REGIONAL DROUGHT RESILIENCE PLAN FOR CASTLEREAGH COUNTRY (DRAFT)

7 MARCH 2024

PREPARED FOR:

GILGANDRA SHIRE COUNCIL

WARRUMBUNGLE SHIRE COUNCIL

PREPARED BY:

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Document Record

Revision	Date Issued	Prepared by	Approved by	Comments
0	15/02/2024	Dr Andrew Krause Assoc Prof Anthony Kiem Randall Medd	Randall Medd	Draft for Review
1	4/03/2024	Dr Andrew Krause Assoc Prof Anthony Kiem Randall Medd	Randall Medd	Updated Draft for Review
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Randall Medd
Central West and Orana Region Manager

projects@projence.com.au
www.projence.com.au

<<Important note on formatting/presentation of this DRAFT document>>

<<This DRAFT document has been produced by Projence for content review by the Castlereagh Country RDRP Project Control Group, key stakeholders and also for independent review by CSIRO in accordance with the Independent Review Guide (December 2023). Highlighted text within the document is for the information of reviewers. Projence has used its standard report template for the draft RDRP as a means of controlling section/figure/table linkages and referencing. Example infographics are provided in this DRAFT, but they are considered indicative only. Upon approval of final plan content, the report will receive a graphic design treatment, and the final "look" of the Castlereagh Country RDRP will be made available to the Project Control Group for review and final approval>>

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<<Both the List of Figures and the List of Tables will be removed from the FINAL version of the RDRP. They remain in this draft plan to assist reviewers to navigate the document>>

This project received funding from the Australian Government's Future Drought Fund.

1 Partnering with the Community

The Castlereagh Country Regional Drought Resilience Plan (RDRP) benefits the people of this region by developing a prioritised list of actions and pathways to build drought resilience. Community involvement in co-design of the plan was critical for not only establishing a shared understanding of the local strengths within the combined population, but also in realising the challenges faced by the regional group when our home suffers under drought conditions.

Discussing personal drought experiences was difficult for many of our community members. Engagement was duly respectful of these hardships, but also needed to consider the prevalence of consultation fatigue resulting from a community subject to owing to the ed the insights gained into what has worked in the past and what could be improved in the future now form invaluable understanding which is only achievable through the community's willingness to contribute to its own drought story. From this engagement, grass-roots initiatives have been identified for drought preparation, response and recovery, meaning this is truly a community-led RDRP which supports community understanding and ownership of actions to address resilience.

The online survey, workshops and interviews were used to focus and understand the community views and test the findings from the *Castlereagh Country Drought Resilience Assessment* report, which was prepared to inform and support the RDRP. The result is practical actions that address key areas identified by the community whist still addressing the risks identified in the Drought Resilience Assessment.

<<The following text to be included verbatim, along with engagement outcome statistics, in an infographic>>

Community attention was drawn to the RDRP program through multiple communication methods across radio, social media, Council webpages, email, postal mailout and printed flyers. Direct engagement with community members occurred via online survey, theme-focus community workshops, interviews with industry and community stakeholders, community drop-in sessions and Council workshops. A total of 149 community members were engaged to support strategy development, many of them sharing their experiences of living with drought, and providing insight into how, as a community, we survived the challenges placed upon us, and what programs and potential solutions help us plan for a more resilient future.

Engagement outcome statistics:

- 105 online survey responses
- 2 theme-focus community workshops, 15 participants
- 7 community drop-in sessions, 19 interviews
- 1 Council workshop, 10 participants
- 1167 stakeholders were contacted via email over 5 emails with an average open rate of 42%
- TOTAL: 250 ideas and opinions received

<<Contents within the following table to be made into an infographic>>

Groups Contacted to Contribute to RDRP

Government	Gilgandra Shire	Warrumbungle Shire
NSW Fisheries	GSC Residents – 7	TBC
National Parks and Wildlife Service	Local Aboriginal Stakeholders - 21	
NSW Local Land Services	Community groups – 31	
Lifeline	All Local Businesses – 87	
Rural Financial Councillor	Coo-ee Heritage Centre Volunteers - 21	
Rural Financial Councillor	Castlereagh Country Stakeholders - 11	
RDA Orana	Hotels, Pubs, Clubs – 13	
Department of Primary Industries	Local Accommodation – 20	
Destination NSW	Miller St Businesses – 45	
Drought Signals	GIL Collective Suppliers – 45	
	CHC Gallery Artists – 31	

2 Acknowledgement of Country

<<Messaging below here to be supported by local indigenous background design in final plan>>

We the authors and contributors to the Castlereagh Country Drought Resilience Plan pay our respects to the traditional owners and custodians of the lands encompassing Gilgandra, and Warrumbungle LGAs, the Gamilaraay, Weilwan, and Wiradjuri peoples.

We acknowledge their elders past and present, the communities and representatives today who play a vital role in continuing their connection to the land, and sharing their knowledge, culture and history with all people of the Castlereagh Country region.

3 Message from Your Mayors

As Mayors of Gilgandra and Warrumbungle Shire Councils we take this opportunity of thanking the community for their involvement in the development of the Castlereagh Country Regional Drought Resilience Plan. The towns, villages and localities are recognised as capable communities, with unique environmental and social qualities and highly productive farmland. Agriculture is a significant segment of our economy, with both livestock production and winter cropping dominating land use across the region. The impacts of extended dry seasons and droughts stretch far beyond the agricultural sector, bringing uncertainty and strain to our local communities and the broader economy. However, there are opportunities for diversification of our regional economy to reduce the economic reliance upon agriculture and increase value-adding options and new industries across the Castlereagh Country region.

For this reason, Gilgandra and Warrumbungle Shire Councils are both heavily invested in better understanding climate variability and dry seasons in our local region and how we can support our regional economy. This will allow us to strengthen our preparedness for future dry season events to better withstand the risks of drought and an increasingly changing climate.

Our communities have dealt with natural disasters such as bushfires, floods, storm events and other natural events requiring a coordinated response. Developing a proactive approach to build resilience to future drought can only be a positive action. The most recent drought in 2017-2020 has left deep scares in our community, financially, emotionally, and environmentally. It also showcased the incredible resilience of our communities and highlighted areas that could be improved.

Castlereagh Country is fortunate to participate in Round 2 of the Regional Drought Resilience Planning process which seeks to understand local impacts and opportunities, while also creating pathways to share and learn from other regions.

This three-stage process brings together a region-specific Drought Resilience Assessment, Regional Drought Resilience Plan and Investment Framework targeting drought resilience projects across economic, social, and environmental pillars. The combination of both technical and scientific evaluation, along with extensive local insights, provide a comprehensive picture of the impacts of climate variability and practical future actions to encourage investment in long term risk mitigation and resilience activities.

This community-led plan will ultimately place Castlereagh Country in a position to adapt, recognise opportunities, and implement mitigation activities with the benefit of both local knowledge and learnings from further afield.

We would like to acknowledge and thank everyone who took part in the Regional Drought Resilience Plan program. This input, paired with a strong evidence base, will be invaluable when considering new options for better managing dry seasons and reduced growing season rainfall in the Castlereagh Country region.

We are fortunate to live and work in such a beautiful part of the world, with a strong sense of community. Our Regional Drought Resilience Plan is yet another tool that will help to support our communities to thrive into the future.

Cr Doug Batten	Cr Ambrose Doolan
Mayor	Mayor
Gilgandra Shire Council	Warrumbungle Shire Council

4 Introduction

Australia is a country with a history of drought. In the Castlereagh Country region, unprecedented dry weather over multiple decades has adversely affected the agricultural sector and agriculturally dependent rural and regional communities. These impacts are expected to become more frequent and severe with climate change. Proactive regional drought resilience planning is imperative to developing locally applicable solutions and responses to achieve effective climate adaptation.

The Australian Government's Future Drought Fund (FDF) 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.

5 Castlereagh Country map

<<Final map to contain updates as marked>>

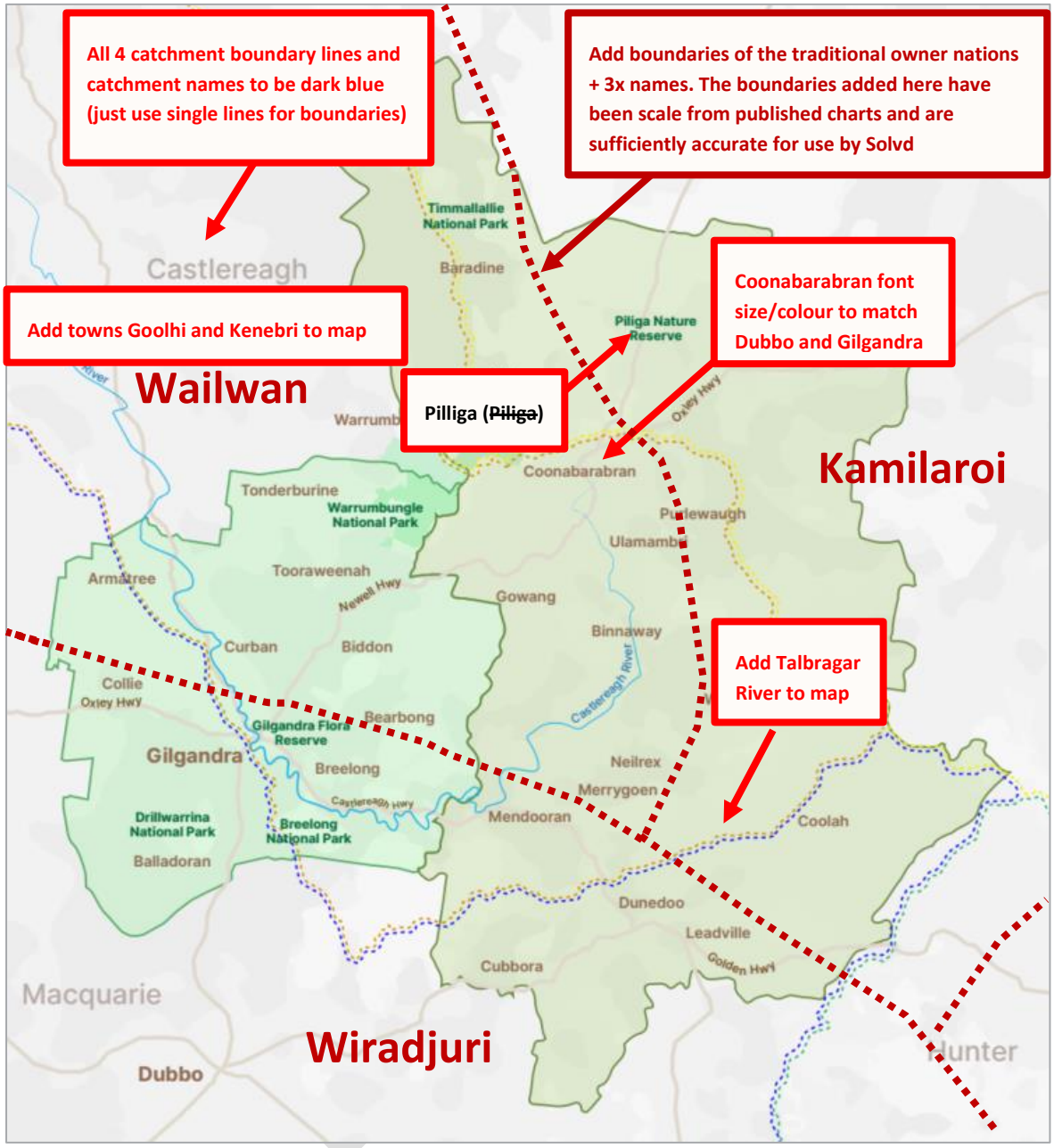


Figure 1: Regional scope of the Castlereagh Country Regional Drought Resilience Plan, including Aboriginal traditional owner nations[1] and river catchments.

[1] This map is based on published map resources and is just one representation of Aboriginal Australia. It indicates only the general location of larger groupings of people which may include smaller groups such as clans, dialects or individual languages in a group. Boundaries are not intended to be exact.

6 Vision

The purpose of the RDRP is to identify actions to prepare for increased climate variability, reduced growing season rainfall, and an increase in the frequency of drought events. This RDRP will inform future investments and assist in securing future funding for communities, the agricultural sector, and regional businesses to help increase drought resilience in the Castlereagh Country region.

Our drought resilience vision for the region has been developed via a grass roots assessment of what can realistically be achieved at community, government, and industry levels to ensure the region is prepared for the current and projected impacts of drought. By creating a shared vision and agreed goals and outcomes, we have set a common direction and aspirational view of our region's future from a drought resilience perspective.

Our drought resilience vision has emerged from stakeholder engagement input which revealed an aspiration in the community to continue to build capacity to withstand the challenges of drought. It is recognised this requires an integrated approach, which shares responsibility across local communities, industry, and all levels of government.

<<The following paragraph is to be placed separately on a single page across a graphic background>>

Our drought resilience vision is 'to build a region that can withstand the impacts of drought and increased climate variability, by creating self-reliant communities, a diverse regional economy, and a sustainable environment'.

7 Drought Resilience at a Glance

<<Draft infographics provided below (will account for 2 pages in the final plan) – infographics to be revised following content approval. There are obvious formatting issues with the example infographics (particularly font sizing), and so reviewers should focus on the appropriateness of the content, all of which is highlighted further below>>

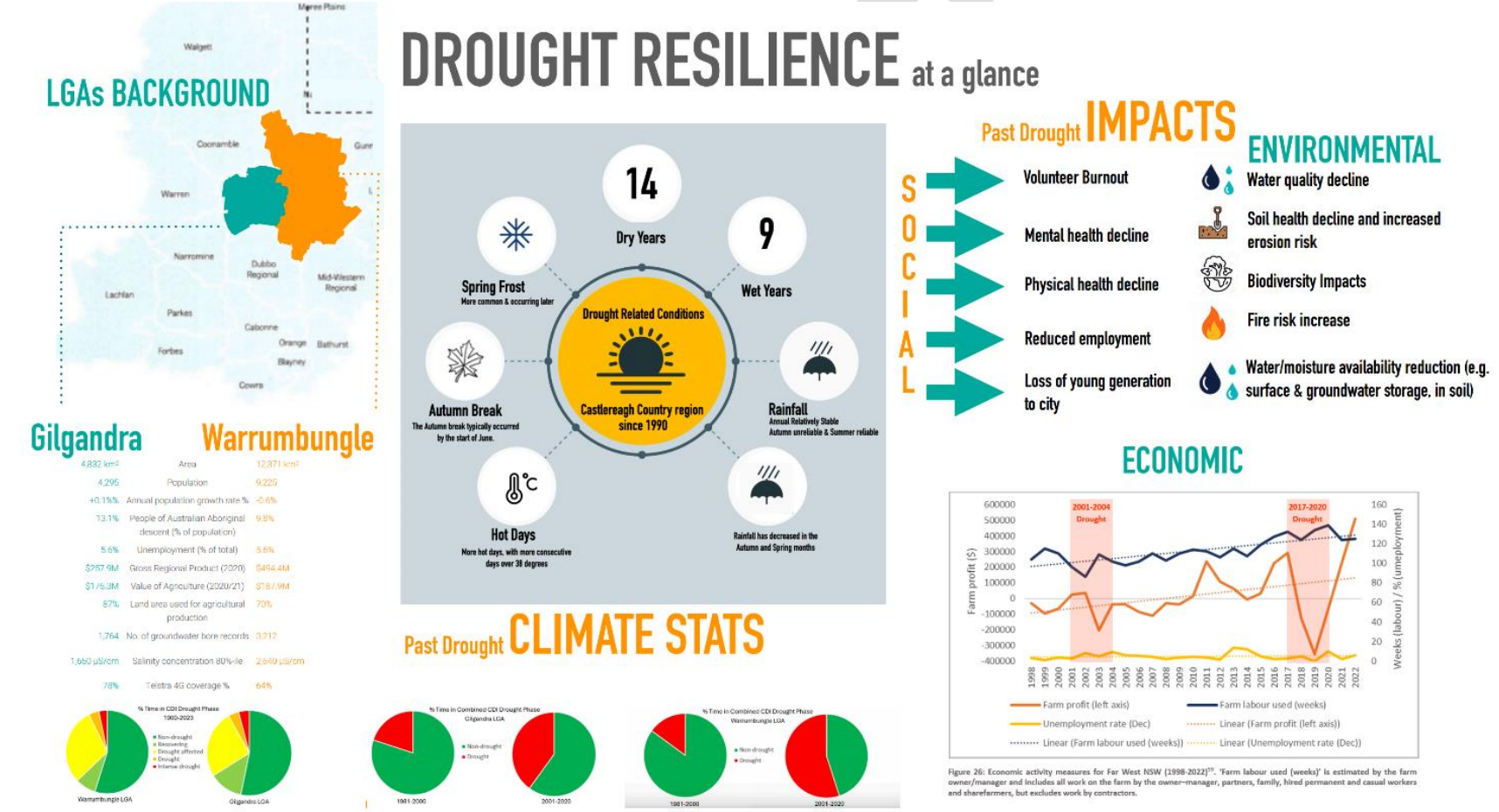


Figure 26: Economic activity measures for Far West NSW (1998-2022)[57]. 'Farm labour used (weeks)' is estimated by the farm owner/manager and includes all work on the farm by the owner-manager, partners, family, hired permanent and casual workers and sharefarmers, but excludes work by contractors.

Future Drought
PROJECTIONS

In the future, it is projected that drought will continue to be a regular occurrence in the Castlereagh Country 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 Castlereagh 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).

- A harsher fire-weather climate in the future (high confidence).

- Fewer frosts are projected (high confidence).

- Average winter/spring rainfall projected to decrease (high confidence).
- Changes in summer/autumn rainfall are possible but unclear and varies by location.
- Increased intensity of extreme rainfall events (high confidence).

Drought **RESILIENCE** status

CATEGORY	INDICATORS	INDEX VALUE
DROUGHT EXPOSURE	1. Current drought exposure 2. Future drought exposure 3. Change in drought frequency (past ~40)	3.8 Gilgandra
DROUGHT SENSITIVITY	4. State Significant Agricultural Land 5. Agricultural employment dependence	
DROUGHT ADAPTIVE CAPACITY	6. Percentage unemployment 7. Telecommunications access 8. Likely groundwater salinity 9. Land and soil capability	4.2 Warrumbungle

Drought Resilience
PROJECTS

1	2	3	4	5	6
STUDY	STRATEGY	STRATEGY	INITIAL FUNDING	SEED FUNDING	BUSINESS PLAN
Regional Water Storage Feasibility	Castlereagh Major Projects Telecommunications Enhancement	Drought Communication	Ag Ideas Business innovation Grant Program	Annual Drought Innovation and Resilience Showcase Field Day	Drought Resilience Community Chest

<<The infographics represent an executive summary, which combines key inputs, understanding and also findings. The following topic areas are covered:

1. Background to LGAs (lite version only here, with a more detailed infographic appearing in Section 10 - Castlereagh Country Profile)
2. Past drought climate stats
3. Past drought economic stats
4. Past drought environmental impacts
5. Past drought social impacts
6. Future drought projections
7. Stakeholder engagement outcomes
8. Drought resilience status (index based)
9. Drought resilience projects selected

1. Background – LGAs

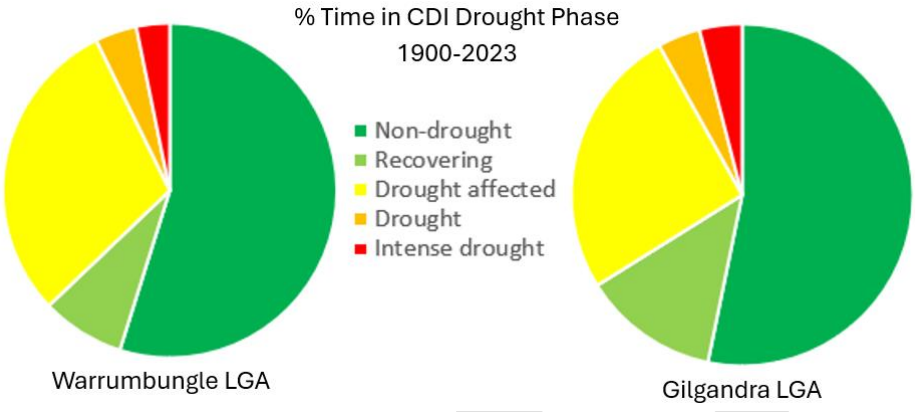
Topic	Characteristic	Warrumbungle	Gilgandra
Demographics	Area	12,371 km^2	4,832 km^2
Demographics	Population	9,225	4,295
Demographics	Population growth rate %	- 0.6%	+0.1%
Demographics	People of Australian Aboriginal descent (% of population)	9.8%	13.1%
Demographics	Unemployment (% of total)[2]	5.6%	5.6%
Economy	Gross Regional Product (2020)	$494.4M	$257.9M
Economy	Value of Agriculture (2020/21)	$187.9M	$176.3M
Agriculture	Land area used for agricultural production	70%	87%
Groundwater	No. of groundwater bore records	3,212	1,764
Groundwater	Salinity concentration 80%-ile	2,640 µS/cm	1,650 µS/cm
Infrastructure	Telstra 4G coverage %	64%	78%

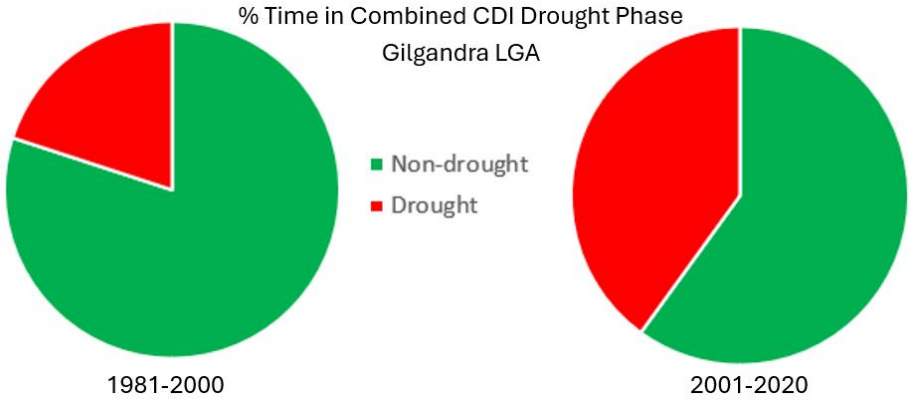
2. Past drought climate stats

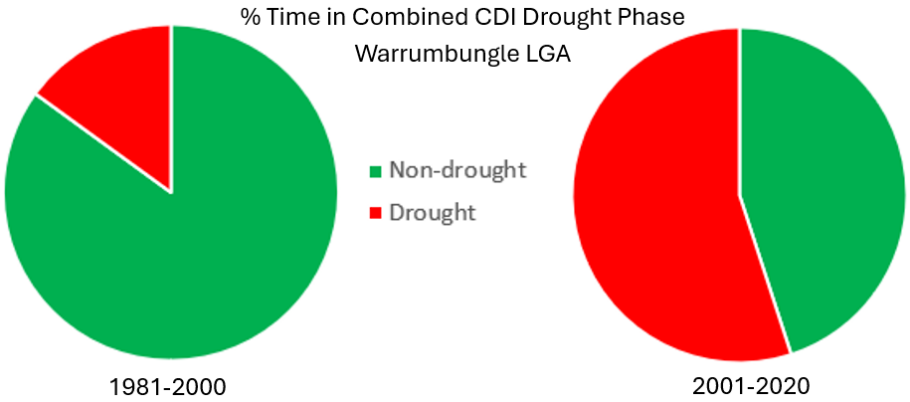
Drought-related conditions in the Castlereagh Country region since 1990 include:

[2] Australian Bureau of Statistics. Income and work: Census - Information on income, occupation and employment. Reference period 2021. Accessed 18 January 2024, <https://www.abs.gov.au/statistics/labour/earnings-and-working-conditions/income-and-work-census/2021>

- Annual rainfall has been relatively stable.
- Dry years have occurred 14 times and wet years have occurred 9 times.
- Rainfall has decreased in the autumn and spring months.
- Summer rainfall has been reliable; autumn has been unreliable.
- The autumn break typically occurred by the start of June.
- Spring frosts have been more common and have been occurring later.
- There have been more hot days, with more consecutive days above 38 °C.







3. Past drought economic stats

Incorporate a version of the below plot

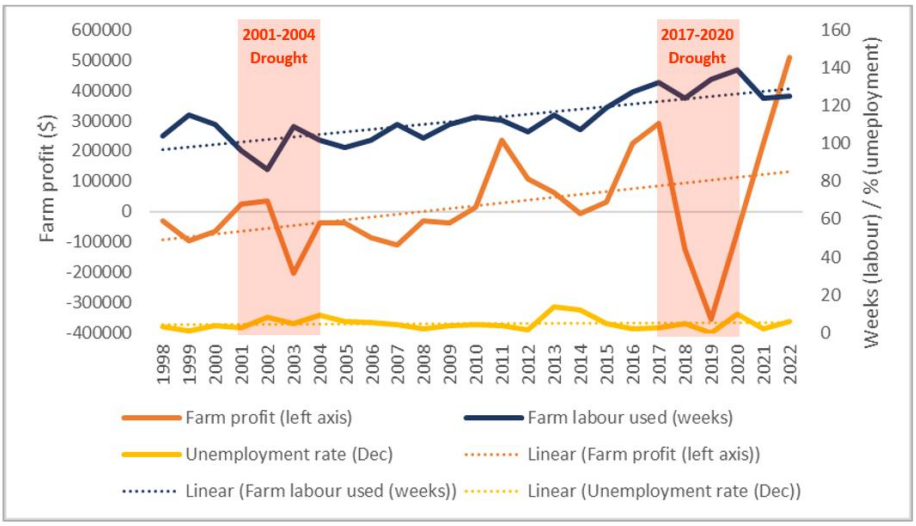


Figure 26: Economic activity measures for Far West NSW (1998-2022)[59]. 'Farm labour used (weeks)' is estimated by the farm owner/manager and includes all work on the farm by the owner–manager, partners, family, hired permanent and casual workers and sharefarmers, but excludes work by contractors.

4. Past drought environmental impacts

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

5. Past 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

6. Future drought projections

In the future, it is projected that drought will continue to be a regular occurrence in the Castlereagh Country 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 Castlereagh 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 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).

7. Stakeholder engagement outcomes

Metric	Indicators
Survey	105 Respondents 73% From Gilgandra Shire LGA 27% For Warrumbungle LGA 55% Female 45% Male 32% Largest age bracket 56 to 70 years of Age 50% Self Employed 41% Employed in Agriculture
Workshop	3 Workshops Conducted Combined 22 People Attended
Drop-In Session	7 Sessions Conducted 25 People Engaged
Interviews	15 Agencies contacted for Input
Communications Channels	13 Facebook Post Newspaper Advertisements 2 Media Release 1 Gilgandra (1200 distribution)

8. Drought resilience status (index based)

Info graphic diagram to be used which relates the below index categories and their respective indicators to the resulting Index value per LGA

Index category	Indicators	Index value
Drought Exposure	1. Current drought exposure 2. Future drought exposure 3. Change in drought frequency (past ~40 years)	Warrumbungle LGA score: 4.2 Gilgandra LGA score: 3.8
Drought Sensitivity	4. State Significant Agricultural Land 5. Agricultural employment dependence	

Index category	Indicators	Index value
Drought Adaptive Capacity	6. Percentage unemployment 7. Telecommunications access 8. Likely groundwater salinity 9. Land and soil capability	

9. Drought resilience projects - $250K remit

Priority Project Name	Project Objectives Overview	Key Benefits Overview	Indicative Project Costs $	BCR
Project 1: Groundwater Access and Availability Online Toolkit	Provide a dedicated online interface that combines all available hydrogeological information on local groundwater, existing water bore infrastructure, details of licensed bores and cost estimates for bore drilling and water licensing.	Improved water management, agricultural productivity, community resilience, and economic development.	150,000	3.33
Project 3: Drought Communication Strategy	Improve local and external communication channels to support drought-affected communities in the Castlereagh Country region.	Increased community awareness, engagement, and support during drought periods.	50,000	4.0
Project 5: Drought Innovation and Resilience Showcase Field Day	Field Day Showcase Promote agricultural resilience and knowledge sharing, enhance community cohesion, and support mental wellbeing.	Increased adoption of drought-resistant agricultural practices, strengthened community cohesion, enhanced agricultural productivity.	35,000	4.29

8 A Plan for Drought Resilience

Of all the climate and weather-related conditions that affect Australia, drought is often the most challenging. New South Wales is prone to periods of persistent drought.

Drought is a defining feature of the climatic cycle of the Australian landscape. In large part this owes 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 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.

The Regional Drought Resilience Planning (RDRP) program is a focus area of the Australian Government's Future Drought Fund. These plans focus on innovative ways to build regional drought resilience, taking steps to plan now to stem the impact of future drought on our region.

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

8.1 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.

8.2 Expected benefits

The RDRPs provide specific projects to help primary producers and communities become more prepared for, and resilient to, the impacts of drought. Benefits may come from strategies which 'maintain to absorb, modify and enhance, or implement to transform' to deal with the stresses of drought.

Implementation funding will be available across the country under the Australian Government's Future Drought Fund.

8.3 Strategic alignment

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

The Future Drought Fund is intended to deliver against three inter-connected strategic priorities:

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

The RDRPs focus on the community as a system where economic, built, environmental and social capacity to endure, respond and evolve through drought are enhanced.

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

Other key strategies with strong linkages and relationships to matters of drought resilience include the Regional Economic Development Strategies (REDS) and NSW State and Regional Water Strategies.

Key tools which support the delivery of the NSW Government's vision for drought ready regions 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.
- NSW Government Department of Primary Industries *DroughtHub*, an online drought assistance and information portal for NSW primary producers.
- NSW Government *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 2). Independent CSIRO review of each RDRP ensures the applied resilience framework allowed for consideration of:

- Absorptive capacity – maintenance of those existing strategies which in the past have proven to absorb drought impacts
- Adaptive capacity – promotion of modification to a system which ultimately results in enhanced future resilience to drought impacts
- Transformative 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.

The Castlereagh Country RDRP has adopted the phrase 'maintain to absorb, modify and enhance, or implement to transform' to reinforce the linkage between intervention actions and desired system influence.

9 About this Regional Drought Resilience Plan

This RDRP is a collaboration between Warrumbungle Shire Council and Gilgandra Shire Council on behalf of the more than 13,000 residents who live across the rural areas and within the many townships, villages, and localities of Castlereagh Country and who collectively call this region their home.

The economic, environmental, and social impacts of drought are real and capable of serious harm to individuals and to the community as a whole. This Castlereagh Country 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 Castlereagh Country 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 Castlereagh Country 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.

9.1 Purpose of the Regional Drought Resilience Plan

The Castlereagh Country 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. There is a strong rural knowledge base amongst the Castlereagh Country community and this co-designed RDRP provides best practice for ensuring drought response is relevant and actionable.

The purposes of this plan are to:

- Create stronger connectedness and greater social capital within communities, contributing to wellbeing and financial security.
- Empowering communities to implement transformative activities that improve their resilience to drought.
- Support more primary producers to adopt whole-of-system approaches to Natural Resource Management to improve the natural resource base, for long-term productivity and landscape health.

The goals of this plan are to:

- Increase understanding of the region's current and future drought resilience, considering the region's unique economic, environmental and social characteristics.
- Form stronger connections, relationships and networks within regions.
- Combine of First Nations' and local knowledge with drought resilience information to make informed decisions.
- Identify actions, pathways and opportunities to improve regional drought resilience, mitigate drought risks and adapt to change.
- Be in a stronger position to implement strategic actions and take advantage of opportunities as they arise.
- Develop concrete actions to address and mitigate short and long term drought impacts.

9.2 The Process undertaken to formulate the Regional Drought Resilience Plan

Department of Regional NSW (DRNSW) 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 DRNSW.

The Resilience, Adaptation Pathways and Transformation Approach (RAPTA) (Figure 2) was used to formulate the RDRP and it governs the process requirements. 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 just as important.

Development of the Castlereagh Country RDRP adopted a considered approach involving processes across three defined stages:

1. Preliminary literature review using the latest scientific knowledge accessible to facilitate a desktop assessment of initial drought resilience understanding of the region.
2. Wide consultation of key stakeholders to establish co-design input pathways to inform development of a Drought Resilience Assessment.
3. 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 benefit-cost evaluation to potential projects across the economic, social and environmental pillars and prioritises projects within funding constraint conditions.

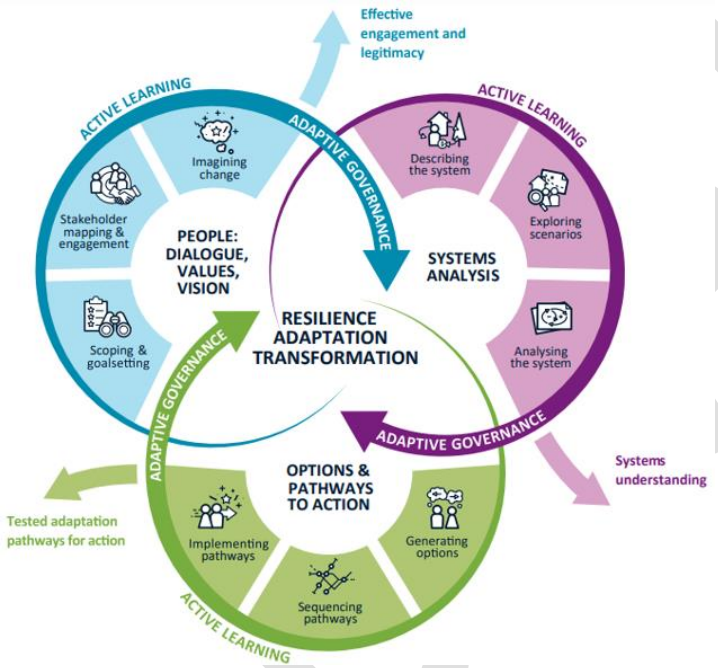


Figure 2: RAPTA processes and modules.[3]

Phase 1 – Desktop review and development of initial resilience understanding

Data sharing was facilitated by the PCG to maximise the knowledge base available to the literature review to best understand 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 were relied on to provide an understanding of current thinking and strategic direction in RDRP development. Socio-economic and land

[3] O'Connell, D, Maru, Y, Grigg, N, Walker, B, Abel, N, Wise, R, Cowie, A, Butler, J, Stone-Jovicich, S, Stafford-Smith, M, Ruhweza, A, Belay, M,Duron, G, Pearson, L, and Meharg, S, 2019, Resilience, Adaptation Pathways and Transformation Approach. A guide for designing, implementing and assessing interventions for sustainable futures (version 2), CSIRO.

utilisation profiles of the region were achieved by describing the population, age structures, employment and labout force characterisitcs, major land uses and their economic activities, water resources and established regional infrastructure. Assessment scale was focused on LGAs, allowing for benchmarking of both the Warrumbungle and Gilgandra Shires.

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 foundation of the desktop assessment of drought impacts in the Castlereagh Country 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.

A preliminary draft Drought Resilience Assessment was commenced based on the desktop findings in preparation for the community stakeholder input.

Phase 2 – Stakeholder Consultation, Co-design and Drought Resilience Assessment Reporting

The PCG approved a Stakeholder and Community Engagement Plan which followed the RDRP conceptual framework, investigating aspects of exposure, sensitivity, impact and adaptive capacity in relation to drought resilience. A stakeholder mapping process was undertaken to identify groups and individuals to consult on the development of the RDRP. The initial consultation stages gathered community experiences of past droughts, highlighting what worked, what didn't work and identifying what the community believes is needed to increase drought resilience in the future. The details and outcomes of the engagement works are captured in the *Castlereagh Country RDRP Stakeholder Engagement Report*.

To inform the development of the RDRP for the Castlereagh Country region, a drought resilience index approach was developed by applying nine 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 *Castlereagh Country 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 (the triple bottom line).

Phase 3 – Detailing Drought Resilience Projects and Priorities for Implementation

The Castlereagh Country stakeholders identified a wide range of actions to improve resilience by looking back at previous droughts. These related to agri-business, land management, health and wellbeing, community networks, drought assistance programs and their coordination, water security, water supply infrastructure and knowledge/information sharing.

Advised by stakeholder input and supplemented by consultant technical experts' understanding and advice, a systematic process was employed to identify projects which fit either of the (i) 'maintain to absorb', (ii) 'modify and enhance', or (iii) 'implement to transform' theory of change model categories.

A total of six transformative priority projects were ultimately identified by the PCG on the basis of recognised potential to advance drought resilience efforts in the region, and also in consideration of the implementation funding constraints of the RDRP progam. Projects were subject to rapid Benefit-Cost Ratio (BCR) to assess economic viability and potential return on investment by considering potential project risks, challenges and associated uncertainties.

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

9.3 Key inputs to the Regional Drought Resilience Plan

The Castlereagh Country RDRP is consistent with 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 also 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:

- Central West and Orana Regional Plan 2041
- NSW Regional Health Strategic Plan 2022-2032
- Department of Planning, Industry and Environment NSW Water Strategy 2021
- NSW Network Infrastructure Strategy A 20-year strategy to transform the NSW electricity network 2023
- NSW DPI Strategic Plan 2022-2030

Regional:

- Castlereagh Regional Economic Development Strategy 2018-2022 - Incorporating Gilgandra Shire Council and Warrumbungle Shire Council
- Castlereagh Regional Economic Development Strategy – 2023 Update
- Country and Outback NSW Destination Management Plan 2022-2030
- Draft Macquarie-Castlereagh Regional Water Strategy

Local:

- Development Strategy Warrumbungle Shire Council – Drought Management Plan 2019
- Warrumbungle Shire Council Community Strategic Plan 2022/2037
- Warrumbungle Shire Council Local Strategic Planning Statement
- Community Action Plans of Baradine, Binnaway, Coolah, Coonabarabran, Dunedoo & Mendooran
- Gilgandra Region Community Strategic Plan 2032
- Gilgandra Local Strategic Planning Statement 2020
- Gilgandra Activation Blueprint

A range of governmental and scientific publications also relied upon to inform the Castlereagh Country RDRP are compiled in Appendix A - Reference List.

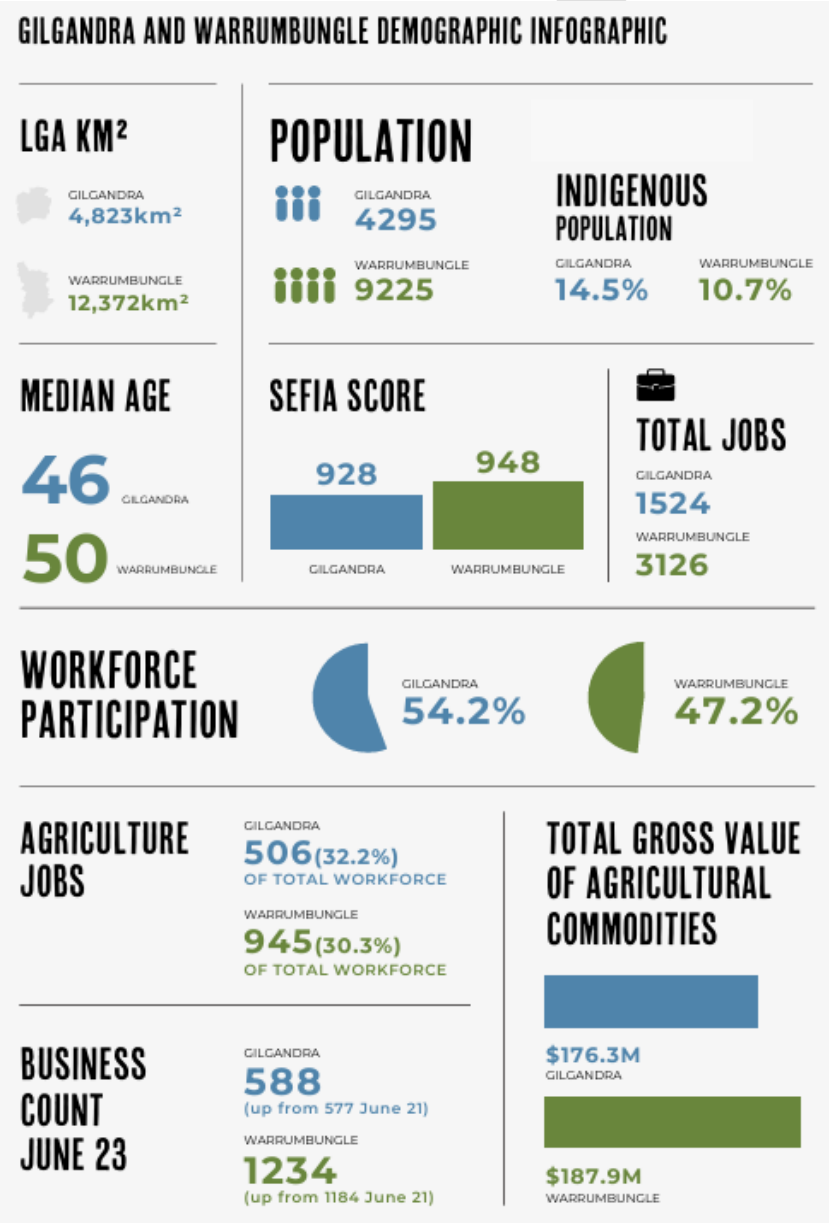
10 Castlereagh Country Profile

Demographics

The Castlereagh Country region includes the Gilgandra and Warrumbungle LGAs and covers an area of 17,203 km^2 in Central West New South Wales. It is home to the Gamilaraay, Weilwan, and Wiradjuri peoples as the Traditional Owners and original natural resource managers of the lands and waters. Key population centres are Coonabarabran and Gilgandra.

The region is well-known for exquisite natural beauty, with major iconic natural assets including the Warrumbungle National Park with its Dark Sky status, which is also home of Siding Spring Observatory, the Pilliga National Park, the Coolah Tops and Castlereagh River.

<<Example infographic provided here – to be refined for final report to summarise key demographic characteristics>>



Economy

Agriculture continues as the key specialisation for the region, generating $364 million to the local economy in 2021 and 48% of the gross regional product (GRP). This is driven largely by a strong sheep, grains, beef and dairy sectors generating approximately 87.5%

of agricultural output. Tourism is also a key source of economic output for the region, with visitors spending $52 million in 2021 (7.0% of GRP), to see the many nature-based tourism assets.

Climate

Monthly mean, maximum, and minimum temperatures averaged across the Castlereagh Country region (Figure 3) 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 it is in the eastern parts of the region, with over 50 hot days per year previously recorded in western region locations.

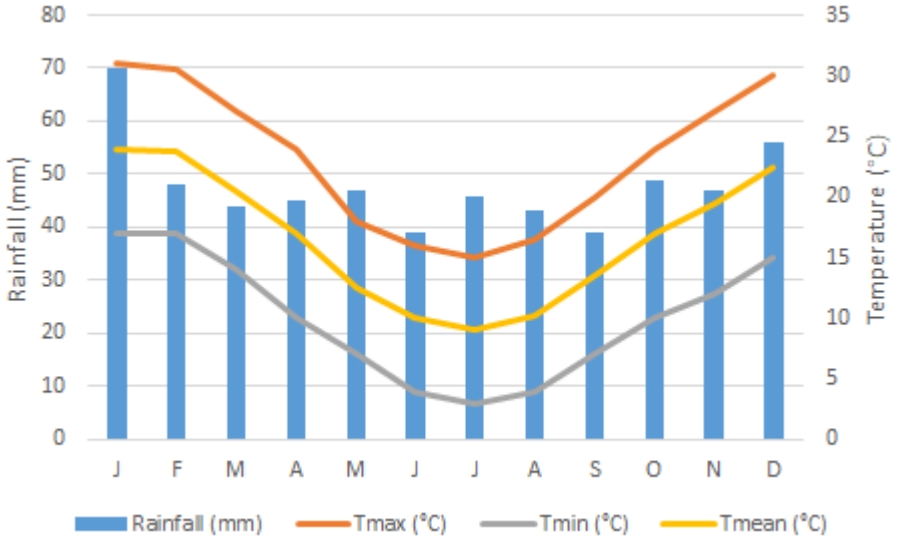


Figure 3: Seasonal rainfall and temperature variations in the Castlereagh region (1960-1991).

Rainfall varies considerably in both space and time across the Castlereagh Country 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 400–600 mm. 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 two 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 Castlereagh Country region from 2018-2020 followed by wetter than average years (and flooding) in 2021 and 2022.

<<The following Table and Figure will be combined into an infographic for the final plan>>

Topic	Characteristic	Warrumbungle	Gilgandra
Demographics	Area	12,371 km^2	4,832 km^2
Demographics	Population	9,225	4,295
Demographics	Observed Mean Annual Population Growth Rate (2016-2021)	-0.6%	+0.1%

Topic	Characteristic	Warrumbungle	Gilgandra
Demographics	Predicted Annual Population Growth Rate (2021-2041)[4]	-0.9%	-1.1%
Demographics	% Population living in townships	86%	69%
Demographics	People of Australian Aboriginal descent (% of population)	9.8%	13.1%
Economy	Gross Regional Product (2020)	$494.4M	$257.9M
Economy	Value of Agriculture (2020/21)	$187.9M	$176.3M
Economy	Value of cattle and calves	$16.7M	$72.2M
Economy	Value of wheat	$84.2M	$30.3M
Agriculture	Land area used for agricultural production	70%	87%
Agriculture	% State Significant Agricultural Land (SSAL)	52%	61%
Groundwater resources	No. of groundwater bore records	3,212	1,764
Groundwater resources	Salinity concentration 80%-ile	2,640 µS/cm	1,650 µS/cm
Infrastructure	Telstra 4G coverage %	64%	78%

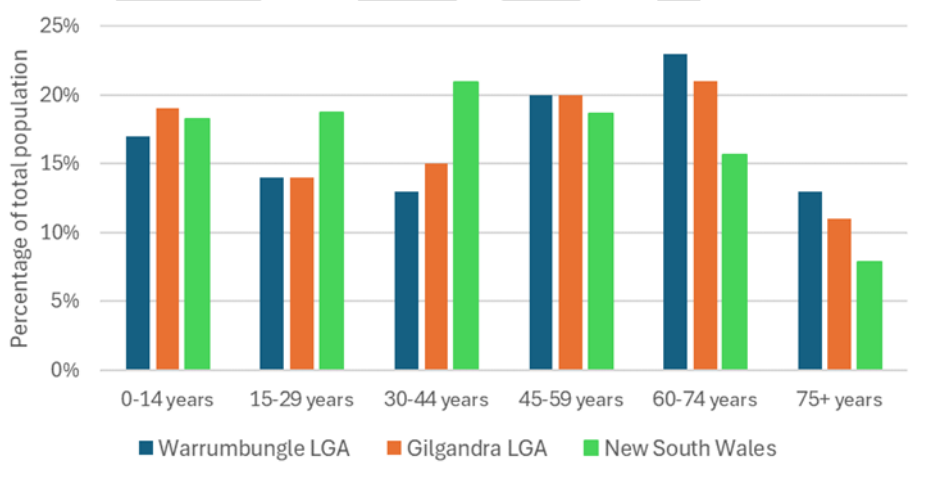


Figure - Population age distribution at the 2021 Census of the Warrumbungle and Gilgandra LGAs compared to the whole of New

[4] NSW Department of Planning, Housing and Infrastructure. Population Projections website. Accessed 1 February 2024. < https://www.planning.nsw.gov.au/research-and-demography/population-projections >

South Wales.

Drought strengths

- Stakeholder feedback indicates communities of the Castlereagh Country region do respond collectively during drought and other naturally occurring emergencies.
- A moderate to high proportion of the region is mapped as State Significant Agricultural Land (SSAL), indicating landscape has capacity to withstand impacts of drought due primarily to existing reserves of land with beneficial biophysical attributes for dryland agricultural enterprises. This is further enhanced, particularly in the Gilgandra LGA, by a high proportion of area with moderate to very high land and soil capability.
- Good to high groundwater quality across the majority 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.

Identified regional strengths are areas to 'maintain to absorb and modify and enhance' in accordance with the RDRP conceptual framework for a successful response to future drought.

Drought 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.
- Population distribution with relatively low proportion of younger working people (15-44 years) compared to elsewhere in New South Wales, indicating low drought adaptive capacity and which also presents challenges in supporting the health and social needs of an ageing population. Residential building approvals have remained consistently below the levels of a healthy housing market, creating difficulty in attracting people of prime working age.[5]
- Low to low very proportion of total area has 4G mobile telecommunication coverage, reducing overall ability of rural landholders to communicate with fellow community members and limiting access to assistance services.
- Limited surface water storage capacity throughout the region threatens agricultural capacity to resist drought stresses.

Identified regional vulnerabilities are areas to 'implement to transform' in accordance with the RDRP conceptual framework for a successful response to future drought.

[5] Department of Regional NSW, 2023. Castlereagh Regional Economic Development Strategy – 2023 Update. <https://www.nsw.gov.au/sites/default/files/2023-02/Castlereagh-REDS-2023-Update.pdf>

11 Our History of Drought Impacts

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).

11.1 Defining drought

The simplest definition of drought is a deficit of water compared with normal conditions. However, it is important to recognise that droughts are more than just a lack of rainfall and that droughts have a wide-range of cascading impacts that may be caused or exacerbated by different factors (Figure 4). 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, that 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 drought 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).

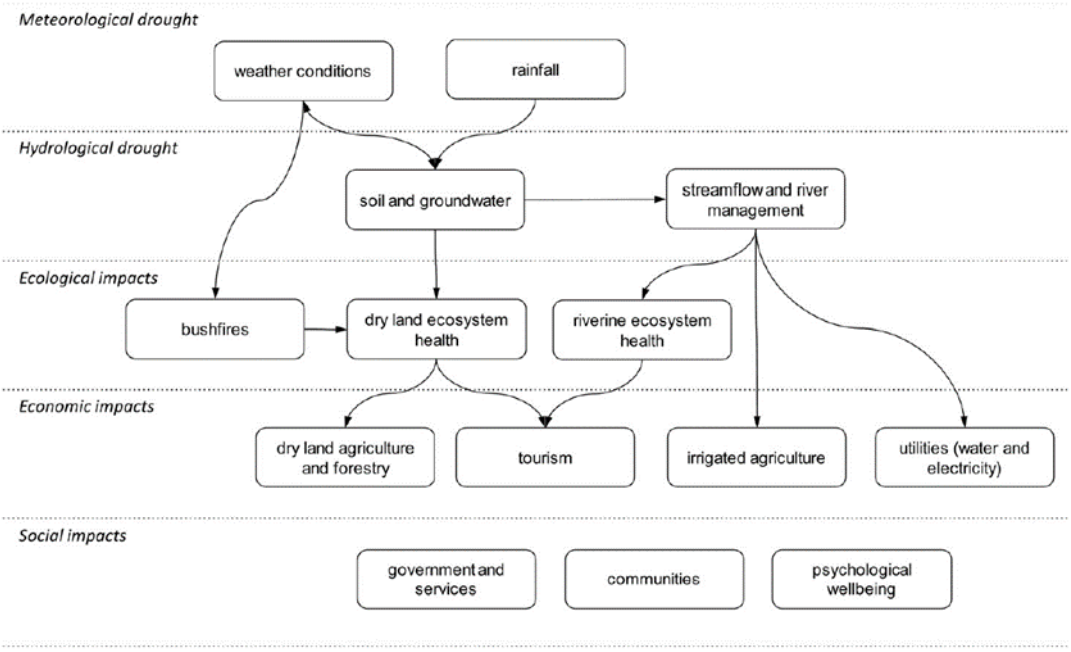


Figure 4: Drought propagation from meteorological drought (i.e. lack of rainfall) through the hydrological cycle and associated environmental, economic, and social impacts[6]

11.2 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. As a consequence, 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)[7]. 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. 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 4) using indices for rainfall, soil, water, and plant growth. Table 1 shows the six drought phases defined by the EDIS using the CDI and provides technical and on-the-ground description of typical field conditions. The six drought phases progress from a Non-drought category where all indicators suggest good conditions for production to recover, through to a Drought Affected (weakening or intensifying) categories, a Drought category and into Intense Drought.

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

Table 1: Phases of drought defined by the Enhanced Drought Information System (EDIS)[8]

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 (weakening)	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.

11.3 Historical drought in the Castlereagh region

The Castlereagh region endured a severe and prolonged period of drought from 2018-2020 (Figure 5). 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 6 shows some recent (since 1980) droughts that have occurred in the Castlereagh Country region that had similar (or worse) impacts to the 2018-2020 drought (the most recent 2018-2020 drought is also included in Figure 6 to enable comparison with earlier droughts). An important point to note from Figure 5 and Figure 6 is the spatial variation in how drought impacts (i.e. rainfall deficits) are experienced across the Castlereagh Country 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

[8] NSW Department of Primary Industries. Combined Drought Indicator, Accessed 26 January 2024. <https://edis.dpi.nsw.gov.au/cdi-drought-phases>

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.

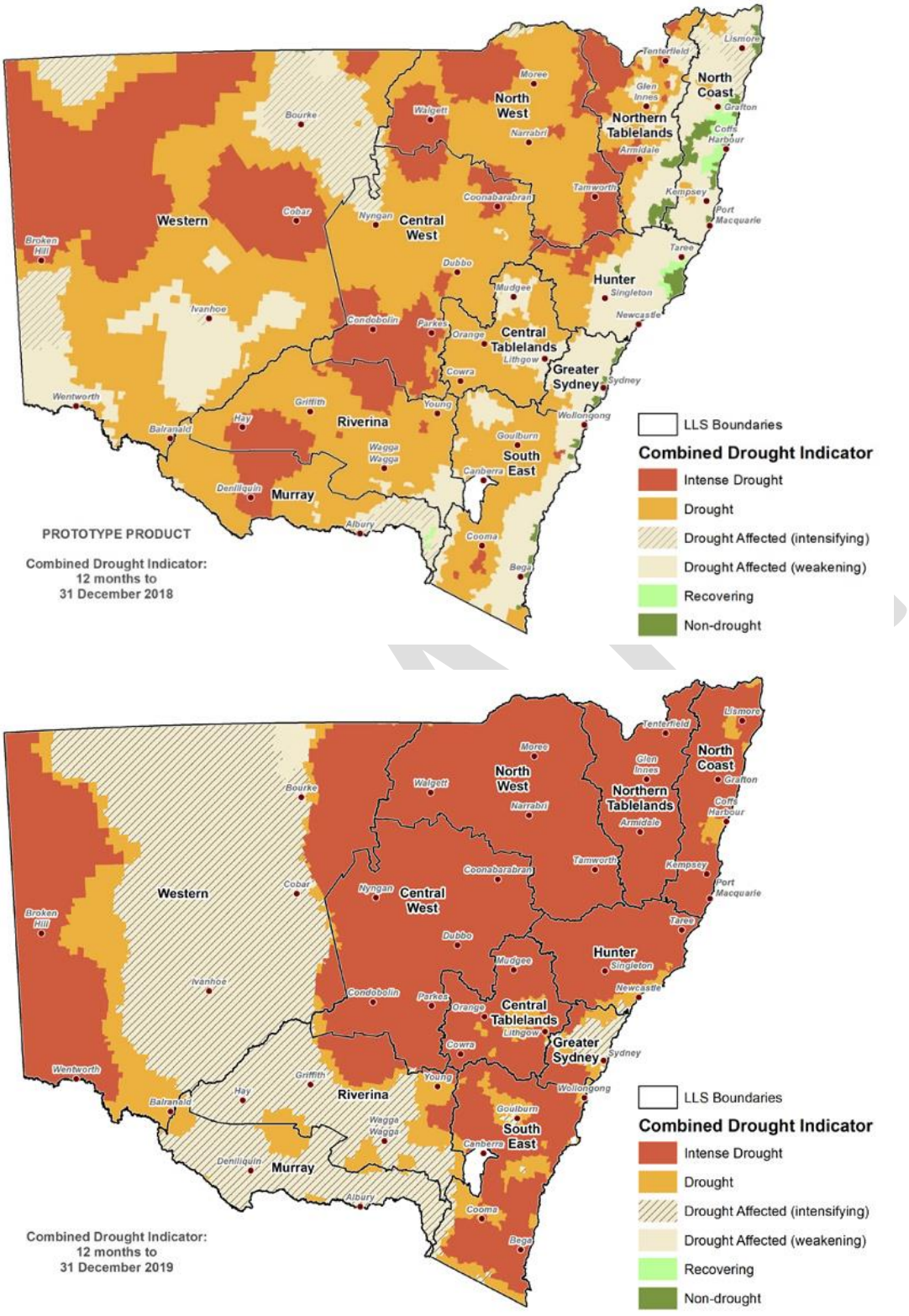


Figure 5: Combined Drought Indicator (CDI) for 12 months to (top) December 2018 and (bottom) December 2019.[9,10]

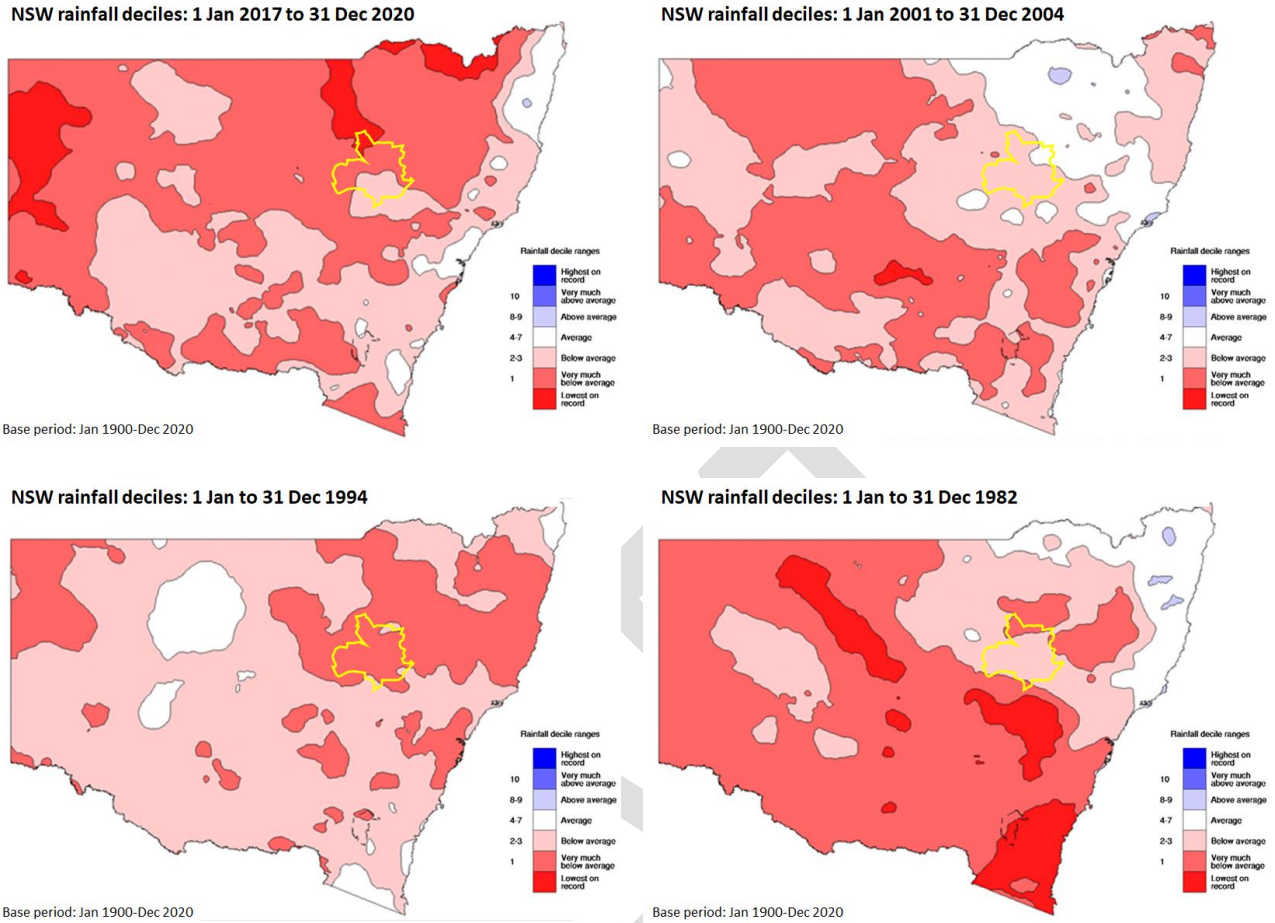


Figure 6: Periods since 1980 associated with drought in the Castlereagh Country region (yellow boundary)

The long-term (1900-2023) historical drought status across the region was determined at representative locations in the Gilgandra Shire (Figure 7) and Warrumbungle Shire (Figure 8) for the *Drought Resilience Assessment for Castlereagh Country* 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.[11]

It is clear drought has regularly occurred within the Castlereagh Country region (Figure 7 and Figure 8). The number of droughts in recent decades (e.g. 2001-2020) is 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 Castlereagh Country RDRP.

[9] 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>

[10] 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>

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

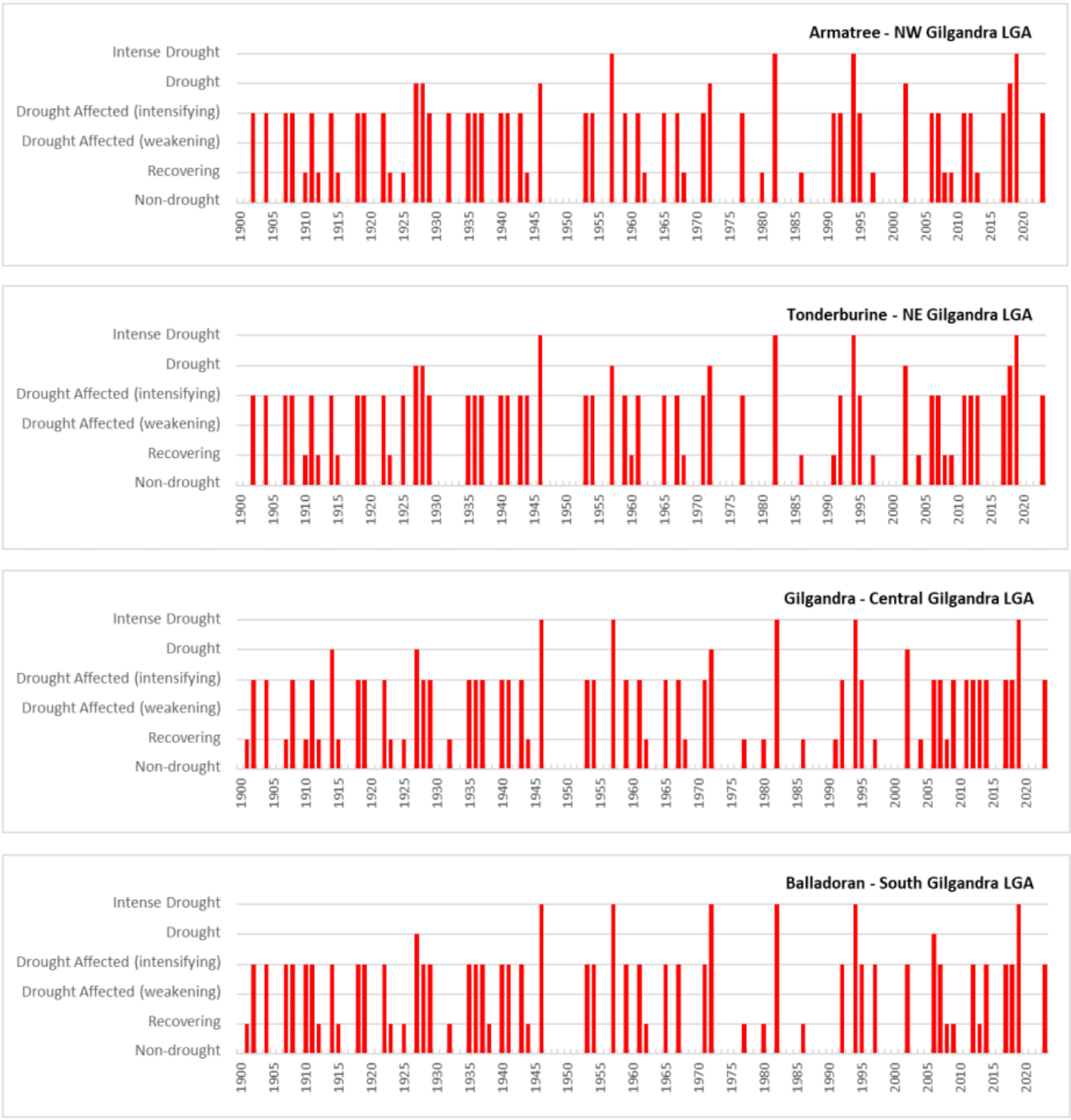


Figure 7: Historical (since 1900) drought phases (as defined in Table 1) at representative locations in the Gilgandra LGA (see map in Figure 1).

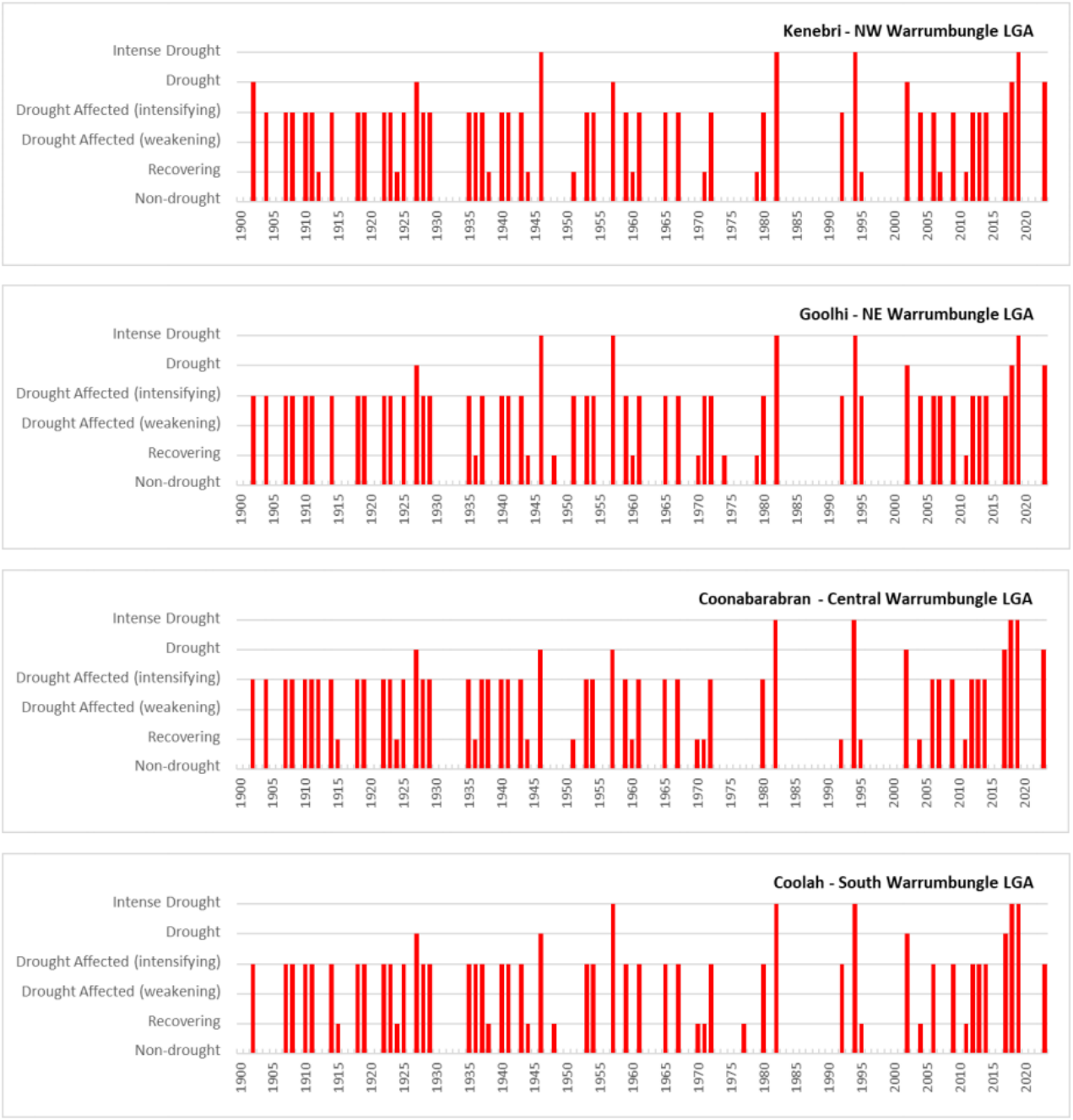


Figure 8: Historical (since 1900) drought phases (as defined in Table 1) at representative locations in the Warrumbungle LGA (see map in Figure 1).

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

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 (2021-2020 minus 1981-2000)
Warrumbungle	Kenebri	3	10	7
Warrumbungle	Goolhi	4	11	7
Warrumbungle	Coonabarabran	2	10	8
Warrumbungle	Coolah	3	9	6
Gilgandra	Armatree	5	8	3
Gilgandra	Tonderburine	4	9	5
Gilgandra	Gilgandra	4	11	7
Gilgandra	Balladoran	5	8	3

11.4 The regional drought context

Acknowledgment of how drought has affected the region in the past across the triple bottom line of social, environmental and economic and characteristics is a foundation of the RDRP's ability to promote the building of drought resilience for the region.

The PCG committed to providing broad, inclusive and transparent consultation, with community at the centre of the RDRP co-design principle. The community and key stakeholders were listened to, and their feedback collected to generate more than 250 ideas and views. Face-to-face and virtual drop-in sessions and workshops during November and December 2023 saw more than 25 community members and stakeholders discuss their experiences with drought and identify opportunities and barriers for resilience. The broader community was invited to share their experience of drought and recommendations via an online survey which had 105 respondents from within the Castlereagh Country region. A separate *Castlereagh Country RDRP Stakeholder Engagement Report* details the extent of consultation achieved.

Each stakeholder has a unique viewpoint formed by personal experiences faced during drought conditions. It is possible that two individuals or community groups may hold opposing opinions on a particular issue. Popular and apparently rival stakeholder responses are considered equally valuable and are conserved in the engagement record for completeness.

Social impacts

- Increased fatigue, anxiety and depression – leading to increased suicide rates.
- Reduced access to greenspace for recreation and exercise caused a decline in wellbeing.
- Increased load on committed individuals and community leaders, which can lead to fatigue and volunteer burnout.
- The timing of rural financial counselling offerings is often disjointed with respect to the commencement and duration of drought periods and also ignores the non-drought periods when rural people have increased time availability for resilience planning.
- Lack of central information sources, coordination between agencies, and streamlined assistance processes were highlighted for improvement.
- Changed demographics as people migrate away from drought-affected areas and industries – particularly young workers.

- Negative mental health impact on farmers believing they are 'poor farmers' in response to destocking pressures or having to destroying stock.
- Community concern regarding the timing and availability of mental health services.
- The extended time required each day to hand feed stock significantly reduces capacity to seek support services.
- The most vulnerable groups (e.g. unemployed and low income) faced housing and subsidy issues, with inadequate support beyond the agriculture sector.
- Limited bathing facilities under tight water restriction scenarios.
- 'Red tape' restrictions to the use of public event hosting infrastructure affects the frequency of community events that bring people together.
- Some community events effectively disseminated information, facilitated connections, distributed essential resources and/or provided relief to younger people.
- Promote more community-driven events, encourage local collaboration, and prioritise resilience-building initiatives.
- Lacking enhancements in education for farmers to assist with management of pastures and stocking rates, to better understand succession planning and to facilitate the passage of innovative learnings between farmers.
- Aligning water restrictions between adjacent LGAs (even when restrictions were not required in the Gilgandra LGA) demonstrates a united approach and provides social support to less water-secure areas.
- Community mental health awareness programs and rural financial counselling services were beneficial.
- Restricted opening hours of community facilities, such as Council pools and laundry services, lessened their potential benefit.

Environmental impacts

- Publicly available groundwater access benefited resilience.
- Strategies for sustainable agriculture, soil conservation, and water infrastructure development require improvement.
- Education on passive cooling, wildlife management, and sustainable gardening practices is deficient across community.
- More encouragement required for diverse species planting, sustainable farming techniques, and infrastructure investments for long-term resilience.

Economic impacts

- External funding lacked coordination, leading to fragmented efforts among agencies, causing confusion about guideline eligibility.
- Challenges in water availability, resulting higher access costs, including carting fees.
- Subsidies (for water, freight and fodder), loans and cash cards for farmers were well-received.
- Efforts to encourage purchasing locally and supporting businesses were acknowledged positively.
- Alarmist media language worked against tourism efforts.
- Ineligibility of farmers to apply for government drought assistance due to existing off-farm income streams (e.g. household member employed in town-based occupation) is a disincentive to diversification.
- Focus on water infrastructure upgrades, education programs, and collaborative efforts for better resource management.
- Allocation of donated good requires improved coordination.

12 Future Drought in the Castlereagh Country region

In the future, it is projected that drought will continue to be a regular occurrence in the Castlereagh Country 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 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 Castlereagh Country region. At all locations the number of growing seasons not associated with drought is projected to decrease and the magnitude of drought is projected to increase (i.e. the number of Intense Droughts is projected to increases at every location and the number of Drought Affected years is projected to increases at six out of eight locations).

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.

LGA	Township location	1. Non-drought	2. Recovering	3/4. Drought Affected	5. Drought	6. Intense Drought
Warrumbungle	Kenebri	-3	-1	4	-1	1
Warrumbungle	Goolhi	-2	0	2	-2	2
Warrumbungle	Coonabarabran	-2	-3	5	-1	1
Warrumbungle	Coolah	-3	2	-1	1	1
Gilgandra	Armatree	-3	-1	2	0	2
Gilgandra	Tonderburine	-2	-2	4	-2	2
Gilgandra	Gilgandra	-1	-2	-1	3	1
Gilgandra	Balladoran	-3	-2	3	0	2

13 Our Drought Resilience Journey

The RDRP is founded on four underlying themes which are underpinned by desired outcomes and priority actions with greatest potential to benefit the community and regional economy by building drought resilience in Castlereagh Country. The project development matrix (Table 4) details 34 assets and/or projects by their theme and theory of change capacity. Key proejct stakeholders have been identified against

<<The following table to be converted into an infographic>>

Theme	'maintain to absorb'	'modify and enhance'	'implement to transform'
Healthy, connected and resilient communities	4	9	2
Infrastructure to support communities and agriculture	0	2	4
Resilient local businesses and regional economy	3	3	3
Sustainable management and use of natural resources	2	2	0
TOTAL	9	16	9

The PCG approved which projects had actions consistent with the requirements of the Federal Drought Fund Agreement's strategic priorities:

- 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.

This selection process ultimately resulted in three RDRP priority projects spanning three of the four thematic framework and targeted for implementation with a view to transform drought resilience in the Castlereagh Country region.

Theme: Healthy, connected and resilient communities

1. Develop and promote Drought Innovation and Resilience Showcase Field Day

Theme: Infrastructure to support communities and agriculture

2. Develop an online groundwater access and availability toolkit.

Theme: Resilient local businesses and regional economy

3. Develop a Drought Communication Strategy

Theme: Sustainable management and use of natural resources

4. No Priority project selected under this theme.

Each of the three RDRP priority projects was subject to Rapid Cost-Benefit Ratio analysis and the findings detailed in the *Castlereagh Country RDRP Priority Projects Rapid BCR Review* report.

Table 4: Project Action Plan

Action Number	Castlereagh Plan Theme	System	Benefits Scale to Resilience	Action	Lead	Stakeholders and Partners	Plan Owner Role	Implementation Timeframe *Short-term: 1-2 yrs* *Medium-term: 3-4 yrs* *Long-term: 5-10 yrs*	Aligned Strategy and Plans	Resilience Priority *1 - Critical* *2 - Important* *3 - Contributor*	Cost Indicator *BCR $ Estimated cost* *$ - Existing Resources available from Stakeholders and Partners* *$$ - Additional Resources Required* *$$$ - Significant Financial Support Required*
1	**Healthy, connected and resilient communities**	Economic Social	Implement to Transform	Develop and promote Drought Innovation and Resilience Showcase Field Day	Gilgandra Shire Council / Warrumbungle Shire Council	Warrumbungle and Gilgandra agri-businesses NSW Farmers Department of Climate Change, Energy, Environment and Water WaterNSW	Facilitate	Short Term	Gilgandra Activation Blueprint Gilgandra Economic Development Strategy Warrumbungle Shire Economic Development & Tourism Strategy 2019 – 2023 Castlereagh Regional Economic Development Strategy	1	$35,000 (BCR assessed)
2	**Healthy, connected and resilient communities**	Economic Social	Implement to Transform	Community Drought Resilience Community Chest / Development Fund	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council	Facilitate	Short Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	2	$35,000 (BCR assessed)
3	**Healthy, connected and resilient communities**	Economic Environmental Social	Maintain to Absorb	Strengthen the promotion of existing drought support resources	Department of Primary Industries	Department of Regional NSW Department of Primary Industries NSW Health	Inform	Short Term	NSW DPI Farm Business Resilience Program	1	$
4	**Healthy, connected and resilient communities**	Social	Maintain to Absorb	Strengthen the promotion of the Mental Health resources available	NSW Health	NSW Health Department of Health and Aged Care	Support and Encourage	Short term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	1	$
5	**Healthy, connected and resilient communities**	Social	Maintain to Absorb	Encourage social events that bring individuals and families together during drought	Gilgandra Shire Council / Warrumbungle Shire Council	Community Service Organisations (e.g. Lions Club/Rotary/CWA) Local Hall Committees Sporting Organisations Local Businesses	Support and Encourage	Short term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	1	$
6	**Healthy, connected and resilient communities**	Social	Maintain to Absorb	Support and encourage training and volunteer recruitment to strengthen and revitalise community volunteer service organisations	Gilgandra Shire Council / Warrumbungle Shire Council	All in-region service organisations and their peak bodies	Facilitate	Short Term	Warrumbungle Shire Council Community Strategic Plan 2022/2037 Gilgandra Region Community Strategic Plan 2032.	1	$

Action Number	Castlereagh Plan Theme	System	Benefits Scale to Resilience	Action	Lead	Stakeholders and Partners	Plan Owner Role	Implementation Timeframe *Short-term: 1-2 yrs* *Medium-term: 3-4 yrs* *Long-term: 5-10 yrs*	Aligned Strategy and Plans	Resilience Priority *1 - Critical* *2 - Important* *3 - Contributor*	Cost Indicator *BCR $ Estimated cost* *$ - Existing Resources available from Stakeholders and Partners* *$$ - Additional Resources Required* *$$$ - Significant Financial Support Required*
7	**Healthy, connected and resilient communities**	Economic Social	Modify and Enhance	Fund Severe Drought Community Response Support Officers hosted by local agencies and shared between local volunteer support groups.	NSW Government	NSW Government	Lobby	Medium Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037 NSW DPI Farm Business Resilience Program	2	$$
8	**Healthy, connected and resilient communities**	Economic Social	Modify and Enhance	Review Community Action Plans in the Warrumbungle Shire to provide achievable delivery actions	Warrumbungle Shire Council	Warrumbungle Shire Council	Facilitate	Short Term	Community Action Plans: Coonabarabran Baradine Binnaway Coolah Dunedoo Mendooran	3	$
9	**Healthy, connected and resilient communities**	Social	Modify and Enhance	Continue investments into community sport and recreation facilities.	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council	Facilitate	Medium Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	3	$$
10	**Healthy, connected and resilient communities**	Social	Modify and Enhance	Lobby State and Federal Government for continued investment in local level data that supports drought decision making	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council Australian Government Department of Agriculture, Fisheries and Forestry NSW Department of Industry	Lobby	Medium Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	3	$
11	**Healthy, connected and resilient communities**	Economic Environmental Social	Modify and Enhance	Develop a Fire Emergency Preparedness Drought Resilience Plan	NSW RFS	Gilgandra Shire Council Warrumbungle Shire Council NSW Rural Fire Service NPWS Forestry Corporation	Lobby	Medium Term	Planning for Bushfire Protection: A guide for councils, planners, fire authorities and developers (November 2019) State Disaster Mitigation Plan	2	$$$
12	**Healthy, connected and resilient communities**	Social	Modify and Enhance	Vulnerable Persons Planning to survive heatwave and environmental impacts of drought	NSW Department of Communities and Justice	Gilgandra Shire Council Warrumbungle Shire Council NSW Housing Department of Communities and Justice Aboriginal Housing Providers	Lobby	Long Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	1	$$

Action Number	Castlereagh Plan Theme	System	Benefits Scale to Resilience	Action	Lead	Stakeholders and Partners	Plan Owner Role	Implementation Timeframe *Short-term: 1-2 yrs* *Medium-term: 3-4 yrs* *Long-term: 5-10 yrs*	Aligned Strategy and Plans	Resilience Priority *1 - Critical* *2 - Important* *3 - Contributor*	Cost Indicator *BCR $ Estimated cost* *$ - Existing Resources available from Stakeholders and Partners* *$$ - Additional Resources Required* *$$$ - Significant Financial Support Required*
13	**Healthy, connected and resilient communities**	Social	Modify and Enhance	Develop a local action plan for community access to existing public amenity assets for use in extreme drought conditions	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council Showground Trusts NSW Department of Education NSW Health	Facilitate	Short Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	3	$
14	**Healthy, connected and resilient communities**	Social	Modify and Enhance	Encourage Education and Youth Support programs that focus on resilience	NSW Department of Education	NSW Department of Education	Lobby	Short Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	2	$$
15	**Healthy, connected and resilient communities**	Economic Social	Modify and Enhance	Develop a local action plan for the management of donations during drought.	Gilgandra Shire Council / Warrumbungle Shire Council	Community Service Organisations	Facilitate and Lobby	Short term		1	$
16	**Infrastructure to support communities and agriculture**	Economic Environmental	Implement to Transform	Develop an online groundwater access and availability toolkit	Gilgandra Shire Council / Warrumbungle Shire Council	Warrumbungle and Gilgandra agri-businesses NSW Farmers Association Department of Climate Change, Energy, Environment and Water WaterNSW NSW Irrigators Council	Facilitate and Inform	Short Term	Central West and Orana Regional Plan 2041 Department of Planning, Industry and Environment NSW Water Strategy 2021 Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2020	1	$150,000 (BCR assessed)
17	**Infrastructure to support communities and agriculture**	Economic Social	Implement to Transform	Develop a business case for a Castlereagh Region Major Infrastructure Projects Telecommunications Enhancement Strategy	Gilgandra Shire Council / Warrumbungle Shire Council	Department of Planning, Housing and Infrastructure Inland Rail Energy Co	Facilitate and Lobby	Short Term	Network Infrastructure Strategy for NSW Central West and Orana Regional Plan 2041 Castlereagh Regional Economic Development Strategy	2	$135,000 (BCR assessed)
18	**Infrastructure to support communities and agriculture**	Social Economic	Implement to Transform	Provide user pay, self-service bulk water filling stations throughout the region.	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council	Facilitate	Medium Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	3	$$$
19	**Infrastructure to support communities and agriculture**	Economic Social	Modify and Enhance	Support Warrumbungle Shire Council to secure water access licences to sustain the Emergency Water Bore Program for town water supply.	Warrumbungle Shire Council	Warrumbungle Shire Council	Facilitate	Short Term	Warrumbungle Shire Council Community Strategic Plan 2022/2037 Warrumbungle Shire Council Drought Management Plan	1	$$

Action Number	Castlereagh Plan Theme	System	Benefits Scale to Resilience	Action	Lead	Stakeholders and Partners	Plan Owner Role	Implementation Timeframe *Short-term: 1-2 yrs* *Medium-term: 3-4 yrs* *Long-term: 5-10 yrs*	Aligned Strategy and Plans	Resilience Priority *1 - Critical* *2 - Important* *3 - Contributor*	Cost Indicator *BCR $ Estimated cost* *$ - Existing Resources available from Stakeholders and Partners* *$$ - Additional Resources Required* *$$$ - Significant Financial Support Required*
20	**Infrastructure to support communities and agriculture**	Economic	Implement to Transform	Lobby for the development of a feasibility assessment for a Feed and Fodder Cooperative Storage Facilities	NSW Farmers	NSW Farmers Local Farm Businesses NSW Department of Primary Industries Department of Regional NSW	Lobby	Long Term	N/A	3	$$$
21	**Infrastructure to support communities and agriculture**	Economic Social	Modify and Enhance	Seek assistance to develop a Transport Infrastructure Management Plan during drought Conditions	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council	Facilitate	Medium Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	3	$$$
22	**Resilient local businesses and regional economy**	Economic Social	Implement to Transform	Develop a Drought Communication Strategy	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council	Facilitate	Short Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037SC WSC Gilgandra Economic Development Strategy Warrumbungle Shire Economic Development & Tourism Strategy 2019 – 2023 Central West and Orana Regional Plan 2041 Castlereagh Regional Economic Development Strategy	1	$50,000 (BCR assessed)
23	**Resilient local businesses and regional economy**	Economic Environmental	Implement to Transform	Develop and implement Ag Ideas Business Innovation Grant Program	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council	Facilitate	Short Term	Gilgandra Activation Blueprint Gilgandra Economic Development Strategy Warrumbungle Shire Economic Development & Tourism Strategy 2019 – 2023 Castlereagh Regional Economic Development Strategy	2	$105,000 (BCR assessed)
24	**Resilient local businesses and regional economy**	Economic Social	Maintain to Absorb	Promote 'Shop Local' and 'Support Local' strategies	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Coolah Chamber of Commerce Why Leave Town Community Bank Gilgandra Bendigo Bank	Support and Encourage	Short term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037SC WSC Gilgandra Economic Development Strategy Warrumbungle Shire Economic Development & Tourism Strategy2019 – 2023	1	$

Action Number	Castlereagh Plan Theme	System	Benefits Scale to Resilience	Action	Lead	Stakeholders and Partners	Plan Owner Role	Implementation Timeframe *Short-term: 1-2 yrs* *Medium-term: 3-4 yrs* *Long-term: 5-10 yrs*	Aligned Strategy and Plans	Resilience Priority *1 - Critical* *2 - Important* *3 - Contributor*	Cost Indicator *BCR $ Estimated cost* *$ - Existing Resources available from Stakeholders and Partners* *$$ - Additional Resources Required* *$$$ - Significant Financial Support Required*
25	**Resilient local businesses and regional economy**	Economic	Modify and Enhance	Build on existing Destination Marketing Programs	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council Destination NSW NSW National Parks and Wildlife Service	Facilitate	Short Term	Warrumbungle Shire Council Community Strategic Plan 2022/2037 Gilgandra Region Community Strategic Plan 2032 Real Country Campaign and Business Case Program Gilgandra Economic Development Strategy Warrumbungle Shire Economic Development & Tourism Strategy 2019 - 2023	3	$$
26	**Resilient local businesses and regional economy**	Economic Environmental	Implement to Transform	Lobby for improved LGA scale datasets relating to economics, land capability and climate.	NSW Department of Primary Industries Department of Agriculture, Fisheries and Forestry	NSW Government	Lobby	Medium Term	Central West and Orana Regional Plan 2041 Castlereagh Regional Economic Development Strategy NSW DPI Farm Business Resilience Program	3	$$$
27	**Resilient local businesses and regional economy**	Economic Social	Maintain to Absorb	Implement existing Regional and Local Economic Development Strategic Plans	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council	Facilitate	Medium Term	Gilgandra Activation Blueprint Gilgandra Economic Development Strategy Warrumbungle Shire Economic Development & Tourism Strategy 2019 – 2023 Castlereagh Regional Economic Development Strategy	1	$$$
28	**Resilient local businesses and regional economy**	Economic Social	Maintain to Absorb	Promote rural/farming information events which involve agricultural knowledge sharing	NSW Department of Primary Industries Local Land Services	Warrumbungle and Gilgandra agri-businesses NSW Farmers Association WaterNSW NSW Irrigators Council NSW Department of Primary Industries	Support and Encourage	Short Term	N/A	3	$
29	**Resilient local businesses and regional economy**	Social Economic	Modify and Enhance	Encourage all businesses to develop financial management tools for economic resilience to drought	NSW Government – Service NSW	Rural Financial Councillors NSW Government Federal Government	Lobby	Medium Term	Gilgandra Economic Development Strategy Warrumbungle Shire Economic Development & Tourism Strategy 2019 – 2023 Castlereagh Regional Economic Development Strategy	2	$

Action Number	Castlereagh Plan Theme	System	Benefits Scale to Resilience	Action	Lead	Stakeholders and Partners	Plan Owner Role	Implementation Timeframe *Short-term: 1-2 yrs* *Medium-term: 3-4 yrs* *Long-term: 5-10 yrs*	Aligned Strategy and Plans	Resilience Priority *1 - Critical* *2 - Important* *3 - Contributor*	Cost Indicator *BCR $ Estimated cost* *$ - Existing Resources available from Stakeholders and Partners* *$$ - Additional Resources Required* *$$$ - Significant Financial Support Required*
30	**Resilient local businesses and regional economy**	Economic Social	Modify and Enhance	Develop Drought Impacted Worker Program	Department of Regional NSW	Gilgandra Shire Council Warrumbungle Shire Council Department of Regional NSW EnergyCo Inland Rail	Facilitate	Medium Term	Gilgandra Economic Development Strategy Warrumbungle Shire Economic Development & Tourism Strategy 2019 – 2023 Castlereagh Regional Economic Development Strategy	3	$$
31	**Sustainable management and use of natural resources**	Social	Maintain to Absorb	Educate on the benefits of drought tolerant species and novel low water use gardening practices	Community	Community	Inform	Short Term	N/A	3	$
32	**Sustainable management and use of natural resources**	Social	Maintain to Absorb	Develop drought tolerant/resilient public green spaces (e.g. community gardens, town ovals)	Gilgandra Shire Council / Warrumbungle Shire Council	Gilgandra Shire Council Warrumbungle Shire Council	Facilitate	Short Term	Gilgandra Region Community Strategic Plan 2017/18 – 2026/27 Warrumbungle Shire Council Community Strategic Plan 2022/2037	3	$
33	**Sustainable management and use of natural resources**	Environmental	Modify and Enhance	Lobby State government to provide conservation measures for the protection of wildlife affected by drought.	NPWS	NPWS	Lobby	Long Term	National Park Plans of Management	3	$$$
34	**Sustainable management and use of natural resources**	Economic Environmental	Modify and Enhance	Lobby State government to provide proactive strategies for feral and invasive pest species control and management during drought.	Local Lands Services	NPWS NSW Forestry Corporation NSW Department of Primary Industries Local Land Services	Lobby	Medium Term	National Park Plans of Management Regional Pest Management Strategic Plan	3	$$$

14 Monitoring, Evaluation and Learning (MEL)

To ensure transparency and adaptive management feature in the long-term management of RDRP actions, the Future Drought Fund's Monitoring, Evaluation and Learning (MEL) framework outlines the rationale, scope and approach for monitoring and evaluating the activities carried out under the Funding Plan, and for the generation and sharing of knowledge gained through funded activities about how to build drought resilience.

To achieve the MEL evaluation objectives, a continuous view of implementation progress (gained through monitoring), a periodic view of performance and achieved public benefits (gained through evaluation) and opportunities to reflect on, and use, the evidence generated to further support innovation, collaboration and improvement to realise the ambition of the Future Drought Fund (gained through learning).

Both Gilgandra and Warrumbungle 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 Castlereagh Region RDRP and have existing pathways to engage with other levels of government to facilitate actions of the plan. Support will also be drawn from key local organisations, to guide and advocate for the actions on building drought within the region.

14.1 Key Evaluation Criteria

The Castlereagh Country RDRP has four key 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 stakeholder working together effectively, and can efficiency be improved?

14.2 Assumptions underpinning the implementation of the RDRP

The Future Drought Fund MEL plan identifies the outcomes for the RDRP to be effectively implemented. Key assumptions affecting outputs for 1 to 2 years outcomes:

- Regional stakeholders have the capacity and capability to participate in strategic planning
- Regional stakeholders are willing to cooperate with each other on regional planning
- Program design is sufficient to give regional stakeholders opportunities to identify and communicate regional drought resilience needs
- Relevant planning at other scales can be aligned
- Regional communities are motivated to take ownership of completed plans and actively seek to implement them
- Communities are willing to share learnings with other regions
- There are sufficient learnings to inform future program design

Key indicative intermediate outcomes (2 to 4 years)

- Supporting consortia of local governments/stakeholders representing a region will result in changes in practice through those regions
- There are sufficient opportunities for regions to implement elements of plans
- Plans contain implementable activities to build drought resilience across Australia
- Regions continue to review, update and implement their plans

These assumptions will need to be monitored during the implementation phase to provide feedback and highlight areas that require further intervention.

14.3 Monitoring progress and evaluating outcomes

The following tables are based on the relevant Future Drought Fund MEL framework indicators and the actions developed in this RDRP. The Plan includes a number of indicators against identified actions.

Table 5: MEL impacts after more than four years (4+)

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. • People, culture and communities: Communities' drought resilience has improved. • Economy: Business owners are pursuing opportunities to increase financial security of their business before, during and after drought. • Landscape and natural environment: Land managers are implementing land management practice 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.	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 taking into account climate, market and other influences impacting on this outcome.

Table 6: MEL long-term outcomes after more than four years (4+)

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, along and 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 and Innovation Hub to ensure that key indicators for the region are captured and provided over time. • Recording case studies of changes made and benefits evident as a result of actions taken from the implementation of the RDRP.

Table 7: MEL success measures and intermediate outcomes 2–4 years

FDF Standard Indicators	Specific Regional Indicators	Evaluation Approach
Actions have been taken based on the plans: • The majority of 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. • 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.	**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. **Action steps have been taken in line with the Action Plan tables around the key outcome areas of:** • People, culture and community • Economy • Landscape and natural environment • Infrastructure and built environment Implementation steps have been undertaken as per the Communication engagement table.	**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. • 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 changes highlighted. • What decisions and/actions they have taken – or aware of – that have been initiated as a result of the Plan. • How the RDSP has impacted on extra resourcing or support to the region to improve drought resilience.

FDF Standard Indicators	Specific Regional Indicators	Evaluation Approach
• Natural resource management capability is improved across 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 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.

15 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 is able to 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 socioeconomic 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).

Term	Definition
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).
Intentional redundancy	Spare or reserve capacity that provides options for responding to change and shocks.
Intervention options	Alternative or complementary actions, projects, programs, policies, initiatives and investments that are planned to bring about change in the system (Maru et al., 2017).
Local knowledge	Local knowledge and First Nations knowledge incorporates elements of lived experience within a landscape, bearing witness to the operation of systems. It includes aspects of people, landscape, culture – how people interact with surroundings and as part of communities and processes.
Megatrends	Major global or regional influences that have driven change in the past and are expected to shape change into the future.

Term	Definition
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 feedbacks. 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).
Social resilience	The ability of the human society to cope with a diverse range of stresses and shocks while maintaining existing social and community functions.
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).

Term	Definition
Threshold	The point at which a change in a level or amount a controlling variable causes a system to shift to a qualitatively different regime. Also referred to as a tipping point (Folke et al., 2010).
Tipping point	See 'Threshold'.
Transform	The process of radically changing or building a new system with different structure, functions, feedbacks and identity (Folke et al., 2010).
Transformation	The process of radically changing or building a new system with different structure, functions, feedbacks 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).

16 Appendices

Appendix A Reference List

<<Reference footnotes to be transferred here upon approval of plan>>