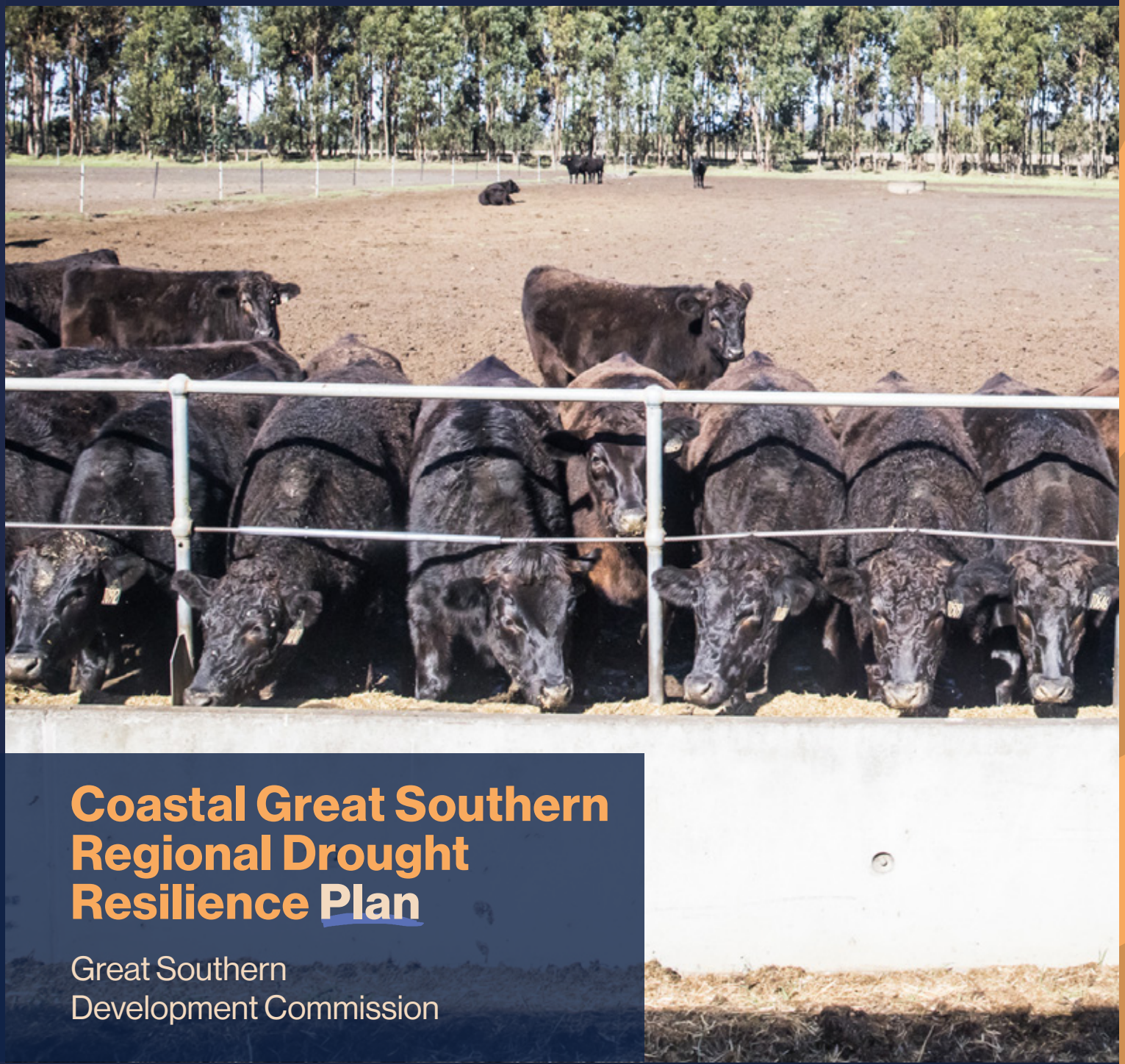
Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

Government of Western Australia
Department of Primary Industries and Regional Development

GREAT SOUTHERN Development Commission



Coastal Great Southern Regional Drought Resilience Plan

Great Southern Development Commission

2025

The Regional Drought Resilience Planning Program is jointly funded through the Australian Government's Future Drought Fund and the WA Department of Primary Industries and Regional Development.

Acknowledgement of Country

Ngala kattidj nidja Noongar moort boodja wer gorah-gorah wer yy-i wer mila. Ngala koort-kwab nidja boodja-k wer kattidj netingar wer bee-dee-eer wer gorah-gorah wer yy-i wer mila.

We acknowledge this is Noongar people's country from long, long ago to now to the future. We are happy to be on this country and acknowledge ancestors and elders from long, long ago to now to the future.

The Board and staff of the Great Southern Development Commission acknowledge the traditional custodians of the lands upon which we operate, the Menang, Kaneang, Goreng, Wudjari and Wilman Noongar peoples. We acknowledge their continuing connection to the lands, waters and sky, and celebrate their almost 50,000 years of life on this land. We pay our respect to elders past, present and emerging.

Disclaimer

This document has been prepared using the best available information and expert analyses to provide an evidence base for the Plan.

All information is provided to the best of our ability, and within the limits of our knowledge and resources. It is anticipated that elements of this Plan will require review and updating, as new information and research becomes available. The implementation approaches identified in this Plan are conceptual and not endorsed by the State of Western Australia.

Cover image: Jenny Feast Photography
Photos: Great Southern Development Commission

Welcome to the Coastal Great Southern Regional Drought Resilience Plan

This Plan is an initiative that has been jointly funded by the Australian Government's Future Drought Fund (FDF) and the WA State Government.

We would like to acknowledge the many community members who contributed to this project.

In particular, we would like to thank our Project Advisory Group (PAG), which included; representatives from the four local government areas that make up the coastal subregion (the City of Albany and Shires of Plantagenet, Denmark and Cranbrook); Wagyl Kaip Southern Noongar Aboriginal Corporation; South Coast Natural Resource Management; and the Department of Primary Industries and Regional Development (DPIRD).

Regional Drought Resilience Planning

Australia is a country with a history of drought. First Nations people have been Caring for Country for thousands of years, preserving natural resources and environmental systems which include semi-arid land and deserts.

> *"A key value of Noongar life is kallip, the amassing and preservation of knowledge about people, their environment and its systems....As a practical knowledge, it informs when various activities such as hunting, fishing and burning should be undertaken. As a spiritual knowledge, it holds the story of bigger natural cycles, such as the annual rain cycles and the longer climatic cycles"*[1]

Producers and regional communities are all too familiar with the significant social, economic and environmental impacts of drought. However, climate change is increasing the frequency and intensity of drought at a rate that exceeds the bounds of historical norms[2].

Current climate forecasts predict that with extreme weather conditions, concurrent climate hazards are likely to compound the overall climate risk for regions [3]. This means that in coming decades the impact of more frequent and intense droughts, and the increased likelihood of other disasters such as extreme heatwaves, severe bushfires, more intense cyclones, flooding and frost events, will present new and emerging challenges for agricultural industries and regional communities.

The Future Drought Fund (FDF) is a long term $5 billion investment by the Australian Government to build drought resilience in Australia's agricultural sector, landscapes and communities.

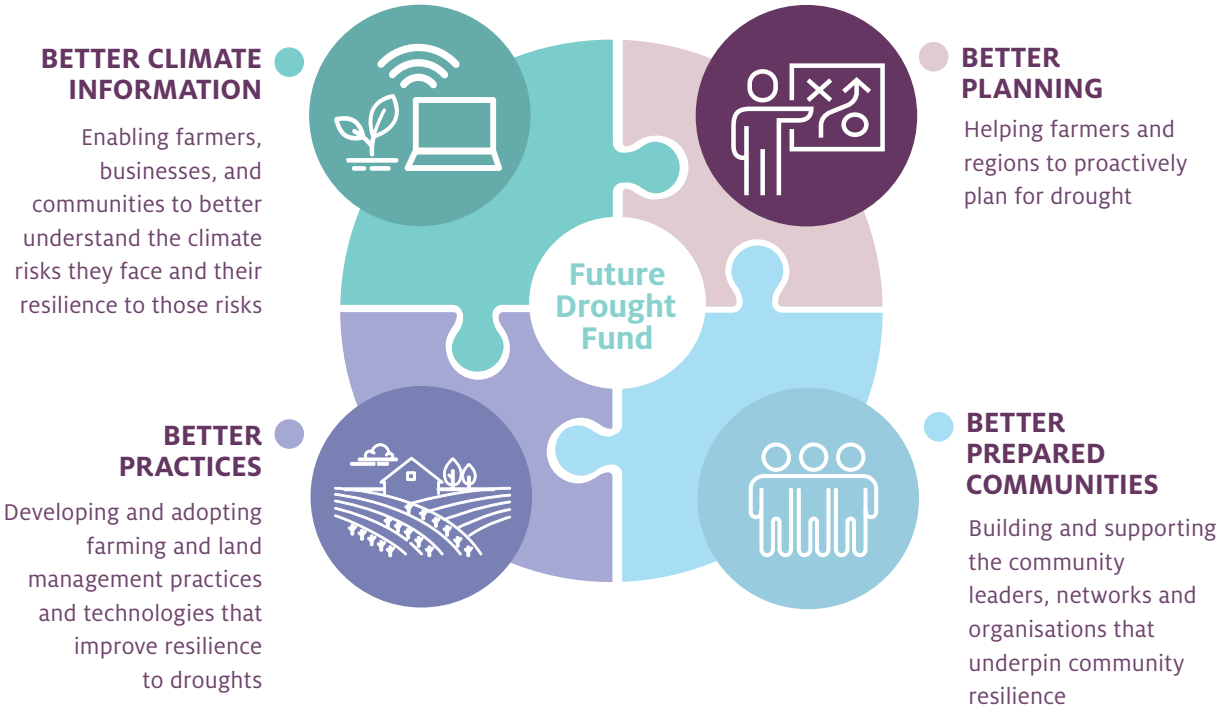


Figure 1. Future Drought Fund Investment Themes

1 Robertson et al., *Nyoongar Boodja Koomba Bardip Kooratan Nyoongar Land – Long Story Short* (Batchelor, Australia: Batchelor Press, 2017) cited in Noongar land Enterprise Group, Valuing Noongar People and Practices in Drought Resilience (Subiaco, Australia: 2022), 22.
2 Naughtin et al., *Our Future World: Global megatrends impacting the way we live over coming decades* (Brisbane, Australia: CSIRO, 2022), 9.
3 Naughtin et al., *Our Future World*, 9

The Regional Drought Resilience Planning Program (the RDRP Program) sits under the FDF Investment Theme 'Better Planning'. It involves funding the development of Regional Drought Resilience (RDR) Plans, to prepare for and manage, future drought risks.

The RDR Plans:

- are community-owned and led, involving local governments, regional organisations, the agricultural sector and local Drought Hubs;
- identify actions to prepare for future droughts based on evidence;
- build on existing planning; and
- draw out regional needs and priorities to inform future investment.

They support regional communities to:

- build their economic, environmental and social resilience to future droughts;
- be in a stronger position to adapt to climate change;
- form stronger connections and networks within and beyond regions; and
- apply best practice data and information to make better decisions.

This Coastal Great Southern RDR Plan has been developed by the Great Southern Development Commission (GSDC) under the RDRP Program. It is the second RDR Plan to be delivered in the Great Southern region.

The Inland Great Southern Regional Drought Resilience Plan was released in late 2023, and involved the GSDC partnering with DPIRD to support delivery across the inland Shires of Jerramungup, Kent, Gnowangerup, Katanning, Kojonup, Cranbrook, Woodanilling and Broomehill-Tambellup.

The GSDC has again partnered with DPIRD to support delivery across the coastal subregion.

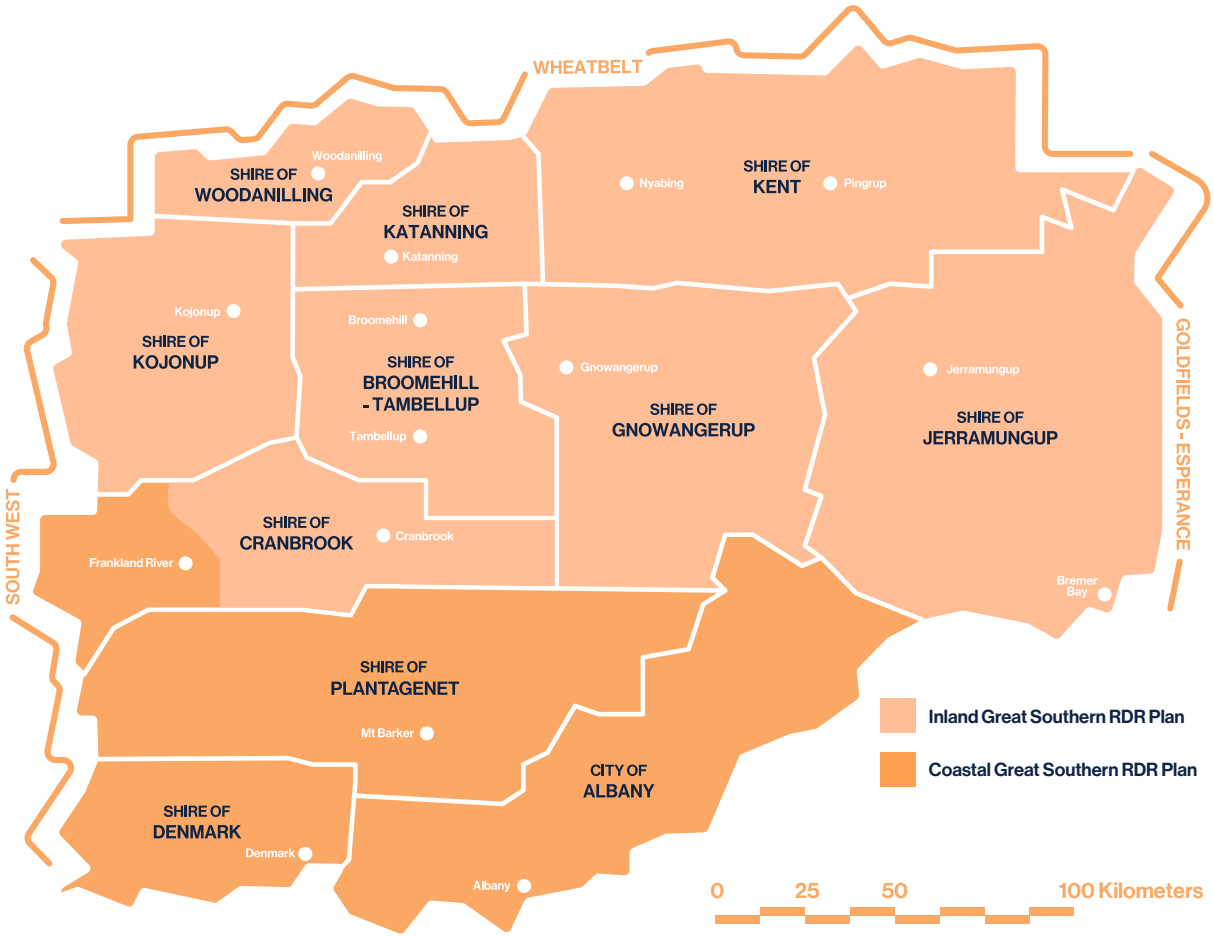


Figure 2. Regional Drought Resilience Planning for the Great Southern

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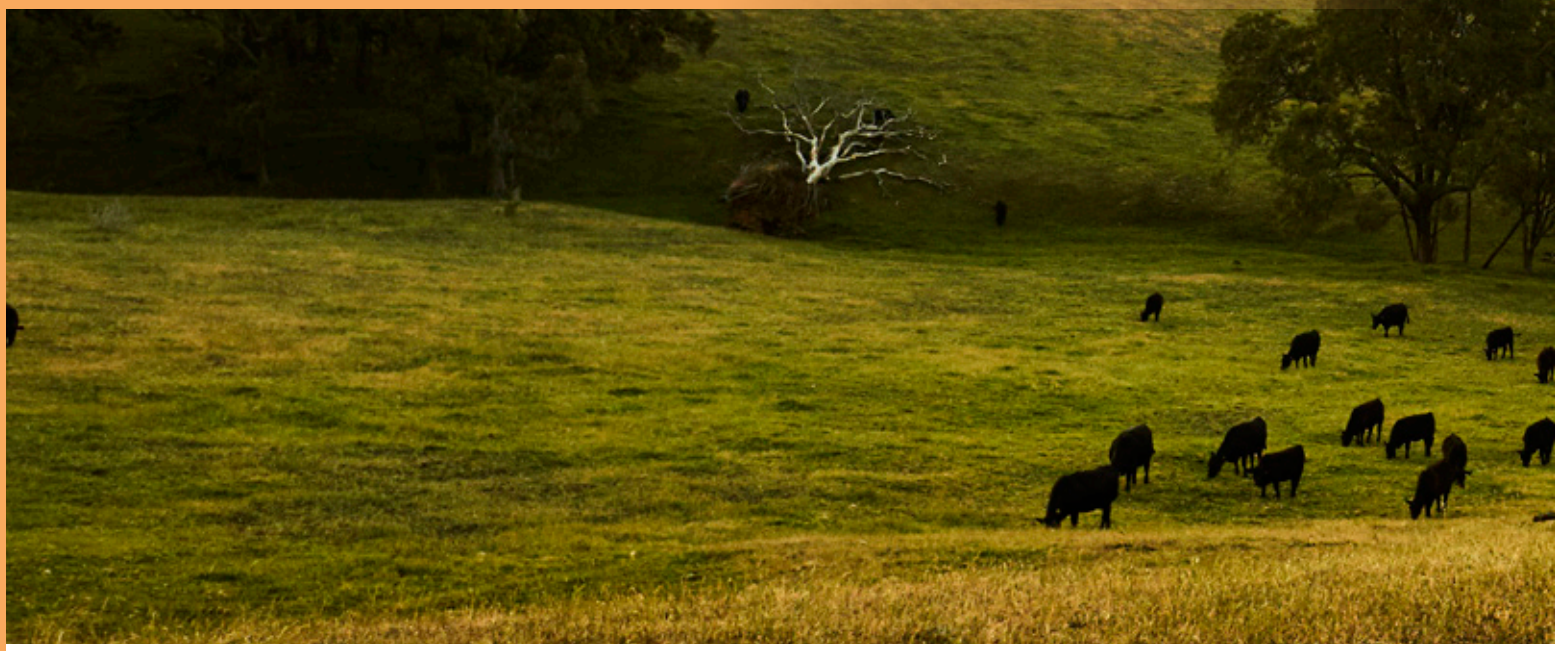


CEO Foreword

Agriculture is part of the social and economic fabric of the Great Southern region. The sector brings jobs to our communities and attracts investment, trade, and diversification opportunities that contribute to the economic prosperity of the region.

The GSDC is one of nine Regional Development Commissions working to coordinate and promote economic development in regional WA. The GSDC recognises the value of agriculture to our region and is committed to building drought resilience to prepare this key sector as we adapt to a changing climate.

This Plan reflects the uniqueness of the coastal areas of the Great Southern region, its landscapes, biodiversity, climate, agricultural industries, and production methods, which are diverse and distinct from hotter and drier inland areas of the region.

Within the Plan, changing rainfall patterns and pressure on water resources emerge as key challenges for the coastal subregion, posing a threat to biodiversity and the natural systems that sustain world-class vineyards and premium fresh produce. Local experiences of “green drought” emerge. Visually the landscape appears green, however groundcover is scarce with reduced soil moisture. This has implications for livestock and growing seasons.

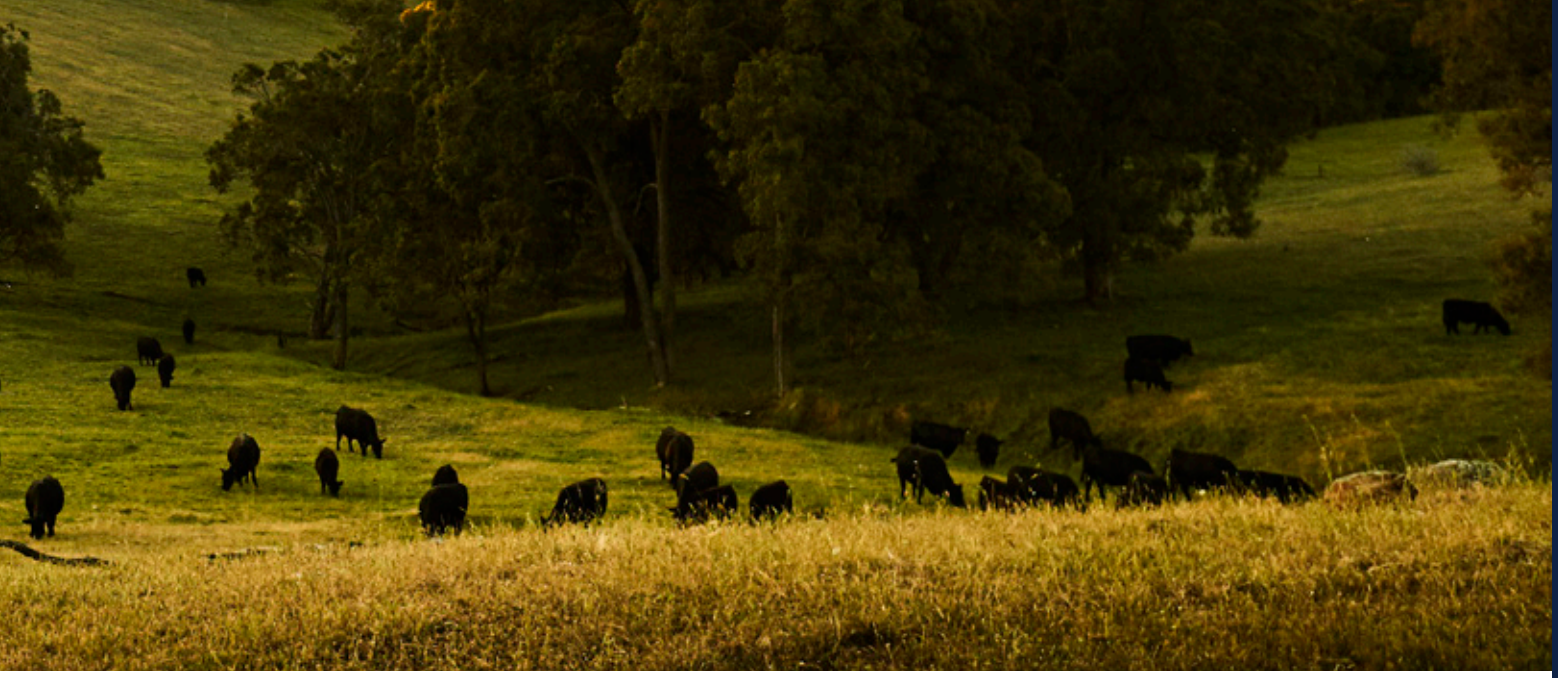
The high proportion of smaller landholders and farming enterprises in the coastal subregion also comes into focus, posing challenges and opportunities that differ to those faced by larger-scale agricultural operations.

The Drought Vulnerability Assessment (DVA) which forms the evidence base for the Plan, draws on the experiences and insights of local communities, and scientific research and climate data. The result is a best practice, proactive roadmap for focussing our efforts on building drought resilience.

This Plan has been a collective, community-led effort, and I would like to acknowledge the stakeholders who generously gave their time to this project, particularly the invaluable guidance of the PAG.

It has been a privilege to work alongside the community to develop a plan for building drought resilience in the coastal subregion, and the GSDC looks forward to continuing to be a part of this important work.

Natasha Monks
Chief Executive Officer
Great Southern Development Commission



Executive Summary

The coastal Great Southern area, referred to in this Plan as the coastal subregion, is defined as the three Great Southern Local Government Areas (LGAs) of the City of Albany and the Shires of Denmark and Plantagenet, as well as the Frankland River region in the Shire of Cranbrook. The localities share a similar climate, growing seasons and agricultural profile, bringing together producers and communities that are likely to have shared experiences of drought.

At first glance it is perhaps surprising that our coastal subregion – which enjoys a cooler, more temperate climate in comparison to drier and hotter inland areas – should have a need for a drought resilience plan.

The coastal subregion is part of a globally recognised biodiversity hotspot, with pristine waterways, fertile soils and reliable rainfall. This is echoed in the traditional Menang name for boodja in Albany – 'Kinjarling' meaning 'place of plenty' and often interpreted as a place of plentiful rain.

The coastal subregion's environmental systems underpin a thriving agricultural sector with an international reputation for premium wines, seafood, horticulture and livestock production.

Yet despite historically reliable rainfall, the coastal subregion, as is the case across regional Australia, is becoming increasingly vulnerable to the environmental, social and economic impacts of a drying climate.

> *"The 2024 summer produced large areas of dying bushland which we are noticing everywhere along the coast, which increases the fire risk and reduces habitat"*
> *- Stakeholder survey response*

This vulnerability comes into focus across all aspects of this Plan – the regional context analysis, infrastructure audit, climatic data and lived experiences captured during stakeholder consultation.

This evidence base culminates in a DVA which indicates that across the coastal subregion, annual rainfall is decreasing, rainfall patterns are changing, temperatures are rising, and soils are drying. This presents new and unprecedented challenges for agriculture and ecosystem sustainability. Importantly, the Plan also recognises that the impacts of drier seasons and drought stretch far beyond the agricultural sector, bringing uncertainty and strain to local communities and the broader economy.

The Plan is structured around five interrelated themes:

The DVA applies a triple bottom line approach across the five themes, drawing on environmental, social and economic factors sourced from data, technical reports and stakeholder engagement to provide an assessment of the drought vulnerability and adaptive capacity of the region.

The DVA highlights opportunities to leverage the strengths of the coastal subregion. For example, the coastal subregion has larger populations and more diverse economies than inland areas, offering some protective factors against drought, and presenting opportunities for diversification, value-add and new industries, particularly in the context of globalisation and trends in food production and increased demand for food provenance.

Conversely, the agricultural sector includes a high proportion of smaller landholders and farming enterprises with lower turnover, which is often supplemented by off-farm income. These smaller operators tend to be more vulnerable to the economic shocks of a dry season and have less resources to invest in planning and infrastructure to build drought resilience.

"Speaking on behalf of the ~65-80ha farmers in our area and southern WA; we might be small farmers but combined we have a significant input into the WA fresh meat supply. These size farms should be ideal to provide for one person/man and his family. We rely on off-farm income, the years/challenges are getting harder to bounce back. The future of the generational farmer is at risk and the average person will not be able to buy in"
– Cheesemaker, Denmark

Infrastructure has a major influence on the capacity of a regional economy to grow, remain resilient and leverage opportunities. An infrastructure audit conducted as a part of this Plan mapped transport links, including road, air, rail and sea, energy and communication networks, and considered water demand and supply.

The audit highlights that investment in water infrastructure and management in the coastal subregion is particularly critical. With existing use of groundwater and surface water sources already at sustainable limits, there are insufficient water resources available to support the projected growth of agriculture. This adds to the evidence base for the DVA.

"I run a small intense operation - we've never had as much water catchment as we have now, but I still need to cart water"
– Producer, Pork and Eggs, Albany & Frankland River

From the evidence base, the DVA develops a drought vulnerability index to assess drought vulnerability across each LGA and makes recommendations to build drought resilience. These recommendations form the basis of an Action Plan for building drought resilience.

The Action Plan has seven focus areas:

1. Water Infrastructure and Management
2. Climate Monitoring and Forecasting
3. Soils and Sustainable Agricultural Practices
4. Community Engagement and Support
5. Risk Management and Adaptive Capacity
6. Research and Innovation
7. Environmental Conservation

These focus areas align with the five drought resilience themes and will guide the development of priority projects for building drought resilience during the next phase of the project.

Strong community participation in the development of this Plan shows that there is clearly a collective will and drive to put the Plan into action. This community support, coupled with a strong evidence base, means that the coastal subregion is now well placed to respond to future drought risks and access opportunities to build drought resilience.

Key Definitions

Adaptive capacity	The internal features and characteristics of a region that influence its ability to respond effectively to and withstand past and future droughts.
Agriculture	The growing and cultivation of horticultural and other crops and the controlled breeding, raising or farming of animals (excluding aquaculture) and allied industries (e.g. related supply chains).
Coastal Great Southern Region (Coastal Subregion)	The City of Albany and the Shires of Denmark and Plantagenet, as well as the Frankland River region in the Shire of Cranbrook.
Drought	The PAG defined drought as a prolonged period of abnormally dry conditions that impact negatively on water availability and diverse agricultural production in a region and consequently impacts negatively on the economy and environment of the region and the health and wellbeing of its residents.
Drought Impact	The degree of exposure to drought in a region and its inherent sensitivity to drought conditions.
Drought Exposure	The extent to which a given system, community or region will be subjected to a particular hazard. It is measured in terms of the extent to which a focus region will be exposed to drought and drought-related climate change processes such as increasing atmospheric temperatures and changes in rainfall patterns and soil moisture.
Drought Resilience	The capacity of a system to absorb a disturbance and reorganise so as to keep functioning in the same kind of way. Rather than just 'bouncing back,' resilience is all about changing and adapting to circumstances, rather than having them change you.
Drought Sensitivity	The extent to which a given system, community or region will be affected by drought. It is measured in terms of the effect of drought on crops and animal production, and the influence of regional characteristics such as soil types and farming systems on the effect that a drought has in the region.
Priority Agricultural Land	Defined in State Planning Policy 2.5 as "Land of State, regional or local significance for food production purposes due to its comparative advantage in terms of soils, climate, water (rain or irrigation) and access to services".

Key Acronyms

CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture Fisheries and Forestry (Commonwealth)
DPIRD	Department of Primary Industries and Regional Development (WA)
DVA	Drought Vulnerability Assessment
FDF	Future Drought Fund (Commonwealth)
GSDC	Great Southern Development Commission (WA)
LGA	Local Government Area
MELP	Monitoring, Evaluation and Learning Plan
MERP	Monitoring, Evaluation and Reporting Plan
NRM	Natural Resource Management
PAG	Project Advisory Group
RDRP	Regional Drought Resilience Plan/Planning
RDR	Regional Drought Resilience
SWIS	South West Interconnected System
TEK	Traditional Ecological Knowledge

Using this Plan

This Plan is the first step towards identifying and communicating the coastal subregion's drought resilience needs and priorities. We now have an important part to play in realising its vision.

We encourage our communities and local organisations, including all levels of government, to use this Plan to:

- increase understanding of the region's drought resilience needs;
- build a knowledge base around region-specific drought vulnerabilities;
- inform future drought resilience priorities;
- collaborate for shared outcomes; and
- support investment opportunities.

The Action Plan section of this document sets out the coastal subregion's focus areas for building drought resilience. It is the result of the Drought Vulnerability Assessment (DVA) and comprehensive stakeholder engagement and consultation.

These focus areas will guide future implementation.

The Plan

This Plan provides a proactive roadmap for building drought preparedness and resilience in the coastal subregion. The three key elements are:

- Regional Context
- Drought Vulnerability Assessment (DVA)
- Building Drought Resilience Action Plan

The regional context provides a snapshot of the coastal subregion's social, economic and environmental characteristics, and explores the potential impacts of global megatrends, including climate change. It includes the findings of an infrastructure audit, which helps build a picture of the subregion's current and future capacity to adapt to a drying climate.

The DVA is the evidence base that draws together insights from the regional context and technical reports, with the lived experiences of local people and organisations.

The recommendations from the DVA form the basis of the Building Drought Resilience Action Plan which puts forward focus areas and implementation approaches to address the needs and priorities of the coastal subregion. These focus areas will be used to further develop and prioritise projects.

This approach ensures that the subregion has flexibility around the selection of specific priorities and projects; recognising that future climate and drought uncertainty is the lens through which communities will need to build drought resilience.

Project Governance

Our governance framework aligns with the parameters set by the Department of Agriculture Fisheries and Forestry (DAFF); the agency responsible for delivery of the Future Drought Fund (FDF).

DPIRD played a vital role in this framework, by providing key support and oversight of the Plan's development and execution.

Locally, the GSDC led and delivered all stakeholder engagement, managed project reporting requirements, and established the local Project Advisory Group (PAG).

Chaired by the GSDC, the PAG included representatives from the local government authorities, and other stakeholders selected for their subject matter knowledge and expertise.

Member organisations were:

- City of Albany;
- Shire of Denmark;
- Shire of Plantagenet;
- Shire of Cranbrook;
- South Coast Natural Resource Management;
- Wagyl Kaip Southern Noongar Aboriginal Corporation; and
- DPIRD.

The PAG met frequently throughout the project, working together collaboratively to reach consensus on decisions. The PAG was instrumental in the development of the context, definitions and critical assumptions for the project. As development of the Plan progressed, the PAG was a valuable resource for ground-truthing data and assumptions.

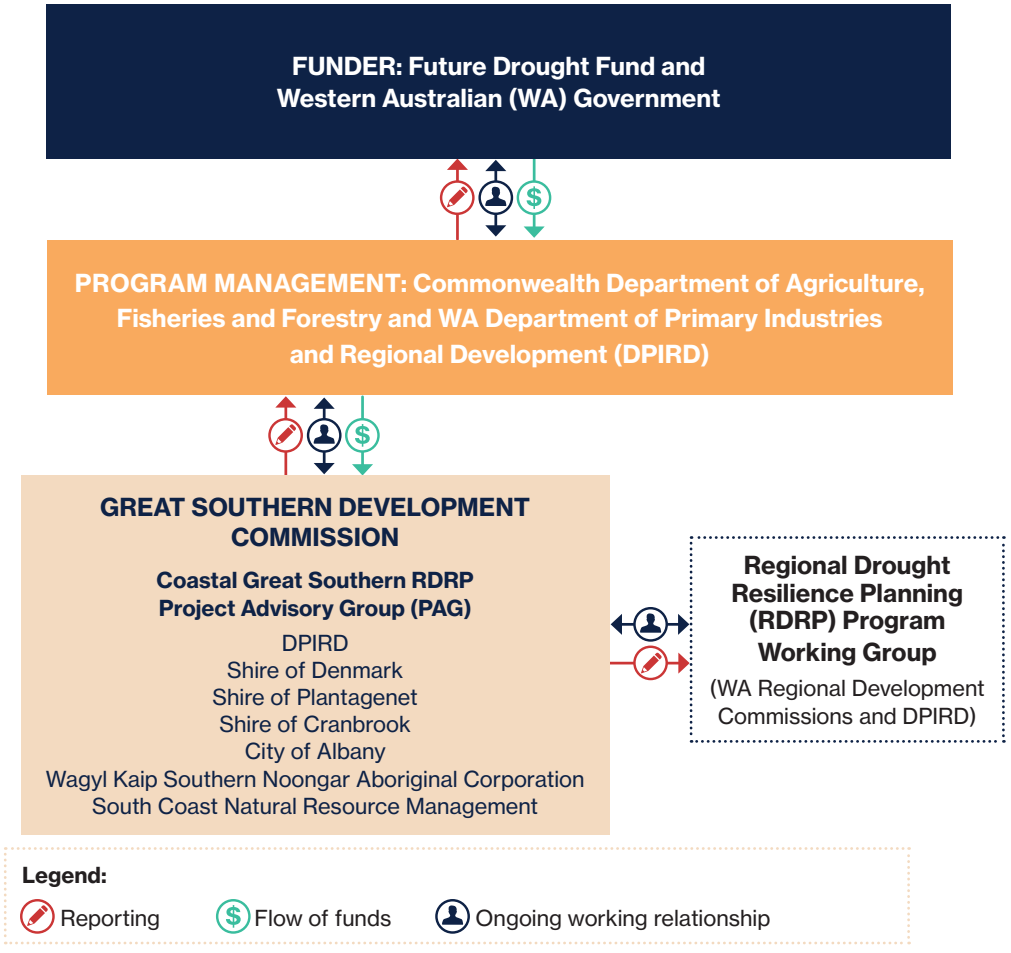


Figure 3. Governance Structure

The Coastal Subregion

The coastal subregion – which forms the project boundary area for this Plan – is defined as the City of Albany and the Shires of Denmark and Plantagenet, as well as the Frankland River region in the Shire of Cranbrook.

Early engagement with the PAG helped to set the parameters for this Plan. A key part of this was the inclusion of the Frankland River region (which sits in the inland Shire of Cranbrook) within the coastal subregion boundary, recognising the synergies between Frankland River and coastal agricultural areas in terms of land use (viticulture and intensive livestock production) and rainfall zones.

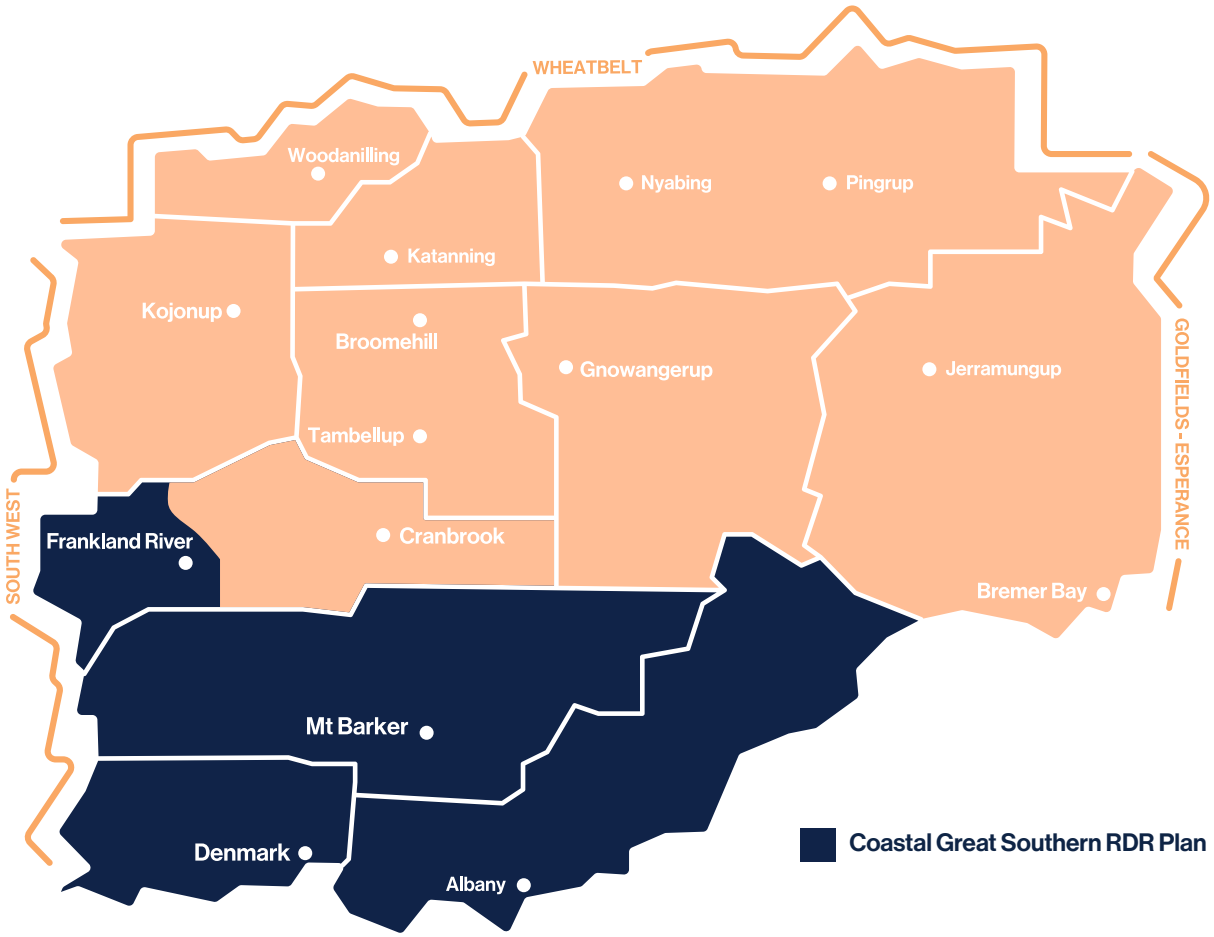


Figure 4. Coastal subregion for Regional Drought Resilience Planning

Vision, Themes and Outcomes

Our vision reflects a strong desire to build robust and adaptable communities that are capable of thriving despite the social, environmental and economic challenges posed by drought:

To continually improve our ability to adapt to the impacts of drier seasons and climate variability within our region's environment, communities, and economy.

The Plan's conceptual framework aligns with the strategic priorities of the FDF, and the key themes developed for the Inland Great Southern RDR Plan. These key themes are:

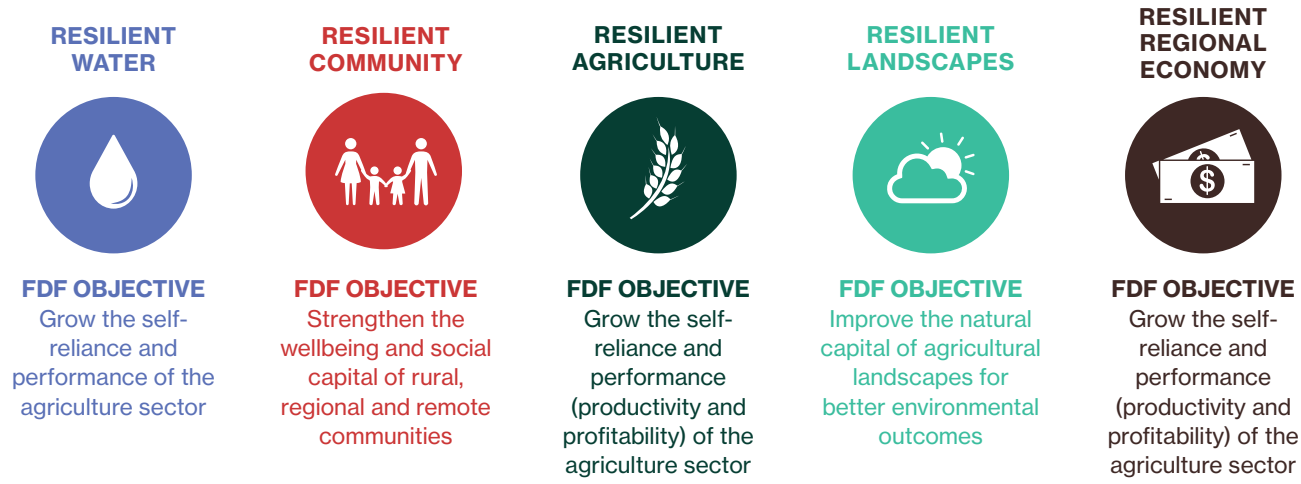


Figure 5: Coastal Great Southern drought resilience themes

Figure 6: Coastal Great Southern drought resilient themes and outcomes

Definitions

Defining Drought[4]

Drought is one of the many climate risks that farmers face, including heavy rain, floods, and extreme weather. It differs from other climatic risks because it can affect many farms at once and lasts longer with an uncertain end date.[5] The prolonged nature of drought results in a multitude of ongoing effects, including disruption to cropping programs and reduction of breeding stock, which jeopardises the profitability and long-term viability of farm operations.

Drought contributes to economic downturns and causes serious environmental degradation such as vegetation loss, soil erosion, and water contamination. The frequency of bushfires, dust storms and frost events tends to increase.

The toll on regional communities' physical and mental wellbeing is significant, which can impact the ability to make decisions and community engagement. For Noongar people, drought is one of several linked factors that have damaged the foundation of Noongar identity and well-being; that foundation being a healthy, natural environment. That foundation being a healthy natural environment.[6] Rural businesses and communities can experience a decline in vitality and viability because of prolonged drought conditions. Recovery from the effects of drought can be challenging due to its enduring consequences, making it difficult for both farming businesses and government agencies to identify triggers for assistance.

The challenge with drought lies in its unpredictability; we don't know when it starts or ends, it often evolves slowly, and measuring or quantifying the impact is difficult until after the event. It can be highly localised or widespread and the impact can be very farm specific.

It is further complicated because the outcome for some can be positive, with higher prices for produce like hay and grain improving profits and allowing for increased investment into their business. Others can have low yields, increased costs for feeding livestock due to the high prices, and long-term effect on productivity due to financial losses.

In the Inland Great Southern RDR Plan, drought was defined as 'Consecutive dry seasons where there is inadequate growing season rainfall over two or more seasons'[7] . However, drought in the coastal subregion is different, with more reliance on summer rainfall and livestock-dominant farming systems using perennial pastures.

The PAG defined drought for the coastal subregion as follows:

"Drought: A prolonged period of abnormally dry conditions that impact negatively on water availability and diverse agricultural production in a region, and consequently impacts negatively on the economy and environment of the region and the health and wellbeing of its residents "

There was extensive discussion around the definition of drought within community surveys and stakeholder workshops. For example, stakeholders defined drought as:

'Unpredictable, local, below average rainfall over multiple seasons causing financial, social and environmental hardship on a region'

'Dry season, a period of dry conditions, seasonal or multi-year within a drying climate scenario'.

4 The full set of references for this section, which informed the definition used in the DVA and this Plan can be found in the DVA Report on the GSDC website www.gsdc.wa.gov.au

5 Department of Primary Industries and Regional Development, 'The evolution of drought policy in Western Australia', Climate, land and water (2018) https://www.agric.wa.gov.au/drought-and-dry-seasons/evolution-drought-policy-western-australia?nopaging=1

6 South Coast NRM, Keogh Bay and the Gillamii Centre (2022). 'Great Southern (Inland) Regional Drought Resilience Plan report on Aboriginal Community Consultations'. Unpublished.

7 GSDC (2023) Inland Great Southern Drought Resilience Plan. Great Southern Development Commission

"Many, many years of farming has led to varying experiences of drought. We are required to constantly adapt our farming practices to respond. 2024 was one of the worst with many factors contributing and we are feeling the reality of previous years...we call it a green drought. We just don't have enough of everything" – Cheesemaker, Denmark

Defining Resilience

The DAFF defines resilience as the capacity to anticipate and minimise environmental, financial, and social impacts through adaptive strategies[8]. Resilience in agricultural systems is defined in terms of the ability to absorb shocks, avoid irreversible changes, and recover from disturbances. It encompasses environmental, social, and economic dimensions, with a focus on adaptation, learning, and self-organisation [9].

The PAG defined drought resilience as follows:

Resilience: The capacity of a system to absorb a disturbance and reorganise so as to keep functioning in the same kind of way. Rather than just 'bouncing back,' resilience is all about changing and adapting to circumstances, rather than having them change you[10]

It is acknowledged that resilience is often difficult to measure precisely but can be assessed by a system's ability to change, self-organise, and learn[11]. Some key factors influencing resilience of regional communities include pre-existing financial viability, risk management and decision making, well-being, and generational change and the role of women in agriculture. These factors align with the broader concept of resilience as the capacity to resist, adapt, and recover while maintaining essential functions [12].

Defining Agriculture

Agriculture refers to both the growing and cultivation of horticultural and other crops, and the controlled breeding, raising or farming of animals (excluding aquaculture) and allied industries (e.g. related supply chains)

Early engagement with the PAG also shaped the definition of 'agriculture', which reflects the key subregional industries of broadacre farming, horticulture, viticulture, meat/poultry, dairy, forestry and specialty products (honey, eggs, flour).

Aquaculture is not included within the definition of agriculture for the purposes of this Plan, and therefore, actions specific to this sector are not captured. However, recognising the economic significance of aquaculture to the region, its contributions are accounted for as part of the broader regional economic analysis. This ensures that while aquaculture-specific interventions may fall outside the scope of this Plan, its role in the regional economy is still acknowledged and considered in strategic planning.

8 Department of Agriculture, Fisheries and Forestry, *National Agriculture and Climate Change Action Plan 2006-2009*. (Canberra: Department of Agriculture, Fisheries and Forestry, 2006).
9 Resilience Alliance, 2009.
10 This definition was agreed and documented at the PAG Meeting of 22 April 2024, citing 'Walker' as the basis for the definition. See Walker B., 'Resilience: what it is and is not', Journal of Ecology and Society, 25/2 (2020).
11 Cabell, J. F., & Oelofse, M. 'An indicator framework for assessing agroecosystem resilience', *Ecology and Society*, 17(1). https://doi.org/10.5751/ES-04666-170118
12 Greenhill et al., *The resilience and mental health and wellbeing on farm families experiencing climate variation in South Australia: Final Report* (Adelaide: Flinders University 2009).

Strategic Alignment

This Plan is consistent with the National Framework for Drought Policy (National Drought Agreement) and the Australian Government Drought Response, Resilience and Preparedness Plan. It also aligns with a number of key national, state, regional and local plans, strategies and policies, including:

Nationally:

- Australian Government Drought Resilience Funding Plan 2024-2028
- South-West WA Drought Resilience Adoption and Innovation Hub
- National Soil Action Plan 2023-2028
- Bush Heritage Australia Strategy 2030

At a State level:

- WA Climate Adaption Strategy 2023
- WA Climate Policy 2020
- Diversity WA (2024 update)
- Department of Water and Environmental Regulation Strategic Plan 2022-2026
- DPIRD Strategic Intent 2022-2026
- DPIRD Primary Industries Plan 2020–2024
- DPIRD State Soil Health Strategy
- State Infrastructure Strategy

Regionally/Locally:

- WA Planning Commission Lower Great Southern Strategy 2016
- Great Southern Regional Water Supply Strategy (unpublished)
- Department of Water Community Water Supplies Partnership Program
- Great Southern Development Commission Strategic Plan 2022-25
- Regional Planning and Infrastructure Framework
- South Coast NRM Strategic Plan 2023-2030
- LGA Strategic Community Plans

Appendix 1 of this document presents a detailed description of alignment of this Plan with the above strategies and policies.

Our Region

Overview

The following section provides the regional context for this Plan. It considers socio-economic indicators and trends, as well as the future impact of global megatrends, including climate change, on the coastal subregion.

It also includes the results of an infrastructure audit, which maps existing transport, water, energy and communications links, systems and resources across the coastal subregion, and assesses the capacity of infrastructure to respond to future demand and a changing climate.

Summary tables of the subregion's geographic, demographic and economic challenges and opportunities, and more detailed insights from the infrastructure audit are included at **Appendix 2** and **Appendix 3** to this Plan.

The analysis in this section has guided the development of stakeholder consultation tools, the DVA and the Action Plan for building resilience across the coastal subregion.

Further supporting evidence is provided in the *Coastal Great Southern Regional Context Report* which is available on the Great Southern Development Commission website: https://gsdc.wa.gov.au/project/regional-drought-resilience-plan

The Coastal Great Southern Region (the coastal subregion)

The Great Southern region is located on the south coast of WA. It comprises eleven coastal and inland local government areas, covering a combined 39,000 km^2. Over 80% of the region's population is concentrated along the coast.

The coastal subregion is defined as the City of Albany and the Shires of Denmark and Plantagenet, as well as the Frankland River region in the Shire of Cranbrook.

The Shire of Cranbrook was also included in the Inland Great Southern RDR Plan; however, the western part of the Shire is in a high rainfall zone and has similar growing conditions, industry and produce to the coastal areas of the region.

The coastal subregion falls within the Wagyl Kaip and Southern Noongar region, which includes the Ganeang, Goreng and Menang Noongar dialectals groups from the Great Southern area.

The coastal subregion has a cooler more temperate climate than inland areas of the Great Southern. The subregion is part of an internationally recognised biodiversity hotspot, with many plant and animal species that are endemic to the region. It encompasses rugged coastline and the highest mountain peaks in Southern WA, jarrah, marri, karri and mallee woodlands, salt lakes and an ancient sandplain to the south.

The subregion is within productive agricultural climate zones, and around two-thirds of the vegetation has been cleared over much of the agricultural region, with some areas having less than 5-10% of original bushland.

Much of the subregion's agricultural land is identified by the WA Planning Commission (WAPC) as Priority Agricultural Land, recognising its significance for food production purposes with comparative advantage in terms of soils, climate, water and access to services. It is also recognised that whilst favourable climate and land characteristics have led to the establishment of intensive agriculture pursuits, for example free range pork and poultry farms, ensuring adequate water supplies are available is vital.

Outside of relatively high-cost flights between Albany and Perth, populations are largely connected and serviced by road networks.

Figure 7. The Wagyl Kaip and Southern Noongar Region[13]

13 Kaartdijin Noongar. About The Wagyl Kaip and Southern Noongar Region. https://www.noongarculture.org.au

Demographic Profile

POPULATION

53,236*

ABORIGINAL PEOPLE

3.4%

of the region's population are indigenous

MEDIAN AGE

46

High proportion of older residents **> 65 years**

Low proportion of young adults **15-24 years**

GROWTH RATE

2.4%

Average annual population growth rate 2021-2023

MULTICULTURALISM

26.2%

of the population were born overseas

The highest proportions are
Denmark: **32.8%**
Plantagenet: **30.7%**

MEDIAN FAMILY INCOME BY LGA

Albany: **$1,757**
Denmark: **$1,491**
Plantagenet: **$1,491**
Frankland: **$2,147**

WA: **$2,214**

Australia: **$2,120**

Note: No overall median family income available in Regional Context report for Coastal GS region

Figure 8. Coastal Subregion Demographic Profile (ABS 2021)

*Estimated coastal subregion population 2023

Table 1. Coastal Great Southern Population distribution (ABS 2021)

ALBANY	SHIRE OF DENMARK	SHIRE OF PLANTAGENET	SHIRE OF CRANBROOK
38,763	6,310	5,388	1,100* [14]

* Of which 353 residents were counted for the Frankland River region

Population growth along the coast represents in-migration from lifestyle retirees and 'sea-changers', as well as people moving from inland Great Southern communities to coastal areas. Population declines in some smaller inland communities in the region are part of a broader trend where large population bases are increasingly unnecessary for productive agricultural practices, together with farm consolidation and in the application of technology to improve productivity.

Continued growth is projected in the coastal subregion, suggesting a population of 58,220 by 2031[15].

Whilst predicted population growth in the coastal subregion will create new opportunities for regional economic growth, it will also place pressure on existing infrastructure and services, particularly health-related requirements for the rapidly ageing population, and water provision.

Balancing this growth with the sustainability of smaller inland communities represents a challenge for the Great Southern region more broadly.

14 Keston Economics, *Regional Context Coastal Great Southern Regional Drought Resilience Plan*, (Albany, Western Australia: 2024). Based on ABS 2021 data.

15 See https://www.wa.gov.au/government/document-collections/western-australia-tomorrow-population-forecasts, cited in Keston Economics, *Regional Context*.

Economic Profile[16]

Total regional output:

$8.96 billion

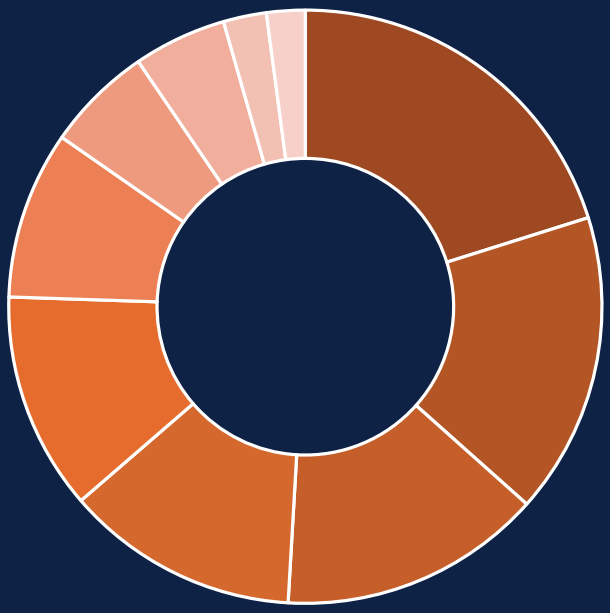
AGRICULTURE, FORESTRY AND FISHING

$1.3 billion

COASTAL SUBREGION AGRICULTURAL PRODUCTION (GROSS VALUE)

$571.2M
(5.6% of WA gross agricultural production value)

Top ten commodities (by gross value)



MANUFACTURING

$1.3 billion

CONSTRUCTION

$1.2 billion

Figure 9: Coastal Subregion Key Sectors by Economic Output

16 Core economic data sourced from REMPLAN. No economic data is available for the Frankland River region; therefore economic context is for the broader Shire of Cranbrook.

The coastal subregion has a relatively strong and diverse economy, with steady population growth and investment across key sectors. The estimate of Gross Regional Product (GRP) for the coastal subregion was $4.6 billion in 2023. This represents 80% of the broader Great Southern GRP and 1% of Gross State Product (GSP).

Table 2: LGA Contributions to GRP in the Great Southern region in 2023

GREAT SOUTHERN LGAS	GRP ($M)	PER CAPITA GRP	PER WORKER GRP	% TOTAL COASTAL GREAT SOUTHERN
Albany	$3,501M	$90,320	$202,831	76.7%
Cranbrook	$143M	$129,784	$260,516	3.1%
Denmark	$437M	$69,187	$210,904	9.6%
Plantagenet	$483M	$89,723	$218,845	10.6%
Total Coastal Great Southern	**$4,564M**	**$88,513**	**$206,621**	**80.0% (total GRP)**
Total Great Southern	**$5,703M**	**$92,172**	**$212,114**	**-**

A detailed location quotient analysis conducted for this Plan demonstrates strong subregional industries in agriculture, forestry and fishing as shown by employment rates, output and value added. The analysis also reveals variations in industry focus and value between LGAs within the coastal subregion.

A more diverse industry profile and higher value output in the City of Albany is in line with the City's role as a regional centre, with organisations and businesses servicing residents living in Albany, and those travelling from elsewhere in the region to access services. Albany is also the largest employer in the subregion, driving employment across key sectors including agriculture, retail, healthcare and hospitality.

ALBANY

$1.03 B
CONSTRUCTION

$791 M
MANUFACTURING

$666.1 M
RENTAL HIRING & REAL ESTATE SERVICES

$635 M
HEALTH CARE & SOCIAL ASSISTANCE

$594.2 M
AGRICULTURE, FORESTRY & FISHING

CRANBROOK

$201 M
AGRICULTURE, FORESTRY & FISHING

$36.1 M
MANUFACTURING

$20.5 M
CONSTRUCTION

$15.1 M
RENTAL HIRING & REAL ESTATE SERVICES

$9.1 M
PUBLIC ADMINISTRATION & SAFETY

DENMARK

$149.8 M
AGRICULTURE, FORESTRY & FISHING

$121.5 M
CONSTRUCTION

$102.4 M
MANUFACTURING

$87.6 M
RENTAL HIRING & REAL ESTATE SERVICES

$53.1 M
PUBLIC ADMINISTRATION & SAFETY

PLANTAGENET

$373.5 M
AGRICULTURE, FORESTRY & FISHING

$359.6 M
MANUFACTURING

$70.6 M
RENTAL HIRING & REAL ESTATE SERVICES

$59.9 M
CONSTRUCTION

$45.9 M
TRANSPORT, POSTAL & WAREHOUSING

Figure 10: Top five industries and Value in Output (by LGA)

All LGAs within the coastal subregion are net exporters, with total subregional net exports of $620.2 million. Agriculture, forestry and fishing is the highest net export industry for Albany, Cranbrook, and Denmark. However, Plantagenet's highest net export industry is manufacturing (with agriculture forestry and fishing still contributing strongly).

In contrast to WA as a whole, which is heavily reliant on mining for net export performance, the coastal subregion is largely reliant on primary production.

Primary production is the dominant industry across the entire Great Southern region. In contrast to inland areas of the Great Southern, which tend to have smaller rural communities and a dominant focus on grain and livestock production, the coastal subregion has a cooler more temperate climate, stronger population growth and an economy that is diversified with horticulture, poultry, seafood, timber and tourism.

In 2020-21 the coastal subregion contributed approximately $571.2 million of WA's total agricultural production gross value (5.6%)[17]. Broadacre crops and livestock are still the main commodities produced and represent comparative advantages for the subregion.

Horticulture (nursery, turf, fruit and nut, and vegetable commodities) has emerged as a significant contributor to food production. Future expansion will depend on sufficient rainfall and access to groundwater supplies for irrigation.

In 2020-21, livestock disposals and products were valued respectively at $220 million and $78.7 million.[18] Major livestock management infrastructure in the broader Great Southern region includes the Katanning Regional Saleyards (sheep) and the Mount Barker Regional Saleyards (cattle), together with abattoirs in Katanning and Narrikup (sheep only).

The Shire of Plantagenet has a growing reputation for free range chicken production, and chicken consumption is one of the fastest growing meat markets in Australia[19].

The Great Southern is WA's largest wine region by total area (Geographical Indication), with wine product receiving international recognition. All primary grape growing subregions sit within the coastal subregion, with Frankland River and Mount Barker accounting for the majority of current production[20].

17 Australian Bureau of Statistics, *Value of Agricultural Commodities Produced, Australia, 2020-21* (Released July 2022) cited in Keston Economics, *Regional Context*.

18 Department of Agriculture, Fisheries and Forestry, Australian *Agricultural Census 2020–21 visualisations – LGA* cited in Keston Economics, *Regional Context*.

19 M*eat and Livestock Australia, Know the numbers: State of the Industry Report 2018*, (19 September 2018) cited in Keston Economics, *Regional Context.*

20 https://www.wineaustralia.com/market-insights/regions-and-varieties cited in Keston Economics, *Regional Context*.

Figure 11. Primary Great Southern wine grape growing areas

Plantation forestry in the Great Southern is estimated to cover more than 90,000 hectares and was worth $162 million in October 2021. Woodchips for biofuel are gaining momentum, with several local governments powering community amenities such as heated swimming pools. The majority of the output is exported as woodchips to the fine paper industry in Japan and China, and in 2023 the sector produced some 1 million tonnes of woodchip exports (down from a peak of 1.75 million tonnes in 2017)[21].

The commercial fishing industry on the south coast is an important contributor to the socioeconomic health of the region. There is a wide diversity of products including pilchards, salmon, crabs, herring, estuarine species, deep sea table fish, sharks, rock lobster and aquaculture species such as oysters and mussels. The products are keenly sought by tourists visiting the region[22].

Mining currently contributes a relatively small proportion of total coastal subregion industry output at $133.8 million (1.5%). The region has a small mining sector producing silica sand and lime sand. However, the value of mining to the region has the potential for growth, with two mineral deposits awaiting investment decisions, including Grange Resources Southdown magnetite mine located north-east of Albany.

The manufacturing industry makes a valuable contribution to the region's economy, with the majority of business establishments based in Albany. The sector employs about 5.7% of workers in the coastal subregion. The manufacturing industry is focused primarily on supplying equipment and machinery to the primary production sector and to the processing of commodities.

Continued growth brings demand for skilled people to fill positions in the professional, trades and services sectors. The manufacturing and fabrication sectors are driven by the requirements of primary production but also have the capacity to respond to the demands of a diversifying economy.

21 Southern Port Authority. Annual Reports (2023 and 2018) cited in Keston Economics, *Regional Context*.
22 https://rdagreatsouthern.com.au/the-great-southern/ cited in Keston Economics, *Regional Context*.

Retail trade, construction and tourism also make significant contributions to the economy. The high level of technology available to wine producers has also generated a need for specialist skills and opportunities in a growing sector.

The coastal subregion has one of the most dynamic small business communities in the State. In 2023, there were 102.4 small businesses (0-19 employees) per 1,000 residents in the region. Small business represents 97.6% of all business activity in the coastal subregion. Of these small businesses, 27.8% are in agriculture, forestry and fishing.

Industries in the coastal subregion are highly interconnected and interdependent.

Infrastructure

Infrastructure has a major effect on the capacity of a regional economy to grow, to remain resilient in the face of challenges and to quickly leverage opportunities.

An infrastructure audit has been conducted to support the development of this Plan and to assess the capacity of infrastructure to respond to future demand and a drying climate. The audit mapped transport links, including road, air, rail and sea, and energy and communication networks. The audit also considered water demand and supply, including rainfall trends, surface water, groundwater, recycled water and potable supply.

The audit highlights:

- water demand is projected to increase, however, there are insufficient water resources to support projected growth;
- the quality and efficiency of the road network impinges on the competitiveness of the regions' primary producers in global markets;
- new developments in gas, solar, wind and wave energy technology and the potential they present for more 'localised' energy generation; and
- the importance of reliable telecommunications access in 'future proofing' rural communities.

Key findings from the audit are summarised in **Appendix 3** to this Plan.

Regional Insight – Improving Water Knowledge

Since the 2014 Great Southern Regional Water Supply Strategy, the following initiatives have been running to improve our understanding of water resource availability in the Great Southern region. This includes a state-funded South Coast groundwater investigation and the CSIRO Brackish Groundwater Investigation.

The South Coast groundwater investigation has involved development of the Albany Aquifer Modelling System, a 3D digital conceptual model of the Albany Groundwater Area and mapping water resource information of the Albany hinterland. The model and mapping were used to inform allocation planning in the region. Linked to this work, DPIRD has secured funding to extend the WaterSmart Farms program which focusses on locating and developing water resources for agro-industries in partnerships with industry and government. The initial pilot is the Great Southern Beaufort Palaeochannel project.

The CSIRO project is developing methods for identifying and characterising untapped brackish groundwater resources in WA, predominantly for irrigated agriculture and remote communities water supply. The project addresses key challenges facing brackish groundwater desalination including; brackish groundwater resource characterisation, inland brine (desalination waste stream) management and energy availability in remote regions. The project, expected to be finalised in 2025.

Global Megatrends

Climate change is widely recognised as a global megatrend alongside trends in technology, globalisation and demographics. These 'megatrends' are trajectories of change, typically unfolding over years or decades, with the potential for transformative impact[23]. The below diagram is taken from the 'Our Future World' report released by the CSIRO in 2022. The report explores the potential impacts of global megatrends, including adapting to a changing climate.

Figure 12. Global Megatrends diagram – extract from the CSIRO Our Future World Report

23 Naughtin et al., *Our Future World*, 4.

As the world adapts to a changing climate, a range of impacts will be felt across the globe. For example [24]:

- The cost of natural disasters is projected to be $39.3 billion per year by 2050.
- The health impacts of climate change highlight the relationship between extreme weather events such as drought, and public health.
- There is increased potential for heat-related deaths, damage to infrastructure and operational problems for critical services such as transportation, healthcare and energy supply.
- Water demand is increasing, and reductions in the availability of water resources and pollution are reducing the amount and quality of future water resources.
- Critical infrastructure, for example road and railways are built using materials and methods designed for stable climatic conditions (with increased rates of deterioration also likely to increase the maintenance cost burden).
- There is potential for mass migration, driven by increases in global surface temperatures and sea-level rises.

The global megatrends are highly interconnected, with flow on impacts and linkages across social, economic and environmental dimensions. This means that although megatrends represent some of society's biggest challenges, they also give rise to possible future responses and solutions.

Industries in Figure 13 below have been rated based on their level of exposure (i.e. the amount of growth and/or adaption that will be required to respond to the megatrend).

	Rapid Urbanisation	Climate / Resources	Geopolitics / Trade	Demographic Change	Technological Advances
Accommodation and Food Services	VH	MH	M	M	M
Administrative and Support Services	VH	L	LM	M	M
Agriculture, Forestry and Fishing	VH	VH	VH	M	VH
Arts and Recreation Services	VH	L	M	MH	MH
Construction	VH	M	MH	MH	VH
Education and Training	VH	L	VL	LM	MH
Electricity, Gas, Water and Waste Services	VH	H	M	VL	VH
Financial and Insurance Services	H	M	LM	MH	H
Health Care and Social Assistance	VH	LM	VL	VH	VH
Information Media and Telecommunications	H	VL	LM	M	VH
Manufacturing	VH	MH	VH	M	VH
Mining	H	H	H	L	VH
Other Services	H	M	M	M	M
Professional, Scientific and Technical Services	H	L	L	M	H
Public Administration and Safety	H	M	L	M	H
Rental, Hiring and Real Estate Services	VH	L	M	M	M
Retail Trade	VH	L	M	M	MH
Transport, Postal and Warehousing	VH	M	LM	M	H
Wholesale Trade	VH	M	M	M	H

NB: L = Low; LM = Low-Medium; M = Medium; MH = Medium-High; H = High; VH = Very High

Figure 13. Industry exposure to global megatrends

24 Naughtin et al., *Our Future World*

Based on the above, scores between 0.0 (very low) and 1.0 (very high) have been applied evenly between the ratings. The average of these values provides a final score for evaluation, enabling industries to be ranked in order of their exposure to all megatrends. Results are displayed as follows in Figure 14:

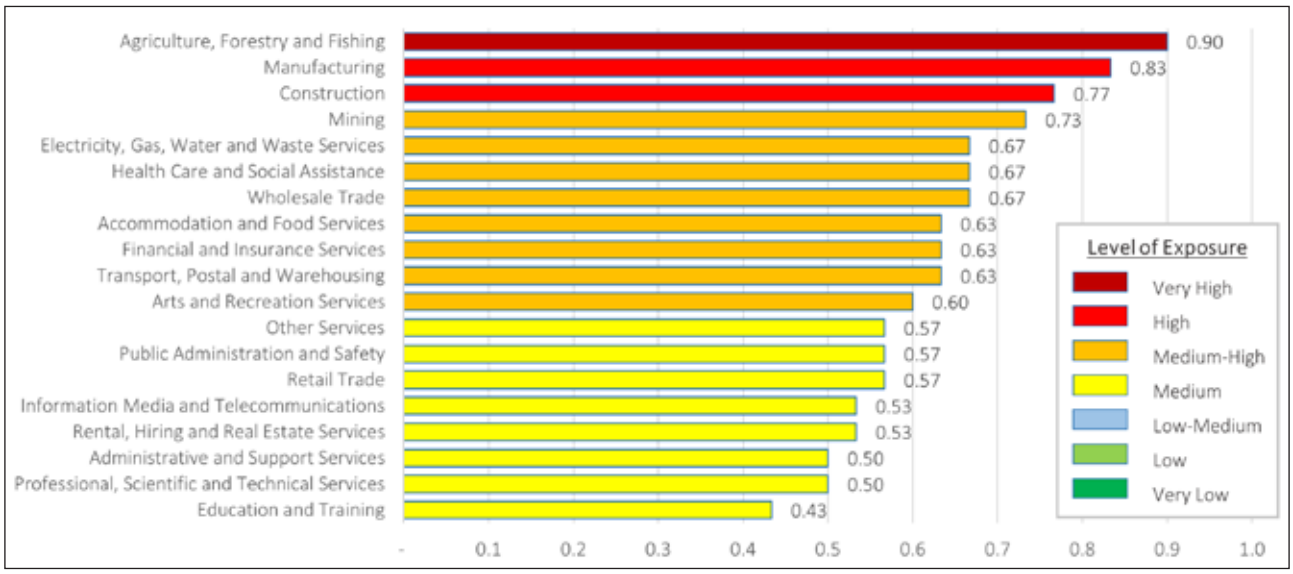


Figure 14. Industry Scoring based on level of exposure to megatrends

This analysis of global megatrend exposure risk indicates that the coastal subregion's highest performing industries (agriculture, forestry and fishing, manufacturing and construction) also have the highest megatrend exposure risk.

This high exposure risk presents both challenges and opportunities for the region. For example:

- Increasing urbanisation will present a need for greater production and food security, and greater demand for the construction and manufacturing industries.
- Climate change and resource scarcity will impact on farming practices as rainfall patterns shift and have consequences for energy options, particularly decarbonisation. There will also be resource and energy implications for the construction and manufacturing industries.
- Globalisation and shifts in global economic power represent global competitiveness challenges, but also many opportunities. For example in demand for primary produce and food (and potentially downstream processing of agricultural products), Asian tourism and citizen consumers (demand for provenance in food products).
- The ageing population represents both a challenge and an opportunity in increased demand in health and aged care sectors, requiring a skilled service sector workforce.
- Technological advances will have consequences on competitiveness but also present opportunities to attract 'digital nomads' and improve productivity in industry sectors, particularly primary production and manufacturing.

It is imperative that industry and infrastructure in the coastal subregion keep pace with global megatrends, as without sufficient investment and development, these industries risk increased import competition and reduced export demand or value from domestic and global markets.

Stakeholder Engagement and Partnerships

Overview

Stakeholder engagement and community consultation undertaken for this Plan focussed on leveraging local networks to tap into a substantial knowledge base.

Engagement was held across multiple platforms and locations – workshops in Mount Barker and Albany, an online survey, face-to-face and online interviews –encompassing diverse viewpoints, knowledge and lived experiences. The process benefited from learnings taken from the Inland Great Southern RDR Plan, providing opportunities to refine and improve the approach. In particular, more targeted engagement with local grower and catchment groups who then sought input from their member base, resulted in higher levels of engagement from individual producers.

In addition, a public consultation period was held in December 2024, with feedback sought from the community and stakeholders on the Draft Plan, which assisted in refining the focus areas and implementation approaches.

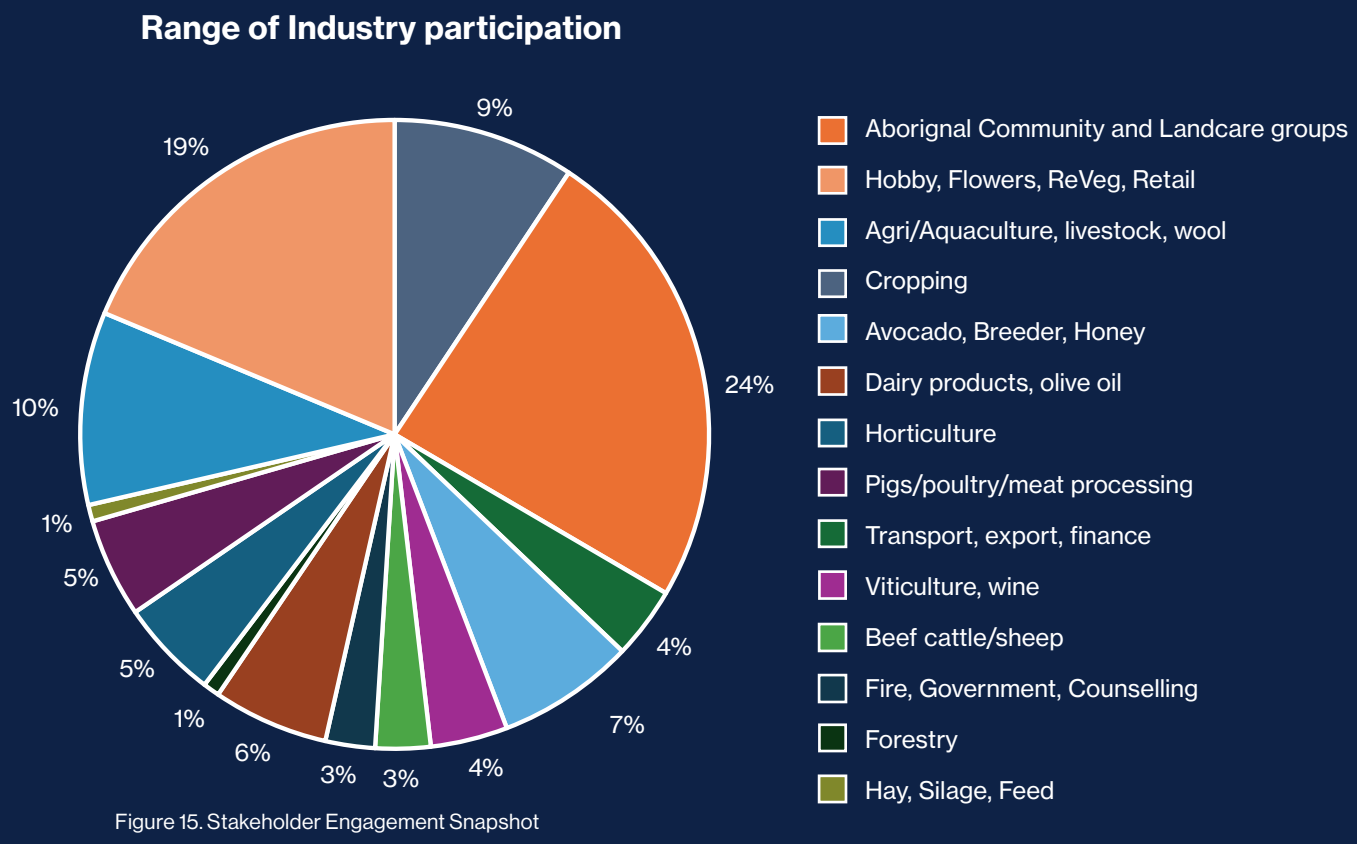


Figure 15. Stakeholder Engagement Snapshot

Stakeholder Workshops (Albany and Mount Barker)

- Participants included a mix of representatives from local and state government agencies, and NFP grower groups and catchment groups. These participants discussed the definition of drought for the subregion, identified key concerns around the impacts of drought, and prioritised potential actions for building drought resilience.
- The highest priorities – where participants perceived gaps and opportunities for building resilience – were access to on-farm planning/business capacity building and better planning around water resources and management.

Image 1. Coastal Great Southern drought resilience workshop held in Albany, July 2024.

Online Survey

Respondents were asked a series of closed and open-ended questions around the definition of drought, the impacts of drought on communities/businesses, and key concerns and gaps around drought resilience.

There was a strong response rate to the survey, which was largely driven by a high return rate on surveys distributed by the following coastal subregion catchment groups, community organisations and grower groups to their members and networks:

- Great Southern Wine Producers Association
- Oyster Harbour Catchment Group
- Stirling to Coast Farmers
- Torbay Catchment Group
- Wellstead Community Resource Centre
- Wilson Inlet Catchment Committee

The 133 responses reflected diverse experiences of community members, agencies and individual producers from across the four LGAs, with almost 70% of respondents reporting that they have lived in the region for more than 15 years.

The majority of producers were from the beef and sheep industry, followed by cropping, viticulture, hobby farms and horticulture. Almost 50% reported a property size between 100 – 1,000 hectares.

Investment in water infrastructure and business planning were the most frequent 'drought resilience' responses implemented by producers during a past dry season/drought. These also rated as the highest priority for future action.

Stakeholder Interviews

Conversations with PAG members, and advice provided at the workshops, helped identify stakeholders for 'deep dive' consultation and case studies. These interviews provided regional insights into farming enterprises that demonstrate drought resilient farming practices , providing valuable lived experience that added to climatic data and assumptions used in the DVA.

Scan the QR code to read more about drought resilience insights in the coastal Great Southern region.

SCAN ME!

Stakeholder Engagement – What We Heard

With the guidance of PAG members, information gathered from the two workshops, interviews and survey responses was collated, synthesised and grouped into key findings under each of the five themes. Paired with the data and technical evidence, these emerging themes inform the DVA which is outlined in the following section.

Resilient Agriculture

The region would benefit from more on-the-ground human resources which would foster opportunities for information exchange and innovation. This would ensure that NRM, local catchment and grower groups have "spare capacity" to be innovative (for example, more availability to actively drive research and development needs/outcomes in the region) and provide more opportunities for information exchange and planning support.

"Catchment/NRM/Grower groups need security of funding/permanency to explore what people really need and how to progress – space to be innovative" – Stakeholder survey response

"A huge gap is in having no redundancy in local groups to develop new ideas into projects." – Local catchment group representative, City of Albany

There needs to be more investment in risk management and planning. It is critical for producers to know their thresholds for dry seasons, plan strategically and invest in good years. This could involve regional communities being better engaged and supported to invest in planning, and more targeted support for smaller landholders and farming enterprises on tighter margins. In addition, learning to sit with the uncertainty around drought and develop flexible approaches to planning is an essential part of building drought resilience, from both a financial and mental wellbeing perspective.

"Very early on a farmer said to me he put aside a day a month for thinking. When people are busy doing and don't make time for planning and devising strategies it can lead to trouble. People need time to think and work through challenges or come up with new ideas" – Interview response (Vineyard owner), Denmark

"In the long term, how you respond to a dry climate this year affects next year's yield. After harvest, the vines need a good drink to set up for next year. Last year's dry season pushed everything forward which impacts yield, we couldn't finish the season" – Interview response (Vineyard owner), Frankland River

Resilient Water

There is a critical need for investment in water infrastructure and management. This should include both support for strategic on-farm water infrastructure and support for strategic community water infrastructure.

"...the key challenge is that strategic thinking is missing... the concept of looking forward, what are the risks over the next 10 years...what do we need to do to ensure a smoother run, particularly for water infrastructure" – Stakeholder survey response

"We need water in the community for those years (one in 50) where there is no rain into October, and nothing but a few mm for 12 months (green drought). When that happens, on-farm water stocks will be used up – there needs to be community sources to help take it through" – Stakeholder survey response

"Truffles need a constant water supply when growing. If the tree gets stressed, it impacts the truffles. Sometimes you're watering to keep the trees alive but there's not enough for the truffles to grow" – Producer, Truffles, Denmark

Resilient Landscapes

We need to do more to incorporate natural ecosystem processes. This could involve consideration of ecosystem processes as part of drought risk and resilience planning, better capture and understanding of our region's natural asset values, and harnessing traditional ecological knowledge (TEK) and land management practices.

"Noongar language does not have a 'drought' [equivalent] term...'drought' is change in the landscape...The current impact [of drought] is evidenced from the observation of the physical responses in flora and fauna and the inter-connection of these responses in the landscape" – Aboriginal corporation, Great Southern

"The benefits and application of TEK is for everyone [not confined to First Nations]. Funding will enable more 'learning together' activities...invest science (R&D) in TEK to enable a wider community acceptance of TEK into farming practices. This will substantiate TEK as best practice" – Aboriginal tourism representative, Great Southern

Resilient Community

Community cohesiveness will help communities in times of drought. Workshop participants reported a wide range of impacts from their drought experiences, and what they valued during this time – from the stress associated with working off farm to support debt payments and the mental anguish of seeing the devastation of drought on the natural environment, to the positive value of looking after community spaces such as ovals and parks and 'over the fence' chats with neighbours.

"A part of a dry season or drought, is the fact that your mental health is so impacted, it is hard to make decisions, especially hard decisions. You know that you only have three weeks of feed left but what do you do – you feel powerless" – PAG member feedback

"As owners, employers you feel the stress of dry seasons, and you feel the impact of other industries. There's financial pressure...vineyards, sheep, everyone is doing it tough at the moment" – Vineyard owner, Frankland River

Resilient Regional Economy

There needs to be a broader focus on market options. For example, options for destocking, sale of fodder and water during dry seasons, expanded local markets and more opportunities for on farm sales and simplified regulation (for example for on-farm processing and diversification ventures) across the region. Policy decisions need to reflect market factors, such as kill space and market prices, that impact the decisions and tools available to producers during dry seasons.

"I think that government want to help but they don't necessarily know how to, and farmers want help but don't know how to ask for it" – Producer, Horticulture, Albany

"Need uniformity in decision making e.g. catchments, dams, haysheds on farms, on farm sales - not three Shires with three different rules" – Stakeholder survey response

"Current concepts of agriculture and tourism are not aligned to outdated planning requirements that limit diversification and innovative development" – Producer, Beef, Denmark

Drought Vulnerability Assessment

The DVA provides the evidence base for this Plan. It represents the culmination of literature, data, technical reports and extensive stakeholder engagement, which informs a science-based approach to evaluating the coastal subregion's susceptibility to drought and provides recommendations to enhance resilience.

The DVA recommendations form the basis of the focus areas and implementation approaches put forward in the Action Plan section of this document.

The DVA addresses the key questions:

- What does drought look like for the coastal subregion now and in the future?
- Where are the areas of most vulnerability?
- What gaps exist in current strategies?

By identifying risks and vulnerabilities, the DVA identifies mitigation strategies and opportunities to build capacity within local communities, businesses, and industries to adapt to the multidimensional challenges posed by drought over the next 20 years and beyond.

The following section provides an overview of the DVA components and findings. A full copy of the DVA can be found on the GSDC website: https://gsdc.wa.gov.au/project/regional-drought-resilience-plan

"I have been practicing small scale farming and vineyard management for approximately 25 years. In the last 7 or 8 years have noticed longer dryer seasons in general in terms of impact on growing seasons. It's not just the dryness but also the spike in hotter days, which can significantly impact fruit. We have seen this particularly in the last 3 or 4 years. This also means using more water, and when relying on rainwater to protect crops, it increases the need for collection. The social impact includes considering how water is used domestically. This means being frugal with household use, which puts pressure on socially including being able to have people come and stay, accommodating workers which are hard to source in regional areas.
– Vineyard owner, Albany

Conceptual framework

The conceptual framework for this DVA (Figure 16) was used as a guide to generate a **Vulnerability Index** for each local government area and agriculture industry in the coastal Great Southern region by using both quantitative and qualitative data.

The aim is to provide insights into where resources and interventions are most needed by identifying the vulnerabilities in the regions.

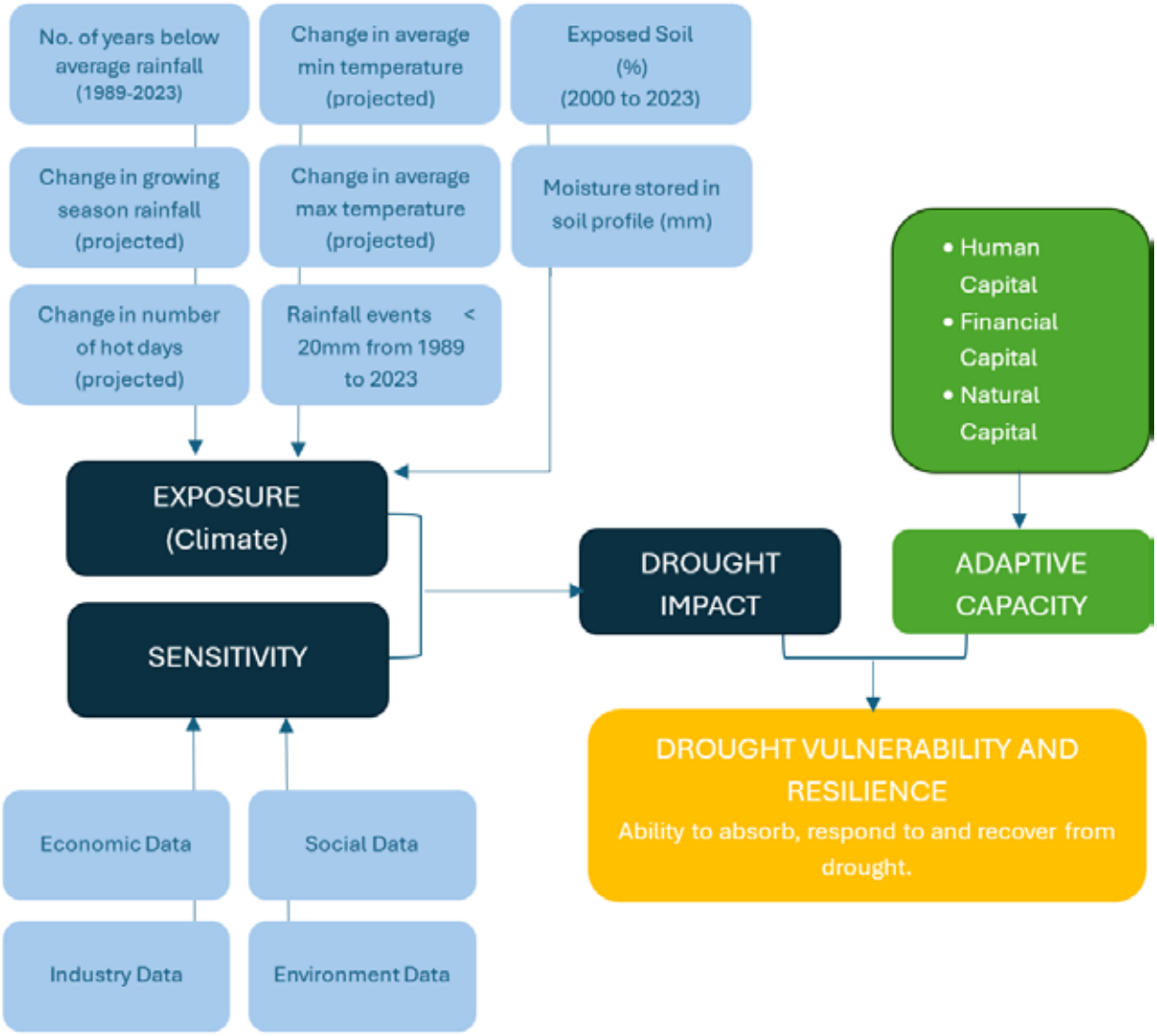


Figure 16: Conceptual framework for drought vulnerability assessment

Regional drought vulnerability assessments require consideration of both the potential impacts of drought and the adaptive capacities of the people and systems in each region. Each element in this conceptual framework has a focus.

Exposure is the extent to which a given system, community or region will be subjected to a particular hazard. It is measured in terms of the extent to which a focus region will be exposed to drought and drought-related climate change processes such as increasing atmospheric temperatures and changes in rainfall patterns and soil moisture.

Sensitivity is the extent to which a given system, community or region will be affected by a particular hazard. For the coastal subregion, sensitivity is about the ways in which this region is impacted by drought. It is measured in terms of the effect of drought on crops and animal production, and the influence of regional characteristics such as soil types and farming systems on the effect that a drought has in the region.

Drought impact includes the degree of exposure to drought in the regions and each region's inherent sensitivity to drought conditions.

Adaptive capacity describes the internal features and characteristics of the regions that influence their ability to respond effectively to and withstand past and future droughts.

The map below (Figure 17) spatially integrates relevant economic, environmental and social data for LGAs in the coastal and inland Great Southern regions to create a GIS-based multi-criteria analysis (MCA). The inputs into the MCA, follow the conceptual framework outlined in Figure 16.

The map shows how areas in the Great Southern region vary from 'very low' to 'very high' vulnerability to drought. This assessment is based on temperature, rainfall and production data, access to infrastructure, population demographics and environmental characteristics.

Most LGAs in the coastal subregion are low or moderately vulnerable to drought with some areas marked high or very highly vulnerable.

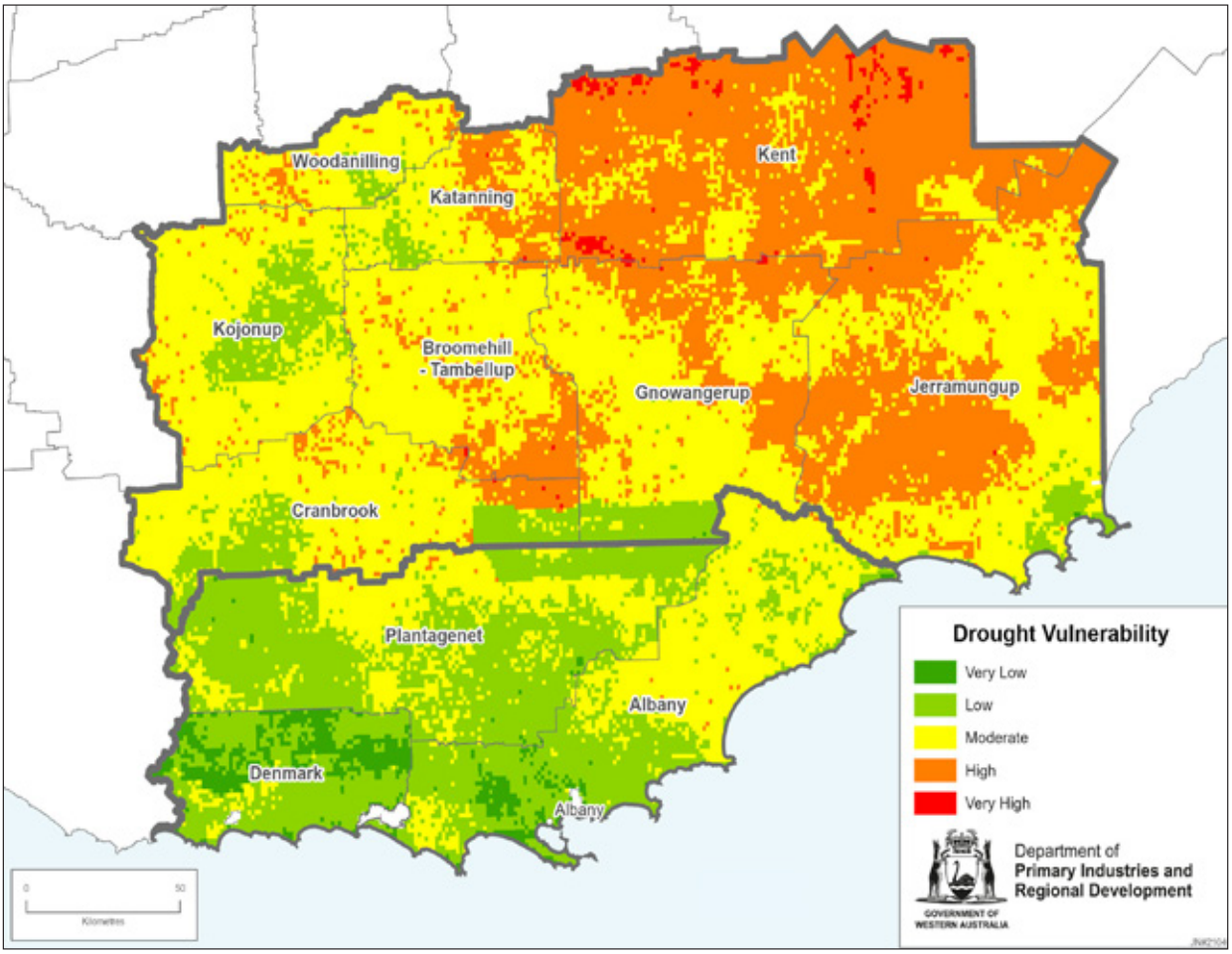


Figure 17. Analysis of Drought Vulnerability for Coastal Southern and Inland Great Southern

"Our main irrigation dam this time 3 years ago was overflowing. We had to divert water from it to our satellite dams. In 2024, it's much, much lower than it should be....we need another 200meg [megalitres] at this time of year...Our back up dam usually holds 70meg, at the moment it's probably got 20meg in it" – Vineyard owner, Frankland River

"Fruit producers rely on bee keepers for pollination services. If the droughts and drying climate affect fruit growers that in turn affects bee keepers...Water access and storage for fruit growers has a direct effect on bee keeping (more than just honey production)" – Apiarist, Albany

The DVA outlines the overall climate conditions for the coastal Great Southern region, showing that most of the region is in high rainfall area and some is very-high rainfall with more than 900 mm of annual rainfall. There is, however, a high level of variation within the rainfall. This provides a level of complexity with managing agricultural enterprises reliant on rainfall, as there is either too much or not enough.

Image 2: A dam at a vineyard in Frankland River, July 2024

Impact of drought

Coastal subregion dry season 2023-24

The coastal subregion tends to experience cooler and wetter conditions than the rest of the state. Although the region has encountered drought and drier seasons in the past, typically, drought has not been a defining feature of the landscape. This is set to change in coming decades, as the region continues to feel the impacts of climate change.

"I was surprised by how fast the season went from being the best [season] ever to really bad. So my lesson is that even though you think you are cruising through, you have to be more prepared prior to the onset" – Beef and sheep farmer, Shire of Denmark

Producers' experiences of the 2023-24 dry season offer valuable insights into region-specific drought responses, current drought preparedness in the community and opportunities to build adaptive capacity.

From spring 2023 through to autumn 2024 many producers reported facing their driest season ever. For some, this was their first encounter with drought conditions. Longer established producers reported the driest conditions since the early 1980s[25]. Dry conditions look set to continue into 2025.

During stakeholder engagement, some producers referred to their recent experiences as a "green drought". Despite the appearance of greenery, there is insufficient water and feed for livestock.

"Going back 100 years, we have experienced significant shortages and a lot of variation in the seasons: intermittent wet and dry. We don't have zero rain years as experienced in Eastern States, we tend to have green droughts" – Horticulturist, Shire of Plantagenet

The impacts of this "green drought" on producers was wide ranging. Pasture growth in 2024 was well below average. Feed shortages and price hikes were compounded by a glut in livestock supply, a lack of kill space at local abattoirs and less live export vessels. In some cases, sheep and cattle producers were forced to euthanise stock [26].

25 For further evidence see for example, Australian Rural and Regional News (15 August 2024), accessed December 2024, https://arr.news/2024/08/15/cattle-industry-drought-prompts-rethink/

26 Countryman (5 October 2023) accessed December 2024 https://www.countryman.com.au/countryman/livestock/was-sheep-slaughter-rate-to-reach-14-million-as-farmers-struggle-to-source-kill-space-c-12047198

Wine growers lost large percentages of crops to weather events, including heatwaves, with an overall 23% reduction (2,769 tonne) on the previous years' vintage [27]. Fruit and vegetable growers faced reduced yields from unseasonably warm weather and erratic weather events.

"The intense heat and inability to keep the vines sufficiently watered has caused a drop of up to 40% of yield in most varieties this harvest… There will also be an impact into the coming season as after the vines have been harvested we give them a good drink with fertilizer to set them up for next year, obviously we have no water so we have been unable to perform this important task in the growing process, many of the white varieties have not received any water for over 2 months and there is every chance that this will impact the 2025 yields"
– Viticulturist, Frankland River

Some producers fared better than others. Whilst rainfall varied from farm to farm, for the most part it was an investment in risk planning and preparedness that set the more positive experiences apart.

Producers who had proactively invested in water catchments – although still impacted by dry conditions – had a buffer to offset reductions and ride out the 'bad' year.

Those who had proactively invested in water irrigation and other innovations to respond to increasingly erratic weather events – for example investing in shifting a percentage of operations to hydroponics – had improved yields (and in some cases realised a financial benefit from increasing demand and limited supply).

"We had a really wet winter in 2021 and on 20 June 2021 we got 120ml in a few hours which washed away much of our ground growing produce and forced our hand to look at hydroponics to insure against such variability and frequency of rain events. The initial outlay is significant, but by 2025 we will be at 50% of production"
– (Farmer and horticulturist), City of Albany

For the region's wine industry, grafting different varietals onto existing vines and sustainable practices to increase shade and ground cover were flagged as future adaptive management practices.

"We may need to look at grafting different varietals on to existing vines. We've changed pruning to create more shade for fruit, but this is a balance with maintaining pest/disease management practices. We now need to plan for the worst-case scenario to build a buffer in for feed for animals, water and for protecting produce from effects of heat stress"
– Vineyard owner, City of Albany

It also highlighted the pressure that many producers are under when responding to the multidimensional impacts of drought. Small landholders and farming enterprises are most affected, with less physical and financial resources at their disposal.

"We really need to prepare better in all domains (feed, water, community support), especially in what were historically wetter parts of the lower Great Southern. These areas are completely unprepared for extended, intensified and frequent dry seasons"
– Livestock farmer and horticulturist, Shire of Denmark

27 Wines of WA Annual Report 2023-2024, Wine Industry Association of WA, accessed December 2024 https://issuu.com/wowaasn/docs/2023-24_annual_report_final_online_1?fr=xKAE9_zU1NQ

The DVA provides an assessment of the overall impacts of drought on the economy, the environment and communities.

Impacts of drought on the economy

Unlike other natural disasters, droughts develop gradually, making it difficult to notice early signs and assess their economic impact until severe precipitation shortages occur. Droughts have long-term effects on agricultural productivity, leading to significant crop and livestock losses, business failures, and reduced income, causing long-term economic strain on regional communities. While producers are less likely to lose jobs, droughts negatively affect employment rates in rural areas, particularly in non-agricultural sectors, with employment dropping 4-5 percentage points in drought-affected areas compared to regions with average rainfall.

The impact of recent dry years on the horticulture and viticulture industries in the coastal subregion appears significant. A combination of rising costs, declining terms of trade and reduced yields are impacting on the financial viability of these businesses. Yields have been seriously impacted due to low rainfall, increased heat stress and reduced harvesting of water.

Impacts of drought on the environment

A changing climate increases the frequency and severity of droughts, leading to greater environmental risks. Four key indicators were selected in the DVA to investigate and understand the impact of drought on the environment. These indicators include Leaf Area Index, Vegetation Growth, Soil Moisture and Exposed Soil (soil protection).

The impact of drought on soil is complex. Reduced rainfall and higher temperatures dry out the soil, creating cracks that reduce the moisture and volume of the soil. This affects the activity of soil organic matter and reduces soil particle cohesion, which changes soil texture and decreases its water holding capacity. Limited plant growth reduces vegetation and crop residue cover, leaving soil vulnerable to erosion through water runoff and wind.

Impacts of drought on the environment also include:

- Reduced water availability and quality, promoting harmful algal blooms (HABs) that produce toxins and harm aquatic life and animals.
- Stressed ecosystems caused by reduced oxygen levels and increased nutrient build-up due to low water flows and higher temperatures.
- Reduced plant productivity, increased mortality, and long-term impacts on species diversity, particularly in regions like Western Australia.
- Irreversible ecosystem changes affecting soil fertility and water purification due to loss of vegetation.
- Increased bushfire risk.

Impacts of drought on communities

The social and economic impacts of drought are closely linked. The more severe the drought, the larger the social and economic impacts on regional communities.

Drought has a wide range of direct and indirect impacts on the health and wellbeing of people, families and communities.[28] Within a community, people's experience of drought will differ. Producers will experience drought differently depending on (for example) location, industry, farm size, turnover and the level of debt carried. These experiences will again differ substantially from local business owners and employees servicing the agricultural sector, and the experiences of people living in regional towns. Environmental degradation associated with drought and other extreme weather events has a direct impact on the health and wellbeing of Noongar people and culture [29].

In addition, there are a broad range of socio-economic factors and characteristics such as health status, age, gender, ethnicity, employment, income, education, family relationships and support systems, that influence the ability of an individual to respond to adversity. These factors either directly or indirectly impact health and well-being in a drought situation, meaning some people and groups will be more vulnerable to the impacts of drought [30].

28 Lester, L., Flatau P., & Kyron M, Understanding the social impacts of drought (Perth: UWA, 2022).
29 South Coast NRM, Keogh Bay and the Gillamii Centre (2022). 'Great Southern (Inland) Regional Drought Resilience Plan report on Aboriginal Community Consultations'. Unpublished.
30 See for example Lester, L., Flatau P., & Kyron M, *Understanding the social impacts of drought.*

At a community level, resilience is often conceptualised in terms of 'community cohesiveness'. Communities are considered resilient when they have qualities and assets that enable them to develop effectively or respond to adversity in ways that strengthen communal bonds, resources and the community's capacity to cope[31].

At the two project workshops that took place after a dry 6-month period for the coastal subregion, participants shared their personal experiences of drought and what they perceived to be the impacts of drought on their communities. These experiences and perceived impacts are summarised below:

- Smaller landholders are not prepared; they have less resources to manage a drought (for example, less grain and hay storage facilities reduces the ability to respond quickly).
- Increasing debt loads impacts producers' ability to prepare/respond to drought and adds to overall financial pressure/strain.
- There is a financial barrier to producers seeking to access professional assistance (expensive when there is no income/money).
- Producers are unable to sell livestock when they need to (for example before they lose too much condition, which also has animal welfare implications).
- The ceasing of the live sheep trade means that this market avenue to sell livestock is lost (a traditional market that assisted in drought conditions).
- The significant cost of hay and stock feed when it is in short supply compounds the financial and animal welfare situations.
- There is a need to work off-farm to financially support families and farm debt (which can have farm viability implications).
- There is a lack of water for livestock and spraying.
- There is a need for additional resources to manage water requirements.
- Ensuring the upkeep of community recreation spaces – for example ovals and parks – means a lot to the community during a drought (positive contribution to wellbeing and mental health).
- The increased workload (and associated stress which can be extreme) required to manage a drought situation has a significant negative impact on the mental health and wellbeing of regional communities.
- During drought, small and medium businesses supported by farm businesses struggle. This can lead to reduced services and the loss of skilled workers and long-term employment opportunities in the community.
- It is not just agriculture that is impacted by drought; other industries are impacted (for example, natural assets, biodiversity and wine and food are drawcards for tourists – some impacts of drought include drying/dying bushland and waterways, tourist attraction closures due to bushfires/bushfire risks, and reduced quality/availability of produce).
- It is distressing for communities to witness the impact of drought on the natural environment, where trees and bushland are dying (coupled with the increased risk of bushfire which is a serious concern within the community).

31 Buikstra et al., 2010; Chenoweth & Stehlik, 2001 cited in Lester, L., Flatau P., & Kyron M, *Understanding the social impacts of drought.*

Drought Vulnerability Index

The purpose of the Drought Vulnerability Index is to provide actionable insights into the vulnerabilities of different local government areas and agricultural sectors. By highlighting where risks are most pronounced, it supports decision-makers in allocating resources and interventions effectively to enhance drought resilience. The conceptual framework outlined in Figure 16 was used to develop the Drought Vulnerability Index using the following components:

1. **Climate Vulnerability:** Measures the exposure to drought, rainfall variability, temperature changes, and long-term climate forecasts.
2. **Economic Vulnerability:** Considers economic resilience factors such as income, employment in agriculture, and financial stability of the local economy.
3. **Environmental Vulnerability:** Includes data on soil health, water availability, and the impact of environmental degradation on agricultural productivity.
4. **Social Vulnerability:** Considers factors like population demographics, access to social services, and community support systems in the face of drought.
5. **Industry Vulnerability:** Focuses on the specific challenges faced by different agricultural sectors (e.g. livestock, cropping, horticulture) and their capacity to adapt to drought.

Quantitative data sources for the index included economic, climate, social, environment and industry data gathered from various literature, the Regional Context report, and the Australian Bureau of Statistics. Qualitative data was derived from community survey responses which were scored based on response to generate objective measures for the index.

Please refer to the DVA report for more information about the methodology used to calculate the index. Tables 7 to 10 in the DVA report contain data and criteria used to substantiate the scoring for each component. The report can be found on the GSDC website: https://gsdc.wa.gov.au/project/regional-drought-resilience-plan.

Vulnerability Results

The Vulnerability Index provides the Coastal Great Southern region with a measure of vulnerability to drought.

Drought vulnerability for each LGA is represented by a **ranking** applied against each **DVA component,** to demonstrate the range and combinations of vulnerabilities within a single geographic region.

A summary of the results from the Vulnerability Index is shown in Table 3. 'Most vulnerable' is ranked at 1, and the 'least vulnerable' is ranked at 4.

Table 3. Results from the Drought Vulnerability Index

	Climate Exposure Index	Social Vulnerability Index	Environmental Vulnerability Index	Economic Vulnerability Index	Regional Industry Vulnerability index
	Rank (1-4)	Rank (1-4)	Rank (1-4)	Rank (1-4)	Rank (1-4)
City of Albany	2	4	4	2	2
Shire of Denmark	1	3	1	4	4
Shire of Plantagenet	3	2	3	1	1
Shire of Cranbrook	4	1	2	3	3

Legend 1 Most vulnerable LGA 4 Least vulnerable LGA

The results from Table 3 tell us that:

- The Shire of Denmark is most vulnerable to climate exposure, which is due to the predicted decline in rainfall by 2050.
- The area of natural vegetation in Denmark Shire makes it the most vulnerable from an environmental perspective.
- The Shire of Plantagenet's economic profile is the most vulnerable because it has the highest value agriculture of all the LGAs.
- The Shire of Cranbrook social vulnerability index is the highest due to its low population and high reliance on agriculture employment with low diversity in its economy.
- The dairy industry is the most vulnerable to drought.
- The sheep and beef sector is a much larger industry with many more businesses in the region, and is more vulnerable to drought when the number of businesses is considered.

Recommendations

The DVA highlights the need for adaptive strategies to mitigate the impacts of drought. The assessment reveals significant challenges posed by climate variability, including reduced rainfall, altered weather patterns, and consequent effects on agriculture, ecosystems, and community well-being.

By investing in water infrastructure, sustainable farming practices, and enhanced climate monitoring, alongside fostering community resilience, the region can better plan for and withstand future droughts.

The following recommendations emphasise the importance of proactive measures for resilience, from an economic, environmental and social perspective. Implementing these strategies will be pivotal in securing the long-term viability of the region's agricultural sector and preserving the unique fabric of the coastal subregion.

These recommendations form the basis for the Building Drought Resilience Action Plan in the following section.

Invest in Water Infrastructure:

- Develop and upgrade water harvesting and storage systems to ensure a reliable supply for livestock, irrigation, and crop spraying.
- Promote water-efficient technologies and practices to optimise usage in agricultural activities.

Enhance Climate Monitoring and Forecasting:

- Use and improve climate monitoring systems for accurate and timely weather forecasts.
- Utilise climate data to inform agricultural planning and decision-making processes, aiding producers in adapting to changing rainfall patterns.

Promote Sustainable Farming Practices:

- Encourage conservation tillage, mulching, and other soil moisture retention techniques to improve soil health and crop resilience.
- Support the adoption of drought-tolerant crop varieties and diversified cropping systems to mitigate risks associated with climate variability

Strengthen Community Engagement and Support:

- Foster community programs that enhance social capital, such as local agricultural groups, workshops, and information-sharing platforms.
- Provide mental health and well-being support services to assist regional communities in coping with the stress and impacts of drought.

Develop Comprehensive Risk Management Plans:

- Create and implement risk management strategies tailored to the specific vulnerabilities of different agricultural sectors and regions.
- Encourage regional communities to adopt decision support tools and financial tools that help mitigate the economic impact of drought and improve preparedness.

Support Research and Innovation:

- Invest in research initiatives exploring new technologies and methods for improving drought resilience in agriculture.
- Facilitate collaboration between researchers, policymakers, and producers to develop practical and scalable solutions.

Improve Soil and Land Management:

- Promote practices that prevent soil erosion, such as maintaining ground cover and restricting grazing during vulnerable periods.
- Encourage the use of soil amendments like lime and fertilizers to manage soil pH levels and improve fertility.

Enhance Adaptive Capacity and Education:

- Provide training and educational programs to producers and communities on adaptive practices and climate resilience.
- Develop resources and tools that help regional communities anticipate and respond to drought conditions effectively.

Implement Environmental Conservation Measures:

- Protect and restore natural vegetation areas to enhance ecosystem resilience and biodiversity.
- Support land management practices that maintain or improve the condition of natural resources and ecosystems.

Facilitate Access to Financial Resources:

- Ensure regional communities have access to financial support and incentives for implementing resilience-building practices.
- Develop funding programs that support the adoption of innovative and sustainable agricultural practices.

Building Drought Resilience Action Plan

This Action Plan takes the first step in providing a framework to identify and communicate drought resilience needs and priorities. This approach ensures that the community retains the flexibility to adapt its priorities and specific projects as implementation progresses; recognising that future climate and drought uncertainty is the lens through which communities will need to build drought resilience.

The Action Plan includes seven focus areas:

1. Water Infrastructure and Management
2. Climate Monitoring and Forecasting
3. Soils and Sustainable Agricultural Practices
4. Community Engagement and Support
5. Risk Management and Adaptive Capacity
6. Research and Innovation
7. Environmental Conservation

The focus areas align with the five drought resilience themes:

RESILIENT WATER

FDF OBJECTIVE
Grow the self-reliance and performance of the agriculture sector

RESILIENT COMMUNITY

FDF OBJECTIVE
Strengthen the wellbeing and social capital of rural, regional and remote communities

RESILIENT AGRICULTURE

FDF OBJECTIVE
Grow the self-reliance and performance (productivity and profitability) of the agriculture sector

RESILIENT LANDSCAPES

FDF OBJECTIVE
Improve the natural capital of agricultural landscapes for better environmental outcomes

RESILIENT REGIONAL ECONOMY

FDF OBJECTIVE
Grow the self-reliance and performance (productivity and profitability) of the agriculture sector

The above themes are highly interconnected and interdependent. Some of the focus areas align with more than one theme, with implementation actions contributing towards building drought resilience across multiple areas. This is captured as part of the Monitoring and Evaluation framework.

Focus Area 1: Water Infrastructure and Management

Reliable water supply is critical for agricultural productivity. Investing in water harvesting, storage systems, and efficient irrigation technologies will enhance the resilience of the agriculture sector, ensuring consistent crop and livestock production even during drought periods.

An increase in water demand is projected across the coastal subregion, driven by population growth, an increase in visitor numbers and agricultural production.

Using information sourced from the *Great Southern Regional Water Supply Strategy – Evaluation*, the infrastructure audit for the coastal subregion indicates that there are insufficient water resources available to support the projected growth of agriculture in the Great Southern, as the use of existing groundwater and surface water sources has reached sustainable limits. In addition, it is estimated that 80% of water use in the region is unlicensed, and most of that is abstracted from surface water sources.

The climate in the region is drying, and climate change will continue to place more pressure on surface and groundwater resources, affecting town water supplies, agricultural production and ecosystems. The drier landscape could have implications for bushfire fuel loads, potentially worsening the severity of bushfires in the future.

Streamflow and groundwater recharge are likely to continue to decline, increasing pressure on water sources, particularly independent town water supply schemes that draw on local dams and catchments. Some of those local dams are already performing less reliably and this effect will likely intensify.

There is expected to be increased water loss through evaporation, increased salinity due to seawater intrusion into aquifers in coastal areas, and soil salinity and saline groundwater in inland areas. Shallow groundwater resources and small dams with small catchments are the most vulnerable.

"Even if water access is identified through mapping, how is it allocated to make sure it is sustainable. If such resources are identified and then not managed effectively how does this affect future viability including water recharge, quality and treatment options? Can we have a traffic light system that looks at suitability of an area for operations based on available data including water security information?" – Livestock meat processor, Shire of Plantagenet

Outcomes

- Water harvesting and storage systems are a reliable supply for livestock, irrigation, and crop spraying.
- Agricultural activities are water-efficient and optimised.

Implementation Approach
Wider adoption of water-efficient technologies and practices that optimise usage in agricultural activities.
Better planning around and proclamation of water sources in high demand areas, to ensure effective allocation to highest priority purpose.
Increased access to hydrology expertise to inform land management and water management.
LGA-level water plans that promote understanding of supply and demand, emergency water supplies, potential new water sources and competing demands.
Investment in new water infrastructure to meet increasing demand and drought-proof industries and businesses, whilst nurturing the natural environment.

Theme Alignment:

RESILIENT WATER

RESILIENT AGRICULTURE

RESILIENT LANDSCAPES

Focus Area 2: Climate Monitoring and Forecasting

Improved climate monitoring and forecasting will enable better planning and risk management, helping producers make informed decisions using data from climate models, and decision support tools for crop and livestock management. This can reduce losses and increase productivity.

The DVA analysis highlights the anticipated rainfall reductions in the coastal subregion under a medium emissions scenario by 2050. Based on this forecast:

- Albany is expected to experience a significant reduction in mean annual rainfall, with a decrease of 106 mm, particularly during the Winter and Spring months
- Denmark is forecast to face an even larger reduction, with a decrease of 131 mm annually by 2050, also predominantly in Winter and Spring
- Frankland River and Mount Barker are predicted to see more modest decreases in rainfall, with reductions of 14 mm and 28 mm respectively in annual averages by 2050.

This data suggests that the coastal areas face considerable changes in seasonal rainfall patterns during key agricultural months. Early warning systems and timely access to data will empower producers and communities to be informed and proactive.

"It would be beneficial to have access to consolidated weather data which links together broader climatic trend data (e.g. Indian Ocean Dipole and El Nino/La Nina predictors) to regional data predictions and trends to the locality of the producer. This is about being able to have validated and reliable data to forward plan and make decisions about crop management or business decisions" – Stakeholder survey response

Outcomes

- Regional communities have access to climate monitoring systems that are accurate and timely.
- Producers can readily access climate data, including changing rainfall patterns, to inform planning and decision-making processes.

Implementation Approach
Increased investment in climate monitoring systems that provide accurate and timely weather forecasts.
Better access to climate data to inform agriculture planning and decision-making processes, aiding producers in adapting to changing rainfall patterns.
Increased investment in advanced weather stations and localised climate models, that provide regular climate updates and advisories to coastal subregion communities.

Theme Alignment:

RESILIENT AGRICULTURE

RESILIENT REGIONAL ECONOMY

RESILIENT COMMUNITY

Focus Area 3: Soils and Sustainable Agricultural Practices

Good soil health is critical for agricultur al practices and natural habitats. Our soil is fragile and an essential asset for production of food and protection of ecosystems for future generations. Adopting sustainable practices will improve soil health, increase crop yields, and reduce the environmental footprint of agriculture. This will contribute to long-term agricultural sustainability and profitability.

Soil is a non-renewable source that is critically vulnerable to loss and degradation, particularly during periods of extreme climatic conditions like drought. Erosion is one of the greatest risks to soil health, as it strips away the fertile top layers of soil and organic matter[32] taking with it most of the fertility and organic matter of the soil.[33]

The impact drought has on soil is complex. Reduced rainfall and higher temperatures dry out the soil, creating cracks that reduce the moisture and volume of the soil, and affect the activity of soil organic matter. This reduces soil particle cohesion, changes soil texture decreasing its water holding capacity, and limits plant growth reducing vegetation and crop residue cover. This leaves soil vulnerable to erosion through water runoff and wind.

"If we have diversity of plant coverage vs bare soil our system will be more resilient...If you sit on the beach for 8 hours in the sun it ends badly. The same goes for our fruit"
– Vineyard owner, Albany

Supporting sustainable agriculture practices and carbon farming, has also been identified by stakeholders as fundamentally important to restore and enhance the health and biodiversity of soils and other ecosystems.

Outcomes

- Producers are informed and supported to mitigate risks associated with climate variability on soil health and crop resilience.
- Coastal subregion communities can access educational programs, resources and tools around sustainable land use and management practices.

Implementation Approach
Effective local networks that communicate the benefits of soil moisture retention techniques to improve soil health and crop resilience.
Wider adoption of drought-tolerant crop varieties and diversified cropping systems which have the potential to mitigate risks associated with climate variability.
Wider adoption of practices that prevent soil erosion, such as maintaining ground cover and restricting grazing during vulnerable periods.
Promote the adoption of land use and management practices that protect and improve soil fertility.

Theme Alignment:

RESILIENT AGRICULTURE

RESILIENT REGIONAL ECONOMY

RESILIENT LANDSCAPES

32 NSW Department of Planning and Environment (30 Jan 2020), *Wind erosion*, NSW Government. https://www.environment.nsw.gov.au/topics/land-and-soil/soil-degradation/wind-erosion Retrieved 30 May 2022
33 Agriculture Victoria (18 June 2021), *Protecting the land in dry times*, Victoria State Government, https://agriculture.vic.gov.au/farm-management/managing-for-and-during-drought/protecting-the-land-in-dry-times Retrieved 30 May 2022

Focus Area 4: Community Engagement and Support

Strengthening social capital, ensuring access to education and health services, fostering economic diversification and protecting the natural environment will contribute to the overall well-being and sustainability of the community.

Developing community cohesiveness is a key part of building drought resilient communities.

Coastal subregion workshop participants reported a wide range of impacts from their drought experiences – from the stress associated with working off farm to support debt payments and the mental anguish of seeing the devastation of drought on the environment, to the value of looking after community recreation spaces such as ovals and parks.

Developing qualities and assets in coastal subregion communities that support community cohesiveness (for example, investing in community infrastructure like health and education cultivating support networks such as sporting clubs and fostering economic diversification) is a fundamental part of building drought resilience under this plan.

Strong social networks are crucial for fostering a sense of belonging, mutual support, and collective action during challenging times. In addition, more formal local networks play a critical role in the dissemination of information within regional communities, including information on early detection of potential drought conditions, and supporting the on the ground responses of responsible authorities in times of drought and associated emergencies (for example bushfire).

"As owners, employers you feel the stress of dry seasons, and you feel the impact of other industries...vineyards, sheep, everyone is doing it tough at the moment"
– Vineyard owner, Frankland River

There is real shame in talking about not coping – providing psychological or other support so that people can access it when they need and reduce the stigma about asking for help is important...to get ahead with support rather than feeling like you need to do it on your own"
– Producer, Albany

Outcomes

- The wellbeing of coastal subregion communities is supported by a diverse range of assets and other qualities (for example access to services, groups and programs) that enhance social capital and promote community cohesion.
- Local economies are diverse and provide varied education and employment opportunities, creating a more stable economic environment that is better able to withstand and respond to the economic impacts of drought.

Implementation Approach
Support proactive investment in health, education and other key government services to support the wellbeing of coastal subregion communities
Fit for purpose community spaces (including natural environments and recreational spaces) and community-run events that support community cohesion and wellbeing.
Effective local networks that undertake early detection and monitoring of seasonal conditions and disseminate relevant information to coastal subregion communities about the potential for drought conditions.
Increased investment in education and training that helps to build a skilled and adaptable workforce, enabling individuals and businesses to pursue diverse economic opportunities.

Theme Alignment:

RESILIENT REGIONAL ECONOMY

RESILIENT COMMUNITY

Focus Area 5: Risk Management and Adaptive Capacity

Comprehensive risk management plans will help producers mitigate the financial risks associated with drought and other climatic events, ensuring the stability and continuity of agricultural businesses. Flexibility is a key part of responding to drought, and this should be reflected in approaches at farm level, and in the funding strategies and policies of industry and government decisionmakers. Providing access to education, resources and training around adaptive practices and climate resilience, will empower producers and educate the wider community about responding to the uncertainty of drought. This will help to build social, environmental and economic resilience across the community, support farm viability and support the mental health and wellbeing of farmers and their families.

Crisis management is the basis of many drought mitigation plans; however, studies indicate that effective drought management strategies are based on risk management. Effective drought risk assessments take into account both drivers and patterns of risk and vulnerability and consider the effectiveness of actions of individuals and institutional bodies.[34]

When drought occurs, the largest impacts are economic, with substantial impact on household incomes.[35] Australian farm businesses already face a high level of risk due to variations in weather conditions and export focussed and unregulated commodity markets.[36] Drought compounds the risks, and the financial impact for producers can be severe, with reduced productivity and profitability.

The above is reflected in the DVA analysis around decreased operating surplus in years of drought, particularly the 2019 drought, and the drought experiences recounted by local producers.

"The opportunity is for better understanding of how to deal with risk in an increasingly turbulent environment...the ability to sit with uncertainty is likely to become increasingly essential for best practice. Flexibility, not rigidity in planning needs to be emphasised"
– Stakeholder survey response

"...smaller family enterprises are not able to compete or ride out the harder years... Smaller producers have to meet the same requirements in the same way with fewer resources, so people give up. This stifles innovation and people's willingness to give new things a go that might make a difference and improve efficiencies" – Apiarist, Albany

Outcomes

- Producers can access decision support and financial tools to mitigate the economic impact of drought and improve preparedness.
- Regional communities have access to financial support and incentives for implementing resilience-building practices.
- Regional communities can access training and educational programs on adaptive practices and climate resilience.
- Resources and tools that help producers anticipate and respond to drought conditions effectively are developed.

34 Hagenlocher et al., 2019 cited in Understanding the Social Impacts of Drought, Lester et. al, Centre for Social Impact WA, June 2022, p.48.
35 Edwards, B., Gray, M., Hunter, B. (2008). Social and economic impacts of drought on farm families and rural communities. Australian Institute of Family Studies. Retrieved 13-04-2022 www.pc.gov.au
36 Peel, M.C, McMahon, T.A, and Finlayson, B.L., 2004, 'Continental differences in the variability of annual runoff-update and reassessment', Journal of Hydrology, vol.295, no. 1, pp. 185-197

Implementation Approach
Collaborations and partnerships that support the development of risk management strategies tailored to the specific vulnerabilities of different enterprises, agricultural sectors and geographical areas within the subregion.
Effective local networks that communicate the benefits of decision support tools to mitigate the economic impact of drought and improve productivity, with a focus on engaging with smaller landholders and enterprises.
Increased investment in training and educational programs to regional communities on adaptive practices and climate resilience.
Effective local networks that build awareness of financial support and incentives for producers and agricultural businesses implementing resilience building practices.
Increased investment in resources and tools that help producers anticipate and respond to drought conditions effectively.

Theme Alignment:

RESILIENT AGRICULTURE

RESILIENT REGIONAL ECONOMY

Focus Area 6: Research and Innovation

Research drives innovation, helping to develop new technologies and practices that improve ecosystem resilience, optimise resource use, and mitigate human impact. This investment will safeguard natural systems, support sustainable development, and enhance the long-term well-being of both ecosystems and communities.

Investing in research and innovation for local solutions will drive the development of new technologies and methods to enhance agricultural productivity and resilience. This can lead to breakthroughs that significantly improve economic outcomes for the agriculture sector.

At the same time, investing in adaptive management and research to protect the environment is crucial because it allows for flexible, science-based responses to evolving environmental challenges such as climate change, habitat loss, and biodiversity decline.

"We had a really wet winter in 2021 and on 20 June 2021 we got 120mL in a few hours which washed away much of our ground growing produce and forced our hand to look at hydroponics to insure against such variability and frequency of rain events. The initial outlay is significant, but the time taken to do modelling to fit out for your site is costly. By 2025 will be at 50% of production" – Producer, Horticulture, Albany

Outcomes

- Local leadership of new technologies and methods for improving drought resilience in agriculture.
- Funding programs support the adoption of innovative and sustainable agricultural practices.

Implementation Approach
Effective networks with both a local and broader reach that identify opportunities to connect with research, technologies and methods for improving drought resilience in agriculture.
Increased collaborations and partnerships between researchers, policymakers, and producers to develop practical and scalable solutions in the subregion.
Wider take up of funding programs that support the adoption of innovative and sustainable agricultural practices.

Theme Alignment:

RESILIENT AGRICULTURE

RESILIENT REGIONAL ECONOMY

Focus Area 7: Environmental Conservation

Our communities are passionate about protecting the environment in which they live, and there are many ways to engage with the community to create action. Vegetation and biodiverse habitats are vital as they provide a range of ecosystem services such as clean air, water filtration, carbon storage, and soil fertility. They support biodiversity by offering food, shelter, and breeding grounds for countless species, as well as creating spaces for cultural heritage, education and activities.

Without proper protection, the loss of vegetation and habitats can lead to ecosystem collapse, reduced agricultural productivity, and diminished quality of life for both humans and wildlife. Healthy ecosystems enhance resilience to climate change, help regulate natural cycles and protect against extreme events like floods and droughts.

Drought also heightens risks such as wildfires which can devastate ecosystems. The Mediterranean-type climate in the southwest of WA is characterised by conditions that are conducive to ignition and spread over a 4–8month period. There are various weather factors that influence the fire environment including coastal sea-breezes, strong easterly winds, abrupt wind changes, and regular lightning storms. The changing climate means that the impact of future droughts could be more severe, with more wind erosion and damage to vegetation and biodiversity.

Recurrent fires that tear through forests and bushland can cause serious loss of vegetation and biodiversity, as plants are burnt off, and animals are killed both from the fire, and from the loss of their habitat and food source. Farmland is scorched, destroying pasture, and infrastructure, and killing livestock. Ash pollutes both the air and waterways, causing issues to human health, and depositing unwanted nutrients that can stimulate harmful algae blooms.

Investing in adaptive management and research to protect the environment is crucial. Noongar control over, and participation in, projects that restore natural ecology is a well-being measure that supports Noongar mental health. Using real-time monitoring and feedback to adjust strategies as conditions change will ensure effective resource conservation.

"[We] need to focus on protecting what native vegetation we still have through fencing, weed control and revegetation. Also need to increase education and compliance on protecting vegetation and urban trees" – Natural resource management group, Albany

"Flora and fauna, whilst important for land regeneration and sustainability, also have agritourism potential" – Aboriginal tourism representative, Great Southern

"[As] elders are maturing in age, there are concerns that the transference of traditional ecological knowledge (TEK) into bush-fire mitigation strategies are inadequate" – Aboriginal Corporation, Great Southern

Outcomes

- Natural vegetation is protected and restored to enhance ecosystem resilience and biodiversity.
- Land management practices maintain or improve the condition of natural resources and ecosystems.

Implementation Approach
Attract investment in research and initiatives that protect and restore natural vegetation areas.
Wider adoption of land management practices that maintain or improve the condition of natural resources and ecosystems.
Effective local networks that support First Nation's stewardship of natural resources to create economic opportunities and facilitate the use of traditional ecological knowledge (TEK) and land management practices.
Effective local networks that address bushfire vulnerability by building regional capacity around strategic risk mitigation.
Effective local networks that connect urban populations to biodiversity and environmental values.

Theme Alignment:

RESILIENT COMMUNITY

RESILIENT LANDSCAPES

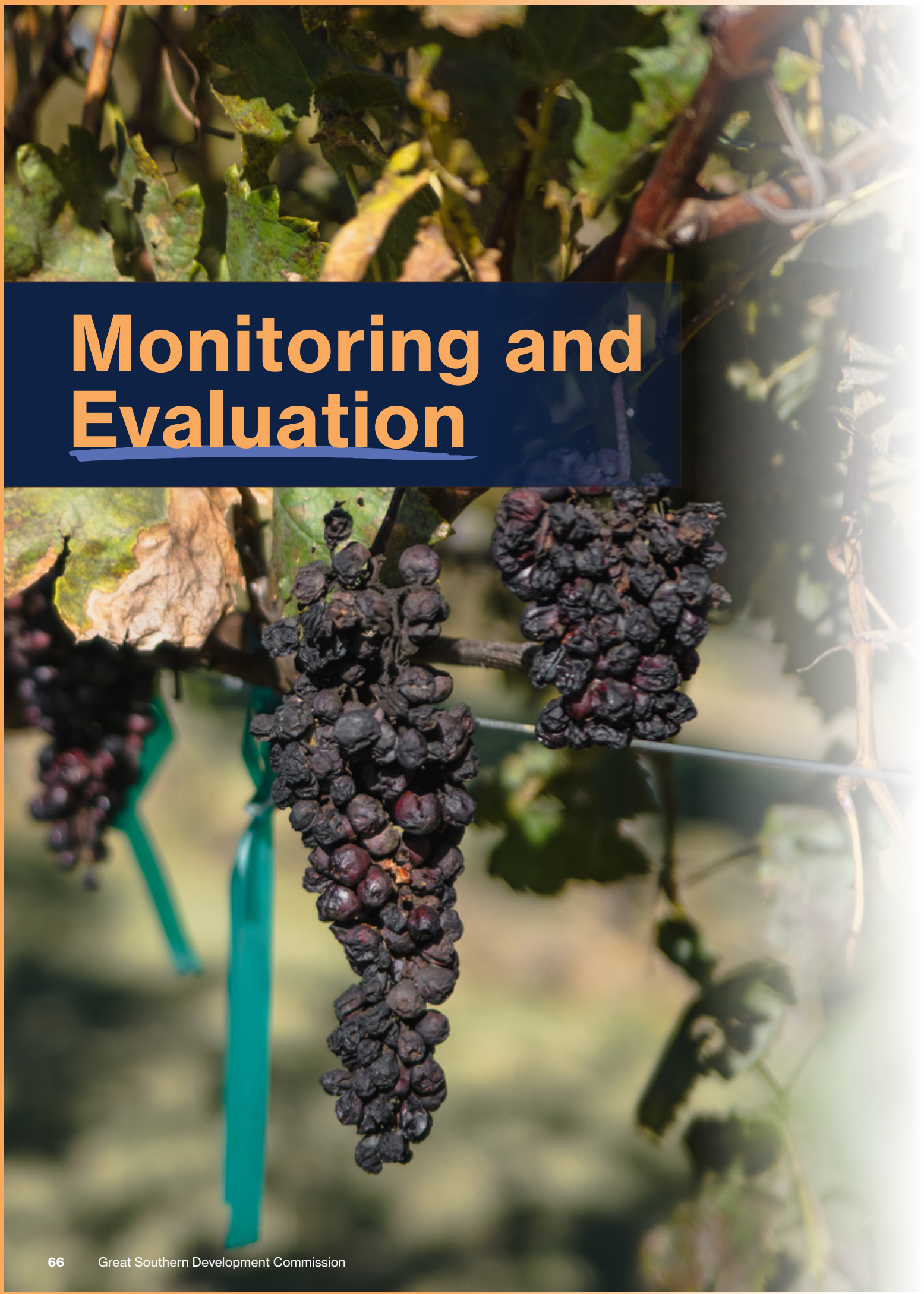
Next Steps

The GSDC will establish an Implementation Working Group that will partner with communities and businesses to deliver drought resilience projects that align with the focus areas and outcomes identified in this Plan.

These projects will be locally-led and co-designed, in collaboration with (for example, but not limited to); coastal subregion LGAs, the South Coast Alliance Inc. the South-West WA Drought Resilience Adoption and Innovation Hub, DPIRD, South Coast NRM, Wagyl Kaip Southern Noongar Aboriginal Corporation and the Department of Water and Environmental Regulation.

The Implementation Working Group will assess projects to achieve incremental, transitional and transformational change, and consider the DVA Vulnerability Index of each LGA.

Some projects will require further investment through the Future Drought Fund Investment Strategy.



Monitoring and Evaluation

Monitoring and evaluation are critical components of effective drought resilience planning, providing the framework to assess progress, adapt strategies, and achieve intended outcomes.

The Monitoring and Evaluation Framework for this Plan sits within the broader context of the FDF Monitoring, Evaluation and Learning Plan (MELP) and the WA RDRP Monitoring Evaluation and Reporting Plan (MERP). During the program period, reporting against the MELP and MERP is coordinated by DPIRD in WA, including monthly activity tracking, quarterly reporting and a six monthly progress report to the DAFF. The MERP also includes a client survey at the completion of the program to collect qualitative data on engagement, capacity and understanding of drought resilience. A FDF Steering Committee formed within DPIRD will provide high-level monitoring and evaluation of the program at a state level.

The Monitoring and Evaluation Framework outlines how the regional level impact of the Coastal Great Southern RDR Plan will be measured against the federal, state and regional indicators. In addition to qualitative measures, the DVA identifies key areas of vulnerability to inform focus areas and implementation approaches. The information captured in the DVA could be used as a baseline for comparison with future assessments to measure the success of the program at building drought resilience.

Short term FDF indicators of success:

- Regional representatives have considered and planned incremental, transitional and transformational opportunities to strengthen resilience.
- Identified actions, pathways and opportunities (including innovative and transformative) to improve regional drought resilience, mitigate risks and adapt to change.
- Communities use relevant data and information to better understand their resilience to plan for drought.
- Plans have buy-in from key stakeholders in the region.
- The number of, and participation in, local networks and programs to enhance drought resilience increases.
- Communities share knowledge, collaborate and partner with government more often to build drought resilience.
- Regional leaders are in a stronger position to implement strategic actions, adapt to change and take advantage of opportunities to build economic resilience as they arise.
- Partnerships, networks and engagement are built between stakeholders managing natural resources.
- Increased community understanding of the region's current and future drought resilience, considering the region's unique economic, environmental and social characteristics.
- Natural resource management capability is improved across region.

Long term FDF indicators of success:

- Agricultural landscapes are functional and sustainable, with healthy natural capital (environmental resilience).
- Agricultural businesses are self-reliant, productive, and profitable (economic resilience).
- Agricultural communities are resourceful, adaptable, and thriving (social resilience).
- Stronger connectedness and greater social capital within communities, contributing to wellbeing and security.
- Communities implement transformative activities that improve their resilience to drought.
- More primary producers preserve natural capital while also improving productivity and profitability.

Monitoring and Evaluation Approach

The GSDC will use a mixed method approach to monitor and evaluate the progress and performance of the Coastal Great Southern RDR Plan including:

- Annual Reporting and Reviews
- Surveys and interviews
- Focus groups
- Quantitative data analysis
- Qualitative data analysis through case studies, most significant change stories.

Monitoring will be conducted annually with comprehensive reviews in line with the short (1-4 years), medium (4+) years and long (10+ years) term outcomes.

Key Evaluation Questions will determine:

- **Relevance**: are the implementation approaches addressing identified needs? Is the plan being utilised for funding applications?
- **Effectiveness**: Are the outcomes being achieved? To what extent? Have any barriers been identified? Are our communities connected and empowered?
- **Efficiency**: Are resources being used well? Are stakeholders able to contribute to activities in the plan?
- **Impact**: What changes (or outcomes) have occurred because of the implementation approaches?
- **Sustainability**: Will benefits persist over time? What progress has been made towards a drought resilient region?

Reporting and Responsibility

Though the implementation of the Plan will be undertaken by a range of agencies and organisations, the GSDC, with DPIRD, are responsible for monitoring and evaluation through this framework.

Reporting will include progress towards achieving the desired outcomes of the Coastal Great Southern RDR Plan through the identified priorities and implementation activities. In addition to monitoring, reporting will be used to capture emerging opportunities, record learnings and considerations for future interventions. Short-term evaluation will be captured through DPIRD MERP reporting during the program phase.

Adaptive Learning

GSDC will leverage the existing Inland Great Southern Regional Drought Resilience Subcommittee to govern, share knowledge and learnings throughout the implementation of both the Inland and Coastal Great Southern RDR Plans. This could include aligning innovations across projects and brokering the relevant links between projects and stakeholders.

As drought resilience processes mature, the ability for further robust adaptation pathways to be implemented will emerge. The table below captures specific items identified for integration as part of future plan iterations:

Table 4. Key aspects of consideration to guide future plan iterations

	Key aspects of consideration to guide future plan iterations
1	**Definitions, vision, goals, outcomes** Future updates of the plan could further clarify the concept of transformation. For example, a long-term indicator of success is stated as 'communities implement transformative activities that improve their resilience to drought', without describing what this entails, or any potential criteria for assessing whether an activity is transformative or not. Future updates of the plan could revise the intended outcomes with stakeholder engagement to better reflect the region-specific context and outcomes that are practicable in times of future drought.
2	**Stakeholder engagement, participation and partnerships** Future updates of the plan could be better informed by stakeholder mapping of groups vulnerable to drought. For example, identifying under-represented community segments, gauging community capacity to participate, and participation levels of different groups (e.g. age, gender, vulnerable people, First Nations people, and minority groups). This information could be used to improve identification, selection, and engagement of stakeholders, and to ensure that adequate supports are in place to involve different community segments. It will also ensure that the most impactful actions are being prioritised.
3	**Active learning and adaptive governance** Future plan updates would benefit from clearer articulation of structured learning processes across its various components, and for more stakeholder learning processes as actions progress. This could be connected to, and consistent with, the monitoring, evaluation and learning (MEL) framework. Future plan updates could specify in more detail the formal adaptive governance arrangements, explaining how they address the following three questions: (i) How will the governance arrangements ensure ongoing appropriate representation of groups with different vulnerabilities to drought, including First Nations communities and non-farming populations? (ii) How will the governance be nested with other governance structures and ensure that decisions are made at the appropriate level (the level closest to where they will have an effect)? (iii) How will responsibilities and ownership of the plan be balanced with rights and resources at appropriate levels for coordinating and implementing resilience-building activities?
4	**System description and resilience assessment** Future plan updates could go beyond characterising impacts and vulnerabilities to provide a more comprehensive assessment of what confers resilience to drought in different sectors, supply chains and segments of communities. This could involve explicitly considering the capacities (anticipatory, absorptive, adaptive and transformative) of the region's different sectors and community segments to drought and related stresses and shocks. Such an assessment would better inform resilience-building pathways and intervention options.
5	**Future scenarios** Future plan updates could develop a suite of plausible future scenarios through a participatory process and consider a mix of livelihoods and sectors, including those that rely less on agriculture and water. The participatory scenario development process and its outcomes could inform active learning and adaptive governance for future updates of the plan and its implementation.

Coastal Great Southern RDR Plan Monitoring and Evaluation Framework

THEMES	FDF ALIGNMENT	WA RDRP ALIGNMENT	LOCAL OUTCOMES	INDICATORS	TIME FRAME
Resilient Landscapes **"Healthy landscapes with natural resources able to sustain industry and environmental services"**	***Improve the natural capital of agricultural landscapes for better environmental outcomes***	*WA's primary producers are productive, profitable and preserve natural capital (Environmental Resilience)*	**Focus Area 1: Water Infrastructure and Management** Water harvesting and storage systems are a reliable supply for livestock, irrigation, and crop spraying. Agricultural activities are water-efficient and optimised.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased adoption of innovative, reliable and water efficient systems for farms, industry and the coastal subregion community.	10+ years
				Integrated water plans for LGAs in the coastal subregion.	4+ years
			Focus Area 3: Soils and Sustainable Agricultural Practices Producers are informed and supported to mitigate risks associated with climate variability on soil health and crop resilience. Producers can access educational programs, resources and tools around sustainable land use and management practices.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to educational programs, resources and tools around sustainable land use and management practices.	4+ years
				Producers feel supported to mitigate risks associated with climate variability on soil health and crop resilience.	4+ years
			Focus area 7: Environmental Conservation Natural vegetation is protected and restored to enhance ecosystem resilience and biodiversity. Land management practices maintain or improve the condition of natural resources and ecosystems.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased areas of natural vegetation that are protected and restored to enhance ecosystem resilience and biodiversity.	10+ years
				The condition of natural resources and ecosystems is maintained or improved.	10+ years
Resilient Agriculture **"An agriculture sector that is highly engaged in innovating farming systems to be resilient to drought"**	***Grow the self-reliance and performance (productivity and profitability) of the agricultural sector***	*WA's regional communities are connected, well and secure.*	**Focus Area 1: Water Infrastructure and Management** Water harvesting and storage systems are a reliable supply for livestock, irrigation, and crop spraying. Agricultural activities are water-efficient and optimised.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased adoption of innovative, reliable and water efficient systems for farms, industry and the coastal subregion community.	10+ years
				Integrated water plans for LGAs in the coastal subregion.	4+ years

THEMES	FDF ALIGNMENT	WA RDRP ALIGNMENT	LOCAL OUTCOMES	INDICATORS	TIME FRAME
Resilient Agriculture **"An agriculture sector that is highly engaged in innovating farming systems to be resilient to drought"**	***Grow the self-reliance and performance (productivity and profitability) of the agricultural sector***	*WA's regional communities are connected, well and secure.*	**Focus Area 2: Climate Monitoring and Forecasting** Regional communities have access to climate monitoring systems that are accurate and timely. Producers can readily access climate data, including changing rainfall patterns, to inform planning and decision-making processes.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to accurate and timely climate monitoring systems.	4+ years
				Producers feel informed and better able to make decisions using accurate and timely climate data.	4+ years
			Focus Area 3: Soils and Sustainable Agricultural Practices Producers are informed and supported to mitigate risks associated with climate variability on soil health and crop resilience. Producers can access educational programs, resources and tools around sustainable land use and management practices.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to educational programs, resources and tools around sustainable land use and management practices.	4+ years
				Producers feel supported to mitigate risks associated with climate variability on soil health and crop resilience.	4+ years
			Focus Area 5: Risk Management and Adaptive Capacity Producers can access decision support and financial tools to mitigate the economic impact of drought and improve preparedness. Producers have access to financial support and incentives for implementing resilience-building practices. Regional communities can access training and educational programs on adaptive practices and climate resilience. Resources and tools that help producers anticipate and respond to drought conditions effectively are developed.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to financial support and tools that mitigate the economic impacts of drought and help regional communities effectively prepare for and respond to drought conditions.	4+ years
				Increased participation in training and educational programs on adaptive capacity and climate resilience.	4+ years
				Regional communities feel supported to implement resilience-building practices.	4+ years
			Focus Area 6: Research and Innovation Local leadership of new technologies and methods for improving drought resilience in agriculture. Funding programs support the adoption of innovative and sustainable agricultural practices.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased uptake of funding programs that support the adoption of innovative and sustainable agricultural practices.	4+ years
				Increased local access to new technologies and methods for improving drought resilience in agriculture.	4+ years

THEMES	FDF ALIGNMENT	WA RDRP ALIGNMENT	LOCAL OUTCOMES	INDICATORS	TIME FRAME
Resilient Water **"The region has a water system the community has confidence in to sustain industry, agriculture, and the community through consecutive decile 1 rainfall years"**	***Improve the natural capital of agricultural landscapes for better environmental outcomes***	*WA's primary producers are productive, profitable and preserve natural capital*	**Focus Area 1: Water Infrastructure and Management** Water harvesting and storage systems are a reliable supply for livestock, irrigation, and crop spraying. Agricultural activities are water-efficient and optimised.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased adoption of innovative, reliable and water efficient systems for farms, industry and the coastal subregion community.	10+ years
				Integrated water plans for LGAs in the coastal subregion.	4+ years
Resilient Communities **"Communities that are resourceful, adaptable and supported to mentally and physically bounce back from drought"**	***Strengthen the well-being and social capital of rural, regional and remote communities.***	*WA's regional communities are transforming and improving drought resilience.*	**Focus Area 2: Climate Monitoring and Forecasting** Regional communities have access to climate monitoring systems that are accurate and timely. Producers can readily access climate data, including changing rainfall patterns, to inform planning and decision-making processes.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to accurate and timely climate monitoring systems.	4+ years
				Producers feel informed and better able to make decisions using accurate and timely climate data.	4+ years
			Focus Area 4: Community Engagement and Support The wellbeing of regional communities is supported by a diverse range of assets and other qualities (for example access to services, groups and programs) that enhance social capital and promote community cohesion. Local economies are diverse and provide varied education and employment opportunities, creating a more stable economic environment that is better able to withstand and respond to the economic impacts of drought.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to services, groups and programs that promote community cohesion during drought.	4+ years
				Regional communities feel supported and connected during drought.	4+ years
			Focus area 7: Environmental Conservation Natural vegetation is protected and restored to enhance ecosystem resilience and biodiversity. Land management practices maintain or improve the condition of natural resources and ecosystems.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased areas of natural vegetation that are protected and restored to enhance ecosystem resilience and biodiversity.	10+ years
				The condition of natural resources and ecosystems is maintained or improved.	10+ years

THEMES	FDF ALIGNMENT	WA RDRP ALIGNMENT	LOCAL OUTCOMES	INDICATORS	TIME FRAME
Resilience Regional Economy **"A diverse, forward-looking, adaptable business sector, not wholly dependent on seasonal conditions"**	***Grow the self-reliance and performance (productivity and profitability) of the agricultural sector***	*WA's regional communities are connected, well and secure*	Focus Area 2: Climate Monitoring and Forecasting Regional communities have access to climate monitoring systems that are accurate and timely. Producers can readily access climate data, including changing rainfall patterns, to inform planning and decision-making processes.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to accurate and timely climate monitoring systems.	4+ years
				Producers feel informed and better able to make decisions using accurate and timely climate data.	4+ years
			Focus Area 3: Soils and Sustainable Agricultural Practices Producers are informed and supported to mitigate risks associated with climate variability on soil health and crop resilience. Producers can access educational programs, resources and tools around sustainable land use and management practices.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to educational programs, resources and tools around sustainable land use and management practices.	4+ years
				Producers feel supported to mitigate risks associated with climate variability on soil health and crop resilience.	4+ years
			Focus Area 4: Community Engagement and Support The wellbeing of regional communities is supported by a diverse range of assets and other qualities (for example access to services, groups and programs) that enhance social capital and promote community cohesion. Local economies are diverse and provide varied education and employment opportunities, creating a more stable economic environment that is better able to withstand and respond to the economic impacts of drought.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to services, groups and programs that promote community cohesion during drought.	4+ years
				Regional communities feel supported and connected during drought.	4+ years
				A diverse local economy that can withstand and respond to the economic impacts of drought.	10+ years

THEMES	FDF ALIGNMENT	WA RDRP ALIGNMENT	LOCAL OUTCOMES	INDICATORS	TIME FRAME
Resilience Regional Economy **"A diverse, forward-looking, adaptable business sector, not wholly dependent on seasonal conditions"**	***Grow the self-reliance and performance (productivity and profitability) of the agricultural sector***	*WA's regional communities are connected, well and secure*	Focus Area 5: Risk Management and Adaptive Capacity Regional communities can access decision support and financial tools to mitigate the economic impact of drought and improve preparedness. Producers have access to financial support and incentives for implementing resilience-building practices. Regional communities can access training and educational programs on adaptive practices and climate resilience. Resources and tools that help producers anticipate and respond to drought conditions effectively are developed.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased access to financial support and tools that mitigate the economic impacts of drought and help regional communities effectively prepare for and respond to drought conditions.	4+ years
				Increased participation in training and educational programs on adaptive capacity and climate resilience.	4+ years
				Regional communities feel supported to implement resilience-building practices.	4+ years
			Focus Area 6: Research and Innovation Local leadership of new technologies and methods for improving drought resilience in agriculture. Funding programs support the adoption of innovative and sustainable agricultural practices.	Number of projects underway to progress implementation approaches.	1-4 years
				Increased uptake of funding programs that support the adoption of innovative and sustainable agricultural practices.	4+ years
				Increased local access to new technologies and methods for improving drought resilience in agriculture.	4+ years

Appendices

Appendix 1: Strategic Alignment

Coastal Great Southern Region Drought Resilience Plan – Strategic Alignment

Strategy	Alignment
WA Climate Adaption Strategy 2023	A strategy to ensure Western Australia's communities, environment and economy are resilient and continuously adapting to climate change in a forward-looking, fair and collaborative manner. The strategy identifies four directions to support and accelerate climate adaptation across the state: 1. Produce and communicate credible climate information and resources; 2. Build public sector climate capability and strengthen accountability; 3. Enhance sector-wide and community partnerships to unite and coordinate action; and 4. Empower and support the climate resilience of Aboriginal people.
Drought Resilience Funding Plan 2024-2028	Provided by the Australian Government Future Drought Fund, the objectives of the Drought Resilience Funding Plan 2024-2028 are: To build economic resilience – growing the productivity and self-reliance of the agricultural sector; to build environmental resilience – improving the function of agricultural landscapes through effective management of the natural resource base; and to build social resilience – strengthening the social capital, wellbeing, and connectedness of rural, regional and remote agricultural communities.
Diversify WA: 2024 Update	Diversify WA is Western Australia's economic development framework. It sets out initiatives, actions and strategies that will contribute to achieving its vision for "a strong and diversified economy delivering secure, quality jobs through increased investment across a broad range of industries". The Primary Industries is one of 9 sectors for strategic development that match WA's unique strengths with global trends to achieve growth across the economy.
Water and Environmental Regulation Strategic Plan 2022-2026	Strategies of the Department of Water and Environmental Regulation include: improved regulatory capability, better management of the environment and strategic solutions to big environmental challenges.
DPIRD Strategic Intent 2022-2026	Department of Primary Industries and Regional Development's Strategic Intent 2022-26 outlines the department's role, purpose, approach and priorities, and new and emerging initiatives to improve and diversify industry and regional competitiveness. Research and development and protection of natural resources are also part of the plan.

Strategy	Alignment
Western Australian Climate Policy	The WA Climate Policy outlines the State Government's commitment to climate change adaptation and achieving net zero greenhouse gas emissions by 2050.Several climate resilience initiatives are identified as part of this policy, including the Climate Resilience Action Plan 2022-25, Climate Science Initiative, Climate Risk Framework and Pilot Sectoral Adaptation Plans. The Climate Science Initiative is aimed at understanding how future global emissions will affect WA's climate. As part of this initiative, climate projections will be provided along with communications material that support agribusinesses and government with interpreting the projections
Great Southern Development Commission Strategic Plan 2024-2025	By working in partnership with local governments, businesses and communities, the GSDC aims to coordinate and support endeavours that build an integrated regional economy, foster regional growth, and transform our communities into vibrant places to work, play and learn. The GSDC's strategic goals include: Strong and diverse economy; Regional liveability; Strong communities; and Organisational excellence.
South Coast Natural Resource Management – Strategic Plan 2023-2030	A strategy to guide investment in natural resource management on the South Coast of WA. This Plan provides a common focus for the communities of the South Coast NRM region to work collectively towards the vision of looking after where we live – communities caring their environment.
Regional Planning and Infrastructure Framework	In June 2022, the Western Australian Planning Commission (WAPC) authorised the preparation of the eight new Regional Planning Strategies, to provide an updated strategy for each region. The Regional Planning Strategies describe broad trends, changes and forecasts in the regions to determine strategic directions that will define and shape appropriate planning responses over the next 20 to 30 years.
LGA Strategic Community Plans	The Strategic Community Plan outlines community long term (10+ years) vision, values, aspirations and priorities, with reference to other local government plans, information and resourcing capabilities. The Strategic Community Plan is not static. A full review is required every four years with a desktop review every two years. The Strategic Community Plan includes establishing the community's vision for the local government's future, including aspirations and service expectations.
Great Southern Regional Water Supply Strategy	Department of Water and Environmental Regulation has developed the Great Southern regional water supply strategy to ensure timely planning and establishment of sustainable water supplies that support long-term regional development. Six strategies have been developed to secure regional water supplies. For more information or a copy of the Great Southern Regional Water Supply Strategy Evaluation, please contact: supply.planning@dwer.wa.gov.au.
Bush Heritage Australia Strategy 2030	2030 strategy is focused on priority Landscapes through land acquisitions, enduring connection to country and conservation on agricultural lands.
National Soil Action Plan 2023 to 2028	Three broad goals of the National Soil Strategy: Prioritise soil health; Empower soil innovation and stewards; and Strengthen soil knowledge and capability.
WA Planning Commission Lower Great Southern Strategy 2016	The purpose of the strategy is to guide land use planning and provide strategic direction for the Lower Great Southern over the next 20 years. One of the key aims is to ensure that land that is required for important regional infrastructure, priority agricultural land, economic growth opportunities, water sources and basic raw materials is identified and retained for those purposes.
State Infrastructure Strategy	This strategy outlines the state's significant infrastructure needs and priorities. It provides a long-term vision and infrastructure outlook across WA's 10 regions to identify both build and non-build solutions. Infrastructure directions for the Great Southern region include supporting agriculture and food, value adding and supply chain efficiency, addressing gaps in social services and infrastructure, including health, education, training and housing and supporting increased water and wastewater network capacity to improve water security.

Appendix 2: Regional Context – Strengths, Challenges, Needs and Opportunities

Geographic Strengths, Challenges, Needs and Opportunities

Strengths	Challenges
1. Cooler and more temperate climate, providing more diverse primary production opportunities (e.g. fruit, nuts, vegetables, wine grapes, dairy, poultry, timber, nursery products, etc.). 2. Access to the coast to support diversified primary production and other industry opportunities, particularly associated with fishing and aquaculture. 3. Access to the coast and Port of Albany provides strong export opportunities to support primary production and other industries. 4. Coastal positioning provides additional energy and water production opportunities which continue to emerge through technological advances (e.g. wave/tidal energy, desalination, green hydrogen production, etc.).	1. The distance from the state's capital, Perth, creates several challenges, including road, water and energy infrastructure capital development and maintenance times and costs, industry transport times and costs, and community isolation. 2. Distance impacts all industries and sectors that are heavily reliant on export and/or import, particularly primary production, construction, and tourism (in the context of destination visitor import). 3. Distance also impacts the attraction and retention of residents, directly through access and isolation, and indirectly through industry challenges (e.g. materials transport, construction delays, and costs of goods and services relative to Perth or closer regional areas).
Needs	**Opportunities**
1. Attraction/retention of residents, businesses & visitors. 2. Greater support and channels for primary production exports. 3. Expanded port capacity is needed to support primary production, mineral and, potentially, container exports. 4. Improved & diversified tourism packages, infrastructure development and promotion, to overcome the barrier of distance from the metropolitan area. 5. Expansion of aviation services to/from Perth (and potentially elsewhere) is required for the growth of the tourism and events sectors. 6. Enhanced opportunities for domestic and international transport networks. 7. Investment is required in inter-regional transport routes, including east-west links to meet the needs of residents, tourists and industry.	1. Enhanced community assets and infrastructure will serve to attract and retain residents. 2. Enhanced industry infrastructure and networks will serve to attract, retain and support businesses/ encourage industry development and expanded output. 3. Enhanced transport, business and trade infrastructure can encourage private investment into regional industry. 4. Strong and informed tourism and economic development initiatives can stimulate key growth sectors, such as construction, retail trade, arts and recreation, rental, hiring and real estate services. 5. Enhanced assets and infrastructure, with consequent growth in population and visitation, will increase opportunities for private and/or public investment in transport infrastructure and networks.

Demographic Strengths, Challenges, Needs and Opportunities

Strengths	Challenges
1. Reasonably strong resident attraction/retention and steady growth across Coastal Great Southern LGAs. 2. Strong future population growth prospects, supporting industry development and regional socio-economic development. 3. Strong and growing multiculturalism, adding new knowledge and skills, expanding and diversifying cultural experiences, and supporting industry development. 4. Strong historic median income growth, catching up to state and national incomes to reduce cost of living pressures. 5. Strong historic jobs growth, including in agricultural sectors, leading to industry output growth and overall regional socio-economic development. 6. Relatively low unemployment rates across all localities, demonstrating strong industry demand for workers.	1. Balancing the management of growth in coastal towns with well-planned infrastructure development, including addressing notable challenges associated with the availability of dwellings. 2. An ageing population, leading to increased demand in the aged care, housing, retail, recreation and lifestyle industries. It will require a skilled service sector workforce. 3. The outmigration of youth, reducing the availability of worker capital to support ageing populations and future skills needed for future growth and innovation. 4. Increasing multiculturalism, where some immigrant cohorts are poorly skilled and have minimal English, continuing to health issues and limiting capacity to become active members of the community, and/or where discrimination can cause isolation. 5. Indigenous people continue to face higher levels of discrimination and disadvantage than the broader community. 6. Lower personal incomes than WA and Greater Perth averages, but comparable costs of living; contributing to disadvantage. 7. Volatile rates of unemployment compared to state and national averages; creating uncertainty that may exacerbate disadvantage and outmigration of youth.
Needs	**Opportunities**
1. Continued growth in the region requires concomitant growth in the economy, supporting infrastructure development (including affordable housing and social services), and employment prospects to cater for the growth, together with social development. 2. An ageing population demands differing levels of infrastructure and services compared with a younger demographic, such as recreational needs, seniors housing, aged care services, and healthcare. 3. There is a need to attract and retain youth, not only to refresh an ageing workforce, but also to provide ongoing critical support services to an ageing population. This requires appropriate infrastructure and services. 4. Initiatives that will grow economic and employment opportunities for Aboriginal residents are fundamental to the long-term prosperity of the region. 5. Infrastructure and services to cater for multiculturalism, with diversified cultures presenting differing needs and to reduce community discrimination. 6. Existing industry resilience and diversification is required to improve income prospects and offset cost of living challenges.	1. An ageing population presents new opportunities for employment and income, for example in recreational fields and healthcare. 2. Diversified infrastructure and assets could attract and retain a younger age demographic, to reduce youth outmigration and cater for a multicultural community. 3. Diversification of the economy, stimulation and resilience building of sectors such as agriculture, construction, manufacturing, and education could help address comparative disadvantage in incomes and improve unemployment volatility. 4. With the further development of agriculture, construction, manufacturing, and supporting industries, there will be significant opportunities for Aboriginal people who have the skills to secure permanent jobs in these areas of the economy. 5. Significant opportunities exist associated with worker attraction and multicultural diversity, provided they can be suitably accommodated.

Economic Strengths, Challenges, Needs and Opportunities

Strengths	Challenges
1. A cooler and more temperate climate provides more diverse primary production opportunities. 2. The region is a net exporter, with particular strengths in primary production and manufacturing. 3. Livestock diversification in recent decades has resulted in a relative increase in the production of poultry and pork, particularly in Plantagenet. There are considerable ongoing export opportunities associated with sector development. 4. The Coastal Great Southern is one of the state's top performing wine producing regions. There is strong potential for expansion of sector output and associated tourism. 5. The subregion is a strong plantation timber grower. Woodchopping is a sector with established export market and port throughput. Additional value is gained through the existence of the Albany biomass plant. 6. A strong manufacturing base provides opportunities to capitalise on and adapt to growth in other industries and sectors (e.g. mining).	1. Per capita GRP is lower than for WA as a whole, and the lowest of all other regions apart from Peel. 2. Industry is dominated by agriculture, manufacturing and construction. A lack of diversification creates risks, particularly where industry is exposed to external geopolitical or climate forces. 3. The region's population is ageing, with potentially profound and far-reaching impact on the longer-term outlook, including productivity declines as the workforce retires, increased costs of health and welfare services, and possibility for a long-run population decline. 4. Current energy, water and transport infrastructure limits industry and business growth. 5. Rapid changes in technology will require concomitant upgrades to infrastructure to support them, particularly for advances in primary production, manufacturing and construction technologies that could make or break future performance of these top Coastal Great Southern industries. 6. The construction industry is lagging behind demand, particularly for residential dwellings, which is in turn impacting the attraction and retention of workers and the broader population.
Needs	**Opportunities**
1. Diversification of industry is required to boost performance, to provide support in times when certain industries experience downturns, and to reduce exposure to global megatrends. 2. There is a need to encourage new investment and expenditure throughout the Coastal Great Southern, where subregion tends to circulate existing capital or leak it to other regions and states. 3. Energy, water, transport and telecommunications / technology infrastructure must keep pace with industry demand and changing geopolitical, climate, and technology megatrends, or our top performing industries will suffer. 4. Primary production, manufacturing and construction industries in the Coastal Great Southern need to keep pace with global megatrends, in terms of both adaptation to climate, technological and geopolitical changes and increased volume output to support rapid urbanisation and demographic change. 5. The construction industry in particular needs to boost volume output to meet resident and worker demand, in turn supporting other industry growth and development (including through the attraction and retention of workers and through non-residential building development to support various industries).	1. Stimulation of the primary production, construction, manufacturing and related industries can boost performance in these sectors, including improvements to net export capabilities. 2. New job opportunities can provide enhanced economic outcomes for Great Southern residents, including persons experiencing disadvantage, and provide additional incentive to attract and retain younger residents. 3. The Great Southern has a wealth of untapped potential in local produce and niche primary production or manufacturing opportunities for international export markets, particularly to service growing Asian markets such as China, Indonesia, Malaysia and India. There are additional opportunities associated with global food security and land as a resource (e.g. niche products for global markets such as carbon sequestration credits). 4. There are opportunities for value-adding industries and to diversify the economy. For example, the end to live sheep export by sea could create new value-adding opportunities for the subregion. 5. An end to post-COVID Chinese tariffs on Australian produce provides opportunity to capitalise on renewed market availability (particularly for barley, beef, and wine). 6. Hardwood plantations in the area are mostly chipped or pulped, as for wider WA. There are opportunities to add greater value (e.g. through biomass or cross laminated timber sector establishment).

Appendix 3: Infrastructure Audit Summary

The following section provides a condensed summary of the infrastructure audit conducted for this plan. The full infrastructure audit is included in the ***Coastal Great Regional Context Report*** which can be accessed on the GSDC website www.gsdc.wa.gov.au

Infrastructure Audit

Infrastructure quality has a major effect on the capacity of a regional economy to grow, to remain resilient in the face of challenges, and to quickly leverage opportunities. Infrastructure is fundamental to the future success of the Great Southern.

The following section provides an overview of current infrastructure in the subregion, likely future demand, and the opportunities and challenges this will present for the region in the context of drought and adapting to a changing climate.

Key Findings – Transport Infrastructure (Road, Air, Rail, Sea)	
Current Situation	**Future Considerations**
The region's strategic freight, tourist and inter-town road routes are Albany Highway (the main route to and from Perth), South Coast Highway and Chester Pass Road. **Albany Regional Airport** is the only airport with scheduled passenger services, carrying over 60,000 passengers per year to and from Perth. **The region is well-serviced by rail transportation of bulk commodities,** predominantly grain (from a network of CBH receival bins) and woodchips. **The Great Southern Rail line** links to Perth, including Kwinana, and the Port of Albany. **The Port of Albany** provides a strong connection to global markets for primary produce and plays a secondary tourist visitation role, through hosting cruise ships. It is located in one of the three best natural harbours in the Southern Hemisphere, with safe natural anchorage, location to major shipping routes, road and rail access and the capacity for expansion for new industries.	**The quality and efficiency of the road network directly impinges on the competitiveness of the region's primary producers in global markets.** **The high cost of passenger flights** is a barrier to significant expansion. With additional investment, **there is potential to expand rail and freight services.** **The port does not have a containerisation facility,** which limits its role in relation to manufacturing and other containerised export opportunities.

Figure 18. Major Roads South West WA

Key Findings – Water (Supply and Demand)	
Current Situation	**Future Considerations**
The Great Southern has multiple town potable water schemes; the Lower Great Southern Towns Water Supply Scheme and the Great Southern Towns Water Supply Scheme. Other settlements in the region, including Frankland River, receive their water supplies from a variety of local sources. **Surface water is the primary water source for towns, agriculture and industry** with groundwater playing an increasingly important role. **The Great Southern region is leading wastewater recycling in WA.** On average, the Water Corporation recycles 70 per cent of its wastewater flows across the region; however, in Albany and Mount Barker the rate is 100 per cent. **It is estimated that 80 per cent of water use in the region is unlicensed,** and most of that is abstracted from surface water sources. **Water for spraying and other purposes can also be made available through Shire standpipes.** **Low rainfall coupled with ongoing hot and dry conditions** are impacting on-farm storages, shire dams and strategic community water supplies. Both surface water and groundwater resources are not being replenished at the same rate as in the past.	**An increase in water demand is projected,** driven by population growth, an increase in visitor numbers and agricultural production. **There are insufficient water resources available to support the projected growth of agriculture** in the Great Southern; use of existing groundwater and surface water sources has reached sustainable limits. **The climate in the region is continuing to dry,** and climate change will continue to place more pressure on surface and groundwater resources, affecting town water supplies, agricultural production and ecosystems. **The drier landscape could have implications for bushfire fuel loads,** potentially worsening the severity of bushfires in the future. **Streamflow and groundwater recharge are likely to continue to decline,** increasing pressure on existing water sources, particularly independent town water supply schemes that draw on local dams and catchments. Some of those local dams are already performing less reliably; this effect is likely to intensify. **There is likely to be increased water loss through evaporation as temperatures rise, and increased salinity** due to seawater intrusion into aquifers in coastal areas, and soil salinity and saline groundwater in inland areas. Shallow groundwater resources and small dams with small catchments are the most vulnerable.

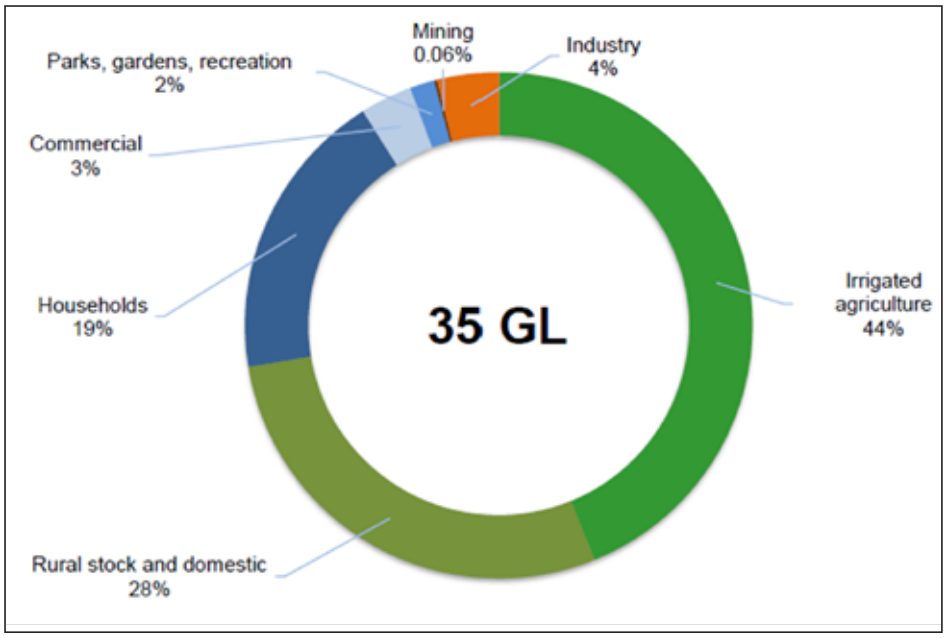


Figure 19. Water use by sector in the Great Southern region 2020-21

Figure 20. Proclaimed groundwater and surface water

Key Findings – Energy	
Current Situation	**Future Considerations**
Baseload power to the region is provided from the South West Interconnected System (SWIS), with generation from coal-fired power stations in the Collie area. **Wind power has a relatively long history in the region,** with the Albany Wind Farm opening in 2001. Recent developments include the extension of the Albany Wind Farm and wind turbines at Mount Barker and Denmark. There is also a well-advanced project from the private sector for a 150 MW wind farm at Flat Rocks (located near Kojonup). **In 2024, 33.6 percent of electricity delivered by the SWIS was from renewable sources** (including generation from solar PV systems).[37] **The lower southwest areas of the state are not currently serviced with natural gas.**	**Population growth will lead to increasing peak demand within the SWIS, which is forecast to increase at an average annual rate of 1.4% over the next 10 years,** resulting in the need for upgrades and expansion of capacity. **Prospects for economic growth,** from anticipated diversification of the economy into the minerals sector and further downstream processing of agricultural product will further increase demand on infrastructure. **The extension of the Dampier to Bunbury Natural Gas Pipeline (DBNGP) would provide significant flow-on benefits.** **New developments in gas, solar, wind and wave energy technology and the potential they present for more 'localised' energy generation,** present opportunities for meeting the needs of the region.

37 Australian Energy Market Operator, Fact Sheet – The Wholesale Electricity Market, 2024

Key Findings – Communications	
Current Situation	**Future Considerations**
Gaps in electronic and digital infrastructure constrain social and economic development and rural enterprises in the region. **Broadband and mobile phone coverage are patchy** across rural areas of the Great Southern.	**High quality, consistent broadband is essential to attract new businesses to the region and digital awareness is essential for existing operators to stay competitive.** Although services have improved, bandwidth and quality concerns continue to impact numerous sectors. **Future proofing' rural communities is a high priority;** this requires improved IT support and the capacity to utilise technology.

Economic Strengths, Challenges, Needs and Opportunities

Strengths	Challenges
1. The Port of Albany is an extremely valuable asset with strong grain and woodchip export capacity. The Port is well serviced by road and rail networks. 2. Coastal Great Southern water systems are relatively well mapped and understood. New sources are being investigated and implemented and procedures are in place to provide water in times of need. 3. The Coastal Great Southern has a relatively strong renewable energy mix.	1. Coastal Great Southern road networks are experiencing increasing volumes of traffic from resident, visitors and heavy haulage. Many roads are narrow or in poor condition, presenting both safety and productivity risks for road users. 2. The port currently does not have a containerisation facility, and this limits its role in relation to manufacturing and other containerised export opportunities, potentially constraining market access for some sectors. 3. Water security, changing weather patterns and other climate-related factors threaten the future of traditional industry within the Coastal Great Southern, particularly with a heavy reliance on conventional agricultural produce and production. Each of these factors has significant infrastructural implications. 4. It is difficult to estimate the use of unproclaimed water supply and the amount of water drawn in these areas cannot be regulated. The vast majority of the Coastal Great Southern is unproclaimed, and thus unregulated. 5. There is not enough water supply to meet projected demand from the agricultural sector. 6. Energy supply is key challenge for the region. Whilst the proportion of renewable energy is increasing, there are several challenges associated with maintaining baseload power, particularly when wind and solar are not available. 7. Rapid changes in technology will require concomitant upgrades to infrastructure to support them (including energy and communications).
Needs	**Opportunities**
1. Ongoing road infrastructure upgrades are required to keep pace with population, visitor and industry growth. 2. Expanded port capacity is needed to support primary production, mineral and, potentially, container exports. 3. Providing regional energy and water security is an essential support for economic growth in the region. 4. There is a need to better regulate non-potable water supply / increase proclaimed areas, providing more control and better monitoring capacity, particularly in times of drought. 5. Continued investment in water and energy infrastructure is required to keep pace with projected population and industry growth. 6. Continued enhancement of technology and communication infrastructure is required to support growth in diverse demographic groups. 7. Agriculture and manufacturing sectors will need to adapt to technological advances, particularly those that increase productivity, such as AI, automation and robotics.	1. Enhanced road infrastructure will improve safety and productivity for road users. 2. Enhanced port infrastructure, such as containerisation facilities, could provide new export opportunities. 3. Climate change should be viewed as an opportunity, as well as a challenge – providing a driver for increased innovation in a sustainable, more diverse, and resilient primary industry sector, and developing a regional knowledge base that can contribute to the knowledge economy. However, this requires adaptation, updating and innovating current practices and technologies, upskilling the workforce, and overcoming barriers such as the perceived risks of regional innovation. 4. Improved water infrastructure and better regulation of water sources can improve industry resilience. 5. Enhanced energy infrastructure and systems could reduce reliance on inefficient energy networks spread over long distances, reducing energy costs and improving reliability and hence lowering barriers to existing industry growth as well as attracting new businesses. 6. Adaptation to and adoption of technological advancement in primary industry and manufacturing sectors can improve competitiveness and provide new growth opportunities.

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