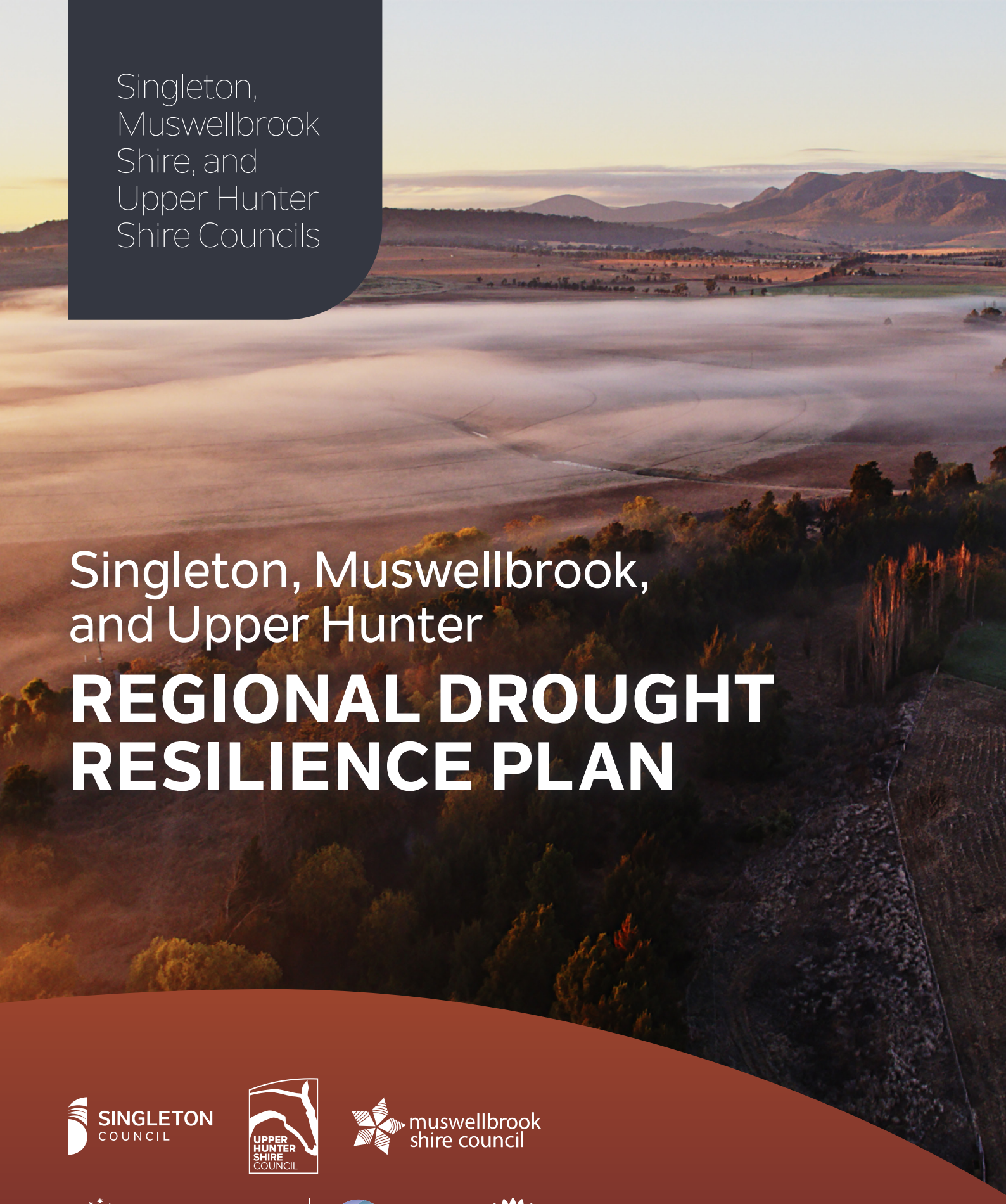
Singleton, Muswellbrook Shire, and Upper Hunter Shire Councils



Singleton, Muswellbrook, and Upper Hunter

REGIONAL DROUGHT RESILIENCE PLAN

SINGLETON COUNCIL

UPPER HUNTER SHIRE COUNCIL

muswellbrook shire council

Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

NSW GOVERNMENT

Jointly funded by the Australian Government and the NSW Government under the Future Drought Fund

Baiame Cave, Wonnarua/Wanaruah Country, Milbrodale (provided by Singleton Council, 2021)

ACKNOWLEDGMENT OF COUNTRY

Ngayan marrungku paran wiyan Wanarruwa, mirumalikan para ani parraykupa, ngatan ngayan marrung wiyan Ngarrakay paranpa yurakaykal ngatan pangaykal.

We acknowledge the Wonnarua people, traditional keepers of this land, and we pay respects to their Elders, past and present.

CONTACT

SINGLETON COUNCIL
12-14 Queen Street, Singleton
PO Box 314, Singleton NSW 2330
T 02 6578 7290
E council@singleton.nsw.gov.au
W singleton.nsw.gov.au

MUSWELLBROOK SHIRE COUNCIL
Campbell's Corner
60-82 Bridge Street, Muswellbrook
PO Box 122, Muswellbrook NSW 2333
T 02 6549 3700
E council@muswellbrook.nsw.gov.au
W muswellbrook.nsw.gov.au

UPPER HUNTER SHIRE COUNCIL
136 Liverpool Street, Scone
34-40 Vennacher Street, Merriwa
47 Mayne Street, Murrurundi
PO Box 208, Scone NSW 2337
T 02 6540 1100
E council@upperhunter.nsw.gov.au
W upperhunter.nsw.gov.au

CONTENTS.

LETTERS FROM THE MAYORS

History shows that drought is a recurring event in Australia, but it's almost impossible to predict when—and for how long—it will occur. Worse still, the impacts of climate change have injected further difficulties to being able to predict the severity of all weather events, including droughts. That's why the Regional Drought Resilience Plan is so important. This collaborative approach with our neighbours in Muswellbrook and Upper Hunter LGAs aims to better equip our communities, our economies and our environment to bounce back quicker and stronger - especially when times are tough.

I acknowledge and thank everyone who has been involved in the development of this Plan, and look forward to the positive outcomes that will benefit our communities.

Cr Sue Moore

Mayor of Singleton

Our Upper Hunter Region has a remarkable landscape.

As weather conditions become more unpredictable with climate change, it is imperative that our Region is well-equipped with the right tools and information regarding all facets of extreme weather management.

The Regional Drought Resilience Plan is a forward thinking and collaborative approach for future environmental threats. As a direct result of the investment in this strategic drought plan, Upper Hunter communities will become stronger, allowing them the opportunity to flourish during these hardships and not rely solely upon our collective tenacity of spirit and resilience.

I wish to express my gratitude to those who contributed to this initiative. These collective insights and shared experiences will further safeguard us from the emotional, economic and environmental uncertainty that comes with such extremities that are commonplace within our country.

Cr Steve Reynolds

Mayor of Muswellbrook

As a farmer, I still remember the toll the 2017 - 2020 drought took on all of us—not just on our land, but on our minds as well. Water carting, dry dams, the constant uncertainty—it wasn't just a devastating time; it was mentally exhausting. That's why this Drought Resilience Plan is so important to me. Working alongside Singleton and Muswellbrook councils, we've crafted a plan that draws from our own hard-earned experiences, not just to protect our farms, but to safeguard our well-being. I'm deeply grateful to our community for sharing your wisdom. It's your insights that make this Plan truly effective, ensuring that when the next challenge comes, we'll be ready—stronger, more resilient, and united.

Cr Maurice Collison

Mayor of Upper Hunter

GLOSSARY OF KEY TERMS

Absorptive capacity

The ability of individuals and groups to continue without adapting or changing their behaviour in response to environmental and socioeconomic changes.[1]

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.[2]

Adaptive capacity

The ability of individuals and groups to adjust and respond to environmental and socioeconomic changes.[2]

Adaptive governance

Adaptive governance is defined by a focus on decentralised decision-making structures and procedurally rational policy, supported by intensive natural and social science. Decentralised decision-making structures allow a large and complex problem like global climate change to be factored into many smaller problems, each more tractable for policy and scientific purposes.[3]

Blue-sky thinking

Brainstorming without limits or being grounded in reality, opening possibilities for creativity without practical constraints.

Co-design

The process of partnership, using participatory methods to develop project delivery and agree objectives and needs. A process of working together utilising generative and explorative processes.

Community-centred

An approach where the local and regional community work together to identify goals that are important to them, develop and implement plans to achieve those goals, and create collaborative relationships internally and with external actors - all while building on community strengths and local leadership.

Drought

Drought in general means acute water shortage. Drought is a prolonged, abnormally dry period when the amount of available water is insufficient to meet our normal use.[4]

Drought in the Singleton, Muswellbrook, and Upper Hunter Region means a recurrent natural phenomenon compounding existing stresses causing extensive impacts. Drought is fully acknowledged across all three LGAs.

Drought resilience

Drought resilience is a measure of a system's ability to absorb, respond and recover to drought risks. In the Singleton, Muswellbrook, and Upper Hunter Region, drought resilience means community resilience and empowerment to respond to and prepare for environmental, social, and economic challenges during times of drought.

Economic resilience

The ability of the economy to absorb the economic impact of shocks and stressors without changing the economic status or outcomes.[2]

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.[2]

Exposure

The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected.[5]

Feedback loop

Feedback loop is a process where the output of a system is fed back into the input, resulting in circular cause and effect that can either amplify or diminish the effects of droughts. It is used to visualise the interdependencies and interrelations of causes and effects across different systems.[6]

Green drought

Green droughts refer to instances when vegetation retains a green top, but growth is stunted, and soil moisture stress has been impacted for over a month.[7] During a green drought there is insufficient rainfall to saturate the soil to generate runoff into rivers and dams.

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 or informally institutionalised.[2]

Hunter Region

Throughout this report, the word Region (capitalised) is used to refer to Singleton, Muswellbrook, and Upper Hunter Council areas. There is no set definition of what constitutes the Hunter, Greater Hunter, Lower Hunter, Upper Hunter, Hunter Valley, or Hunter region. Different entities use these terms, often interchangeably and often without clearly delineating exactly which LGAs they are referring to. Where this Plan references statistics, we have used the terminology from the originating report.

Intervention options

Alternative or complementary actions, projects, programs, policies, initiatives, and investments that are planned to bring about change in the system.[8]

Local knowledge

Local knowledge and First Nations knowledge incorporate elements of lived experience within a landscape, bearing witness to the operation of systems. It includes aspects of people, landscape, culture – how people interact with surroundings and as part of communities and processes.

Maintain

Maintaining actions, or maintaining the system, refers to efforts to keep the Region (as it currently exists) the same i.e., maintaining the status quo.

Megadrought

Drought persisting multi-years and of extreme severity. Drought lasting decades.[9]

Modify

Efforts to modify the system. It refers to efforts working to adapt part of the system to meet newly defined goals.

Planetary boundary

The planetary boundaries concept, developed by Stockholm Resilience Centre, Stockholm University, presents nine boundaries for safe operation, where humanity can develop and thrive for future generations. These include climate change, novel entities, biosphere integrity, land-system change, freshwater change, biogeochemical flows, ocean acidification, atmospheric aerosol loading, and stratospheric ozone depletion. All boundaries are assessed, and six of the nine boundaries have been crossed. Crossing boundaries means increasing the risk of generating large-scale abrupt or irreversible environmental changes.[10]

Resilience

The ability of a system to absorb a disturbance and reorganise, so as to maintain the existing functions, structure and feedback.[11] Also see general resilience, specified resilience, economic resilience, environmental resilience, and social resilience. For the Region, community emphasised the need for proactive resilience, with the ability to "ride the wave" and "roll with the punches" to find a way to cope with financial, environmental, and social challenges arising during drought.

Risk

The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems.[5]

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.[12]

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.[2]

Stressor

An event that occurs gradually over a timeframe that causes an adverse effect, e.g., drought.[2]

Systems

The interaction of processes, networks, and inter-dependencies across a complex 'whole'.

The Region

Singleton, Muswellbrook, and Upper Hunter Region. “The Region”, “Our Region” or variations of such have been used interchangeably throughout the Plan.

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.[8]

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.[13]

Trends

Major global or regional influences that have driven change in the past and are expected to shape change into the future.[14]

Transform

Transformative actions aim to change the existing system, creating a new reality (also see Transformation).

Transformation

The process of radically changing or building a new system with different structure, functions, feedback, and identity.[2]

Trigger point

A pre-agreed situation or event, that when met, activates a management intervention. Trigger points are usually defined in the planning phase. [2]

Triple bottom line

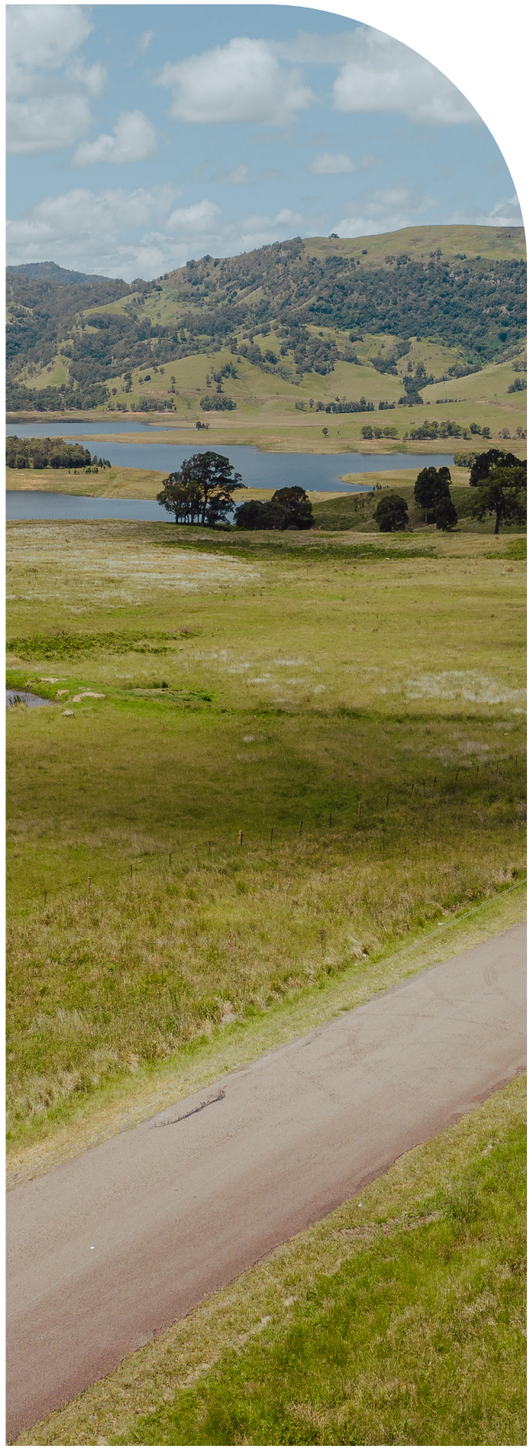
A concept traditionally derived from accounting framework that demands organisations to meet the goal of sustainable development. This approach seeks to equally focus on economic, social, and environmental outcomes.

Value add

The difference between the value of goods and the cost of materials or supplies used to produce them.[15]

Vulnerability

The propensity or predisposition to be adversely affected.[5]



KEY ABBREVIATIONS

°C	Degrees Celsius
ABS	Australian Bureau of Statistics
BoM	Bureau of Meteorology
CBA	Cost Benefit Analysis
CBD	Central Business District
CDI	Combined Drought Indicator
COVID-19	Coronavirus disease 2019
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSPs	Community Strategic Plans
DPIRD	Department of Primary Industries and Regional Development
FDF	Future Drought Fund
FIFO	Fly-In Fly-Out
GL	Gigalitre(s)
GRP	Gross Regional Product
GVA	Gross Value Added
IP&R	Integrated Planning and Reporting
kL	Kilolitre(s)
kL/y	Kilolitre(s) per year
LALC	Local Aboriginal Land Council
LGA	Local Government Area
MEL	Monitoring, Evaluation, and Learning
NEMA	National Emergency Management Agency
NSW	New South Wales
PCG	Project Control Group
RAMHP	Rural Adversity Mental Health Program
RAPTA	Resilience, Adaptation Pathways, and Transformation Assessment
RCP	Representative Concentration Pathway
RDR Plan	Regional Drought Resilience Plan
RDRP	Regional Drought Resilience Planning
REDS	Regional Economic Development Strategies
SDGs	Sustainable Development Goals
SROI	Social Return on Investment
UFW	Unaccounted For Water
UHWUA	Upper Hunter Water Utilities Alliance

01

ABOUT THIS PLAN.

A PLAN FOR DROUGHT RESILIENCE

Drought is a recurring event in Australia. Australian history is punctuated by periods of economic, social, and environmental hardship associated with these extended dry conditions, with the most severe living on in our memories through their names: the Federation drought, the Millennium drought, the 2019/20 drought to name a few.

Droughts are difficult to predict with limited warning as to duration, severity, or extent. It becomes more challenging to simulate future drought conditions due to a lack of understanding around the contributing physical factors, including those of climate change. Their slow, chronic nature often means that by the time a drought is identified, the opportunity for implementing change (implementing mitigation or adaptation measures) is lost.

Droughts are expensive: the 2019/20 drought cost $5.5 billion across NSW.[16]

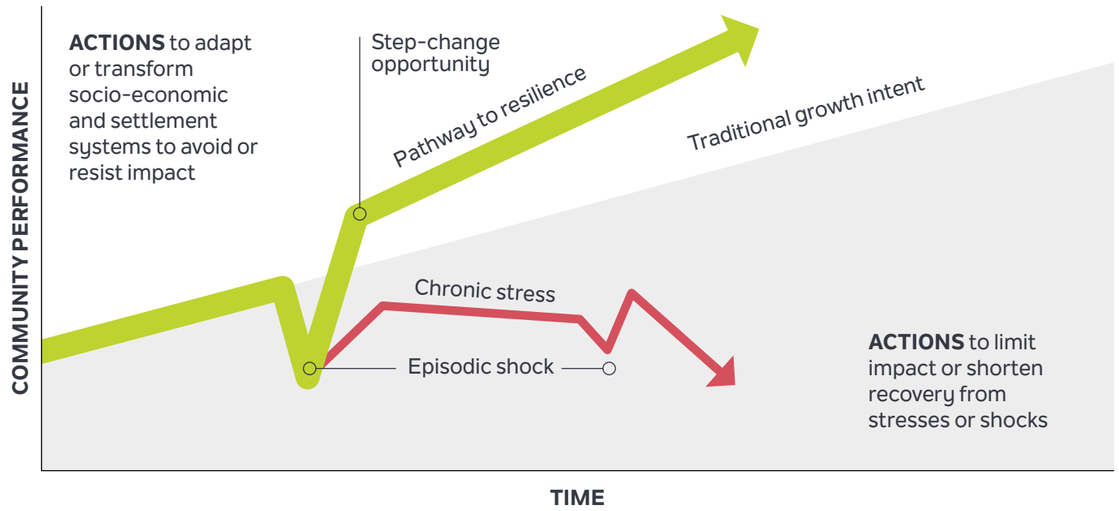
Farmers bear the brunt of drought impacts. Roughly 1 in 2 farmers have thoughts of suicide or self-harm, and sadly, farming suicide rates are 59% higher than the general population.[17] Often drought is accompanied by bushfires, which compound the impacts. When a drought breaks, often with flooding rains, the impacts linger for months, years or decades. Whilst traditionally viewed as an issue confined to communities dominated by farming and agribusiness, drought impacts ripple across numerous sectors: from water supply to regional towns, to the viability of local businesses, the amenity of recreational spaces, to our environmental and cultural heritage.

The cyclical nature of droughts suggests we will continue to face drought in the future. No two drought events are the same, and droughts in the future are projected to be harsher, longer, and more frequent. The most effective response to this rising risk is to strive for greater drought resilience.

We want to avoid chronic stresses and episodic shocks degrading the performance of our community, our economy, and our natural environment.

Figure 1.1 illustrates how the identification and implementation of actions which maintain, modify, or transform our Region, can limit the impacts of drought, and position ourselves to bounce back quicker and stronger. This can be achieved by building sustainable and diverse regional economies, thriving local communities, and enhancing our natural environments.

Figure 1.1: Improving our prosperity through resilience (adapted from Fiksel, 2016)



REGIONAL DROUGHT RESILIENCE PLANNING OBJECTIVES AND PURPOSE

The Commonwealth Government's *Future Drought Fund* seeks to enhance the public good by building drought resilience in Australia's agricultural sector, the agricultural landscape, and communities. The 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.

One of the five focus areas of the *Future Drought Fund* is the *Regional Drought Resilience Planning (RDRP) program*. The objectives of the RDRP process are to:

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

In NSW, this program is jointly funded by the NSW Government and provides support for local governments to work together in a regional consortium to deliver a Regional Drought Resilience Plan (RDR Plan) unique to the regional community.

Resilient regional communities are supported through a variety of other NSW government policies and plans, including their Regional Economic Development Strategies (REDS), the Department of Planning and Environment's Regional Plans, and NSW State and Regional Water Strategies (see *Table 6.2* in Section 6 for further linkages between this RDR Plan and other strategies).

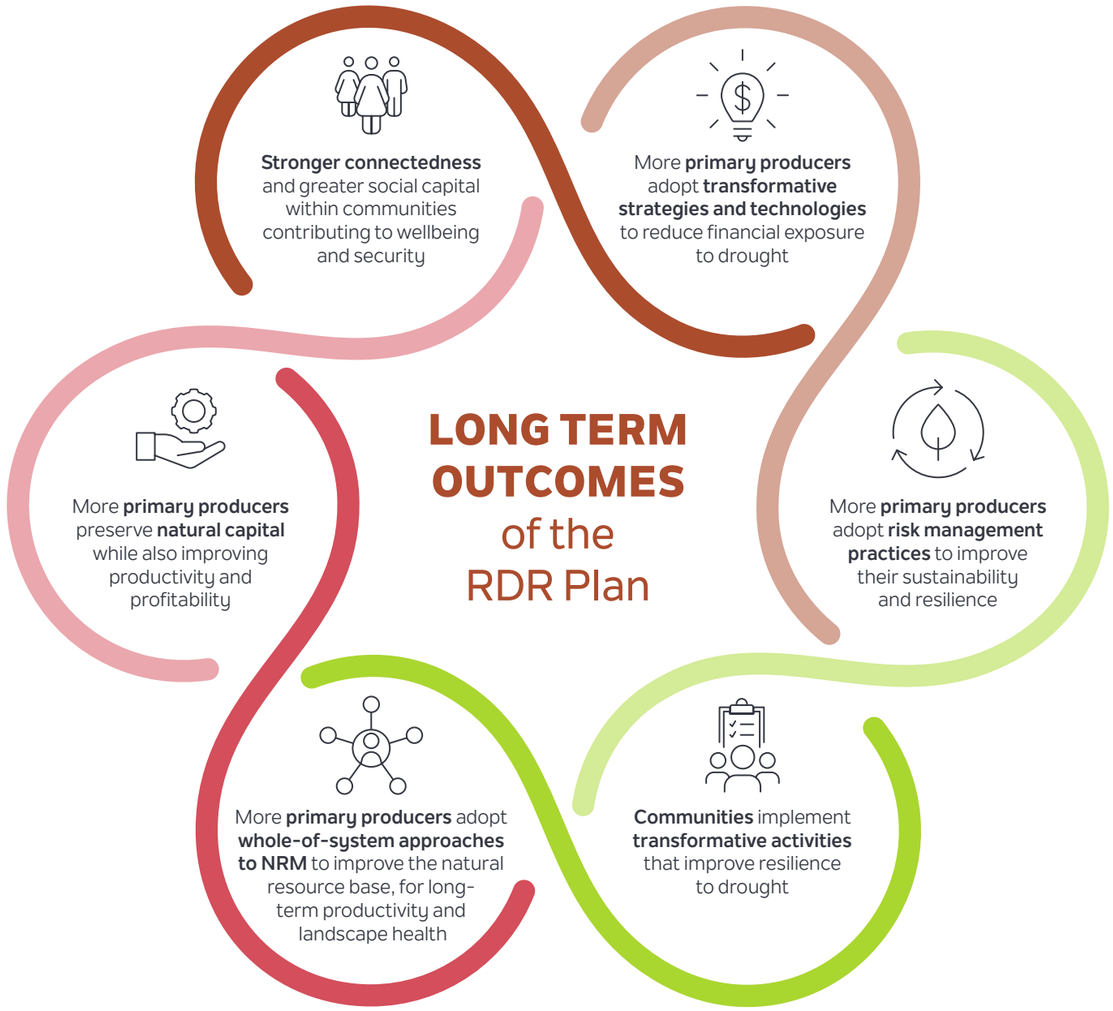
Key tools which support the delivery of the NSW Government's vision for drought-ready regions include:

- Australian Government's *Drought Resilience Adoption and Innovation Hubs* (including University of Southern Queensland, and Charles Sturt University)
- NSW Government Department of Primary Industries *DroughtHub* which is an online drought assistance and information portal for NSW primary producers, and their *Climate Vulnerability Assessments* for horticulture and viticulture, broadacre cropping, forestry, extensive livestock, marine fisheries, and biosecurity risks.
- NSW Government *AdaptNSW* website, to inform and empower communities, businesses, households, and government to adapt to climate change.

These community based RDR Plans are designed to complement and build on the actions of the Federal and State governments. The purpose of the RDR Plans is shown in *Figure 1.2*.

Figure 1.2: Long term outcomes of the RDR Plan

Source: Department of Agriculture, Water and the Environment. 2020.[18]



02

ABOUT THIS REGIONAL DROUGHT RESILIENCE PLAN.

This Regional Drought Resilience Plan (RDR Plan) is a collaboration between Singleton Council, Muswellbrook Shire Council, and the Upper Hunter Shire Council. The Plan is designed to strengthen the capacities of local residents, communities, institutions, businesses, and systems to withstand the economic, social, and environmental challenges arising during periods of drought.

By building resilience across the Region, we will ensure our community can grow and prosper before, during, and after dry times. By investing in resilience early, our Region reaps the benefits in good times, whilst becoming better adapted to the challenging experiences of drought in the future.

This RDR Plan is **community owned and driven**, co-designed with community leaders, residents, local businesses, and organisations. The input of local knowledge has provided the plan with a strong foundation, a shared vision, allowed for targeted efforts leveraging existing and new opportunities to strengthen community resilience.

THE PROCESS OVERVIEW

Project Inception

Establishment of the PCG
Department of Primary Industries and Regional Development
Singleton Council
Muswellbrook Shire Council
Upper Hunter Shire Council

Resilience Assessment

Regional Snapshot
Demographics and Social Factors
Key industries and Economic Factors
Our Natural Environment
Local Plans & Strategies

A “What-If” Analysis
Previous Drought Impacts
Resilience Challenges
Resilience Opportunities

System Diagnostics
Future Drought Projections
Future Changes within the Region

Stakeholder Engagement

Stakeholder Mapping

Stakeholder and Community Engagement Plan

Community Input
'Have Your Say' Survey
Street Talks
Targeted Interviews
Community Workshops
Action Detailing Consultation

Outcomes
Drought Impacts (Systems Diagnostics) including Challenges and Opportunities
A Brighter Future (Strengths and Existing Services)
Vision and Ideas for the Future including an Action Long List (Our Preferred Options)

Synthesis and Reporting

Actions
Economy
Environmental
Social
Cross-Cutting
(Our Preferred Options)

Action Pathway

Monitoring, Evaluation and Learning (How We Will Learn)

WHAT BROUGHT US HERE?

Project Inception

To collaborate across our Region, the Project Control Group (PCG) was formed, allowing for easy communication across Singleton, Muswellbrook, and Upper Hunter Councils.

Resilience Assessment

Regional snapshot

Key features of the Region were identified and assessed via desktop research and community engagement activities. This provided a baseline understanding for the Region and its resilience to drought events. Information accessed for this process was taken from public sources including Bureau of Meteorology (BoM), REMPLAN, IDCommunity, Census and other Australian Bureau of Statistics data, council data, and pertinent local/regional plans. These sources were utilised to consider the economic, social, and environmental resilience of our Region and fed into the technical desktop study (the Resilience Assessment) which considered community strengths and resilience before, during, and following past drought events.

A "what-if" analysis

The technical Resilience Assessment considered future drought scenarios for various climate conditions. Climate data for rainfall, hot days, heat stress, bushfire, evaporation, soil moisture, runoff, and erosion was obtained primarily from My Climate View, supplemented by data from the BoM and CSIRO. Data was obtained for an RCP 8.5 scenario for the Region. Historical and future climate projections for the year 2070 were considered, exploring what future drought and climate conditions could look like for the Region if climate changes were realised. By considering a possible "what-if" and the "worst case scenario", our Region was able to explore plausible future pathways and measures to reduce stress and potential impacts.

Stakeholder Engagement

Community input

Our communities were the primary drivers of this Plan. This RDR Plan exists to serve our communities and our Region. To ensure engagement represented a diverse array of voices, a stakeholder mapping exercise was undertaken to identify individuals, groups, and businesses impacted by drought to ensure a collaborative approach to drought resilience was adopted. Using local knowledge, council databases, research, and PCG input, a long list of key stakeholders were identified, contacted, and recruited. These include, but were not limited to stakeholders in the following sectors:

Water and Agriculture
(Local farmers, water utilities, viticulture, Hunter Region Livestock Exchange, farm equipment manufacturers and suppliers, trades, equine studs, industry groups, and veterinarians)

Health
(Rural Financial Counselling Services, Services Australia, pharmacies, not-for-profits, Farmgate counsellors, Rural Adversity Mental Health Program (RAMHP), Regional Services Support Network (RSSN), NSW Health and Public Health Network)

Local Businesses
(Homewares, clothing stores, hospitality venues, real estate, charity organisations)

Environment and Culture
(Landcare, Local Land Services, and Aboriginal entities etc.)

Tourism
(Wineries, wedding venues, florists, accommodation providers)

Education
(Schools, youth)

Industry
(Mining, power, renewable energy, offset land managers)

Through three rounds of community consultation guiding the RDR Plan development, surveys and workshops allowed residents to identify existing challenges and opportunities arising from drought. For full details of engagement, see *Figure 2 1*. Community input directly shaped the Resilience Assessment, and vice versa, with research findings from the Resilience Assessment guiding engagement approaches and consultation activities. Desktop research informing the regional snapshot, history of drought and its impact, and the Resilience Assessment as a whole were used during engagement activities, guiding discussion questions and information presented to the public prior to activity commencement. This included drought projections and technical content that was easily consumable for our community.

Integrated learning and vision setting

Local voices and insights shared during consultation provided the opportunity to capture a shared community vision. Community input was refined through two rounds of engagement to understand past drought impacts, establish a list of current actions and initiatives, identify existing support services and systems which provide effective assistance, and detail the Regional challenges arising from drought. These lessons learned were captured within the Resilience Assessment and Stakeholder Engagement Outcome Support Report. Feedback was also provided to the Project Control Group (PCG) consisting of representatives from the NSW Government Department of Primary Industries and Regional Development (DPIRD), council representatives, and independent consultants, ensuring councils and DPIRD were aware of the desired vision for the Region and existing day-to-day challenges community faces during dry times.

After integrating various priorities and ideas across community, businesses, council members and council staff, key organisations, and service providers, the proposed vision for the Plan was tested with workshop participants in a third round of consultation. Identified goals for the Plan which aligned with Regional values and sentiment shared during previous workshops were identified and considered further within the Resilience Assessment and workshops. This step was critical in ensuring community input was woven throughout all aspects of the RDR Plan.

Regional Drought Resilience Plan

System diagnostics

From the future drought scenarios obtained during the Resilience Assessment, drought impacts to critical systems within the Region were considered. Combining local knowledge and scientific data, a clear understanding of historic impacts to social, economic, environmental, and governance spheres were obtained. From this, we were able to consider the implications for water capture/storage, grazing industries, wine and tourism, people, and community. A systems map was created based on local knowledge and research accumulated around the Regional challenges and opportunities to bolster drought resilience. The interlinkages across these areas were considered, with drought impacts acknowledged as never occurring alone.

A brighter future?

Ideas for a more drought-resilient future were considered by the community to imagine a better future. Ideas were canvassed during workshops, surveys, and phone interviews, with creativity and 'blue-sky' thinking encouraged. Particular focus on actions with maintaining, modifying, or transformative capability was encouraged to shift from the reactionary to preparation and pre-emptive approaches. As a locally-led Plan, sentiment from the Have Your Say Survey to "keep actions doable" were also acknowledged. Opportunities and possible future actions were captured within an action longlist. Key themes and ideas raised by the community across the Region were then utilised to group this longlist. Key themes included education and communication, financial and business, agriculture, social connection, environmental, governance, and industrial involvement. Ideas ranged from the development of a comprehensive drought communications plan, to bus tours across wine/tourism and grazing/equine/cropping enterprises to allow for peer-to-peer learning. These potential actions were filtered into environmental, economic, and social pillars, to allow for prioritisation where long-lasting change was possible.

Our preferred options

Following development of the action long list, further engagement was undertaken with collaborators and key stakeholders/community representatives to discuss potential action owners and prioritised actions based on community need, efficacy, whether the actions were implementable, or had the potential to build upon existing activities. This process was guided by councils and PCG representatives, resulting in a priority action list. Tangible and purposeful actions were further developed with self-identified action owners through a detailed process and development of implementation steps for each action. Round three engagement conversations allowed relevant stakeholders to map their vision for each action, encouraging ground truthing and practical steps to implement the action and empower stakeholder buy-in. By prioritising actions that addressed identified resilience challenges, which were canvassed during prior workshops, the project ensured each action was set up for success, creating a level of accountability.

How we will learn

Monitoring and evaluation processes were developed in alignment with desired action outcomes to ensure continuous innovation and learning is fostered through intentional capacity building and education. This provides us with accountability and knowledge relating to our uncertain future. Together, this Plan will enable our community to concretely achieve a stronger drought resilient Region.

KEY INPUTS

Existing bodies of work span governance and leadership, agriculture, and equine sectors, social, economic, infrastructure, environmental, climate change, demographics, and other scientific studies and research. This Plan sits alongside numerous policies and strategic plans ranging from local council level through to the international stage. These documents provided key inputs within the RDR Plan.

Priority actions of this Plan have been mapped against these key inputs, demonstrating the strategic alignment of each action. Further mapping against the Sustainable Development Goals (SDGs) and Sendai Framework for Disaster Risk Reduction have been included to reflect the global scale of drought resilience work. This is further elaborated in the Action Strategic Alignment section.

Table 2.1: The Drought Resilience Planning Process in Detail

	STAKEHOLDER ENGAGEMENT					RDR PLAN
Project Inception Setting Project Foundations	**Round 1 Engagement** Challenges and Opportunities	**Thematic Approach** Where to Focus Effort	**Round 2 Engagement** Solutions for the Future	**Outcomes** How to Get There	**Round 3 Engagement** Action Detailing	**Synthesis** Regional Drought Resilience (RDR) Plan
Establish **Project Control Group** (representatives from Singleton, Muswellbrook Shire, and Upper Hunter Shire Councils, and the Department of Primary Industries and Regional Development).	**Where:** Singleton (including Hunter Regional Livestock Exchange), Muswellbrook, Aberdeen, Scone, Merriwa, Denman, and Jerrys Plains.	Environment / Water	**Where:** Singleton, Muswellbrook, Murrurundi, Gundy, Broke, and Sandy Hollow.	Plan Vision, Goals and Objectives	**Where:** Virtual – online meetings, phone calls and emails.	Vision, goals, and objectives
Engage with relevant Subject Matter Experts.	**Who:** Residents, farmers, agricultural services, business owners, retail staff, Aboriginal groups, and members of the Rural Support Services Network.	Agri-business / Workforce Development	**Who:** Key council representatives, industry and service provider stakeholders, community organisations, and community members.	Longlist of Actions	**Who:** Proposed action owners and key stakeholders.	Process for drought resilience
Resilience Assessment (local strategic context, environmental, social, and economic context, previous drought impacts, future drought projections, challenges, and opportunities).	**What:** Street talks, phone interviews, and group meetings.	Agriculture	**What:** Thematic workshops with stakeholders in response to recognised future drought projections, and follow-up phone interviews targeting marginal and vulnerable stakeholder groups unable to attend in-person workshops.	Priority Actions	**What:** • Action rationale • Implementation steps • High-level cost estimates • Action leads and stakeholders • Action outcome, key performance indicators, and evaluation • Complementary actions and next steps where relevant	Priority actions under economic, social, and environmental pillars, and cross-cutting
Stakeholder & Engagement Plan (key stakeholders, demographics, and how to involve them, including marginal and vulnerable groups such as First Nations, elderly, and persons with a disability).	**How:** Discussion with residents on the ground canvassing drought impacts, community strengths, existing services, and ideas for actions across key areas: *community and recreation, environment, local business and regional economy, utilities and infrastructure, cultural heritage, and vulnerable groups.*	Wine / Tourism	**How:** Facilitated discussions – review of ideas from round one, additional ideas, idea evaluation (effectiveness, feasibility, value for money, addressing root cause, capacity to deliver, supplementary and avoid duplication of efforts). Long list of actions developed.	Complementary Actions	**How:** Council representatives prioritised actions based on local appetite. Subsequent online meetings, emails, and phone calls were conducted to co-design and detail the actions.	Monitoring, evaluation, and learning
Have Your Say Survey (generating project interest and ground-truthing the desktop study).		Equine Industry		Next Steps		
		Social Cohesion				
		Mental Health				
		Mining and Energy Industry				
		Education / Youth				

OUR PARTNERS

This RDR Plan was developed in partnership between Singleton, Muswellbrook Shire, and Upper Hunter Shire Councils, made possible by joint funding from the Australian Government's Future Drought Fund and the NSW Government. As a community-centred Plan, a wide range of stakeholders and residents across our Region was engaged via a thoughtful and dedicated engagement approach.

This occurred via interviews, phone calls, surveys, workshops, street talks, and one-on-one meetings. From the community engagement, the mining and energy sectors were identified as facilitating community resilience through employment and economic spend within the Region. However, the same sectors are also a challenge for agriculture, wine, and equine sectors through competition for land and water. As the Region prepares for the inevitable transition away from mining due to Australia's low carbon economy trend, this RDR Plan considers opportunity for renewables, establishing a diversified economy and skilled workforce.

Figure 2.1 shows the breadth of engagement conducted for this Plan. Community members, business representatives, NSW Government representatives, service providers, charitable organisations, agriculturalists, and the three councils were engaged to ensure this RDR Plan was truly community-centred and focused.

Many shared stories of hardship, comradery, and community spirit in spite of drought. Visions for a more resilient future were readily considered.

While the focal point of this engagement was targeted workshops, interviews, and surveys, informal engagement was also conducted with a broad cross-section of the community, providing critical insights into local challenges, opportunities, and possible solutions or interventions to improve drought resilience of the Region. From the economic powerhouse of the Hunter Valley (Singleton and Muswellbrook) to the Upper Hunter, stakeholders included graziers, health providers, support services, local business owners, community organisations, and more. Participants shared their personal drought journey, whilst also sharing the drought journey of the Region. *Figure 2.1* provides an overview of the community and stakeholder engagement undertaken, with the Engagement Outcome Summary Report providing a detailed overview of the engagement outcomes.

Figure 2.1: Engagement outcomes

Have Your Say Survey

161 respondents*
(Feb - Mar 2024)

The survey link was shared with a range of service providers and industry groups to maximise reach.

Street Walk Conversations

100 participants
(March 2024)

Businesses consulted:

- Agricultural suppliers, agronomists, and stock and station agents
- Local small and medium businesses (including (but not limited to) clothing, discretionary groups, supermarkets, bakeries, boutique food/wine)
- Environmental services
- Real estate agencies
- Accommodation providers
- Cleaning services
- Regional Services Support Network
- Mining employees
- Key community groups and organisations such as Rural Financial Counselling Service
- Visitor Information Centres
- Veterinarians
- Tavern owners
- Local residents
- Small acre farmers
- Trade and hardware businesses
- Butchers
- Bowling Club
- Pharmacy
- School Parent & Citizens (P&C)
- Pony Club
- Chamber of Commerce
- Insurance providers, brokers, and accountants

Workshops

9 workshops
96 participants**
(Mar-Apr 2024)

Organisations Engaged:

- Environmental groups
- Cafes, restaurants, and pubs
- Emergency services
- Drought Relief Coordinator
- Local residents (young and old)
- Farmers / graziers / equine studs
- Tourism, wedding, accommodation, and viticultural representatives
- Technical service providers
- Health care representatives (not-for-profits and government authorities)
- NSW state government organisations such as Reconstruction Authority
- Rural Financial Counselling Service
- Rural Adversity Mental Health Program (RAMHP)
- Farmgate
- Mental health organisations
- Community organisations and charities
- Where There's a Will
- School groups
- Progress Associations
- Mining companies
- Council representatives

Targeted Interviews

20 phone interviews
(March 2024)

Including:

- Farmers
- Council Water Teams
- Local Land Services
- Rural Adversity Mental Health Program
- Local community groups e.g., Where There's a Will, One Day Closer to Rain
- Hunter Thoroughbred Breeders Association
- Aboriginal entities (e.g., Wanaruah Local Aboriginal Land Council (LALC) and Wonnarua Nation Aboriginal Corporation)
- National Emergency Management Agency (NEMA)
- Disability and Aged Care Service Providers

Invitations

Workshop and Engagement Invitations sent to:

- Accommodation providers
- Tourism Associations
- Wineries and viticulturalists
- First Nations
- Education Providers
- Farmers/ cropping / graziers
- Equine (hobby and stud farms)
- Mining and large industry
- Veterinarians
- Local small and medium businesses
- Manufacturing and Industries
- Country Women's Association
- Community Organisations

** Note, given surveys were completed anonymously, it cannot be determined the level of overlap that arose between survey participants and participation in the other engagement activities.*
*** Note, some participants attended multiple workshops.*

The six main principles underpinning our engagement strategy for the RDR Plan are:

01

Community-centred:

Place the community at the centre.

02

Understand the context:

Taking time to review local documents to build local and regional awareness.

03

Respect complexity:

While rural areas can routinely experience long term drought conditions, with megatrends broadly applicable to the Region, local nuances and complexities should be considered at the heart of all work.

04

Work in partnership:

Co-design is an important tool, working with openness and trust to foster strong relationship building.

05

Communicate respectfully and inclusively:

Sensitive, simple and clear communication is essential to address people and ensure their time is not 'wasted'. Consulting with a diverse range of stakeholders to capture an array of voices allows for representative opportunities and actions.

06

Recognise and build capability:

Enable meaningful comment and contributions to build on existing strengths and activities across the Region.

The objectives of our engagement from the outset were:

Foster co-designed, community-centred planning, and collective ownership of the resulting plan to leverage existing strategic planning and avoid duplication of effort

Recognise the diversity of people, businesses and landscapes involved in agricultural production, including Indigenous groups and landholders

Harness diverse Region-specific knowledge and skills for a triple-bottom-line approach[19]

Our engagement strategy for the RDR Plan was also informed by the internationally recognised approach developed by the IAP2 depicted in *Figure 2.2*. As far as reasonably practicable, the intention was to engage with community and stakeholders at the collaborate and empower end of the spectrum.

Figure 2.2: IAP2 Framework.

01	02	03	04	05
Inform	**Consult**	**Involve**	**Collaborate**	**Empower**
Provide information to improve understanding of issues and opportunities.	Seek feedback on alternatives / decisions.	Directly engage the public to incorporate their issues and concerns, and to understand aspirations.	Partner with the public in the development of strategies and actions.	Final decision-making rests with the public.

Increasing level of public / stakeholder impact on decisions

Source: International Association for Public Participation

03

OUR REGION.

Termed the 'economic powerhouse', Singleton, Muswellbrook, and the Upper Hunter LGAs are responsible for the supply of 60% of New South Wales's (NSW) energy and resources, as well as providing these outputs into the global economy.[20] Situated 90 minutes from Newcastle, and 3 hours from Sydney, our Region offers a unique blend of scenic country living and community spirit, with big city benefits.[21]

Our Region boasts history, grazing, wines, dining, mines, equine, cropping, and defence. Across the three LGAs, our Region, shown in *Figure 3.1*, spans a total area of approximately 16,393.8km^2 and is home to 55,163 people.

Resting on the traditional lands of the Wanaruah, Wonnarua people, our region has a rich cultural past. Wanaruah, Wonnarua People's rich history is steeped in the land before time. Our Dreamtime - a sacred time during which the Hunter Valley was shaped by the great spirit Baiame.

In the Beginning, everything was sleeping, sleeping in chasms of eternity until the All Father Creation Spirit Baiame awakened and breathed life into the whole Valley creating mountains, plains, rivers, and all living beings.

"The land held the key to life's secrets. Man was bestowed with the wisdom to read the land, uncovering explanations for existence in every rock, tree, and creek. He did not possess the land; rather, the land possessed him. To know the land was to know life." [22]

For Aboriginal people, the land embodies both a spiritual essence and a vital source for sustaining life. They nurtured this existence through a profound respect for the land, employing what we now recognise as traditional land management practices.

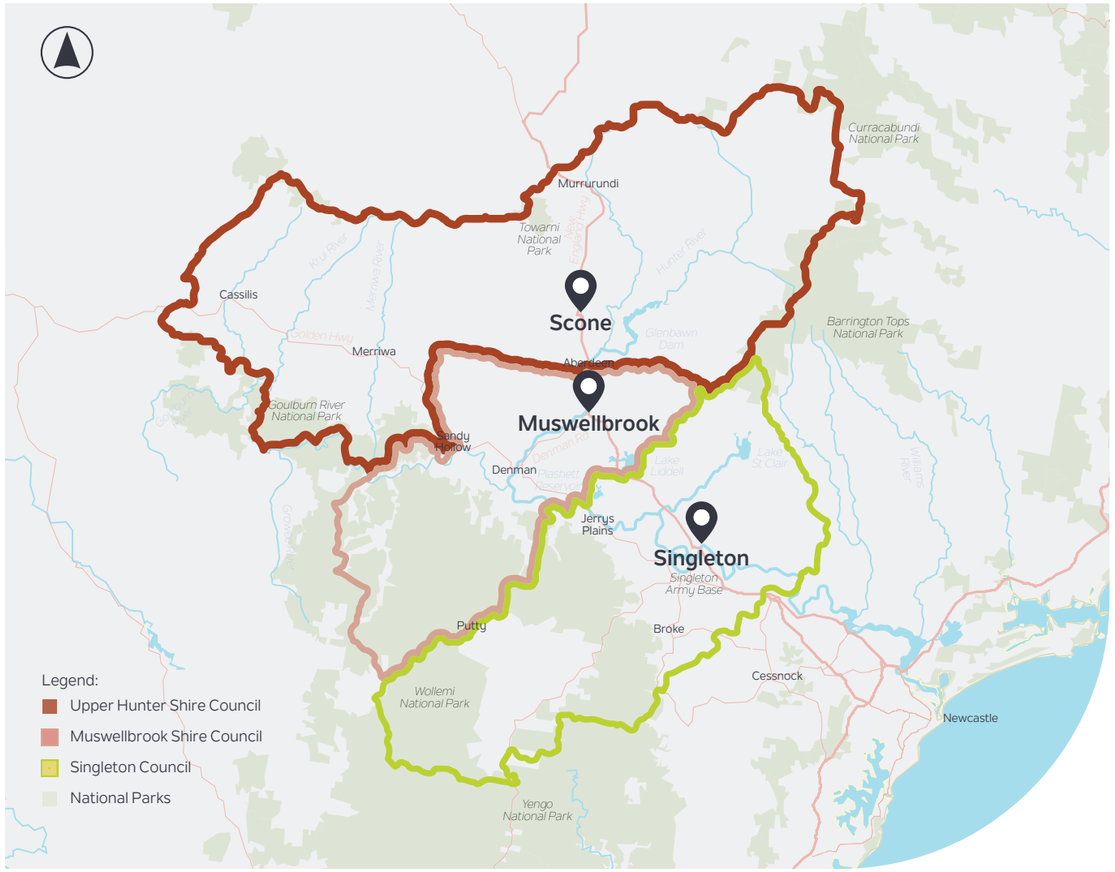
This sustainable approach provided a consistent source of nourishment while minimising environmental impact. By reestablishing and implementing these traditional land care methods, we can foster improved outcomes for both the environment and future generations.

As of 2024, 4,931 people

living in our Region identify as Aboriginal and/or Torres Strait Islander, representing 9% of our population.

Figure 3.1: Singleton, Muswellbrook, and Upper Hunter Regional Map

Source: WSP. 2024



The coloured lines represent the LGA boundaries.

Table 3.1: Key Statistics

Source: ABS Census 2021; unless otherwise stated

Demographic / Statistic	Singleton	Muswellbrook	Upper Hunter	NSW Average
Traditional Owners	Wanaruah, Wonnarua	Wanaruah, Wonnarua	Wanaruah, Wonnarua	-
Major Towns and Localities	Singleton, Broke, Bulga, Jerrys Plains, Branxton (partly)	Muswellbrook, Denman, Sandy Hollow	Scone, Aberdeen, Murrurundi, Merriwa, Gundy, Cassilis	-
Area [23,24,25]	4,892.8 km^2	3,404.9 km^2	8,096.1 km^2	-
Population	24,577	16,357	14,229	-
Population 65 years or older	14.4%	15.0%	21.2%	17.7%
Population growth by 2036	28,600[26]	20,320[27]	16,184[28]	-
Identify as Aboriginal or Torres Strait Islander	8.3%	11.7%	7.0%	3.4%
Median weekly income (personal)	$819	$769	$751	$813
Percentage of households with a weekly income less than $650	15.1%	18.9%	21.3%	16.3%
Unemployment rate	3.7%	5.1%	3.2%	4.9%
One or more long-term health conditions	29.4%	31.6%	30.5%	27.0%
Volunteers	14.7%	12.1%	16.5%	13%

Major industries across the Region

Source: REMPLAN. 2024

Major Industry	Value Added ($ million)	Jobs Supported
Mining	$6,875m	10,600
Health care and social assistance	$217m	2,459
Construction	$327m	2,435
Agriculture, forestry, and fishing	$373m	2,410
Retail trade	$202m	2,216
Education and training	$222m	1,900
Electricity, gas, water, and waste services	$619m	1,034
Rental, hiring, and real estate services	$700m	305

Mining is the dominant employment industry in the Region, with thermal open-cut coal mines and underground mining operations located across the area. Many businesses and residents benefit from the salaries and spending generated by the mines. However, there are also many in the Region who are less well off: approximately 1 in 5 households in our Region has an income below $650 per week.[29] This creates significant social differences across the Region: those on lower incomes have less capacity to invest in drought resilience with minimal financial bandwidth to withstand economic hardships associated with dry times.

The mining industry operates within close proximity, and sometimes in tension[30] with the Region's town and rural residents and major employers. Muswellbrook Shire's thoroughbred breeding industry extends in an arc from Denman to Sandy Hollow, along Bylong Valley Way to Widden and includes the two largest studs in the southern hemisphere. Bespoke dairy, olive oil, and beef businesses are located within a few minutes' drive from coal mining activities, as are boutique wine and tourism businesses, who attract national and international visitors.

Access to groundwater and Hunter River water is a topic of debate, with different viewpoints expressed across the Region. Only a small proportion of water rights are traded each year[31], and the prices paid can be beyond the reach of many. As the world seeks to achieve the 2015 Paris Climate Agreement, demand for coal is likely to change in the future. However, opinions differ- some are optimistic about the future and longevity of the coal industry, others note that job losses are likely in the medium-term, whilst others are actively pursuing transition opportunities.[32] Change is already underway. Some mines are naturally approaching the end of their life, with rehabilitation plans well underway. The 2023 closure of the Liddell Power Station has recently morphed into an opportunity, with a solar panel manufacturing hub announced in 2024.

Generating $283.35 million in output, tourism is an important regional industry. Visitors are drawn to the wine, gourmet offerings, boutique accommodation, golf, and a plethora of activities and experiences.[33] The health care and social assistance sector pays $62.19 million in wages and salaries, the highest of any sector in the Upper Hunter. However, this is more reflective of the number of people employed in aged care, health, and other services, rather than these roles having higher salaries for individuals.[34]

The Hunter River is the lifeblood of the Region, providing water to many communities, agricultural enterprises, and industry. Glenbawn Dam and Glennies Creek Dams are our primary water storage reservoir but are also a favourite destination for camping and fishing. The Region is blessed with large tracts of nature, which support camping and hiking opportunities as well as habitat for iconic and endangered species such as the Regent Honeyeater, Swift Parrot, Wollemi Pine, and the Hunter Galaxis. Over 40% of the land in Muswellbrook LGA is National Park.[35] The Upper Hunter is known for being the second largest producer of thoroughbred horses in the world, only behind Kentucky, USA Meanwhile, Singleton is a mosaic of many different environments, home to a number of Endangered Ecological Communities (EECs) providing habitat for various threatened flora, avifauna, chiroptera, and other mammals.

04

DROUGHT AND OUR REGION.

WHAT IS DROUGHT?

As a land of extremes, Australia has highly variable rainfall records, with periods of extreme rainfall and periods of low rainfall. In simple terms, drought means an acute water shortage and a prolonged, abnormally dry period when the amount of available water is insufficient to meet our normal use.[36]

Edwards et al. (2018) has four definitions of drought, which are meteorological, agricultural, hydrological, and socio-economic (*Figure 4.1*). It is difficult to determine a start and end, or when the landscape, our people or the economy have recovered.

Droughts can be exacerbated by high temperatures which increase evaporation, low or declining water tables and bushfires. They can last a single season or become a 'megadrought' which may persist for many decades.[37] As for other disasters, they are difficult to predict or compare with differences in seasonality, extent, duration, severity, among other variables all contributing to the drought experience.

Figure 4.1: Types of droughts and their definition[38]

01	**Meteorological drought**, or a period of months to years with low rainfall.
02	**Agricultural drought:** short-term dryness in the surface soil layers (root-zone) at a critical time in the growing season.
03	**Hydrological drought:** prolonged moisture deficits that affect surface or subsurface water supply, reducing streamflow, groundwater, dam and lake levels.
04	**Socio-economic drought:** other effect of elements of the above droughts on supply and demand of economic goods and human well-being.

DROUGHT MONITORING IN NSW

The Enhanced Drought Information System (EDIS) is a publicly available drought monitoring tool that monitors seasonal conditions across NSW. Launched in March 2018, EDIS is used across government and farming stakeholders to build drought risk awareness, emphasise drought preparedness, and improve confidence in drought monitoring and early warning. A key feature of EDIS is the development of the NSW Department of Primary Industries and Regional Development (DPIRD) Combined Drought Indicator (CDI).

The CDI integrates a range of data and model outputs in a framework that is useful for decision makers. It combines meteorological, hydrological, and agricultural definitions of drought (above) using indexes for rainfall, soil and water and plant growth. From these, a fourth index, drought direction, is utilised. EDIS is undergoing redevelopment to provide farmers with world-leading weather and climate data to enable better business decisions.

STAGES OF DROUGHT

Used together, the indexes of the EDIS indicate the stages of drought, which are used in this Regional Drought Resilience Plan (RDR Plan).

The six stages progress from a non-Drought category where all indicators suggest good conditions for production, to recovery, through to a Drought Affected (weakening or intensifying) category, a Drought category, and into Intense Drought *(Figure 4.2)*.

Complementing the stages is detailed information on:

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

Figure 4.2: Stages of drought in NSW

Source: EDIS

01	02	03	04	05	05
Non-Drought Phase	**Recovering** Phase	**Drought Affected (Weakening)** Phase	**Drought Affected (Intensifying)** Phase	**Drought** Phase	**Intense Drought** Phase
At least one indicator is above the 50th percentile	All indicators are below the 50th percentile but above the 30th percentile	At least one indicator is below the 30th percentile and the rainfall trend is positive over the past 90 days	At least one indicator is below the 30th percentile and the rainfall trend is negative over the past 90 days	At least one indicator is below the 5th percentile	All three indicators (rainfall, soil water, plant growth) are below the 5th percentile

A LONG HISTORY OF DROUGHTS

Federation Drought

Known as one of the worst droughts across the country, Australian sheep and cattle farmers faced heavy cost burdens alongside a national wheat crop failure.[39]

WWII Drought

Major waterways across NSW, Victoria, and South Australia were impacted. Our Region's lifeblood, the Hunter River, stopped flowing in December 1944.[39] Stock was severely impacted with NSW farmers losing over 10 million sheep across the state[40] and hand feeding a common occurrence across our Region.[41]

Millennium Drought

This drought occurred from 1997 to 2009 in most areas, however, in the Hunter the drought was prolonged until 2014. NSW experienced the lowest rainfall since 1865.[42]

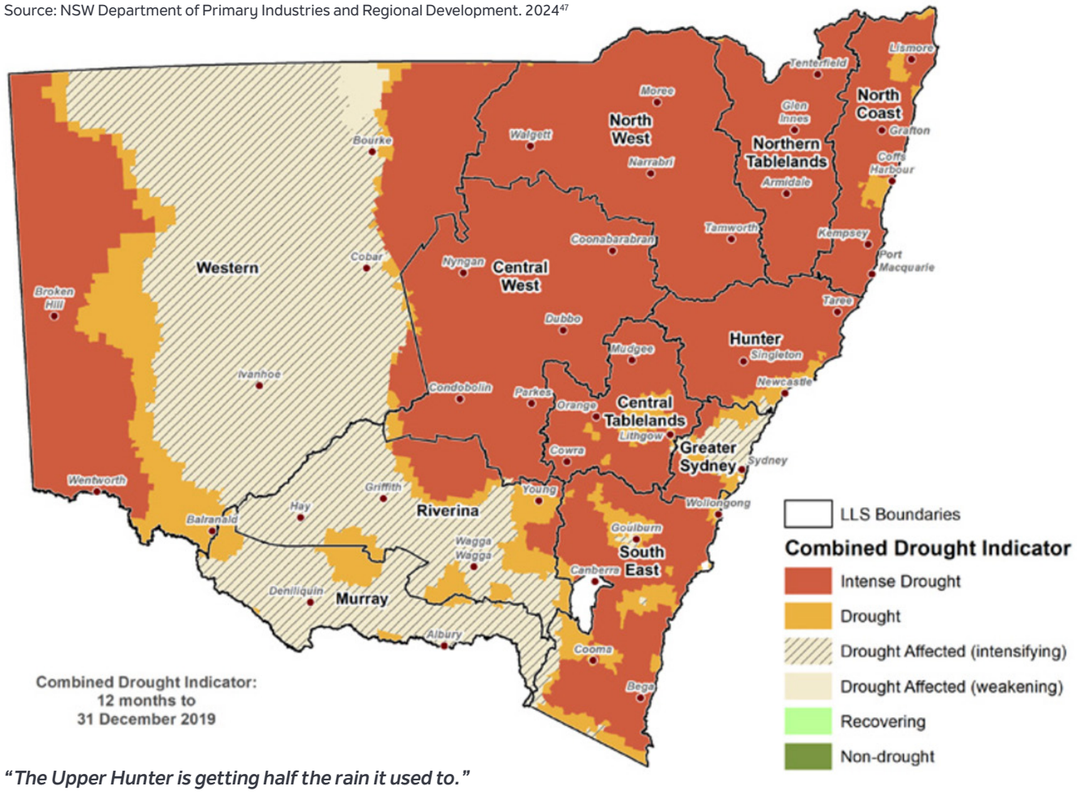
Media reports from the time indicate that the Millenium drought was mainly felt in our Region from 2006 through to 2014. Hunter politicians and locals were calling for the region to be "drought-proof" through infrastructure projects,[43,44] such as the Tillegra Dam, which despite some periods of support, has never eventuated. With dams sitting below 50% for much of this period, water allocations were cut for agriculture, horticulture, viticulture, and industry.[45]

2018/19/20 Drought

Described as the "*worst drought in our living memory*" the conditions were the driest and warmest conditions on record.[46] The drought was widespread covering the majority of the State, as shown *Figure 4.3.* This drought caused many to face significant economic, environmental, and social hardships.

Figure 4.3: NSW Combined Drought Indicator to 31 December 2019

Source: NSW Department of Primary Industries and Regional Development. 2024[47]



"The Upper Hunter is getting half the rain it used to."

Impacts of drought in our Region

Whilst no two droughts are the same, we know that drought will continue to impact our economy, our community, and our environment.

Financial and Infrastructure Impacts

In 2013, Singleton's residential water consumption doubled during a period of very low spring rainfall. Whilst our yards are valued for their greenery and as a place to enjoy the outdoors, the downside were higher water bills and talk of 'wasted water'.[48] In contrast, the 2019 drought saw Murrurundi run out of water and some groundwater bores dry up. Water was trucked in daily, at a cost of $40,000 a month,[49] with residents enduring level 6 water restrictions, 3-minute showers, only two loads of washing a week, and reliance on bottled water for drinking.[50] Kids couldn't even enjoy playing under a sprinkler with their family, friends, and pets.[51] Whilst the new pipeline from Scone and storage tank brought improved water security to Murrurundi, there are many villages and landholders still reliant on tank water. For these residents, water efficiency was and still is a daily necessity. Some landholders pinned their hopes on groundwater to supply their homes and their livestock. Yet there were stories of people spending $30,000 on water diviners and bore drillers, with no success.[52]

Historically, travelling stock routes have been relied upon for grazing cattle during dry times. However, dry watering points have led to long wait times.[53] Current management arrangements for stock routes further limits their use. A variety of viewpoints on the topic of transport subsidies, charity hay drives, and other forms of government and non-government assistance also exist across the Region. For some landholders, these forms of assistance, no matter how small, were seen as providing extremely beneficial support, financially and emotionally. In contrast, some felt that they were only token gestures, which did little to alleviate the hardships being experienced. Some residents expressed concern that the assistance wasn't necessarily going to those most in need, with a perception that a percentage of recipients were 'gaming the system'. Others believed that the tax rebates, low-interest loans, and grants were simply propping up enterprises that were otherwise unsustainable. For those with off-farm income, they were often caught in a dilemma. Their day jobs were providing an alternative source of income and potentially a financial buffer from drought, whilst at the same time, preventing them from accessing certain kinds of drought assistance. The diversity of viewpoints highlights the complexity and challenges surrounding provision of drought assistance. For some it is a lifeline that they seek to be available in future droughts and for others it is the opposite.

History has also shown that our Region can be dealt double and even triple blows during and following a drought. In 2007, dairy and cattle farmers along the Hunter River lost feedstock, equipment, fences, and other infrastructure when a flood rounded off a devastating drought.[54] The high cost of production and low milk prices which have coincided with drought conditions are seen by many as being contributing factors to the decline in the dairy industry in our Region. Major droughts often result in an earlier start to the bushfire season, adding an additional worry to landholders' minds throughout spring and summer. In 2019/20 bushfires burnt throughout our Region. Even when the fire danger had passed, the perception that fires were burning nearby kept many tourists away. This was despite the best (and ongoing) efforts of our councils to promote our Region as still being open for business. The latest drought to affect our Region coincided with the COVID-19 pandemic, and was followed by back-to-back disasters – bushfires, then flooding, landslips, and road closures.

Another compounding impact of drought is the deterioration of unsealed roads and the requirement of large quantities of water to maintain them. This leaves councils, particularly the Upper Hunter which has just shy of 1000km of gravel roads, in an unenviable position given that water is precious for our community, but so too is decent road infrastructure. Other organisations have also faced tough decisions brought about by drought conditions. In 2018, the Department of Defence sought to cull about 150 brumbies on the Singleton Army base with dwindling food and water supplies but faced substantial criticism.[55]

Agricultural Impacts

Pasture underpins much of the agricultural industry in the Region,[56,57] with the species mix, growth, and quality all affected by the amount and timing of rainfall. When there is insufficient rainfall for pasture growth or runoff into farm dams, tough decisions are required on an almost daily basis. Whether to hold onto or sell off stock, where and how to source water for animals and humans alike, where to find fodder, and how much is too much to pay. Hand feeding stock and carting water is labour intensive and time consuming. With many of our rural landholders having day jobs off the farm or working shifts in the mines, this often resulted in a continuous procession of exhausting 12 to 15-hour days. The severity of the last drought meant that many reached the point where they could no longer afford, or no longer find fodder to feed their animals. Then came the added problem of long wait times for the abattoir,[58] or having to pay more on transport and yarding fees than was recouped in the sale.

Stock transport providers also experienced tensions with stock owners when stock was of too poor a condition to be transported. These factors and the timing of pregnant cows or recently born calves, can lead to animal welfare issues. With few viable options, shooting one's animals can be the only option, which brings with it a heavy mental toll. Even those who wanted to sell up and move on did not find the path easy, with real estate agents noting fewer people were buying in the Region.[59]

For others, the financial burden was exceeded by the deep emotional attachment they had with their herd of cattle or the horses they had owned and cared for, more as pets than as livestock. In the equine industry, selling up was often not an option, with bloodlines having taken countless years or decades to refine. Similarly, those with horse agistment businesses went to enormous lengths to keep their operations going, not willing to forgo their customer base. The dry, dusty, and hot conditions can increase the susceptibility of horses to viruses and diseases, reduce fertility, challenge the maintenance of trotting tracks and training venues, and limit the opportunities to safely transport horses to events or other locations.

For the western parts of our Region, around Cassilis, dry conditions can prevent crops being sown, or cause substantial reductions in the harvest which make it difficult to break even. Impacts extend to the wine industry with harvest declines of 50% not uncommon.[45] The harvest period can occur as much as four weeks earlier, and the typically hot conditions associated with drought require careful planning to avoid heat stress amongst harvest staff. The vignerons must adapt their processes to account for changes in the acidity, sugar content, colour, and alcohol content. Limited water is a particular challenge for an industry that relies on the cleanliness of winemaking equipment. The 2019/20 bushfires increased the risk of smoke taint in grapes and ash fall; therefore, crops may not have been harvested or they may have been sold at a loss as feedstock to other industries. At the same time many tourists cancelled their travel plans in the false belief that the wine-growing region was directly impacted by bushfires.

Whilst there is a perception amongst some that the mining industry is well provisioned with water, they are not immune from drought impacts. During a prolonged drought, a reduction in operations is likely, with the flow-on impacts to local employment and our economy.[60] For our wine and tourism sector, the challenges are multidimensional. Being frugal with water was not something on the minds of most visitors, despite gentle prompts to be water-wise during dry times.[61] Keeping the water flowing to their customers necessitates costly and regular water carting for those whose operations are reliant on tank water. The visual appeal of our Region is diminished when drought conditions turn the paddocks to dust, and the vines are no longer postcard perfect.

Community and Personal Impacts

It is therefore unsurprising that the top emotional challenges experienced by farmers is the financial burden, the impact of stock loss, the rebuild and recovery, the loss of control and family and personal trauma.[62] With livelihoods at risk, this creates stress across all generations. Suicidal behaviour is known to increase by up to 15% during severe drought[63] and in the period from 2016 to 2020, the Muswellbrook and Upper Hunter local government areas had one of the highest suicide rates in NSW.[64] This stems from a culmination of factors: rising financial stress from drought impact (especially in combination with increased costs of living, risks of economic downturn) which inevitably leads to increased tension in the home environment. Elimination of discretionary spending means few to no social outings and a chance to take a break. Long hours of hard work for all members of the family, from school-aged children to those who should be enjoying a relaxing retirement. A constant state of exhaustion from long hours which isn't helped by having minimal water to freshen up with a shower or launder dirty clothes.

Environmental Impacts

Drought impacts extend to the environment. Dry soils become brittle and erode, vegetation is lost, and air pollution from dust storms increases.[65,66] A quote reported in the media referenced "one-inch cracks in the ground that go down probably half a metre".[67,68] Often dry conditions can allow weedy plant and pest species to proliferate, creating environmental harm, as well as additional stress for landholders with time, energy and money needed on pest control and weed management. In 2006-07, the Glenbawn and Glennies Creek storage reached an all-time low of 33% capacity.[69] When the dam levels are low, campers and fishers note that algal blooms are more likely, and the invasive carp thrives, outcompeting the native fish.

Drought Strengths

Drought has also shown just how innovative, resourceful, and supporting our community can be. In 2018, the Muswellbrook and Upper Hunter Shire Councils launched their 'We LIVE Here' gift cards which channelled over $1 million to support local businesses.[70] 2019 saw the introduction of the 'Spend in Singleton' card, an initiative of Business Singleton and Singleton Council, to similar success. A Merriwa farmer launched the 'One Day Closer to Rain' Facebook page to provide a place for people to share how drought affects them. Whilst the sister page, Rural Cottage Crafts acts as a platform for rural and regional Australians, particularly women, to sell their home-made crafts. Local groups have rallied to provide community support, including: Muswellbrook Rotary Club raising $45,000 in 2018, local chapters of 'Doing It for Our Farmers', a pop-up pantry in Mayne Street, Murrurundi[71], and volunteers from further afield such as the Rural Aid Farm Army. Even in these times of adversity, the resilience of our farmers shone through. Despite the drought being 'the worst since 1870', a Cassilis sheep farmer captured national attention. He laid out sheep feed in the outline of Australia, capturing stark images of his sheep flock being kept alive in a barren paddock.[72]

Feedback Loops

There were multiple drought impact pathways and feedback loops identified during the develop of this RDR Plan. A selection is shown in *Figure 4.4.*

How to read *Figure 4.4*

Each colour within the below feedback loop represents a theme or cluster of related impacts, flowing from the starting trigger, drought conditions. Green boxes broadly categorise environmental considerations, pink show agricultural themes, yellow, economic and social influences, and purple, reasons for retaining stock despite difficult drought conditions that otherwise may result in destocking. This diagram should be read from the centre outwards, starting at the black box, "drought conditions".

Cascading events are reflected in the next box, with direction of flow reflected by the direction of each arrow. These arrows can be read as "resulting in" or "producing". This map aims to provide a succinct story, reflecting voices heard across our community and informed by desktop research from the Resilience Assessment, demonstrating the systematic effects of drought. This systems map helped inform the Plan's proposed actions by distilling key themes and stories, whilst providing specific points that may require intervention (thereby identifying critical points where the Plan's actions can provide assistance).

Figure 4.4: Selection of drought-related impact pathways and feedback loops for our Region.

WHAT WILL THE FUTURE LOOK LIKE?

Whilst we can't predict the future, there are projections and resources available, such as MyClimate View and the Department of Primary Industries and Regional Development's Climate Vulnerability Assessment.

These provide an indication of the conditions our Region may experience in the future to prepare for future droughts. While predicting weather conditions involves significant uncertainty, general trends are provided below. These drought projections informed our community engagement material, shaping the questions asked and information sought from participants. High level overviews of the climate data were provided at the beginning of each workshop to ensure our community was informed and aware of the possible future reality our Region faces. Further information was available upon request.

My Climate View

A collaboration between Australia's national science agency CSIRO and the Bureau of Meteorology, aiming to *provide Australian farmers with tailored insights into their changing climate by presenting agriculturally relevant historical and future climate information in one place so farmers can explore local climate trends.* My Climate data provides information for various agricultural commodities including beef, sheep, dairy, wine grapes, and cropping (wheat, barley, sorghum, lupins). The resolution of data from My Climate View is a 5km x 5km grid which supports the assessment of climatic variations across the Region. Despite having an agricultural focus, the datasets support analysis of drought impacts on agriculture, people, and infrastructure.

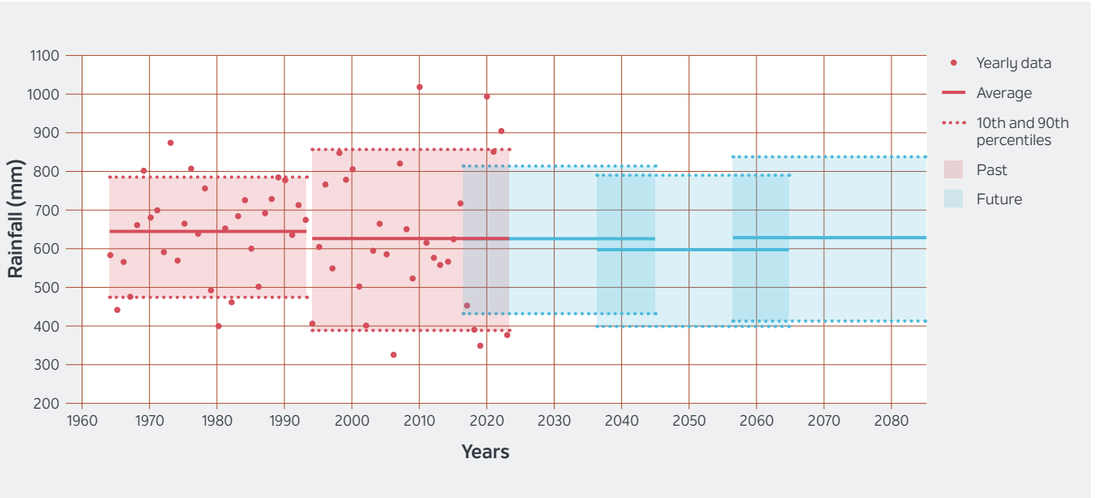
NSW DPIRD Climate Vulnerability Assessment

A climate vulnerability and opportunity assessment across NSW primary industries. This resource canvasses the resilience of extensive livestock, broadacre cropping, horticulture and viticulture, forestry, and biosecurity risk, providing information surrounding these industries. This is helpful in informing planning, risk management, and adaptation decision making.

Historical seasonal rainfall is highly variable across all parts of the Region. Within each season, there can be a five-fold difference between the rain received in one year and what is received in the next. This trend is set to continue in the future, with *Figure 4.5* providing an example for Cassilis, which is a locality with a mix of grazing-reliant farms. With evapotranspiration expected to increase across all seasons[73] this means more water will be lost from above ground storage, vegetation, pastures, and soil. So even if the same amount of rain is received in a season or year, it will be less effective in stimulating pasture growth and filling our on-farm or public water storages.

Figure 4.5: Annual Rainfall, Historic Records, and Climate Projections (RCP 8.5) for Cassilis

Source: CSIRO & BoM. 2024.[74]



Droughts are often associated with El Nino conditions, creating above average temperatures. Extended periods of high heat increase evaporation, intensifying soil moisture loss and creating the conditions conducive to damaging bushfires.[76] These conditions are dangerous for our wildlife and natural environments, as well as for our livestock. *Figure 4.6* shows the projected increase in dangerous heat stress days, using Denman as an example, given the number of beef graziers in the area.

The current and projected changes for high heat days and heat stress conditions are shown in *Table 4.1* for a selection of locations throughout our Region. Readers are encouraged to view the climate projections for their specific location and agricultural enterprise on the MyClimateView website.

Figure 4.6: Heat Stress Days in the 'Danger' Category for Beef, Historic Records and Climate Projections (RCP 8.5) for Denman

Source: CSIRO & BoM. 2024. [75]

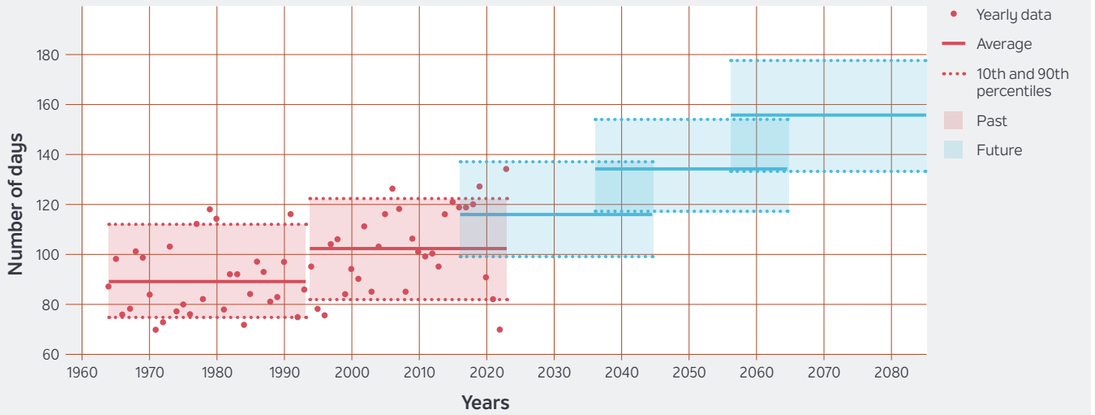


Table 4.1: Heat Climate Projections under RCP 8.5

	Singleton			Denman			Scone			Murrurundi			Putty		
	Baseline	2050	2070	Baseline	2050	2070	Baseline	2050	2070	Baseline	2050	2070	Baseline	2050	2070
Number of days per year over 35°C	23	37	46	30	47	57	27	43	53	10	20	26	13	23	29
Number of days per year over 40°C	4	7	10	5	10	14	3	8	11	0	1	2	2	3	5
Heat stress days[>]	80	126	146	89	134	155	87	130	151	46	83	101	54	96	115

Note: Baseline data refers to the 1964-1993 average.
[>] Heat stress days consider temperature-humidity index over a particular threshold (≥79), defined as 'danger' stress for beef production

05

DROUGHT RESILIENCE CHALLENGES AND OPPORTUNITIES.

This section provides an overview of difficulties relating to drought and opportunities arising out of these challenges. These have been informed by our community engagement and desktop research conducted as part of the Resilience Assessment.

Challenges and opportunities identified as part of the desktop study, the Resilience Assessment, were validated and explored with stakeholders and community members.

An amalgamation of engagement feedback and the Resilience Assessment are provided over page.

CHALLENGES

Every drought is different

No two droughts are the same, with a multitude of factors determining the severity of impacts. The extent of dry conditions beyond our Region, affects the availability and cost of purchasing fodder, finding somewhere to agist stock and the price paid for animals at the saleyards. Market prices fluctuate, affecting the cost of inputs like fuel and fertiliser. Other stresses add to the burden, such as cost of living pressures, interest rates, housing affordability and availability. When we look to the future, there is no such thing as a normal season. Rainfall is projected to be highly variable and hotter temperatures are likely to increase moisture loss from soil and pastures. When rain does fall, runoff into dams may be less than expected. Future droughts are likely to worsen, becoming longer, more intense, or more frequent. The ever-changing nature of droughts and possible future climatic conditions raises the imminent need for flexibility and adaptive management to ensure nimble responses. Forward planning and examination of known successes during past events builds the bank of knowledge held within our community.

Constrained funding for water infrastructure

Communities relying on water resources and availability are also placed under significant stress during drought. As an example, Singleton water planners expect that droughts resulting in a 25% decline in water allocations will result in unmet demand by 2032.[77] Water prices increase, with many rural residents (not serviced by reticulated water systems) carting water to their properties, a costly exercise. Whilst subsidised, alongside other compounding stresses such as rising petrol prices, this places additional burdens on farmers, particularly given the quantities of water needed to be obtained for livestock consumption. All three councils face tensions, torn between revenue raised from water services, whilst maintaining efficient infrastructure and water saving initiatives, reducing water consumption. It must also be noted that while all three participating councils identified water infrastructure projects within the Regional Drought Resilience Planning program, securing funding for large scale projects is challenging. Whilst funding is constrained and resourcing challenges remain an ever-present challenge for the Region, actions working to improve water infrastructure would enhance regional water security. This could be supported by grant funding to allow for forward planning and water infrastructure upgrades.

Ineffective water market

The Greater Hunter region's water market is inefficient as only 10% of water is potentially available for trading.[78] The water that is traded is mostly at a price beyond the reach of most within the agricultural industry. Whilst the mines largely rely on rainfall for their operations and some mines operate their own water-sharing program, they still hold a share of water entitlements: 95% of licences in Glennies Creek below Glennies Creek Dam, 18% of the Lower Wollombi Valley, and 14% of the Hunter Regulated Alluvium groundwater sources.[79] Working to ensure fair water allocations and compliance across the Region are recommended in response to known water market challenges.

Small lot sizes and farm profitability

Community frequently described the difficulties concerning sustainable farming practices and the ongoing viability of local farms. Small parcels of fragmented land constrain graziers, croppers, and other enterprises from generating a profit solely from agricultural endeavours. Many within the industry balance their farming commitments with part- (or full-) time off-farm work, providing a diversified income. However, this reduces the time and energy available to dedicate to management activities on their parcel of land or leads to lives becoming a physical and mental marathon of 12 to 15 hour days. Tax rebates further complicate the system, potentially creating incentives resulting in decisions which may not be financially sustainable in the longer term. For others, turning a profit is not a high priority, and their motivations are more around the lifestyle, living closer to nature, or perhaps having space between themselves and their neighbours. Many of our landholders are also relatively new to the land, meaning they don't have access to decades of farming experience to call upon when times turn tough. Drawing upon local knowledge from those who have lived within the Region for numerous years would assist newcomers within our community. Likewise, benefits to social infrastructure can be realised. Maximising farming capacity and working to build spare capacity and redundancy will assist small farming operations in remaining viable during tough times.

Difficulty in turning a profit

The Region has faced compounding disaster events from natural hazards. From drought (2017-2020), to bushfire (2019-2020), to flood (2021), the pandemic (2019-2021), more floods (2022), and a mouse and locust plague (2022). The back-to-back, unrelenting nature of these events provide minimal opportunities to recover, physically, emotionally or financially. Whether it is through loss of stock, poor or no harvests, damage to infrastructure or a backlog of maintenance, it is difficult to return to profit. The pricing regime of supermarkets was singled out by many landholders for being unfair and failing to value their constant hard work.[80] Efforts to maximise community resilience, supporting mental and physical wellbeing will encourage the Region to take care of themselves during periods of difficulty. Actions and activities working to support community groups, likewise, ensure sufficient social infrastructure exists for the Region to lean upon during these challenging periods. Work bolstering the financial viability of farming operations (such as business and financial contingency planning) could also provide benefits.

Growing expectations on farmers

Farmers are facing growing expectations to do more. Transitioning towards carbon neutral farming, regenerative agriculture practices, and environmental accounting create extra burdens. Compliance and bureaucratic administrative requirements build further obligations on time-poor individuals. Furthermore, farm succession planning, navigating exit plans or transitions to the next generation to ensure security and involvement of younger parties can take years. This places additional strain during otherwise already difficult circumstances. Encouraging the uptake of social support systems (as simple as joining a friend for a cuppa or playing rugby at the local footy club) provides reprieve from these growing expectations. Clear lines of communication, leveraging knowledge already held within the community and supporting small business financial viability under this Plan are expected to bring additional benefits to the Region.

Farmer physical and mental wellbeing

Following a disaster, it is said 1 in 5 farmers want to give up.[81] During drought, primary producers handle heavy burdens. Between hand feeding stock, carting water, and providing for their households, many have limited time or money for social and recreational activities which provide a reprieve or mental break from the farm. These financial and time pressures can segue into mental health issues.

This distress can cause increased risk of substance abuse and domestic violence. Farmer stoicism can also reduce the likelihood of someone reaching out for help. When they do, many face the difficult process determining which provider is appropriate. Even if they find the appropriate organisation, services may have long waiting lists, meaning necessary support is not available when needed most. Recognising the constraints poor mental and physical health holds upon farmers and their families, this Plan works to support community and facilitate fit-for-purpose social infrastructure to further the Region's journey in improving mental health and wellbeing.

The mining conundrum

Mining offers significant salaries and income to the Region, the highest of any employers.[82] However, some within the community raised significant concern regarding the fragmentation of land and environmental impacts of this industry. Some believe that valuable land is being lost to the mines or associated environmental offsets, reducing the land available for grazing, and even where land is rehabilitated, the quality of the pasture is seen to be inferior. As coal-fired power stations close, and the energy sector moves towards renewables, the skills required by energy workers will change. Workers may need to upskill or re-skill. Uptake of opportunities arising during the mineral extraction transition will encourage and maximise the Region's potential in remaining an economic powerhouse during this change. Leveraging existing opportunities, the mining industry provides additional means for the Region to build drought resilience, primarily through the provision of financial support and job opportunities.

A fragmented communication landscape

Across the Region, feedback was received that the closure of locally run newspapers, such as the Scone Advocate, Hunter Valley News, and Upper Hunter News, had impacted the ability to tell local stories, and promote local events. This extends to the decline in people listening to radio. Whilst the younger generations have grown up with social media and are digitally savvy, many within our older cohort have not kept pace with these new communication modes. Connecting individuals to information, support services, and events is therefore challenging. There is no one best way for service providers to get their message out there, and no single option for community groups to offer their support and connect with members of their community. Recognising the dividing nature of this challenge, with young and elderly populations engaging with different methods of communication, actions within this Plan could focus on development of a universal communication method relating to drought. Incorporating drought considerations within planning policies, whilst leveraging knowledge already circulating across the community will allow for the formation of a comprehensive drought communications plan.

OPPORTUNITIES

Our landholders are resilient

A region is as strong as its people. Our community continues to show that we are tough, coping with additional burdens and challenges as they arise. We see our landholders using entrepreneurial insight and ingenuity. People can juggle caring for their land, running a business or working off farm, and maintaining family relationships. However, there is a limit, and rural residents don't always 'bounce back' after difficulty. Such labels can also create pressure to 'tough it out'. Opportunities exist to shift the focus to one which supports wellbeing at all times for happy, healthy and thriving individuals and for communities that care for one another and look after their mates. Leveraging our Region's collective resilience, it remains critical that this Plan continues to support the community's mental and physical wellbeing. Actions tailored towards financial pulse checks, supporting social infrastructure and community groups, and leveraging community knowledge will ensure that our landholders remain resilient in future drought events.

Community spirit and volunteers

As a Region, we are blessed with a diverse and welcoming community. Through commitment, kindness, and teamwork, stories of compassion and camaraderie were heard throughout engagement conducted for this Plan. We are supported by numerous community facilities (like town halls, sporting facilities, and pony clubs), providing communal points of assembly. Organisations and social movements such as 'Where There's a Will', 'One Day Closer to Rain', 'Cuppa and Connect', 'Farmer Wants a Fish', and 'Our Shout' are locally led initiatives already providing improved connection across the Region. Social infrastructure such as community halls act as "hubs" during drought, offering a communal location for locals to chat, and for service providers to meet with affected landholders. Actions tailored within this Plan should work to capitalise on this community spirit, ensuring community groups retain ongoing support and our community champions are supported in our collective drought resilience journey.

Transition to new and emerging industries

Some mines and power stations in the Region are reaching the end-of-life, with their land being rehabilitated or transformed into new uses. This may free up ground and surface water entitlements for other uses and there is a strong desire among locals to know what will happen to water allocations and resources. Others see potential in using mining buffer land for other industries such as intensive agriculture. Shifts are also occurring across the globe as we transition to a lower-carbon economy. New and emerging industries are possible for our Region which may bring new employment industries and a need for workers with different skill sets. The proximity of our Region to the Port of Newcastle, Newcastle Airport and the Sydney market, is a source of opportunity to strategically optimise our agricultural outputs.[83] Improving the economic viability of small businesses and leveraging our biggest industry for enduring community benefit would assist our Region. Actions leveraging opportunities from industry transitions will ensure the Region remains an economic powerhouse in years to follow mine site closures.

Natural resource stewardship

Caring for Country and optimising our existing natural resource management are opportunities to improve our long-term drought resilience.[84] Building natural capital and strengthening the natural resilience and condition of the Region's ecosystems will encourage ongoing environmental stewardship, benefiting both humans and wildlife/plants. Entities such as Local Land Services and Landcare are active in our Region, offering resources and promoting best practice in vegetation cover, pest and weed control, soil health, regenerative farming and water management. Environmental offsets and biodiversity conservation agreements provide further opportunities to demonstrate how much we value our natural environment. These approaches can achieve co-benefits, improving farm profitability, diversifying income sources, and providing opportunities for eco- and agri-tourism. Actions maximising water retention across the landscape, incorporating First Nations land management techniques, and maintaining healthy soils and native vegetation could be considered by the Plan to build the resilience of our natural assets.

Connecting people with resources

There are many data sources available to improve awareness of seasonal and longer-term weather conditions and provide early indicators to assist in decision making. Local Land Services, Landcare, and Department of Primary Industries and Regional Development have a large array of information, webinars, events, and other resources to assist landholders. The key is to connect the audience with these resources, in a way that speaks to their motivations, and what they value most. Maximising clear lines of communication, ensuring community knowledge is leveraged and forward planning is utilised to reach a broad audience with available resources and support could be considered by this Plan as a potential action area.

First Nations land management

The Region has a strong connection to Country, with First Nations people – the oldest continuing culture in the world – passing down cultural practices through the generations for more than 65,000 years. Opportunities arise in coordinated cultural burns and firestick burning approaches: reducing fuel loads, moderating weeds and pests, and helping our land to heal and regenerate. Embracing First Nations cultural land management has the potential to deliver cultural, social, drought and disaster resilience benefits. Actions raised within this Plan could consider a return to traditional land management techniques such as cool fire burns to regenerate flora, providing both environmental and social/cultural benefits to the Region.

The **Sustainable Development Goals (SDGs)**, adopted by the United Nations in 2015 are a universal framework and blueprint to achieve a resilient and sustainability future for all.

They have been widely adopted within the global community to guide the sustainable development process across environment, social, and economic pillars. SDGs have been utilised throughout this RDR Plan to demonstrate the linkages between the Region's challenges, opportunities, actions, and the resilience and sustainable future pathways.

Read more: https://sdgs.un.org/goals

06

A PLAN FOR DROUGHT RESILIENCE.

The Program Logic in *Table 6.1* describes our drought resilience journey. This starts with a shared vision, strategic objectives and goals and our pathway to change via priority and complementary actions to support the achievement of our desired short- and long-term outcomes.

Table 6.1: Program Logic

Vision

For Singleton, Muswellbrook Shire and Upper Hunter Shire communities, drought resilience means we survive the negative impacts of dry times until they pass, ensuring we have opportunities to adapt and prosper. Our Region is future ready and has strategies in place in advance of challenging times, building upon existing strategies that have proven results. Our people and businesses are equipped with the knowledge and tools to adapt to changing circumstances. Our community is the foundation of our support network through their commitment, innovation, and resourcefulness. Our decision-making supports sustainable and healthy soil, water, and air. We approach our challenges in partnership, achieving strength in our unity.

Strategic Objectives

To achieve this vision, actionable steps within the economic, environmental, and social spheres of influence were prioritised.

Economic Resilience

Fostering innovation and collaboration to enhance productivity and competitiveness in transitioning industries as the Region supports and strengthens existing businesses to bolster economic stability and diversification in preparation for future dry times.

Social Resilience

Building upon existing social capital and attracting a diversity of culture and people to our Region to address inequalities and foster equal access to promote social mobility. Working to empower marginalised communities and vulnerable social groups, boosting mental and social resilience community-wide during times of hardship.

Environmental Resilience

Ensuring awareness of, and implementing initiatives which protect our natural assets, promoting environmentally conscious behaviour across our community, businesses, and industries to ensure access and availability to natural spaces for years to come.

Goals

Economic Resilience

- Diversify our farm enterprises and identify new agricultural opportunities
- Leverage changes in our Region to diversify our economy and employment opportunities
- Promote networking and collaboration among local businesses
- Build the capacity of individuals and small business to take ownership of drought resilience

Social Resilience

- Promote mental and physical wellbeing across all generations
- Support our community groups to expand their reach and realise their goals
- Enhance utilisation of available support services and resources
- Enhance connections and collaborations across community groups and support services

Environmental Resilience

- Ensure efficient water management especially in times of drought
- Promote increased adoption of drought resilient and sustainable land management practices
- Improve preparedness and planning for future periods of reduced water availability

Actions

Action D: Ensuring Economic Prosperity as Our Region Transitions

- **Complementary Action:** Improving Small Business Financial Viability

Action C: Supporting Our Community Groups

- **Complementary Action:** Facilitating Fit-for-Purpose Social Infrastructure
- **Complementary Action:** Furthering our Community's Journey to Mental Health and Wellbeing
- **Complementary Action:** Leveraging the Knowledge Held Within Our Community
- **Complementary Action:** Grant Writing Toolkit
- **Complementary Action:** Leveraging our Biggest Industry for Enduring Community Benefit

Action B: First Nations Land Management Practices

Cross Cutting Actions

Action A: Comprehensive Drought Communications Plan

- **Complementary Action:** Leverage Local Land Services Landholder Research
- **Complementary Action:** Incorporate Drought Considerations into Planning Policies

Action E: Forward Planning and Helping Our Water Users Prepare for Dry Times

- **Complementary Action:** Considering Social Value in the Integrated Planning and Reporting Framework
- **Complementary Action:** Improving Water Infrastructure to Enhance Regional Water Security
- **Complementary Action:** Improve Awareness of Compliance Regimes for Water Taken from the Hunter River

Short Term Outcomes

(≤ 4 years)

Through the implementation of each action, it is expected that the RDR Plan will generate short-term outcomes that demonstrate progress towards our vision, strategic priorities, and goals. It is anticipated that the above actions will produce the following economic, environmental, and social resilience outcomes within our community:

Economic Resilience

- Thriving businesses who are well supported, minimising impacts of economic shocks or disruptions with minimal losses or sudden layoffs. This paves the way for economic diversification of the economy through attracting non-agriculture and mining-based businesses and employment opportunities
- Promotional support existing for "buy local" strategies that increase and sustain local businesses
- Reduced widespread unemployment and associated social and economic impacts during turbulent periods of time
- Continued consumer confidence, leading to sustained spending levels during drought periods, which helps support businesses and economic activity
- Business owners actively pursuing opportunities to adopt better financial planning, income diversification, and utilisation of available grants, rebates, and financial support. This establishes widespread uptake of available training and grant opportunities, reducing cost pressures and creating widespread awareness of drought-preventative initiatives

Social Resilience

- Enhanced coordination and collaboration among government agencies, stakeholders, and communities to facilitate a cohesive and integrated approach to drought response and resilience-building efforts
- Support for community groups resulting in delivery of social connection activities, reducing isolation and improving mental, physical, and spiritual wellbeing
- Improved collaboration and support, with mutual resource sharing, increasing community social cohesion and uptake/awareness of available services and initiatives run throughout the Region
- Cognisant community members who are aware of future drought impacts, with preparation and planning undertaken to ensure drought resilience during tough times
- Improved water management practices helping to ensure community water supplies are reliable and accessible during water shortage periods, therefore enhancing public health and wellbeing
- Provision of psychosocial support services to help individuals, families, and communities cope with the stresses of drought

Environmental Resilience

- Maintained amenity and performance of recreational spaces and public open greenery, enabling residents to undertake activities which beneficially impact physical and mental wellbeing
- Improved water efficiency with reduced reliance on non-potable and potable water supplies from the Region's water storage dams and aquifers
- Bolstered traditional cultural caring methods implemented across the Region with improved environmental practices, resulting in reduced water stress during drought
- Instils a sense of shared environmental responsibility and natural resource stewardship through drought education, providing lasting positive impacts on local natural ecosystems
- Implementation of short-term water conservation measures such as restrictions on non-essential water usage, promoting efficient irrigation techniques, and repairing leakages to preserve water resources
- Strengthening of drought monitoring systems and early warning mechanisms to provide timely information to stakeholders, enabling proactive drought response and management

Long Term Outcomes

(> 4 years)

Attaining our long-term outcomes hinges on the successful execution of each action, accumulating our short-term outcome successes, and thereby achieving our strategic priorities and goals.

- There is a common understanding and a shared vision in the Region managing drought risks and build community drought resilience
- The Region collaborates and works collectively within partnerships to build drought resilience across three pillars: economic, environmental, and social resilience
- Measures are implemented to limit impacts of drought and better coordinate and respond to drought events and incidents
- Stakeholders and communities proactively share knowledge and lessons learned, taking actions that contribute to drought resilience
- A diversified local economy

Monitoring, Evaluation and Learning

To ensure our journey towards long-term outcomes remains on track, adaptable, and achievable, the Plan will employ robust monitoring, evaluation, and learning mechanisms.

This will provide valuable insights to refine our strategy and approaches to best suit our community and needs as required.

ACTION STRATEGIC ALIGNMENT

To ensure our Region is leveraging existing work and initiatives, it is helpful to consider how this RDR Plan aligns with existing policies, strategies, and legislation. *Table 6.2* provides a quick overview of how identified actions brought forward from our community within this Plan align within the existing political arena. For example, our action "Ensuring economic prosperity as Our Region transitions" is highly relevant to and shares synergies with the Upper Hunter Destination Management Plan, which aims to build tourism and visitation to the Region. Our action aims to diversify the regional economy away from single sources of income (largely mineral extraction), while the Destination Management Plan works to diversify the economy through bolstering of the tourism industry.

Meanwhile, documents such as the Australian Government Drought Response, Resilience, and Preparedness Plan 2019 have a broad applicability to our Plan. It is a pivotal document in establishing the drought preparedness and resilience scene across Australia and directly links into this Plan. This means all actions directly reducing drought's influence on our Region are closely aligned with the intentions of this national plan. Supplementary actions, working to reduce co-stressors (such as boosting community resilience and improving economic resilience) are ancillary to the national plan.

Each '●' within *Table 6.2* notes synergies between our Plan and the existing strategic policy sphere.

Table 6.2: How Our Actions Align with Strategic Policies and Strategies (Local through to International)

	Relevant Policies and Strategies	Comprehensive drought communications plan	First Nations land management practices	Supporting our community groups	Ensuring economic prosperity as our Region transitions	Forward planning and helping our water users prepare for dry times
Singleton	Community Strategic Plan	●		●		
	Local Strategic Planning Statement	●				●
	Integrated Water Cycle Management Strategy					●
	Climate Change Risk Assessment and Adaptation Plan		●			
	Sustainability Strategy 2019-2027					●
	Council and Community Emissions Reduction Action Plan 2023		●			●
	Socio-Economic Development Strategy – 2020-2024			●	●	
Muswellbrook	2022-2032 Community Strategic Plan	●		●		
	Local Strategic Planning Statement 2020 – 2040	●		●		
	Integrated Water Cycle Management Strategy					●
	Adverse Impacts Plan 2020				●	
Upper Hunter	2032: Community Strategic Plan	●		●		
	Local Strategic Planning Statement	●			●	
	Integrated Water Cycle Management Strategy					●
	Upper Hunter Destination Management Plan				●	
	Sustainability Action Plan					●
	Climate Change Strategy and Action Plan		●			
Regional	Hunter Joint Organisation Local Disaster Communication Planning Framework	●				
	Upper Hunter Economic Diversification Plan				●	
	Hunter Regional Economic Development Strategy 2023 Update				●	
	Greater Hunter Regional Water Strategy					●
	Upper Hunter Water Utilities Alliance (UHWUA) Drought and Emergency Response Management Plan 2022					●
	Destination Management Plan Hunter Valley Situation Analysis 2022				●	
	Hunter Valley Destination Management Plan 2022-2030				●	
	Hunter Regional Plan 2041				●	
State	NSW Water Strategy 2021	●				●
	NSW Waste and Sustainable Materials Strategy 2041				●	●
	NSW Climate Change Adaptation Strategy		●		●	
	20-Year Economic Vision for Regional NSW (20-Year Vision) 2021				●	
	Managing and Preparing for Drought 2018	●			●	
	NSW Climate Change Policy Framework	●				
	Extreme Events Policy	●				
	NSW State Disaster Mitigation Plan 2024-2026	●		●		●

	Relevant Policies and Strategies	Comprehensive drought communications plan	First Nations land management practices	Supporting our community groups	Ensuring economic prosperity as our Region transitions	Forward planning and helping our water users prepare for dry times
National	Australian Government Drought Response, Resilience, and Preparedness Plan 2019	●	●			●
	National Drought Agreement 2018	●			●	●
	National Climate Resilience and Adaptation Strategy 2021-2025		●			●
	National Climate Risk Assessment First Pass Assessment Report		●			
	The Second National Action Plan to Implement the National Disaster Risk Reduction Framework		●			
International	UNCCD Drought Resilience Technical Guideline					●
	Sendai Framework for Disaster Risk Reduction 2015-2030 Action 1 – Understanding Disaster Risk	●			●	●
	Sendai Framework for Disaster Risk Reduction 2015-2030 Action 2 – Strengthening disaster risk governance to manage disaster risk	●	●	●	●	●
	Sendai Framework for Disaster Risk Reduction 2015-2030 Action 3 – Investing in disaster risk reduction for resilience		●			●
	Sendai Framework for Disaster Risk Reduction 2015-2030 Action 4 – Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.	●		●		●
	SDG 1: No Poverty*					
	SDG 2: Zero Hunger*					
	SDG 3: Good Health and Well-Being	●			●	
	SDG 4: Quality Education	●	●			
	SDG 5: Gender Equality*					
	SDG 6: Clean Water and Sanitation					●
	SDG 7: Affordable and Clean Energy				●	
	SDG 8: Decent Work and Economic Growth				●	
	SDG 9: Industry, Innovation and Infrastructure		●		●	●
	SDG 10: Reduced Inequalities	●	●		●	●
	SDG 11: Sustainable Cities and Communities	●		●	●	●

	Relevant Policies and Strategies	Comprehensive drought communications plan	First Nations land management practices	Supporting our community groups	Ensuring economic prosperity as our Region transitions	Forward planning and helping our water users prepare for dry times
International (cont.)	SDG 12: Responsible Consumption and Production	●				●
	SDG 13: Climate Action		●			●
	SDG 14: Life Below Water*					
	SDG 15: Life on Land	●	●			●
	SDG 16: Peace, Justice and Strong Institutions			●		
	SDG 17: Partnerships for the Goals	●	●		●	●

*Actions have been developed to align with the three pillars of resilience: economic, environmental, and social. Sustainable Development Goals (SDGs) adopted by the United Nations align with these three pillars, acting as a blueprint for peace and prosperity across our planet and people, both now and into the future. For homogeneity, challenges, opportunities, and actions have been linked to key SDGs to demonstrate the linkages throughout this RDR Plan. SDGs marked with an * do not align with the RDR Plan's actions but have been included for entirety.*

The **Sendai Framework** focuses on the adoption of measures which prevent the creation of new risk, reduce existing risks, and increase resilience, which align with the objectives of this Regional Drought Resilience Plan (RDR Plan). Of the seven global targets to guide progress on the Sendai Framework, this RDR Plan will support six of the targets: reducing disaster mortality, reducing the number of people affected, reducing direct economic losses, reducing disaster damage and disruption of basic services, increasing the number of countries with local risk reduction strategies, and increasing the availability of and access to multi-hazard early warning systems.

ACTION PATHWAYS

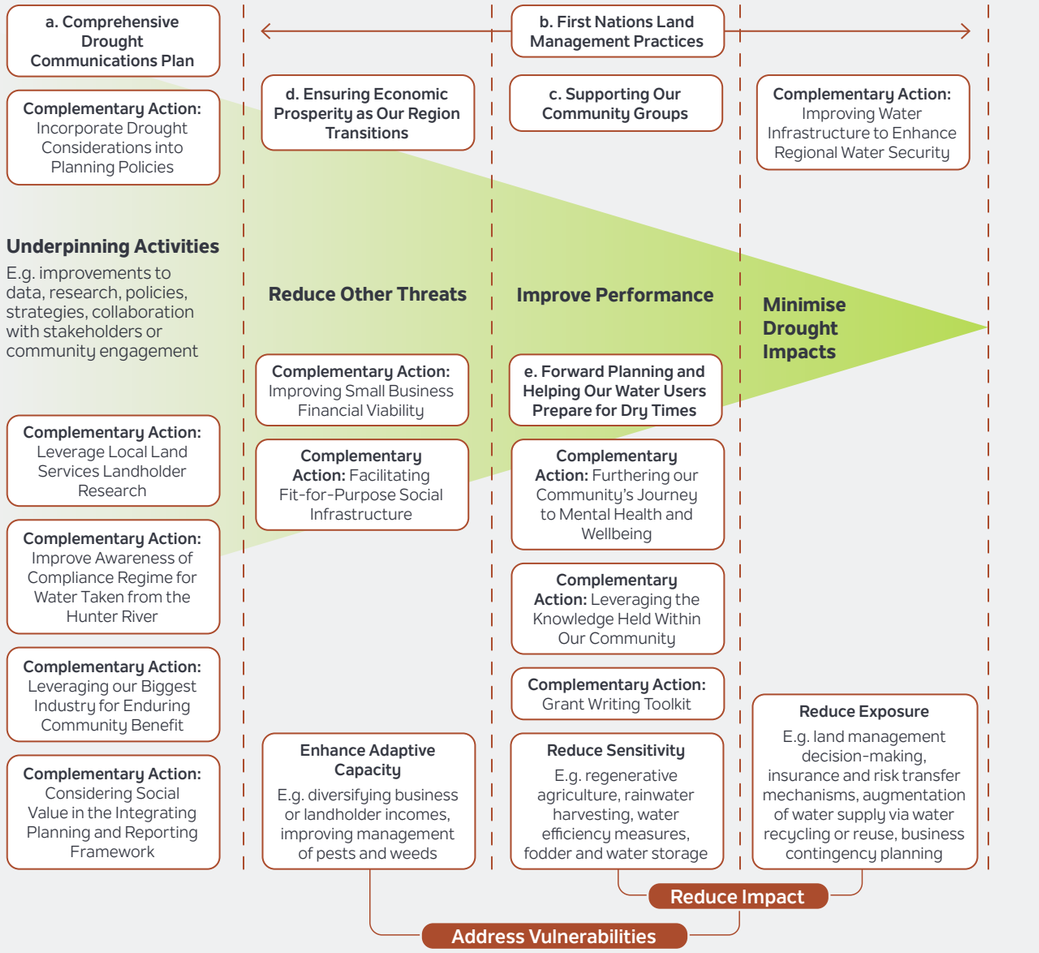
Figure 6.1 demonstrates how the priority actions of this RDR Plan locate on the impact pathway spectrum. The impact pathway spectrum represents different activities that may help build resilience to drought in the Region and range from supporting or underpinning activities, enhancing adaptive capacity, improving performance, and reducing exposure. The actions developed in this Plan are spread across this spectrum to provide a comprehensive approach to address drought vulnerabilities and reduce drought impacts. The actions were developed, evaluated, and prioritised during the stakeholder and community engagement program using the approaches discussed in The Process section.

In subsequent pages, action plans for the five priority actions are documented and include information to support funding endeavours, and recommendations for implementation. This includes action rationale, high-level estimated costs and implementation timeframes, implementation steps, potential benefits, and complementary actions.

Please note the information provided within action plans, particularly timeframes and costs, are intended as preliminary estimates to be further developed in subsequent phases following the completion of this RDR Plan.

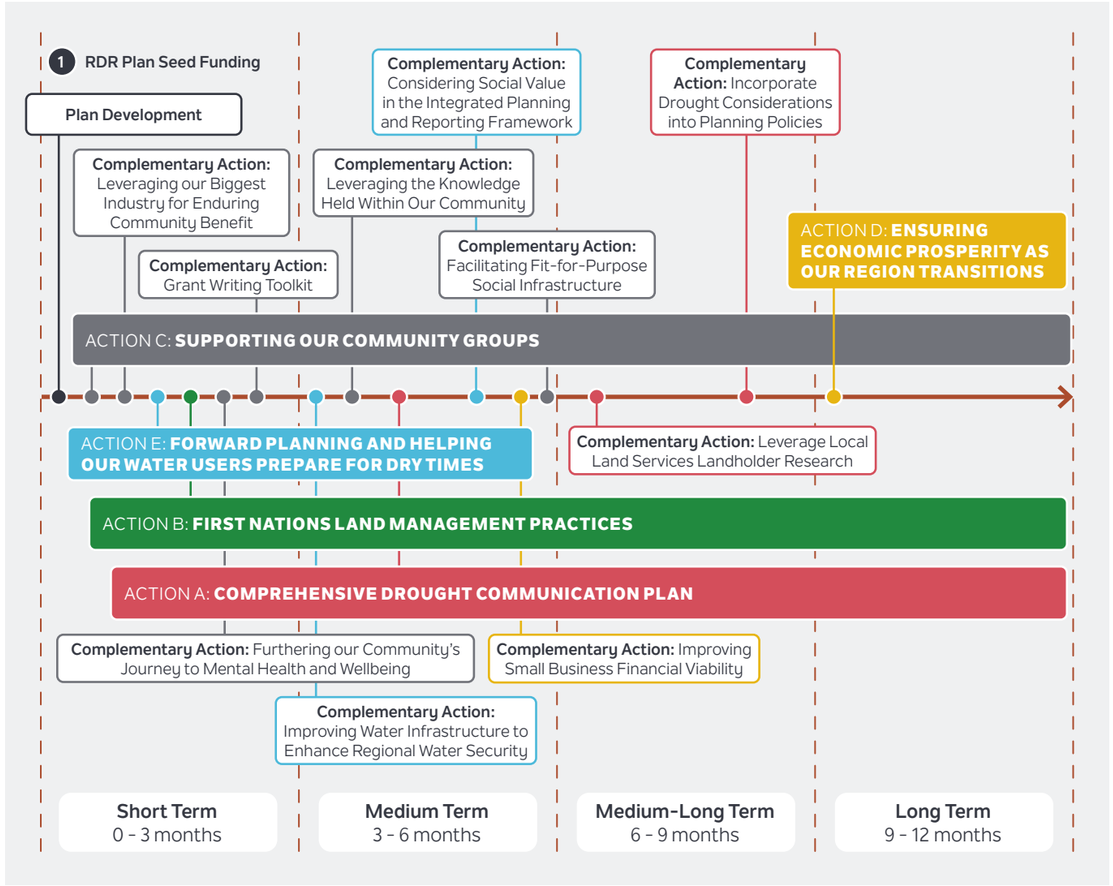
Figure 6.1: Action Pathways

Source: Adapted from the National Environmental Science Program, Climate Systems, Interventions for Biodiversity Conservation



The prioritised actions for this RDR Plan have been tentatively mapped against the 1-year RDRP implementation timeframe. While these suggested timeframes indicate when each action could be initiated, it is important to note that the expected impacts of these actions (including some implementation) will extend well beyond the 1-year period. This approach ensures that we can achieve both immediate and sustained progress towards our resilience goals.

Figure 6.2: RDR Plan Implementation Timeline



HOW TO READ AN ACTION

Collectively, the five priority actions and further complementary actions outlined within this section aim to provide our Region with a sound basis to achieve our vision to build a drought-resilient community. The actions outlined in this RDR Plan follow a consistent format, including the following information:

Themes

A brief snapshot of the action's theme. This Plan considers four key thematic areas:

01	**Environment**
02	**Social**
03	**Economic**
04	**Water**

Additionally, each action has been aligned with the Sustainable Development Goals (SDGs) to reflect international best practice.

Rationale

This section explains why the noted action appears within the final RDR Plan. It contextualises information heard from our community alongside how the action will promote drought resilience across the Region.

Timeframe

The estimated timeframe for action completion.

Estimated Costs

Approximate, preliminary costing estimated for each proposed action/project, remaining subject to funding and resource availability.

Action Owner

The proposed lead coordinator who will drive action development.

Stakeholders

Outlines who will benefit from this action and who is the intended audience and recipient of the project.

Steps for Implementation

A suggested methodology from resilience specialists which can be used by action owners in conjunction with local knowledge and preferential steps to undertake each action.

KPIs

Key performance indicators which provide a means to measure the success of each action.

Linkages to Existing Strategies

1-3 highly relevant policies and strategies aligning with the detailed action, demonstrating how the RDR Plan action contributes to achieving the goals of an existing plan, or vice versa. Further strategic alignment is canvassed within *Table 6.2* above.

Resilience Dividend

Expected benefits likely to arise as an action is carried out. This section reflects the positive benefits gained through project investment across projects designed to bolster drought resilience as opposed to business-as-usual.

Complementary Actions

Further supplementary actions raised during engagement which complement the prioritised actions within this Plan.

ACTION A: COMPREHENSIVE DROUGHT COMMUNICATION PLAN

Theme: Cross cutting

Rationale

A consistent theme heard throughout the engagement period and validated by the three councils was the strong need for a comprehensive and coordinated communication plan and approach to support improved dissemination of information across the Region. Feedback highlighted that there was limited understanding of, or consistency of information relating to available support, programs, and initiatives available to assist with drought preparedness efforts and how to access them. It was also evident that information needs to be tailored to different audiences and provided in multiple formats (both physical and digital) in easily accessible language. With growing expectations on farmers to meet new "climate-friendly" KPIs and to be drought forward-thinking, the overwhelming amount of information available across the Region presents challenges. For this reason, a comprehensive drought communications plan was recommended during engagement to address the fragmented communication landscape, connecting people with resources (an identified opportunity for the Region).

This action contains several elements, each of which forms part of an overall Comprehensive Drought Communications Plan (Communications Plan) designed to address the challenges identified and increase preparedness for and resilience to future droughts. There is also the opportunity to leverage the Communications Plan with the Disaster Communications and Planning Framework and Toolkit identified by the Hunter Joint Organisation, which contains key communication resources and structures to assist with preparing communication collateral during disaster.

This action would be implemented over time, with the opportunity for different elements to be delivered at different stages once the baseline and foundational elements have been achieved. Some of the elements will either maintain or modify the system, while others will be transformative, strengthening resilience and shifting the dial towards greater self-empowerment.

Part A: Building Stakeholder Database

The foundational element of the Communications Plan is the development of a Stakeholder Database. It was evident during the engagement process that there isn't a consistent or consolidated process for recording stakeholder and community details.

This makes it difficult for councils to contact groups of stakeholders and ensure that the people who need the information are receiving it.

By developing a stakeholder database, using an established tool such as Consultation Manager, councils will be able to store stakeholder information and record when and how stakeholders have been engaged. Knowing who the key community stakeholders and champions are will also assist in coordinating and efficiently linking people in need to the appropriate available support.

This element has the potential to transform the system, increasing the connection and partnerships between councils and the community, the depth of understanding in the community of information and support available, and subsequently increased drought resilience. This element will also support other council initiatives beyond drought resilience and preparedness.

Part B: Leveraging Existing Channels and Events

Engagement findings showed that there are existing communications channels, activities, and events which could be leveraged to avoid duplication of resources and funding. A key step in developing the Communications Plan will be to identify these existing channels, activities, and events that could be utilised to further promote drought preparedness and resilience.

In terms of events, an integral step will be liaising with the key industries, such as wine, tourism, grazing and equine stakeholders, to identify opportunities to add value to existing events. This will avoid duplication and also assist people who are time poor to attend a range of industry events to receive multiple benefits in one event.

These events will provide networking and connection opportunities, which are critical to maintaining positive morale and mental wellbeing.

Councils already have established communications channels which can be leveraged to improve dissemination of information about drought preparedness. These channels include the rates notices, newsletters, council websites and social media pages.

Once identified, these activities, events, and channels will be included in the Communications Plan and form part of the overall action plan to roll out throughout the Region.

This element is expected to both maintain and modify the system, by utilising existing resources to raise awareness about drought resilience with a broader reach of audience.

Part C: Dedicated Information portal

A key element of the Communications Plan is establishing appropriate avenues to share information across the Region. Feedback from the engagement found there is a disconnect between the information developed and the intended audience. There is a need for a 'one-stop-shop' of information that is accessible to a wide range of people. It is envisaged that a local drought portal could be created and embedded on each council's website. Local employers can act as a valuable conduit to disperse information. This portal could also be embedded within the intranet pages of large local employers, should they wish to participate.

The portal would include information about available services, training sessions and e-learning modules, amongst other general drought preparedness information. By embedding this information on intranet sites, which are high traffic sites for local employees, the information will be more widely accessible. This element will, in the first instance, involve collating information already available, followed by establishment of an online portal. Additional information can be added as it is developed or made available. This element is expected to modify the system, but may also contribute to transformation, as the portal can be scaled over time with additional functionality as funds are sourced.

Timeframe

6 months to 1.5 years

Estimated Costs

$50,000-$150,000

Action Owner

Singleton, Muswellbrook Shire, and Upper Hunter Shire Councils

Stakeholders

Key stakeholder groups, such as the Rural Support Services Network, and community champions / organisations, local employers, landholders, and other community members / residents

Steps for Implementation

1. Develop and issue an RFQ for a contractor to develop the Drought Resilience Communications Plan.
2. Undertake a review of Consultation Manager programs, using lessons learned from other councils, before purchasing a licence to an appropriate program.
3. Utilise the services of the communications contractor to host a series of internal council meetings to determine existing stakeholder databases and establish a process for consolidation and migration to the new program.
4. Hold a series of key stakeholder interviews to identify any gaps in the stakeholder lists.
5. Undertake a review of online portal programs, using lessons learned from other councils, before purchasing a licence to an appropriate program.
6. Utilise the services of the communications contractor to host a series of internal council meetings to determine appropriate information for the online portal.
7. Hold a series of interviews with key local employers about the best approach for embedding the portal on intranet sites.
8. Work collaboratively with the communications contractor to develop the Communications Plan, which will include detail of key engagement activities and dissemination channels, stakeholder mapping, and key messages.
9. Deliver engagement activities and information through the avenues and channels outlined in the Communications Plan.
10. Monitor media coverage and analyse its impact and reach, making recommendations to stakeholders for improvement regarding engagement.
11. Develop a plan, with key responsibilities and actions, to manage updates to the Communications Plan to ensure the content remains current.
12. Incorporate the Plan within Integrated Planning and Reporting documents and/or communications plans across each Council (where funding and resources are available).

KPIS

1. Number of stakeholders added to the database.
2. Number of stakeholders reached using existing channels.
3. Number of existing activities and events leveraged to promote drought resilience and preparedness and participant numbers.
4. Number of social media posts, council website updates, and newsletters and rates notices distributed.
5. Number of visits to information portal.
6. Number of downloads from information portal.
7. Increased uptake of support and services.

Linkages to Existing Strategies

- Community Strategic Plans (Singleton Community Strategic Plan, Muswellbrook 2022-2032 Community Strategic Plan and 2032 Community Strategic Plan (Upper Hunter)): These plans outline how Council will work with community to ensure consistency and informed decision making. A clear and comprehensive drought plan will work to fulfill the goals of this Plan.
- Hunter Joint Organisation Local Disaster Communication Planning Framework: This communication framework is highly relevant to our RDR Plan, providing a possible template and key messaging tools that could be utilised to the RDR Plan's advantage.
- Sendai Framework for Disaster Risk Reduction 2015-2030, Action 1, Understanding Disaster Risk: As an action focused on ensuring clear lines of communication across Councils to maximise peer-to-peer learning, this works directly towards increasing the Region's understanding of drought, a slow-onset disaster event.

Resilience Dividend

- **Social** – increased understanding of support and services available, as well as improved social connections, with greater uptake and awareness of available support services offered across the Region (both physical health, mental, and financial supports), and increased attendance at events and activities.
- **Economic** – increased financial sustainability of local residents, landholders and business owners through increased understanding of drought preparedness and resilience measures.
- **Environmental** – increased uptake of preparedness measures, including sustainable land management practices through increased awareness of available support and programs.

Complementary Actions

Leverage Local Land Services Landholder Research

There is an opportunity to leverage the Local Land Services led research Hunter Land Management Framework: 'Paddock between the ears: leveraging social capital to build natural capital', to gather a deeper understanding of the local farming community and whether the policies and interventions are performing as intended. Engagement findings indicated a lack of awareness of initiatives, activities and understanding, which validates the need to review how and who initiatives are targeted at.

This complementary action involves organising a knowledge sharing session between Local Land Services, council representatives and other relevant stakeholders to discuss the findings from the research and cross map existing interventions and proposed new interventions with typologies identified through the research.

This activity will help to target existing and new initiatives with the right stakeholder groups to be more effective. An appropriate approach for an adjusted approach would then need to be determined.

It is important to note that the findings of the research are not currently available, and this action progressing would be contingent on accessing the information. If this complementary action can progress, it has the potential to transform the system. Receiving specific information about stakeholder groups and the ability to adjust approaches to ensure increased success of policies and interventions would significantly increase drought preparedness and resilience.

Incorporate Drought Considerations into Planning Policies

The Singleton, Muswellbrook, and Upper Hunter agricultural industry has changed significantly over recent years, with a shift away from large dairy, cattle, and grazing farms towards smaller farms. These smaller rural lots often do not provide a sufficient land area to enable a sustainable and financially profitable agricultural enterprise. Engagement feedback highlighted this shift with many of these lots referred to as hobby farms or lifestyle blocks. The Local Land Services research in *Complementary Action: Leverage Local Land Services Landholder Research*, yet to be publicly published, provides complementary evidence of this change in focus from rural land purely delivering financial returns to landholders seeking a range of tangible and intangible value from their land.

This complementary action would involve conducting an informal review of existing Local Strategic Planning Statements for each council area. This would seek to identify how the planning mechanisms are interacting with agricultural financial and tax implications, such as primary producer status, which may be at odds with lot sizes incapable of delivering sustainable financial returns. For example, the question was asked during the engagement for this Plan, whether the approach to land use planning is setting people up for failure during drought. This informal review would seek to capitalise on the findings from the engagement conducted for this RDR Plan and the insights gained from the Local Land Services research. Review findings could then be incorporated into the councils' respective Local Strategic Planning Statements when they are each up for renewal.

This action may also be capable of identifying changes to land use planning, which also assist the Region in meeting the needs of a growing population, and other changes precipitated by the energy transition underway in the Region's industry. This action has the potential to not only modify but also transform the Region's systems and the way planning controls are developed and implemented across the Region.

ACTION B: FIRST NATIONS LAND MANAGEMENT PRACTICES

Theme: Environmental

Rationale

Identifying opportunities to collaborate with and learn from the First Nations community in the Region is key to improving drought resilience. Engagement with local First Nations stakeholders and community members identified multiple bespoke First Nations land management practices taking place across the Region, and there is an opportunity to adopt and expand these practices. With every drought different to the last, adopting a position of active listening to Country supports unique, respectful environmental protection.

Feedback highlighted that there are various First Nations land management practices currently conducted across the Region, but there is a lack of awareness amongst the broader community about what these practices involve and how they can be adopted. Nature resource stewardship was a key issue for many during workshops. Organisations and stakeholders who are already practicing cultural land management, including cool burning, identified during engagement sessions include Wanaruah Local Aboriginal Land Council and Wonnarua Nation Aboriginal Corporation who also works closely with Bindelong.

The critical component and first phase of this action is to work closely with identified stakeholders, such as those noted above, to determine how to engage and progress conversations about local First Nations land management practices, what they entail, the appropriateness of expanding the practices throughout the Region. It is important that the First Nations community is involved from the beginning, and that the most appropriate approach for this action is led by First Nations stakeholders. Once thorough and robust collaboration has been undertaken, this action would ultimately involve recognising the traditional land management practices in a formalised process that would allow widespread implementation and adoption.

This action will not only help to increase drought resilience through improved land management practices, but also create linkages with the local First Nations community to strengthen community cohesion. There may also be opportunities to leverage funding options from other stakeholders, such as universities, to expand this action further.

This action will seek to modify the system and has the potential to be transformative through the building and strengthening of relationships, as well as through the implementation of cultural land management practices to increase resilience throughout the Region.

Timeframe

1-2 years

Estimated Costs

$50,000-$100,000

Action Owner

Singleton, Muswellbrook Shire, and Upper Hunter Shire Councils

Stakeholders

Wanaruah Local Aboriginal Land Council, Wonnarua Nation Aboriginal Corporation / Bindelong

Steps for Implementation

1. Develop and issue an RFQ for a contractor to develop the Drought Resilience Communications Plan.
2. Engage First Nations subcontractor to lead the engagement process with, ensuring time for meaningful consultation, First Nations in Wanaruah/Wonnarua Country and other stakeholders to capture projects currently underway in the Region.
3. Map a process for the implementation and adoption of First Nations land management projects throughout the Region incorporating research into what is being done in other areas of Australia.
4. Engage with potential “early adopter” landholders to ascertain how First Nations land management can be incorporated into their own practices.
5. Deploy First Nations land management projects according to the agreed process.

KPIs

1. Percentage of First Nations entities engaged across the Region.
2. Number of First Nations projects identified.
3. Number of First Nations projects implemented throughout the Region.
4. Number of “early adopter” landholders engaged.

Linkages to Existing Strategies

- Singleton Council and Community Emissions Reduction Action Plan 2023: Adopting First Nations land management activities could improve land use emissions, improving the Region’s scope 1-3 emissions. Rehabilitation of mining land would also positively benefit the overall goals of this Plan.
- NSW Climate Change Adaptation Strategy: A return to traditional land management methods has the potential to significantly reduce climate change risks to the Region including drought.

Resilience Dividend

- **Social** – increased partnerships and collaboration between First Nations stakeholders and community members, councils, and the broader community.
- **Economic** – increased financial sustainability of local residents, landholders and business owners through increased understanding of alternative land management practices to increase drought preparedness and resilience measures.
- **Environmental** – increased environmental prosperity through adoption of alternative land management practices to increase drought resilience.

ACTION C: SUPPORTING OUR COMMUNITY GROUPS

Theme: Social

Rationale

For those living on the land or not connected to town water, drought can be like running a marathon. After a full day of work, energy needs to be found to drive into town to cart water for beloved horses, cattle, or other farm animals. Finding fodder is an exercise in perseverance, ringing around to find bales, then stomaching their ever-rising cost. Creative approaches, like buying juicing carrots each day from the supermarket can add a few more options to the feed equation. Many don't think twice about the monetary cost and effort, such is the bond and connection they share with their animals.

For those operating horse agistment businesses, or running dozens of head of cattle, the quantities of feed and water needed are even greater. Whilst selling off cattle is an option for some, for others it can be difficult to contemplate losing bloodlines which have taken decades of work. Agistment businesses are in a similar position, not wanting to forego their customer base which has taken similar lengths of time to build.

Whilst these rural endeavours may be different, the people involved share a similar story of water and feed. Comfort, strength and hope can be gained by knowing that others are also doing it tough. Taking a break, catching up with friends, and engaging in an off-farm activity, can also provide a mental break. Even if it is just for a few short hours.

The Region is blessed with many diverse and passionate community groups. The level of innovation and creative approaches being applied to age-old problems is astounding. Some operate online, providing a virtual space to share drought stories and a marketplace for locally made items. Others are helping build resilience through our rural women, our youth, or even via locally grown produce. Meanwhile the volunteers from the pony-clubs, sporting teams, creative and environmental pursuits, enable all age groups to stay physically and mentally active. These groups create a sense of place for individuals and families, helping to foster positive emotional bonds with their community members. These social connections create a space for people to talk of shared hardships, offering a reminder that one is not alone in their drought journey.

Volunteers from these community groups spoke of ways they would like to improve their group, or their offerings. For some it was about opening new chapters or widening the reach of their group, for others it was about ways to ease the burden on volunteers or deliver more to their audience. Volunteers typically wear multiple hats and are stretched thin. During a drought, attempts to fundraise mean asking more from the very same people trying to watch every last dollar they spend.

However, during the engagement for this Plan, we consistently heard that these community groups can deliver substantial gains for relatively small sums of money. That is, the return on investment for social capital and social connections is immense. These groups can then continue and expand on their role facilitating local people achieving self-help during times of drought. The benefits extend beyond drought: these groups deliver support and other in-kind assistance, through floods, bushfires, or other times of adversity. This action will seek to develop and deliver a grants program for community groups. In the process, the action will encourage trust, information sharing, and stronger networks between community members, partners, local government, and government agencies. This action builds on existing community strengths, seeking to ease the burden on volunteers as a way to increase their capacity. It is anticipated that this will slowly modify the existing system and create transformative change by supporting bottom-up change.

Timeframe

Ongoing

Estimated Costs

$50,000-$100,000 to be shared amongst groups

Action Owner

Singleton, Muswellbrook Shire, and Upper Hunter Shire Councils

Stakeholders

Community Groups. Businesses or industry groups who seek to support community resilience.

Steps for Implementation

1. Continuously scan for internal and external funding opportunities to support this action.
2. Develop a process, such as an expression of interest, to identify eligible groups and activities.
3. Incorporate considerations of diversity, equity, and inclusion (including varying levels of written and digital literacy) in the application and selection process.
4. Develop an evaluation framework, to develop a qualitative and quantitative evidence-base which demonstrates the tangible and in-tangible return on investment achieved by selected recipients.
5. Deliver the grant program with a view to establishing a recurring program.

KPIs

1. Number of applications received.
2. Number and diversity of recipients.
3. Demographics of residents supported by the recipient groups.
4. Value of in-kind contributions generated.
5. Levels of volunteering

Linkages to Existing Strategies

- Community Strategic Plans (Singleton Community Strategic Plan, Muswellbrook 2022-2032 Community Strategic Plan and 2032 Community Strategic Plan (Upper Hunter)): As key documents promoting community leadership, this action works to facilitate greater community cohesion and improve government transparency to support community decision making and projects.
- NSW State Disaster Mitigation Plan 2024-2026: Supporting Government's commitment community safety and resilience, this action works to foster greater opportunities to build drought resilience and reduce disaster impacts.

Resilience Dividend

- **Social** – Research indicates that the strength of community connections and their access to informal support is a key determinant in how quickly a community can recover from a disaster, such as drought.[85]
- **Economic** – A connected community is capable of drawing from its own wealth of knowledge and abilities in improving their drought preparedness, reducing the resultant financial impacts.

Complementary Actions

Facilitating Fit-for-Purpose Social Infrastructure

In our communities, it is our social infrastructure, such as community halls, which play a key role in a resilient community. These facilities are the venues for large and small gatherings, from games nights to festive dinners and parties. They are a place to connect with neighbours and friends, share stories, have fun, and de-stress. In times of drought, and other hardship, these facilities are also a crucial location for information sharing. With a facility nearly in every town and village, they are the primary meeting place for our rural communities. Before and during droughts (and other disasters) they act as the central hub where service providers and government agencies can meet with, and link residents with resources and support. Yet many of our facilities do not meet the needs of today, often with no internet or disabled access, non-water efficient appliances and toilets. We need to establish a baseline for each of these community facilities, and a plan on how to bring them up to a standard which reflects their status as key social infrastructure. Whilst Singleton Council and Muswellbrook Shire Council have already started this process, the Upper Hunter Shire Council is keen to follow suit. There is recognition, that the three councils can achieve economies of scale by working together, buying in bulk, or organising upgrades in a single package of work.

Furthering our Community's Journey to Mental Health and Wellbeing

Mental and physical health is a key concern for the community, with observations that drought family wellbeing is low and there is a sense of hopelessness within the community. For many, the prospect of drought is re-traumatising and causes significant stress. Helping the community to feel more mentally and physically prepared for drought and helping them to manage their wellbeing throughout drought is critical.

Through the community engagement period several local community organisations and support services who contribute to improving community mental health and wellbeing were identified. One group in particular was Where There's a Will, which 'exists to create a new normal where enhanced mental health and wellbeing allows our Upper Hunter community to thrive and flourish'.

Where There's a Will has already developed a range of positive education and learning initiatives specifically designed to be implemented in local schools for students and teachers. This complementary action would focus on Where There's a Will and their next steps in expanding their education program. It would involve engagement with the group to understand their action plan for future implementation of their program, and where the RDR Plan could assist in progressing the roll out of the program. This complementary action has the potential to modify the system in the first instance by building confidence, capacity and capability in relation to wellbeing, but may also transform the system by changing traditional attitudes towards mental health and wellbeing held and passed down through generations.

Leveraging the Knowledge Held Within Our Community

Engagement feedback identified the desire for greater peer to peer learning, where the community can learn from one another what works and what can be improved. Peer to peer learning can also contribute to social cohesion and improved mental health and wellbeing.

This complementary action would involve organising bus tours of key local industry enterprises, including tourism and accommodation ventures, winery operations, and cropping or grazing businesses. Participants can learn from each other, providing practical examples and advice to their peers, on what has worked to improve their financial viability or land management practices. For the wine and tourism industry, these tours would deliver co-benefits, improving the capacity of participants to cross promote each other's offerings to tourists. It would involve leveraging already established activities which may be run by Landcare or Local Land Services. This action would aim to modify the system, promoting a proactive approach to drought resilience and business prosperity.

Grant Writing Toolkit

Our community, business and environmental groups play a key role in helping our Region thrive. These groups spend countless hours fundraising, augmenting their finances with grants for specific projects, or equipment to support their activities. Each of our three councils already has a process in place to assist community, business and environmental groups find potential grant opportunities. Stakeholders also noted that there are other entities providing grant-writing support, however there is limited awareness of eligibility criteria and how to secure this assistance. Community volunteers expressed a desire for additional assistance via a grant-writing toolkit, which responded to a diversity of learning styles. Potential tool kit elements include in-person workshops, online or on-demand webinars, how-to-guides, information sheets detailing tips, tricks, templates, and sample responses and links to additional support.

Leveraging our Biggest Industry for Enduring Community Benefit

Mining and associated industries are a core part of our Region's identity. As our largest employers, these companies directly and indirectly support many of the small and medium businesses in our area. Many of our Region's mining companies have community support programs which provide grants, sponsorships, and other initiatives to assist local community groups and projects. Typically, these are conducted by individual companies, with no over-arching regional approach. The mantra 'working together to achieve more' and 'building on existing activities' were two recurring themes of the community and stakeholder engagement conducted for this RDR Plan. An opportunity exists to leverage the existing relationships between the councils, local mining and associated companies (like the Upper Hunter Mining Dialogue, Transgrid, EnergyCo, Australian Rail Track Corporation (ARTC)), and the community. By working together there is potential to deliver some larger scale projects to achieve long-term and lasting social, environmental and/or economic benefits. A co-benefit of improved collaboration is to improve the two-way flow of information, particularly as it relates to rehabilitated and buffer land holdings as well as land managed for environmental offsets.

ACTION D: ENSURING ECONOMIC PROSPERITY AS OUR REGION TRANSITIONS

Theme: Economic & Social

Rationale

Mining is the dominant employer in the Singleton, Muswellbrook, and Upper Hunter local government areas and occupies a significant land footprint. Historically, mining underpins our Region's prosperity, and prior to that it was agriculture, with energy continuing to be a focal point. Over the past decade or so, we have seen the Ashton North East, Drayton, Muswellbrook Coal and Liddell open cut mines cease production. The Liddell Power Station was decommissioned in 2023. These closures are often accompanied by job losses however we have seen staff redeployed from operational roles into mine rehabilitation and closure activities. However, others leave the area or pursue fly-in-fly-out/drive-in-drive-out opportunities to remain working in the mining sector. Further mine closures are predicted in coming years and decades as coal seams are exhausted, creating challenges around land allocations and economic prosperity for the Region.

However, out of closure can come opportunity to transition to new and emerging industries. In March 2024, the Federal Government unveiled their Solar Sunshot program, which will support the opening of a solar manufacturing facility at the Liddell site. During the engagement for this RDR Plan, community members and stakeholders spoke in positive terms of other potential uses for these former mining and energy sites. Future uses as diverse as water storages, pumped hydro 'big-batteries', to mountain bike parks were suggested. Others spoke of a desire to see the land returned to productive grazing or natural vegetation, and the potential for water entitlements from the Hunter River to be re-allocated. Each of these use cases has the potential to diversify the Region's economy. This means new jobs and new skills need to be acquired, but also necessitates land use, workforce, and economic development planning to ensure the right mechanisms are in place to support these changes. Much of this work is underway.

Beyond looking at what's possible and how to develop a workforce to leverage these new opportunities, we need to understand what these changes might mean for drought resilience. We know that mining operations are vulnerable to extended dry conditions and may have to suspend their operations in a severe drought. So even in the absence of change, our economy would benefit from diversification. Will these new industries place additional strain on our water resources? Will the transition free up water allocations which can go back into our existing agricultural enterprises? Is there an opportunity for new agricultural endeavours such as intensive horticulture or value-adding through processing or manufacturing? Will the changes in our Region alter the forecasts for population growth and necessitate upgrades to our water infrastructure? Opportunities such as these offer the potential to address the deep-rooted challenges across the Region, such as the "difficulty in turning a profit", as identified during the community engagement phases of the RDR Plan project.

The Region's transition will result in rapid transformative change in a relatively short period of time. This action is simply the first of many steps. It is about defining the issue as it relates to drought and water availability, aligning with work already underway and making recommendations to inform the next stage in the journey, packaged into an economic futures water considerations strategy.

Timeframe

1-2 years

Estimated Costs

$50,000-$100,000 (for phase 1 only – problem definition and recommended next steps)

Action Owner

Singleton, Muswellbrook Shire, and Upper Hunter Shire Councils

Stakeholders

A comprehensive stakeholder mapping exercise forms part of the project implementation

Steps for Implementation

1. Conduct a stakeholder mapping exercise to identify a comprehensive list of project stakeholders, sphere of control and influence, to determine desired level of project involvement.
2. Conduct future scenario planning to understand potential new and declining industries.
3. Map impact on water demand, potential for direct or indirect impacts on water availability, synergies and challenges with existing Integrated Water Management Plans.
4. Identify need for skill development to match with likely new or emerging agricultural industries.
5. Review existing planning policies to identify opportunities to attract or enable new industries.
6. Conduct community and stakeholder engagement to support steps 2 to 5.
7. Provide recommendations for next steps which are within council's control and sphere and influence.
8. Provide recommendations on partnerships, networks, and advocacy to further the Region's transition planning objectives.

KPIs

1. Engagement activities conducted.
2. Potential changes in industries and employment mapped.
3. Agricultural skill needs assessment completed.
4. Water demand implications assessed.
5. Strategic partnerships developed.
6. Recommendations adopted.

Linkages to Existing Strategies

- Socio-Economic Development Strategy 2020-2024: Providing strategic direction to ensure resources improve the liveability of the Singleton LGA, this Action relates to this strategy and should be incorporated to ensure drought resilience is a key economic consideration.
- 20-Year Economic Vision for Regional NSW (20-Year Vision) 2021: The NSW Government is working to make significant investments including health and regional liveability. This action will go towards achieving the goals of this Plan.

Resilience Dividend

- **Economic** – A diverse economy with substantial water-independent industries will provide a financial buffer for the Region's residents and businesses during drought conditions.
- **Social** – Low unemployment, and a diversity of job opportunities for all skill levels, enables the community to be confident about their Region's liveability now and into the future.

Complementary Actions

Improving Small Business Financial Viability

A consistent theme heard during the engagement period was the financial pressures experienced by small local businesses, including the increased cost of living and in particular, power prices. This was the case for tourism businesses, as well as agricultural enterprises which rely upon irrigation, with water pumps being energy intensive. Increased operating costs, reduces the financial buffers available to businesses to ride out the business downtown they may experience during a drought. We know that financial stress is a major contributing factor to declining mental health.

This complementary action would involve desktop research to identify available technology options relevant for the key local industries (wine, tourism, or grazing), such as solar power and battery storage, electric vehicle parking stations, solar water pumping, or automated farm water management. This information would then be converted into resources, information packs, webinars, or other capacity building mechanisms. This would be complemented by information on available financing mechanisms, such as green loans and grants. The action would provide an opportunity for each of the three councils to explore whether Environmental Upgrade Finance, through providers such as the Sustainable Australia Fund, are a good fit for their council and community, and a mechanism to overcome the upfront costs associated with energy and water efficiency upgrades.

This complementary action would aim to modify the system but could also contribute to council community emission reduction initiatives, which would have a transformative impact.

ACTION E: FORWARD PLANNING AND HELPING OUR WATER USERS PREPARE FOR DRY TIMES

Theme: Cross Cutting – Water Management

Rationale

The three councils in our Region are responsible for operating the water supply schemes which service the major townships of Scone, Aberdeen, Merriwa, Cassilis, Murrurundi, Muswellbrook, Denman, Sandy Hollow and Singleton. In the 2019/20 drought, the northern parts of our Region were particularly affected by dwindling water supplies. Water restrictions were also introduced in the Upper Hunter, Muswellbrook and Singleton Shires in response to the community's desire to 'do their fair share'. Water was trucked into Murrurundi until a new pipeline and pumping stations were built to transfer potable water to the town from Scone. The experience during this last drought demonstrated that our community is supportive of water conservation measures in our homes, local businesses, and in public spaces.

Action is already happening to improve the efficiency of our water supply system. Each of our Region's councils have welcomed state government funding to deliver leak detection programs across the water network. Not only do leaks represent lost water in our system, but they also represent an increase in the cost of production, given that every drop of water supplied to our customers' needs to be captured, treated, and pumped.

Whilst there is an intention to improve water use efficiency in other areas, multiple barriers exist. For our largest water users, the frequency of meter readings is insufficient to detect leaks in a timely fashion or to enable adaptive management of their consumption. With water being a relatively cheap commodity for industry and business, it has also not seen the attention to detail, that has been placed on electricity consumption. As a result, many big users have limited awareness of how much water they are using in different parts of their operations, although this is less of an issue in the Upper Hunter Shire Council area.

Population growth also creates notable challenges for the Region's water security risks, with water considered an expensive commodity beyond the spare capacity of most within the agricultural space. This creates rebound effects within the water market, with possible savings created within one sector potentially resulting in increased consumption and expansion within another. Given the multiple pathways that could drive increased water consumption, this could lead to indirect impacts and substantial increases in demand on the potable, reticulated water system, at a time when the system is least able to cope. This is exacerbated by other factors such as industry growth, or ageing infrastructure.

Even our council facilities are not immune. We acknowledge the need to improve our own awareness of how water is being used in our own facilities which use large quantities of water. Once we know this information, we can develop a plan of action, making changes as finances allow. We also recognise the important role our local sporting fields, swimming pools, and community facilities play during times of drought. These are the places where our local community come to connect with friends and family, have fun, exercise, or simply take a break from the physical and mental demands of hand-feeding animals and other drought hardships. During the consultation for this Plan, we also heard how essential it was for residents to have access to a green or blue space, in the midst of dry, dusty and brown drought conditions.

The 2019/20 drought prompted a review of our Region's Drought Management Plan. In response to community feedback, we have simplified our water restrictions, and are keen to communicate these updates. We know that many in our community are already taking actions to conserve water, such as using water efficient front-loading washing machines. However, the online survey and street conversations undertaken for this RDR Plan indicate residents, particularly those connected to town water, would like to find out what other actions they can take before and during a drought. Information is also sought by those who rely on rain or bore water for their daily use.

This action consists of four parts, which can be implemented individually or as a singular package. The action seeks to modify our existing approach to water efficiency across three target audiences: our local businesses who consume large volumes of water within their asset or facility, our council facilities which consume large quantities of water, and our community, whose use when combined, represents the largest overall usage category. This action aims to address the multi-layered challenges surrounding water consumption and demand during dry times.

Timeframe

3-6 months

Estimated Costs

$50,000-$100,000

Action Owner

Singleton, Muswellbrook Shire, and Upper Hunter Shire Councils

Stakeholders

- Largest water users
- Council recreational and community facilities

Steps for Implementation

Part A – Securing more granular data for our highest water users to improve interventions and management.

Part A aims to identify water consumption patterns to enhance the effectiveness of drought management strategies through detailed data collection via analysis of available technologies. Given water constraints during periods of drought, this action is born out of the necessity for efficient and targeted management of water resources. Understanding usage patterns in greater detail is essential for devising effective interventions, allowing for precision and customised solutions.

1. Conduct an analysis of available technology or other mechanisms which improve the frequency and granularity of water consumption data available for our Region's highest water users.
2. Conduct a multi-criteria analysis to evaluate the options against key factors, such as the capital and operational costs, maintenance and technical requirements, reliability, lifespan, and user-preferences.
3. Provide bespoke recommendations for each council, which reflect their current approach to water metering and other relevant factors.

Part B – Supporting our highest water users establish a baseline for their consumption.

Part B increases transparency and accountability within our high-water users across the Region. Through enhanced monitoring and informed decision-making, comprehensive data understanding and availability will allow real-time monitoring of water usage, enabling quicker responses to emerging issues and trends. The action also works to facilitate tailored water conservation strategies specific to the needs and operational context of each water user.

1. Review and update where necessary the template for Water Efficiency Management Plans for organisations to complete to ensure consistency across the Region.
2. Engage with high water users in relation to water efficiency management planning.

Part C – Developing Water Management Plans for councils' highest water using assets.

To effectively lead change across the Region, Councils will also be developing Water Management Plans for their high-water usage assets. This facilitates transparency and proactive accountability across the Region, ensuring water saving efforts are tailored to each identified asset, efficiently conserving water and maintaining essential services. This aims to increase the spare capacity and response options available to Council during drought events.

1. Audit high-water use council assets to understand where and how water is being used.
2. Identify existing water efficient practices in place and evaluate their effectiveness.
3. Identify and quantify options to improve water use efficiency, including any efficiencies in scale for adopting the same option across multiple assets within and across the three council areas.
4. Develop a Water Management Plan, including a monitoring, evaluation, and learning framework, for each of the audited assets.
5. Implement the Water Management Plans as funding becomes available.

Part D – Develop a Drought Communication Strategy

To facilitate best practice and efficient improvements across the Region, a Drought Communication Strategy is recommended. Effective communication is crucial in managing the broad array of challenges arising from water management during drought. This action aims to inform, engage, and mobilise the community and stakeholders to mitigate the worst of these impacts.

1. Develop or update existing resources, such as fact sheets, short format videos or home water assessments, which articulate actions residents can take before and during a drought.
2. Develop key messages, collateral, and channels to support the communication of drought emergency response measures including:
    a. Background and need for water conservation which reflects the various values the community places on water.
    b. Details on each level of water restrictions.
    c. What each council is doing to manage the water supply in their LGA.
    d. The eligibility and process to obtain a water use exemption.
    e. Where and how to access bulk water, for commercial carting operations and members of the public.
    f. Community feedback, queries and reporting of non-compliance.
    g. Where to find additional information.
3. Identify and include links to resources, in relation to actions local landholders can take before a drought, to provide water for their livestock, noting that this aspect of water management falls under the remit of NSW Local Land Services and NSW Department of Primary Industries and Regional Development, rather than councils.
4. Articulate the role for councils' reticulated water supply in supplying emergency water for livestock during a drought, where and how this water can be accessed and any other relevant information.

KPIs

1. Number of high-water users engaged and percentage who baseline their operations.
2. Number and type of council facilities audited and subject to a Water Management Plan.
3. Water efficiency measures identified and implemented.
4. Lessons learned from the evaluation of existing water efficiency measures.
5. Development of a Drought Communication Strategy
6. Number of resources and type of collateral developed.
7. Media enquiries, news stories, social media hits, website interactions relating to the project components or materials developed.

Linkages to Existing Strategies

- Integrated Water Cycle Management Strategy for each Singleton, Muswellbrook, and Upper Hunter LGA: Designed to encourage natural environmental water flows and water smart development, this action falls neatly within the remit of this existing strategy.
- Greater Hunter Regional Water Strategy: Designed to manage the Region's water needs and bolster future water security, this action will support the reduction of water consumption in line with this strategy.
- NSW Water Strategy 2021: Working to improve the state's water security, reliability, quality, and resilience, this action works to build upon existing work within this space, thereby supporting this strategy.

Resilience Dividend

- **Environment** – Less water used in our network means more water available in the rivers, dams, and streams that our wildlife uses to survive, and we use for recreation, irrigation, and other uses.
- **Economic** – Every drop of drinking water used in our network must be captured, treated, and pumped which is a cost born by our councils and our users. For the end-user, saving water means saving money on water bills and, when water is heated, the savings in electricity can be substantial.
- **Social** – The act of voluntarily reducing ones' water consumption, sends a powerful message to those living on the land, or who are reliant on rainfall, that their community cares and is willing to work together through the hardships of drought.

Complementary Actions

Considering Social Value in the Integrating Planning and Reporting Framework

Communities (including residents, businesses, and landowners) relying on water resources and availability are placed under significant stress during drought, especially due to reduced water allocations and water restrictions. Improving water conservation behaviour in non-drought times is usually a good strategy to reduce reliance on potable water during droughts, however councils have noted that lower water usage may adversely impact council revenues from reduced water service charges. Council's rates are regulated by IPART, and in general, councils are cognisant of the impact of raising water charges through a request for Special Variation in rates.

Muswellbrook Shire and Singleton Councils already incentivise potable water conservation by residents, with lower rates payable for residential water consumption usage under 350kL each year (under 450kL/y for Muswellbrook and 350kL/y for Upper Hunter). This tariff threshold of 350kL – 450kL each year is significantly higher than average household usage. In 2021-22, the average amount of water used by households fell by 3%, from 181 to 175kL per household.[86]

This Action proposes a review of the residential water usage tariff thresholds and a cost benefit analysis of incentivising water conservation measures when offset against opportunities to defer capital and operating expenditures on water supply and treatment infrastructure.

The income that councils derive from water supply charges are 'ring fenced' for use on the operational, maintenance and capital expenditure needs related to those services and activities. This action recommends the conduct of a Social Return on Investment (SROI) Analysis in addition to a Cost Benefit Analysis (CBA) to estimate the social value of further investment in water conservation campaigns during non-drought periods. This can include a consideration of the following questions:

- What is the forecast revenue impact from reducing residential water consumption of Tier 1 water users (0 – 350 kL/y) by approx. 175 kL/y to align with NSW average?
- What is the forecast savings from deferring capex and opex savings on water infrastructure, due to reduced demand for water services due to water conservation behaviours?
- What is the social value (through financial proxies) that can be assigned to improved community resilience, to be incorporated in a business case for alignment with the IP&R framework?

Based on the outcomes of the business case, further consideration should be made on expanding the water savings campaign across all three council areas.

Muswellbrook Shire Council has a community awareness campaign that encourage water conservation, Singleton encourages permanent Water Wise rules and Upper Hunter has adopted the 'Blue House' program. Further investment in these campaigns, and introduction of such a campaign to the Upper Hunter LGA, combined with a three-tiered rate tariff will incentivise water conservation behaviours and reduce reliance on potable water for non-potable uses during drought.

Improving Water Infrastructure to Enhance Regional Water Security

Throughout the engagement conducted for this Plan, it was apparent that residents take for granted that water will come out of their tap when they turn it on. In the last drought, Murrurundi residents experienced first-hand the devastating impacts to daily life which arise when a town runs out of water. The emotional toll on families, businesses, and even council staff was immense. Each of the three councils within this Region are required to manage the water infrastructure within their area. This infrastructure is a substantial network of pipes, pumps, and treatment plants, which enable water to be delivered to homes and businesses on the reticulated network. Whilst rainfall is free, the infrastructure is not, and neither is the maintenance, which runs into the millions of dollars each year. Each council has an Integrated Water Cycle Management Plan and like strategies for water security and the provision of appropriate, affordable, cost-effective, and sustainable urban water services that meet community needs and protect public health and the environment. These documents are dynamic and are reviewed by council and the Department of Climate Change, Energy, the Environment and Water. These evidence-based strategies identify key upgrades, modifications, and new pieces of infrastructure necessary to achieve water security in the short, medium, and long term. It is a priority for each council, and an expectation of their communities, that these water security works come to fruition.

Improve Awareness of Compliance Regime for Water Taken from the Hunter River

The overwhelming majority of people and entities within our Region are doing the right thing, abiding by the rules and regulations which govern our water resources. However, there is a perception that a handful may be pushing the boundaries, or out-right flouting the rules and stealing water. A recurring theme evident in the community engagement conducted for this Plan, was the importance placed on fairness. This action will seek to leverage the Natural Resource Access Regulator's education and engagement services to assist stakeholders, including council staff, water users, and the general public, improve their understanding of water law, the compliance regime, and roles and responsibilities. This action will seek to modify the system.

07

MONITORING, EVALUATION, AND LEARNING.

Monitoring, Evaluation, and Learning (MEL) Frameworks ensure existing programs can be assessed for their effectiveness and improved. By improving our drought resilience program, the Region will be able to further reduce future impacts from drought events, apply past lessons learned to maximise long-term sustainability, and ensure adaptive management.

To optimise effective MEL outcomes, MEL activities should be embedded within Council governance models at every stage of the RDR Plan program cycle (from initial implementation to close out phases). The intention of this RDR Plan and the proposed MEL processes allows for regular review and update by the PCG consortium and implementation partners to reflect changes. Through active learning and adaptive governance, best practice can be followed and encouraged across the Region.

This Plan's MEL process can be incorporated within the Integrated Planning and Reporting and/or Community Strategic Plan reporting across each Council (where funding and resource is available).

As a living document, this RDR Plan and MEL process will be reviewed and updated as drought conditions across the Region change, and our communities grow in their understanding of our drought vulnerabilities.

ACHIEVING OUR GOALS

The Program Logic (in Section 6.1) describes the goals and strategic objectives, alongside what the Plan hopes to achieve over the short, medium, and long term.

ASSESSING OUR PROGRESS

The Future Drought Fund's Monitoring, Evaluation, and Learning Framework 2020 establishes the RDRP Program's ongoing commitment to strengthened drought preparedness and resilience. In ensuring the Region achieves the intended goals of the Program, four focus areas should be considered and guide the program's evaluation questions, as shown below.

Table 7.1: Evaluation Focus (based on FDF's MEL Framework)[87]

Evaluation Focus	Key Guiding Questions
Rationale/Appropriateness	• To what extent are the RDRP programs aligned with the strategic objectives of the Funding Plan, and targeted at important needs? • What can be done to improve the appropriateness of the RDRP investments?
Outputs/Efficiency	• To what extent are the RDRP program outputs being administered and delivered efficiently, and to the expected quality? • What can be done to improve efficiency of the RDRP investments?
Outcomes/Effectiveness	• To what extent are the RDRP programs achieving their intended short-, medium-, and long-term outcomes (and any unintended outcomes)? • What can be done to improve the outcomes of the RDRP investments?
Impact	• What signs of progress are there towards long-term drought resilience? • What priorities and opportunities do the programs reveal for drought resilience, future Funding Plans and programs?

OUR ROLES AND RESPONSIBILITIES

The Project Control Group (PCG) developed during the RDR Plan development phases of this project will continue to operate as a reference governance structure overseeing the RDR Plan implementation and ongoing development. The PCG is responsible for MEL processes through this framework. Key roles and responsibilities in relation to continued MEL are outlined within *Table 7.2*. It is expected that the PCG will remain in place, reconvening as required (expected to be quarterly, with a minimum of one meeting per quarter).

Table 7.2: PCG Roles and Responsibilities

Participant	Description of responsibilities
Council consortium: **Singleton Council** **Muswellbrook Shire Council** **Upper Hunter Shire Council**	• Singleton Council will remain as the lead council within the Region's consortium. • Maintain monthly meetings assessing ongoing performance, steering action implementation, and sharing MEL outcomes. • Manage and maintain budgets, timelines, and critical decision-making functions.
Department of Primary Industries and Regional Development	• Following closure of the RDR Plan Development phase, it is expected that DPIRD will continue to be consulted throughout the implementation phase. The council consortium will continue to share lessons learned, MEL outcomes with DPIRD and other regions.
Any other individuals selected by the PCG	• The selection process of suitable individuals is to be determined by the PCG. They could be key implementation partners, government departments/ authorities, community representatives, who will provide independent feedback and expertise provided on an as-need basis.

Continuous monitoring, evaluation, and learning responsibilities will be shared amongst the Council consortium. During the implementation phase, councils will discuss and select appropriate governance arrangements for each action depending on the nature and coverage of the required work and management effort.

DATA COLLECTION TOOLS

Collecting appropriate data and information throughout the delivery of RDR Plan is critical for a robust MEL process. Building on existing systems and processes at each Council (through the Integrated Planning and Reporting resources), tools and methods listed below were suggested to aid data collection and MEL reporting (*Table 7.3*). During the RDRP implementation phase, some lessons learned will be applied to update the tool list.

Key principles from the FDF MEL framework were used to inform the design and delivery of all MEL activities for this Plan:

- Utilisation-focused
- Cost-effective
- Fit-for-purpose
- Transparent and accountable
- Realistic timeframes and targets
- Flexible[88]

Table 7.3: Potential Tools

Data source/tool	Description	Collection frequency	Data availability
End of activity assessment	At the end of each action or project element, request feedback from stakeholders (such as the Upper Hunter Mining Dialogue) and implementation partners (e.g., Bindelong).	End of project element or end of action	Continuous and ongoing
Information Management System	Stores and enables analysis of basic information on participating stakeholders and community group members aligning with Council's Information Management Policy (e.g., Muswellbrook's Record Management Policy).	Ongoing	Real-time
Media monitoring and media analytics	Capture stories that are profiled in the media (e.g., the 98.1 Power FM radio station, Singleton Argus, Hunter River Times, etc.) about regional drought resilience and relevant actions. Capture insights from social media sites (e.g., Council Facebook pages) including engagement, reach, content performance, reactions, and audience demographics.	Quarterly	Available for traditional local media e.g. print (e.g., Singleton Argus), TV (e.g., the ABC) and radio (e.g., 2NM). Engagement tools embedded in social and online media.
Community surveys	Online or hard copy surveys sent to stakeholders and communities to gather feedback on the RDR Plan effectiveness (distributed within local community hubs such as the Singleton Library, Lioness Club of Muswellbrook, Muswellbrook Chamber of Commerce and Industry, Merriwa Country Women's Association). Potential to include drought resilience questions within existing council surveys (e.g. Community Strategic Plans).	Annually	Annually, one month after survey closes
Monitoring visits	Targeted monitoring visits to interview relevant stakeholders and communities to gather feedback in written report to support data assurance.	Every 6 months	One month after monitoring visit
Case studies of changes	Recording case studies of changes made and benefits accrued as a result of actions taken from the implementation of the Plan.	Annually	Annually
Self-evaluation	Self-reflection on progress to date, achievements and lessons learned by project leads and the Drought Resilience Project Control Group team, and implementing partners.	Quarterly	Quarterly, as a standing agenda item in scheduled project team meetings.

It is expected that these activities will provide the PCG with a deeper understanding of the successes of the RDR Plan and what can be improved. This works to ensure full and informed action planning for implementation of each action can be established.

Table 7.4: Indicators for Regular Monitoring of the RDR Plan

Vision	**For Singleton, Muswellbrook Shire and Upper Hunter Shire communities, drought resilience means we survive the negative impacts of dry times until they pass, ensuring we have opportunities to adapt and prosper. Our Region is future ready and has strategies in place in advance of challenging times, building upon existing strategies that have proven results. Our people and businesses are equipped with the knowledge and tools to adapt to changing circumstances. Our community is the foundation of our support network through their commitment, innovation, and resourcefulness. Our decision-making supports sustainable and healthy soil, water, and air. We approach our challenges in partnership, achieving strength in our unity.**
Action	ACTION A **COMPREHENSIVE DROUGHT COMMUNICATION PLAN**
Inputs / Activities	• Hire contractor • Develop Drought Resilience Communications Plan • Consultation Manager program review • Build stakeholder database
Short Term Outcomes (≤ 4 years)	• Business owners across the Region actively pursuing opportunities to adopt better financial planning, income diversification, and utilisation of available grants, rebates, and financial support • Enhanced coordination and collaboration among government agencies (e.g., Hunter Local Land Services, NSW DroughtHub), stakeholders (e.g., Upper Hunter Community Services and Rural Support Services Network), and communities (e.g., residents) to facilitate a cohesive and integrated approach to drought response and resilience-building efforts • Support for community groups (e.g., Murrurundi Pony Club) resulting in delivery of social connection activities, reducing isolation and improving mental, physical, and spiritual wellbeing • Provision of psychosocial support services to help individuals, families, and communities cope with the stresses of drought • Strengthening of drought monitoring systems and early warning mechanisms to provide timely information to stakeholders (e.g., local farmers), enabling proactive drought response and management
Long Term Outcomes (> 4 years)	• The Region collaborates and works collectively within partnerships to build drought resilience across three pillars: economic, environmental, and social resilience • Stakeholders and communities proactively share knowledge and lessons learned, taking actions that contribute to drought resilience
Drought resilience benefits	• Increased understanding of support and services available (e.g., Upper Hunter Family Support Service) • Improved social connection • Increased uptake of support services (e.g., Mental Health Wellbeing Clinic Singleton) • Increased event/ activity attendance • Increased financial sustainability • Increased drought resilience understanding • Increased uptake of preparedness measures
Outputs	• Stakeholder database • Dedicated information portal
Goals	• Promote networking and collaboration among local businesses (e.g., Broke Fordwich Wine and Tourism Association) • Support our community groups to expand their reach and realise their goals • Enhance utilisation of available support services and resources • Enhance connections and collaborations across community groups and support services • Improve preparedness and planning for future periods of reduced water availability
Specific Indicators	• Number of stakeholders added to database • Stakeholders reached using existing channels • Number of existing activities and events leveraged to promote drought resilience and participant numbers (e.g., Cassilis Rodeo) • Number of social media posts, council website updates, and newsletters (e.g., the Singleton Edit) and rates notices distributed • Number of visits to information portal • Number of downloads from information portal • Level of uptake of support and services
Assumptions	• Stakeholders are willing to collaborate and share information across the Region • People wish to be connected to available information and resources

Action	ACTION B **FIRST NATIONS LAND MANAGEMENT PRACTICES**	
Inputs / Activities	• Hire First Nations consultation subcontractor • Conduct meaningful consultation	• Map methodology for implementation • Engage potential "early adopters"
Short Term Outcomes (≤ 4 years)	• Maintained amenity and performance of recreational spaces and public open greenery, enabling residents to undertake activities which beneficially impact physical and mental wellbeing • Bolstered traditional cultural caring methods implemented across the Region with improved environmental practices, resulting in reduced water stress during drought • Instils a sense of shared environmental responsibility and natural resource stewardship through drought education, providing lasting positive impacts on local natural ecosystems	
Long Term Outcomes (> 4 years)	• Stakeholders and communities proactively share knowledge and lessons learned, taking actions that contribute to drought resilience (e.g., Hunter Local Land Services, Hunter Region Landcare Network) • The Region collaborates and works collectively within partnerships to build drought resilience across three pillars: economic, environmental, and social resilience	
Drought resilience benefits	• Increased partnership and collaboration • Increased financial sustainability • Increased alternative land management practice adoption	• Increased drought preparedness and resilience measures • Increased environmental prosperity
Outputs	• First Nations cultural land management activities undertaken across the Region • Collaboration between First Nations stakeholders and community members • Cross-organisational collaboration	
Goals	• Build the capacity of individuals and small business to take ownership of drought resilience • Enhance connections and collaborations across community groups and support services (e.g., Bindelong, Wonnarua Nation Aboriginal Corporation) • Promote increased adoption of drought resilient and sustainable land management practices	
Specific Indicators	• Percentage of First Nations entities engaged across the Region • Number of First Nations projects identified • Number of First Nations projects implemented throughout the Region • Number of "early adopter" landholders engaged (e.g., local farmers)	
Assumptions	• First Nations people are willing to engage and share knowledge • Organisations already practicing cultural land management have capacity to train and undertake further work • Community members/ stakeholders are willing to adopt suggestions	

Action	ACTION C **SUPPORTING OUR COMMUNITY GROUPS**	
Inputs / Activities	• Identify funding opportunities • Develop evaluation framework	• Deliver grant program
Short Term Outcomes (≤ 4 years)	• Promotional support existing for "buy local" strategies (e.g., 'We LIVE Here' local investment cards) that increase and sustain local businesses • Enhanced coordination and collaboration among government agencies, stakeholders, and communities (e.g., Mens Shed, Lions Club of Muswellbrook) to facilitate a cohesive and integrated approach to drought response and resilience-building efforts • Support for community groups resulting in delivery of social connection activities, reducing isolation and improving mental, physical, and spiritual wellbeing • Improved collaboration and support, with mutual resource sharing, increasing community social cohesion and uptake/awareness of available services and initiatives run throughout the Region • Provision of psychosocial support services (e.g., Upper Hunter Youth Services) to help individuals, families, and communities cope with the stresses of drought	
Long Term Outcomes (> 4 years)	• There is a common understanding and a shared vision in the Region managing drought risks and build community drought resilience • The Region collaborates and works collectively within partnerships to build drought resilience across three pillars: economic, environmental, and social resilience	• Measures are implemented to limit impacts of drought and better coordinate and respond to drought events and incidents • Stakeholders and communities proactively share knowledge and lessons learned, taking actions that contribute to drought resilience

Drought resilience benefits	• Strengthened community connection and access to information • Connected community capable of drawing on its wealth of knowledge and abilities in improving drought preparedness and reduced financial impacts	
Outputs	• Grant writing toolkit	• Grant program
Goals	• Leverage changes in our Region to diversify our economy and employment opportunities • Promote networking and collaboration among local businesses • Build the capacity of individuals and small business to take ownership of drought resilience. • Promote mental and physical wellbeing across all generations • Support our community groups to expand their reach and realise their goals	
Specific Indicators	• Number of applications received • Number and diversity of recipients • Demographics of residents supported by the recipient groups	• Value of in-kind contributions generated • Levels of volunteering
Assumptions	• Community willingness to collaborate	• Community can do lots with limited funding

Action	ACTION D **ENSURING ECONOMIC PROSPERITY AS OUR REGION TRANSITIONS**	
Inputs / Activities	• Stakeholder mapping • Future scenario planning around key and emerging industries	• Mapped water demand impact • Existing policy review • Community and stakeholder engagement
Short Term Outcomes (≤ 4 years)	• Thriving, supported businesses with minimal impacts from economic shocks or disruptions with minimal losses or sudden layoffs • Reduced widespread unemployment and associated social and economic impacts • Business owners actively pursuing opportunities to adopt better financial planning, income diversification, and utilisation of available grants, rebates, and financial support	
Long Term Outcomes (> 4 years)	• A diversified local economy • The Region collaborates and works collectively within partnerships (e.g., like the Scone Chamber of Commerce) to build drought resilience across three pillars: economic, environmental, and social resilience	
Drought resilience benefits	• A diverse economy with substantial water-independent industries providing a financial buffer for residents and businesses during drought conditions • Low unemployment, job opportunity diversity (for a range of skill levels), enabling community confidence, particularly around the Region's liveability	
Outputs	• Identified transition opportunities attracting new industries (like the Hunter Energy Hub at the retired Liddell Power Station)	• Next steps recommendations on partnerships, networks, and advocacy to further the Region's transition planning objectives
Goals	• Diversify our farm enterprises and identify new agricultural opportunities • Leverage changes in our Region to diversify our economy and employment opportunities • Promote networking and collaboration among local businesses • Build the capacity of individuals and small business to take ownership of drought resilience	
Specific Indicators	• Engagement activities conducted • Potential changes in industries and employment mapped • Agricultural skill needs assessment completed	• Water demand implications assessed • Strategic partnerships developed • Recommendations adopted
Assumptions	• Ongoing economic prosperity of the mineral extraction industry • Community desire to utilise coal mining funding • Willing support from community to transition to alternative industries	

Action	ACTION E **FORWARD PLANNING AND HELPING OUR WATER USERS PREPARE FOR DRY TIMES**	
Inputs / Activities	• Technology analysis relating to water consumption data • Multi-criteria analysis and evaluation • Water meter recommendations	• Template Water Efficiency Management Plans • Council asset audits • Develop messaging and update existing communication resources relating to drought emergency response measures
Short Term Outcomes (≤ 4 years)	• Maintained amenity and performance of recreational spaces and public open greenery, enabling residents to undertake activities which beneficially impact physical and mental wellbeing • Improved water efficiency with reduced reliance on non-potable and potable water supplies from the Region's water storage dams and aquifers • Improved water management practices helping to ensure community water supplies are reliable and accessible during water shortage periods, therefore enhancing public health and wellbeing • Instils a sense of shared environmental responsibility and natural resource stewardship through drought education, providing lasting positive impacts on local natural ecosystems • Implementation of short-term water conservation measures such as restrictions on non-essential water usage, promoting efficient irrigation techniques, and repairing leakages to preserve water resources • Strengthening of drought monitoring systems and early warning mechanisms to provide timely information to stakeholders (e.g., local farmers), enabling proactive drought response and management	
Long Term Outcomes (> 4 years)	• There is a common understanding and a shared vision in the Region managing drought risks and build community drought resilience • The Region collaborates and works collectively within partnerships to build drought resilience across three pillars: economic, environmental, and social resilience	
Drought resilience benefits	• Less water utilised across the network meaning increased water availability for our natural systems • Water saving (and therefore monetary savings)	• Collective efforts to reduce water consumption showing communal care for those living through the hardships of drought
Outputs	• Social value considered within the IP&R Framework • Improved water infrastructure • Improved Hunter River Water Regime Compliance • Drought Communication Strategy	• Water Management Plans developed for councils' highest water using assets • Established water consumption baselines • Granular water consumption data
Goals	• Ensure efficient water management especially in times of drought • Promote increased adoption of drought resilient and sustainable land management practices • Improve preparedness and planning for future periods of reduced water availability	
Specific Indicators	• Number of high-water users engaged and percentage who baseline their operations • Number and type of council facilities audited and subject to a Water Management Plan • Water efficiency measures identified and implemented • Lessons learned from the evaluation of existing water efficiency measures • Development of a Drought Communication Strategy • Number of resources and type of collateral developed • Media enquiries, news stories, social media hits, website interactions relating to the project components or materials developed	
Assumptions	• Stakeholder willingness to reduce water consumption • Funding availability • Efficacy of existing drought related resources • Water consumption data and availability for baselining exercise	

REPORTING AND ACCOUNTABILITY OBLIGATIONS

Delivery of MEL processes for this RDR Plan will be informed by and aligned with the councils respective Integrated Planning and Reporting (IPR) Framework. Data will be collected during implementation of the RDR Plan, ensuring data collection is interwoven within PCG planning and review meetings to enable adaptive learning. Drought resilience will be canvassed as part of the Community Strategic Plans (CSPs) context. For example, drought resilience can be canvassed within the community engagement conducted for the development of the CSPs, and actions identified for the CSPs can be cross mapped for their alignment with drought resilience objectives. Incorporation of knowledge gained throughout implementation could be made with via the annual report, with mid-term progressions and end of progress tracked to maximise MEL processes. Recognising the differing maturity levels across councils, this may look different across each council within the PCG.

RISKS IN EFFECTIVELY DELIVERING OUR MEL FRAMEWORK AND RDR PLAN

The following risks have been identified as possible barriers to effective implementation of the Plan, based on key risks from the Future Drought Fund MEL framework for the RDR Plan in consultation with stakeholder input during the engagement program. Suggested risk mitigation measures will be dependent on Council resources and funding availability.

Table 7.5: Risks to Our RDR Plan Delivery

Risk	Risk Rating	Suggested Mitigating Measures
Lack of resources, capability, appropriate government mechanisms to coordinate strategic planning activities and insufficient funding to implement planned actions	High	• Lobby government for ongoing seed funding • Develop long-term financial plans to ensure sustainable funding for planned actions • Explore options for alternative funding sources such as grants
Insufficient capacity of regional stakeholders to actively participate in the Plan	High	• Canvas potential action owners and ensure selected participants are aware of the project burdens (e.g., First Nations locals responsible for Action B – First Nations Land Management Practices) • Provide resources and funding where possible to support ongoing buy-in and support
Insufficient feedback to community	Medium	• Develop annual MEL report to improve transparency of the RDRP program • Utilise existing communication channels (digital platforms such as council websites, mobile apps, social media, regular newsletters, community meetings) to provide forums for discussion and timely, transparent updates on council activities and decisions • Develop and utilise structured feedback mechanisms such as community surveys
Actions identified by community within this Plan are insufficient in making positive drought resilience changes across the Region	Medium	• Implement MEL processes to proactively manage and adjust priority actions under the program to ensure actions are continually tailored to the needs of the Region • Continually update and conduct a detailed needs assessment to understand specific vulnerabilities and strengths of the Region (the Resilience Assessment) • Ensure actions are evidence-based, backed up by best practice and proven strategies that work within other Regions with similar challenges • Prioritise inter-regional collaboration to share knowledge, resources, and best practice
There are insufficient learnings to inform future program design and implementation	Medium	• Establish clear objectives (following the SMART technique, specific, measurable, achievable, relevant, time-bound) for the RDR Plan and MEL framework • Measure identified KPIs aligning with each key priority action and track progress to measure success • Ensure sufficient regular data collection is gathered throughout the Plan's implementation phase • Foster a culture of continued learning, utilise technology where possible, engage stakeholders, implement pilot programs, and document/report program activities, outcomes, and lessons learned
PCG members are unable to agree on, or successfully implement lessons learned from MEL	Medium	• The MEL framework articulates the governance responsibilities of each PCG member as part of this program. Regular monitoring and lessons learned is agreed to as part of membership to the RDRP program. Using agreed program-level MEL indicators aligned to the Region will ensure members are in the best position to agree on and implement MEL lessons learned
Data used within the MEL process is unavailable (either does not exist, is restricted, or is not available within a timely manner) **Data is of poor quality or is untrustworthy**	Medium	• High-level indicators have been selected based on their existence, ensuring data can be regularly monitored over the long-term. KPIs have also been elected based on this principle • Appropriate oversight from the PCG and FDF will maintain oversight of regular reporting made. High-level indicators have been selected and should be collected using standard methods of sufficient sample sizes
Insufficient regional stakeholders are willing to cooperate with each other on drought regional resilience planning issues	Low	• Provide workshops and training to educate community on the Plan and ways to get involved (e.g., RDR Plan launch events) • Encourage community members to participate, with appropriate follow-up via stakeholder databases developed/maintained across the Region • Regularly update community on wins gained under the RDR Plan
Program design is insufficient to give regional stakeholders opportunities to identify and communicate regional drought resilience needs	Low	• Implement appropriate MEL processes such as community surveys, monitor media outputs and feedback received by stakeholders to proactively encourage community buy-in
Program fails to align with other relevant strategic plans across the Region	Low	• Implement appropriate MEL processes to ensure integration across each council (recommended within CSPs and IP&R Frameworks at a minimum)
Regional communities are not motivated to take ownership of completed Plans nor actively seek to implement them	Low	• Provide workshops and training to educate community on the Plan and ways to get involved • Encourage community members to participate, with appropriate follow-up • Regularly update community on wins gained under the RDR Plan
Stakeholders and community are unwilling to share lessons learned with other regions	Low	• Regularly engage with the community to build trust and demonstrate the benefits of knowledge sharing • Be transparent around how shared lessons will be used positively to impact other regions • Share success stories from other regions that have benefited from shared lessons to illustrate tangible benefits • Develop and/or utilise user-friendly platforms (such as online portals, radio etc) to share lessons learned
Insufficient opportunities for the Region to implement elements of the Plan	Low	• Ensure regular PCG meetings to identify stakeholders and regional collaborations allowing for resource and knowledge sharing • Regularly review Plan progressions and ensure inclusive participation is encouraged across the Region
Region fails to continue to review, update, and implement its Plan	Low	• Regular MEL meetings conducted by PCG members to ensure accountability and momentum gained during the RDRP process is maintained

These risks will be continually reviewed and updated during the implementation phase to reflect changes and identify further intervening measures to reduce residual risks to the RDRP program delivery. Risk ratings are defined below:

High: High probability of occurring with significant negative impacts to the RDRP program delivery.
Medium: Moderate probability of occurring with noticeable (though manageable) impact to the RDRP program delivery.
Low: Low probability of occurring with minimal impact to the RDRP program delivery.

REFERENCES

1 Bene, C., Wood, R.G., Newsham, A. & Davies, M. 2012. Resilience: new utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes. IDS Working Paper, 405(006), https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.2040-0209.2012.00405.x.

2 CSIRO. 2021. Facing the Future of Disaster Resilience. Accessed 22 Feb 2024. <https://www.csiro.au/en/news/all/articles/2021/november/future-disaster-resilience>

3 Brunner, R. & Lynch, A. 2017. Adaptive Governance. Climate Science. https://doi.org/10.1093/acrefore/9780190228620.013.601

4 Bureau of Meteorology. 2023. Understanding Drought. Australian Government. Accessed 22 Feb 2024. <http://www.bom.gov.au/climate/drought/knowledge-centre/understanding.shtml>.

5 IPCC. 2022. Climate Change 2022: Impacts, Adaptation and Vulnerability. Accessed 22 Feb 2024. <https://report.ipcc.ch/ar6/wg2/IPCC_AR6_WGII_FullReport.pdf>.

6 The Climate Reality Project. N.d. Climate 101: Feedback Loops & Tipping Points. Accessed 4 Apr 2024. <https://www.climaterealityproject.org/sites/default/files/climate-101-tipping-points-and-feedback-loops-factsheet.pdf>.

7 CSIRO. 2021. Facing the Future of Disaster Resilience. Accessed 21 May 2024. <https://www.csiro.au/en/news/all/articles/2021/november/future-disaster-resilience>

8 Maru YT, Sparrow A, Butler JRA, Banerjee O, Ison R, Hall A, Carberry P. 2018. Towards appropriate mainstreaming of "theory of change" approaches into agricultural research for development: challenges and opportunities. Agriculture Systems, 165:344-353.

9 Cook, B. et al. 2022. Megadroughts in the Common Era and the Anthropocene. Nature Reviews Earth and Environment, 3: 741-757.

10 Stockholm Resilience Centre. 2023. Planetary Boundaries. Stockholm University. Accessed 4 Mar 2024. <https://www.stockholmresilience.org/research/planetary-boundaries.html>.

11 Walker, B., Holling, C., Carpenter, S. R. & Kinzig, A. 2004. Resilience, adaptability and transformability in social–ecological systems. Ecology and Society, 9(2): 5.

12 Resilient Sydney. 2018. Resilient Sydney: A Strategy For City Resilience. City of Sydney. Accessed 22 Feb 2024. <https://www.cityofsydney.nsw.gov.au/-/media/corporate/files/2020-07-migrated/files_r/resilient-sydney-a-strategy-for-city- resilience-2018.pdf?download=true>.

13 Folke, C. et al. 2010. Resilience thinking: integrating resilience, adaptability and transformability. Ecology and Society, 15(4): 20.

14 Taylor, C.M. et al. 2017. Frequency of extreme Sahelian storms tripled since 1982 in satellite observations. Nature, 544: 475-478.

15 NOAA. N.d. Frequently Asked Question (FAQ) Sheet for the Value Added Table. Accessed 22 May 2024. <https://www.st.nmfs.noaa.gov/st1/fus/FAQ_value_added.pdf>.

16 Fleming-Munoz, D.A., Whitten, S. & Bonnett, G.D. 2023. The economics of drought: a review of impacts and costs. The Australian Journal of Agricultural and Resource Economics, https://doi.org/10.1111/1467-8489.12527.

17 National Farmers Federation. 2023. National Farmer Wellbeing Report 2023. Norco Foods. Accessed 8 Mar 2024. <https://norcofoods.com.au/wp-content/uploads/2023/03/1212_Farmer-wellbeing-report_Navigation_FINAL.pdf?x64161>.

18 Department of Agriculture, Water and the Environment. 2020. Future Drought Fund Monitoring, Evaluation and Learning Framework. Australian Government. <https://www.agriculture.gov.au/sites/default/files/documents/mel-framework.pdf>.

19 Future Drought Fund Farm Business Resilience – Program Framework (Appendix A), March 2021.

20 Upper Hunter Region. 2024. About Up. Accessed 22 Feb 2024. <https://upperhunterregion.com.au/about>.

21 Singleton Council. 2024. LGA Information. Accessed 22 Feb 2024. <https://www.singleton.nsw.gov.au/Business/Doing-Business-in-Singleton/LGA-information>.

22 Miller, J. (1986). Koori: A Will To Win. Angus & Robertson Publishers.

23 Data.NSW. 2020. Singleton Shire Council. NSW Government. Accessed 22 Feb 2024. <https://data.nsw.gov.au/data/organization/about/singleton-shire-council#:~:text=northwest%20of%20Newcastle.-,It%20is%20of%20area%204892.8%20sq,home%20to%20over%2024%2C070%20people.>.

24 Your Council. 2022. Muswellbrook. NSW Government. Accessed 22 Feb 2024. <https://www.yourcouncil.nsw.gov.au/council-data/muswellbrook-1696393585/>.

25 Your Council. 2022. Upper Hunter. NSW Government. Accessed 22 Feb 2024. <https://www.yourcouncil.nsw.gov.au/council-data/upper-hunter-1696393585/>.

26 Singleton Council. 2024. Singleton LGA Growth Infrastructure and Facilities. Accessed 22 Feb 2024. <https://www.singleton.nsw.gov.au/Development/Strategic-Planning/Land-Use-and-Development-Plans/Local-Strategic-Planning/Singleton-LGA-Growth-Infrastructure-and-Facilities>.

27 PHN. 2021. Muswellbrook LGA. Accessed 22 Feb 2024. <https://hneccphn.imgix.net/assets/src/uploads/images/Muswellbrook-LGA-Profile-2021_2021-10-05-000602_ugwp.pdf>.

28 Primary Health Network. 2021. Upper Hunter Shire LGA. Accessed 27 Feb 2024. <https://hneccphn.imgix.net/assets/src/uploads/images/Upper-Hunter-Shire-LGA-Profile-2021_2021-10-05-000636_lubp.pdf>.

29 Australian Bureau of Statistics. 2022. Singleton 2021 Census All Persons QuickStats. Accessed 22 Feb 2024. <https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA17000>; Australian Bureau of Statistics. 2022. Muswellbrook 2021 Census All Persons QuickStats. Accessed 22 Feb 2024. <https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA15650>; Australian Bureau of Statistics. 2022. Upper Hunter Shire 2021 Census All Persons QuickStats. Accessed 22 Feb 2024. <https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA15650>.

30 Sheather, M. 2019. Hunter Valley Farmer Takes on Mining Company – and Wins. NSW Farmers. Accessed 22 Feb 2024. <https://www.nswfarmers.org.au/NSWFA/NSWFA/Posts/The_Farmer/Environment/Hunter_Valley_farmer_takes_on_mining_company_and_wins.aspx>.

31 NSW Department of Industry. 2018. Greater Hunter Regional Water Strategy – Securing the future water needs of the Hunter, Central Coast and Mid-Coast areas. <https://www.dpie.nsw.gov.au/__data/assets/pdf_file/0006/502557/greater-hunter-regional-water-strategy.pdf>

32 NSW Parliament. 2021. Briefing paper: Transitioning communities dependent on coal mining in NSW, Briefing Paper No 1/2021. <https://www.parliament.nsw.gov.au/researchpapers/Documents/Transitioning%20Communities%20Dependent%20on%20Coal%20Mining%20in%20NSW.pdf>

33 REMPLAN. 2024. Economy, Jobs and Business Insights. Accessed 22 Apr 2024. <https://app.remplan.com.au/muswellbrook/economy/tourism/output?state=VxVBSE!5xRjSlPy4ljbq3wSzWXWGUXFxhpL1HenJnPl8NLNyhOhLBSjhDSpv4AcrZL>; REMPLAN. 2024. Economy, Jobs and Business Insights. Accessed 22 Apr 2024. <https://app.remplan.com.au/upperhunter/economy/tourism/output?state=jm6MTq!jm6MTPNY2H0GLpDcbGw43ckFPhmDjcKL8Ljsa7m71hnhl8TVhWSyGd6FGjr>; REMPLAN. 2024. Economy, Jobs and Business Insights. Accessed 22 Apr 2024. <https://app.remplan.com.au/singleton/economy/tourism/output?state=Vyorc0!WYxzi9xgMu4aNjLUlRM0ltKFnf74qidRrRaUvxJxdfAfVnhVfKl90aPTMob>.

34 REMPLAN. 2024. Economy, Jobs and Business Insights. Accessed 22 Feb 2024. <https://app.remplan.com.au/upperhunter/economy/industries/wages-salaries?state=p4QaFG!z4pYFyLbzSlJgZ1fRYbLxS0F1hVneUQ3Y39hW6J6juvhZXIyhRSWW50U2xz>.

35 REMPLAN. 2024. Our Place – Our Community. Muswellbrook Shire Council. Accessed 22 May 2024. <https://app.remplan.com.au/muswellbrook/community/summary?state=pxoBFAk2RTL1je2ta6qnN4ipt8t4kn>.

36 Bureau of Meteorology. 2022. Understanding Drought. <http://www.bom.gov.au/climate/drought/knowledge-centre/understanding.shtml>.

37 Falster, G., Abram, N. & Wright, N. 2024. A 20-Year 'Mega-Drought' in Australia? Research Suggests it's Happened Before – and we Should Expect it Again. Australian National University. Accessed 22 Apr 2024. <https://iceds.anu.edu.au/news-events/news/20-year-%E2%80%98mega-drought%E2%80%99-australia-research-suggests-it%E2%80%99s-happened-%E2%80%93-and-we-should>.

38 Edwards, B., Gray, M. & Hunter, B. 2018. The social and economic impacts of drought. Centre for Social Research & Methods. Accessed 16 Apr 2024. <https://csrm.cass.anu.edu.au/sites/default/files/docs/2018/12/CSRM_WP5_2018_DROUGHT_2.pdf>.

39 Bureau of Meteorology. 2024. Previous Droughts. Australian Government. Accessed 26 Feb 2024. <http://www.bom.gov.au/climate/drought/knowledge-centre/previous-droughts.shtml>.

40 Australian Institute for Disaster Resilience. N.d. Eastern Australia, 1937 Environment – Drought. Australian Disaster Resilience Knowledge Hub. Accessed 26 Feb 2024. <https://knowledge.aidr.org.au/resources/environment-drought-eastern-australia/>.

41 Trove. 1940. Hunter Valley Drought. Accessed 26 Feb 2024. <https://trove.nla.gov.au/newspaper/article/17694560>.

42 AdaptNSW. 2024. Climate Change Impacts on Drought. NSW Government. Accessed 26 Feb 2024. <https://www.climatechange.environment.nsw.gov.au/impacts-climate-change/weather-and-oceans/drought>.

43 Sherval, M. & Greenwood, A. 2012. 'Drought-proofing' regional Australia and the rhetoric surrounding Tillegra Dam, NSW. Australian Geographer, 43(3): 253-271.

44 Hornery, S. 2011. 1163 – Tillegra Dam. Parliament of New South Wales. Accessed 26 Feb 2024. <https://www.parliament.nsw.gov.au/la/papers/Pages/qanda-tracking-details.aspx?pk=21028>.

45 Department of Primary Industries and Regional Development. 2023. Hunter Regional Economic Development Strategy – 2023 Update. NSW Government. Accessed 27 Feb 2024. <https://www.nsw.gov.au/sites/default/files/2023-02/Hunter-REDS-2023-Update.pdf>.

46 NSW Department of Primary Industries and Environment. 2024. The 2017-20 Drought. NSW Government. Accessed 23 Feb 2024. <https://water.dpie.nsw.gov.au/allocations-availability/drought-and-floods/drought-recovery/2017-20-drought>.

47 NSW Department of Primary Industries. 2024. Combined Drought Indicator. NSW Government. Accessed 23 Feb 2024. <https://edis.dpi.nsw.gov.au/>.

48 ABC News. 2103, 20 February. Dry spell prompts water-use spike. <https://www.abc.net.au/news/2013-02-20/singleton-water-use/4529308>

49 Kelly, M. 2020. Water Pressure: The Endless Drought has Brought Murrurundi's Residents to the Brink Physically and Mentally. Newcastle Herald. Accessed 23 February 2024. <https://www.newcastleherald.com.au/story/6282187/the-nsw-town-living-without-water/>.

50 Lapham, J. 2021, 28 October. Murrundi's new reservoir secures water for future droughts. <https://www.abc.net.au/news/2021-10-28/after-drought-murrurundi-hopes-reservoir-secure-water-future/100575012>

51 Connell, C. 2020. Murrurundi's Taps Turned on in Drought-Ravaged Town Living for Years on Restrictions. ABC Upper Hunter. Accessed 26 Feb 2024. <https://www.abc.net.au/news/2020-05-29/murrurundi-taps-turned-on-in-town-with-highest-restrictions/12298474>.

52 ABC News. 2019, 5 August. Drought-hit town of Murrurundi has three months of water left. What happens then? <https://www.abc.net.au/news/rural/2018-08-05/the-town-about-to-run-out-of-water/10073762>

53 ABC News. 2006, 3 May. Dry conditions take their toll in NSW. <https://www.abc.net.au/news/2006-05-03/dry-conditions-take-their-toll-in-nsw/1744750>

54 ABC News. 2007, 12 June. Flood deals blow to drought-stricken farmers. <https://www.abc.net.au/news/search?query=drought%20singleton>

55 Notzon, N. 2018, 18 December. Animal welfare groups protest planned NSW brumby cull. <https://www.abc.net.au/listen/programs/worldtoday/animal-welfare-groups-protest-planned-nsw-brumby-cull/10630826>

56 https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0018/471024/Upper-hunter-region-agricultural-profile.pdf

57 https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0004/471028/hay-hemp-profile-upper-hunter-region.pdf

58 ABC News. 2013. Predicted Rain Welcomed by Farmers. ABC News. Accessed 26 Feb 2024. <https://www.abc.net.au/news/2013-05-23/predicted-rain-welcomed-by-farmers/4707748>.

59 Connell, C. 2020. Murrurundi's Taps Turned on in Drought-Ravaged Town Living for Years on Restrictions. ABC Upper Hunter. Accessed 26 Feb 2024. <https://www.abc.net.au/news/2020-05-29/murrurundi-taps-turned-on-in-town-with-highest-restrictions/12298474>.

60 NSW Department of Industry. 2018. Greater Hunter Regional Water Strategy – Securing the future water needs of the Hunter, Central Coast and Mid-Coast areas. <https://www.dpie.nsw.gov.au/__data/assets/pdf_file/0006/502557/greater-hunter-regional-water-strategy.pdf>

61 Spencer, E. 2023. NSW Households Urged to Reduced Water Use Before State Dips into Drought. The Guardian. Accessed 22 Apr 2024. <https://www.theguardian.com/australia-news/2023/nov/08/sydney-water-drought-warning-summer-water-restrictions>.

62 Bernasconi, A. 2023. Hunter Valley, North West Cattle Farmers Consider Destocking as Drought Returns. ABC Rural News. Accessed 23 Feb 2024. <https://www.abc.net.au/news/rural/2023-08-10/drought-conditions-in-hunter-valley-sees-farmers-destocking/102702548>.

63 ABC News. 2014. Upper Hunter and Liverpool Plains Drought Assistance. ABC News. Accessed 26 Feb 2024. <https://www.abc.net.au/news/rural/programs/nsw-country-hour/2014-02-19/upper-hunter-and-liverpool-plains-drought-19-02-14/5269866>.

64 Australian Institute of Health and Welfare. 2024. Deaths by suicide, Australia. < https://maps.arcgis.aihw.gov.au/portal/apps/experiencebuilder/experience/?data_id=dataSource_10-18b35b9e8e8-layer-26-18b35b9ab66-layer-23%3A111&id=47b5b317d1074ad09d93e861a6ebfb55&page=Main&views=LayersTab>

65 CSIRO. 2023. Understand the True Cost of Drought. Accessed 27 Feb 2024. <https://www.csiro.au/en/news/all/articles/2023/july/cost-of-drought>.

66 ABC News. 2013. Dry Spell Prompts Water-Use Spike. ABC News. Accessed 26 Feb 2024. <https://www.abc.net.au/news/2013-02-20/singleton-water-use/4529308>.

67 ABC News. 2014. Rain Eases Drought Pain. ABC News. Accessed 26 Feb 2024. <https://www.abc.net.au/news/2014-02-20/rain-eases-drought-pain/5271308>.

68 Williams, L. & Condon, M. 2023. Upper Hunter Farmers Hold Out for Rain as Dry Weather Takes Effect in NSW. ABC Rural News. Accessed 26 Feb 2024. <https://www.abc.net.au/news/rural/2023-06-09/upper-hunter-nsw-farmers-drought-concerns-dry-weather/102454740>.

69 Australian Government. 2019. Water Storage in the Hunter River Basin <https://www.bioregionalassessments.gov.au/assessments/15-current-water-accounts-and-water-quality-hunter-subregion/15111-water-storage-hunter-river-basin>

70 ABC News. 2018, 24 August. Local business boost initiative surpasses $1 million in the Upper Hunter. <https://www.abc.net.au/listen/programs/upperhunter-breakfast/we-live-here-gift-card-milestone-upper-hunter-muswellbrook/101366308>

71 Kelly, M. 2020. Water Pressure: The Endless Drought has Brought Murrurundi's Residents to the Brink Physically and Mentally. Newcastle Herald. Accessed 23 February 2024. <https://www.newcastleherald.com.au/story/6282187/the-nsw-town-living-without-water/>.

72 ABC News. 2018. 29 July. Sheep line up for a feed in the shape of Australia at Cassilis property Dalkeith Olde. <https://www.abc.net.au/news/2018-07-29/dalkeith-olde/10033966>

73 Dowdy, A. et al. 2015, East Coast Cluster Report, Climate Change in Australia Projections for Australia's Natural Resource Management Regions: Cluster Reports, eds. Ekström, M. et al., CSIRO and Bureau of Meteorology, Australia.< https://www.climatechangeinaustralia.gov.au/media/ccia/2.2/cms_page_media/168/EAST_COAST_CLUSTER_REPORT_2021updated.pdf>

74 CSIRO & BoM. 2024. Past and Future Climate Detail. My Climate View. Accessed 22 Apr 2024. <https://myclimateview.com.au/climate-data?commodity=Temperate%20Dairy&climateRisk=dairy-thi>.

75 CSIRO & BoM. 2024. Past and Future Climate Detail. My Climate View. Accessed 22 Apr 2024. <https://myclimateview.com.au/climate-data?commodity=Temperate%20Dairy&climateRisk=dairy-thi>.

76 Papari, J., Sharples, J., & Perkins-Kilkpatrick, S. 2021, 29 January. How heatwaves and drought combine to produce the perfect firestorm. University of New South Wales. <https://www.unsw.edu.au/newsroom/news/2021/01/how-heatwaves-and-drought-combine-to-produce-the-perfect-firesto>

77 Fernandes, G. 2021. Draft Integrated Water Cycle Management Strategy. Singleton Council. Accessed 16 Apr 2024. <https://portal.singleton.nsw.gov.au/RedDocServ24/default.aspx?DocID=3wubYthUwjg%3D>

78 NSW Department of Industry. 2018. Greater Hunter Regional Water Strategy – Securing the future water needs of the Hunter, Central Coast and Mid-Coast areas. <https://www.dpie.nsw.gov.au/__data/assets/pdf_file/0006/502557/greater-hunter-regional-water-strategy.pdf>

79 Lock the Gate. 2014. Unfair Shares: How Coal Mines Bought the Hunter River. Accessed 5 Marc 2024. <https://www.lockthegate.org.au/unfair_shares#:~:text=Water%20use%20and%20ownership,from%20various%20Hunter%20Valley%20sources.>.

80 Brown, A. & Giannini, D. 2024. 'Tilted Playing Field' For Farmers Against Supermarkets. Hunter Valley News. Accessed 17 Apr 2024. <https://www.huntervalleynews.net.au/story/8547205/tilted-playing-field-for-farmers-against-supermarkets/>.

81 National Farmers Federation. 2023. National Farmer Wellbeing Report 2023. Norco Foods. Accessed 8 Mar 2024. <https://norcofoods.com.au/wp-content/uploads/2023/03/1212_Farmer-wellbeing-report_Navigation_FINAL.pdf?x64161>.

82 St Hilliers. 2019. Singleton Building Refurb & Maintenance, NSW. Accessed 5 Mar 2024. <https://sthilliers.com.au/current-projects/singleton-building-refurb-maintenance/>.

83 Singleton Council. 2024. Agriculture Opportunities. Accessed 28 Feb 2024. <https://www.singleton.nsw.gov.au/Business/Economic-Development/Agriculture-Opportunities>.

84 Day, S. 2019. Drought in Australia. Australian Government. Accessed 29 Feb 2024.

85 Australian Red Cross. 2012. Relationships matter: the application of social capital to disaster resilience. < https://www.redcross.org.au/globalassets/cms-assets/documents/emergency-services/12-011-red-roundtable-report_v3-f-web.pdf>

86 Australian Bureau of Statistics. 2023. Water Account Australia. Accessed 7 May 2024. <https://www.abs.gov.au/statistics/environment/environmental-management/water-account-australia/latest-release#key-statistics>.

87 Department of Agriculture, Water and the Environment. 2020. Future Drought Fund Monitoring, Evaluation and Learning Framework. Australian Government. <https://www.agriculture.gov.au/sites/default/files/documents/mel-framework.pdf>.

88 Department of Agriculture, Water and the Environment. 2020. Future Drought Fund Monitoring, Evaluation and Learning Framework. Australian Government. <https://www.agriculture.gov.au/sites/default/files/documents/mel-framework.pdf>.

Supported by

NSW GOVERNMENT

Department of Primary Industries and Regional Development

Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

SINGLETON COUNCIL

UPPER HUNTER SHIRE COUNCIL

muswellbrook shire council

Jointly funded by the Australian Government and the NSW Government under the Future Drought Fund