the opportunity to learn from the communication and coordination around COVID-19.

8.2.2 Focus areas to build resilience

To foster and grow resilience, the community and stakeholders identified the need to support more sustainable agriculture practices, to upgrade critical infrastructure and to prioritise domestic water supply. Other focus areas included:

- Providing education and support for more sustainable agriculture.

8.3 Resilience initiatives and beneficiaries

The co-design process identified 42 potential resilience building initiatives. Analysis of these initiatives by the PCG identified 5 key themes which each have associated desired outcomes and target beneficiaries.

	Beneficiaries	Potential outcomes
Healthy, connected and resilient communities	Communities of Dubbo Regional and Narromine Shire Councils including: • CALD • First Nations • Aged and isolated • Youth Community service and charitable organisations	Communities have opportunities to come together to support and nurture each other. People have access to mental health and community services. Partnerships between government agencies, support organisations and councils, provide coordinated, easy to access information and support services. There is a clear governance model with identified leadership. There is support and recognition for volunteers.
Sustainable management and use of natural landscapes	Communities of Dubbo Regional and Narromine Shire Councils First Nations groups Landcare groups Council Environmental groups	Land managers are implementing land management practice changes to improve the resilience of the landscape and the natural environment to drought.
Resilient local businesses and regional economy	Local and regional businesses Employees, apprentices, trainees Employment seekers Tourists and tourism-based enterprises Business chamber / collective	Business owners are pursuing opportunities to increase financial security of their business before, during and after drought. Government policy and initiatives assist in the diversification of regional business. Initiatives facilitate shopping and spending locally. Tourism is not impacted by negative media around drought.

Resource management and infrastructure to support communities	Councils Communities of Dubbo Regional and Narromine Shire Councils	Investing in building, maintaining and improving infrastructure has contributed to increasing the communities' drought resilience.
Strong farm enterprises and agriculture industry	Farmers Contractors - agricultural Agriculture businesses and partners	Farmers have access to education that is relevant to the region and tailored to their needs. There are mechanisms in place to share information across the agriculture network. Diversification opportunities are supported through government assistance agencies.

8.4 Prioritising resilience initiatives

The project development matrix details 42 resilience initiatives by theme and theory of change capacity, and also identifies their origin within the RDRP co-design process. Key project stakeholders and partners have been identified against each project.

Healthy, connected and resilient communities	3 Maintain to absorb	7 Modify and enhance	7 Implement to transform
Sustainable management and use of natural landscapes	0 Maintain to absorb	2 Modify and enhance	3 Implement to transform
Resilient local businesses and regional economy	1 Maintain to absorb	6 Modify and enhance	0 Implement to transform
Resource management and infrastructure to support communities	1 Maintain to absorb	2 Modify and enhance	4 Implement to transform
Strong farm enterprises and agriculture industry	0 Maintain to absorb	3 Modify and enhance	2 Implement to transform
	Total: 5	Total: 20	Total: 17

The PCG completed a review process of each of the 42 initiatives and endorsed projects consistent with the requirements of the Federal Drought Fund Agreement's strategic priorities to:

- Grow self-reliance and performance of the agricultural sector
- Improve the natural capital of agricultural landscapes for better environmental outcomes
- Strengthen the wellbeing and social capital of rural, regional and remote communities.

The identified drought strengths and vulnerabilities combined with the drought climate projections also informed the prioritisation of initiatives by the PCG. With the Narromine LGA reliance and focus on agriculture it was essential to prioritise initiatives that provided opportunities to build resilience across this sector. Investment in this area was seen to have significant long-term benefits to a wide range of stakeholders, not just primary producers.

The prioritisation of initiatives to strengthen the regional and local economy reflects the feedback from the community and builds on the existing commitment to diversification and local growth initiatives to achieve a stable and resilient economy.

Significant feedback from the community focussed on the need for improved communication, leadership and education. With projections indicating further droughts and other climatic events, investment in initiatives that build resilience in these areas was prioritised by the PCG.

This review process ultimately resulted in 8 recommended projects across 3 of the 5 thematic frameworks.

Healthy, connected and resilient communities

1. Narromine Shire digital engagement platform hub to enable improved community engagement
2. Provide expert education to the community on the science of drought, including patterns, trends and forecast
3. Strengthening the access and promotion of mental health resources available
4. Develop a Drought Communications Strategy including media, social media and community engagement

Resilient local businesses and regional economy

5. Enhance and continue to invest in programs that encourage and support the local economy
6. Implement existing Regional and Local Economic Development Strategic Plans
7. Implement a business resilience program to enhance capacity to deal with economic challenges presented by drought

Strong farm enterprises and agriculture industry

8. Agriculture industry education needs-analysis and development of training programs focussed on drought management.

The 42 resilience initiatives are detailed in Appendix A.

9 Monitoring, Evaluation and Learning (MEL)

The Future Drought Fund's Monitoring, Evaluation and Learning (MEL) framework outlines the rationale, scope and approach for monitoring and evaluating the initiatives carried out under the plan, and for sharing of knowledge about how to build drought resilience.

Both Dubbo Regional and Narromine Shire councils play a central role in their communities and have demonstrated ongoing commitment to lead in times of adversity. The councils are the obvious custodial candidates of the Central Orana Region RDRP and have existing pathways to engage with other levels of government to facilitate implementation of the plan. Support will also be drawn from key local organisations, to guide and advocate for building drought resilience within the region.

9.1 Key evaluation criteria

The Central Orana RDRP has 4 MEL criteria:

- **Action impact** – what evidence exists to support project achievement of long-term drought resilience?
- **Program effectiveness** – are programs achieving their proposed outcomes, and can outcomes be improved?
- **Appropriateness** – are program outcomes aligned with the overall strategic objectives?
- **Program efficiency** – are programs being delivered efficiently with stakeholders working together effectively, and can efficiency be improved?

9.2 Assumptions underpinning plan implementation

As plans are implemented, monitoring of assumptions will assist in the identification of areas for review.

Key assumptions affecting outcomes 1 to 2 years

Where outcomes will be achieved in 1 - 2 years, council will consider these as part of their operational planning process.

- Communities and stakeholders are willing and able to participate in strategic planning
- Communities and stakeholders actively participate and collaborate
- Opportunities for engagement and communication about resilience is part of the program design
- Regional plans and strategies are interconnected and aligned
- The community is a motivated owner of the plan and is key to the successful implementation
- Opportunities for sharing knowledge and experiences with other regions will be community led
- Future program design will be informed from the delivery and evaluation of this program.

Key assumptions affecting outcomes 3 to 4 years

Where outcomes will be achieved in 3 - 4 years, council may choose to consider these as part of their delivery programs.

- Partnerships between the consortia and stakeholders will act as a catalyst for change
- There are enough resources to implement parts of the plan
- Drought resilience will be improved through the implementation of the initiatives
- Plans will be monitored, amended and completed.

Key assumptions affecting outcomes 5 to 10 years

Where outcomes will be achieved beyond 5 years, council may choose to consider these as part of their community strategic planning and financial planning processes.

9.3 Monitoring progress and evaluating outcomes

The following tables are based on the Future Drought Fund MEL framework indicators and the actions developed in this RDRP.

Table 5: MEL indicators and outcomes 1–2 years

FDF Standard Indicators	Specific Regional Indicators	Evaluation Approach
Actions have been taken based on the plans with: • Many plans have had elements implemented. • Primary producers and businesses supported to improve their sustainability and resilience. **Decisions have been made to implement:** • Regional representatives have considered and planned incremental, transitional and transformational opportunities to strengthen resilience. • Identified actions, pathways and opportunities (including innovative and transformative) to improve regional drought resilience, mitigate risks and adapt to change. • Communities use relevant data and information to better understand their resilience to plan for drought. **Capacity has been developed** • Regional leaders are in a stronger position to implement strategic actions, adapt to change and take advantage of opportunities to build economic resilience as they arise.	**The achievement of key pillars to underpin the achievement of objectives are:** 1. Drought monitoring, early warning systems and plans for responses are being developed and refined. 2. Those most vulnerable and at risk of droughts have been identified and steps taken to address their vulnerability. 3. Measures have been initiated to limit the impacts of and respond better to drought. **Steps have been taken in line with the action plan tables key outcome areas of:** • Healthy, connected and resilient communities • Resilient local business and regional economy • Sustainable management and use of natural landscapes • Infrastructure and built environment • Strong farm enterprises and agriculture industry	**Monitoring actions that should be taken at a regional level by RDRP owners include:** • Recording of steps taken, actions initiated, and resources gained that have been triggered by the RDRP framework, strategies and planned actions. • Annual reporting and review of plan implementation, engagement, participation, actions, barriers and opportunities to regional stakeholder organisations and government – and changes to the RDRP made as needed to best meet regional needs. Should external evaluation be undertaken, as well as taking the national data, above information and annual review into account (against planned actions), a range of regional stakeholders should be interviewed / surveyed to gauge their understanding, engagement and actions they have taken as a result of Plan guidance and initiatives. Types of questions should include: • Their level of awareness and understanding of the RDRP – and how aware they think others are

- Partnerships, networks and engagement are built between stakeholders managing natural resources.
- Increased community understanding of the region's current and future drought resilience, considering the region's unique economic, environmental and social characteristics.
- Natural resource management capability is improved across the region.

Regional stakeholders are involved

- Plans have buy-in from key stakeholders in the region.
- The number of, and participation in, local networks and programs to enhance drought resilience increases.
- Communities share knowledge, collaborate and partner with government more often to build drought resilience.
- Greater sharing of learnings related to drought resilience between communities.

- How invested they are in engaging with other stakeholders around the Plan implementation
- How confident they are that they have the skills and resources to make the changes highlighted
- What decisions and/actions they have taken – or aware of – that have been initiated as a result of the Plan
- How the RDRP has impacted on extra resourcing or support to the region to improve drought resilience.
- How they think the RDRP has added value and made a difference in increasing drought resilience in the region.
- What is working and what needs to change with respect to the RDRP and its effective on-going implementation.
- Organisations nominated for actions in the RDRP including for the communication engagement activities, should also be interviewed to review what was undertaken, how it was done, what response was gained and, if not, why not.
- Case studies should be further captured/developed to understand/demonstrate the program logic / the theory of change and inform recommendations for changes / support needed to maximise the RDRP effectiveness.

Table 6: MEL indicators and outcomes 3 - 4 years

FDF Standard Indicators	Specific Regional Indicators	Evaluation Approach
• Agricultural landscapes are functional and sustainable, with healthy natural capital (environmental resilience). • Agricultural businesses are self-reliant, productive, and profitable (economic resilience). • Agricultural communities are resourceful, adaptable, and thriving (social resilience).	Strong and healthy people living with the land and resilient to drought. **Healthy, connected and resilient communities:** • Communities' drought resilience has improved. **Resilient local business and regional economy:** • Business owners are pursuing opportunities to increase financial security before, during and after drought. **Sustainable management and use of natural landscapes:** • Land managers are implementing change to improve the resilience of the landscape and the natural environment to drought. **Infrastructure and built environment:** • Investing in building, maintaining and improving infrastructure has contributed to increasing the communities' drought resilience. **Strong farm enterprises and agriculture industry** • Bespoke education has provided the agriculture sector with opportunity to implement new practices or processes to build individual and collective resilience.	These longer-term impacts are best captured at a national level by the federal government through ABARES surveys and other national statistics based on a benchmark and considering climate, market and other influences impacting on this outcome.

Table 7: MEL indicators and outcomes after more than 5 years

FDF Standard Indicators	Specific Regional Indicators	Evaluation Approach
• Stronger connectedness and greater social capital within communities, contributing to wellbeing and security. • Communities implement transformative activities that improve their resilience to drought. • More primary producers preserve natural capital while also improving productivity and profitability.	• A regional drought surveillance program is in place that monitors and analyses key indicators of current and emerging environmental (meteorological and landscape), social and economic conditions, which are markers of drought. • There is widely shared and well-informed regional engagement with managing drought risk for long-term community resilience. • The region comes together to build drought resilience. • Widespread enterprise level drought risk management is established across the region. • Measures are implemented to limit impacts of drought and better respond to drought. • Adequate and appropriate drought risk management essential infrastructure in place and stress tested for times of drought.	The councils, as the RDRP owners, together with key stakeholder representatives, will have the role of initiating actions in line with the plan, reviewing progress against the plan objectives and making changes to the plan as needed to maintain its relevance and usefulness. While some of these indicators will be captured in national surveys and statistics as above, monitoring actions that should be taken at regional level by the RDRP owners would include: • Monitoring and reporting of regional level indicators that are captured as part of local government surveillance, surveys and annual reporting. • Liaising with the regional Drought Hub to ensure that key indicators for the region are captured and provided over time. • Recording case studies of changes made and benefits evident because of actions taken from the implementation of the RDRP.

10 Glossary of key terms

Term	Definition
Absorptive capacity	The ability of individuals and groups to continue without adapting or changing their behaviour in response to environmental and socioeconomic changes.
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 (CSIRO, 2022).
Adaptive capacity	The ability of individuals and groups to adjust and respond to environmental and socioeconomic changes (CSIRO, 2022). In other words, the extent to which a system can exploit opportunities and resist or adjust to change. For the RDRP, adaptive capacity is measured in terms of historical response to droughts in the regions or estimated according to a set of resilience proxies such as income, education, community participation rates and drought resilience natural features (ground cover, topography).
Adaptive governance	Coordinating iterative, flexible and responsive interactions between systems when designing interventions and for their implementation and evaluation.
Anthropogenic (human-induced) climate change	Climate change resulting from human activities (e.g. emissions of greenhouse gases (GHGs), precursors of GHGs, and aerosols caused by human activities). These human activities include the burning of fossil fuels, deforestation, land use and land-use changes (LULUC), livestock production, fertilisation, waste management and industrial processes.
Climate change	Change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of climate properties and that persists for an extended period, typically decades or longer.

Climate projections	A climate projection is the simulated response of the climate system to a scenario of future emission or concentration of greenhouse gases (GHGs) and aerosols, generally derived using climate models. Climate projections are distinguished from climate predictions by their dependence on the emission/concentration/radiative forcing scenario used, which is in turn based on assumptions concerning, for example, future socio economic and technological developments that may or may not be realized. Climate projections are what climate models indicate could happen while climate predictions are what is expected to happen (usually with likelihoods attached).
Climate variability	Variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).
Co-design	The process of partnership to develop and formulate project delivery and agreed objectives and needs, using participatory methods. A process of working together utilising generative and explorative processes.
Controlling variable	A key element in the system that is underlying or shaping change of the system.
Drought	Drought in general means acute water shortage. The simplest definition of drought is a prolonged, abnormally dry period when the amount of available water is insufficient to meet our normal use (BoM, 2022).
Drought declaration	A drought declaration is the responsibility of state and federal governments which must consider other factors apart from rainfall, however the Bureau of Meteorology's Drought Statement assists by providing rainfall information. In NSW, drought declarations are supported by data confirmed through the Enhanced Drought Information System.

Drought resilience	The ability to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall and changed seasonality of rainfall, for improved economic, environmental and social wellbeing.
Economic resilience	The ability of the economy to absorb the economic impact of shocks and stressors without changing the economic status or outcomes (CSIRO, 2022).
ENSO	El Niño-Southern Oscillation (ENSO). The term El Niño was initially used to describe a warm-water current that periodically flows along the coast of Ecuador and Peru, disrupting the local fishery. It has since become identified with warming of the tropical Pacific Ocean east of the dateline. This oceanic event is associated with a fluctuation of a global-scale tropical and subtropical surface pressure pattern called the Southern Oscillation. This coupled atmosphere–ocean phenomenon, with preferred time scales of two to about seven years, is known as the El Niño-Southern Oscillation (ENSO). It is often measured by the surface pressure anomaly difference between Tahiti and Darwin and/or the sea surface temperatures in the central and eastern equatorial Pacific. During an ENSO event, the prevailing trade winds weaken, reducing upwelling and altering ocean currents such that the sea surface temperatures warm, further weakening the trade winds. This phenomenon has a great impact on the wind, sea surface temperature and precipitation patterns in the tropical Pacific. It has climatic effects throughout the Pacific region and in many other parts of the world, through global teleconnections. El Niño refers to the warm phase of ENSO while the cold phase of ENSO is called La Niña.
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 (CSIRO, 2022)
Exposure	The extent to which a given system, community or region will be subjected to a particular hazard. For the RDRP, exposure is measured in terms of the extent to which a focus region will be exposed to drought and drought-related climate change processes such as increasing atmospheric temperatures and changes in rainfall patterns and soil moisture.

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 (CSIRO, 2022).
Implement to transform	Describe innovative interventions to an existing system which transforms that system to be effective against the impacts of future drought events (i.e. actions which stimulate transformative capacity).
Local knowledge	Local knowledge and First Nations knowledge incorporate 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.
Maintain to absorb	Describes maintaining existing strategies which have proven to absorb drought impacts (i.e. actions to sustain existing absorptive capacity).
Megatrends	Major global or regional influences that have driven change in the past and are expected to shape change into the future.
Modify and enhance	Describes changes to an existing system resulting in enhanced future drought resilience (i.e. actions which increase future adaptive capacity).
Public-good benefits	A good or service in which the benefit received is available to all, and where access to the good or service cannot be restricted.
Rebound effects	Reduction in expected gains with implementing technologies that increase efficiency of resource use when this efficiency encourages more use of the resource.
Resilience	The ability of a system to absorb a disturbance and reorganise so as to maintain the existing functions, structure and feedback. Also see specified resilience, economic resilience, environmental resilience, and social resilience.

Resilience thinking	Considers the dynamics and development of complex social-ecological systems. It encompasses resilience, adaptation, and transformation as interconnected concepts that define the broad range of type and magnitude of change in social ecological systems at different scales.
Response diversity	A range of different reactions to change that contribute to the same function.
Risk	The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems (IPCC, 2020).
Sensitivity	The extent to which a given system, community or region will be affected by a particular hazard. For the RDRP, sensitivity is fundamentally about the ways in which regions are impacted by drought. It is measured in terms of the effect of drought on crop and animal production and the influence of regional characteristics such as soil types and farming systems on the effect that a drought has in the region.
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' (Resilient Sydney, 2018).
Slow variables	Slowly changing factors that shape the nature of faster responses in the system (e.g. soil moisture, rising salinity, vegetation fuel load, demographic and health trends, debt to income ratios, vegetation cover).
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 (CSIRO, 2022).
Specified resilience	Resilience of a particular part of a system to an identified stress or shock, though the timing and magnitude of the stress or shock may be unknown.
Stressor	An event that occurs gradually over a timeframe that causes an adverse effect, e.g. drought (CSIRO, 2022).

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 (Maru et al., 2018).
Threshold	The point at which a change in a level or amount of a controlling variable causes a system to shift to a qualitatively different regime. Also referred to as a tipping point (Folke et al., 2010).
Tipping point	See 'Threshold'.
Transform	The process of radically changing or building a new system with different structure, functions, feedback and identity (Folke et al., 2010).
Transformation	The process of radically changing or building a new system with different structure, functions, feedback and identity.
Trends	Major global or regional influences that have driven change in the past and are expected to shape change into the future (Taylor et al., 2017).
Trigger point	A pre-agreed situation or event, that when met, activates a management intervention. Trigger points are usually defined in the planning phase (Wise et al., 2014).

Appendix A

Healthy and connected communities

	System	Resilience scale	Action	Source	Timeframe	Lead	Lead role	Stakeholders	Resilience priority	Cost
1	Social Economic Environmental	Maintain to absorb	Strengthen the promotion of existing drought support resources	Community consultation Key stakeholder interaction	Short term	NSW Department of Primary Industries and Regional Development	Inform	Dubbo Regional Council Narromine Shire Council	1	$
2	Social	Maintain to absorb	Strengthen the access and promotion of the mental health resources available	Community consultation Key stakeholder interaction	Short term	NSW Health	Support and encourage	NSW Health Department of Health and Aged Care	1	$
3	Social	Maintain to absorb	Encourage social events that bring individuals and families together during drought	Community consultation Key stakeholder interaction	Short term	Dubbo Regional Council (DRC) Narromine Shire Council (NSC)	Support and encourage	Community organisations	1	$
4	Social Economic	Modify to enhance	Maintain drought community support services' capacity throughout all stages of the drought cycle	Key stakeholder interaction	Medium term	DRC and NSC	Support and encourage	Community organisations NGO and government agencies	1	$$
5	Social	Implement to transform	Narromine Shire Council digital engagement platform hub to enable improved community engagement	Community consultation Key stakeholder interaction	Short term	NSC	Facilitate	NSC	1	$$

6	Social Economic	Implement to transform	Establish a Donations Coordination Action Plan, including communication pathways and roles and responsibilities	Community consultation Key stakeholder interaction	Short term	Western Rural Support Network	Facilitate	Community organisations DRC and NSC	1	$$
7	Social Environmental	Implement to transform	Provide expert education to the community on the science of drought, including patterns, trends and forecast.	Community consultation Desktop and existing document review Key stakeholder interaction	Short term	DRC and NSC	Support and encourage	NSW Department of Primary Industries and Regional Development	1	$$
8	Social	Modify to enhance	Establish a grant mechanism in existing community grant programs to support community organisations capacity to respond and support during droughts	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Facilitate	Community organisations	1	$$
9	Social Economic Environmental	Modify to enhance	Drought round table with local MPs on the necessary policies, lobby-ing and issues to take forward on drought matters	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Lobby	Local MPs Peak bodies	2	$

10	Social	Modify to enhance	Update and enhance volunteer management strategies and plans including recognition program, succession planning, leadership training and mental health training	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Facilitate	Community organisations and their peak bodies	1	$
11	Social Economic	Modify to enhance	Identification of key community service providers that can deploy and provide surge or early-stage drought funding.	Community consultation Key stakeholder interaction	Medium term	DRC and NSC	Support and encourage	Western Rural Support Network	1	$
12	Social	Modify to enhance	Mental health support for children of families impacted by drought.	Community consultation Key stakeholder interaction	Short term	NSW Health	Lobby	Child and Adolescent Mental Health Services (CAMHS) Headspace	2	$
13	Social Economic Environmental	Implement to transform	Create resources that prepare the next generation for living with drought and normalise drought in this region.	Community consultation Key stakeholder interaction	Medium term	DRC and NSC	Support and encourage	NSW Department of Primary Industries and Regional Development	3	$$

14	Social	Implement to transform	Crisis leadership training	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Facilitate	NSW Department of Primary Industries and Regional Development	1	$
15	Social	Implement to transform	Capture lessons learnt from COVID-19 response and incorporate into future drought response	Community consultation Key stakeholder interaction	Medium term	DRC and NSC	Lobby	Business NSW	3	$$$
16	Social Economic	Implement to transform	Develop a Drought Communications Strategy including media, social media and community engagement	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Facilitate and implement	DRC and NSC	1	$$
17	Social	Modify to enhance	MOU between both councils on combined approach to management of drought	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Facilitate	DRC and NSC	3	$

Sustainable management and use of natural landscapes

	System	Resilience scale	Action	Source	Timeframe	Lead	Lead role	Stakeholders	Resilience priority	Cost
18	Social	Maintain to absorb	Educate on the benefits of drought tolerant species and low water use gardening practices	Community consultation Key stakeholder interaction	Short term	Community organisations	Support and encourage	Community organisations	3	$
19	Social	Maintain to absorb	Develop drought tolerant/resilient public green spaces (e.g. community gardens, town ovals)	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Facilitate	Community organisations	3	$
20	Social Economic Environmental	Implement to transform	Support the development of Indigenous land management education opportunities	Community consultation Key stakeholder interaction	Medium term	DRC and NSC	Support and encourage	Local Indigenous organisations	2	$$
21	Social Economic Environmental	Implement to transform	Involve the local Indigenous community in the development of native vegetation programs	Community consultation Key stakeholder interaction	Medium term	Local Indigenous organisations	Support and encourage	Local Indigenous organisations	2	$$

22	Social Economic Environmental	Modify to enhance	Work collaboratively with Local Aboriginal Land Councils and other Indigenous organisations on initiatives for youth and economic development	Community consultation Key stakeholder interaction	Medium term	Local Indigenous organisations	Support and encourage	Local Indigenous organisations	2	$
23	Social Economic Environmental	Implement to transform	Facilitate native and local tree species give away programs to support passive cooling activities in the urban areas	Community consultation Key stakeholder interaction	Medium term	DRC and NSC	Facilitate	Local business and community organisations	2	$$

Resilient local businesses and regional economy

	System	Resilience scale	Action	Source	Timeframe	Lead	Lead role	Stakeholders	Resilience priority	Cost
24	Social Economic	Modify to enhance	Enhance and continue to invest in programs that encourage and support the local economy	Key stakeholder interaction	Short term	DRC and NSC	Support and encourage	Chamber of Commerce and NSW Business	1	$$

25	Economic	Modify to enhance	Build on existing destination marketing initiatives	Community consultation Desktop and existing document review Key stakeholder interaction	Short term	DRC and NSC	Facilitate	Destination NSW	3	$$
26	Social Economic	Maintain to absorb	Implement existing Regional and Local Economic Development Strategic Plans	Community consultation Desktop and existing document review Key stakeholder interaction	Medium term	DRC and NSC	Facilitate	NSW Department of Primary Industries and Regional Development	1	$$
27	Social Economic	Modify to enhance	Encourage businesses vulnerable to the economic impact of drought to develop financial management tools for economic resilience	Desktop and existing document review	Medium term	NSW Government - Service NSW	Lobby	Rural financial councillors NSW Government Federal Government	2	$
28	Social Economic	Modify to enhance	Enhance and update local employment strategies to ensure a focus on planning and action to retain workers during drought impacted periods	Key stakeholder interaction	Medium term	DRC and NSC	Facilitate	NSW Department of Primary Industries and Regional Development NSW EnergyCo Inland Rail	3	$$

29	Social Economic	Modify to enhance	Implement a business resilience program to enhance capacity to deal with economic challenges presented by drought	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Support and encourage	Chamber of Commerce and NSW Business	2	$$
30	Economic Environmental	Modify to enhance	Initiate a business water saving program	Community consultation Key stakeholder interaction	Short term	DRC and NSC	Support and encourage	Chamber of Commerce and NSW Business	1	$

Resource management and infrastructure to support communities

	System	Resilience scale	Action	Source	Timeframe	Lead	Lead role	Stakeholders	Resilience priority	Cost
31	Economic Environmental	Implement to transform	Improve and enhance groundwater access and availability of information	Key stakeholder interaction	Medium term	DRC and NSC	Facilitate and inform	NSW Farmers Association Department of Climate Change, Energy, Environment and Water WaterNSW NSW Irrigators Council	1	$$
32	Environmental	Maintain to absorb	Free water saving devices and education programs to enhance water conservation practices and messages	Key stakeholder interaction	Short term	DRC and NSC	Facilitate	WaterNSW	1	$
33	Economic Environmental	Modify to enhance	Investigate planning changes to incentivise use of native local species in new developments and as replacement option in existing developed areas	Community consultation Key stakeholder interaction	Medium term	DRC and NSC	Facilitate	NSW Department of Planning, Housing and Infrastructure	3	$$

34	Social Economic Environmental	Implement to transform	Approval of current application for 1,500 unit shares (up to 1,500 ML/yr) in a specific purpose water access licence in the Macquarie River (Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016 / That Part Of The Water Source Downstream Of The Upper Limit Of Lake Burrendong) to enable Narromine Shire Council, as the water utility, to diversify water supply sourcing away from the current groundwater only" scenario.	Key stakeholder interaction	Short term	NSC	Facilitate	Department of Climate Change, Energy, Environment and Water	1	$

35	Social Economic	Implement to transform	To activate any future approved specific purpose water access licence owned by Narromine Shire Council, a raw water pump station would need to be approved and constructed on the Macquarie River and new pipeline connection provided to the existing water treatment plant.	Key stakeholder interaction	Medium term	NSC	Facilitate	Department of Climate Change, Energy, Environment and Water	1	$$$
36	Economic Environmental	Modify to enhance	The new advanced wastewater treatment facility to be built in 2025 at Dubbo Sewerage Treatment Plant through a public private partnership allows for exploration of recycled water substitution in water supply reticulation.	Key stakeholder interaction	Short term	DRC	Facilitate	Private enterprise partner	2	$$

37	Economic Environmental	Implement to transform	Develop and lobby for transformative water infrastructure projects that enhance the economic, social and environmental future of the Central Orana Region	Key stakeholder interaction	Long term	DRC and NSC	Facilitate	Department of Climate Change, Energy, Environment and Water Local MPs	1	$$$

Strong farm enterprises and agriculture industry

	System	Resilience scale	Action	Source	Timeframe	Lead	Lead role	Stakeholders	Resilience priority	Cost
38	Social Economic	Modify to enhance	Local agriculture networking opportunities and promotion of information sharing – identification of a local champions.	Community consultation Key stakeholder interaction	Short term	Agricultural businesses and professionals	Support and encourage	NSW Farmers Association WaterNSW NSW Irrigators Council NSW Department of Primary Industries	3	$
39	Social Economic	Modify to enhance	Agriculture industry education needs analysis and development of training program focused on drought management	Community consultation Key stakeholder interaction	Short term	NSW Department of Primary Industries and Regional Development Local Land Services	Facilitate and inform	NSW Farmers Association WaterNSW NSW Irrigators Council NSW Department of Primary Industries and Regional Development	1	$$

40	Social Economic	Implement to transform	Support the development of Indigenous land management education opportunities	Community consultation Key stakeholder interaction	Medium term	Local Indigenous organisations	Support and encourage	Local Indigenous organisations	3	$$
41	Social Economic Environmental	Modify to enhance	Hold a drought symposium and invite leading experts from around the country and world to present	Community consultation Key stakeholder interaction	Medium term	DRC and NSC	Support and encourage	NSW Farmers Association WaterNSW NSW Irrigators Council NSW Department of Primary Industries and Regional Development	3	$$
42	Economic	Implement to transform	Lobby for the development of a feasibility assessment for a feed and fodder cooperative storage facilities	Community consultation Key stakeholder interaction	Long term	NSW Farmers	Lobby	NSW Farmers Local Farm Businesses NSW Department of Primary Industries and Regional Development	3	$$$

Table key:

Timeframe: Short term: 1-2 years; Medium term: 3-4 years; Long term: 5-10 years

Resilience priority: Priority 1 - Critical to resilience; Priority 2 - Important to resilience; Priority 3 - Contributor to resilience

Cost: $ - Existing resources available from stakeholders and partners; $$ - Additional resources required; $$$ - Significant financial support required from stakeholders and partners

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