Fitzroy and Capricornia Regional Drought Resilience Plan

2022–2030

Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

Queensland Government

Rural Economies
Centre of Excellence

The Fitzroy and Capricornia Regional Drought Resilience Plan has been developed as a partnership between the Rural Economies Centre of Excellence and the following organisations who will lead implementation of any actions: Banana Shire Council, Central Highlands Regional Council, Gladstone Regional Council, Livingstone Shire Council, Rockhampton Regional Council and Woorabinda Aboriginal Shire Council.

The Regional Drought Resilience Planning program is jointly funded through the Australian Government's Future Drought Fund and the Queensland Government. Development of the plan has been supported by the Australian Government (Department of Agriculture, Fisheries and Forestry) and the Queensland Government (Department of Agriculture and Fisheries).

Acknowledgement

We pay our respects to the Aboriginal and Torres Strait Islander ancestors of this land, their spirits and their legacy. The foundations laid by these ancestors – our first Australians – give strength, inspiration and courage to current and future generations, both Indigenous and non-Indigenous, towards creating a better Queensland.

We recognise it is our collective efforts and responsibility as individuals, communities and governments to ensure equality, recognition and advancement of Aboriginal and Torres Strait Islander Queenslanders across all aspects of society and everyday life.

On behalf of the Queensland Government, we offer a genuine commitment to fearlessly represent, advocate for, and promote, the needs of Aboriginal and Torres Strait Islander Queenslanders with unwavering determination, passion and persistence.

As we reflect on the past and give hope for the future, we walk together on our shared journey to reconciliation where all Queenslanders are equal.

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Interpreter statement

The Queensland Government is committed to providing accessible services to Queenslanders from all culturally and linguistically diverse backgrounds. If you have difficulty in understanding the regional drought resilience plan, you can contact us for assistance and we will arrange an interpreter to effectively communicate the plan to you.

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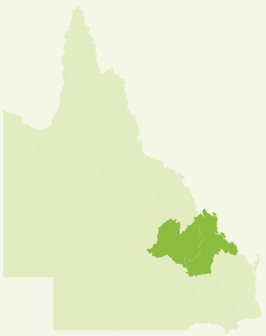
Foreword



The Fitzroy and Capricornia Region in central Queensland comprises six local government areas:

- Banana Shire
- Central Highlands Region
- Gladstone Region
- Livingstone Shire
- Rockhampton Region
- Woorabinda Aboriginal Shire

Image: Minerva Hills National Park.

Agriculture, particularly beef cattle grazing, is a mainstay of the regional economy and the lifeblood of many smaller townships.

Drought is a major risk to many key sectors across the region, impacting on the livelihoods of people in agriculture and the lifestyles of residents across the region.

Severe drought also increases the risks of water shortages in irrigation industries and many towns, including sectors such as power generation and mining where water is a key input. There is now greater recognition of the impacts that drought has on people and social networks across the region, and how long it can take to recover from major events.

There is already a 'bank' of resilience in the region to drought events. Landholders have established waters and pastures on their properties, while major dams and weirs assure water supplies for townships, irrigators and industry. There is increased access to fodder supplies, transport and markets, making it easier for primary producers to respond, while improved weather forecasting and financial tools help businesses to manage the extra risks. In addition to this there are a range of support programs from government and relief efforts from communities to help people and businesses in times of trouble. Yet more can be done, particularly if drought risks intensify with climate change.

This regional plan provides an opportunity to hear from local stakeholders where the priorities lie in building further resilience to drought events. It represents a collaborative process from many parties to identify where drought is impacting on people, businesses, services and infrastructure, and what the priorities are to improve planning, responses and resilience into the future.

The plan captures the aspirations of people in the Fitzroy and Capricorn region about what they think the priorities should be. This is only the first step, as actions and responsibilities have not yet been assigned. These will be the focus of the next stages of work with stakeholders and agencies in the region.

Professor John Rolfe
Central Queensland University,
Rural Economies Centre of Excellence

Nev Ferrier
Chair, Central Queensland Regional
Organisation of Councils

Introduction

Background

The Regional Drought Resilience Planning (RDRP) program is jointly funded through the Australian Government's Future Drought Fund (FDF) and the Queensland Government.

The Queensland Department of Agriculture and Fisheries (DAF) has partnered with the Rural Economies Centre of Excellence (RECoE) with the purpose to have an impact on how regions can survive and thrive into the future.

The RDRP process will:

- foster learning and build social capital
- foster co-designed, community-led planning and collective
- ownership of the resulting plan and its implementation
- leverage existing local, regional and state strategic planning
- recognise the diversity of people, businesses and
- landscapes involved in agricultural production
- provide linkages with the FDF Drought Resilience Adoption and Innovation Hubs.

The program provides funding to the Rural Economies Centre of Excellence (RECoE) to work with five regional communities in the foundational year, developing regional drought resilience plans to prepare communities for and manage future drought risks. The Fitzroy and Capricornia region has been selected as one of the first regions to deliver a plan.

The plan for the Fitzroy and Capricornia region is being developed by Central Queensland University (CQU) in partnership with the Central Queensland Regional Organisation of Councils (CQROC).

Each plan will build upon the Regional Resilience Strategy as part of the Queensland Government's Strategy for Disaster Resilience, led by the Queensland Reconstruction Authority. Based on evidence and collaboration though partnering with local councils, regional stakeholders and other organisations, the plans – led and owned by the community – aim to drive decisions, actions and investments to proactively manage drought risk.

Regional Drought Resilience Planning

Australia, and particularly the State of Queensland, is no stranger to drought. First Nations traditional stories of drought go back thousands of years and European settlers have officially recorded drought in Australia since the late 1700s. Droughts have been officially 'declared' in Queensland since 18970.[1]

The economic, social and environmental costs of drought in Queensland are immeasurable. The toll taken on regions and their communities is high and the impacts often linger for decades. So, in recent years there has been a growing emphasis on the importance of drought resilience planning. This means planning now for the next drought and considering how to do things better or differently to make our communities more resilient.

Alignment with the Queensland Strategy for Disaster Resilience and Regional Resilience Strategies

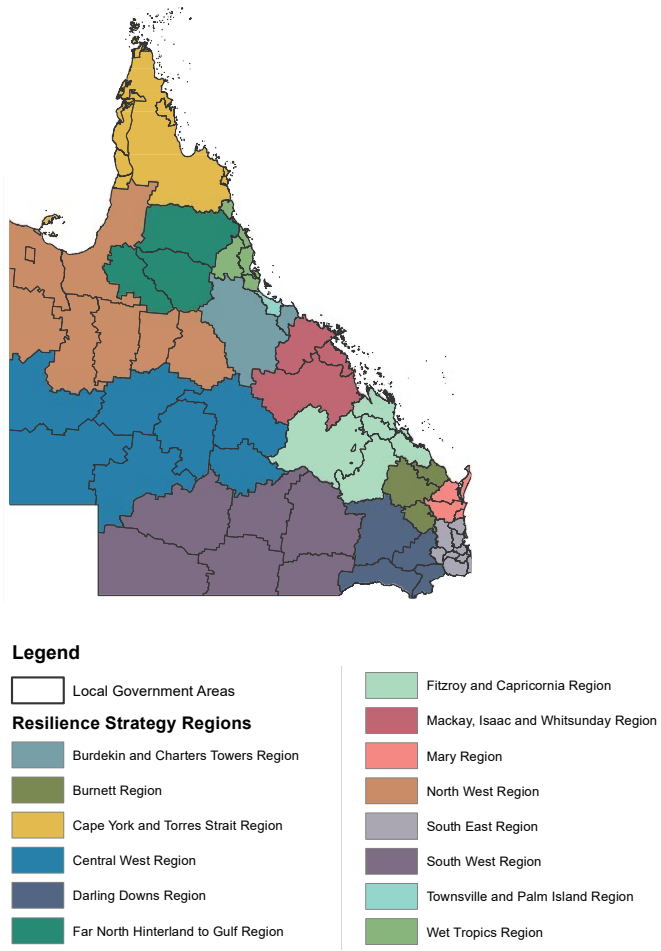
Queensland is the most disaster impacted state in Australia, and Queenslanders are susceptible to a variety of hazards. We are facing unprecedented change in both our current and future operating environment with a dynamic political, social, economic and policy landscape surrounding disaster risk reduction and resilience. This is being amplified by natural hazards becoming more frequent and intense due to a changing climate.

The *Queensland Strategy for Disaster Resilience 2022–2027* (QSDR) promotes a systems approach to resilience that connects with a range of agencies and sectors to deliver improved outcomes for Queensland.

Queensland's suite of Regional Resilience Strategies ensures every region across Queensland is now part of a locally-led, regionally-coordinated and state-facilitated blueprint to strengthen disaster resilience.

It is often agreed that resilience planning for disasters and resilience planning for drought should be aligned. The Queensland RDRP program builds on the work completed under the QSDR, led by the Queensland Reconstruction Authority (QRA). The RDRP program provides the opportunity to have a clear focus on drought risk in the context of regional resilience, addressing the unique challenges it poses and the need for setting out drought-specific priorities and actions at a regional and local level.

Figure 1: Queensland's Regional Resilience Strategies (Regions and Local Government Areas), *Queensland Strategy for Disaster Resilience 2022–2027. Source: Queensland Reconstruction Authority.*



Regional planning and approach

This plan for the Fitzroy and Capricornia region was developed and produced through a collaborative partnership between RECoE, CQROC and its member LGAs, Queensland Department of Agriculture and Fisheries (QDAF), the regional facilitator and key regional stakeholders. The engagement model was developed from earlier work undertaken by RECoE, Red Cross Queensland[2], the Queensland Reconstruction Authority (QRA)[3], CSIRO[4] and was informed by international best practice from the World Bank and the UNDRR.[5] The plan has been reviewed by an independent assessor appointed by the Australian Government, and their feedback has been incorporated in the final plan.

The plan was co-designed with local stakeholders, using an approach that emphasised trust-building, building on existing networks, local co-design and commitment, risk-informed processes, place-based and regional strategies, locally led and coordinated solutions and integrated multi-objective responses.

Regional engagement process

The RDRP engagement process was iterative and involved a systems approach that highlighted local voices and ownership, and also combined both subjective and objective perspectives with a respect for local, traditional (including First Nations) as well as 'scientific' knowledge.

The goal is to develop a regional plan that reflects the needs of central Queensland, is owned by stakeholders in the region, but is still consistent with state and federal plans and priorities. To achieve this in the most efficient way, an open engagement model has been developed (Figure 2). In the longer term the plan should be a living document that can be revised with current information and priorities.

Learn from the past, don't overstock, set up good water Infrastructure and keep in mind to sell early.

Nev Ferrier

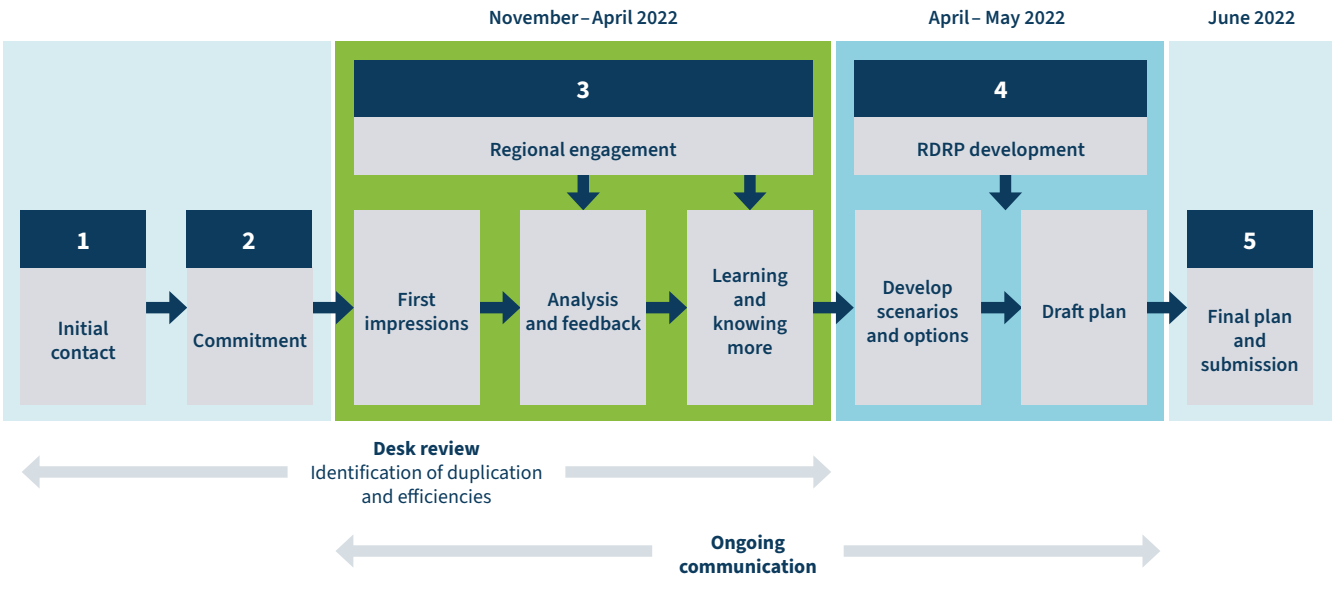
Strategic alignment

QRA supports the design of the RDRP program and is a key program stakeholder. Throughout QRA's development of Regional Resilience Strategies, drought has been raised as a serious challenge impacting regions.

The RDRP Program provides the opportunity to have a clear focus on drought risk in the context of regional resilience, addressing the unique challenges it poses and the need for setting out drought specific priorities and actions at a regional and local level. The RDRPs also consider other related regional planning e.g., economic development and Natural Resource Management strategies.

An important priority for the Fitzroy and Capricornia plan is to generate consistency with other regional plans and initiatives. This has been achieved through the partnership with CQROC and careful review of other planning processes and policy mechanisms relevant to drought in the region.

Figure 2: Engagement process.



Key principles and concepts: drought and resilience

Whilst there is no universally accepted definition of drought, in Australia, the Bureau of Meteorology (BOM) states, "drought, in general, means acute water shortage".[6]

In Queensland, drought is 'declared' for a local drought area and/or individual properties. Local drought areas are drought declared "when the rainfall recorded during the previous 12 months (minimum) is in the lowest (or driest) decile or below the 10th percentile when compared to the long-term historical rainfall".[7] This is the technical definition of drought utilised in this plan.

'Resilience' is harder to define. The World Bank has defined resilience as the ability

"…to anticipate, absorb, accommodate or recover from the effects of a hazardous event in a timely and efficient manner".[8]

Australia's CSIRO perhaps more specifically states:

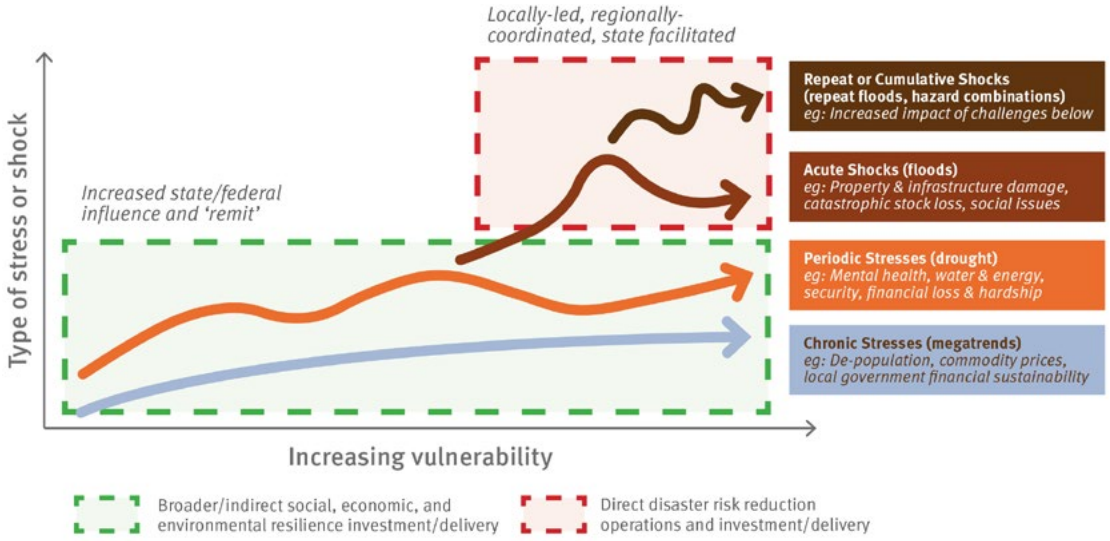
"drought resilience will result in a regional Australia that can endure deeper, longer droughts, and recover from them sooner. This will allow our food and agribusinesses to boost national farm income, increase food security, and protect the regional jobs that rely on agriculture. It will increase the resilience of rural and regional communities that depend on agriculture and improve environmental outcomes".[9]

This plan utilises drought resilience objectives that broadly align with the four key objectives underpinning the Queensland Strategy for Disaster Resilience.

Figure 3: Four key objectives of the *Queensland Strategy for Disaster Resilience 2022–2027. Source: Queensland Reconstruction Authority.*

Experience from earlier works on resilience has highlighted the crucial importance of community and regional resilience, sometimes referred to as 'societal' resilience. For instance, work by QRA has revealed that community stakeholders report that their 'societal resilience' is significantly affected by chronic and enduring stresses (long-term megatrends such as ageing populations, fluctuating commodity prices), periodic stresses (such as drought) that are often cyclical, acute shocks (such as rapid-onset disasters), cumulative shocks (often a rapid succession of shocks or the increased impacts of the combined stresses and shocks).

Figure 4: How resilience is affected by stresses and shocks. *Source: Queensland Reconstruction Authority.*

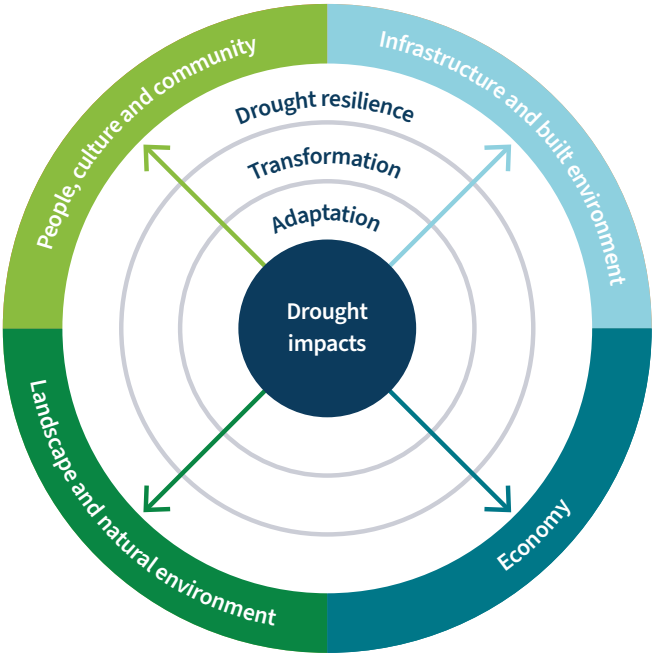


Whilst drought has been often referred to as "an enduring feature of the Australian landscape", when viewed in this context of community resilience, drought is also understood as a periodic stress that comes and goes. However, it is now evident that the warming caused by climate change has added to the variability in Queensland's weather and "increased the severity of drought conditions during periods of below-average rainfall".[10]

Importantly, our approach and engagement processes encouraged community and regional stakeholders to express their own observations of 'drought' and 'resilience'. We have combined the 'local' with 'outside' definitions to produce the regional understanding that underpins this plan and identifies drought impacts, risks and pathways to resilience.

The third goal is to develop resilience across four key dimensions (Figure 5).

Figure 5: Queensland RDRP elements of drought resilience. *Source: Queensland Regional Drought Resilience Planning.*



How to use this plan

The purpose of the plan

The purpose of the plan is to develop a practical guide to improve the resilience of the Fitzroy and Capricornia region to future droughts.

Droughts differ by factors such as intensity, scale and impacts, and no widely accepted definition is currently available. One goal is to identify terms and definitions that are locally relevant. Policy frameworks and responsibilities for dealing with drought are spread across multiple institutions, making it difficult to navigate and coordinate effective responses. A second goal is to develop a collective understanding of the programs, agencies and responses available to deal with droughts in the region.

The Fitzroy and Capricornia RDRP has been developed in accordance with the guidelines distributed by the Australian Government's FDF program. It also has been shaped by the inputs from key stakeholders along with the voices and experiences of the region's people.

Accordingly, the key objective of this RDRP is to:

- Express the outcomes of the Fitzroy and Capricornia RDRP process and the aspirations and commitments of the region's people
- Identify and establish critical networks and partnerships to inform and support drought resilience planning and actions
- Combine the best of local and traditional knowledge with best practice data and information to make informed decisions
- Clearly identify and plan for the ongoing and future impacts of drought across the region
- Highlight pathways that the region can use to adapt to changes and build drought resilience
- Specify key actions (regional and local) that can be implemented to build drought resilience in the region.

The RDRP process is intended to be practical, implementable, and ongoing. As the region undertakes the specified actions, this plan will assist with monitoring progress and future learning. Drought planning allows more economic responses to dealing with droughts, and to avoid equity impacts of variations in support to affected stakeholders. The aim is to have local and regional inputs into how responses to droughts can be better designed.

This RDRP corresponds with the parallel development of the Fitzroy and Capricornia Regional Resilience Strategy which focuses on improving responses to natural disasters (excluding drought). Together the two plans provide a template for improving responses to future pressures, particularly ones that may be amplified in the future by climate change.

Key inputs

Some key plans, projects and studies which have been drawn upon to inform this plan include:

- Queensland Government Drought Policy and Assistance Programs
- Queensland Strategy for Disaster Resilience
- Resilient Queensland
- Fitzroy and Capricornia Regional Resilience Strategy
- Central Highlands Drought Management Plan 2009
- Banana Shire Drought plan
- LGA Disaster Management Plan
- AgForce: Queensland Drought program Review
- AgForce: Agricultural Business Cycle
- AgForce: Joint Review of the Intergovernmental Agreement on National Drought Program Reform
- Rockhampton Regional Council Mount Morgan Water Supply Security.

In addition to these specific drought programs this plan has also drawn on a number of other planning documents relevant to the Fitzroy and Capricornia region. These include both Regional (economic) Development Plans and Local Disaster Management Plans for the six LGAs, and Water Security Plans and Regional Water Supply Security Assessment for the Rockhampton, Gladstone and Central Highlands LGAs. All shires (apart from Woorabinda Aboriginal Shire) are participants in the Queensland Climate Resilience Program.

Other important linkages

It is the intention of this Plan that it is considered and factored into a range of other strategies and plans – including (but not limited to):

- regional plans
- regional economic development strategies
- regional transport and infrastructure plans
- natural resource management plans
- water resource plans
- local and district disaster management plans
- local asset management and capital works plans
- local corporate and community development plans
- land use planning schemes
- local and regional health strategies.

The plan should be relevant to charities; non-government organisations; not-for-profits; businesses; and government agencies with an interest in responding to the effects of drought in the region.

Image: Yeppoon Disaster Centre. *Source: McAlister & Burford.*

Image: Woorabinda Aboriginal Shire Council. *Source: ABC.*

Engagement process for this plan

A co-design approach with stakeholders in the Fitzroy and Capricornia region was undertaken in the generation of this Plan. Stakeholder analysis considered the range of participants across the whole Fitzroy and Capricornia region ensuring the type of stakeholder was representative of those who are directly or indirectly affected by drought. The International Association for Public Participation model of stakeholder planning and engagement was followed. It enables the compartmentalisation of the type of individuals, groups, non-government organisations, industry, representative groups, commerce, government and producers affected by drought. Essentially the model provides a base to canvas the range of stakeholder parties and define their 'roles' in terms of being either collaborator stakeholders, affected stakeholders, beneficiary stakeholders or general interest stakeholders.

As this work centres on building resilience for agriculture producers and support industries and communities, emphasis was on stakeholders directly affected (e.g. local graziers, growers, land managers etc.) and those that are most indirectly affected (e.g. small business in rural and remote towns, agribusiness, logistic support and farm service industries) in remote and rural towns. Efforts were taken to involve a wide mix of stakeholders within and across sectors, but more importantly across the geographic area of the Fitzroy and Capricornia region.

Stakeholders were drawn from a range of industry and community sector types:

- Governments: Local, State and Federal agencies
- Business (including small business)
- Research and education
- Not-for-profits and community service delivery
- Producers, graziers and growers.
- Industry representative groups (agriculture and/or rural community development).

Much use was made of existing cross-sector engagement networks such as the Food and Fibre Plus network (primary producer and micro business stakeholders) as well as the Regional Agricultural Economic Development Practitioners Network (primarily government agency stakeholders). Between these and the CQROC many of these participants included representatives from local government.

To honour the co-design approach within tight timeframes for both the research, impact and analysis of issues; as well as strategic development, a careful approach to engagement was mapped out:

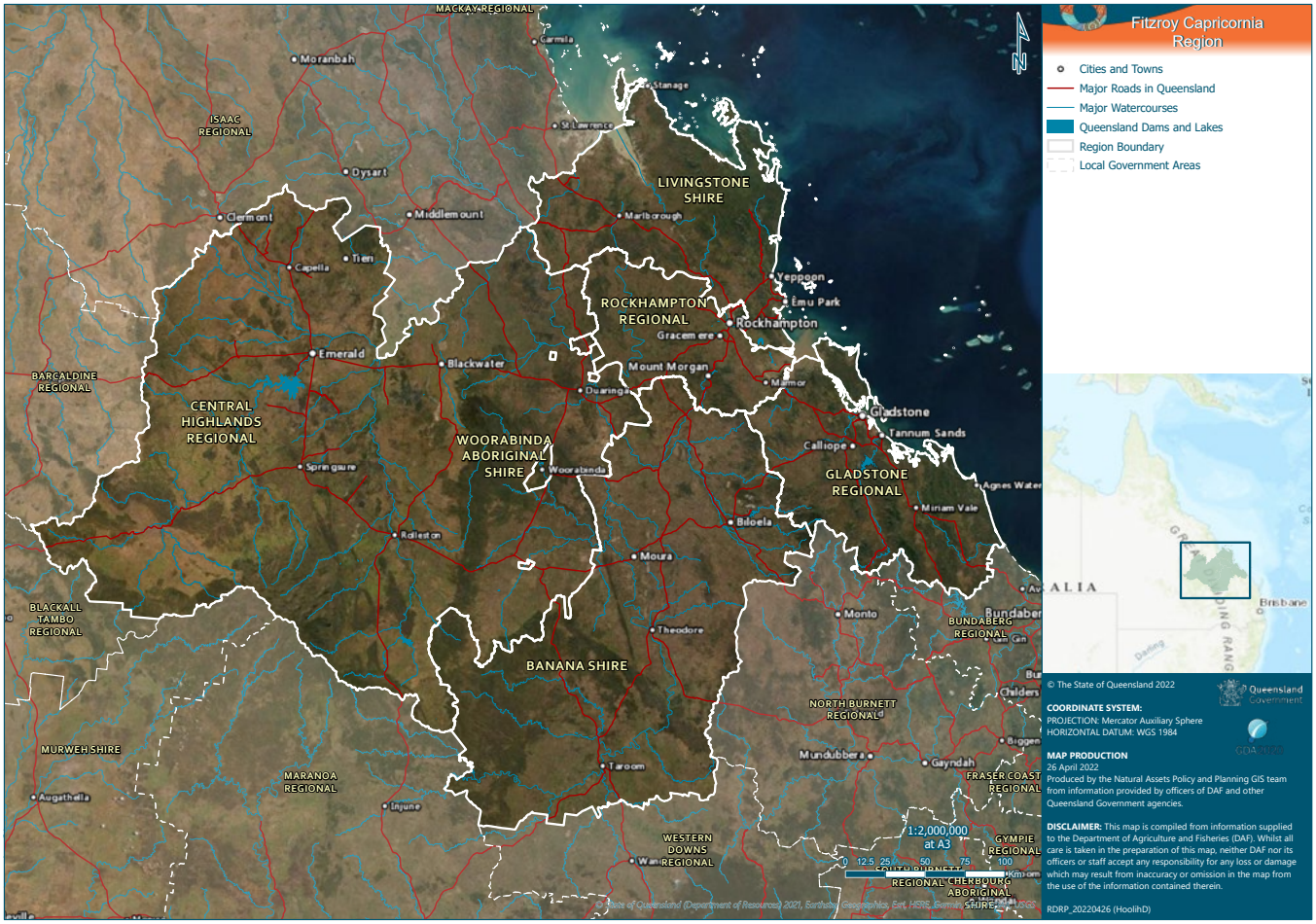
- Engagement commenced in November 2021 with one-on-one and small group meetings about the region. The aim of this initial round was to both inform participants of the FDF activities, to garner first impressions and call for suggested additional stakeholders or focal points.
- The second round of conversations targeted additional stakeholders, presentation of early feedback and exploration of further issues.
- From February to May 2022, face-to-face and online group sessions were held to present summaries, get collective feedback and explore priority strategic areas.

An information exchange approach was part of the ethos with the facilitators and the audience to provide comfort and 'equal standing' with regard to their knowledge base and their observations.

The progress of engagement was purposely defined and plotted to ensure those mostly affected or those that would be important beneficiaries were given prominence, to seek their understanding of drought, their experiences and observations with the impacts. Correspondingly it was felt important to engage with and involve local government in the early phases. Conversations were geared to try and identify the drivers and pressures that culminate to increase vulnerabilities and focus on these in suggesting actions that can lead to better resilience to drought.

Regional profile

Figure 6: Map of the Fitzroy and Capricornia region. *Source: Department of Agriculture and Fisheries, Queensland Government.*



The Fitzroy and Capricornia Region is located in central Queensland, surrounded by Mackay Isaac Whitsunday region to the north, the Darling Downs-Maranoa and Wide Bay in the south, the Queensland Outback in the west and Pacific Ocean in the east. The Fitzroy and Capricornia region comprises the six local government areas of Banana (S), Central Highlands (R), Gladstone (R), Livingstone (S), Rockhampton (R) and Woorabinda (S).

The Fitzroy and Capricornia Region has a total land area of 117,588.0km^2. This region has a sub-tropical climate with moist and warm summer together with a dry winter with an average daily temperature range of 14.9°C to 28.2°C and an average annual rainfall of 704mm (Queensland Government Statisticians Office, 2021). Extreme weather events such as major and minor floods, storm surges, tropical lows, cyclones, bushfire and heatwaves and drought occur frequently in this region (BoM, 2018).

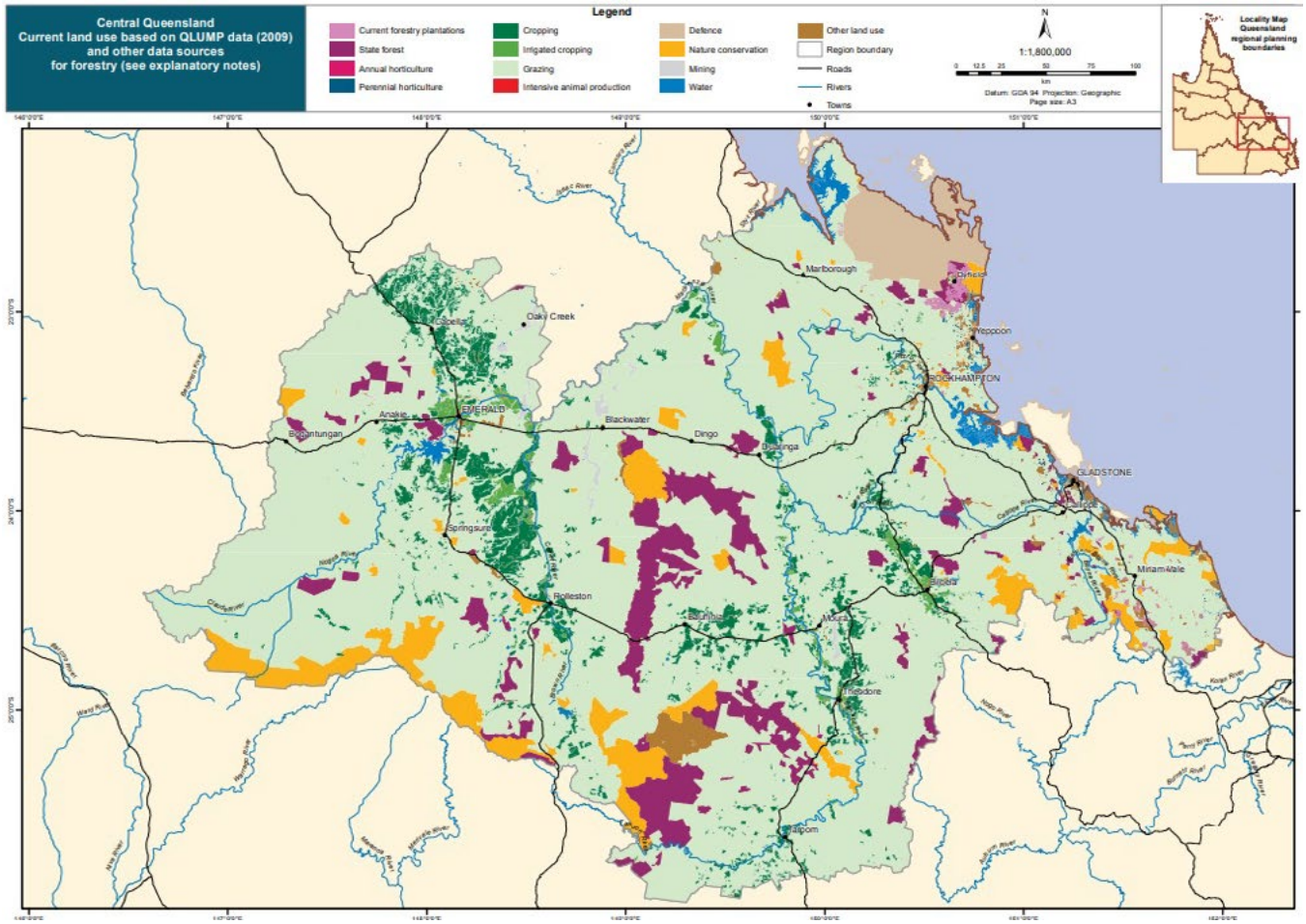
As of 30 June 2020, the estimated resident population for Fitzroy and Capricornia Region was 228,200 persons. The annual population growth rate has been 0.1% in the last five years (2015–2020). The population is concentrated in the major centres of Rockhampton, Gladstone, Yeppoon, Emerald and Biloela.

The Fitzroy and Capricornia Region overlays most of the Fitzroy River basin, which is the largest catchment in Queensland and the second largest water basin in Australia. Several large dams (e.g. Fairbairn Dam, Callide Dam, Awoonga Dam) plus a number of weirs provide about 2.5 million mega-litres of water storage across the region. The Lower Fitzroy River Infrastructure Project (LFRIP, 2017a) involves raising the capacity of the existing Eden Bann Weir and establishing a new weir at Rookwood on the Fitzroy River. This project will provide an additional 76,000 mega-litres of water for agricultural, industrial and urban use in the region.

Mining is the largest industry by value in the region, given the overlay with the southern part of the Bowen Basin. There is also a large minerals processing sector and port network based in Gladstone.

Agriculture is the major land use in the region, with nearly 4,000 agricultural enterprises across a diverse range of sectors (Figure 7). The Fitzroy and Capricornia region has a strong natural resource base with high quality land and good access to water, helping to generate a relatively consistent supply of agricultural product (ACIL Allen 2019).

Figure 7: Agricultural land use in the Fitzroy and Capricornia region. *Source: Growing Central Queensland 2019.*



Beef cattle grazing accounts for the majority of land use, over 2,000 separate business enterprises, and approximately $1.0 billion in annual production (ACIL Allen 2019). Other agricultural commodities generate nearly $0.5 billion in annual production, including cotton, pulses, wheat sorghum and tree crops in cropping and irrigation systems (Figure 8).

In relative terms, beef cattle grazing is the dominant sector in the region, with 54% of business enterprises and almost 70% of total agricultural production by value (Figure 9). However, the most rapid growth has been occurring in the pulses sector (e.g. chickpeas and mung beans), horticulture (grapes, pineapples, macadamias) and in aquaculture (ACIL Allen 2019).

Figure 8: Snapshot of top agricultural commodities by value. *Source: Adapted from ACIL Allen 2019.*

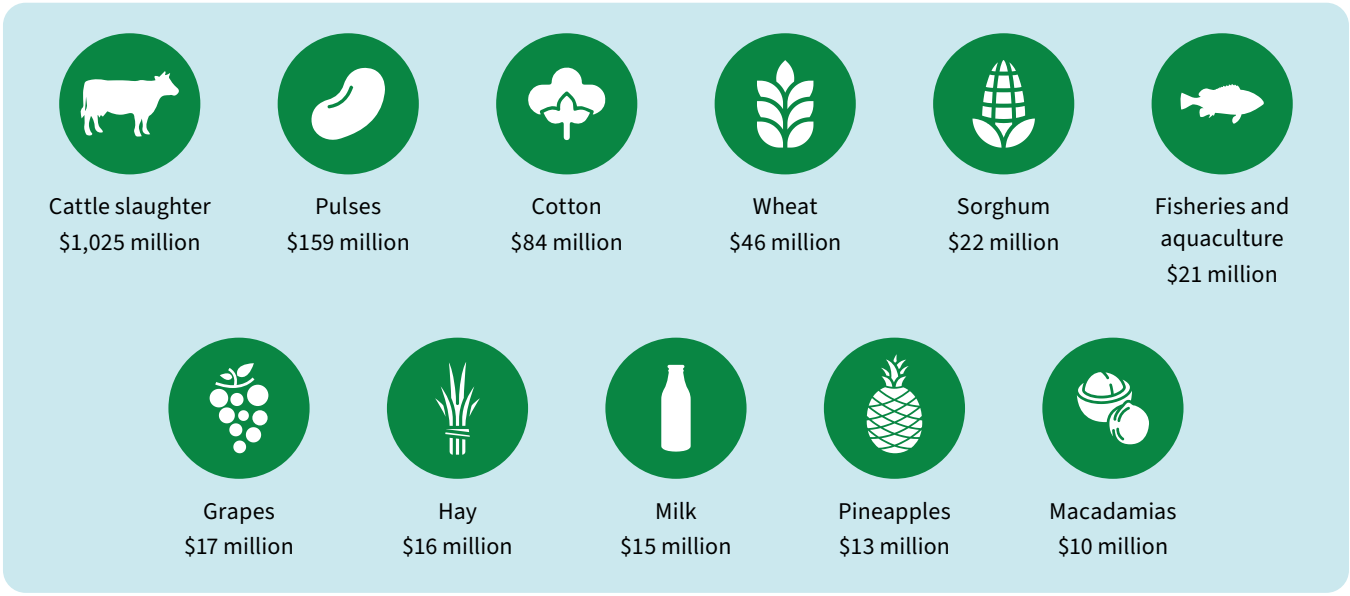
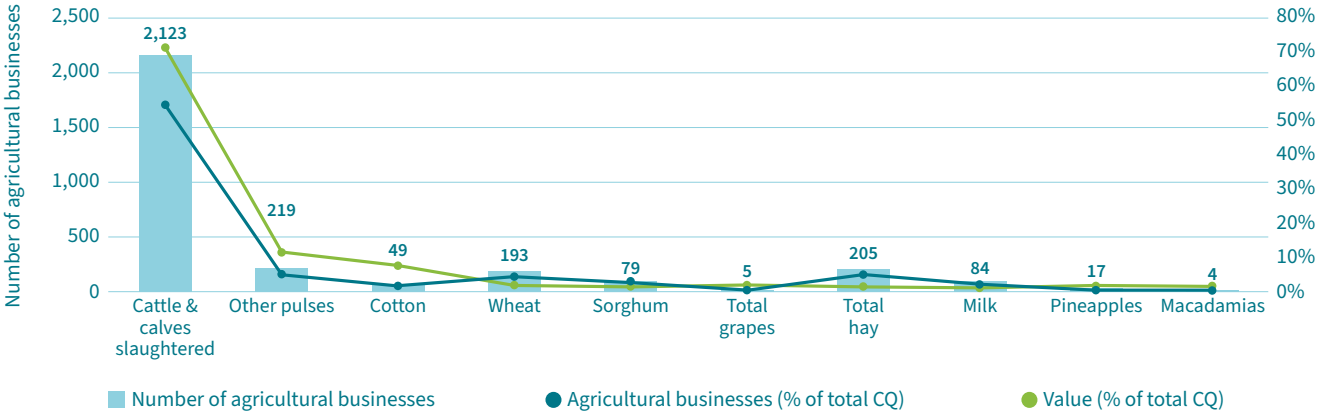
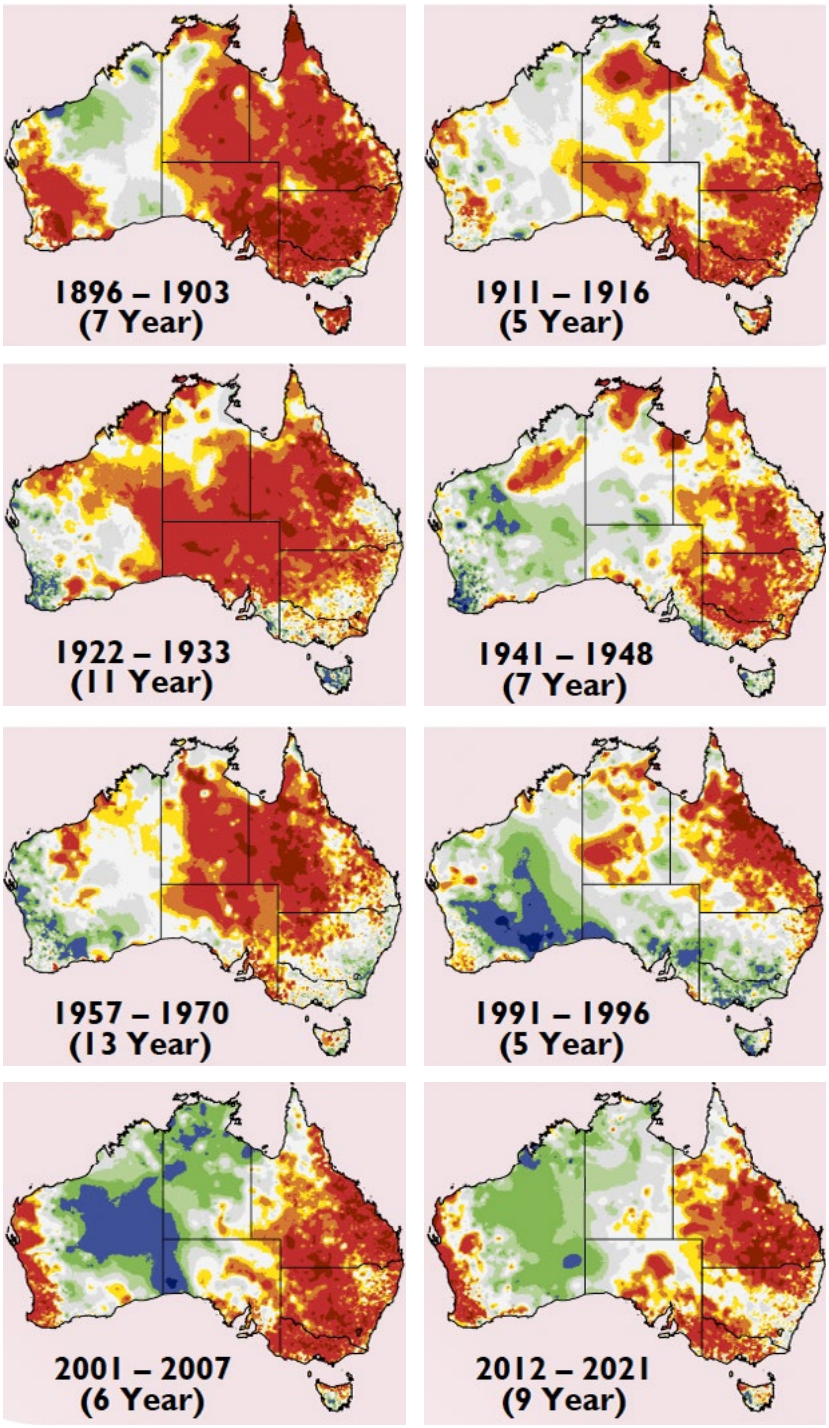


Figure 9: Number of business and contribution to regional agricultural production by sector. *Source: Adapted from Growing Central Queensland 2019.*



History of drought in this region

Figure 10: Queensland's extended wet and dry period. *Source: Queensland Government (2021)* https://data.longpaddock.qld.gov.au/static/posters/WetDryDroughtPoster.pdf.



Some notable drought periods in Queensland can be summarised as follows:

- The drought in 1896–1903 is known as the Federation Drought. It was associated with over 40% of livestock being lost in Queensland.
- During the drought from 1911 to 1916, many pastoral stations closed down with a heavy stock loss.
- Severe drought for a longer period between 1922 to 1933 resulted in cattle loss which was equal to the number of cattle sold off properties.
- In 1941–1948 drought pasture shortage resulted in reduced wool production with large stock losses.
- The widespread drought from 1957 to 1970 affected QLD severely.
- The drought from 1991 to 1996 was characterised by back-to-back El Nino events. National drought policy was initiated in this period.
- The Millennium drought in QLD occurred from 2001 to 2007. This drought resulted in reduced pasture and limited resource conditions in several regions.
- Drought in the period from 2012 to 2021 limited both surface and stock water supplies and pasture growth. The dry cycle was interrupted by tropical cyclones Marcia (2015) and Debbie (2017).

Past impacts of drought in this region

People, culture and community

- Increased workload and stress, which create health and family problems.
- Increase in mental health problems, such as post-traumatic stress and suicidal behaviour
- Higher demand on a variety of social and human services.
- Impacts on children's education as the parents could not afford the boarding school fees.
- Decrease in recreational opportunities as parks and rivers are affected due to drought.

Image: Woorabinda Multipurpose Health Service. *Source: Queensland Health.*

Case Study: Water restrictions because of drought left the regional community heart broken.

Mount Morgan is located approximately 38 km southwest of Rockhampton and within the jurisdiction of Rockhampton Regional Council. The main source of water for Mount Morgan is the Number 7 Dam (No. 7 Dam) on the Dee River. Fitzroy River Water, which is a business unit of the Rockhampton Regional Council (RRC) is the registered water service provider for Mount Morgan's urban water supply under the Fitzroy basin water plan. From 15 March 2015, RRC imposed a level 6 water restriction in Mount Morgan due to the declining water reserve in the No. 7 Dam. The level of water in the No. 7 dam has fallen below its 10% capacity. The water restriction was applied in accordance with the Council's drought management plan. Carting water is costing this region's ratepayers $70,000 a week, as reported in a news article. With the level-six water restrictions, 3,000 residents of Mount Morgan are reliant on an emergency supply of up to 22 water trucks a day. The water restriction due to the drought condition left a severe impact on the community as they feel frustrated, and heartbroken considering the long-term water security has been an issue for decades.

Source: ABC Capricornia, 14 Apr 2021, https://www.abc.net.au/news/2021-04-14/70k-a-week-to-be-spent-trucking-emergency-water-to-mt-morgan/100065704.

Economy

- Drought affects agriculture, including irrigation, cropping and grazing sectors.
- Reduced business and personal spending.
- Increased costs, particularly feedstock for animals.
- Increased workloads particularly, for animal husbandry.
- Severe economic impact on the regional economy and gross domestic product.
- Effect on the livelihoods of the local population.
- Declining productivity in the major support industries, often felt for many years.

Image: Feeding cattle in drought. *Source: J. Rolfe.*

Case Study: Central Queensland mung bean growers lose millions to drought.

According to the Bureau of Meteorology (BOM), central Queensland has suffered the worst drought in Australia in recent years (2017–2019). A senior agronomist says conditions are the worst he has seen in 40 years. One mung bean grower in Banana Shire Council (central Queensland) indicated that up to 40% of his mung bean crop would be lost due to the dry conditions. He anticipated that the recent drought caused losses of about 161 hectares of the crop which would be worth about $500,000. The total loss within the industry is huge. Central Queensland agronomists said that some farmers in the area had not had a crop for four years, which is devastating for smaller farmers.

Source: ABC rural news, 12 March, 2021, https://www.abc.net.au/news/rural/2021-03-12/farmers-struggle-amid-la-nina-no-show-in-central-queensland/13214944.

Case Study: Irrigation water prices go higher in Emerald, Central Queensland.

In recent years, the irrigation water price has increased in central Queensland. This is due to the lower supply of irrigation water caused by the regional drought over the last few years. Horticulture growers in Emerald, Central Queensland, are buying the most expensive water in Australia to keep their trees and vines alive. The price for a megalitre of temporary allocation water peaked at $3,380 in 2020, about 190% higher than what growers would normally expect to pay in the Nogoa Mackenzie system (Fairbairn Dam). The Fairbairn Dam could hold about three times as much water as Sydney Harbour when it is full. But in December 2020, it hit a historic low of just 7.39%, reducing supplies of accessible water for the local farmers. The grapevines, citrus or macadamia growers in this region had to pay this higher price, otherwise letting their plants die would be more costly. One cotton grower from this region said the expensive water market gave growers an opportunity to make more money by trading water than planting a crop. A representative from the Emerald Chamber of Commerce said the whole community suffered during the drought. Alongside agricultural production, drought reduces farm employment and the usage of machines, fuel, chemicals, and other inputs. This creates a huge snowball effect, and every family suffer because of that.

Source: ABC rural news, 9 March, 2021, www.abc.net.au/news/rural/2021-03-09/la-nina-fails-to-provide-affecting-more-than-just-farmers/13226696.

Landscape and natural environment

- Drought conditions impact the normal growth of plants.
- Loss in ground cover exposing soil increasing vulnerability to erosion, structure decline and loss of nutrients.
- Lower water levels in reservoirs and waterholes, as well as reduced streamflow in rivers and creeks.
- Reduction of some wetlands, groundwater depletion, drying of catchments and impact on water quality.
- Lack of drinking water for livestock and wildlife.
- Increased incidence of bushfires and wildfires.

Image: Drought conditions. *Source: J. Rolfe.*

Case Study: Major droughts devastating to livestock, people and nature.

All people on the land in Central Queensland accept the reality of periodical drought occurring in about one year in ten, but no drought before or since has had such a disastrous effect on the cattle industry as the great drought which reached its ghastly worst in 1902 but in some areas did not completely break until the summer of 1903–04. Because it was general in eastern Australia there was no escape through agistment in more fortunate districts, nor was there the later sophisticated equipment for moving fodder or stock quickly or for carting or pumping water. …At Tooloombah (Marlborough) only 3.10 inches (77.5mm) fell between 1st of January and 2 December 1902. Shortly before the December fall, O.J.C. Beardmore noted: "Nothing seems alive. Trees on the riverbank dying in millions. Water all gone." …Beardmore's Peak Downs station, Booroondara, northeast of Capella, received only 6.21 inches (155.25mm) for the year, and in February 1903 he recorded that the drought seemed to have killed nearly all the cattle in the country, in many cases ninety per cent of the herd. …Nearly everyone in the district seemed bankrupt and hopeless of the future. …On Comet Downs station which Falconer Hutton Snr had bought about 1898 the drought was so severe that "you could put a sheep dog around the plain turkeys and put them in the fowl house, the kangaroos were too weak to hop and the kookaburras could not fly."

Source: Lorna McDonald 1981. Rockhampton: A History of City and District. University of Queensland Press, Brisbane, pp. 240–243.

Infrastructure and built environment

- Lack of water supply for many small communities
- Increased risks of impacts on industry relying on water as a key input
- Significant stress on water network assets.
- Increased water pollution due to a drop in water flows
- Impact on urban water supply.
- Recycled water may be necessary to maintain service, which leads to higher costs.
- Higher maintenance and repair costs for water treatment systems due to lower quality inputs.
- Increased maintenance for parks and gardens.

Image: Fairbairn Dam. *Source: Sunwater.*

Case Study: Fairbairn Dam: Drought proofing the Emerald region.

In early 1968 the irrigation scheme for the Emerald region was presented in parliament. The proposed scheme outlined that the Fairbairn Dam (Maraboon Dam then) would supply 147,600 megalitres per annum. As assumed, this would increase rural agricultural production and mitigate drought effects. The scheme was later modified to support the Blackwater district, and the dam was completed in 1971. This infrastructure scheme supported the expansion of irrigated farming areas. It also supported the expansion in mining in these areas. During the drought of the mid-1990s, there was a risk that the supply from the dam would fail. A study was conducted to identify the consequence and the effect on the community if the dam had failed. The failure of the dam would reduce 9,500 jobs in the community, and $50 million per annum worth of irrigated agriculture production. However, timely rainfall occurred to restore the water level of the Fairbairn dam.

Source: Queensland Government, Inquiry into Infrastructure and the Development of Australia's Regional Areas https://www.aph.gov.au/parliamentary_business/committees/house_of_representatives_committees?url=primind/rdinq/sub257e1.pdf.

Queensland country life news, https://www.queenslandcountrylife.com.au/story/7029778/farmers-hold-out-hope-as-fairbairn-hits-historic-lows/.

Likely future impacts (risks) of drought in this region

There have been major advances since the disastrous Federation drought of 1900–02 to make the region more resilient. Notable achievements include:

- Improved property infrastructure for water, pastures and roads
- Public water infrastructure including weirs and dams to assure water supplies
- Greater diversification in agriculture, including the development of an irrigation sector
- Improved animal and plant genetics
- Increased farm inputs (e.g. fodders and supplements) and transport networks
- More sophisticated livestock and product markets
- Improved weather forecasting and financial management tools.

In addition to these advances, there is a strong network of services in the region across Australian, Queensland and local governments, together with additional capability from non-government organisations and private firms. There has also been the development of a large number of drought support programs by the Australian and Queensland Governments which have increasingly helped enterprises and stakeholders in the region to manage the impacts of droughts over time.

Despite these advances, the Fitzroy and Capricornia region remains highly susceptible to drought pressures. In part this is because most pasture and agricultural lands are rainfall dependent. Even where major water storages support irrigation, industrial processes and urban supplies, longer term droughts can impact on water security and create pressures to focus on priority supplies. As water is increasingly allocated for higher value uses, such as industry and horticulture, such interruptions come at higher cost.

Historically the focus of government drought programs has been to support the viability of rural enterprises. However, this is changing in three important ways. There is:

- now greater awareness that drought has wider impacts than on agricultural businesses, with the negative impacts on business networks and small towns much more
- increasing focus on the human dimensions of drought rather than the agribusiness impacts, including supporting the social fabric and mental welfare of people in agricultural enterprises and rural areas; and
- more focus on making enterprises and regions more resilient to drought ahead of time, rather than simply responding to pressures during drought events.

An underlying driver for future impacts of drought in the Fitzroy and Capricornia region are the pressures expected from climate change. Among the key changes that are expected in Queensland are higher temperatures, hotter and more frequent hot days, more intense downpours, and less frequent but more intense tropical cyclones. In Central Queensland, it is projected that the region's current average summer temperature of 27° will rise to over 28° by 2030 and over 30° by 2070 (Department of Environment and Science, 2019). This will be associated with fewer frosts and higher fire risks.

Rainfall projections for 2070 show minor change or a decrease, particularly in winter and spring, although the number of events will fall and intensity of rainfall events is likely to increase. However, rainfall is naturally highly variable, and this will continue to be a major factor in the next decade. The impacts on drought are less certain, but it is likely by late this century under a high emissions scenario that eastern parts of the region will experience more times in drought (Department of Environment and Science, 2019).

People, culture and community

Stakeholder perceptions of the major effects of drought on **People, culture and community** are summarised below.

Many stakeholders prioritised the human dimension of change that occurs with drought. Whether on the land or in small remote communities there is much concern about impacts on peoples' health and well-being. There are many sub-issues and problems that combine to affect individual and community wellbeing.

During non-drought periods the resilience and community focus of residents in the bush is well-known. With droughts the culmination of pressures on human health and well-being can create dramatic impacts on the liveability of communities.

Drought brings together various stresses including financial, resourcing, staffing, and growing levels of uncertainty for the future. For many, drought increases work commitments and there is no time for relaxation and de-stressing. The critical decline in numerous services in the more remote and rural areas add to the anxiety of various stakeholders.

The link to job stress within small communities weighs heavily on people as droughts become prolonged. Lack of production and jobs on farms transfers economic pain from the properties to towns. There is limited cash to support employees and businesses swing toward relying on casual employment, or limited part time work – and eventually to not being able to engage any support. There is insufficient funding for employers to offer training and experience to existing and new staff – so work stress for employees rises. This scenario entrenches the trend toward transient rural job opportunities now typical in many parts of rural Australia. Attracting employees to remote areas under stress is difficult and is made worse through limited financial offerings to entice staff retention. Retail business suffers in the short term, and hospitality is impacted the most. This limits the early entry jobs for youth in small towns and communities. There are limited resources to avail initial jobs and to create certainty for their future. This often drives youth away from communities prematurely.

Cultural and social services within rural and remote communities also suffer. The role of community events and gatherings of specific and general nature provide beneficial benefits for health and well-being. There is a lack of time and resources for people to dedicate to cultural events. Volunteerism also suffers as many have less time to give. Many of those under stress in towns do not call upon professional health or other social services due to the same reasons. They simply do not have the available disposable cash or time. Where health and social services survive, they suffer from lack of continuity (staff retention) and ability to communicate proactively with clients before pressures become overwhelming. Time and resource constraints affect sport and recreational clubs as attendance and membership declines.

In the more remote areas, the above stressors lead to a decline in the provision of health and community support services. With those affected by drought putting off action on their health and well-being the demand for services declines, and with this the ability to secure funding from Government is affected. The ability for health and social welfare specialists to offer early and proactive action diminishes. So, in stressed communities there is often dramatic decline in local service especially in the skilled allied health and professional services provision. Where health services are in decline and doctors, nurses and specialists leave rural and remote communities the financial situation makes it hard to attract replacements. Continuity of employment within the bush is a huge issue without drought but is exacerbated when drought conditions prevail. The impact on individuals and families in high anxiety periods is the excessive costs in travel to health services elsewhere.

Education and training opportunities in the bush and rural communities also suffers from similar pressures. Home schooling takes prominence over local education or boarding schools with-in region. Like with health services with a decline in numbers and ratio changes between teacher and students, service decline eventuates. Sometimes this leads to closing of education and training facilities.

Economy

Stakeholder perceptions of the major effects of drought on the **Economy** are summarised below.

One of the main drivers to the depressed situation with people, culture and community during drought is the decline in incomes and finance for growers, producers and their supporting communities. Loss of income on farm sees the transfer of consequences to small town and communities.

No income means no expenditure in-town with dramatic impact on remote service providers including small-medium scale industrial fabricators. During drought times farmers will defer new machinery purchases, repairs, new assets, new plant material, maintenance of machinery and parts for assets that are essential to good production. Elsewhere in the commercial sector there is reduced demand for plants material, fertilisers chemicals etc with implications for logistics behind the supply chains to get materials and products to farm or from farm.

With de-stocking of land there is limited income for producers to spend on feed and animal husbandry or medical supplies for stock. Dramatic selling off of stock means professional services like Veterinarian, agronomy and breeding service all decline. Financial stress in these arenas has flow on debt pressures to other industries.

With reduced expenditure across all sectors service provision and business staffing needs decline. Retail and hospitality within remote areas is most quickly affected. Even where tourists may still be attracted there is limited financial incentive to employ staff to service such visitation. Often the amenity of larger attraction sites are also severely affected by the

Image: Sorghum crop. *Source: V. Zeil.*

Image: Cotton at Biloela. *Source:* www.queensland.com

drought conditions, reducing visitor numbers. Against this scenario however there is often an increase in the sale of stock (but in extremely poor condition in terms of animal health). So, agribusiness service companies and logistic providers do get some trade in the initial onset of drought. However, this dramatically declines as stock numbers are massively reduced over the landscape.

Logistics and transport support industries are massively affected. This is relevant to both on-farm transporting, non-farm transporting companies as well as the service industries that maintain transport systems. Overall, the impact over time is higher transport unit costs both for farm production and communities.

With financial stress across industry sectors in rural and remote communities comes limited demand for professional services from real estate, legal, surveying, investment advisors, etc. With prolonged drought often small professional businesses tend to relocate to more populous areas closer to the coast. The implication of professional service decline adds weight to the slowdown of retail, services and social service industries in those towns, as professionals often provide the day-to-day incomes for many retail and small businesses.

Lack of disposable incomes and pressures on access to finance affects those willing to venture into alternative livelihood opportunities that may increase their resilience to drought. Many alternative income developments are reliant on water and staffing as chief ingredients to the economic opportunity. With agritourism, as an example, poor availability of staffing alone makes many ventures cost prohibitive.

Landscape and natural environment

Stakeholder perceptions of the major effects of drought on **Landscape and Natural Environment** are summarised below.

A common theme from producers and small business in remote towns was the trends to an overall drying out of catchments and lower condition of the different biomes. These were seen to cause by a combination of pressures such as poor land management, climate change and variability, weed infestations, mono-culture grasses, disruption to waterways, limited rest of land, no rotation of cropping, and over reliance in chemicals. This has resulted in an overall decline in the resilience of the various biomes and geophysical systems.

With the drying out of catchments whether from land management, climate change or prolonged drought, the cumulative impact is diminished resilience to drought and increased risks. Bushfires are now experienced in areas that were previously moist forests. Further, areas that previously had distinct wet seasons where bushfire risk was reduced were now experiencing high biomass growth and dry periods between November and April. Sometimes multiple fire hazards and extreme events were occurring off-season during this period. Prolific fire fuel grass growth and then drying out of season causes a greater number of bushfire events. It also brings heightened fire risk closer to the settled areas of towns.

In terms of the implications on drought, repeated incidence of bushfire over time depletes the seed base for natural growth cycles of bush and grasslands. Soil biota regimes have changed. Invasive species flourish further depleting soil nutrients. Soil scald areas appear, or bare areas are subject to erosion. This scenario combines to reduce the resilience of large areas to future drought.

The changes in the weather patterns and the extremes of heat, rainfall and prolonged drought affects the tolerance regimes of vegetation whether introduced or native. Along waterways the vegetation distribution areas are reduced in width as trees, bushes and native grasses seek the subterranean moisture closure to the creeks. Eventually the waterways are reduced in width as the vegetation adapts to the new regime impacted by limited ground and subterranean wetted areas. The prior vegetated areas become hardened and add to drying of the catchment. The habitats become thinner ribbons along waterways and have reduced coping capacity for change such as infestations of invasive species, disease and pests.

With the drying out of catchments with less biodiversity, topsoils are more exposed to extremes, they harden and are depleted of nutrients. They become more susceptible to stock pressures, local flood flows and erosion. Prior grass and vegetation cover which helped cool the topsoils and keep them moist, as well as enabling carbon and nutrient cycling now are in a vicious cycle of soil fertility decline. All this creates less resilience to drought conditions.

Changes in soil moisture regimes, reduced fertility and soil's structure decline often favours mono-culture land cover grasses. Without healthy mixes of grass and herb cover natural competition is affected or mono cultures dominate to the point where natural nutrient cycling and healthy soil biodiversity diminishes. With the domination of monoculture grasses or weeds the mix of native and introduced species of value to grazing performance is also affected. Disease and pests will proliferate when natural competitors are reduced with this monoculture scenario.

For more natural bush settings, these changes cause biodiversity decline which affects the health of remnant native bush areas. Prolonged drought provides additional stress on these systems and affects both flora and faunal habitats.

Waterways are affected by the landscape modifications and hardening of soils which increases volumes and runoff velocity in rain events, increasing scouring and erosion. Water doesn't have the time to infiltrate the soil profile as it once did. Riparian and littoral zones of the waterways no longer provide healthy bases for aquatic biology and revegetation of creek banks to stabilise them. Reduced constant flows of water in waterways, and conditions where water is of inferior quality in turn impacts producers in terms of availability and suitability of the water for farm use. Along with the drying of catchments this multiplies pressures that reduces drought resilience.

Infrastructure and built environment

Stakeholder perceptions of the major effects of drought on **Infrastructure and Built Environment** are summarised below.

Droughts reduce the reliability of supplies in major water storages, and in severe cases water is restricted to key industries. Water is an essential input into industry, including heavy industry at Gladstone, power generation at Stanwell and Callide, for the operation of coal mines, and for feedlots. Reliable supplies are also critical for the irrigation sector, particularly given the growth in permanent tree crops such as citrus, macadamias and avocados in the region.

With reduced incomes and inability to secure finance during drought, farmers and producers reduce their investment in farm technology, repairs and maintenance, as well as usual and planned land management changes. Planned purchases of machinery, their upgrade and servicing of farm machinery are postponed. Planned fencing, waters, pasture renovation, new water supply infrastructure and modern technology to instigate water efficiency is deferred. There is less available cash to spend on water security and appropriate changes to land management to suit the drought conditions that often are prolonged. The search for forage in drought years puts pressure on Councils and their management of stock routes and creates challenges to provide equitable access to emergency grazing.

Image: Rockhampton Barrage. *Source: ABC*.

The stresses flow on to towns and essential small service businesses. There is reduced demand on the servicing and maintenance of infrastructure and farm machinery. Small industrial fabricators and machinery sales agencies are examples of impacted businesses. Many such businesses either close temporarily or permanently as a result of prolonged drought. Over time this in turn impacts on the local government rate base and general incomes across the community necessary to maintain both public infrastructure and private infrastructure. A reduced rate base of Council impacts on their ability to service existing infrastructure as well as maintain or extend new services to residents. The impacts are long felt as once drought conditions are over, as the upgrading of poorly maintained infrastructure whether on farm or within towns is often cost-prohibitive or takes multiple years to restore to its former serviceability.

Some water security issues are dramatic in small remote towns that service agriculture production. Small water storages quickly become empty and water cartage from larger towns to the smaller villages is costly. The need for a greater volume of water or alternative forms of supply requires higher investment in assets, transport and chemicals and processes for treatment. The cost of additional weirs or dams for supply in small to medium communities typically needs to be based on return-on-investment (ROI) criteria. However, these are often not achievable without extenuating circumstances like access to nearby supplies or additional demands from adjacent mining or industry that makes projects more commercially viable.

Image: Awoonga Dam. *Source: Sunwater.*

Building drought resilience in our region

Lessons learnt from the past – stories of resilience

Much has been achieved in the region during the 20th and 21st century to make the region more resilient to drought. Notable achievements include:

- Improvements in private infrastructure, animals, pastures and crops in agriculture that make rural enterprises more resilient to seasonal variations
- Greater diversity of agricultural enterprises that help to diversify the risk of adverse seasons, including through the development of the irrigation sector
- More robust agricultural technologies, supply chains and transport networks that facilitate advanced management responses
- Public water infrastructure including weirs and dams to assure water supplies
- Improved weather forecasting and financial management tools
- Strong network of services and support mechanisms for rural and regional community needs
- Coordinated planning and delivery mechanisms across three levels of government, including robust mechanisms to deal with natural disasters
- a large number of drought support programs to help enterprises and stakeholders in the region to manage the impacts of droughts when they occur.

Despite these advances, stakeholders identified some challenges in managing future drought impacts. The complexity of current programs and the challenges of coordinating responses across various levels of government and agencies is one challenge.

An important theme was the focus of stakeholders on the human impacts of drought, particularly on rural producers, rural networks and small communities. These are priority issues for future planning. While the focus of stakeholders is largely around 'people' issues, and the importance of building resilience in people, this is a little out of step with the traditional focus of drought programs on agribusiness support.

The financial support mechanisms embodied in current drought programs generated substantial comment that things needed to be done differently. Many agricultural producers and agribusiness suppliers noted that cash grants from drought programs often disincentivises drought resilience. It would be necessary to change the focus of support programs to build longer term resilience.

There were also complex equity issues raised about the outcomes of current drought programs. Many stakeholders felt that experienced producers had many opportunities to employ more sustainable land management practices over the last two decades or more and should not need support in drought years. However those stakeholders recognised that new younger families entering agriculture do need some financial assistance during the period of gaining adequate knowledge about strategic management responses.

In terms of new mechanisms to incentivise drought resilience, innovative ideas were canvassed by producers and agribusiness service providers. There was broad support for changing the focus from drought response towards building more resilience in the region through adjustments to support mechanisms.

These included new mechanisms similar to the superannuation guarantee system where farmers contribute to a fund during good seasons, supported by government co-contribution, with the ability to pull down a portion of these funds when under drought stress. This would be a refinement of the current Farm Management Deposit scheme. Others called on performance-based mechanisms for grants and or low-cost loans based on well monitored performance indicators and measures. It would see support based on tranches where subsequent parts would be based on satisfactory implementation of resilience activities at each stage.

There was also mention of performance measures (based on criteria) needing to be satisfied prior to any application for assistance i.e. co-contribution mechanisms, requiring action firstly from the applicant implemented on the ground before assistance mechanism were triggered. Such pre-costs able to be accounted for co-financing. Some suggested that performance criteria should cover best practice animal husbandry in addition to land management improvements.

A vision of our drought resilient region

Different conceptual frameworks exist to help organise and evaluate drought planning, including:

- Drought Resilience, Adaptation and Management Policy (DRAMP) (Crossman 2018)
- The Resilience, Adaptation Pathways and Transformation Approach (RAPTA) (O'Connell et al. 2019; NDNQFRRA 2019)

This plan draws on the three pillars in the DRAMP framework because it is specifically focused on drought, simple to apply, suitable to evaluate planning, and has already been used by Government (NDNQFRRA 2019). The three relevant components are to prepare, respond and limit:

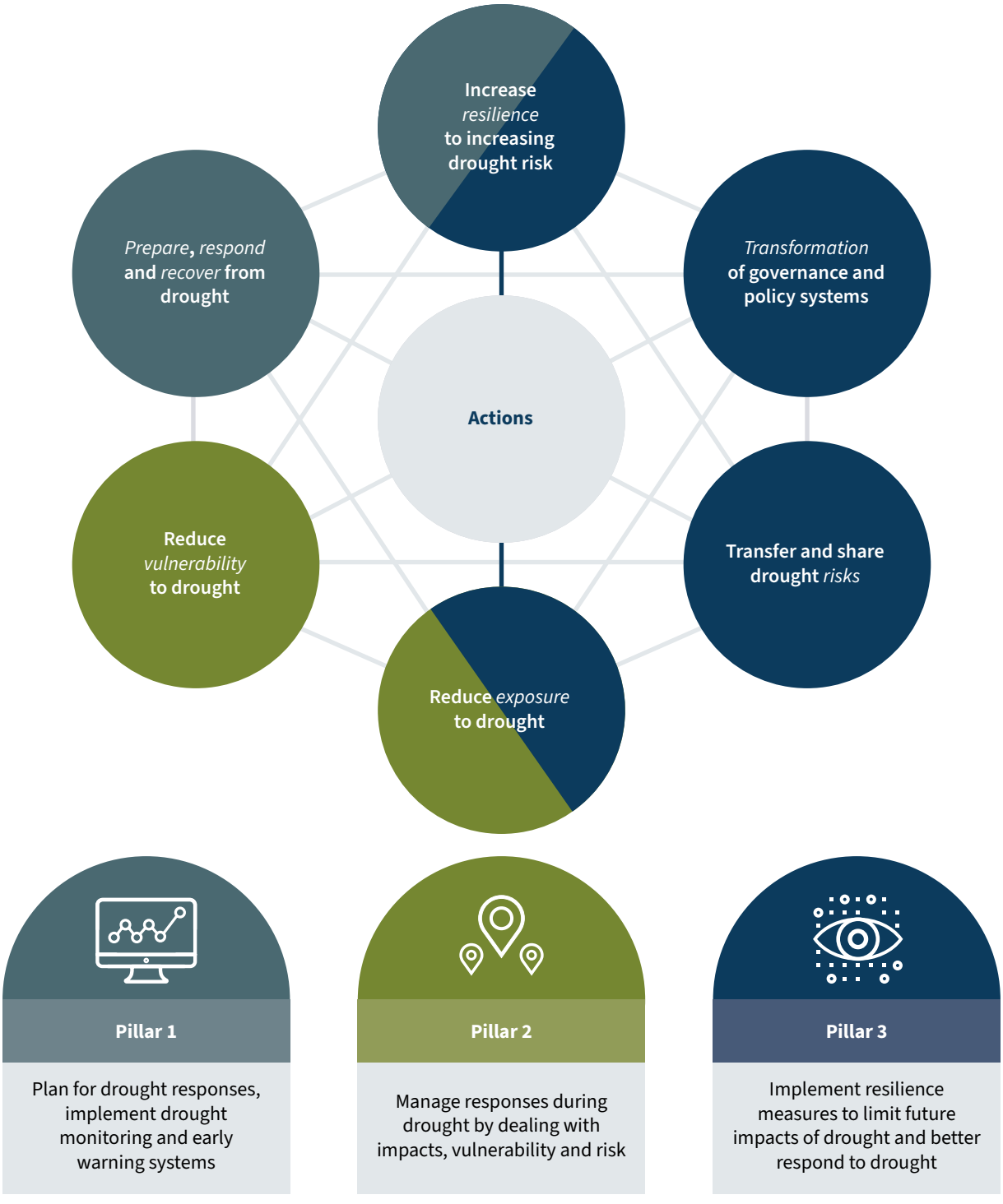
a) Develop planning and governance systems, implement drought monitoring and early warning systems

b) Implement policies during droughts to target those vulnerable and help them recover

c) Implement measures to make agricultural producers and communities more resilient to drought, and that support mechanisms are in place.

Further details on the underlying framework and key pillars are shown in Figure 11.

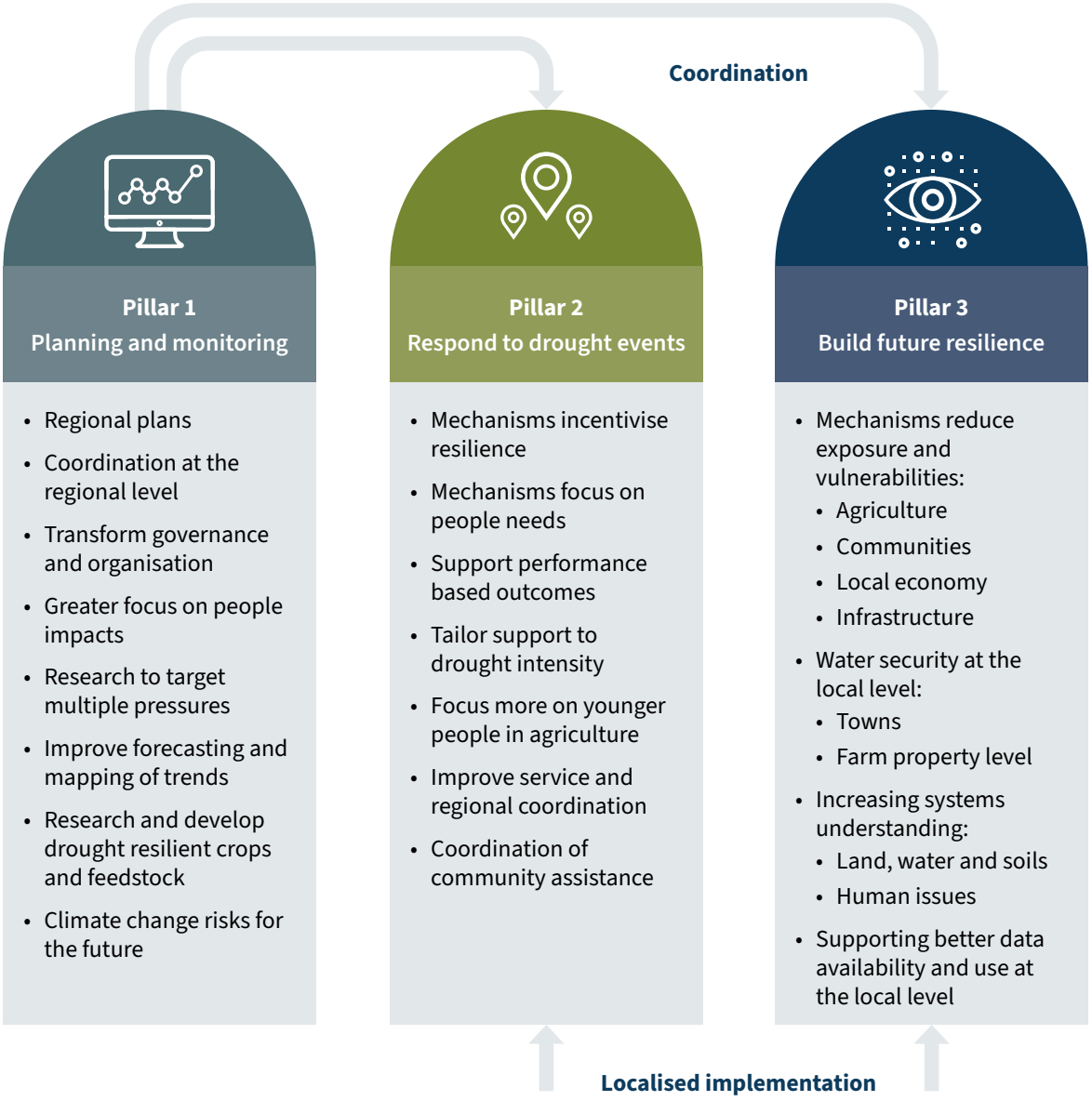
Figure 11: The Drought Resilience, Adaptation and Management Policy (DRAMP) Framework. *Source: Adapted from Crossman, 2018.*



Key priorities

The priorities that have been identified from stakeholders and agencies in the Fitzroy and Capricornia region have been summarised under each pillar to develop a unique Drought Resilience Plan for the regional area that is consistent with national planning frameworks.

Figure 12: Three pillars for the Fitzroy and Capricornia Drought Resilience Plan.



The consultation process identified that while resilience is an important priority for the region, a regional strategy should not only focus on this.

Pillar 1 – Planning and monitoring

Pillar 1 captures the need to improve planning and coordination at the regional level, to help manage and prioritise the complexity of programs that exist in the drought space, and to develop tools and processes to support response and resilience strategies.

Pillar 2 – Respond to drought events

Pillar 2 captures the need to assist people in times of drought. Resilient communities are those that are able to help people in trouble. The focus here is on transforming the current network of programs and mechanisms to better support the needs of the region and to have more structured outcomes.

Pillar 3 – Build future resilience

Pillar 3 captures the need to develop more resilience in the region. Bolstering capacity will help to reduce the pressure on response mechanisms during droughts, as well as helping to adjust to future pressures from climate change.

The Regional Strategy

This Regional Drought Resilience Plan is a locally-led and regionally coordinated plan and actions will be driven from a regional level. It is acknowledged that some actions require involvement of additional stakeholders such as state or federal agencies, regional governance, local stakeholder groups, charities, NRM bodies and community groups. Where this is the case, actions will be driven through local leadership and while stakeholders may work together to deliver the actions, this plan does not commit these additional stakeholders to any responsibility, resourcing or funding.

Regional actions and initiatives

The key actions identified from stakeholders and agencies through the consultation process have been summarised under each pillar and are shown in the following three tables. There is substantial consistency with the programs and priorities of the FDF.

A regional collaborative arrangement of government, industry, education, research, local government and agricultural producers is needed to better plan for and respond to drought risks at a local and regional scale. The regional coordination needs to focus on the full spectrum of needs, including:

1. Early warning and preparatory decision-making (downscaling large data systems to sub-regional and local levels).
2. Decision platform development and capacity development at regional and local levels.
3. Better planning and coordination of service delivery, particularly to address impacts on people.
4. Develop governance and organisational capacity at the regional level
5. Coordinate forecasting about changing intensity and frequency of droughts in future, concentrating on downscaling forecasts of climate change to sub-regional levels.

Current mechanisms of drought support tend to be short-term responses to critical events, and do not necessarily build resilience, or perversely, can discourage it.

There needs to be more focus to addressing impacts on people rather than businesses, and a more seamless coordination of services at a local and regional level when a drought occurs.

Managing drought impacts needs to take more consideration of drought intensity and the impact of time lags. There needs to be objective measures and mapping of drought at various levels of impact so that responses can be calibrated.

Support programs for agriculture should recognise those that have previously invested in effective drought resilience measures, build on their success and encourage their involvement with others as peers. There may be need for extra support for younger producers who may not have had enough time to become financially stable or build knowledge about resilient management practices.

There is a plethora of support programs across all levels of government and from NGO and assistance organisations. Better ways of prioritising and coordinating this support needs to be developed.

New mechanisms are needed to incentivise resilience over time. As capacity for resilience takes time incentives may need to be offered during non-drought periods when stress is lower and disposable cash and/or finance available.

Future research on drought resilience should recognise that vulnerabilities to severe drought are exacerbated by the culmination of various pressures on the landscape, such as climate change, poor land management, prevalence of mono-culture grasses, pests and disease, land degradation and drying of catchments.

Table 1: Priorities and actions for Pillar 1 – Planning and monitoring

Pillar 1 – Planning and monitoring

Priority	Purpose	Action
Regional Plans	Create a shared understanding within the region of priorities, actions and responsibilities, which are a basis for future government funding.	Needs hosting and ongoing development within the region. Requires consultation to establish a regional partnership. Governance mechanism needed to enable actions to be implemented through local frameworks.
Greater focus on people impacts	Reduce impacts of drought on people (including in agriculture) rather than focus on supporting agribusinesses.	Engage in the region to generate recommendations for change. Develop community, social, welfare and business systems to help people get through drought.
Regional Coordination	Improve planning and coordination for services from regional agencies in droughts.	A whole-of-region approach and collaborations to be developed for the Fitzroy and Capricornia region.
Transform governance and organisation	Develop processes at regional level for State-Federal resources to match the implementation of the regional plan and local actions.	Facilitate a process to establish a new partnership for managing drought in the region. Establish a host for ongoing management of plan. Recommend policy settings updated to enable pragmatic coordination at the regional and local levels.
Research to target multiple pressures	Identify complex linkages and outcomes of multiple pressures of droughts, both in agricultural systems and in communities where there are varying impacts on people.	Analyse what patterns of multiple pressures have emerged in the region in previous droughts. Use results to provide more systematic understanding for agribusiness managers and services providers about how to respond to drought conditions.
Improve mapping and forecasting of drought	Improve mapping and forecasting of droughts at finer scales to improve knowledge flows into businesses and service providers.	Increase use of objective measures of drought intensity within the region, to enable forecasting implications at landscape level suited to adapting pragmatic resilience building measures. Run information and training services to improve understanding and adoption of new tools.
Better data availability at the local level	Improve take up and use of drought and weather forecasting data.	Improve interface between data hosts and businesses, and champion adoption of data in local business management. Enable better access of editable and multi-use data at the local level.
Climate change risks for future	Coordinate forecasting about changing intensity and frequency of droughts in future.	Update regional plans and processes to manage drought as climate risks increase.

Table 2: Priorities and actions for Pillar 2 – Respond to drought events

Pillar 2 – Respond to drought events

Priority	Resilience activity	Priority action
Trigger points for program needs	Help people from all sectors to cope with the impacts during a drought, including agriculture. Identify trigger points where help needs to be ramped up and coordinated.	Conduct a regional review process to: (a) establish clear trigger points for increased support as drought intensifies, (b) review and improve current drought policies for the region, (c) streamline policies and programs to access support.
Support better management outcomes in agriculture	Focus support programs on agricultural managers with better management practices to better incentivise resilience or trigger management changes towards resilience.	Support Drought Hubs and agencies to (a) identify criteria for support programs and better management practices (b) revise drought aid so it is applied in ways that stimulate resilience (c) improve financial and analysis skills of people in agriculture.
Tailor support to drought intensity	Change drought categorisation to four levels of intensity and scale level of support to each intensity level.	Conduct a regional review process to reach regional stakeholder agreement on objective classification of drought; develop plans to tailor support to each level of drought intensity; identify responsibilities to coordinate this support.
Focus more on younger people in agriculture	Make allowances for younger and new producers who may not have had the time to become financially stable or build knowledge to institute resilient management practices.	Tailor program criteria to support younger producers who have trouble coping in a drought situation.
Improve service and regional coordination	Identify how health, community, education and other services can be efficiently delivered during drought times.	Review service availability relevant to drought across the region, particularly mental health and community support programs. Identify how these can be better targeted as drought intensifies. Map and improve coordination of government services in the region.
Improve coordination of community assistance	Find better ways of targeting and integrating support from NGOs, NFPs and assistance organisations during droughts.	Develop mechanisms that identify and predict drought needs of people and communities, as well as systems to better coordinate and target community and NGO assistance to make it effective, such as a needs register for the regional area.

Table 3: Priorities and actions for Pillar 3 – Build future resilience

Pillar 3 – Build future resilience

Priority	Purpose	Action
Mechanisms to support drought resilience: Agriculture	Encourage agricultural enterprises to plan ahead and develop systems and skills to become more self-reliant during drought.	Review and improve current drought policies; find mechanisms to improve adoption of planning and adaption programs; improve financial and property management. Generate a shared vision with agricultural stakeholders in the region about the priorities for mechanisms. Improve land and water management to improve farming landscape functions.
Mechanisms to support drought resilience: Communities	Develop systems that provide services and make communities more self-reliant ahead of drought.	Review (heat-map) availability of services that become essential during droughts, particularly mental health and community support programs (e.g. CWA). Ensure that these are in place and strategies exist to ramp up service provision as needed.
Mechanisms to support drought resilience: Local economy	Identify the likely impacts of drought on rural and regional economies and identify strategies to ameliorate effects.	Identify potential economic impacts at the LGA/community level; identify mechanisms that may ameliorate impacts (e.g. offsetting infrastructure spending); develop plans to coordinate this support.
Mechanisms to support drought resilience: Infrastructure	Provide supplies and improve water security for industry. Identify and plan for necessary public infrastructure (e.g. communications, transport, urban water systems).	Review priorities for water supplies and infrastructure in the Fitzroy basin and increase the speed of developments that meet required business case and approvals. Develop public infrastructure to support response programs (Communications, transport) and local communities (e.g. water supply, parks, environmental assets).
Improve water security: Agriculture	Review and plan for opportunities to improve water supplies in agriculture through a mix of improved efficiencies, changed system management and priorities, on-farm waters and new water infrastructure.	Develop systems to rehydrate landscapes on-farm and improve water retention and landscape function, so as to reverse the drying of catchments. Review the suitability of current drought programs to build resilience in agricultural enterprises in the region, including farm water management.
Improve water security: Townships	Improve planning and water supplies for smaller townships that experience water stress in droughts.	Identify communities most in need across the six LGAs; fund new mechanisms to provide or augment water supplies.

Priority	Purpose	Action
Increasing systems understanding: Agriculture	Develop better understanding of natural and agricultural systems to underpin planning for resilience, particularly as risks of climate change intensify.	Develop mechanisms that align current information and science on better management practices in agriculture with planning for drought management. Work with DCAP and Drought Fund programs (particularly Drought Hubs) to provide more targeted support to landholders.
Increasing systems understanding: Communities	Map the complexity of impacts of drought on people and their needs to identify likely requirements over time.	Map the needs for people and community support during drought times at the Fitzroy Capricornia and LGA levels.

Communications strategy and community engagement

Theory of change

Historically drought has tended to be viewed as a natural disaster, with reactive management approaches supporting those who are affected. These policies have proven to be inefficient because they create a culture of dependency and provide few incentives for reducing future drought impacts (Crossman 2018).

Policy thinking has evolved to consider drought as a natural event that requires advance preparation to build resilience and reduce vulnerabilities. Resilience is a multifaceted concept involving a range of views that combine resistance in the face of adversity, rebounding and transformation (Dale et al. 2014). The DRAMP Framework outlined in Figure 11 has six cross-cutting goals to reducing the risks and impacts of drought:

- Reduce exposure to drought
- Reduce vulnerability to drought
- Increase resilience to drought risk
- Transformation of systems
- Prepare, respond and recover from drought
- Transfer and share drought risks.

The theory of change adopted for this project is focused on improvements under each of these goals so that stakeholders within the region are better prepared to treat drought as a natural event to be managed.

This program

The co-design approach used for the creation of the plan will continue in the next phase with stakeholders involved in determining the best implementation mechanisms for strategic and more specific local actions.

The focus of engagement will focus on regional planning and local delivery of pragmatic actions and service delivery. The people focus of resilience building will continue with emphasis on delivering capacity to locals and communities affected by drought (producers, small and micro businesses, and sub-regional coordination groups). It is these players that are critical for on-the-ground actions, which can be replicated across the broader region for long term resilience building. Without their sense of ownership driving direction at the grass roots level, sustained and effective implementation can suffer.

Implementation of priority actions of the local and community level may be orchestrated through existing decision-making mechanisms, whether in local government, across business representative groups, economic development entities, sub-regional NRM groups, community agencies or NGOs.

Some priority actions stemming from early warning and planning for drought (e.g. capacity for more granular sources of editable data) will require coordination from the regional level.

What the architecture will be for implementation at the regional level is not yet known. Local Government and the Central Queensland Regional Organisation of Councils, together with government agencies like the Departments of Agriculture and Fisheries and the Department of Regional Development Manufacturing and Water and research institutions such as the Rural Economies Centre of Excellence and Central Queensland University will continue as essential partners.

Determining the best means for coordination and action at this level will be the key outcome for the next phase. Suitable governance mechanisms to address drought as part of disaster resilience is going to be the other key challenge for the implementation of the Plan. Taking local groups and individuals along this journey of governance will present the best options for future implementation.

A comprehensive Communications and Stakeholder Engagement plan will be generated as an initial step in the next stage, together with the formation of a regional reference group of key stakeholders. The key stakeholder groups involved to date will again be targeted for this next phase with a priority to increase the numbers of producers, micro/small businesses, and NGOs from small and remote rural communities.

- Australian, Queensland and Local Government representatives
- Farmers, graziers and producers
- Research Institutions
- Local innovation and entrepreneurial groups (micro-business, agriculture or land management focus)
- Industry collaborators and suppliers
- Rural and Agricultural Service businesses
- Non-government organisations
- Health and wellbeing community groups.

Monitoring, evaluation and learning (MEL)

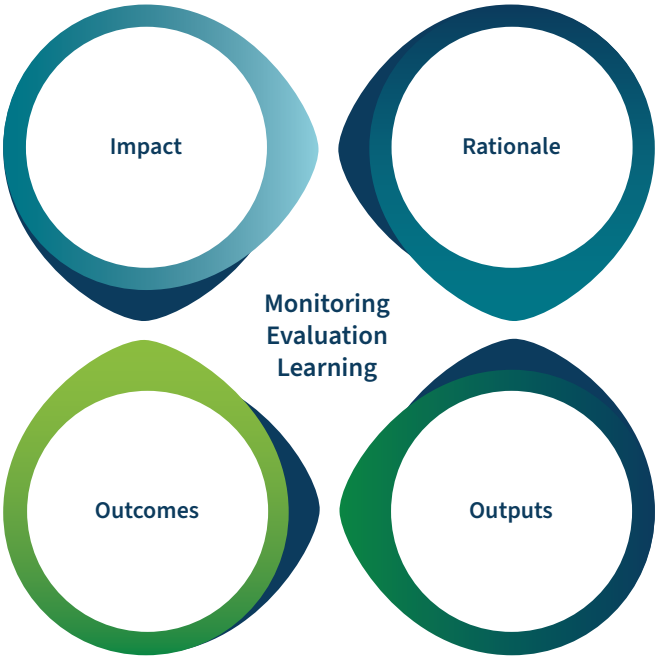
The FDF represents the Australian Government's ongoing commitment to strengthen drought preparedness and resilience. Development and publication of RDR plans (such as this one) aims to identify and guide actions to build the region's resilience to future droughts. The overall benefits of regional planning are aimed to:

- Empower communities to identify the impacts of drought and develop regional drought resilience and response management plans
- Support communities to consider the incremental, transitional and transformational opportunities needed to strengthen drought resilience and encourage innovative initiatives at the regional level
- Facilitate increased community understanding of their resilience to drought, including encouraging communities to share their learnings with each other
- Encourage improved natural resource management capability through planning.

Any planning process, however, requires a strong monitoring, evaluation and learning cycle. For the purposes of this plan, we adopt the framework of FDF for evaluation with a focus on impact, effectiveness, appropriateness and efficiency as shown in the following diagram.

Figure 13: Adapted from Future Drought Fund (FDF) approach to Monitoring, Evaluation and Learning (MEL).

Impact
What signs of progress are there towards long-term drought resilience? What priorities and opportunities do the Fund and programs reveal for drought resilience policy, funding and programs?



Appropriateness
To what extent are the programs aligned with the strategic objectives of the Fund, and targeted at important needs? What can be done to improve the appropriateness of the investments?

Effectiveness
To what extent are programs achieving their intended outcomes (and any unintended outcomes)? What could be done to improve the outcomes of the investments?

Efficiency
To what extent are the Fund and program outputs being administered and delivered efficiently, and to the expected quality? What can be done to improve efficiency of the investments?

Current programs

This plan fits within a broader framework of planning for resilience at the state, regional and local level. The Queensland Reconstruction Authority are currently developing a regional resilience strategy for the Central Queensland region to deal with the impacts of non-drought disasters. All local governments in Central Queensland have local disaster management plans, as does the Rockhampton District Disaster Management Group, which consider similar dimensions of.

Currently three local governments in the region (Central Highlands, Gladstone Regional Council and Rockhampton Regional Council) have Drought Management Plans, although these are only focused on the risks associated with urban supplies from major impoundments. The Banana Shire Council has developed a Guide to Drought Assistance Schemes for its residents as a part of drought planning strategies with the shire.

A number of strategic development and recovery plans within the region will help to support the implementation of this plan, given the consistency of underlying themes important to the region. This includes the Central Queensland Regional Plan from 2013, and a number of strategic plans within each local government area.

MEL data collection methods

Data should be collected at established points in implementation of the RDRP. Types of data may include collaborative planning meetings, ongoing desk top analysis, review of existing data, surveys, interviews and focus groups, and case studies. The data collection process should balance qualitative and quantitative methods to enable deep data capture.

Overall program outcomes

The Fitzroy and Capricornia plan sets the quadruple-bottom line regional outcomes intended from these, including economic, environmental, social and governance outcomes.

Outcomes	Examples
Economic	Reduced economic costs arising from drought.
Environment	Reduced environmental decline emerging from drought.
Social	Increased general community health as a key resilience factor.
Governance	Stronger focus on local and regional governance and coordination processes.

Program logic

The program logic of the RDRP identifies the outcomes from each of the activities in the Plan, based on the theory of change and overall program outcomes.

RDRP Drought Resilience Vision			
Activity	**Delivery Process**	**Outcome**	**Process Indicator Examples**
Improve support mechanisms during droughts to incentivise resilience	→	Increased economic resilience in the agricultural sector.	Assistance packages are transformed from a 'cash' response focus to performance basis, with support for younger producers who have trouble coping in a drought situation.
Tailor support to drought intensity	→	Change drought categorisation to four levels of intensity and scale level of support to intensity level.	Regional agreement on objective classification of drought; plans to tailor support to each level of drought intensity; agreement on responsibilities.
Improve data availability and forecasting at local level	→	Enterprises integrate data and forecasting into production management; community needs for services are predicted and planned.	Improved interface between data hosts and businesses; better modelling of the multiple pressures that drought creates.
Focus on needs of people in communities and agriculture	→	Change focus of support away from agribusinesses to people needs, including those in agriculture.	Potential service needs across regions are mapped by drought intensity, including for mental health and community support.
Improved Regional Governance Capacity	→	Improved region capacity to drive resilience strategies.	Processes and coordination established at regional level, plans scheduling the ramp up of support at tipping points of drought intensity.
Improved water security	→	Improved access to water in drought times for agricultural businesses, small towns and major sectors.	New mechanisms to provide or augment water supplies for small towns, farms and irrigation sector.

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