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GOVERNMENT OF WESTERN AUSTRALIA

Wheatbelt Development Commission

Wheatbelt Region

Regional Drought Resilience Plan



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We acknowledge the many individuals, organisations and businesses across the region who contributed to the development of this plan through their participation in interviews, meetings and workshops. We also recognise the in-kind support provided by technical specialists, as well as the consultants who undertook research and analysis that informed this document. We extend our appreciation to the Wheatbelt RDRP Steering Group and the advisory and governance groups involved in reviewing and refining key elements, and to the partner agencies and stakeholders whose support contributed to the development of this plan.

Contact

Wheatbelt Development Commission
75 York Road
NORTHAM WA 6401

Telephone: (08) 9622 7222

Email: info@wheatbelt.wa.gov.au

Website: wheatbelt.wa.gov.au

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Disclaimer

This document has been prepared using the best available information and technical analysis to provide a robust evidence base for the plan. Information is provided in good faith and reflects the knowledge and resources available at the time of writing. Elements of the plan may require review and updating as new data, research and insights emerge. The implementation approaches described are indicative only and are not endorsed by the State of Western Australia.

Version 1.0

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Acknowledgement of Country

The Wheatbelt Development Commission respectfully acknowledges the Traditional Owners of the lands on which we live and work, being the family and clan groups of the Ballardong, Goreng, Gubrun, Kalamaia, Njaki-Njaki, Whadjuk, Wiilman, Wudjari, Yued and Yamatji Peoples of the Noongar Nation. We pay our respects to Elders past, present and emerging, and recognise their enduring connection to Country, founded on deep knowledge, stewardship and culture.



The Noongar Nation peoples are made up of fourteen different language groups each correlated with different geographic areas and unique cultural knowledge (Kaartdijin) across south-west Western Australia:

Amangu, Yued/Yuat, Whadjuk/Wajuk, Binjareb/Pinjarup, *Wardandi*, Balardong/Ballardong, Nyakinyaki, Wilman, Ganeang, Bibulmun/Piblemen, Mineng, Goreng and Wudjari *and* Njunga.



Building on the Southern Wheatbelt Regional Drought Resilience Plan

The Southern Wheatbelt (SW) Regional Drought Resilience Plan was developed as a standalone plan in 2021–22 as part of the pilot phase of the RDRP Program in Western Australia. The SW RDRP encompasses 28,512km² across the Shires of Dumbleyung, Wagin, Lake Grace, Kulin and Kondinin. A drought vulnerability assessment deemed the region highly to very highly vulnerable to drought.

The SW RDRP identified five key themes — **Resilient Water**, **Resilient Communities**, **Resilient Agriculture**, **Resilient Landscapes** and **Resilient Regional Economies**, and over 130 interventions to build drought resilience.

Notably, SW stakeholders identify improving water system resilience and reliability as the key priority to build drought resilience in the region, alongside a desire to better articulate agricultural systems research and development needs, building strengthened regional connections and project specific opportunities to diversify the economy.

The initial implementation projects concentrate on building resilient water systems, by focusing on identifying new water sources and improving water collection and storage for community and emergency use.



The Wheatbelt RDRP builds on the work completed in the SW RDRP. The Wheatbelt Plan supersedes the SW RDRP, through the actions and interventions identified within the plan will be ratified through incorporation into the whole of Wheatbelt plan.

Southern Wheatbelt stakeholders should note the broader regional and sub-regional actions in the Wheatbelt RDRP are relevant to the Southern Wheatbelt region, supporting continuity and integration across both planning areas.

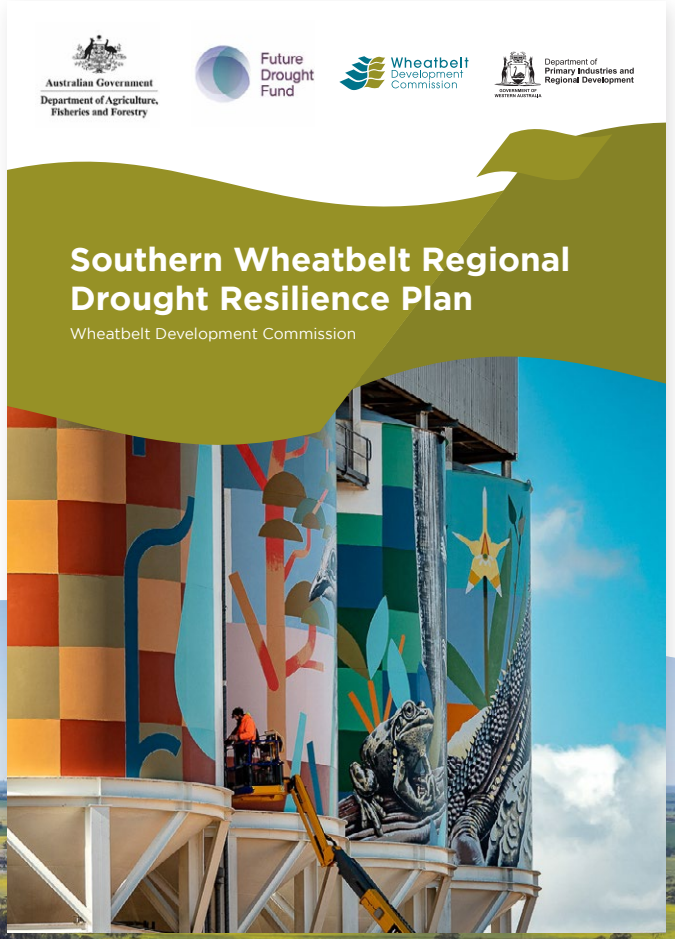




Image courtesy: Peter Ptschelinzew

Foreword

In a drying climate, it is no longer viable to wait for drought before taking action. Resilience must be built ahead of time through the way we plan, invest and make decisions about infrastructure, services and community readiness.

The Wheatbelt is a region of strategic and economic importance to WA. It contributes more than one third of the State's agricultural output, produces over half of the large-scale wind and solar energy in the South West Interconnected System, and serves as a central corridor for regional and national supply chains.

However, these strengths are closely tied to climate conditions. Declining rainfall, reduced streamflow, shorter growing seasons and more frequent heat extremes are placing pressure on community wellbeing, infrastructure and regional economies. Preparing for these conditions is essential to protecting liveability and building longer term resilience.

Jointly funded through the Australian Government's Future Drought Fund and the WA Government, the Wheatbelt Regional Drought Resilience Plan (the Plan) draws on the knowledge and experience of those who live and work in the region, supported by scientific research and climate data. It examines the social, economic and environmental impacts of drought and provides a roadmap for strengthening preparedness, guiding investment and supporting more resilient communities over time.

Importantly, the Plan reflects the capabilities that already exist within the Wheatbelt. Community leadership, innovation, agricultural expertise and strong social networks provide a foundation for collective action and practical solutions that support long term resilience.

I would like to acknowledge the many local governments, community groups, industry representatives and individuals who contributed their experience, ideas and insight to shape this Plan. Your input has ensured it reflects the diverse needs, opportunities and aspirations of the region.

The Wheatbelt Development Commission looks forward to continuing these partnerships as we move from planning to action and build a more resilient future for our region.

Rob Cossart
Chief Executive Officer
Wheatbelt Development Commission

Executive Summary

The Wheatbelt Regional Drought Resilience Plan (RDRP) outlines a two-pronged approach to strengthening resilience across the Wheatbelt. It addresses place-based challenge while advancing longer-term, region-wide strategies to manage complex drought risks. The plan is underpinned by foundational actions that support communication, monitoring and analysis, providing a strong evidence base for targeted investment and action.

The RDRP provides a coordinated, risk-based framework to strengthen drought resilience across the Wheatbelt. Developed in line with Australian Government Regional Drought Resilience Planning principles, the plan focuses on building the capacity of communities, industries and landscapes to anticipate, absorb and adapt to drought, while maintaining economic productivity, environmental condition and social wellbeing.

The Wheatbelt is a vast and diverse region of 77,000 people across 42 local government authorities (LGAs), ranging from large regional centres to very small towns. The regional economy is stable, generating a gross regional product of $9.12 billion, underpinned by strong grains and mining sectors and supported by 9,500 small and medium enterprises.

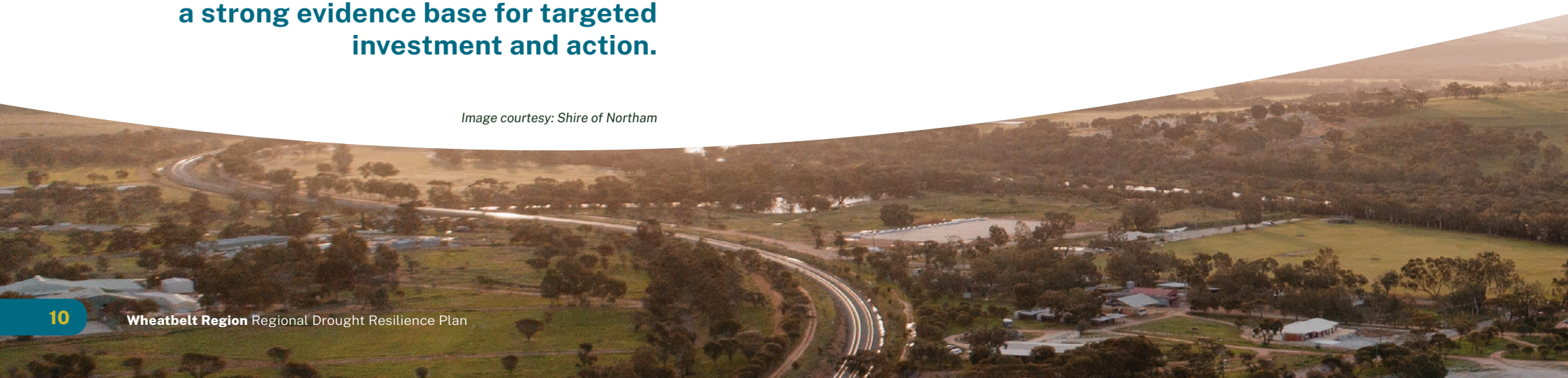


Image courtesy: Shire of Northam

Despite this strength, the region faces growing climate, economic and demographic pressures that vary across its five sub-regions. Building long-term drought resilience will require collective regional action, strengthened local capacity and forward-looking planning across social, natural and built systems.

Developed during 2024–25, the Wheatbelt RDRP is informed by a comprehensive drought vulnerability assessment and extensive engagement with regional stakeholders. It identifies six interlinked themes that together form the foundation of resilience across the region:



1. Embedding
Embedding resilience thinking

2. Securing
Securing the region's water future

3. Building
Building capacity of businesses and communities

4. Growing
Growing a diverse and resilient economy

5. Strengthening
Strengthening agricultural resilience and innovation

6. Restoring and valuing
Restoring and valuing natural environment





Image courtesy: Ben White

Water security

Consistent with national drought resilience priorities, water security is identified as a key driver of Wheatbelt drought resilience. In some areas, population growth and emerging industries are intensifying competition for limited groundwater. In others, declining rainfall and ageing infrastructure are reducing the reliability of traditional water supplies, prompting investigation of alternative water sources and delivery models. This variability highlights the need for tailored, place based solutions that reflect local conditions and future demand.

Agricultural and horticultural resilience

Broadacre agriculture remains the Wheatbelt's dominant industry, contributing 25% of the region's annual economic value and 30% of Western Australia's agricultural output. The sector supports 30% of employment and 45% of local businesses. While this largely rain-fed sector has adapted well to a hotter, drier climate - with grain yields increasing over the past 50 years despite a 20% decline in annual rainfall - pressures are intensifying. Yield gains are narrowing, seasonal variability is increasing, and farm dams are less reliable during consecutive dry years. Continued, locally focused research, development and extension is required to support long term productivity, particularly through improved water-use efficiency and securing on-farm water supplies.

There is also significant opportunity to improve water-use efficiency among the Wheatbelt's more water intensive horticultural and livestock enterprises. The irrigated horticultural sector generates around 15% of WA's horticultural value and accounts for the majority of groundwater use in the fast-growing Central Coast sub-region. Increasing competition for groundwater, combined with declining rainfall and recharge underscores the need for improved strategic planning to better understand current resources and future demand.

Community resilience

While drought resilience and climate change adaptation have received strong attention at the farm level through Federal, State and local initiatives, comparatively less work has focused on community level vulnerability and resilience. Community resilience across the Wheatbelt is complex[1], and further work is required to develop measurable social resilience indicators.

Self-reliance and local initiatives are defining strengths of Wheatbelt communities, supported by the largest volunteer workforce in Western Australia. However, volunteer burnout is a growing risk, exacerbated by drought and climate pressures that affect mental health, water supplies, recreational facilities, and the reliability of power and telecommunications. An ageing and slow-growing population is placing additional pressure on volunteer supply at the same time as demand increases. Strengthened capacity-building and strategic planning at local government and community levels are essential to support volunteers and build long-term resilience.

Volunteers underpin sporting, social and emergency services across the Wheatbelt, but an ageing, slow-growing population is placing pressure on both volunteer supply and demand.

1. 'Living Well in the Wheatbelt' strategy (2025–2035) Wheatbelt District Leadership Group

Natural environment resilience

Extensive land clearing since the early 1900s has made the Wheatbelt one of Australia's most productive cropping regions, but in some LGAs less than 5% of original native vegetation remains. Highly fragmented remnant woodlands now support over 200 threatened species, with the region forming part of one of 36 globally recognised biodiversity hotspots.

These natural assets hold deep cultural significance for Noongar Traditional Owners, are central to community wellbeing, and underpin a nature-based tourism economy generating around $400 million annually. Sites most at risk from the combined impacts of dry seasons, shallow soils and groundwater depletion should be prioritised for monitoring. Landholders, Aboriginal ranger teams and community groups need support to protect and buffer high risk and ecologically critical remnant vegetation. There are also opportunities to target global interest in land based natural environment investment to vulnerable areas.

Building drought resilience: anticipate, absorb and adapt

The Wheatbelt RDRP adopts a nationally consistent resilience framework aligned with Australian Government drought policy.

Anticipate

Improving the capacity to anticipate drought risk requires access to reliable data and consistent indicators to build strong situational awareness. The Wheatbelt region is assessed as 'moderately vulnerable' overall, with some areas more highly exposed due to declining rainfall and reliance on rain fed agriculture. Further work is required to establish a more detailed and accurate baseline of drought vulnerability and resilience, particularly at LGA and sub-regional levels across water, infrastructure, human capital and natural environment. Foundational actions identified through stakeholder engagement will strengthen evidence-based planning and better inform decision making.

Implementing the foundational activities identified through the Wheatbelt RDRP stakeholder engagement process will strengthen measures of drought vulnerability and enable more accurate assessment of drought resilience over time, supporting tailored policy development and action across the region.

*A drought resilient Wheatbelt is one in which communities, landscapes and industries can **anticipate, absorb, and adapt** to drought conditions while maintaining wellbeing, economic stability, and environmental sustainability.*



Foundational drought resilience activities identified through the Wheatbelt RDRP include:

- **Communicate the Wheatbelt RDRP strategies** through targeted engagement and partner alignment.
- **Undertake community and sub-regional** water needs analyses.
- **Support LGAs** to assess priority infrastructure needs.
- **Review and update** sub-regional economic and growth plans to reflect climate risks.
- **Developing an online platform** for carbon, biodiversity and offset investment.
- **Auditing community green space** to guide improved management.

Image courtesy: Kulin Bush Races

Absorb

Reducing the impacts of drought requires strong communities, resilient infrastructure, diversified economies and well managed natural systems. Pressures on volunteers, ageing infrastructure, water reliability and fragmented landscapes heighten vulnerability during prolonged dry periods.

The RDRP identifies a mix of immediate and longer-term actions to reduce exposure an mitigate future impacts:

- **Implementing** the 'Living Well in the Wheatbelt' strategy.
- **Deliver** a 'Resilient Wheatbelt' small grants program.
- **Support** small business climate resilience.
- **Building** leadership capacity through existing networks and programs.
- **Embedding** climate scenario planning in regional plans.
- **Ensure** horticulture growth and climate adaptation plans have a focus on the Central Coast and Central Midlands region.
- **Strengthen** cross regional agricultural networks.

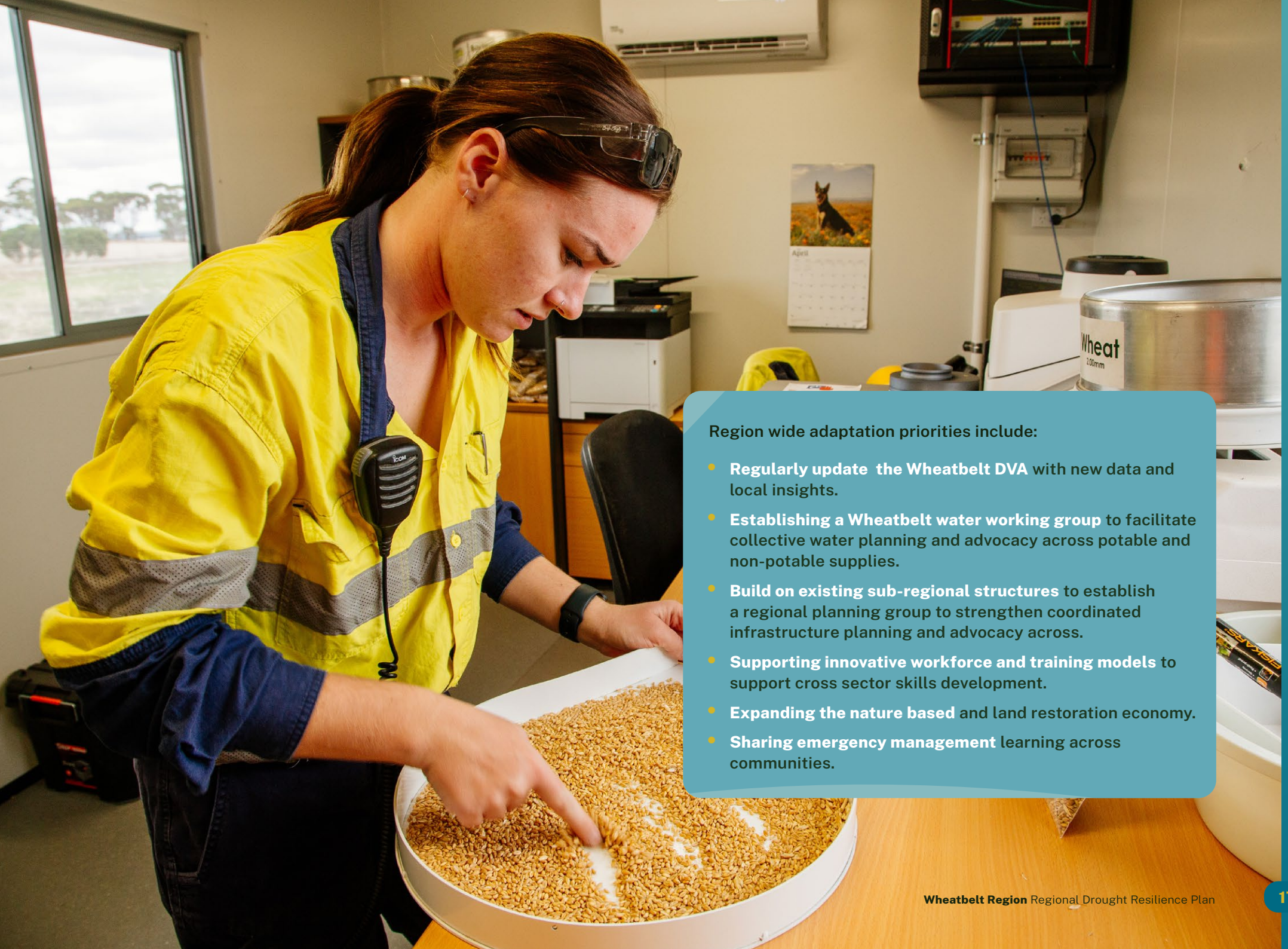
Adapt

Adaptation is an ongoing process that requires continual learning, innovation and coordinated regional governance. Across the Wheatbelt, communities and industries are already demonstrating strong adaptive capability — from trialling desalination and re-engineering dams to expanding the land restoration economy and developing collaborative housing and service models. The region has a solid foundation of collaborative governance, though sustaining capacity requires ongoing attention and support. Collaborative approaches are critical to the region's ability to adapt and innovate to remain resilient and continue to prosper in a changing climate with increasing drought risk.

The remoteness and small size of many Wheatbelt communities has resulted in the region's towns having an embedded quality of self-sufficiency and social connectedness.



Image courtesy: Williams CRC



Region wide adaptation priorities include:

- **Regularly update the Wheatbelt DVA** with new data and local insights.
- **Establishing a Wheatbelt water working group** to facilitate collective water planning and advocacy across potable and non-potable supplies.
- **Build on existing sub-regional structures** to establish a regional planning group to strengthen coordinated infrastructure planning and advocacy across.
- **Supporting innovative workforce and training models** to support cross sector skills development.
- **Expanding the nature based** and land restoration economy.
- **Sharing emergency management** learning across communities.

A living resilience framework

The Wheatbelt RDRP outlines more than 30 priority actions across foundational, quick win and future pathway categories (Section 10). They capture the needs of a region experiencing record grain production, while also facing significant infrastructure and capacity challenges to manage growth, protect environmental health and maintain essential services. Figure 1 demonstrates how these actions are linked within the action plan framework.

Designed as a living document, the Wheatbelt RDRP will be reviewed annually and updated every five years, to reflect new data, shifting economic conditions and evolving community and industry needs.

The plan provides a long-term framework for coordinated investment, policy development and project delivery, supporting sustained economic, social and environmental resilience to drought across the Wheatbelt.



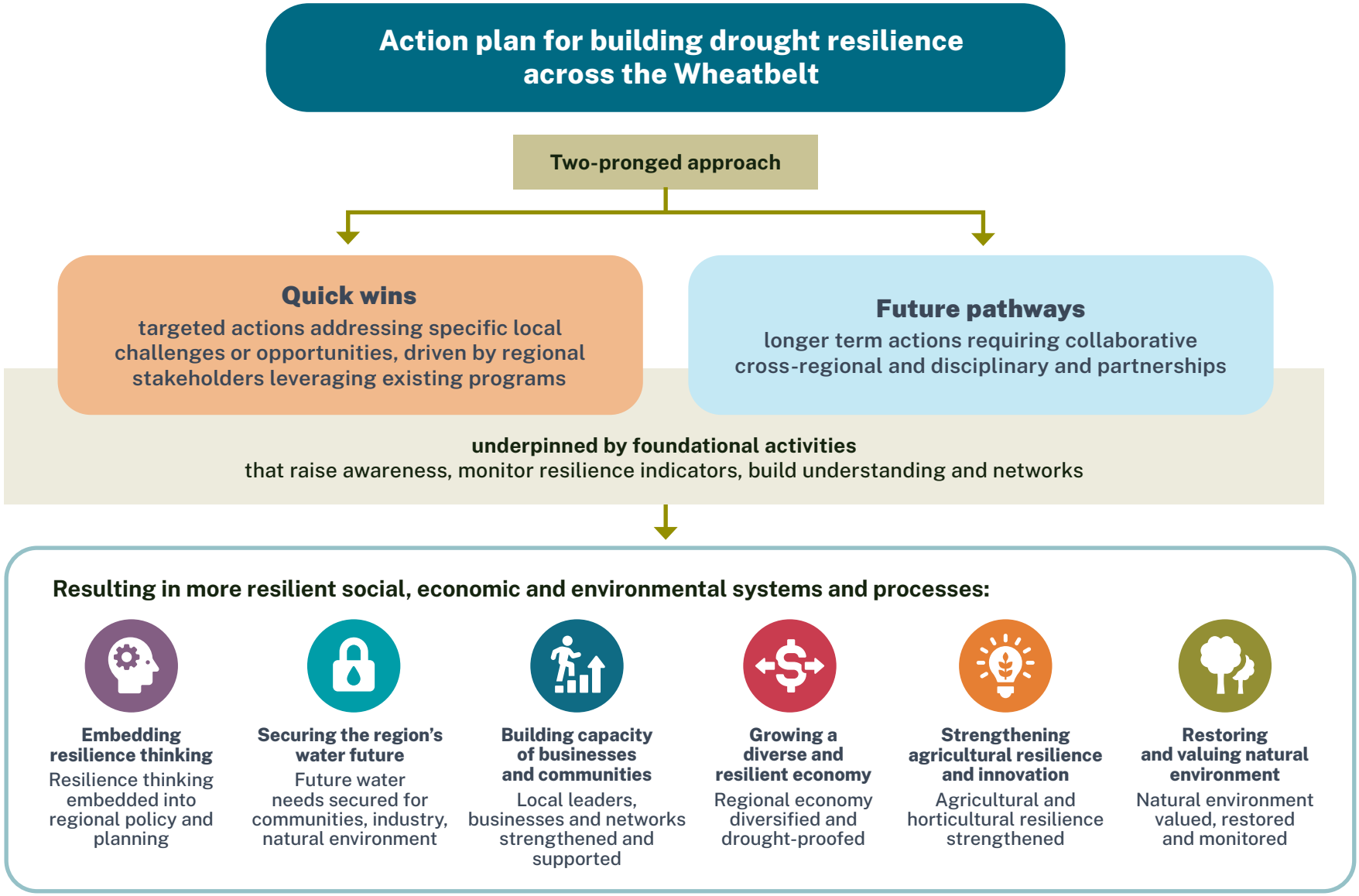


FIGURE 1 Action plan for building drought resilience across the Wheatbelt

Introduction

Building long-lasting resilience across the Wheatbelt will require a multi-pronged and collaborative approach — one that recognises the need for ongoing innovation across agricultural and horticultural enterprises in the face of climate change while also (and importantly) attending to the social, economic and environmental vulnerabilities faced by the region's many and far-spread communities.

The Wheatbelt Regional Drought Resilience Plan (the Wheatbelt RDRP) is the culmination of in-depth data collection and analysis along with hundreds of discussions held across the region during 2024 and 2025 years. Notably, this plan was developed in the year that the Wheatbelt's major industry, broadacre agriculture, achieved record-breaking grain yields.

Through the course of developing the Wheatbelt RDRP it became evident that despite a sophisticated understanding of the impacts of climate change and drought on rain-fed broadacre enterprises, significant gaps exist in quantifying and monitoring the environmental and social impacts of drought to enable a true measure of adaptive capacity across the Wheatbelt.

To better understand these gaps in knowledge and determine what was needed to address them, assessments of water supply and demand and the status of communications and power infrastructure, road networks, housing supply, natural environment and economic diversity were undertaken at local and sub-regional levels across the Wheatbelt.



Image courtesy: Angie Roe, Austockphoto

Underpinning this work was a comprehensive stakeholder consultation process in which more than 300 people representing over 200 different groups and organisations were interviewed in-person, online or by phone using a structured format to gather qualitative information on the drought resilience issues and barriers facing the Wheatbelt and the short- and long-term action needed to build resilience across communities, industries and local government.

In addition, case studies were developed to provide a snapshot of the resilience already embedded across the region.

The Wheatbelt RDRP Steering Committee collated and prioritised the stakeholder consultation responses over 20 hours of in-person workshops and online discussions into a prioritised list of activities that were deemed a 'quick win' project, longer-term 'future pathways' strategy or a 'foundational' activity. This prioritisation process formed the basis for the Wheatbelt RDRP implementation plan (a summary of which can be found in Section 10 of the document). Prioritised drought resilience activities are identified across six implementation themes and their underlying outcomes collectively capturing the main drivers of drought resilience within the region's communities, economies and landscapes (Figure 2).



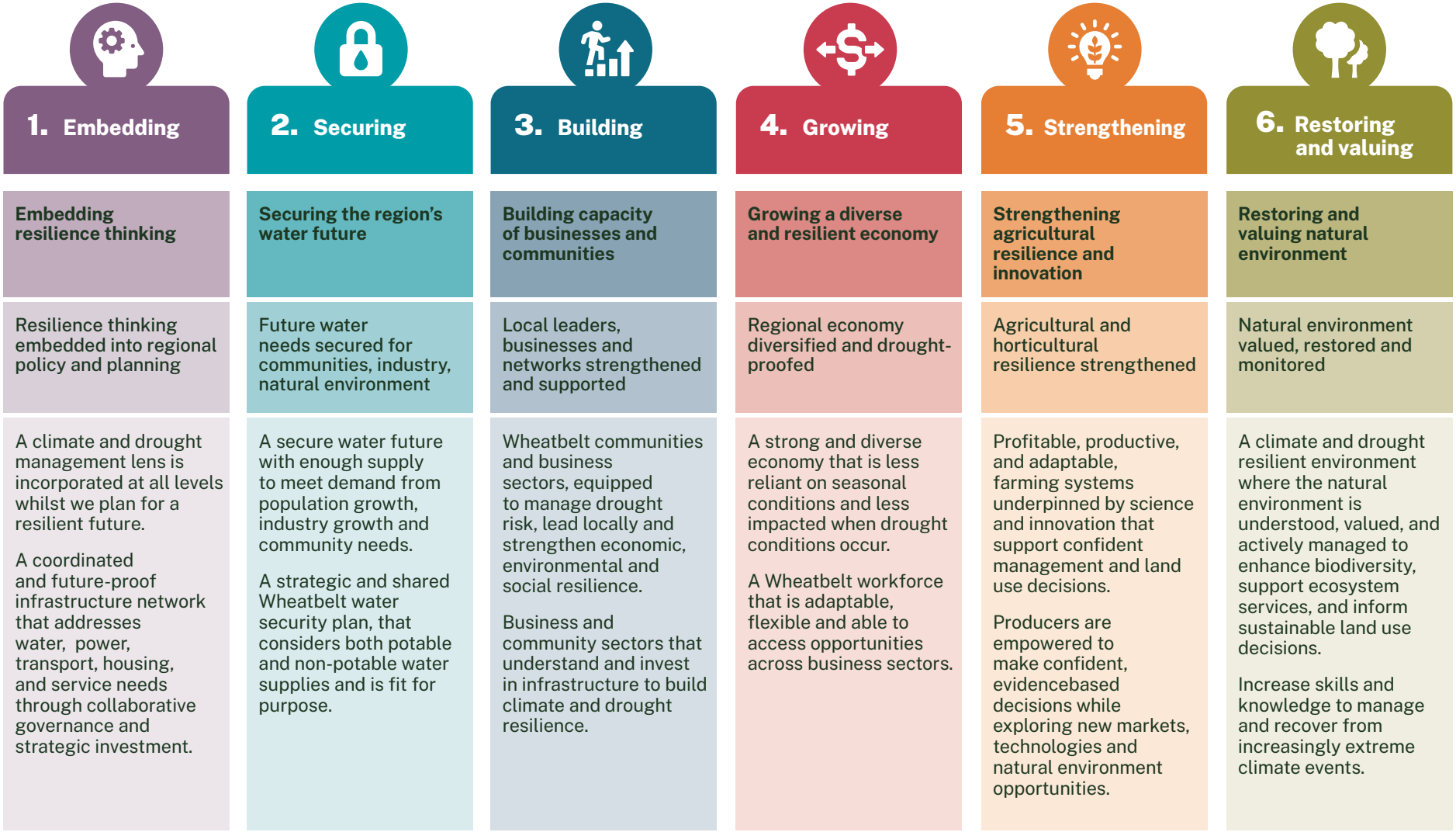


FIGURE 2 Strategies and outcomes for building drought resilience across the Wheatbelt

Reading the Wheatbelt RDRP

The Wheatbelt RDRP is divided into 10 sections (see Figure 3). Sections 1–2 provide a detailed overview of the Wheatbelt — its size, sub-regions, people, industries, economies, and climate. Sections 3 defines drought and resilience for the Wheatbelt whilst Section 4 assesses economic, environmental and social data for the Wheatbelt to provide a region-wide drought vulnerability assessment.

Sections 5–9 are in-depth discussions of how drought and climate change have impacted the Wheatbelt's primary industries, water supply and demand, communities and sub-regions and how projected climate change is expected to play out across the region. Case studies in this section showcase how Wheatbelt communities and sub-regions are responding to the impacts of a drier, more variable climate. These stories highlight the resilience embedded across the region and act as examples of what is possible with collective action, collaborative governance and local leadership.

Section 10 collates and integrates the findings of the stakeholder engagement interviews and the quantitative and qualitative analyses done during the Wheatbelt RDRP process — into an implementation plan that provides a framework for building sustained drought resilience across the Wheatbelt.

Hundreds of hours of discussions and analysis informed the Wheatbelt RDRP — a plan that has been developed from the 'ground up' to capture the practical and fit-for-purpose action that Wheatbelt communities want and need to build resilience across their region.

The Wheatbelt RDRP is offered as a valuable resource for use by communities, local governments, industry groups and government agencies to inform decision making, attract funding and guide investment in sustained drought resilience on behalf of the 77,000 people who call the Wheatbelt home.



Image courtesy: Kulin Bush Races

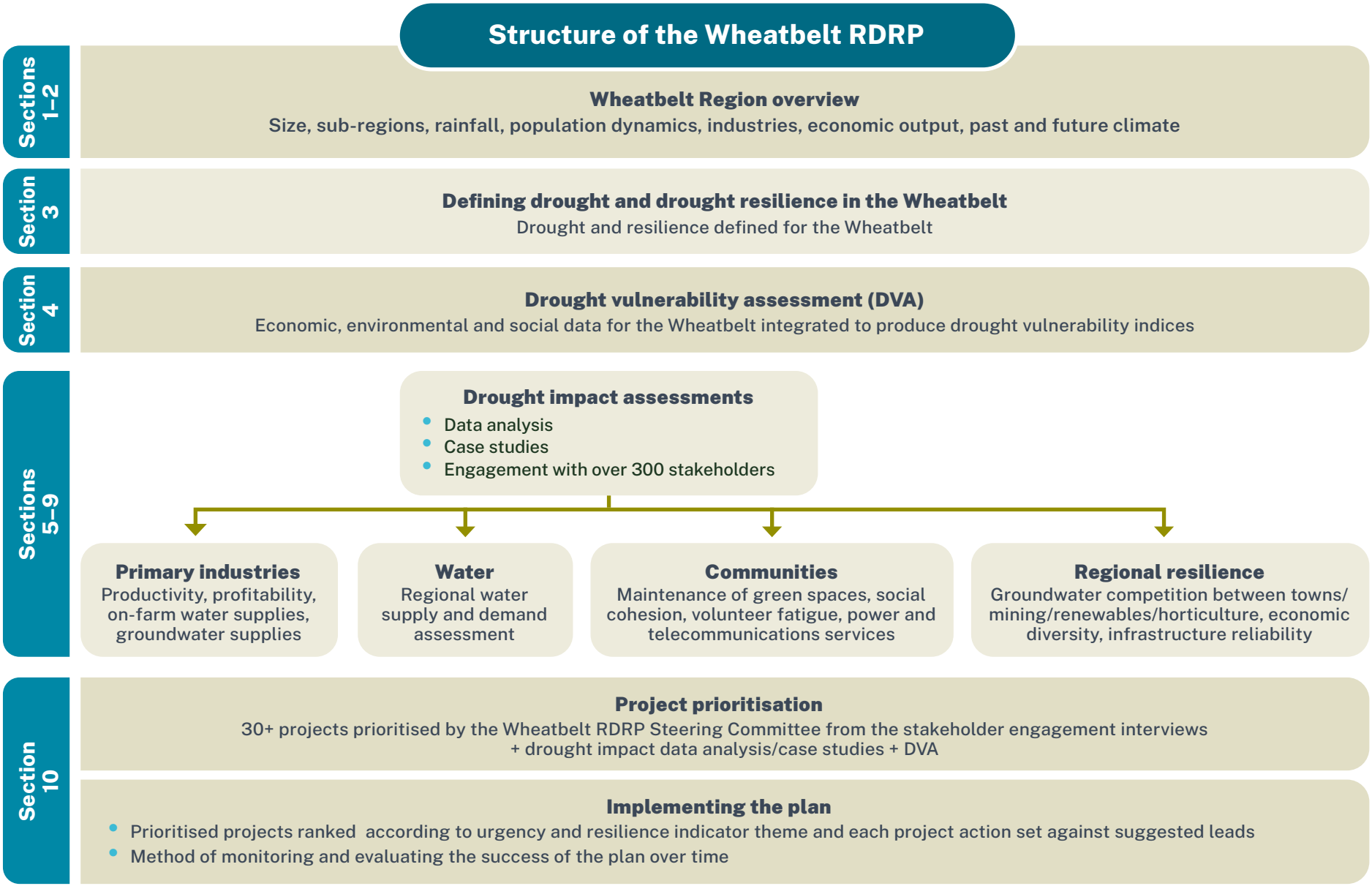


FIGURE 3 Structure and content of the Wheatbelt RDRP showing how quantitative and qualitative analyses were used to develop the prioritised drought resilience projects and implementation plan





A drought resilient Wheatbelt is one in which communities, landscapes and industries can anticipate, absorb, and adapt to drought conditions while maintaining wellbeing, economic stability, and environmental sustainability.

Wheatbelt Region — overview

1.





"There is a perception that the Wheatbelt is close to Perth — that 'it's just up the hill' but, while the Wheatbelt's borders encircle Perth, only 4% of the region is classed as inner regional. In fact, 57% of the region is classed as remote and 31% as outer regional according to the Accessibility/Remoteness Index of Australia."

Wheatbelt District Leadership Group[1]

1. Wheatbelt District Leadership Group (2025) — Living Well in the Wheatbelt: A long term strategy to improve outcomes for the Wheatbelt community towards 2035 and beyond

Image courtesy: Angie Roe, Austockphoto

The Wheatbelt Region at a glance:

- **Size** 155,000 km² (two-thirds the size of Victoria)
- **Population** 77,000 people with some areas to the west growing at considerable rates
- **Economy** based on agriculture and mining but growing in diversity (renewables, manufacturing)
- **Climate** rainfall from 600 mm in the west to less than 300 mm in the east. One of the most affected areas globally in terms of rainfall decline from climate change.
- **Environment** the Wheatbelt sits within the South-West Botanical Province of Western Australia — one of just 36 globally-recognised biodiversity hotspots.
- **Drought vulnerability** economic diversification, capacity building and strategic planning needed to build resilience across the region

Introduction

The Wheatbelt of Western Australia covers more than 155,000 square kilometres and is home to about 77,000 people disbursed across five sub-regions in 200+ local communities administered by 42 local governments (LGAs).

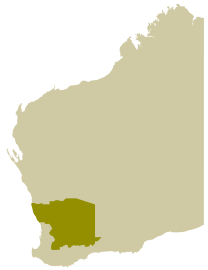
The Wheatbelt's five sub-regions — Avon, Wheatbelt South, Central Coast, Central East and Central Midlands, span from the Indian Ocean in the west to the edge of the arid Goldfields in the east and from the border of WA's pastoral region in the north down to beef, dairy and wine country in the south (Figure 1). For ease of analysis the five Southern Wheatbelt RDRP LGAs are included in the Wheatbelt South sub-region.

"Resilience is about being healthy and well across the lifespan... Our communities and the people in them need to be given the opportunity to start well, grow well, work well, live well and age well."

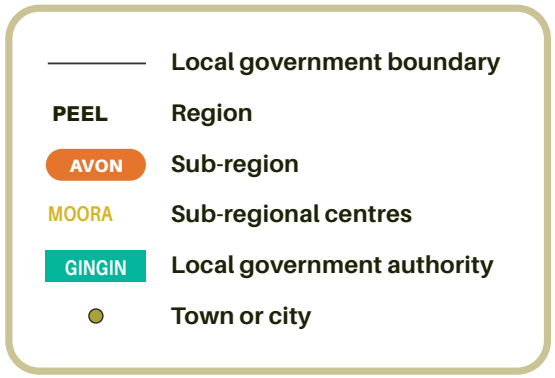
Wheatbelt RDRP consultancy feedback



Image courtesy: Kulin Bush Races



The Wheatbelt is one of nine WA regions and spans an area two-thirds the size of Victoria.



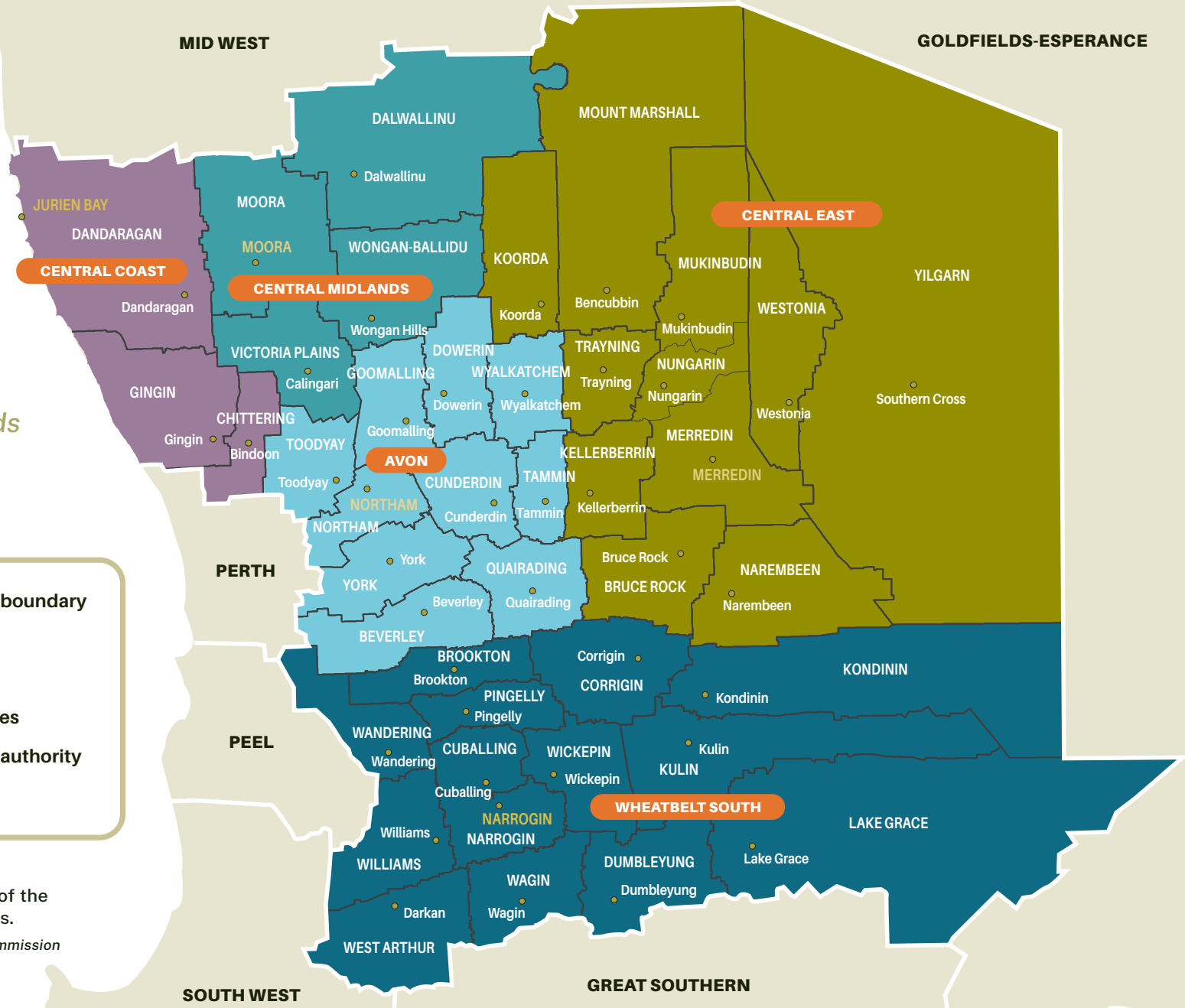


FIGURE 1 Map showing location of the Wheatbelt and its five sub-regions.

Data source: Wheatbelt Development Commission

Wheatbelt town populations range from a high of more than 11,000 (Northam) through to less than 200, with some smaller settlements home to fewer than a dozen people. A few Wheatbelt towns are just under an hour from the Perth metro but most require a journey of two to four hours.

Despite having one of the strongest economies in Western Australia, more than half the Wheatbelt's population has a socio-economic score less than the state average.

About 90% of the region was cleared for agriculture about 100 years ago and the remaining 10% of remnant vegetation holds a high conservation value that is recognised both globally and nationally. Many of the plant and animal species in the Wheatbelt are found nowhere else in the world and the region's 150 kilometres of coastline north of Perth is a significant tourism area.

Just over half of the Wheatbelt is arable land dedicated to broadacre agriculture, horticulture and intensive livestock production with the region contributing 30% of WA's total agricultural value in 2023–2024. Annual rainfall in the region ranges from 600 mm in the west to less than half this (295 mm) in the east (Figure 2).

Water for towns, farms and communities comes from the many millions of litres of fresh groundwater abstracted from beneath the Central Coast sub-region each year through to the few hundred millimetres of annual rainfall that falls in the Central East. Inland areas are serviced by the piped water scheme from Perth.

Climate change is impacting the amount and timing of annual rainfall across the region with concomitant impacts on ground and surface water supplies. Each Wheatbelt sub-region faces a unique set of water challenges and creating sustainable drought resilience in the Wheatbelt will require tailored approaches.

The Wheatbelt is a vast and diverse region that requires an equally diverse drought resilience response — one with a local focus encompassed by a strategic regional overview.



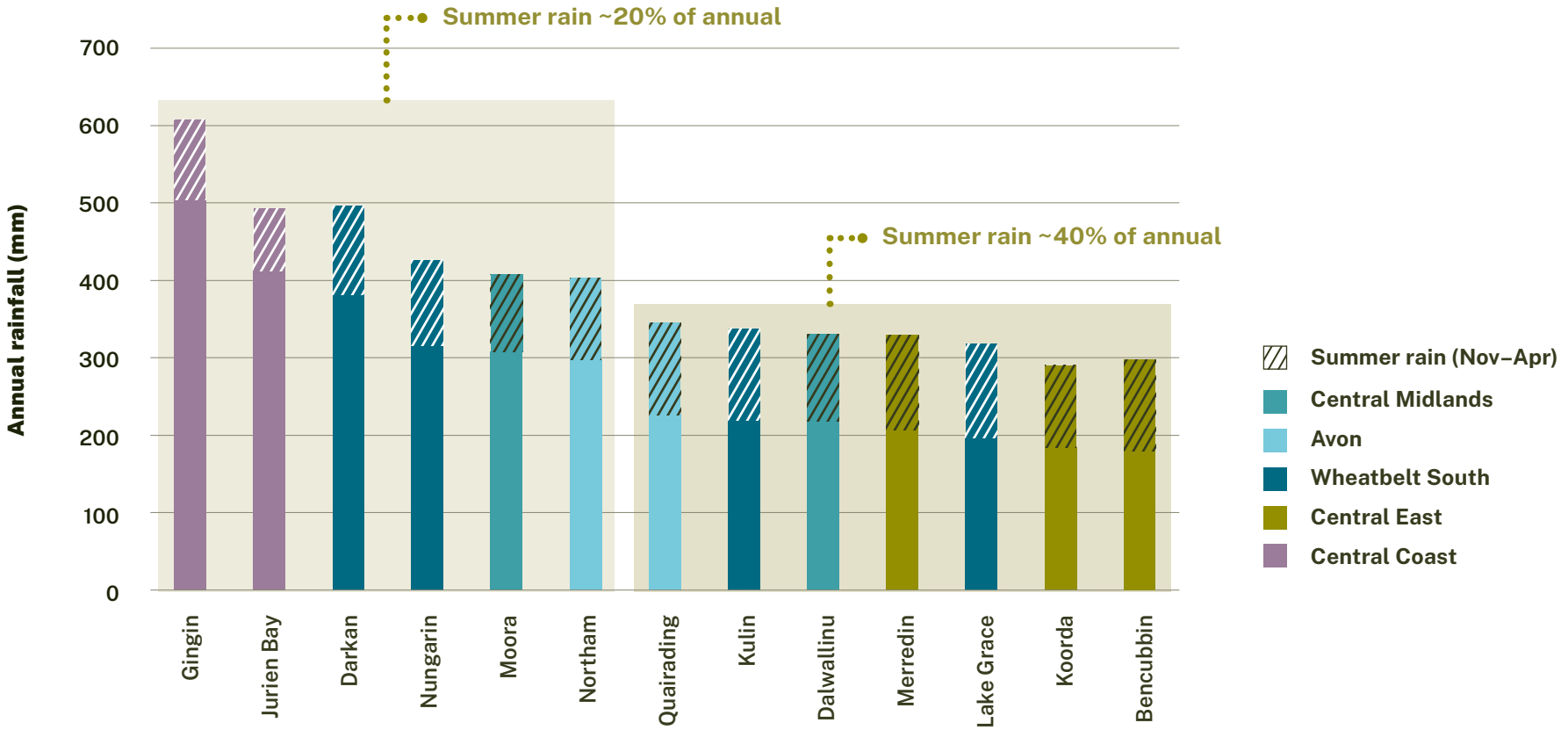


FIGURE 2 Average annual rainfall across local government areas (west to east) and sub-regions in the Wheatbelt

Data source: Climate Services for Agriculture

Annual rainfall ranges from a high of 600 mm in the west to less than 300 mm in the east. The proportion of rain that falls outside the growing season increases to the east of the region.



Wheatbelt — economy

Total economic output from the Wheatbelt in 2024 was just under $18 billion (Figure 3).

Agriculture and mining account for a combined 50% of the Wheatbelt's economic output but agriculture accounts for nearly half of all businesses in the region (compared to <1% for mining) and is responsible for four times as many jobs.

Agriculture is the largest employer across all Wheatbelt sub-regions and about 45% of all Wheatbelt businesses are connected to the industry (Figure 4). The construction sector accounts for the second largest share of Wheatbelt businesses (11%).

Building drought resilience across the Wheatbelt will require continued climate adaptation in the agriculture sector along with economic diversification into sectors less reliant on seasonal rainfall.

Image courtesy: Megan Hele



WA Total

Population (2023)
2.95 million

Total Economic Output (2024)
$838.5 billion

The Wheatbelt is WA's fifth largest regional economy.

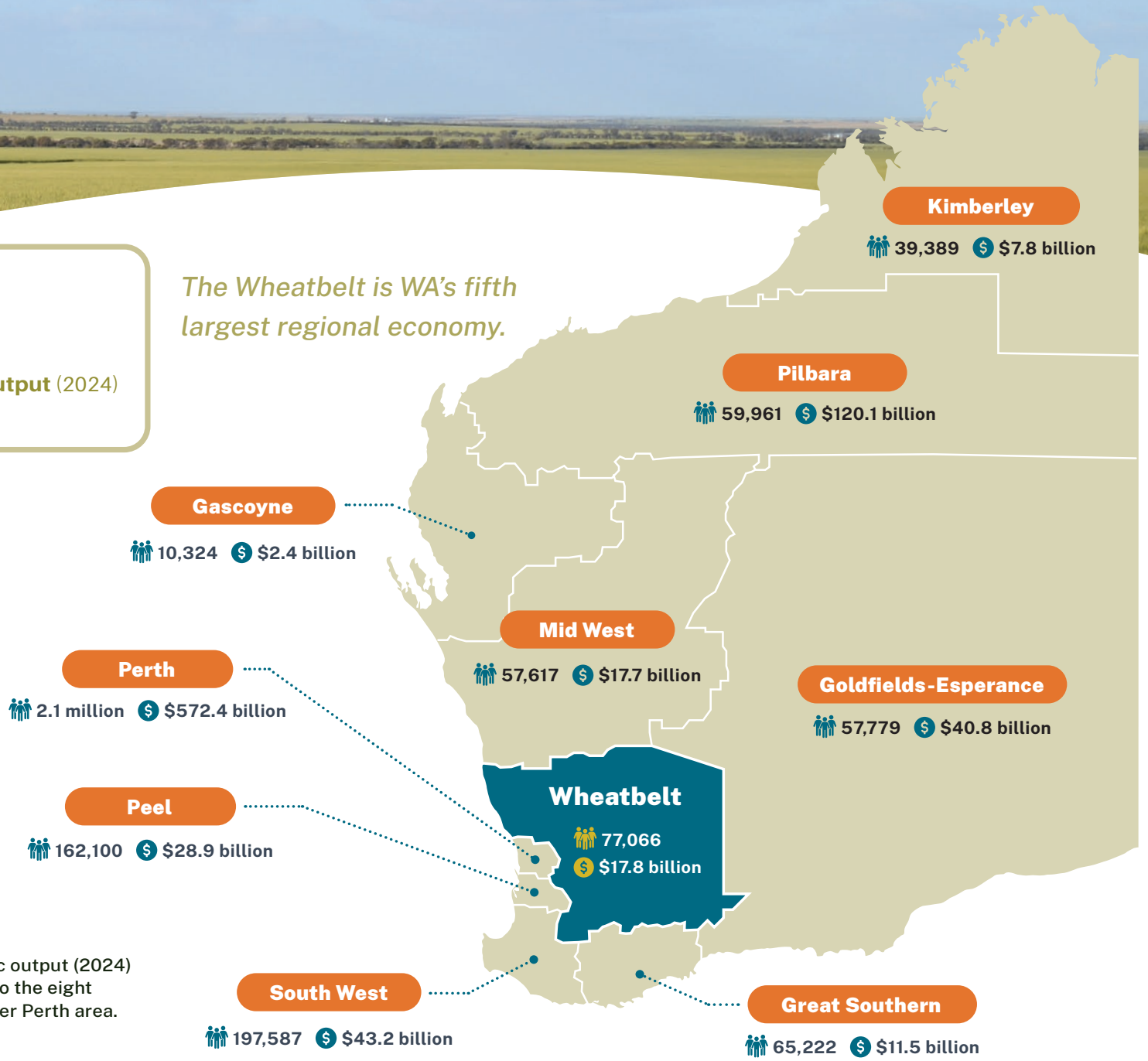


FIGURE 3 Wheatbelt economic output (2024) and population (2021) relative to the eight other WA regions and the greater Perth area.

Data source: REMPLAN



FIGURE 4 a) Relative employment in the top three business sectors across Wheatbelt sub-regions (2021).

Data source: BankWest Curtin Economic Centre

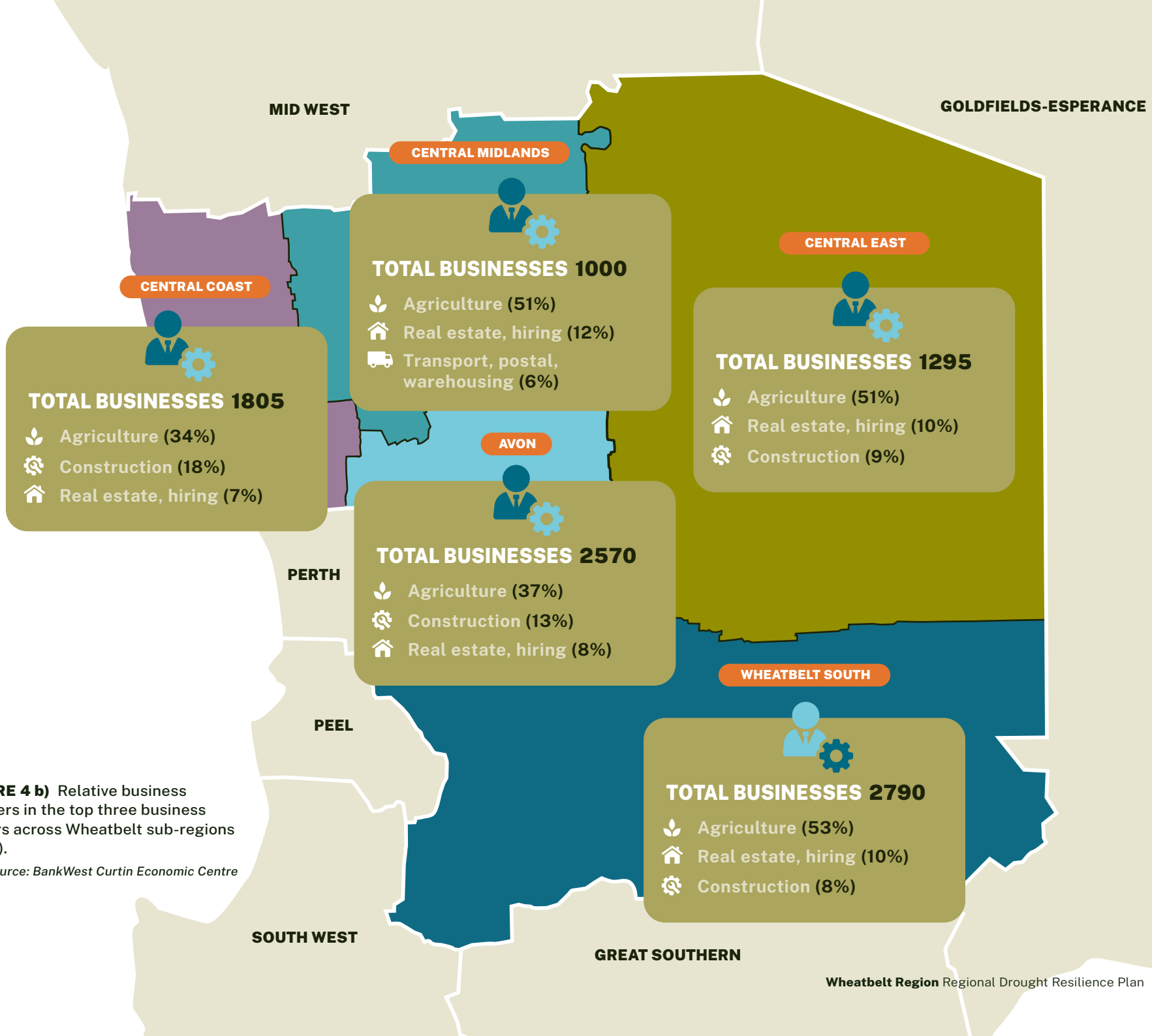
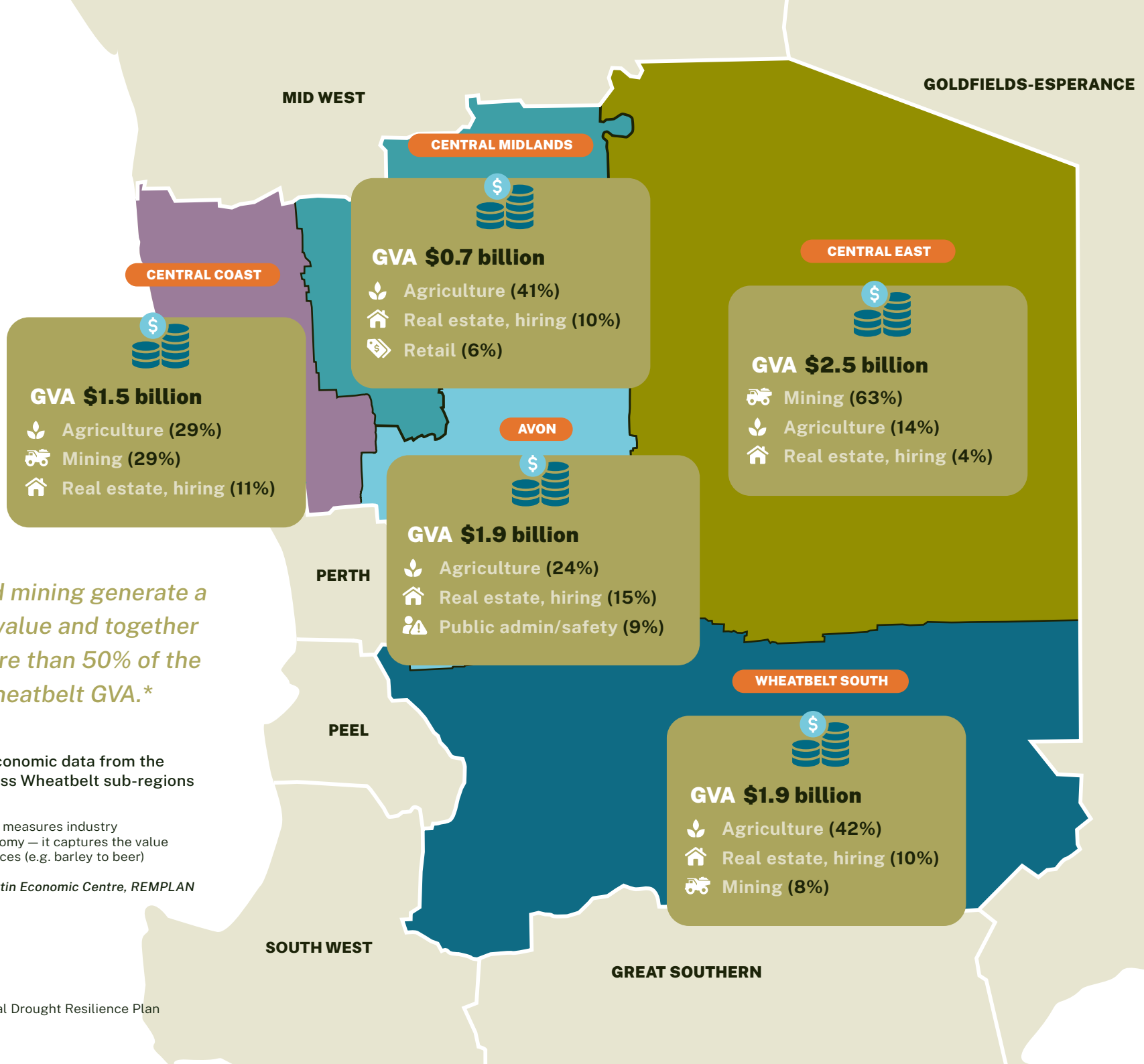


FIGURE 4 b) Relative business numbers in the top three business sectors across Wheatbelt sub-regions (2023).

Data source: BankWest Curtin Economic Centre



*Agriculture and mining generate a similar annual value and together account for more than 50% of the total annual Wheatbelt GVA.**

FIGURE 5 Relative economic data from the top three sectors across Wheatbelt sub-regions (2022–2023).

* Gross Value Added (GVA) measures industry contributions to the economy — it captures the value added to goods and services (e.g. barley to beer)

Data source: BankWest Curtin Economic Centre, REMPLAN

The Avon is the most diversified of the Wheatbelt's sub-regions, followed by the Central Coast while the Central East is a significant player in the mining industry, accounting for about 60% of the Wheatbelt's current mining value (Figure 5).

Continued diversification of the Wheatbelt's economy will be critical to building drought resilience across the region and reducing its vulnerability to dry seasons and climate change.

Economic analysis by the Bankwest Curtin Economic Centre (2025)[2] found the Wheatbelt's diversification index reflects a moderate level of economic diversity with an obvious main strength in agriculture and comparative advantages in mining, wholesaling (grain), and manufacturing/construction. The report concludes that the region has significant potential (and imperative) to diversify into emerging sectors such as renewable energy and critical mineral mining as well as downstream processing of agricultural and mining commodities, transportation logistics and tourism.

2. Bankwest Curtin Economic Centre (2025) Economic Diversification in the Wheatbelt — a report for the Wheatbelt Development Commission (unpublished)



Wheatbelt — population

The Wheatbelt has the third highest population (~77,000) of all WA regions but the region as a whole is growing at one of the slowest rates — with total population increasing by just 2.3% between 2015 and 2023 compared to 13.4% across WA (Figure 6).

Population is highly dispersed across the Wheatbelt's 200+ communities ranging from more than 11,000 (2021) in the regional centre of Northam (Avon sub-region) through to fewer than 200 in smaller and more remote communities. Population dynamics vary widely at a sub-regional level with Avon and Central Coast experiencing significant population growth between 2015 and 2023 (Figure 7).

Between 2015 and 2023 the Central Coast sub-region grew at 15.4% — faster than all other regions in WA except for Peel (23.9%) (Figures 6 & 7).

The Wheatbelt has a significantly older population relative to the state average with a median age of 47 compared to 40.6 for the WA average.[3] In 2021, people aged 55–64 made up the highest proportion (16%) of the Wheatbelt's population compared with 12% for WA as a whole (Figure 8).

3. Australian Bureau of Statistics. (2024). Regional population by age and sex. ABS. https://www.abs.gov.au/statistics/people/population/regional-population-age-and-sex/latest-release.



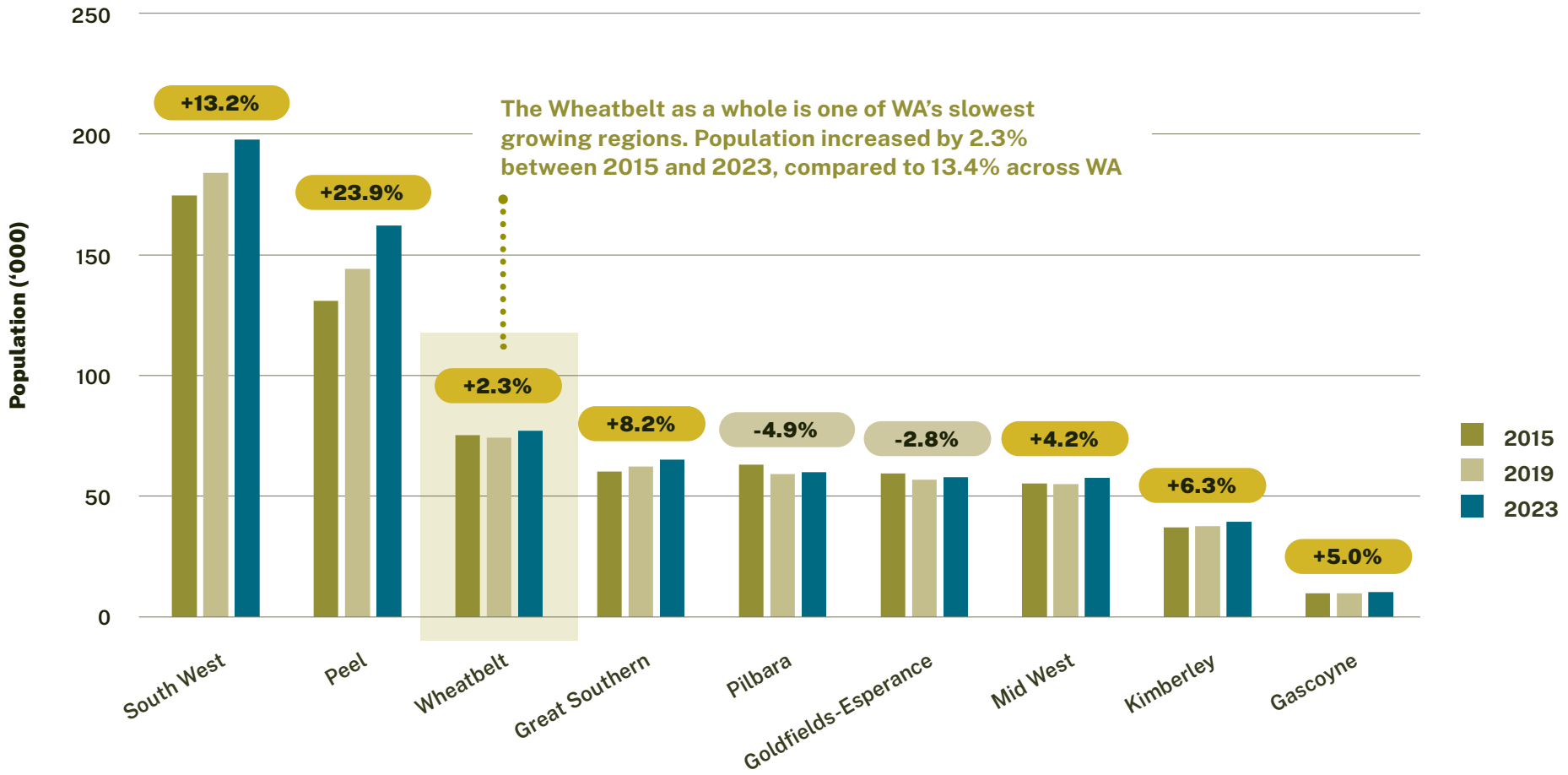
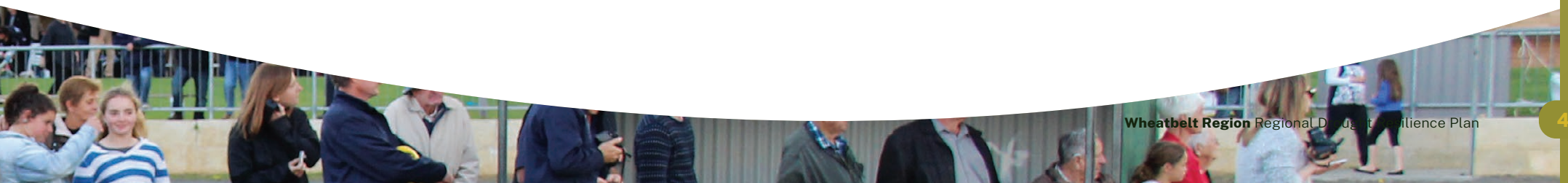


FIGURE 6 Population dynamics in the Wheatbelt (2015–2023) compared with WA's eight other regions.

Data source: BankWest Curtin Economic Centre



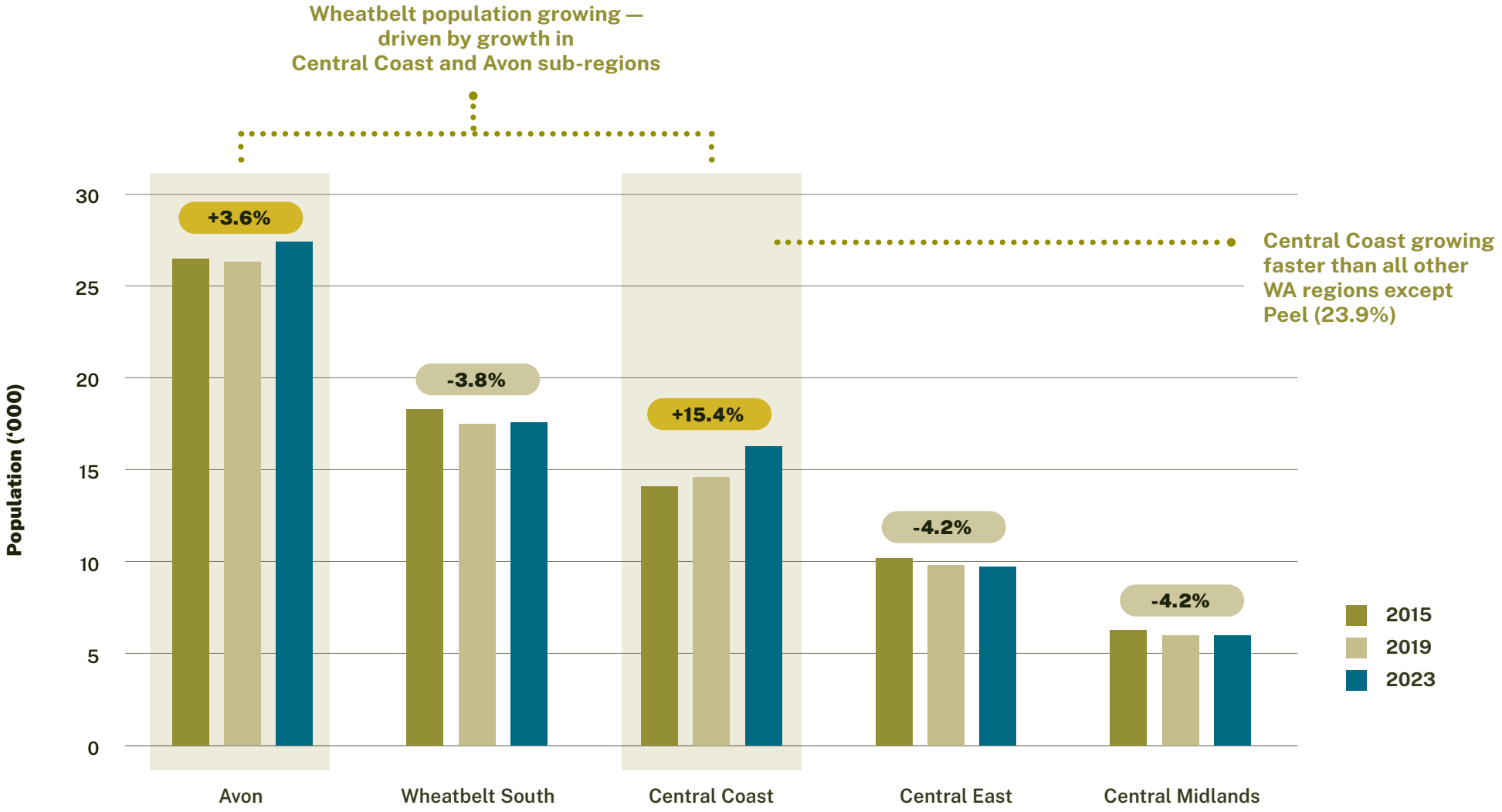


FIGURE 7 Population dynamics across the Wheatbelt's five sub-regions (2015–2023).

Data source: BankWest Curtin Economic Centre



FIGURE 8 Wheatbelt population by age cohort compared with the WA average (2021).

Data source: BankWest Curtin Economic Centre, ABS (2021)

Rural communities need to maintain a critical number of residents in a range of demographics to remain viable and attract services and infrastructure.

Population decline in some areas of the Wheatbelt could be further exacerbated by a drying climate. Economic diversification (renewable energy, downstream processing of agricultural and mining commodities, tourism development) and investment in and advocacy for infrastructure development and service delivery in Wheatbelt communities will be needed to build drought resilience and maintain and grow populations across the region.

In other areas — such as west Avon and Central Coast — growing populations are placing higher demand on water supplies that will come under increasing threat as the climate dries. Water supply and demand audits and investment in infrastructure and services are needed to underpin this population growth and build resilience as the climate dries.



Image courtesy: DPIRD






Cadoux
Mollerin
Wongan Hills
Bencubbin
Mukinbudin
150 m
KOORDA HOTEL

2. Wheatbelt Region — climate

Implementing innovation and infrastructure across the Wheatbelt to keep abreast of a drier, hotter climate



Quantifying and communicating:

- Impact of recent and predicted climate change on Wheatbelt primary industries and communities
- Economic and social benefits of capturing, storing and using water more efficiently and productively on-farm, in towns and at a sub-regional level.



Wheatbelt Region — climate at a glance:

- **Annual rainfall across the Wheatbelt** has dropped by as much as 20% over the past 50 years and is predicted to decline further by as much as 10% in some areas out to 2050
- **Rainfall decline has been associated with a one-degree warming trend** and the number of days above 35°C are expected to rise by 20–30% out to 2050
- **Under all emissions reduction scenarios** there is high confidence that the duration and frequency of droughts in southwest WA (which includes the Wheatbelt) will increase compared to the present climate
- **A drier, hotter climate has implications** for the wellbeing of Wheatbelt communities and its major industry — agriculture

Implementation plan themes covered in this section:



Embedding resilience thinking

Securing the region's water future

Building capacity of businesses and communities

Growing a diverse and resilient economy

Strengthening agricultural resilience and innovation

Restoring and valuing natural environment

Introduction

Western Australia's southwest (which includes the Wheatbelt) has experienced climate-induced drying at one of the fastest rates in the world, and this is projected to continue.[1]

Successful climate adaptation across the Wheatbelt will be underpinned by:

- **Tailored climate projections communicated at sub-regional and industry levels**
- **Sub-regional and community-level water supply and demand audits**
- **Community-level audits of green spaces, pools, water capture and storage initiatives**
- **Strategic infrastructure planning at community and sub-regional levels**
- **Continued RD&E investment across primary industries**

This section outlines how the climate has changed across the Wheatbelt over the past 50 years and the predicted climate change expected out to 2050.

Climate change is affecting every community in the state. People living in rural and remote regions face additional challenges because of their relative isolation.

Climate Adaptation Strategy — building WA's climate resilient future (Government of Western Australia, 2023)

1. IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press



Recent climate

Annual rainfall across south-west WA (which includes the Wheatbelt) has declined by 10–20% over the past 50 years.

As a result, rainfall zones in the Wheatbelt have shifted southwest by 100 km and the area designated as low rainfall (<325 mm) has nearly doubled (Figure 1).

The decline in rainfall has resulted in fewer wet years and many more lower rainfall years across the Wheatbelt with the traditional 'break of season' (defined as 25 mm of rain over three days) becoming later and more variable — especially on heavier soils (Figure 2).

"Wheatbelt industries and communities need access to information on current and future climate risks to plan for and build climate change resilience across the region."

Wheatbelt RDRP consultancy feedback



Image courtesy: Megan Hele

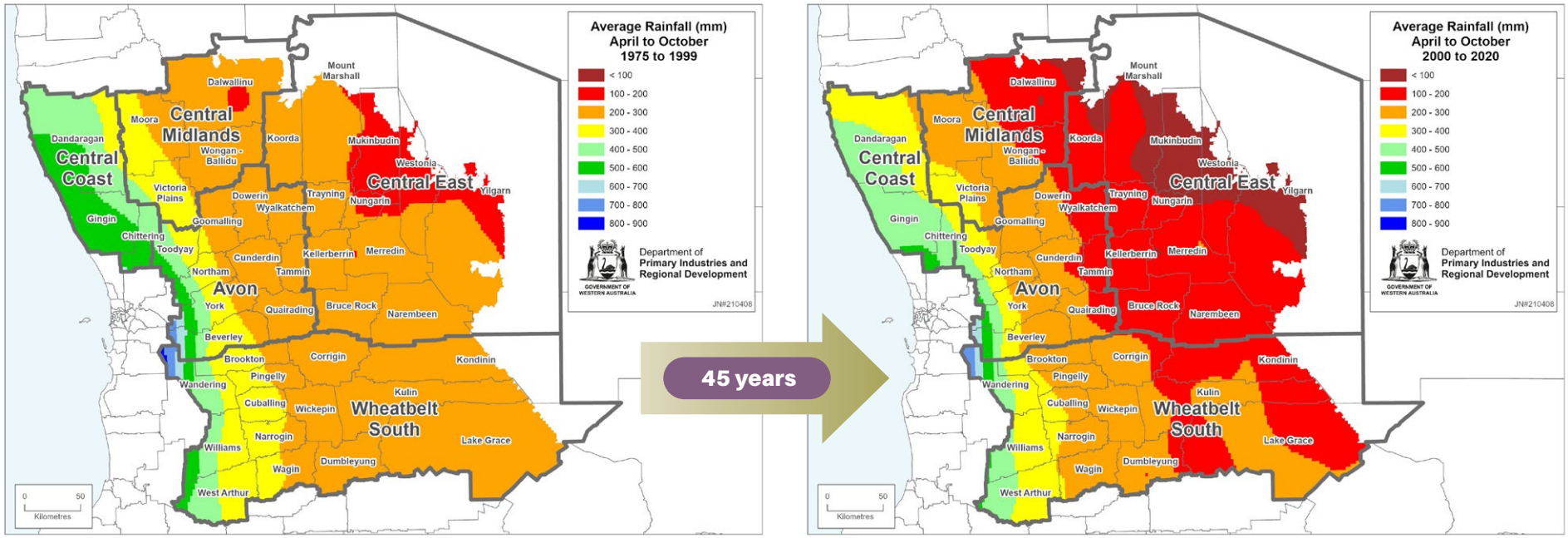


FIGURE 1 Change in average growing season rainfall (1975–2020) in the Wheatbelt. *Note: rainfall zones have shifted southwest over the past 50 years and the area designated as low-rainfall (<325 mm) has nearly doubled.*

Source: Department of Primary Industries and Regional Development



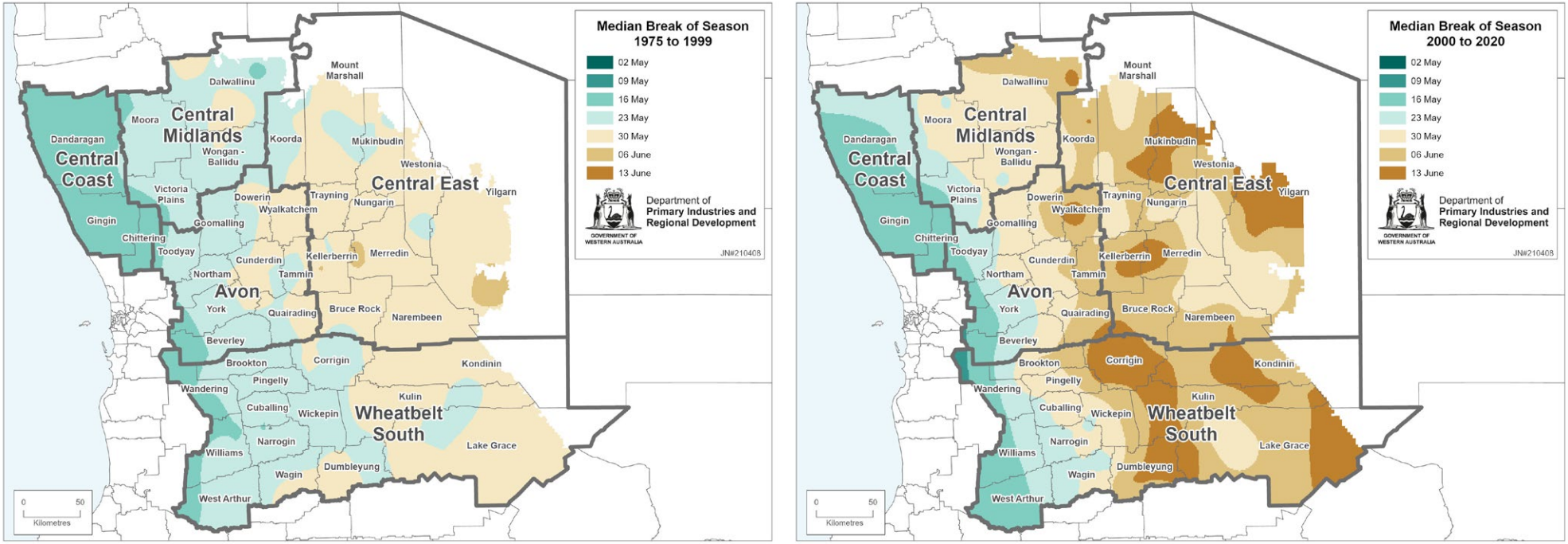


FIGURE 2 Change in timing of 'autumn break' across the Wheatbelt (the traditional sowing start date) between 1975–1990 compared with 2000–2020. *Note: traditional autumn break has been delayed by as much as three weeks in some eastern and southern areas — especially on heavier soils.*

Source: Department of Primary Industries and Regional Development

Over the past 40 years, seasonal drought frequency has increased by a factor of 3–4 in some parts of the Wheatbelt (Figure 3).

Over the past 50 years, rainfall decline has resulted in an 80% reduction in streamflow into water reservoirs supplying Perth and south-west WA (which includes the Wheatbelt) (Figure 4).

With significantly less runoff, many of the 200,000 farm dams across the Wheatbelt are capturing only 20–30% of the run-off they captured 40-years ago with many no longer meeting farm water demands during consecutive low rainfall years (for more information see Section 5 *Wheatbelt Water Demand*).



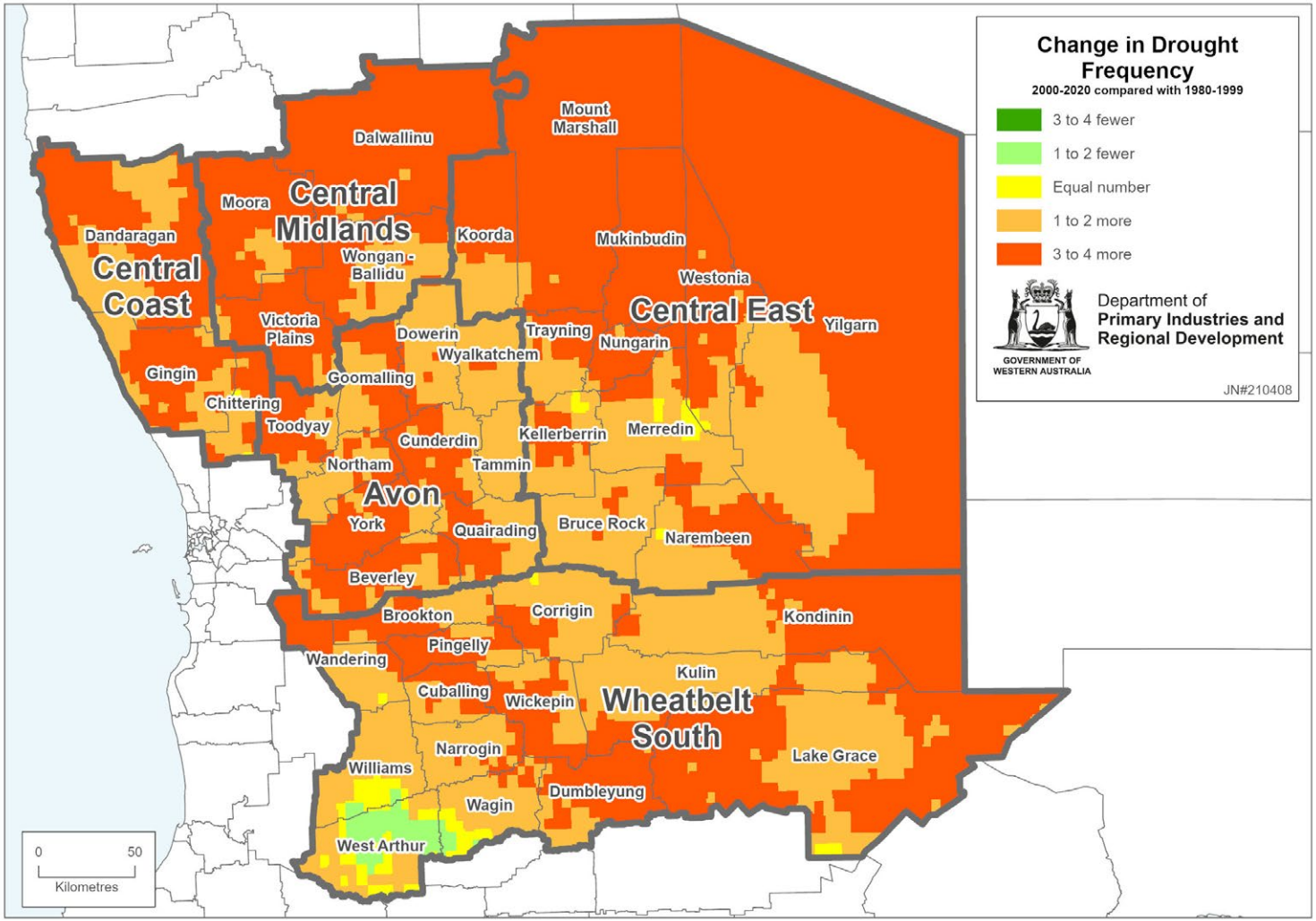


FIGURE 3 Change in frequency of seasonal drought (1980–2020) across the Wheatbelt. *Note: seasonal drought frequency (defined as total rainfall during April to October in decile 1) has increased by a factor of 3-4 in some parts of the Wheatbelt.*

Source: Department of Primary Industries and Regional Development

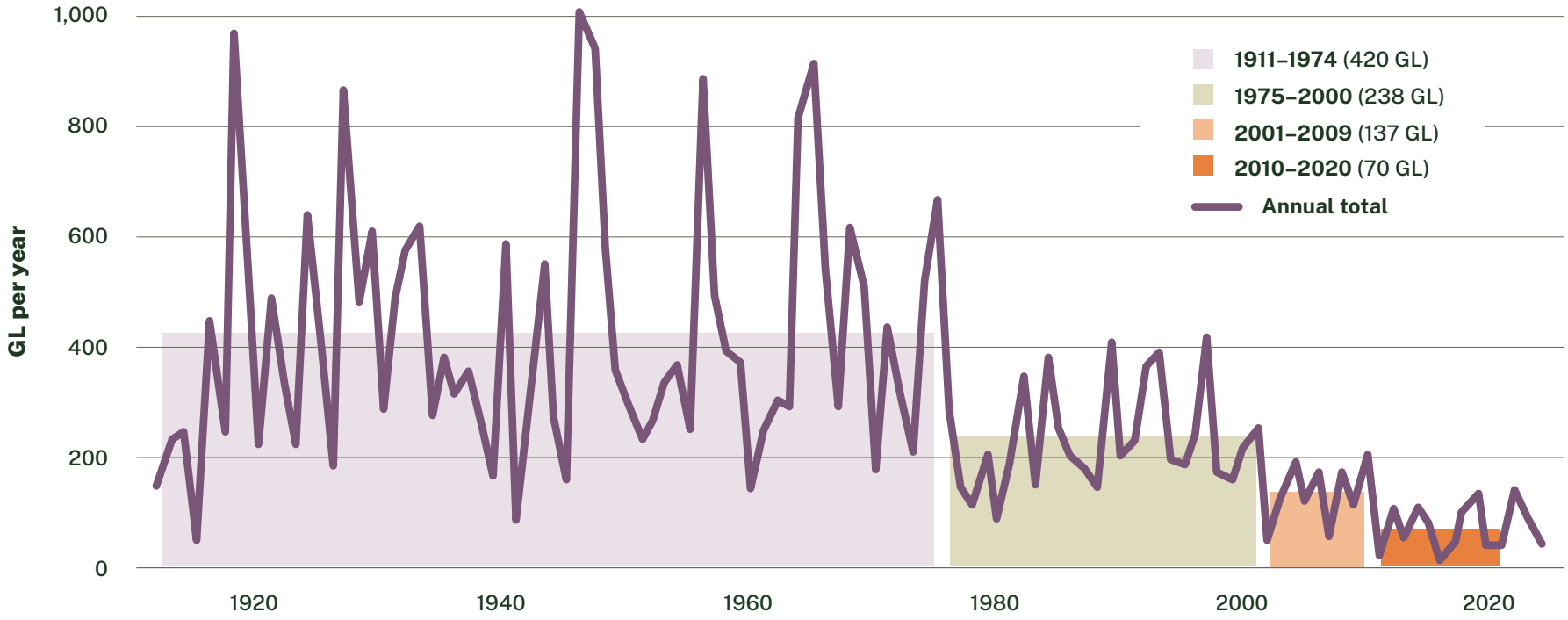


FIGURE 4 Reduction in streamflow into water reservoirs supplying Perth and south-west WA (which includes the Wheatbelt) over the past 100 years. *Note: there has been an 80% drop in streamflow over the past 50 years.*

Source: Water Corporation of Western Australia



Predicted climate

Climate modelling predicts that the drying trend experienced across the Wheatbelt since the mid-1970s is likely to continue with annual rainfall projected to decline a further 2–10%, particularly in eastern areas (Figure 5).

The climate models have high confidence of less rainfall in winter and spring and that annual rainfall will decline, but changes to autumn and summer rainfall remain unclear.

Growing season rainfall is expected to decline further across the Wheatbelt under a medium emissions scenario — with the area receiving less than 200mm rainfall expanding to the southwest (Figure 6).

Crop yield will be most affected by changes in rainfall, particularly timing of rainfall. Declining growing season rainfall and lighter rainfall events will make evaporation losses more significant, and less water will be stored deep in the soil. Plant available water capacity of soils will become increasingly important in determining yield, with yield declines likely to be greater on clay soils compared to sands, particularly in drier eastern areas. Crop yields may be largely unchanged or increase in wetter western and southern areas where higher temperatures and reduced waterlogging will benefit crops.[2]

By 2050 under a medium emissions scenario, there will be 20–30% more days above 35°C across the Wheatbelt — resulting in increased heat stress in communities, crops and livestock (Figure 7).

2. Sudmeyer, R A, Edward, A, Fazakerley, V, Simpkin, L, and Foster, I. (2016), *Climate change: impacts and adaptation for agriculture in Western Australia*. Department of Primary Industries and Regional Development, Western Australia, Perth. Bulletin 4870.



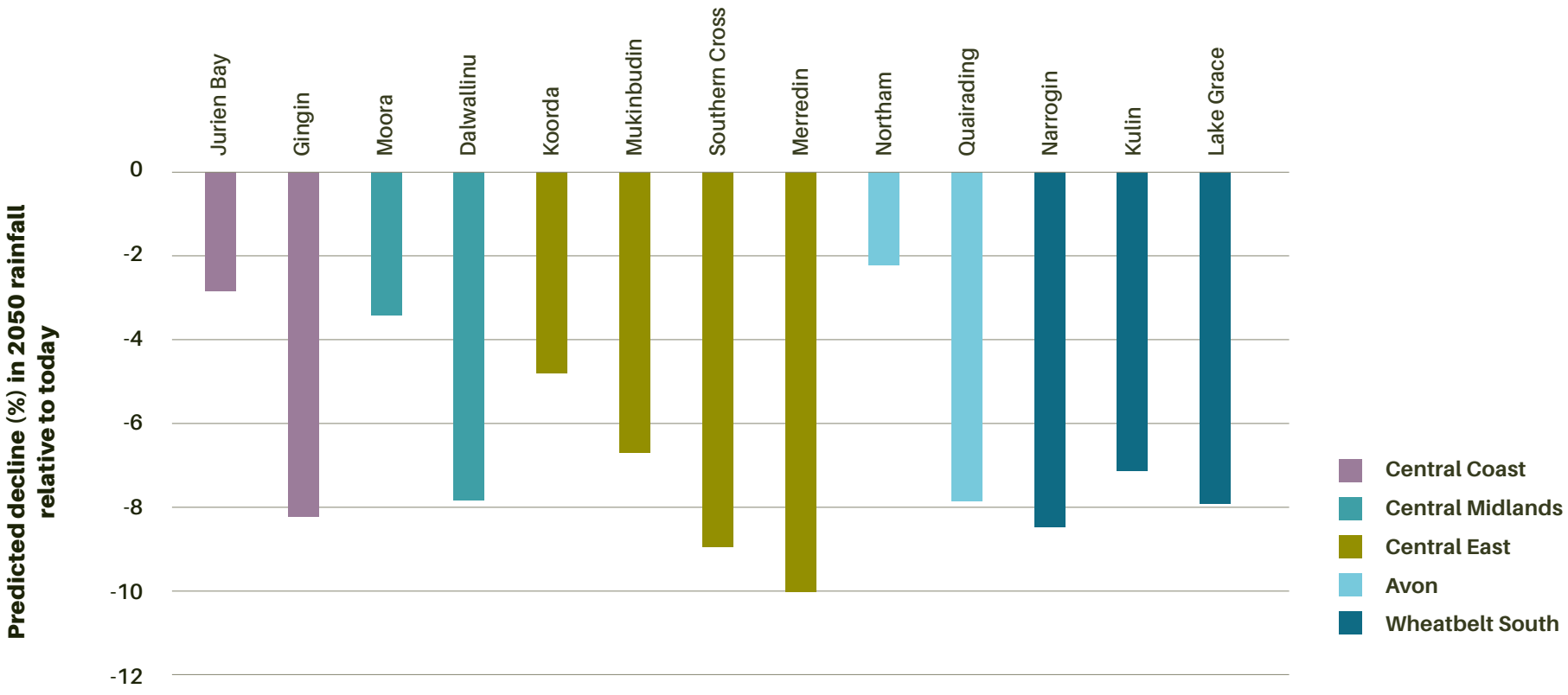


FIGURE 5 Predicted annual rainfall decline (%) across Wheatbelt towns and sub-regions (from west to east) by 2050.
Note: Predictions are based on a medium emissions scenario in which greenhouse gas emissions are reduced substantially by end of the century, but not enough to stop continued warming.

Data source: Climate Services for Agriculture

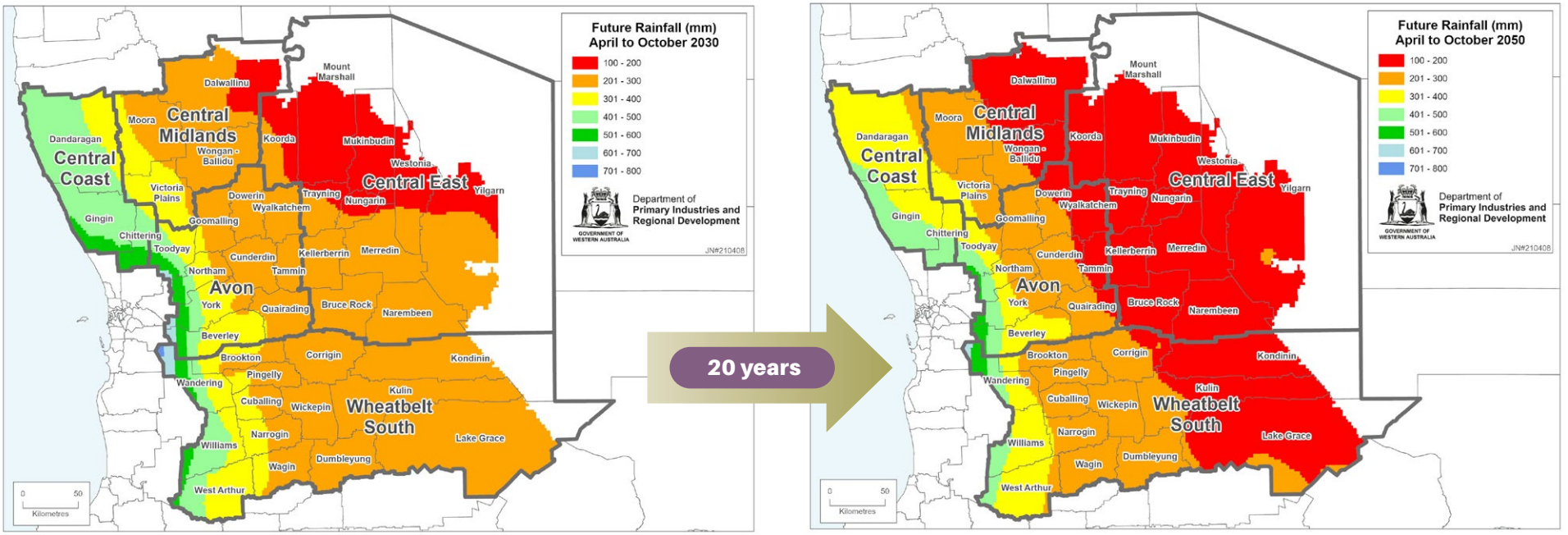


FIGURE 6 Predicted growing season rainfall across the Wheatbelt in 2030 and 2050 compared with recent past. *Note: Predictions are based on a medium emissions scenario in which greenhouse gas emissions are reduced substantially by end of the century, but not enough to stop continued warming.*

Source: Department of Primary Industries and Regional Development

Higher temperatures, and to a lesser extent declining rainfall, will hasten crop development times and reduce the flowering period. Each day with temperatures above 35°C during grain fill can reduce wheat yield by 5% while temperatures above 32°C during canola flowering can cause flower abortion.[3] In extreme temperatures, sheep and cattle can require up to 80% more water and reproductive rates can drop.[4,5,6]

3. Sudmeyer, R A, Edward, A, Fazakerley, V, Simpkin, L, and Foster, I. (2016), *Climate change: impacts and adaptation for agriculture in Western Australia*. Department of Primary Industries and Regional Development, Western Australia, Perth. Bulletin 4870.
4. William H. E. J. Van Wettere et al. (2024) Heat stress from current and predicted increases in temperature impairs lambing rates and birth weights in the Australian sheep flock, Nature Food.
5. Graeme B. Martin, Geoffry Fordyce, Michael R. McGowan, Jennifer L. Juengel. (2024) Perspectives for reproduction and production in grazing sheep and cattle in Australasia: The next 20 years, Theriogenology, Volume 230.
6. Department of Primary Industries and Regional Development (DPIRD), Western Australia. (2024), Livestock water requirements and water budgeting for South West Western Australia. Department of Primary Industries and Regional Development, Perth, WA. Factsheet DPIRD-18.



Image courtesy: Megan Hele

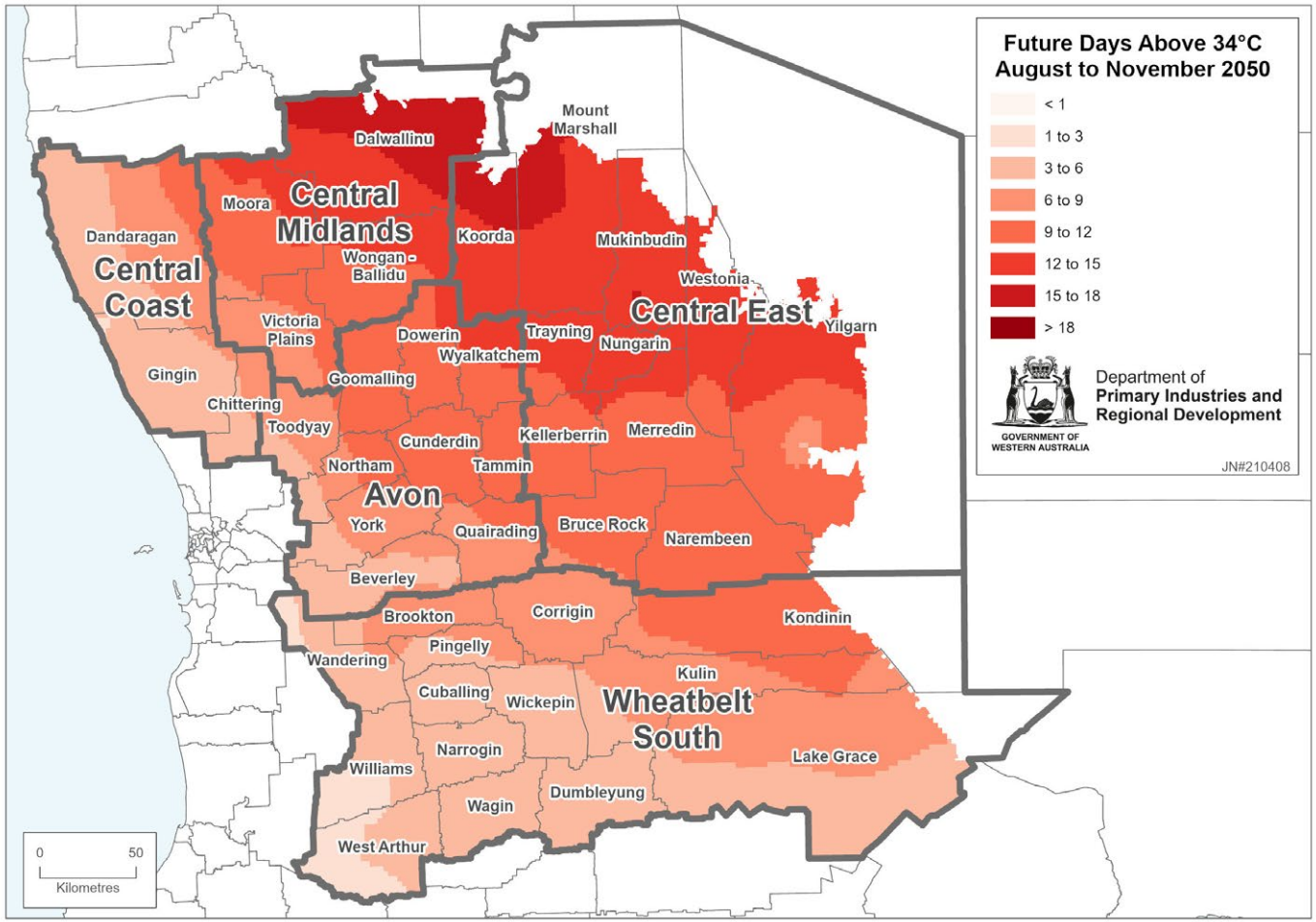


FIGURE 7a) Predicted increase in number of days above 34°C by 2050 compared with the recent past across the Wheatbelt and in selected towns across the Wheatbelt (from west to east). *Note: Predictions are based on a medium emissions scenario in which greenhouse gas emissions are reduced substantially by end of the century, but not enough to stop continued warming.*

Source: Department of Primary Industries and Regional Development

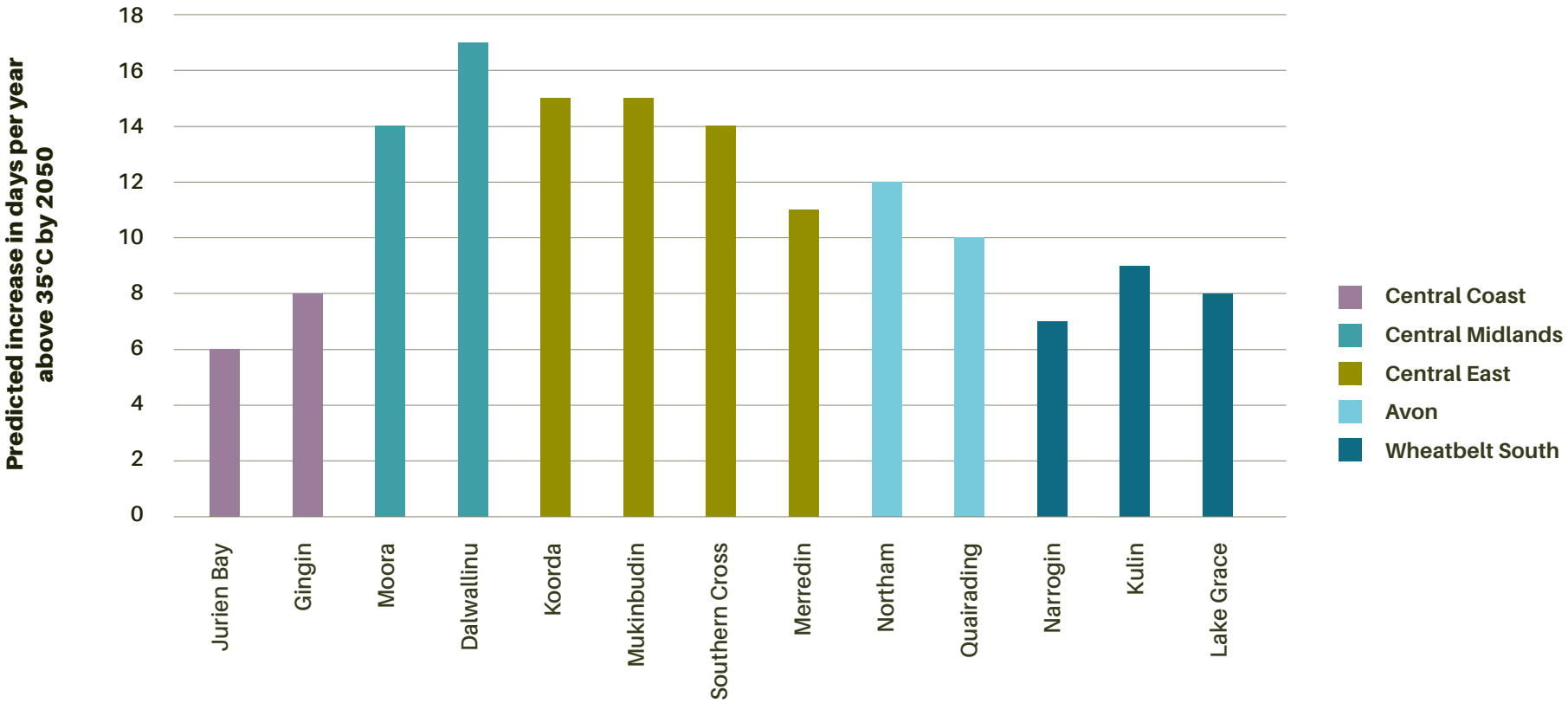


FIGURE 7b) Predicted increase in number of days above 34°C by 2050 compared with the recent past in selected towns across the Wheatbelt (from west to east). *Note: Predictions are based on a medium emissions scenario in which greenhouse gas emissions are reduced substantially by end of the century, but not enough to stop continued warming.*

Source: Climate Services for Agriculture

Action required

- **Communicate the main findings of the Wheatbelt Drought Resilience Plan** (including the Wheatbelt climate story) at a community and sub-regional level to encourage continued adaptation to a drier, hotter climate with higher incidences of drought
- **Apply a climate and drought resilience lens** across all Wheatbelt policy development and strategic planning at community, sub-regional and regional levels to ensure industry and communities can continue to stay abreast of the changing climate

For details on each of the actions above see *Implementing the Plan* in Section 10 of this report.



Image courtesy: Angie Roe, Austockphoto

3. Defining drought and drought resilience for the Wheatbelt

Understanding the impacts of drought on communities and landscapes to guide tailored and long-lasting drought resilience responses across the Wheatbelt



Drought can occur anywhere, from the arid centre to the coastal strip. Its impacts are wide-ranging, extending beyond farmers and their families to their whole communities.

Parties to the National Drought Agreement (2024) National Drought Agreement annual report 2023–24



Image courtesy: DPIRD

Defining drought and drought resilience:

- **A prolonged period of abnormally dry conditions** that impacts negatively on water availability and 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
- **A drought resilient Wheatbelt** is one in which communities, landscapes and industries can anticipate, absorb, and adapt to drought conditions while maintaining wellbeing, economic stability, and environmental sustainability.



Image courtesy: Shire of Narembeen

Introduction

Drought is defined as a prolonged, abnormal dry period when the amount of water available is insufficient to meet normal use (Australian Bureau of Meteorology).

The need for a Wheatbelt-appropriate definition of drought was raised several times during stakeholder consultation for the pilot Southern Wheatbelt Regional Drought Resilience Planning program. Farmers and agribusiness deemed 'growing season rainfall' rather than 'annual rainfall' the more important measure of drought in areas dependent on agriculture — with two or more consecutive dry growing seasons having severe business and personal consequences. In addition, the growing prevalence of 'hot droughts' (overlapping periods of low rainfall and high temperatures) was identified as a serious threat to Wheatbelt farming operations and communities.

So-called 'hot droughts' are defined by total rainfall (mm) during the April to October growing season being in decile 1 (the lowest 10% of years on the historical record) and daily maximum air temperatures during the August to November grain fill period being in decile 9 (the hottest 10% of years on the historical record). Hot droughts can be devastating for the environment and societies, and are expected to increase globally.[1,2] In WA, hot droughts have primarily occurred in the past 15 years (2005–2020) mostly in the coastal regions of the southwest but the Wheatbelt has also experienced two hot droughts between 2000 to 2020.[3]

No definition can adequately measure drought for all people, disciplines, locations and timeframes, and drought definitions should be developed and applied for a specified context.[3]

1. Overpeck, J. T. The challenge of hot drought. Nature 503, 350–351 (2013)
2. Bourne, A. R., et al. Hot droughts compromise interannual survival across all group sizes in a cooperatively breeding bird. Ecology Letters 23, 1776–1788 (2020)
3. Mastrantonis, S., (2022) Defining drought in Western Australia. Centre for Crop and Disease Management. Curtin University, WA.



The following meteorological definitions of drought developed during the pilot Southern Wheatbelt RDRP focused on total rainfall during the April to October growing season:

- **Drought Year:** total rainfall (mm) during the April to October growing season is in decile 1 (the lowest 10% of years on the historical record)
- **Severe Drought:** total rainfall (mm) during the April to October growing season is in decile 1 for two or more consecutive years.
- **Hot Drought:** total rainfall (mm) during the April to October growing season is in decile 1 and daily maximum air temperatures during the August to November maturing season are in decile 9 (the hottest 10% of years on the historical record).

While these meteorological definitions of drought help capture the impact of rainfall deficiency and extreme temperatures on broadacre agricultural enterprises in the Wheatbelt, a more comprehensive drought definition is needed to encapsulate the impacts of drought across Wheatbelt communities, landscapes and economies. Technical work commissioned on behalf of the federal regional drought resilience process in southern WA along with stakeholder consultation across the Wheatbelt developed the following drought definition for the Wheatbelt:

'A prolonged period of abnormally dry conditions that impacts negatively on water availability and 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 policy

Drought policy has evolved considerably in WA since the 1980s, with a policy shift towards preparing for drought rather than distribution of relief funding in response to a drought declaration (the last of which occurred in 1982 in WA).

Following successive dry seasons in WA's eastern and central grainbelt between 2006–2010, WA implemented the $80 million Australian Government Pilot of Drought Reform Measures between 2010–2012, aimed at ensuring farm business preparedness for drought through business management training, household and community support and exit grants. Following the success of the pilot reform measures, farm business capacity workshops were delivered through the Plan, Prepare and Prosper program from 2012–2014. Figure 1 illustrates the history of drought policy in Australia.

The new National Drought Agreement (2024–2029) recognises that drought impacts beyond the farm gate and into the broader rural community.



Image courtesy: Megan Hele

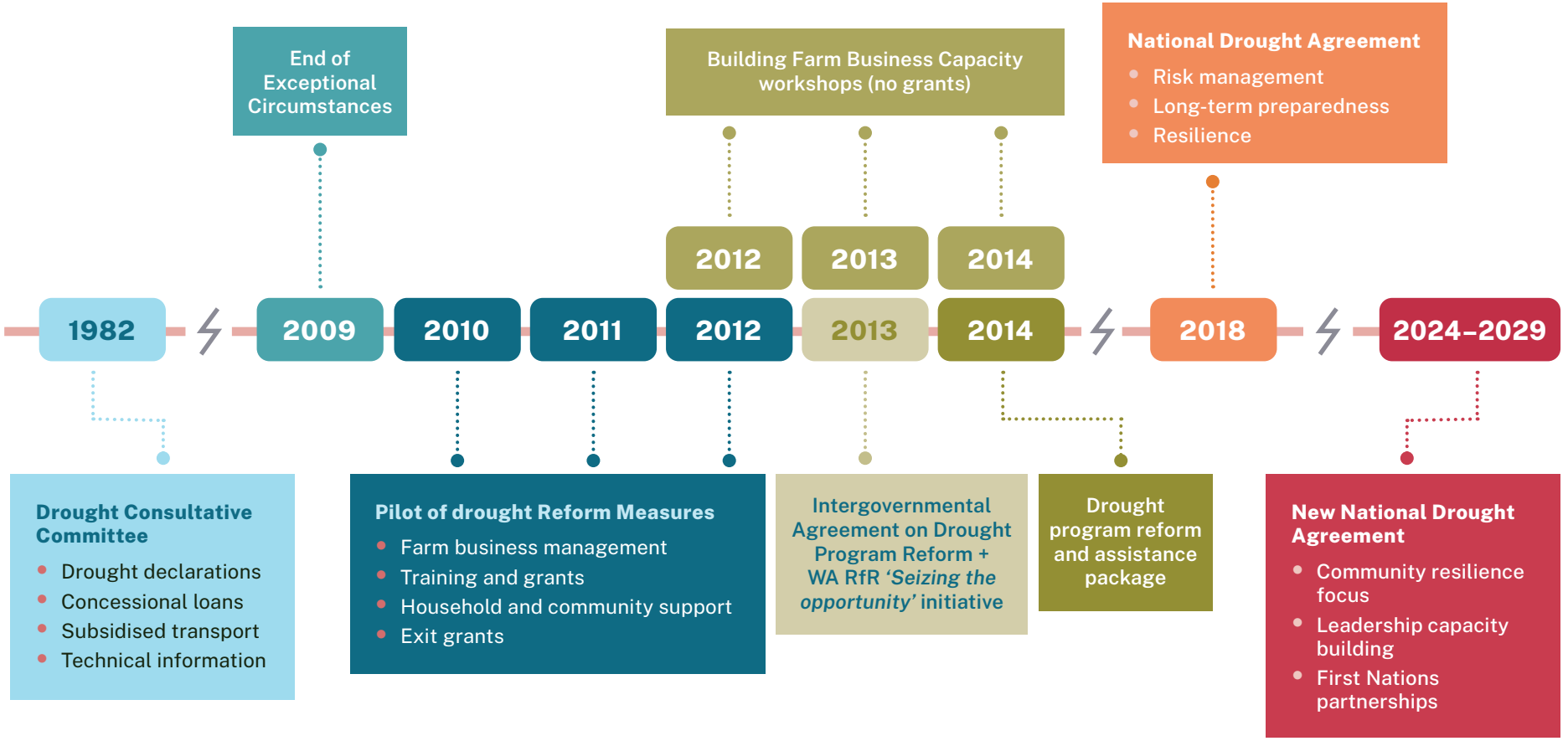


FIGURE 1 Brief history of Western Australia drought policy from the 1980s to present.

Data source: Department of Primary Industries and Regional Development



Image courtesy: DPIRD

The 2018 Drought Agreement was a five-year intergovernmental agreement between the Australian, state, and territory governments, and was designed to help Australian agriculture prepare for, manage, and recover from drought. It established a framework for national coordination of drought policies and programs, clarifying the roles and responsibilities of each jurisdiction to ensure consistency and reduce duplication. The current agreement runs from 2024 to 2029 and builds on this first agreement by recognising:

- that drought impacts beyond the farm gate and into the broader rural community.
- that drought policies and programs should cover mental health, social cohesion and safety, and that these are issues that can be exacerbated by drought.
- the need to partner with First Nations peoples, communities and/or peak organisations when developing and delivering drought policies and programs.
- that the development and delivery of drought policies and programs should be evidenced based.
- that there will be times when even the most prepared and resilient may need support and that this support should be provided to avoid market distortions and that eligibility should be based on need, not activated by drought declarations.

"National and State drought policy has shifted from crisis management and financial assistance to preparedness and risk management."

Intergovernmental Agreement of National Drought Program Reform Working Group



Drought resilience

Drought resilience is a subset of regional and community resilience and involves an interconnected complex of observable and unobservable factors. No one approach can be used to build resilience across the Wheatbelt.

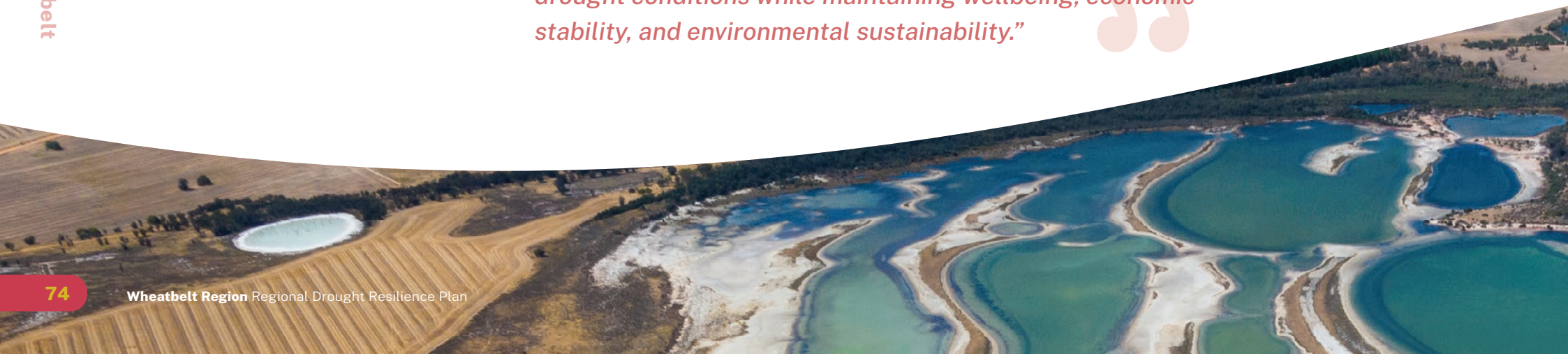
"When droughts inevitably occur, communities need to be ready — and in a way that works for each particular community. With natural disasters, including drought, there is no cookie-cutter solution."

Natalie Egleton, CEO Foundation for Rural & Regional Renewal

Over the course of developing the Wheatbelt RDRP it became clear that a multi-pronged and tailored approach was needed to instil long-lasting resilience across Wheatbelt communities and the region's main economy — agriculture.

To capture the complexity and breadth involved in drought resilience in the Wheatbelt the following definition was developed through the Wheatbelt RDRP stakeholder consultation process:

"A drought resilient Wheatbelt is one in which communities, landscapes and industries can anticipate, absorb, and adapt to drought conditions while maintaining wellbeing, economic stability, and environmental sustainability."



All stakeholders consulted through the Wheatbelt RDRP process were asked to describe what a resilient, adaptable Wheatbelt looked like. The need for collaboration, planning and monitoring was a common thread across all responses. The two quotes below come from a Wheatbelt tourism director and a regional Telstra communications manager:

"A resilient Wheatbelt embraces innovation, diversity, and collaboration, enabling communities and industries to withstand external pressures while continuing to grow."

Linda Vernon, Tourism Officer Wheatbelt Way

"A resilient Wheatbelt region is prepared for drought conditions and has short-, mid- and long-term strategies developed to monitor and model conditions and identify and act on areas most at risk."

Boyd Brown, Regional Manager Telstra

Image courtesy: Kulin Bush Races

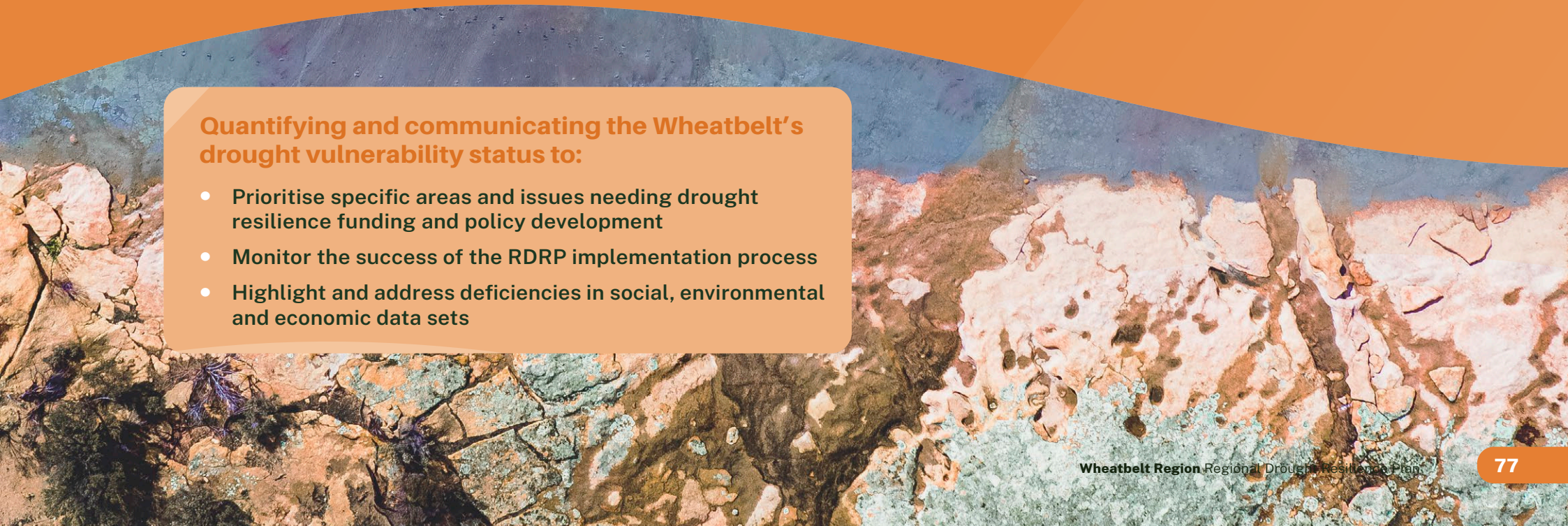




Image courtesy: DPIRD

4. Wheatbelt drought vulnerability assessment

Integrating available social, economic and environmental data to keep track of drought vulnerability across the Wheatbelt



Quantifying and communicating the Wheatbelt's drought vulnerability status to:

- Prioritise specific areas and issues needing drought resilience funding and policy development
- Monitor the success of the RDRP implementation process
- Highlight and address deficiencies in social, environmental and economic data sets



Wheatbelt drought vulnerability at a glance:

- **The Wheatbelt as a whole is currently rated moderately vulnerable** to the impacts of drought with ratings across sub-regions ranging from 'low-to-moderate' in the high-rainfall west through to 'very high' in low rainfall eastern areas
- **While the drought vulnerability assessment** picks up current and future climatic and biophysical threats well, it falls short in properly assessing social, natural and human capital and infrastructure status at local (LGA) and sub-regional levels
- **Community and regional resilience relies on a suite of factors** with some only captured through qualitative analysis using case studies and storytelling to unravel the drivers of successful resilience
- **Addressing these data/status deficiencies will provide depth** to future drought vulnerability analyses and enable the impact of implemented RDRP projects to be properly assessed

Introduction

Building drought resilience across the Wheatbelt requires an understanding of where the region's people, processes and systems currently stand in the face of a drying climate.

The vulnerability index map in Figure 1 was developed by integrating and weighting a range of national and regional economic, environmental and social data related to drought vulnerability and resilience in the Wheatbelt. The map and its underlying data sets provide a broad snapshot in time of drought vulnerability at a sub-regional level across the Wheatbelt.

The process used to develop the drought vulnerability indices can be repeated (and refined) over time to assess the impact of drought resilience measures instigated via the Wheatbelt regional drought resilience implementation plan (see Section 10 *Implementing the Plan*).

"A drought resilient Wheatbelt is prepared for drought conditions and uses monitoring and modelling to identify areas of highest risk."

Wheatbelt RDRP consultancy feedback



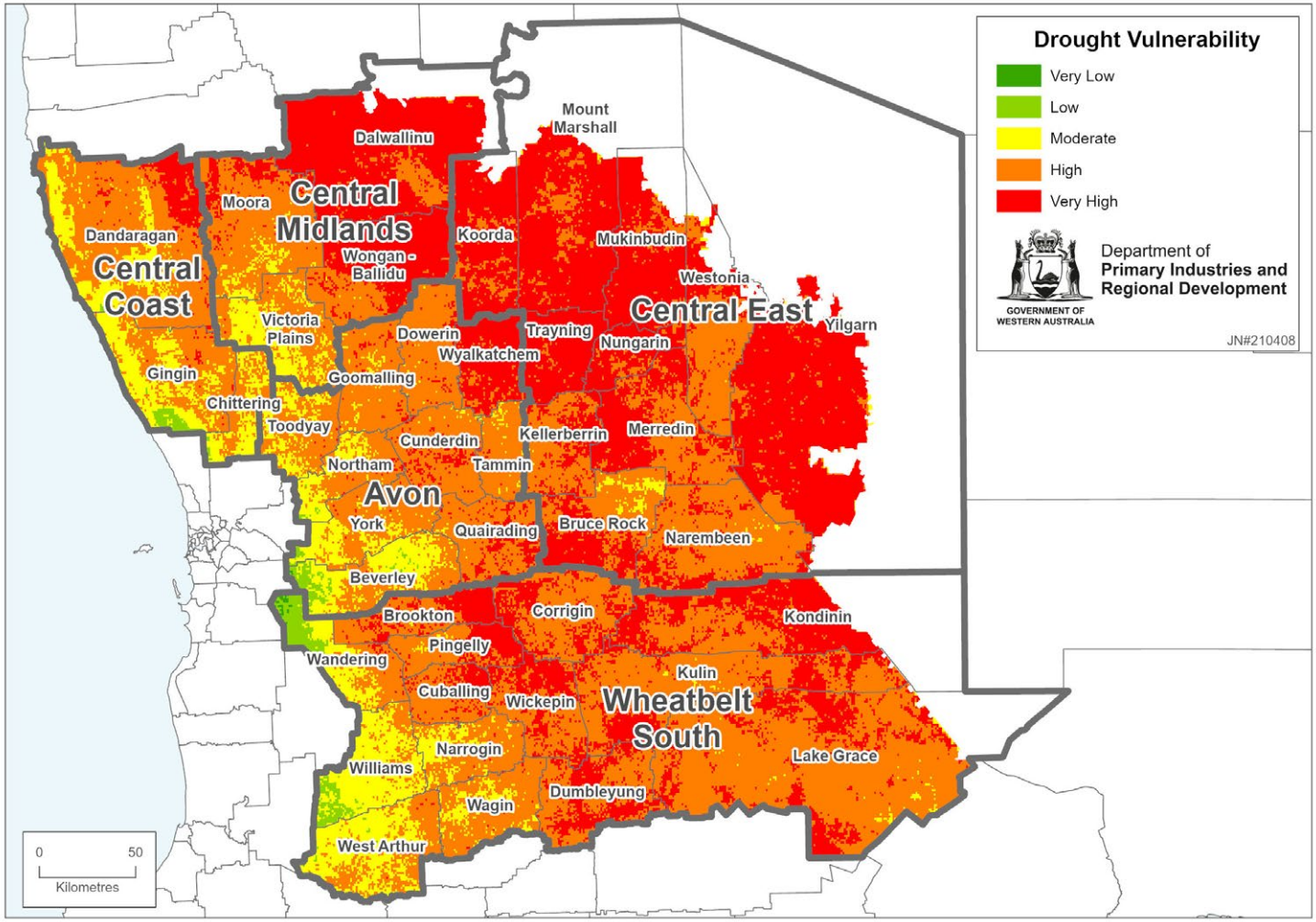


FIGURE 1 Drought vulnerability index for the Wheatbelt showing areas of high (orange–red), moderate (yellow) and low (green) vulnerability. The map is the result of several layers of economic, social and environmental data integrated to create a snapshot in time of drought vulnerability at a sub-regional scale.

Source: Department of Primary Industries and Regional Development

Drought vulnerability across the Wheatbelt is currently deemed to range from 'low-moderate' to 'very high' with a small pocket of the region in the far west rated as having 'very low' drought vulnerability.

Sub-regional drought vulnerability

To identify issues requiring priority action at a sub-regional level, the data used in Figure 1 is displayed in more detail in Figures 2a–e.

Each vulnerability assessment was based on the same 10 indicators (Table 1). Drought vulnerability indicators were rated on a sliding scale from 1–5, with 1 being the lowest vulnerability and 5 the highest (Table 2).

The Wheatbelt as a whole is currently considered moderately vulnerable to future drought and climate change, however the drought vulnerability of individual sub-regions is rated as low-medium through to very high (Figure 1).

All sub-regions are now dealing with more drought years than they did 40 years ago and all have economies heavily reliant on agriculture. Economic diversification and continued investment in agricultural resilience will be required as the climate dries and becomes hotter.



Image courtesy: Angie Roe, Austockphoto

TABLE 1. Drought vulnerability indicators used to assess drought vulnerability and resilience in the Wheatbelt

Drought vulnerability indicator	Notes on drought vulnerability measure
Projected change in temperature and rainfall	• Change in number of days above 34°C August to November by 2050 • Percentage change in rainfall April to October by 2050 (Climate Services for Agriculture)
Change in timing of the autumn break	• Percentage difference in time of median seasonal break between 1975-1999 and 2000-2020 (defined as least 25 mm of rainfall over three consecutive days before sowing) (DPIRD and BOM)
Change in drought frequency	• Drought is defined as growing season rainfall in the 10th percentile and is calculated relative to the average seasonal rainfall over the preceding 40 years. (DPIRD)
Production risk	• Incorporates measures of (1) average regional production for wheat, barley, canola, sheep and cattle, (2) proportion of high quality agricultural land, (3) wheat yield potential and (4) 20-year average NDVI* (DPIRD)
Trend in groundcover (NDVI*)	• Quantifies number of days at the lowest 10% of NDVI (vegetation cover) between 2002 and 2021 (DPIRD)
Percentage employment in agriculture	• Proportion of employed people in farming and allied industries (Australian Census 2016)
Percentage unemployment	• Proportion of people at employable age who are registered as unemployed (Australian Census 2016)
Access to infrastructure	• Scheme water coverage and proximity to main road infrastructure and strategic community water supplies (DPIRD)
Groundwater quality	• Groundwater salinity level (fresh to hyper saline) (DPIRD)
Soil capability	• Land capability for cropping based on analysis and interpretation of DPIRD's soil-landscape mapping dataset

* NDVI: **normalised difference vegetation index** measures the 'greenness' of vegetation and is used in studies of climate change, agriculture, and natural disasters.

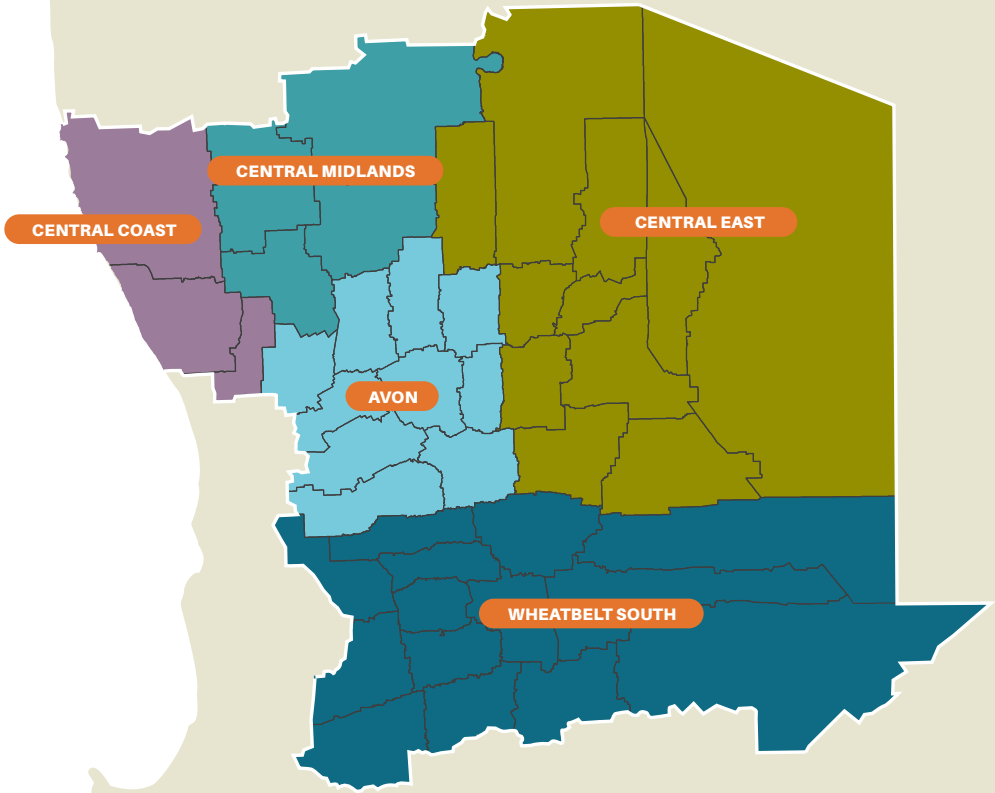


FIGURE 2 Drought vulnerability assessments for **a)** Central Coast **b)** Central Midlands **c)** Avon **d)** Central East and **e)** Wheatbelt South sub-regions.

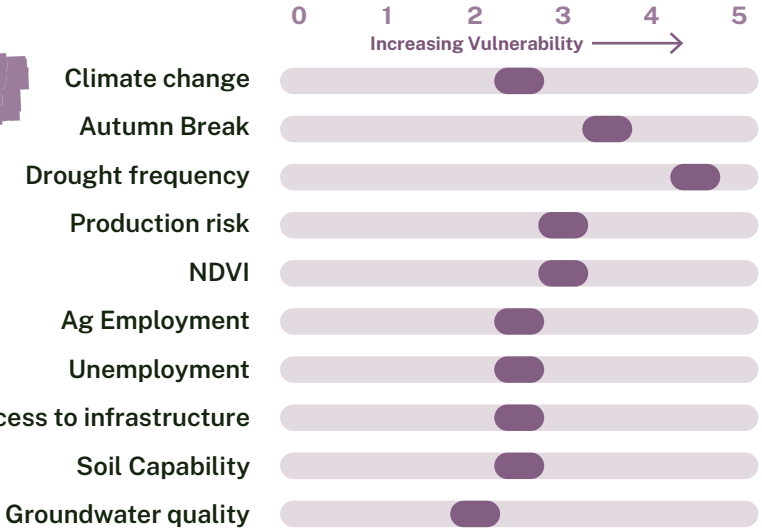
Source: Department of Primary Industries and Regional Development

It is important to note that while these indicators provide a broadscale assessment of drought vulnerability and resilience they do not pick up more nuanced drought resilience issues and success stories — such as the state of infrastructure, housing supply, social services and natural capital across the Wheatbelt (see Section 9 *Regional Resilience*); drought threats to farm and community water supplies (see Section 5 *Wheatbelt Water Demand*); or the positive impact that volunteer groups and innovative governance systems have on Wheatbelt community cohesion and function (see Section 8 *Community Resilience*).

Capturing measures of these resilience indicators will provide depth to future vulnerability assessments and enable the impact of implemented drought resilience projects to be properly assessed.

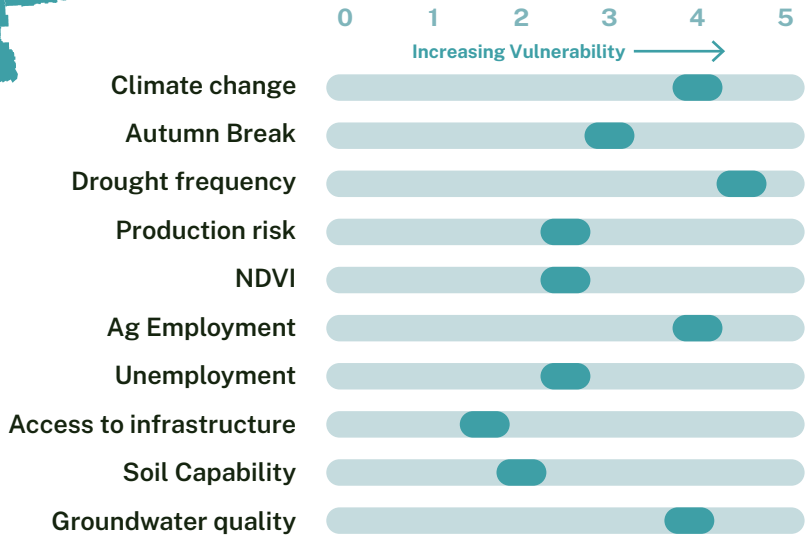


a) Central Coast:



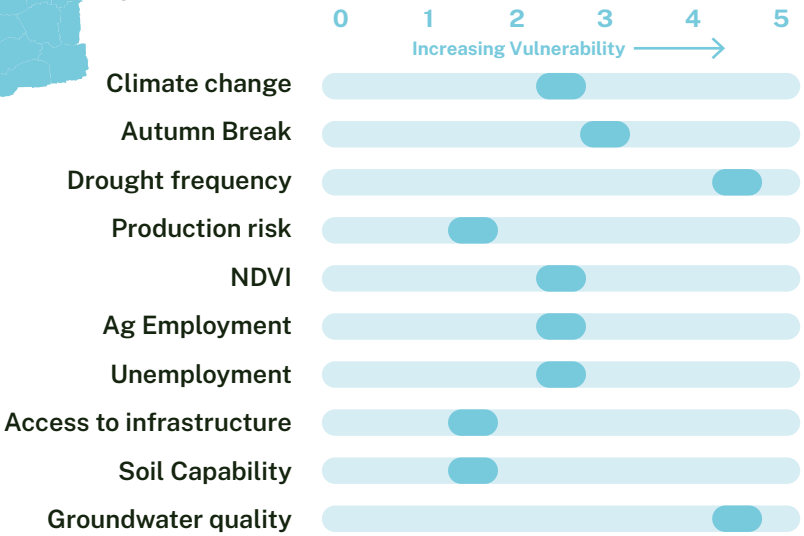


b) Central Midlands:



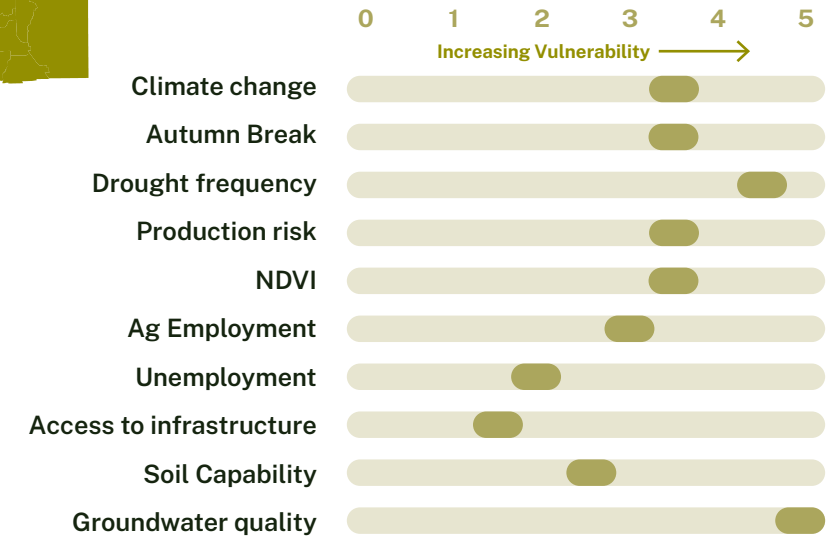


c) Avon:





d) Central East:





e) Wheatbelt South:

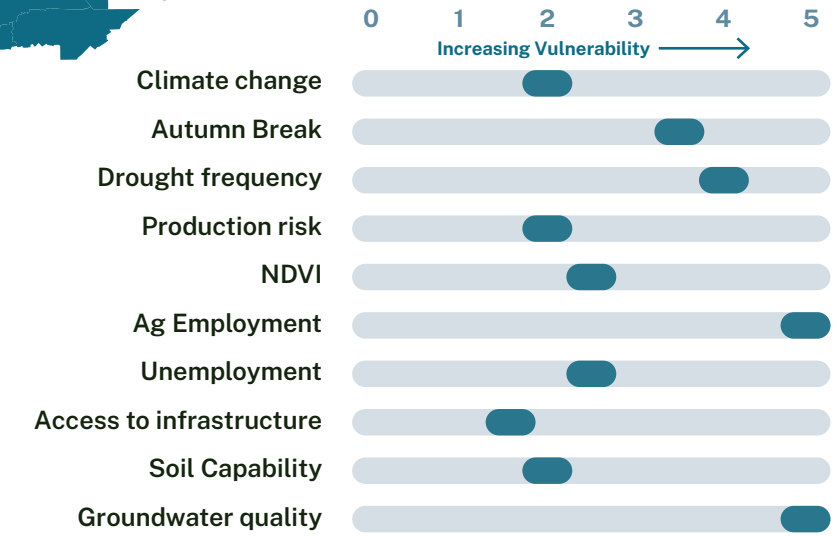


TABLE 2. Drought vulnerability indicators used to assess drought vulnerability and resilience in the Wheatbelt

Drought vulnerability indicator	Drought vulnerability sliding 1–5 scale details (1= lowest vulnerability and 5= highest vulnerability)
Projected change in temperature and rainfall	1. No increase in number of hot days, no change or an increase in rainfall 2. Moderate increase in number of hot days (<2.5), moderate decrease in rainfall (<15%) 3. High increase in number of hot days (<2.5 more hot days), moderate decrease in rainfall (<15%) 4. Moderate increase in number of hot days (<2.5), large decrease in rainfall (≥15%) 5. High increase in number of hot days (≥2.5 more hot days), large decrease in rainfall (≥15%)
Change in timing of the autumn break	1. Autumn break occurs earlier than the preceding 40-year median 2. Autumn break occurs 0–2% later than the preceding 40-year median 3. Autumn break occurs 3–5% later than the preceding 40-year median 4 . Autumn break occurs 6–8% later than the preceding 40-year median 5. Autumn break occurs ≥9% later than the preceding 40-year median
Change in drought frequency	1. Three or four fewer droughts than the preceding 40 years 2. One or two fewer drought than the preceding 40 years 3. Equal number of droughts as the preceding 40 years 4. One or two more droughts than the preceding 40 years 5. Three or four more droughts than the preceding 40 years
Production risk	1. Very low risk — good production, good soils and high average NDVI* 2. Low risk 3. Moderate risk 4. High risk 5. Very high risk — marginal production, poor soils and low average NDVI*
Trend in groundcover (NDVI*)	1. NDVI*@10% for 181–200 days between 2002 and 2021 2. NDVI @10% for 161–180 days between 2002 and 2021 3. NDVI @10% for 141–160 days between 2002 and 2021 4. NDVI @10% for 121–140 days between 2002 and 2021 5. NDVI @10% for 100–120 days between 2002 and 2021

* NDVI: **normalised difference vegetation index** measures the 'greenness' of vegetation and is used in studies of climate change, agriculture, and natural disasters.

TABLE 2. Drought vulnerability indicators used to assess drought vulnerability and resilience in the Wheatbelt

Drought vulnerability indicator	Drought vulnerability sliding 1–5 scale details (1= lowest vulnerability and 5= highest vulnerability)
Percentage employment in agriculture	1. Very few people employed in agriculture (<10%) 2. Few people employed in agriculture (10–20%) 3. Some people employed in agriculture (20–30%) 4. Many people employed in agriculture (30–40%) 5. Very many people employed in agriculture (>40%)
Percentage unemployment	1. Very low unemployment (0–2%) 2. Low unemployment (2–3%) 3. Moderate unemployment (3–4%) 4. High unemployment (4–5%) 5. Very high unemployment (>5%)
Access to infrastructure	1. Critical road and/or water infrastructure within 10km (very high) 2. Critical road and/or water infrastructure 10–25km away 3. Critical road and water infrastructure 25–50km away 4. ritical road and water infrastructure 50–100km away 5. Critical road and water infrastructure more than 100km away (very low)
Groundwater quality	1. ≤500mg/L total dissolved solids (fresh water) 2. 500–999mg/L total dissolved solids (marginal salinity) 3. 1000–2999mg/L total dissolved solids (brackish water) 4. 3000–6999mg/L total dissolved solids (saline water) 5. ≥7000mg/L total dissolved solids (saline to hyper saline)
Soil capability	1. High to very high capability 50–70% 2. Moderate to very high capability >70% 3. Moderate to very high capability 50–70% 4. Low to very low capability 50–70% 5. Low to very low capability >70%

* NDVI: **normalised difference vegetation index** measures the 'greenness' of vegetation and is used in studies of climate change, agriculture, and natural disasters.

Measuring and monitoring drought resilience

Significant gaps exist in our ability to quantify the environmental and social impacts of drought and capture a true measure of adaptive capacity across the Wheatbelt.

For example, the last environmental score card for Western Australia was done nearly 20 years ago in 2007. The *Regional Natural Resource Management Strategy* for the (Wheatbelt's) Avon River Basin was released more than a decade ago in 2013 — and the strategy's main recommendations are still relevant and largely unmet — a situation that underscores the investment and coordination needed to enhance and protect the Wheatbelt's unique and dispersed natural capital and implement monitoring systems to assess impact of restoration projects..

In addition, very little is known about the true adaptive capacity and drought vulnerability of Wheatbelt communities in the face of a drying climate. Audits of infrastructure needs and the drought resilience of recreational and other green spaces is needed across the Wheatbelt to create baseline data sets that can be used in ongoing resilience monitoring.



- **Drought vulnerability** is a function of the sensitivity and exposure of people and systems to the environmental, social and economic impacts of drought
- **Drought resilience** is a function of the adaptive capacity of people or systems to the environmental, social and economic impacts of drought (Figure 3)

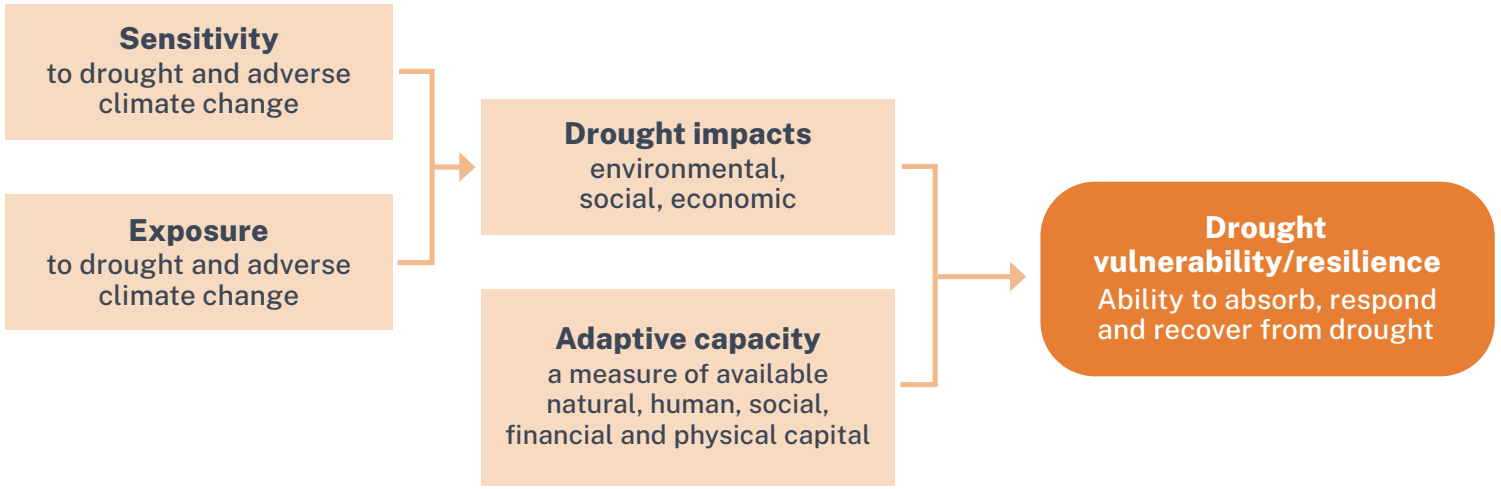


FIGURE 3 Factors contributing to drought vulnerability/resilience of people, processes and systems in the Wheatbelt.

Source: Department of Primary Industries and Regional Development

Image courtesy: DPIRD

There is also an urgent need to develop capacity at the LGA level to ensure local communities are working collaboratively and strategically to attract and manage the infrastructure and services needed to build resilience and economic diversity across the Wheabelt in the face of a drier, hotter climate.

A community is considered resilient when 'members of its population are connected to one another and work together, so that they are able to function and sustain critical systems, even under stress; adapt to changes in the physical, social or economic environment; be self-reliant if external resources are limited or cut off; and learn from experience to improve itself over time'[1].

1. Arbon, P., Steenkamp, M., Cornell, V., Cusack, L. & Gebbie, K. (2016). Measuring disaster resilience in communities and households: Pragmatic tools developed in Australia. International Journal of Disaster Resilience in the Built Environment. 7. 201-215.

Many inspirational examples of the Arbon et al (2016)[1] community resilience definition can be found across the Wheatbelt's 200+ communities and 42 local government authorities (LGAs) — from individuals banding together to buy local grocery shops and pubs on behalf of their towns through to local government alliances that build agency and capacity, low-rainfall farmers increasing water use efficiency and business strength despite drops in season rainfall, innovative aged care and childcare systems developed using local expertise; locally-developed wireless telecommunication systems; primary industries based on First Nation's cultural and environmental values; and the many thousands of committed, long-term volunteers underpinning the region's sporting, fire-fighting, ambulance and social clubs.





Communicating Wheatbelt resilience success stories and developing more robust measures of drought vulnerability will ensure a more accurate assessment of Wheatbelt drought resilience into the future and a more tailored approach to drought resilience policy development and action across the region.



Action required

- **Regularly update and enhance** the Wheatbelt drought vulnerability assessment (DVA) with climatic, economic, social, and environmental data, and by integrating local insights from community groups, LGAs, and industry bodies.
- **Use the updated DVA to guide** infrastructure planning, funding applications, emergency management, and investment prioritisation across the Wheatbelt.

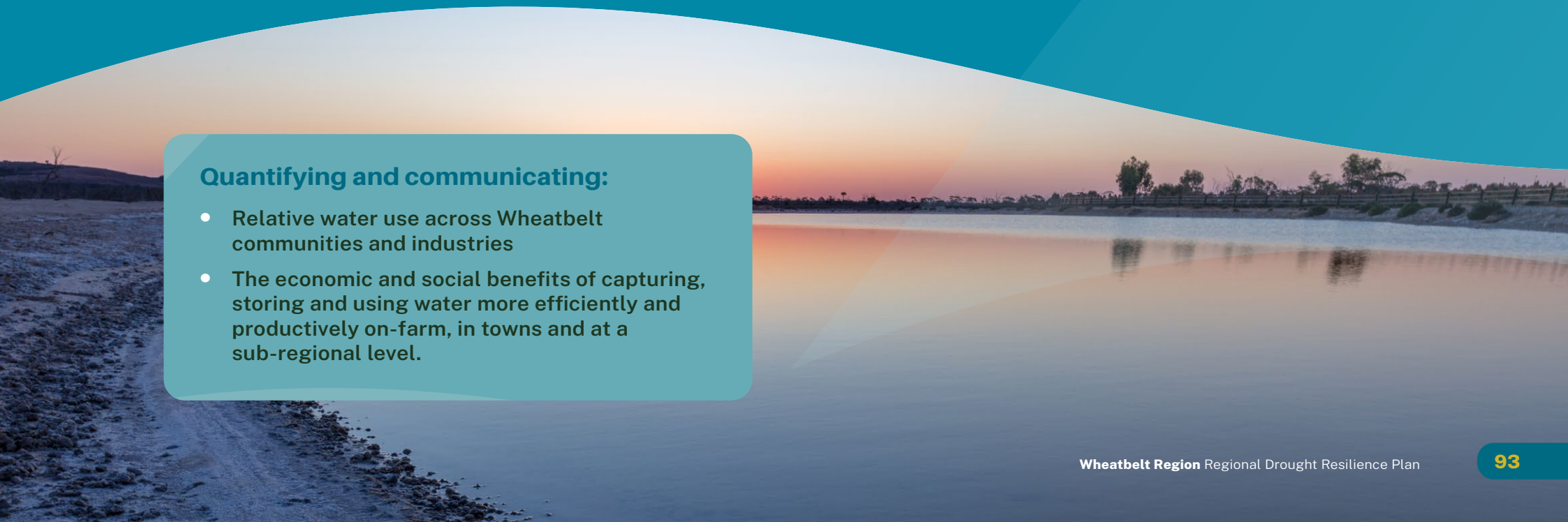
For details on each of the actions above see *Implementing the Plan* in Section 10 of this report.



Image courtesy: Angie Roe, Austockphoto

5. Wheatbelt water demand

Applying a strategic lens to Wheatbelt water use in the face of climate change, population growth and industry diversification



Quantifying and communicating:

- Relative water use across Wheatbelt communities and industries
- The economic and social benefits of capturing, storing and using water more efficiently and productively on-farm, in towns and at a sub-regional level.



Image courtesy: DPIRD

Wheatbelt – water demand at a glance:

- **Currently no comprehensive Water Strategy** for the Wheatbelt region
- **Growing competition for water** between expanding towns and agriculture/horticulture and mining/renewables ventures
- **Climate change placing downward pressure** on town and farm water supplies
- **Need to quantify supply and demand** at regional, sub-regional, community and farm level **to support forward planning**

Implementation plan themes covered in this section:



Embedding resilience thinking

Securing the region's water future

Building capacity of businesses and communities

Growing a diverse and resilient economy

Strengthening agricultural resilience and innovation

Restoring and valuing natural environment

Introduction

The water supply and demand equation for the Wheatbelt is complex.

Wheatbelt water demand comes from 77,000 residents, 3000+ farms and thousands of commercial businesses and public institutions across 15 million hectares of land (Figure 1).

Supply is drawn from an equally diverse mix of sources including desalinated seawater processed south of Perth, groundwater aquifers, surface water captured in Mundaring Weir in the Perth hills and in Harris and Stirling dams near Collie in the southwest, rainwater captured in hundreds of community and many thousands of farm dams, rainwater captured from domestic and commercial rooves and, in some towns, recycled wastewater and stormwater.

Water underpins the Wheatbelt's productivity, ecosystems and liveability and growth of its towns. From biological productivity and economic viability of its primary industries, through to the health of its natural ecosystems and the capacity of its towns and LGAs to create liveable and socially cohesive communities, support new industries, diversify economies and grow populations.

Both supply and demand sides of the Wheatbelt water equation are under increasing strain, and addressing challenges will be critical to securing drought resilience for the Wheatbelt. Climate change tops the challenge list — placing downward pressure and increased cost on the supply side of the water equation while also increasing water demand from livestock and cropping systems, public open spaces and households (Figure 1).

Developing additional water supplies for the Wheatbelt while improving the way water is used and prioritised at a sub-regional and local government level lie at the heart of solving the water challenges faced across the region.

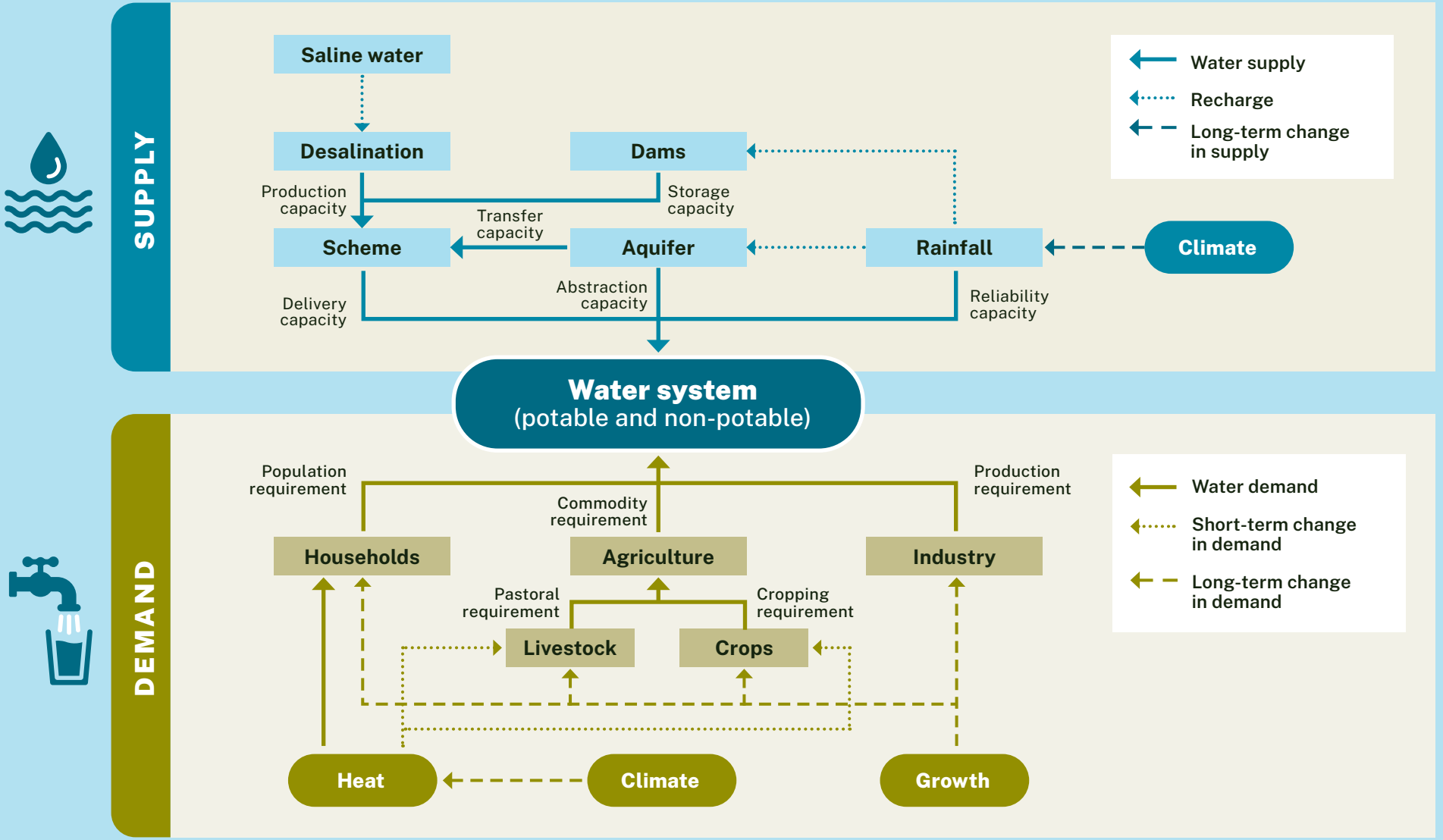


FIGURE 1 Overview of water supply and demand in the Wheatbelt (adapted from Boruff et al (2018) Changing water system vulnerability in Western Australia's Wheatbelt region, Applied Geography, Volume 91).

Wheatbelt water supply

Climate change has and will continue to disrupt water supplies in the Wheatbelt through reduced run-off into storage reservoirs and farm dams and reduced recharge into groundwater aquifers.

Overlaying the impact of climate change on water supplies, is the growing competition for fresh water as Wheatbelt populations grow north and east of Perth and the growing competition for groundwater between agriculture, mining and renewable energy operations. Ageing pipeline infrastructure adds further cost and complexity. Despite these challenges, the Wheatbelt still has opportunities to secure additional water sources and use existing supplies more efficiently.

Wheatbelt water currently comes from three main sources:

1. Drinking water piped in from Perth and Collie via 13,000 kms of pipelines in the Goldfields and Agricultural Water Supply Scheme (GAWS) and the Great Southern Towns Water Supply Scheme (GSTWSS) (see Figure 2)
2. Stored rainfall in water reservoirs and community/farm dams and tanks
3. Groundwater and surface water abstracted from aquifers and rivers (predominantly in the Central Coast sub-region)

Recycled waste water is used in some communities across the region. Community desalination is operational in the Shires of Merredin and Dumbleyung.

Drinking water

Most drinking (potable) water for the Wheatbelt is imported from Perth and Collie (Figure 2) where streamflow into catchment dams has fallen by 80% over the past 50 years (Figure 3). As these reservoirs can no longer reliably meet demand, desalinated seawater is increasingly filling the gap and is projected to be 65% of potable water by 2035 (Figure 4).

However seawater desalination is energy intensive, requiring more than four times more energy than groundwater collection, and over 40 times more than dam-sourced water.

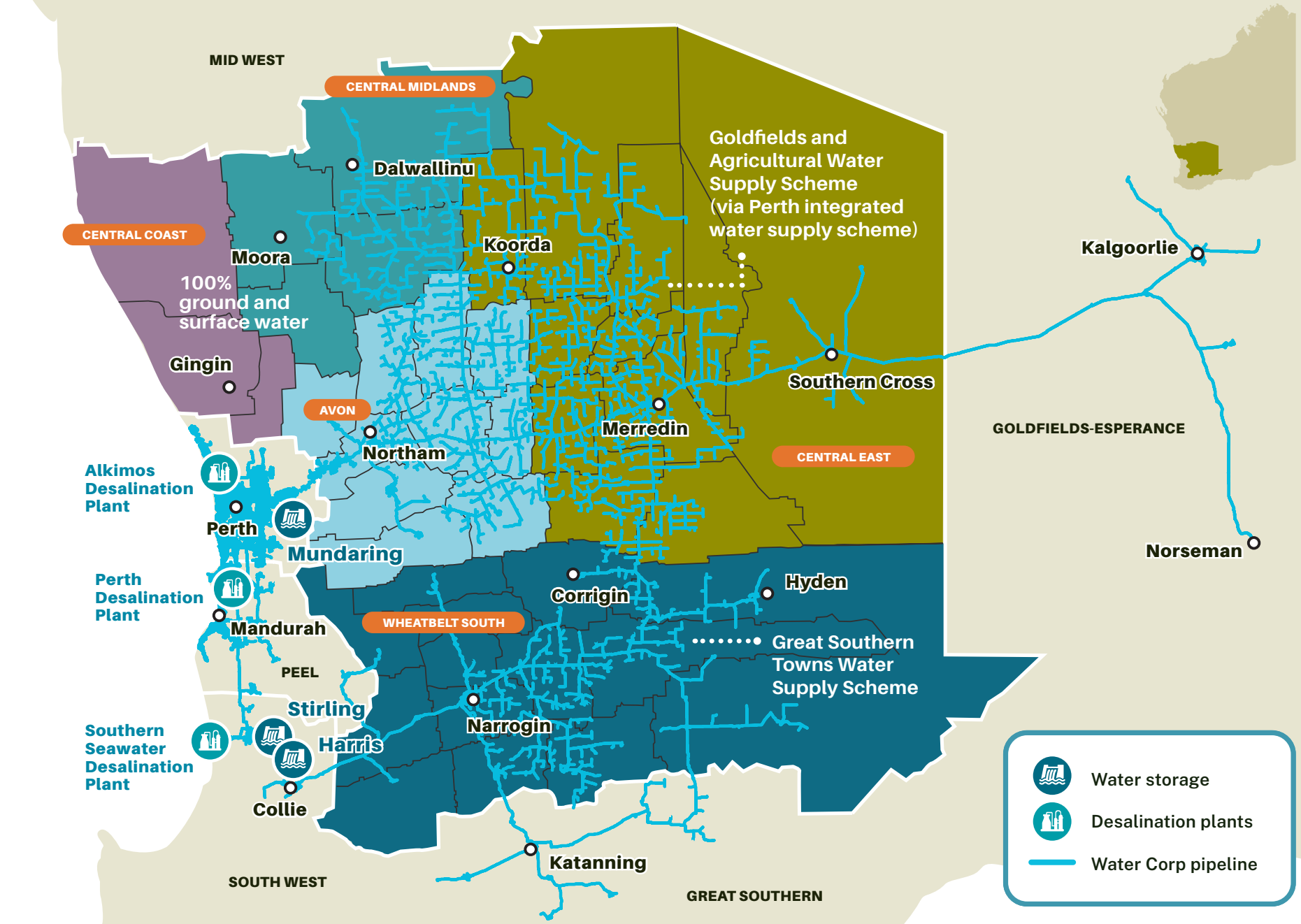


FIGURE 2 Scheme (potable) water supply networks administered by the Water Corporation across the Wheatbelt.

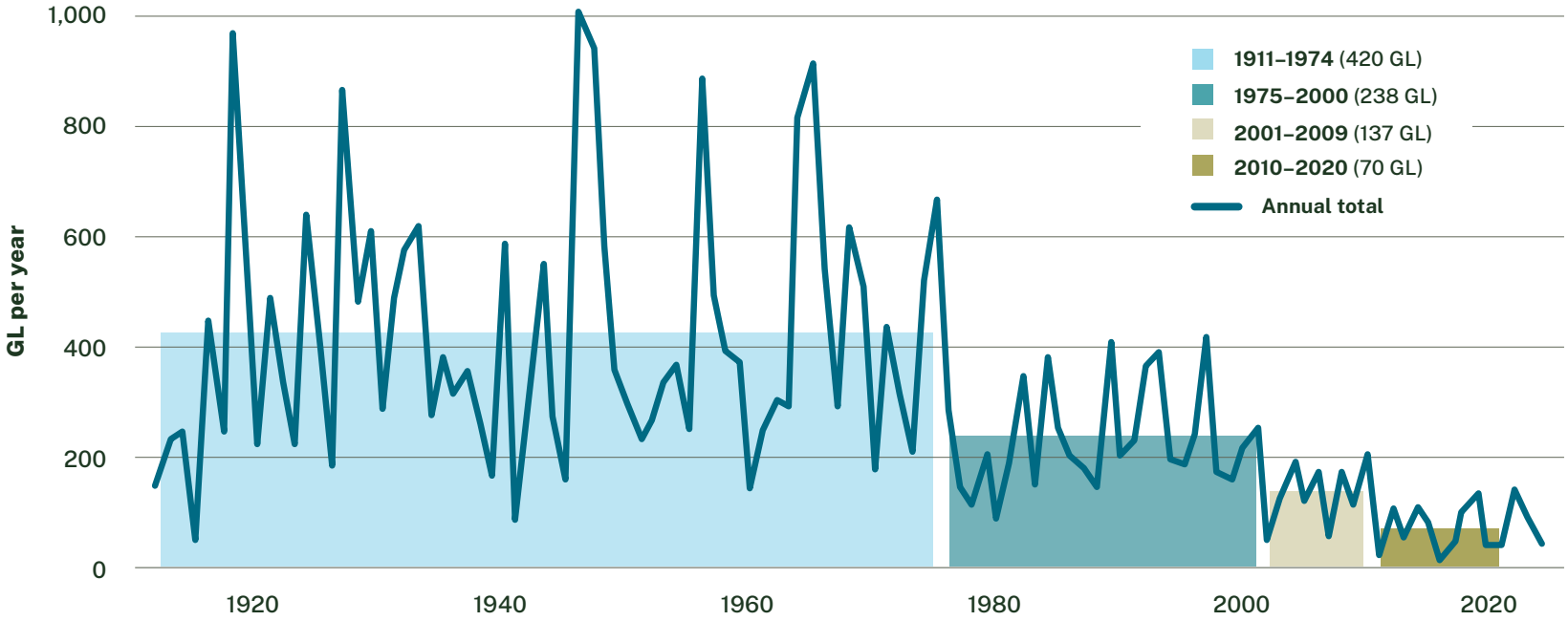


FIGURE 3 Reduction in streamflow into water reservoirs supplying Perth and South West regions over the past 100 years.
Note: there has been an 80% drop in streamflow over the past 50 years.
Data source: Water Corporation

While desalination will help secure drinking water supplies, producing this water will be more expensive and this could impact Wheatbelt consumers who currently pay about the same as Perth water consumers despite the cost to supply water to the Wheatbelt being considerably higher.

Farm and community dams

Reduced run-off over recent decades has affected farm and community dams across the Wheatbelt. Many of the 200,000 farm dams now capture only 20–30% of the run-off they received 40-years ago, leaving them unable to meet on-farm water demands needed during consecutive low rainfall years. As most dryland farms across southwest WA depend almost entirely on on-farm water supplies, declining and compromised dam storage has driven a sharp increase in water carting and 'water deficiency declarations' over the past five years (Figure 5).

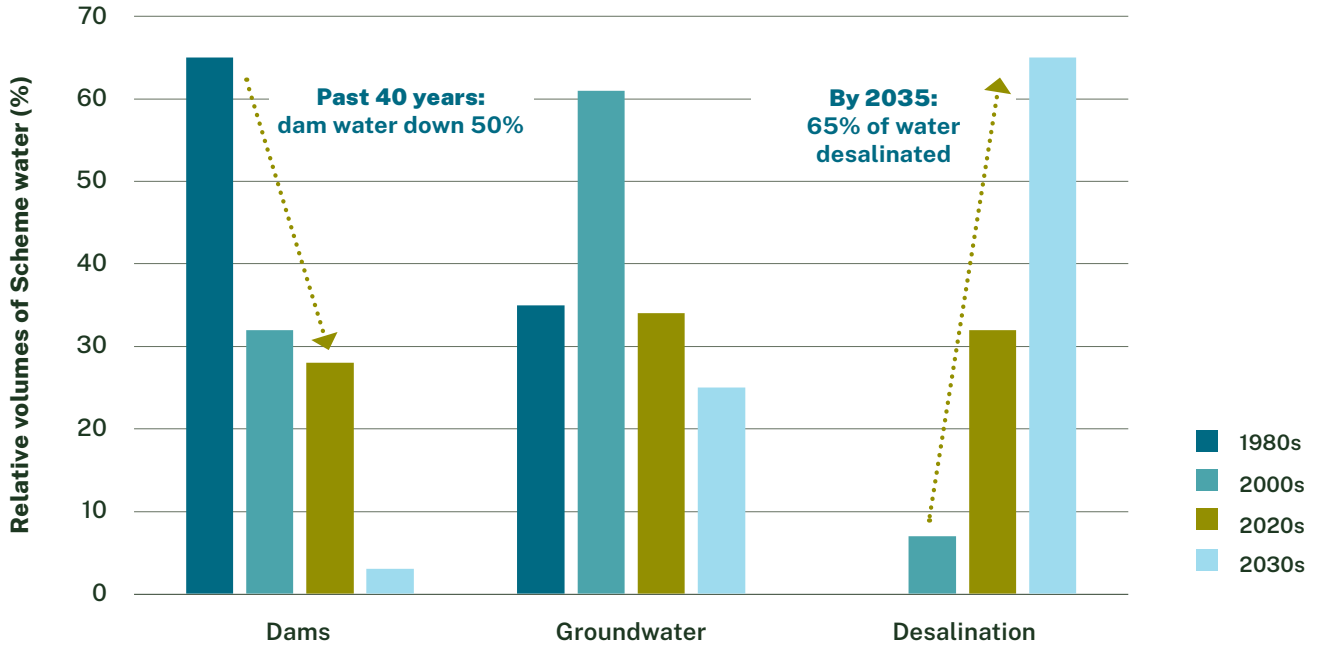


FIGURE 4 Relative sources of drinking (potable) water supplied into the Perth Integrated Water Supply Scheme (and from there into the Wheatbelt) over the past 40 years and projected to 2035.

Data source: Water Corporation

Seawater desalination is four times more energy intensive than groundwater collection and over 40 times more energy intensive than water sourced from dams. Securing Wheatbelt water supplies will also require using available water more efficiently.

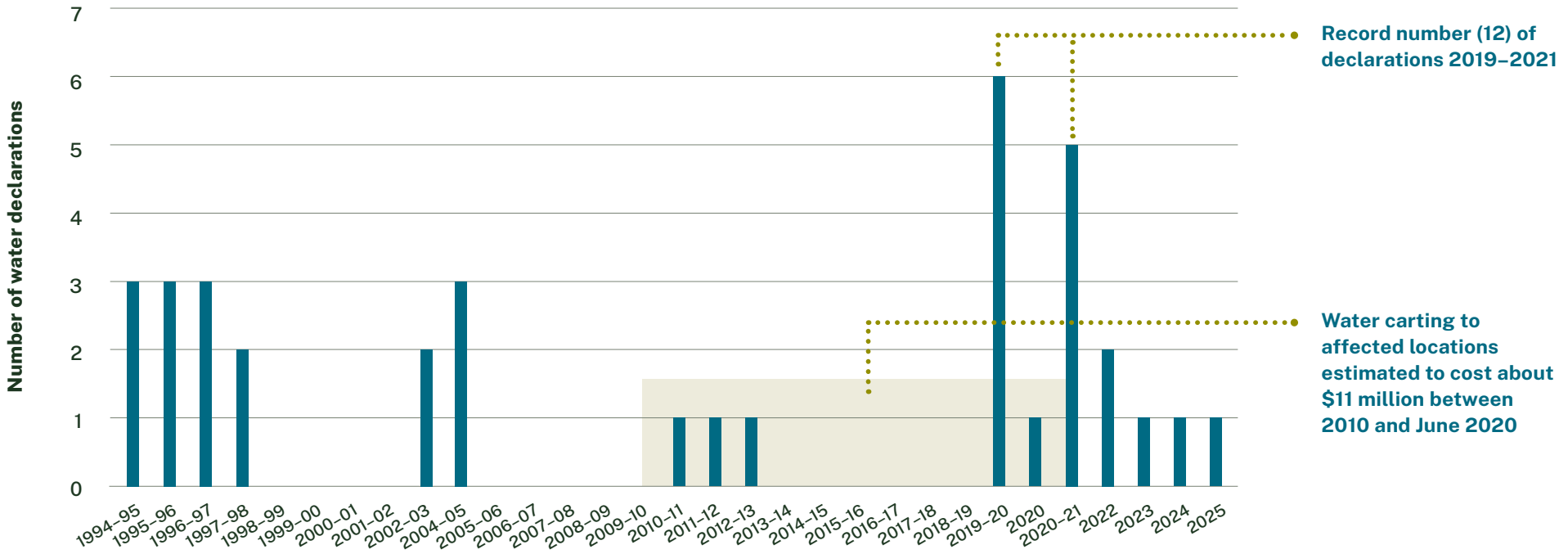


FIGURE 5 Number of 'water deficiency declarations' across dryland farming areas in southwest WA over the past 30 years.
Note: nearly 45% of declarations have occurred over the past five years (2020–2025) with water carting required to meet emergency farm and community water demands. About 20% of water declarations over the past 30 years have occurred in the Wheatbelt.

Data source: Department of Water and Environmental Regulation.

Licensed groundwater and surface water

WA is divided into proclaimed and unproclaimed regions of groundwater, with most of the Wheatbelt unproclaimed. Water use is regulated in proclaimed regions through licensing, which includes major towns and settlements. Water usage in unproclaimed areas is much less restrictive. Moora, in the Gingin groundwater region, sits on the boundary between proclaimed and unproclaimed areas.

Significant supplies of fresh groundwater and limited supplies of fresh surface water occur from Gingin to Jurien Bay within the Wheatbelt Central Coast sub-region and part of the Central Midlands sub-region (Figure 6). The Central Coast sub-region relies completely on licensed groundwater and surface water allocations for domestic drinking water and water for mining, horticulture and renewable energy operations.

In the Gingin groundwater allocation plan area, there are 36 proclaimed groundwater resources under the Rights in Water and Irrigation Act 2014, *with a total allocation (July 2025) of 174 GL per year. Twenty-one of the groundwater resources are fully allocated and a further nine include water reserved for future public water supply. Surface water resources in this area have a total allocation of 1.3 GL per year and are fully allocated.*

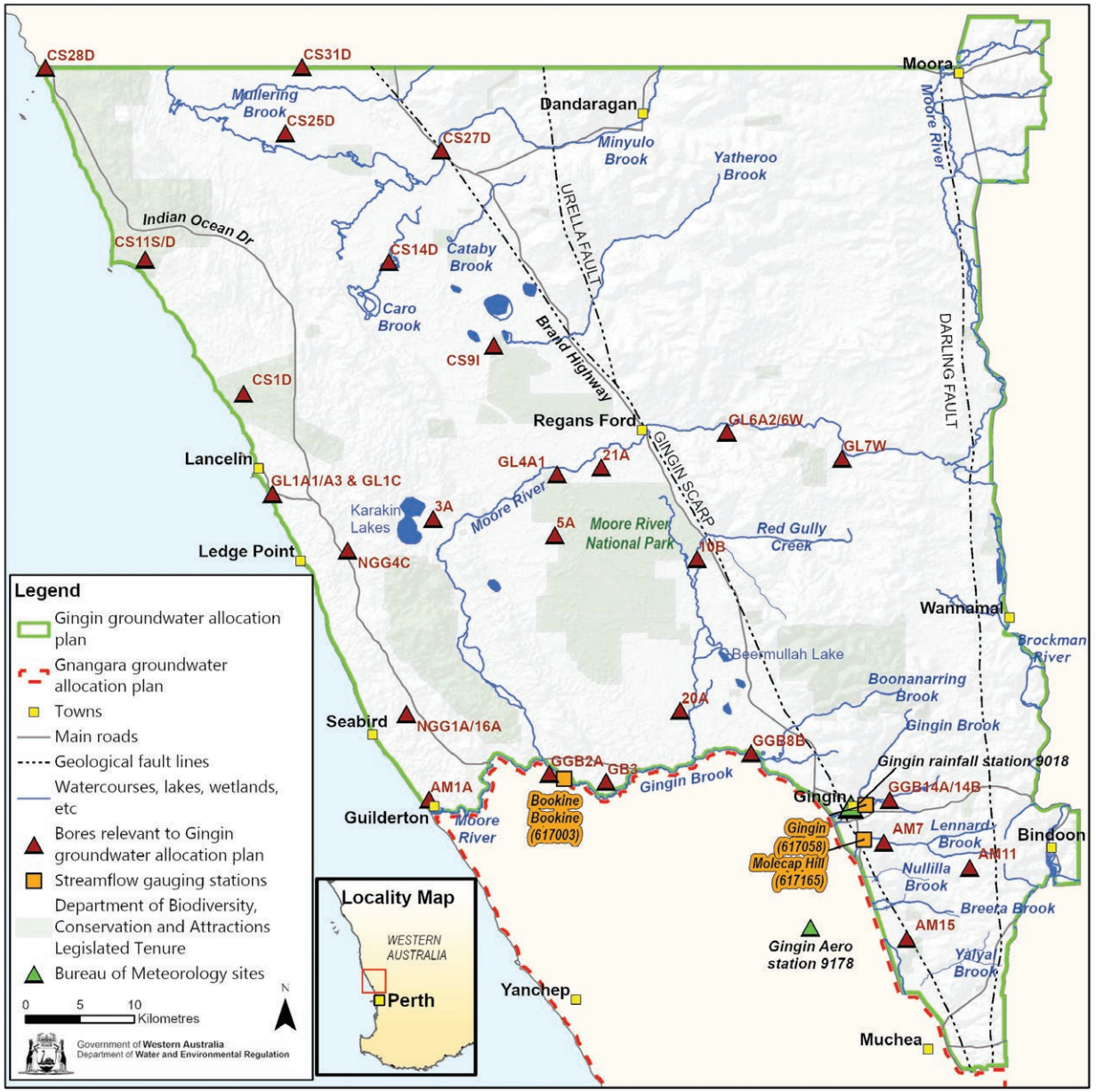


FIGURE 6 Boundary of the Gingin (Wheatbelt Central Coast sub-region) groundwater allocation plan area and some of the monitoring bore locations within the plan area (DWER 2024). Moora (Wheatbelt Central Midlands sub-region) is located on the north-eastern edge of the plan.

Groundwater levels and stream flows in the Gingin area are being impacted by reduced rainfall due to climate change. Since 2011, average annual rainfall in Gingin is nine per cent lower than the period 1975 to 2010. Seasonal rainfall patterns are also changing. Rainfall volumes over the winter wet season are lower, with peak rainfall occurring later in the season, and more rainfall occurring over the dry season.[1]

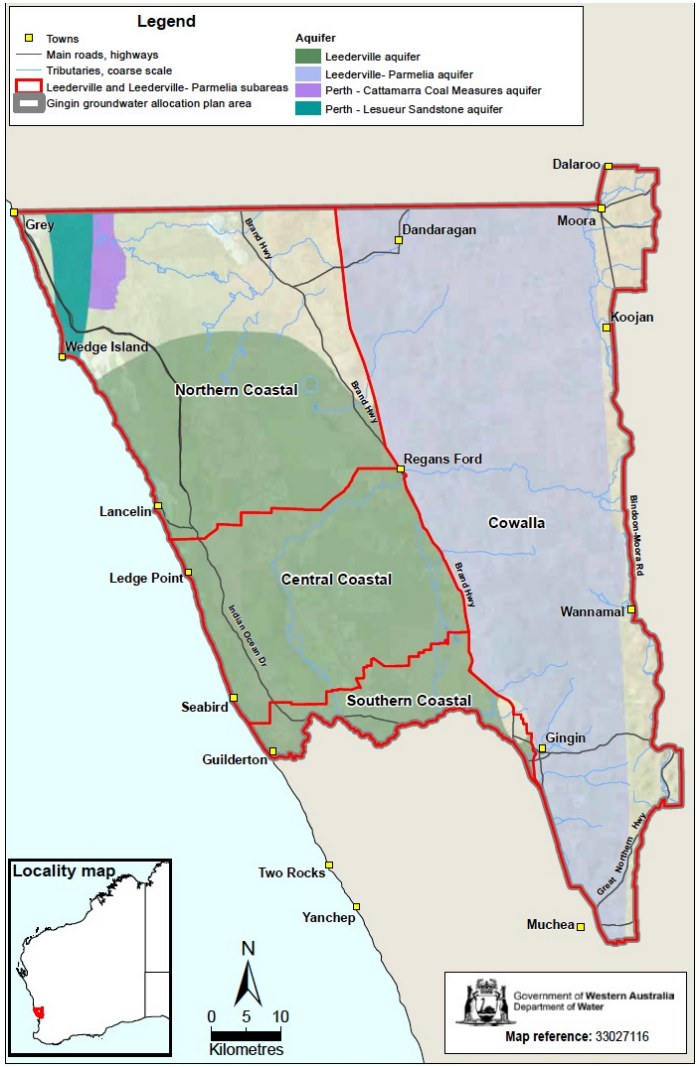
1. Government of Western Australia (2024) Gingin groundwater and surface water allocation plans: 2024 evaluation statement, Department of Water and Environmental Regulation, Perth, Western Australia

Monitoring bores across the region's five major aquifers show mixed trends over the past 25 years, reflecting differences in rainfall, abstraction and aquifer connectivity. The most concerning decline is in the southern portion of the Leederville–Parmelia aquifer (beneath Gingin to Dandaragan), where groundwater levels have declined by 10 metres since the 1990s due to reduced recharge and cumulative cumulative abstraction (Figures 7a and b). The aquifer is now fully allocated and licence trading rules were updated in 2024 to further protect aquifer levels and the ecosystems they support, such as Gingin Brook.[1]



Image courtesy: Megan Hele

a)



b)

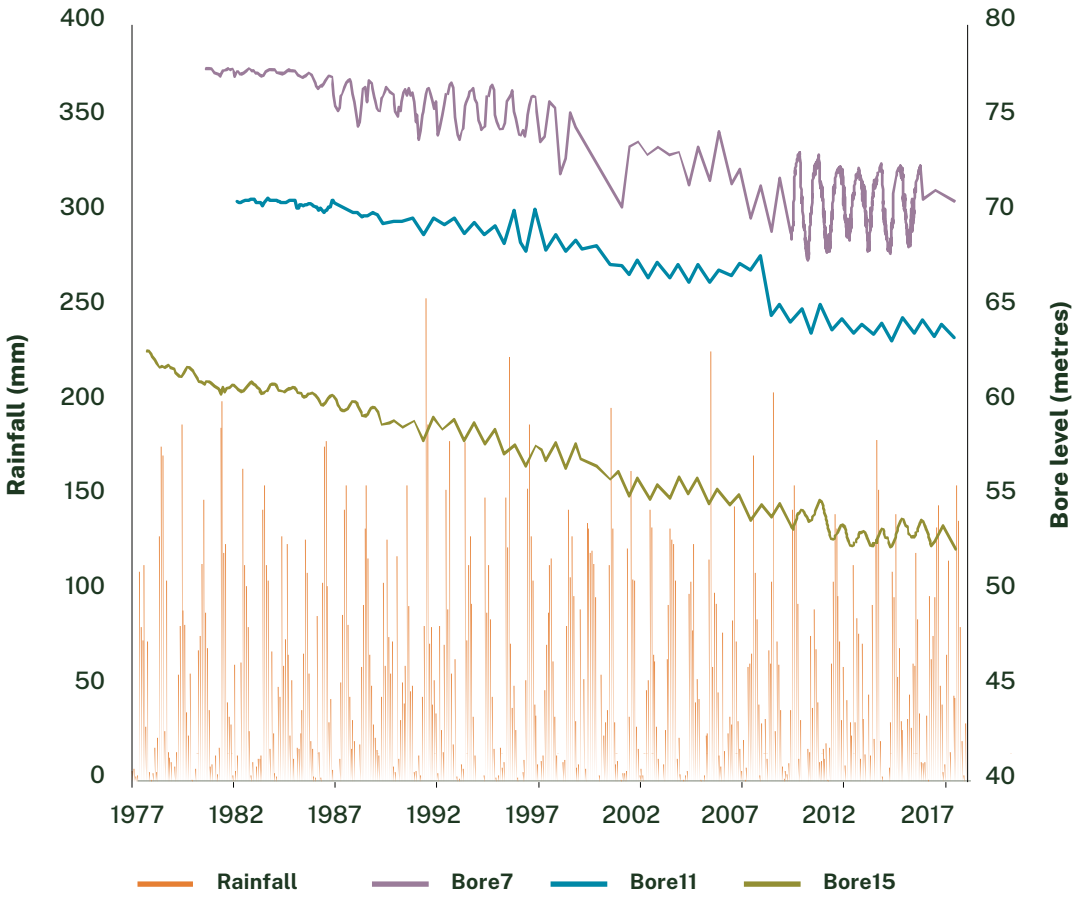


FIGURE 7 a) Location of Leederville-Parmelia aquifer and Leederville aquifer in the Gingin groundwater allocation plan area (Wheatbelt Central Coast sub-region). Moora (Wheatbelt Central Midlands sub-region) is located on the north-eastern edge of the plan area. **b)** Gingin annual rainfall (1977–2020) and trends in groundwater levels from three monitoring bores within the southern Leederville–Parmelia aquifer that runs beneath Gingin to Dandaragan in the Central Coast sub-region of the Wheatbelt (adapted from DWER 2024).[2]

2. Government of Western Australia (2024) Gingin groundwater and surface water allocation plans: 2024 evaluation statement, Department of Water and Environmental Regulation, Perth, Western Australia

Wheatbelt water demand

Measuring actual water use across the Wheatbelt is difficult because many of the 3000+ farms rely on unlicensed 'self-supply' sources such as dams, bores and tanks — providing 80–100% of their water. These volumes are not directly measured, and can only be estimated from Australian Bureau of Statistics data of livestock numbers and cropping area.

The data in this section comes from a Wheatbelt water use account developed by the Department of Water and Environmental Regulation (DWER). It combines licensed (allocated) groundwater and surface water data with estimates of non-licensed water use, scheme water (potable) and farm water. DWER is working with the Department of Primary Industries and Regional Development (DPIRD) to refine estimates of farm water use and storage.

Please note: the water data can not be separated for the Avon, Central Midlands and Central East sub-regions.

Total water use

In 2021–2022, total water use in the Wheatbelt was estimated at 156 GL (Figure 8a). About 10% (15 GL) was piped drinking (potable) water supplied through the Water Corporation (Figure 2), while 90% (130 GL) came from licensed and unlicensed groundwater and surface water. Recycled wastewater made up less than 1%.

The Central Coast sub-region has the largest water demand — consuming nearly three quarters of the Wheatbelt total while the Avon, Central Midlands and Central East sub-regions collectively use 20% of the total, and the Wheatbelt South sub-region uses 7% (Figure 8a).

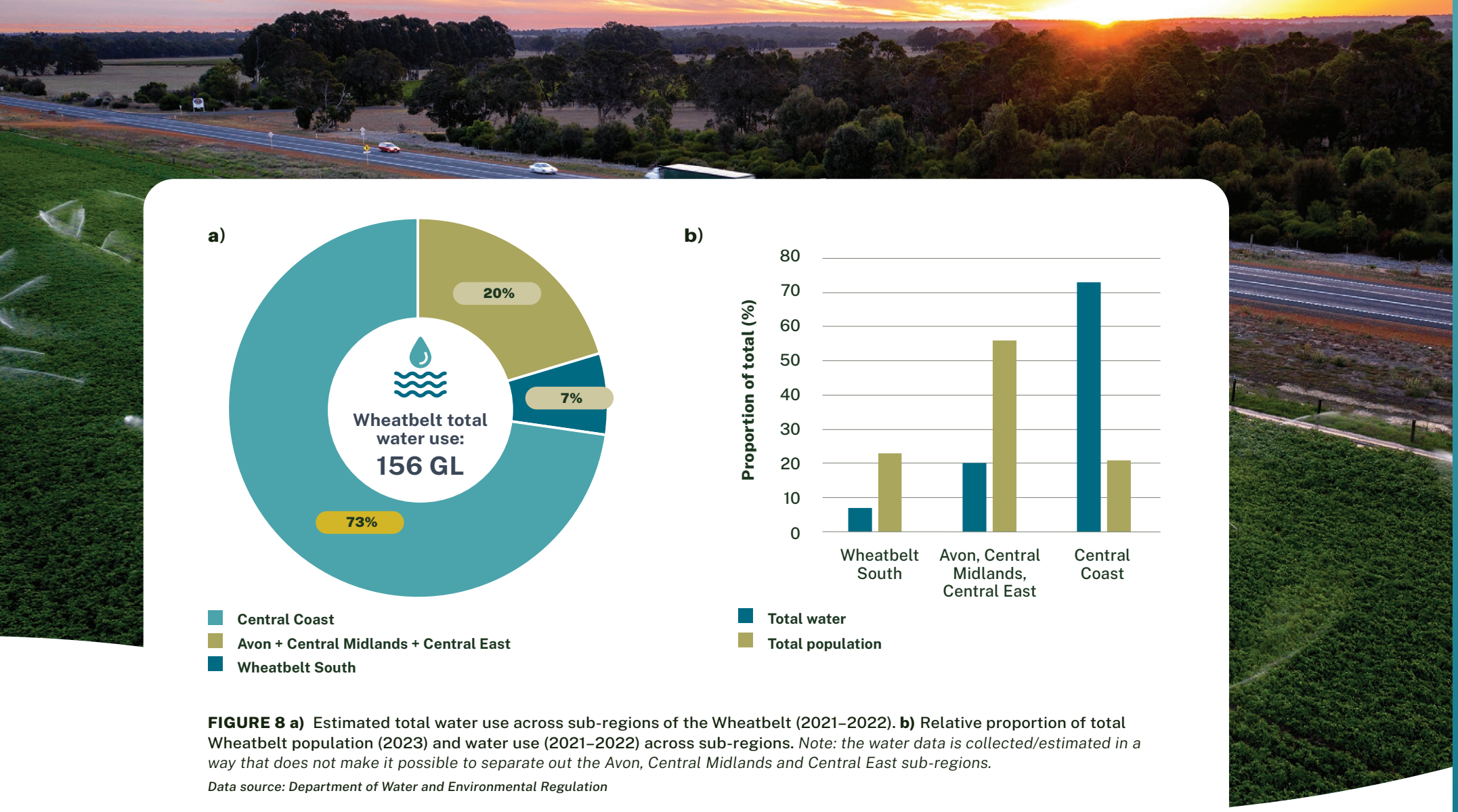


FIGURE 8 a) Estimated total water use across sub-regions of the Wheatbelt (2021–2022). **b)** Relative proportion of total Wheatbelt population (2023) and water use (2021–2022) across sub-regions. *Note: the water data is collected/estimated in a way that does not make it possible to separate out the Avon, Central Midlands and Central East sub-regions.*

Data source: Department of Water and Environmental Regulation

The Central Coast, home to 20% of the Wheatbelts population, accounted for 73% of total water use. The Avon, Central Midlands and Central East sub-regions together hold nearly 60% of the Wheatbelt population, but use just 20% of total water use (Figure 8b).

Irrigation for horticulture is the region's largest water user — accounting for 60% of total water use in 2021–2022, followed by farm 'households and livestock' at 15% and mining at 13%. Wheatbelt town households accounted for about 7% of total water use (Figure 9).

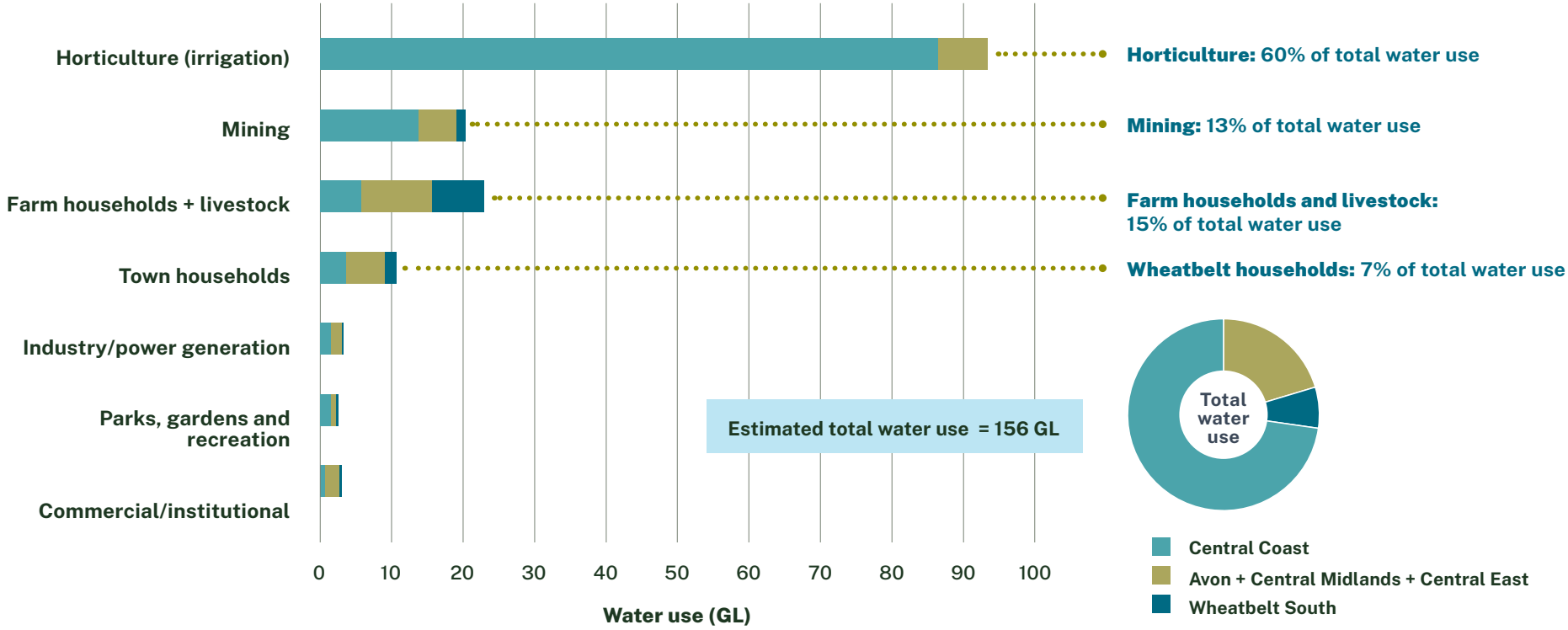


FIGURE 9 Estimated total water use across the Wheatbelt by purpose and sub-region (2021–2022).

Data source: Department of Water and Environmental Regulation



Drinking (potable) water

Of the 15 GL of drinking (potable) water piped into the Wheatbelt via Water Corporation schemes, about 45% is used by town households and about 35% by farms (households + livestock). The remaining 20% is used by industry and commercial operations and to water public open spaces (Figure 10). About 80% (12 GL) of potable water is used within the Avon, Central Midlands and Central East sub-regions and about 20% (3 GL) in the Wheatbelt South (Figure 10). The Central Coast sub-region sources all its potable water from allocated groundwater and surface water and has its own local water supply schemes. Central Coast water service providers currently have licenses totalling about 5 GL for public water supply (data not shown).

Licensed (allocated) water

Only about half of all (licensed) groundwater and surface water allocated to the Wheatbelt is used in any year due to the ebbs and flows in demands from horticulture, agriculture and mining operations. Of the 240 GL of water licensed to Wheatbelt licensees in 2021–2022, about 130 GL was abstracted and used.

The Central Coast sub-region (for which groundwater is almost the sole water source) used about 80% of this while the Avon, Central Midlands and Central East collectively used about 20%. The Wheatbelt South used less than 1% of the total licensed water allocated to the Wheatbelt (Figure 11).

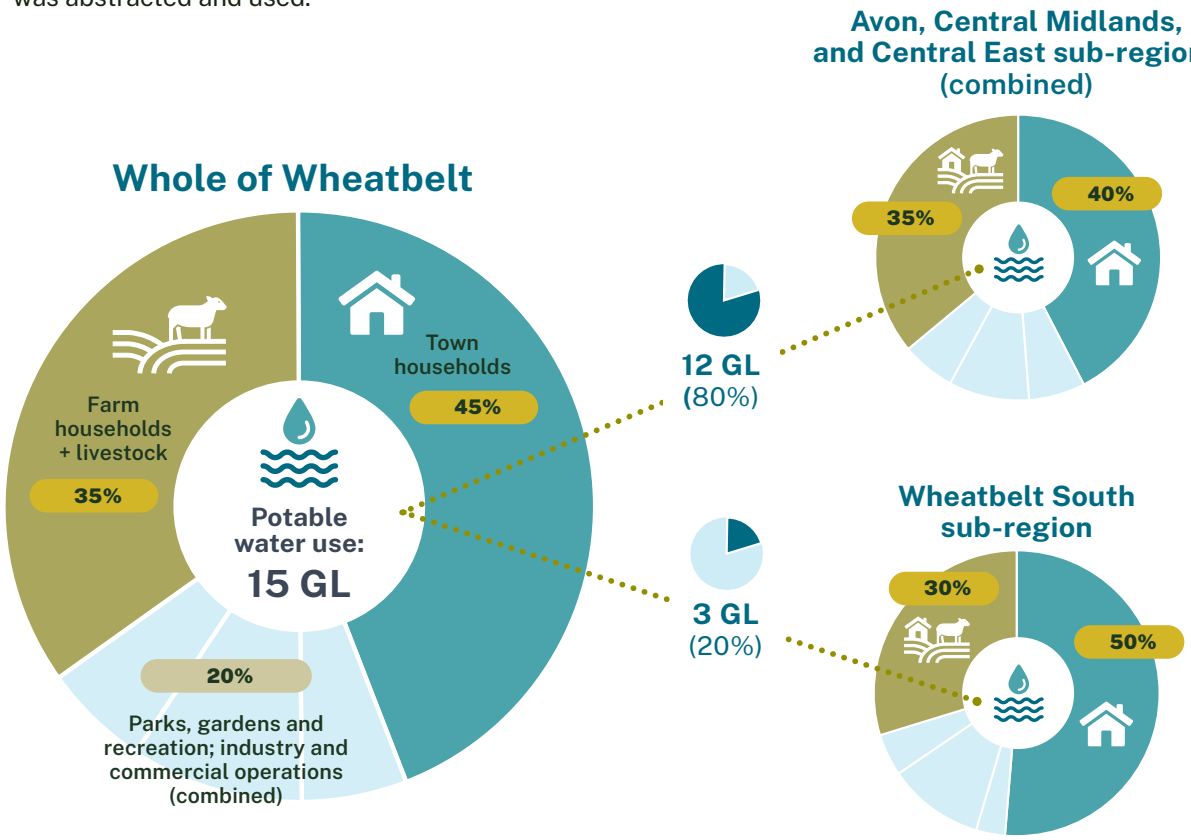


FIGURE 10 Estimated potable water use by purpose and sub-region across the Wheatbelt (2021–2022).

Data source: Department of Water and Environmental Regulation



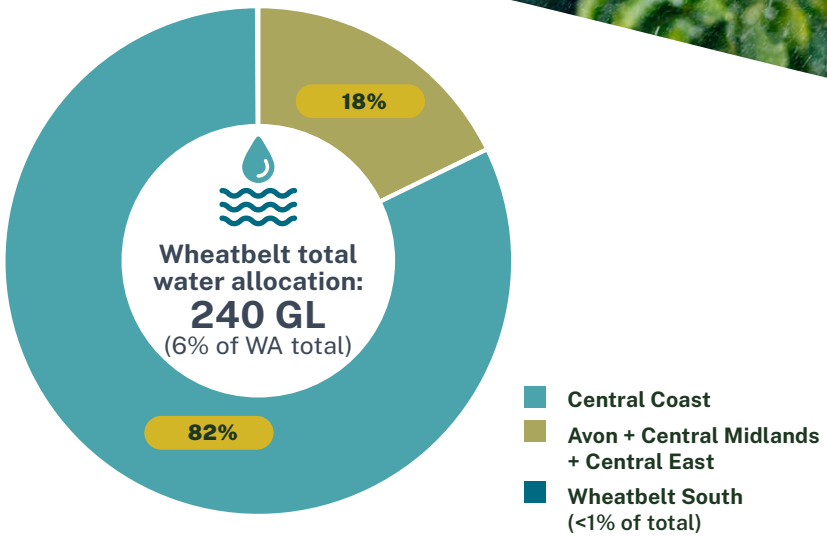
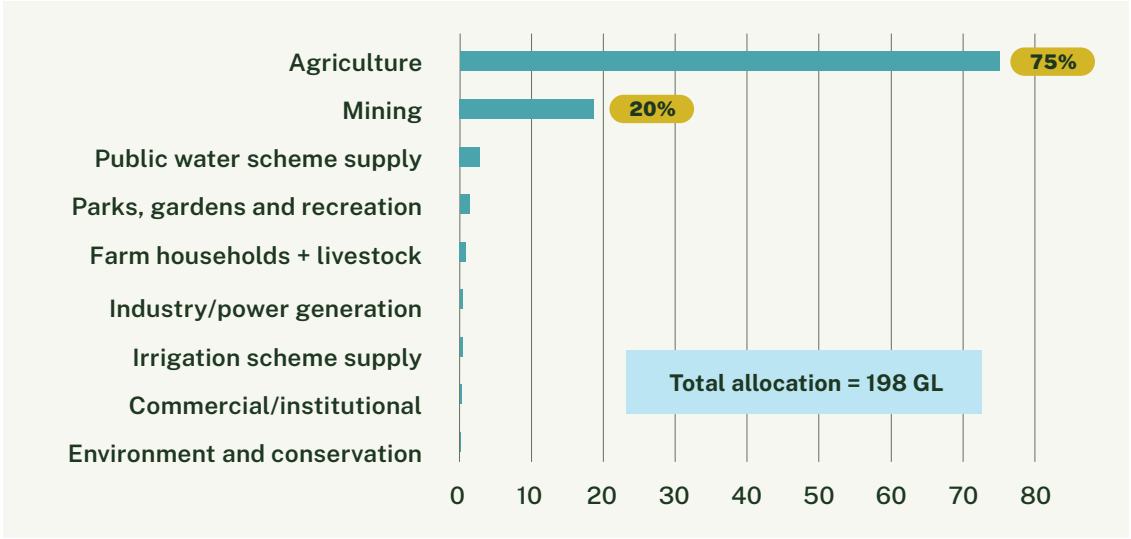


FIGURE 11 Allocated licensed water across Wheatbelt sub–regions (2021–2022). *Note: only about half of all allocated water is used each year.*

Data source: Department of Water and Environmental Regulation

Mining and agriculture (mainly horitculture) account for more than 95% of allocated water across the Wheatbelt — with agriculture using 75% and mining 20%. Of the 198 GL allocated to the Central Coast sub-region in 2021–2022, 148 GL was used for agriculture (horticulture) and 40 GL for mining. Of the combined 43 GL allocated to the Avon, Central Midlands and Central East sub-regions about 45% was used for mining and 30% for agriculture (horticulture) near Moora in the Central Midlands (Figure 12).

a) **Central Coast sub-region**



b) **Avon, Central Midlands, and Central East sub-regions**





Image courtesy: Megan Hele

FIGURE 12 Relative (%) use of allocated groundwater and surface water by purpose in **a)** the Central Coast sub-region and **b)** the Avon, Central Midlands and Central East sub-regions combined (2021–2022).
Note: only about half of all allocated water is used each year.
Data source: Department of Water and Environmental Regulation

Sub-regional water use

Access to water varies across the Wheatbelt sub-regions and water supply is constrained by a range of challenges.

Securing water supplies across the Wheatbelt requires a tailored approach at the sub-regional and LGA level. For example, not all towns and farming properties have access to Water Corporation potable water schemes and must be self-sufficient for 80–100% of their water requirements. Other areas have access to fresh groundwater supplies (Central Coast) while much of the groundwater in other areas of the Wheatbelt is saline and requires desalination (and a viable business case) to be of use.

Central Coast sub-region

The Central Coast sub-region accounts for nearly three quarters of the total water use of the Wheatbelt with horticulture using 75% of the sub-region's annual 113.5 GL, and mining about 10% (Figure 13).

Threats to Central Coast water supplies include a fast-growing population (15.4% in the past decade), driven by the growth of the Perth metropolitan area to the south, increasing groundwater competition from mining, renewables and horticultural projects and declining rainfall, groundwater recharge and streamflow. Combined, these impacts reduce the volume of water that can be sustainably abstracted for consumptive uses.

There is a need to carry out strategic planning and water audits for the sub-region to better understand current water resources and future needs from industry developments, horticulture and housing.

DWER is currently developing the Gingin groundwater allocation plan (including scientific investigations and numerical modelling) in accordance with the *Gingin groundwater and surface water allocation plans: 2024 evaluation statement*.[3]

[3] Government of Western Australia (2024) Gingin groundwater and surface water allocation plans: 2024 evaluation statement, Department of Water and Environmental Regulation, Perth, Western Australia



FIGURE 13 Central Coast sub-region: estimated total water use (2021–2022).

Data source: Department of Water and Environmental Regulation

Avon, Central Midlands and Central east sub-regions

The Avon, Central Midlands and Central East sub-regions collectively use 20% of total Wheatbelt water with 'farm households + livestock' using about a third of the sub-regions' annual 31.8 GL followed by horticulture at 22% (Figure 14). Fresh groundwater is limited across these sub-regions — especially in the Avon and Central East. The impact of climate change on the volume of runoff into dams represents a threat to water supply alongside rising competition for water between mining and renewable energy projects and the ongoing maintenance requirements of the 120-year-old potable water pipeline (see Figure 2). There is a need to assess farm water storage infrastructure across the Avon, Central Midlands and Central East sub-regions to ensure it can meet future water demand for stock and spraying across a range of climate scenarios.

Wheatbelt South sub-region

The Wheatbelt South sub-region uses just 7% of total Wheatbelt water and relies largely on self–supplied water captured in dams and tanks along with potable scheme water via the Great Southern Towns Water Supply Scheme (GSTWSS) (see Figure 2).

Of the 10.8 GL of estimated total water use in the Wheatbelt South, two thirds is used by farm households and livestock (Figure 15). With 80–100% of farm water in the Wheatbelt South needing to be self-supplied via dams and tanks, there is a need to ensure dams in the sub-region are engineered to optimise runoff — especially during below-average rainfall seasons. Repeated hot, dry conditions in this sub-region in recent years have highlighted the need to plan for multi-year droughts at the sub-regional and farm level.



FIGURE 14 Avon, Central Midlands and Central East sub-regions (combined): estimated total water use (2021–2022).

Data source: Department of Water and Environmental Regulation



FIGURE 15 Wheatbelt South sub-region: estimated total water use (2021–2022).

Data source: Department of Water and Environmental Regulation



Water planning

Each Wheatbelt sub-region has a relatively unique pattern of water use, and water management and planning for the Wheatbelt will therefore require a nuanced approach (Figure 16).

Sub-regional water threats

Figure 17 summarises annual water use across the Wheatbelt by water source and purpose and lists possible drought resilience measures that could be implemented to either use water more efficiently or store and capture water more effectively. The graph highlights how varied water use is across Wheatbelt end users, and underscores the need for a tailored approach to water management across the region.

The major water threats facing the sub–regions can be summarised as:

- **Wheatbelt South:** reduced reliability of dams for stock water; limited access to scheme (potable) water
- **Central Coast:** increasing competition for groundwater due to population growth and mining/renewables/horticulture/intensive livestock developments
- **Avon, Central Midlands, Central East:** reduced reliability of dams, increasing age and maintenance needs of scheme water pipeline, competition for groundwater (Moora in the Central Midlands), population growth and potable water demand (west Avon).



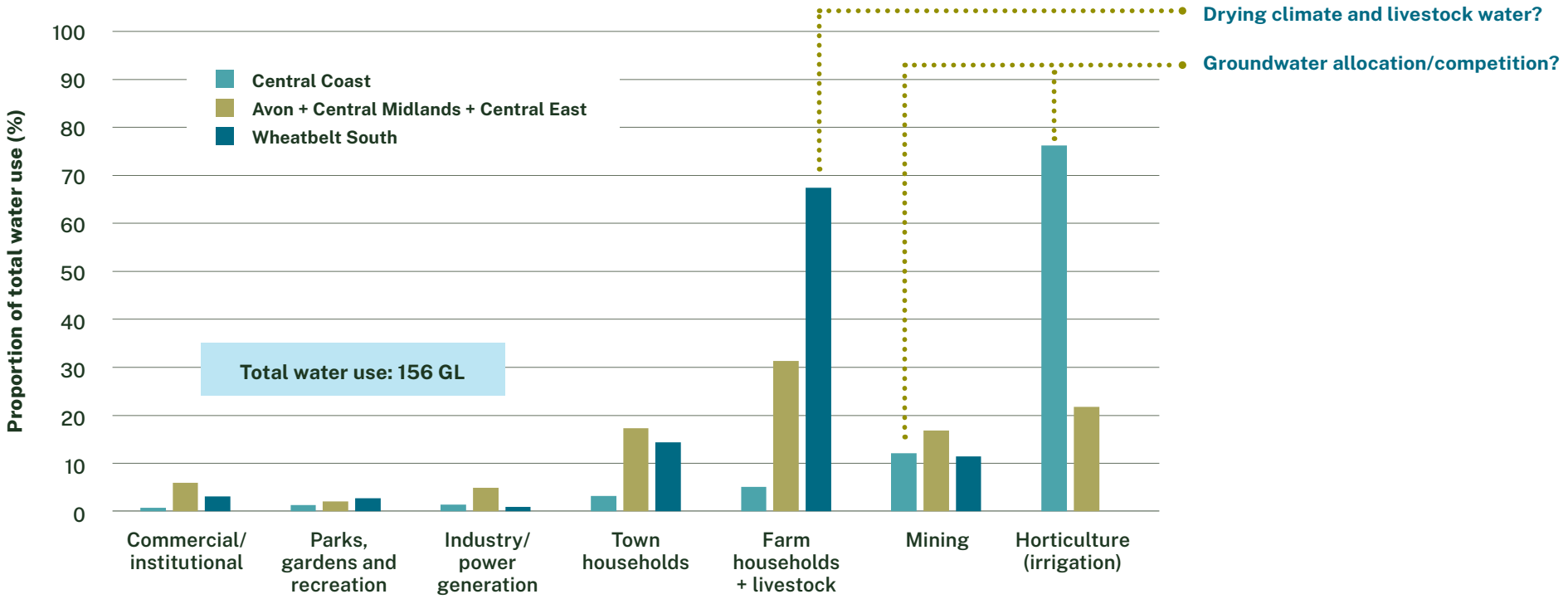
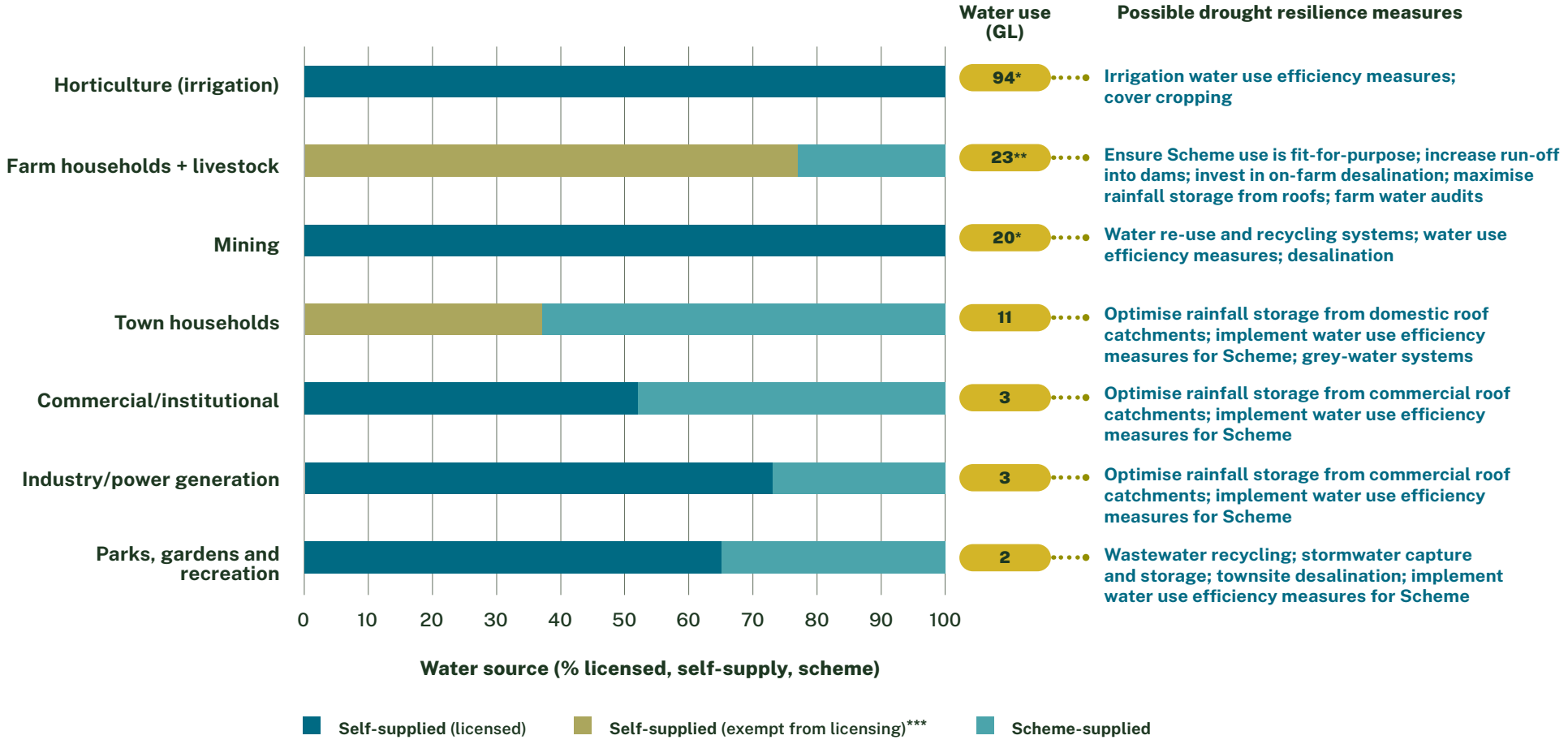


FIGURE 16 Relative (%) water use by purpose across Wheatbelt sub-regions (2021–2022). *Note: Horticulture water use in the 'Avon + Central Midlands + Central East' occurs almost exclusively in and around Moora in the Central Midlands.*

Data source: Department of Water and Environmental Regulation





Note: Data rounded to whole numbers
* Actual allocation (June 2023) = 162 GL for agriculture and 56 GL for mining (only about half of all allocated water is used in any one year)
** Amount used by livestock based on 2021 ABS broadacre livestock data *** Self-supplied (exempt from licensing) = water estimated in private dams, bores and tanks

FIGURE 17 Source and purpose of water used across the Wheatbelt (2021–2022) and possible measures to improve drought resilience across the region.

Data source: Department of Water and Environmental Regulation. Data interpretation: Wheatbelt Development Commission



Image courtesy: DPIRD

Building drought resilience

Despite growing constraints on Wheatbelt water supplies, opportunities exist across the Wheatbelt at the town, farm and sub-regional level to build drought resilience by securing alternative water supplies and by using current water supplies more efficiently.

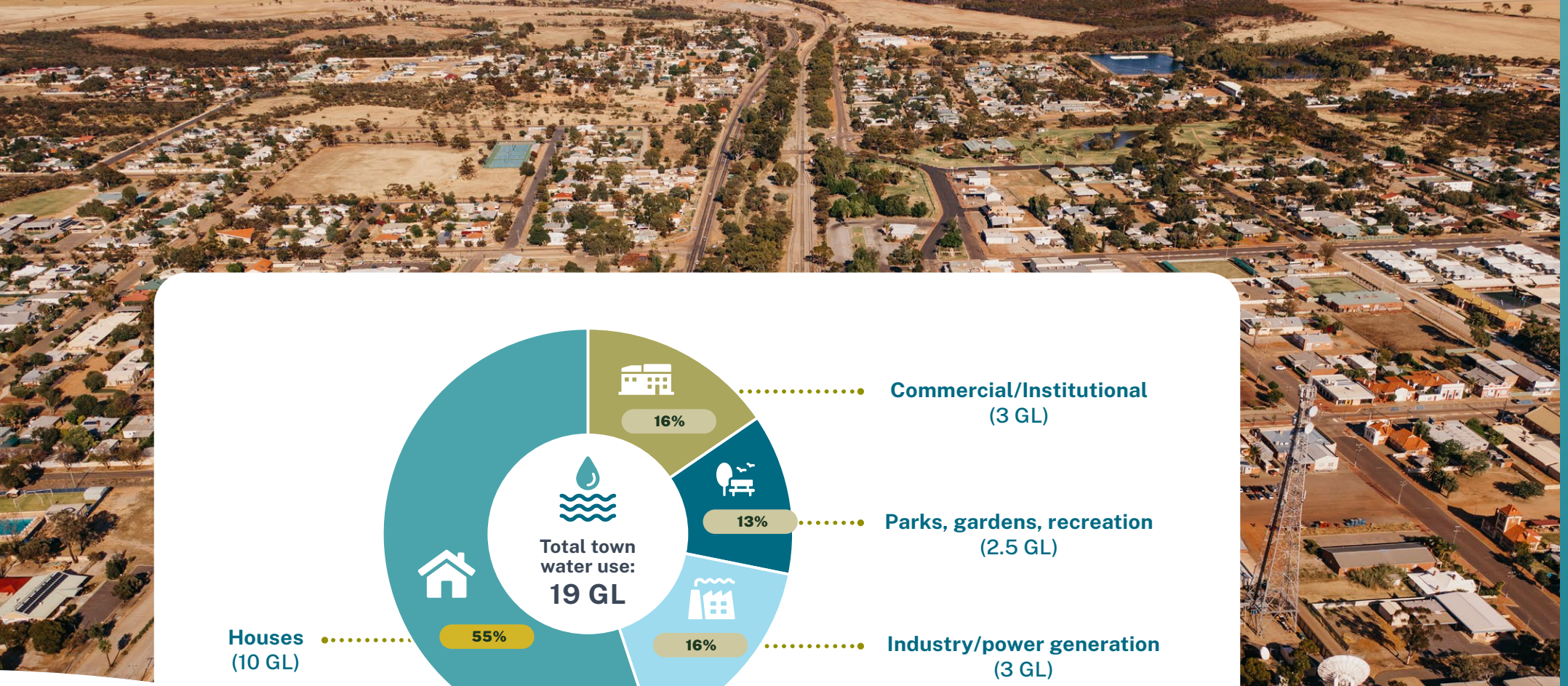
The following case studies illustrate the water supply and demand issues playing out across the Wheatbelt and the solutions being trialled and implemented at the local government level to lift water security and drought resilience.

A common theme arising from the case study interviews is the need to empower local governments with the skills and funding capacity to solve their specific water issues and ensure sustainable success.

Shire-level drought resilience

The 200+ towns across the Wheatbelt use about 12% or 19 GL of the region's total annual water (156 GL). Just over half (~10 GL) is used by households, with 13% (2.5 GL) used to water public open spaces and the remainder used by industry/power generation and commercial businesses/public institutions (~3 GL each) (Figure 18).

The proportion of total Wheatbelt water used to irrigate parks, gardens and recreational amenities is very small at just 1.5%, but having green spaces over the summer and especially during dry seasons, has a large impact on the social cohesion and liveability of Wheatbelt towns. About 35% of the water used to irrigate parks, gardens and recreational spaces in the Wheatbelt is sourced from scheme water piped in via the Water Corporation's water network. Using recycled wastewater reduces local government water costs considerably, but not all shires have access to recycled wastewater and, even when they do, irrigation demands during dry seasons can outstrip supply.



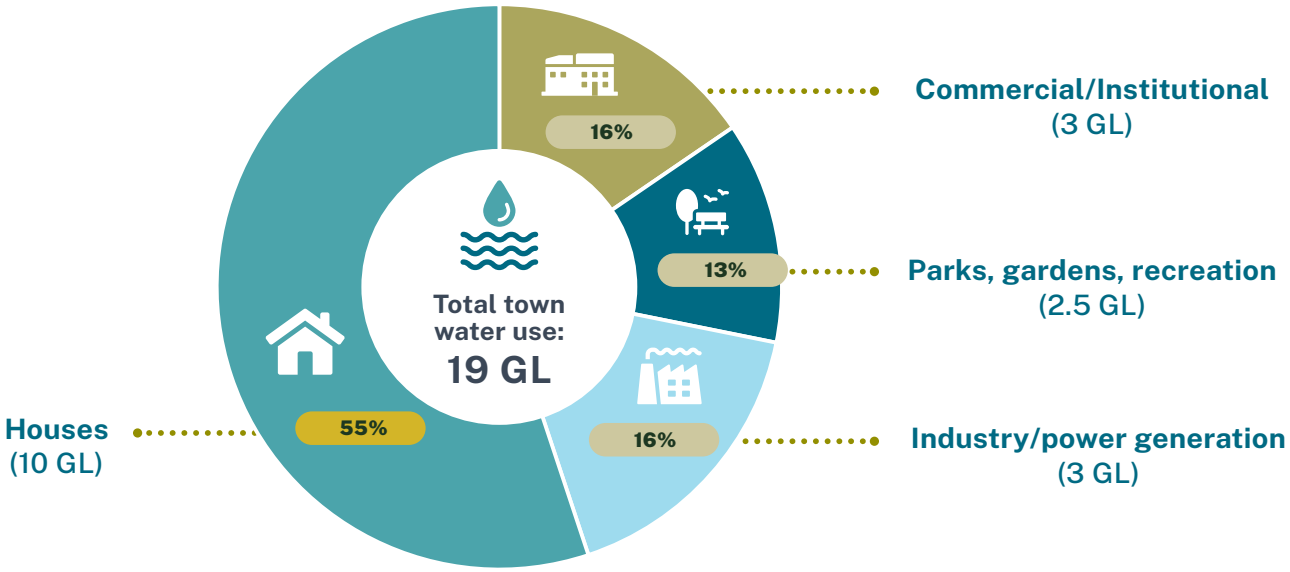


FIGURE 18 Total town water use by purpose across the Wheatbelt's 42 local government areas.
Data source: Department of Water and Environmental Regulation



Image courtesy: Tourism Western Australia

Securing affordable irrigation water for green spaces — and for sporting facilities in particular — would make a significant contribution to the social connectivity and liveability of Wheatbelt towns during drought.

Williams Shire



Sub-Region: Wheatbelt South

Population (2021): 1040 (40% in town)

Population growth (2016–2021): 3.8%

Industries: Agriculture (dryland); industrial precinct; tourism

Annual rainfall: 566 mm

Potable water use (2023): 0.08 GL per year; ~1.5 million litres/week

Water issues:

- **Increased capacity needed** at LGA-level to carry out strategic analysis of water threats and opportunities
- **Over-reliance on scheme water** with no back-up or redundancy if the pipeline fails for any reason
- **Significant cost switching to scheme water** to irrigate local ovals when recycled wastewater runs out
- **Competition for potable water** from roadworks and windfarm development
- **Competition for local groundwater** from bauxite mining west of the shire

When interviewed on 20 May 2025, Williams Shire CEO Peter Stubbs forecast that the town would run out of recycled wastewater for irrigating the local sports fields and parks within two days.

"Luckily it's going to rain this weekend, so we might just get through without needing to use scheme water this year. Last year we had to switch to scheme water in early April and it cost us $20,000. Other shires without recycled wastewater systems are paying $50,000 to $100,000 or more each year to irrigate their ovals."

Williams' scheme (drinking) water is delivered via the Great Southern Towns Water Supply Scheme (GSTWSS) from Harris and Stirling dams near Collie. The town currently has no back-up potable water supply and Peter is concerned they could be left without water if the pipeline system was to fail.

"Three months back a truck ran into the pipeline between Williams and Narrogin and ruptured the pipe — which was a major issue. That sort of event could see a town like Williams without a water supply for days or even weeks — the public toilets would be shut with no water to run them and you'd then be faced with potentially evacuating the schools and dealing with the impacts on local businesses like the roadhouse and cafes who couldn't operate without water."

"I'd be more comfortable if we had a million litres of drinking water storage on top of the hill so if the scheme supply goes down we know we've got four or five days' worth of rationed supply."

The shire would like to expand its water storage capacity and has received funding through the Community Water Supplies Partnership program (administered by the WA Department of Water and Environmental Regulation) to install strategic tanks for firefighting water across the district.

"There's a limit to roof catchment but there's also an option to expand our catchment storage by capturing excess water from roads and big roof structures like the CBH — and pump it to a storage tank so it can come down to town using gravity. We could also develop lined dams to capture and store water."

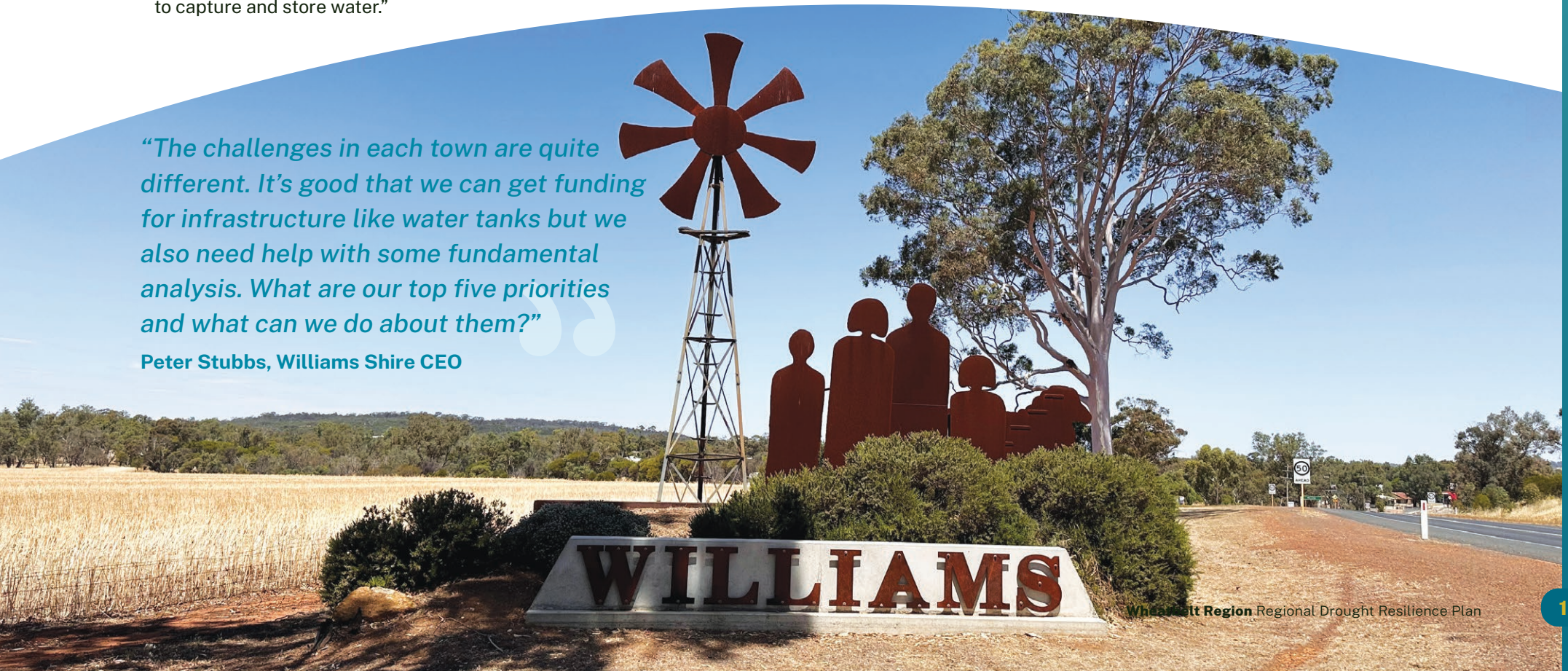
Increasing storage requires strategic planning and Peter says small local governments like his do not have the in-house expertise to do the analysis.

"If we're going to increase storage we need consultants or Water Corporation engineers to examine what's possible — there needs to be a strategic assessment around the key vulnerabilities of our system and what we can practically do about it."

Peter has been involved in discussions around water through the Voluntary Organisation of Councils — a cooperative body made up of local councils within a specific region who gather to discuss common issues at a local government level.

"The challenges in each town are quite different. It's good that we can get funding for infrastructure like water tanks but we also need help with some fundamental analysis. What are our top five priorities and what can we do about them?"

Peter Stubbs, Williams Shire CEO



Dumbleyung Shire



Sub-Region: Wheatbelt South

Population (2021): 681

Population growth (2016–2021): 1.5%

Industries: Agriculture (dryland); aquaculture (yabbies); tourism

Annual rainfall: 390 mm

Potable water use (2023): 0.06 GL per year; ~1.1 million litres/week

Water issues:

- **Increased local capacity needed** to operate town desalination plant
- **Strategic approach required** to solve water issues at scale
- **Lack of rain and run-off** has adversely affected local parks and sporting facilities
- **High water table** has damaged community infrastructure
- **Pool closure has affected community** — socially and economically
- **Competition for water** from road building/maintenance

Dumbleyung Shire CEO Gavin Treasure says a lack of dam water to irrigate the main Dumbleyung sports oval over the dry 2025 summer has forced the shire to pivot to scheme water irrigation at significant cost to the Council's budget.

"We received significant feedback from concerned local residents over the deteriorated condition of our main ovals to play sport. Scheme water is expensive but we are willing to pay as having access to a quality sports oval during the winter sports season is non-negotiable."

The shire is hoping to go some way towards addressing its irrigation water issue by desalinating the saline groundwater currently rising beneath the town that is causing significant damage to infrastructure.

Gavin says the shire is also trying to improve rainfall capture by cleaning out its major dams and assessing the efficiency with which surface catchments are capturing water. "But in a drying climate we've decided that desalination of our groundwater resource is a good option to explore."

Dumbleyung is one of three pilot towns taking part in the WaterSmart Farms desalination project being overseen by the Department of Primary Industries and Regional Development, the WA Water Corporation and Murdoch University. The project is in its final year and funding is coming to an end.

The desalination plant has so far generated about 4.4 million litres of fresh 'permeate' water and disposed about 6.1 million litres of brine 'reject' water into a decommissioned dam that has been saline for decades.

"We have recently doubled our desalination-produced water storage capacity to about two million litres of permeate water and we now shandy this with scheme water to irrigate the oval. Previous 2015 Strategic Water Assessments have estimated that Dumbleyung townsite requires circa 21 million litres of water per annum to provide a sustainable supply to meet recreational irrigation requirements. So whilst desalination supply won't necessarily offset this demand, it certainly provides another valuable resource for public use."

The desalinated permeate water is currently costing about $2.70 per kilolitre (excluding internal wage costs) to produce, which compares favourably with the cost of scheme water at $3.01 per kilolitre. Operating the new technology has not always been simple, and the shire is working to overcome issues with help from project partners and desalination plant suppliers.

"Desalination plants are complex and you need someone with the skillset and experience to respond to issues — so there's a knowledge issue and also a finance issue with running a plant — how do we successfully embed this new operation into our local government business?"

"The only reason we have got this far is because we've had support from project people who knew what they were doing. If local governments are going to embed desalination operations in their towns there's an ongoing requirement to support local governments and build capacity confidence and knowledge at the local level."

Gavin Treasure, Dumbleyung Shire CEO

Gavin believes desalination at scale in Wheatbelt towns is an essential part of securing local water supplies.

"We haven't got a water supply problem, we have a water quality problem — we've already got large quantities of mostly brackish to saline water beneath the surface — and we are now learning how to economically extract and store it."

Gavin is hoping the town can use what they have learned from the project and plan for a larger desalination plant.

"Across the Wheatbelt we don't have a strategic outlook in terms of how our water supplies are changing — we know the climate is warmer and drier and we know it's impacting agriculture and our towns — but we are responding through very project-specific eyes."

"We need to take a step back and look at things across the board, at a macro strategic level, and try and come up with an action plan to understand and respond to our water shortfall at scale."

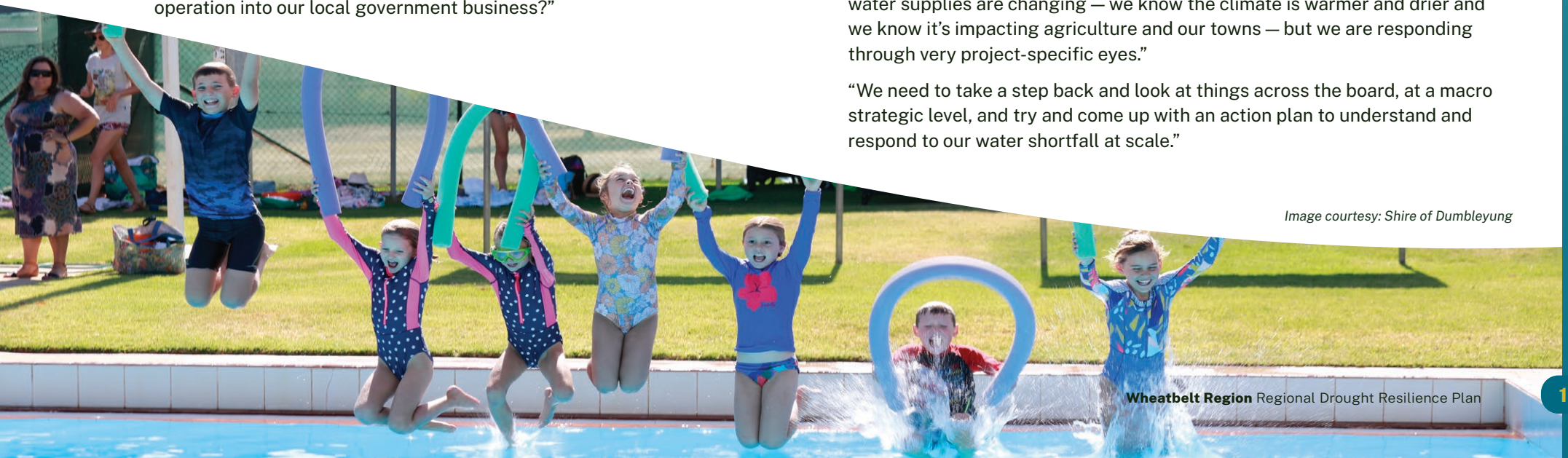
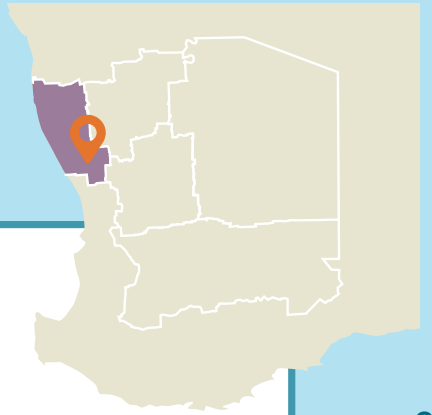


Image courtesy: Shire of Dumbleyung

Gingin Shire



Sub-Region: Central Coast

Population (2021): 5,576

Population growth (2016–2021): 6.9%

Industries: Agriculture (dryland); horticulture; intensive livestock; mining, tourism

Annual rainfall: 624 mm

Potable water use (2023): 0.5 GL per year; ~8.9 million litres/week

Water issues:

- **Rapid population growth** placing pressure on water and housing infrastructure demands
- **Significant water demand** for road construction and maintenance
- **Ratepayer funds not meeting** development demands
- **Lack of staff capacity** to implement water-wise strategies

Gingin Shire Operations and Assets Executive Manager Ruth March is currently dealing with a housing developer looking to build about 5,000 extra dwellings in a coastal town within the Gingin Shire, which will effectively double the population there in a short period of time. A further four housing developments are also in the pipeline within other coastal areas of the shire.

"We are experiencing rapid population growth and development, which is putting additional strain on our limited water resources and infrastructure."

The Central Coast sub-region grew by 15.4% between 2015 and 2023 compared to 2.3% for the Wheatbelt as a whole. The sub-region is currently growing faster than all other WA regions except Peel (23.9%).

The shire is interested in exploring desalination and implementing systems to become a 'waterwise council' but currently lacks the staff and funding to pursue these options.

"As a small shire, we don't have the staff to develop and implement sound water strategies. We're going through the budget now and I don't even have the money I need to maintain the roads we've got. So basically whatever help is out there, we need it."

Water availability during construction and maintenance is one of the shire's biggest issues and Ruth is currently in the process of putting in funding applications to locate tanks and bores around the shire to meet the significant water demand.

"About half our roads are sealed and half are unsealed. During the summer when it's dry, we need water to be able to do maintenance grading. We don't have tanks or bores that can provide water for road maintenance or for farmers during drought or for firefighting services. We end up being less productive because we have to wait for the water truck to come from a further distance to fill up."

The shire has one standpipe available for public use and 12 licenses for bores and surface water capture. The bores provide water for the shire's parks, golf club and entry statements.

"We are close to our allocation limit water usage compared to our license. Considering that the shire is growing, and we've got several new housing developments, we're struggling to make do with what we have."

Ruth March, Gingin Shire Operations and Assets Executive Manager

"Our ratepayer base is small, and we run a very lean machine from a financial perspective and so we try and make the best of the dollars that we do get. We don't have a huge amount of staff and we don't have a huge amount of money to do what we're trying to do."



Image courtesy: Shire of Gingin

Sub-regional drought resilience

Water issues vary considerably across the Wheatbelt's five sub-regions and addressing water threats and opportunities will therefore require a range of approaches.

For example, population in the Central Coast sub-region has grown 15.4% since 2015 and housing, horticulture, mining and, increasingly, renewable energy developments are now competing for finite allocations of fresh groundwater.

By contrast, hundreds of kilometres away in the Central East, where population has fallen by 4% since 2015, farmers are investigating ways to viably tap into and desalinate brackish to saline groundwater to secure livestock water during dry seasons.

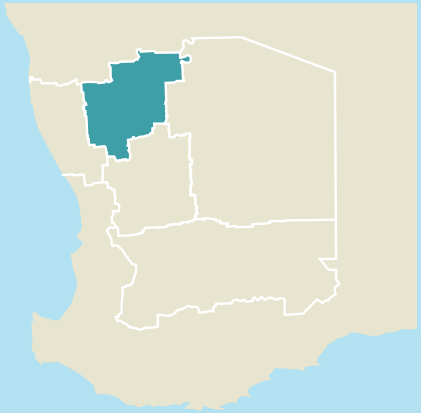
Creating drought-resilient sub-regions across the Wheatbelt will require a detailed understanding of water supply and demand issues at a local level.





Image courtesy: Tourism Western Australia

Central Midlands sub-region



- **Population (2021):** 1,755
- **Population growth (2016–2021):** 1.3%
- **Industries:** Agriculture (dryland); horticulture; mining, manufacturing
- **Annual rainfall (Moora):** 460 mm
- **Potable water use (2023):** 0.4 GL per year; ~8 million litres/week

Water issues:

- **Growing water competition** — renewable energy, mining, horticulture, intensive livestock
- **Lack of consultation at local government level** regarding renewable and mining developments is hampering a capacity to plan properly for water

Former Moora Shire President Tracy Lefroy believes tailored, shire-level approaches to water are needed for the Wheatbelt to properly meet the range of challenges and opportunities associated with water supply and demand across the region.

"At a shire level we have different capabilities, different needs and a range of different circumstances — while it might be more difficult, these issues really need to be looked at on a case-by-case basis not as a one-size-fits-all strategy."

"More and more industry is coming into the Wheatbelt — all with competing needs for water and it feels like there isn't an overarching strategy about how we are going to allocate water resources to different industries and communities — each of which has a range of different needs."

Tracy Lefroy, Former Moora Shire President

"There are plans to construct 400 or 500 turbines in our area and they will need something like 500 kilolitres for every footing that is built — on top of that is water demand for dust suppression. There is a lack of planning and definitely a lack of consultation and engagement with local government about these water requirements."

Tracy says the shire came within five days of running out of water for green space irrigation a couple of years ago and increased their wastewater storage capacity to better meet demand. "We are looking at the potential of further extending our sewerage plant to see if some of that water can be treated and used in cement manufacturing for the footings. We will probably also need some form of desalination and if we do that we will need to double or perhaps treble our water storage capacity."

The shire currently has the capacity to produce about a gigalitre of recycled wastewater each year which is used to irrigate green spaces and for light industrial needs. "But we will need to increase this substantially to cover the water demand from the wind turbine footings and we will need to produce water of specific quality for the cement too."

"Our aquifer is slow recharging due to clay in the area — it's under a fair amount of pressure already and with 300 to 400 workers coming to town to build the turbines — it's going to put more pressure on the aquifer."

"Even with initiatives like stormwater injection it's likely to take 50 years before that injected water has an impact on aquifer recharge."

"Mining development will also have an impact — we have mining companies drawing water out of the aquifer along with a substantial commercial feedlot and a commercial piggery and I don't really think we know how much water is being drawn and we've got no sense of future water demand and whether there will be anything left over."

Tracy says Moora's neighbouring shire, Dandaragan (Central Coast sub-region), grew by 4.5% in population in 2023–2024 despite initial projections expecting a growth of just 0.4%. "We service a lot of Dandaragan's needs so this growth could put more pressure on our water resources."

"We need to do a lot more planning and study into future demands and how we will cope."

"We really want to be prepared because we are getting very close to these renewable projects commencing and we run the risk of being too late in our water planning process — how do we plan rapidly but still be accurate?"



Securing alternative water supplies for the Wheatbelt

Outputs from the new climate model known as CMIP6 (Coupled Model Intercomparison Project, Phase 6) indicate there is a 90% chance of a further 20–30% rainfall decline over southwest WA (and therefore the Wheatbelt) in the next few decades (Figure 19).

CMIP6 is a new generation climate model that gathers climate models from research groups around the world to simulate past and future climate scenarios. The models simulate the physics, chemistry and biology of the atmosphere, land and oceans in great detail, and require some of the largest supercomputers in the world to generate the CMIP6 climate projections.

Australian climate researchers have used the CMIP6 to forecast the climate outlook for Australia out to 2080–2099 compared with the period 1995–2014 under a high emissions (RCP8.5) scenario.[4] Of the 33 models run as part of the forecasting exercise 90% predict a significant drying of southwest Australia (and therefore the Wheatbelt) between June and November (Figure 19).

Growing season rainfall has already dropped by as much as 50–60 mm or 20% in some areas of the Wheatbelt over the past 90 years — with concomitant impacts on community and agricultural water supplies. CMIP6 projections of further rainfall reductions underline the importance of securing alternative water supplies for the Wheatbelt — especially for periods of successive dry seasons — and of capturing and safely storing more rainfall during good seasons.

4. Grose, M. R., et al. (2020). Insights from CMIP6 for Australia's future climate. Earth's Future, 8

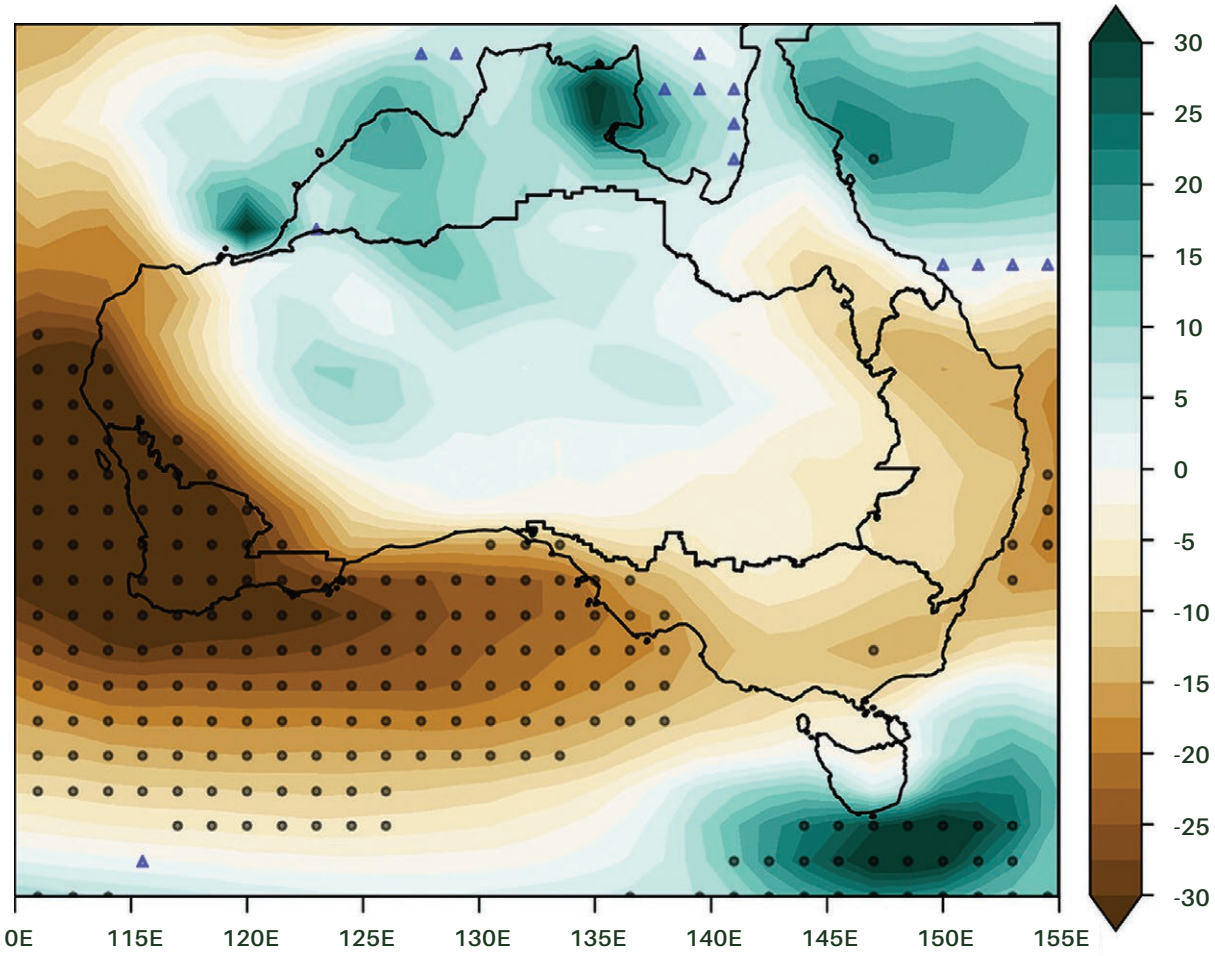


FIGURE 19 CMIP6 rainfall projection (% decline) for June-Nov for 1995–2014 to 2080–2099 under high emissions (RCP8.5). Dark brown stippling indicates >90% model agreement on sign of change, while blue triangles show regions of small change. *Note: The Wheatbelt is within the dark brown stippling.*
Source: Grosse et al (2020)[5]

Wheatbelt groundwater exists in compartments and not in one easy-to-access aquifer and the challenge is locating water sources of sufficient quantity and quality. Paleo-channels (ancient underground river systems) hold the greatest promise for water extraction and desalination at a scale suitable for community or industry water demand. Fractured rock aquifers are typically localised and have potential as sources of groundwater for on-farm water supply.

Regardless of the type of groundwater, most Wheatbelt groundwater is brackish-to-saline (apart from the freshwater aquifers in the Central Coast sub-region) (see Figure 20a and b) and will require desalination for most farm and community uses. The challenge is to develop abstraction and treatment systems that are economically viable, and which can out-compete the cost of accessing emergency water ($8–9/kL) and ultimately scheme water ($2.66/kL for domestic customers; higher for major customers). If this cost barrier could be overcome, desalination could help supplement or even secure water supplies in some parts of the Wheatbelt.

The Water Smart Farms R&D project is improving access to groundwater for farms and regional communities and assessing the feasibility of farm-scale desalination units. As part of the project, evaluation of 30 early adopters of farm desalination systems is being carried out across the Wheatbelt and a pilot project is nearing completion to investigate community-scale desalination units in several Wheatbelt towns — including Dumbleyung, Katanning and Merredin.

5. Grose, M. R., et al. (2020). Insights from CMIP6 for Australia's future climate. Earth's Future, 8

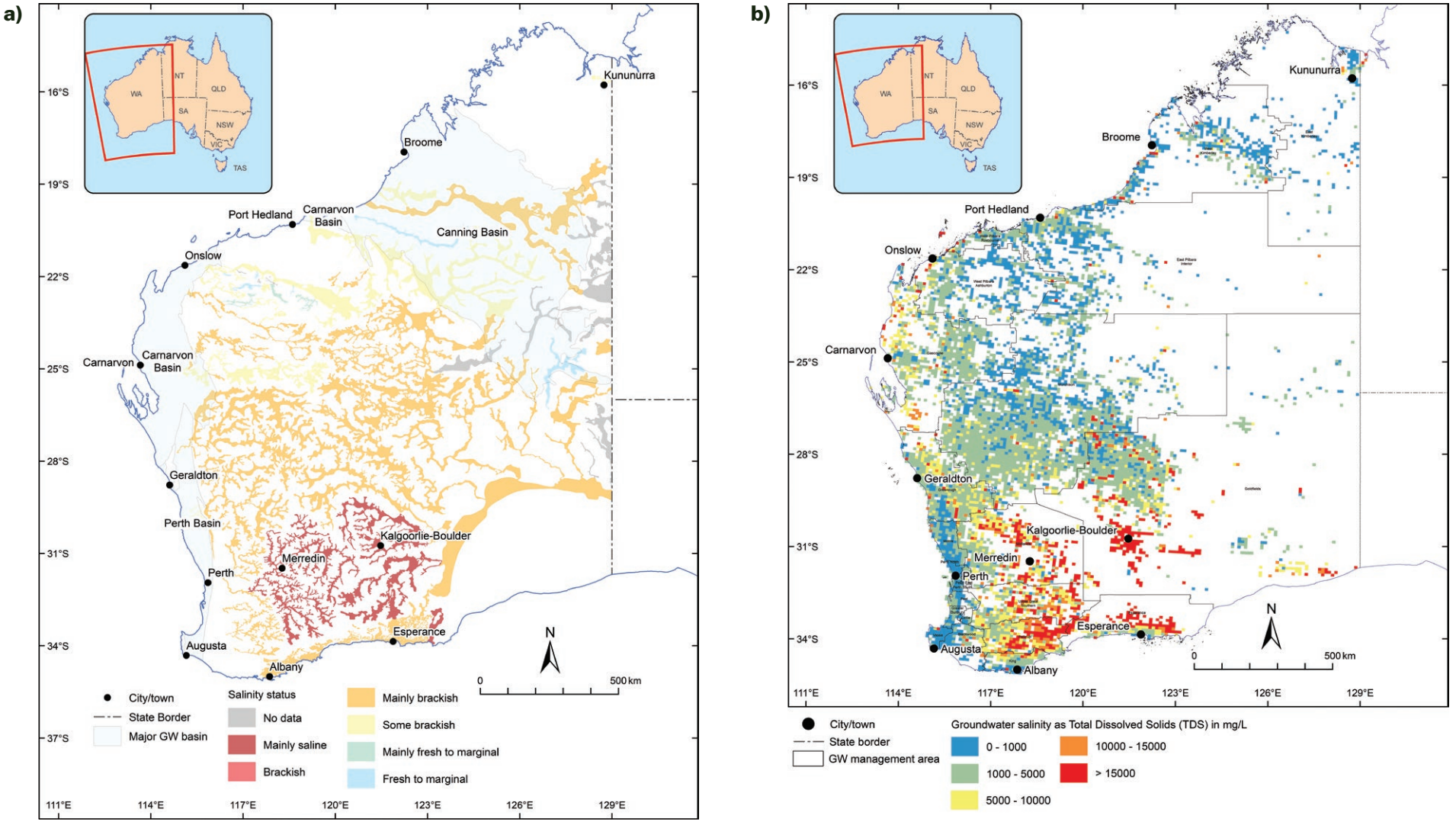


FIGURE 20 Salinity levels of groundwater systems across Western Australia. *Note: most of the Wheatbelt has access to some form of brackish to saline groundwater (seawater is 35,000 mg/litre).*

Source: Barron, O., Taylor, A., et al (2025) Brackish groundwater characterisation across Western Australia, CSIRO EP2025-3252

Salt levels are measured in **milligrams per litre**.

- **Fresh:** Less than 500 mg of salt per litre
- **Marginal:** Between 500–1,000 mg of salt per litre
- **Brackish:** Between 1,000–5,000 mg of salt per litre
- **Saline:** Between 5,000–35,000 mg of salt per litre
- **Hyper-saline:** More than 35,000 mg of salt per litre

Farm desalination plants

Early adopters of on-farm desalination occur mostly in the southern and south-eastern areas of the Wheatbelt where the scheme pipeline network is less prevalent (Figure 21). Many of the 50 desalination units were installed on farms in response to the Decile 1–2 seasons of 2018–2020 (R George pers. comm. 2025).

Most of the 50 units were matched to existing farm bores whose reliability was not known, and issues with bore flow rates may have contributed to performance issues with some desalination units. New production bores drilled as part of the Water Smart Farms project have since resulted in successful outcomes for many project participants, with particular success in the development of fractured rock exploration techniques. Yields of up to 100kL/day were derived from many of the successful bores.

All early adopters indicated securing livestock water during summer was the main driver of installing desalination units — but many now use the water for crop spraying as it is of such high quality.

Most of the early adopters have access to standpipe (scheme) water but the time (and cost) involved in lining up to cart the water were major incentives for exploring on-farm water from desalination.

Early results from the on-farm desalination operations indicate that the operating costs of desalination are higher than the supply charge for scheme water ($2.66/kL for domestic/small-scale customers), and considerably more expensive than dam or suitable quality bore water. However, the combined capital and operating desalination costs are likely less than, or similar to, the costs of carting water ($8–9/kL) while also being more convenient and offering superior quality water, especially for crop spraying. Total capital costs of a farm-scale desalination unit start at around $50–100,000. Solar powered units have a higher capital cost but a lower cost per kilolitre of water produced.



Image courtesy: Ben White



FIGURE 21 Location of on-farm desalination units being investigated as part of the Water Smart Farms project. Most farms are in the southern and south-eastern parts of the Wheatbelt where the Scheme pipeline is less prevalent.

Adapted from DPIRD Water Smart Farms Factsheet (2025).

Community desalination plants

Affordable water for irrigation of public sporting and recreational amenities is critical to maintaining green spaces and social cohesion within regional communities.

Many towns across the Wheatbelt do not have access to recycled wastewater for irrigation and must use scheme water or let their amenities die over the summer months and during dry seasons. Some local governments are absorbing $50–100,000 per year to water green spaces with scheme water.

Wheatbelt shires are working with the Water Corporation, Murdoch University and the Department of Primary Industries and Regional Development (as part of the Water Smart R&D program) to investigate the potential of desalinating groundwater to lower rising water tables beneath their towns while generating a source of irrigation water for community amenities and firefighting purposes. The project is in its second and final year.

The proof-of-concept community desalination plants established at Dumbleyung, Katanning and Merredin are in the early stages of being assessed but all have demonstrated that desalinated groundwater can be a cost-effective source of irrigation water for public open spaces. The challenge now is to develop viable ways to scale up the desalination units to replace scheme water while ensuring local shires are supported as they embed desalination technical capacity in their day-to-day operations.



Image: Merredin desalination plant. (courtesy: Shire of Merredin)

Dumbleyung Shire



Sub-Region: Wheatbelt South

Population (2021): 681

Population growth (2016–2021): 1.5%

Industries: Agriculture (dryland); aquaculture (yabbies); tourism

Annual rainfall: 390 mm

Potable water use (2023): 0.06 GL per year; ~1.1 million litres/week

Groundwater salinity: 18g/L (seawater is 35g/L)

Desalinated water yield: 22 kL/day @$2–3/kL

Water use: Sports oval and firefighting

Dumbleyung Shire desalination project manager Dave Williams says many Wheatbelt towns do not have a good handle on the volume, quality and accessibility of the water sitting underneath them nor the true cost of scheme water supply, which is highly subsidised.

"This desalination program could be a game changer for small communities and for the state because it provides the local community with a reliable, cost-effective water supply for firefighting, for their swimming pools, for their ovals and gardens."

Dave believes the project has been a catalyst for the community to take a more proactive, holistic approach to managing their water resources.

"The program has given us a window of opportunity to plan for the future. It's not a silver bullet, but it does provide us with a stop gap."

The Shire of Dumbleyung has also been successful in securing further State Government funding through the Community Water Supplies Program to complete desilting works to two of the towns main dams, establish a new concrete silt trap to its main town dam and to undertake water catchment refurbishment works that supplies this dam.

The project has faced operational challenges and Dave says it has taken two years to become fully familiar with the desalination unit. “We’re fortunate to be working with the government agencies (DPIRD and DWER) and the universities, (Murdoch University and UWA). They’re a great bunch and a great team.”

Dave has approached the challenge of finding an alternative irrigation supply for Dumbleyung by imagining a scenario of ‘no rain, no scheme water’. “We currently pay $3.01 per kilolitre for water commercially and we can produce desalinated water for $2.70 per kilolitre (excluding internal wage costs). The price per kilolitre is important, but there’s other benefits with desalination like reducing groundwater levels under the town and demonstrating ESG goals.”

“Without the water. There is no oval, no sport. With no sport, people have to travel. And when you have water, people stay. That’s why it’s important.”

Dave Williams, Dumbleyung Shire Desalination Project Manager



Image courtesy: Shire of Dumbleyung

Merredin Shire



Sub-Region: Central East

Population (2021): 3125

Population growth (2016–2021): -7%

Industries: Agriculture (dryland)

Annual rainfall: 324 mm

Potable water use (2023): 0.5 GL per year; ~ 10 million litres/week



Image courtesy: Shire of Merredin

A trial community desalination plant in Merredin is helping lower the saline water table under the town, which has been compromising building foundations and brickwork in local buildings. Shire of Merredin CEO, Craig Watts says the goal is to use the desalinated water to supplement scheme water irrigation of green spaces across the town.

"The cost of desalinated water is now becoming comparable to the cost of scheme water, and even the maintenance costs of the system are outweighed by the benefits of having easy and sustainable access to an alternative water source while lowering the groundwater table under the town."

With the desalination project coming to an end, the Merredin shire is hoping to extend the trial for another couple of years to investigate a new reverse-osmosis filtering system and maintain access to Water Corporation expertise for a bit longer to train staff and build local knowledge around desalination.

"We want to establish a specialist training program for our local government staff that covers all aspects of non-potable water capture, storage, treatment and irrigation to ensure we're getting the most efficient use of all of our non-potable water."

Craig says local governments tend to have high staff turnover, and documenting processes and training staff as they come on board will underpin the success of the desalination plant — a complex piece of equipment that needs specialist expertise to run.

"There's also an opportunity to bring staff involved in the three trial desalination plants across the Wheatbelt together to share their knowledge and learnings."

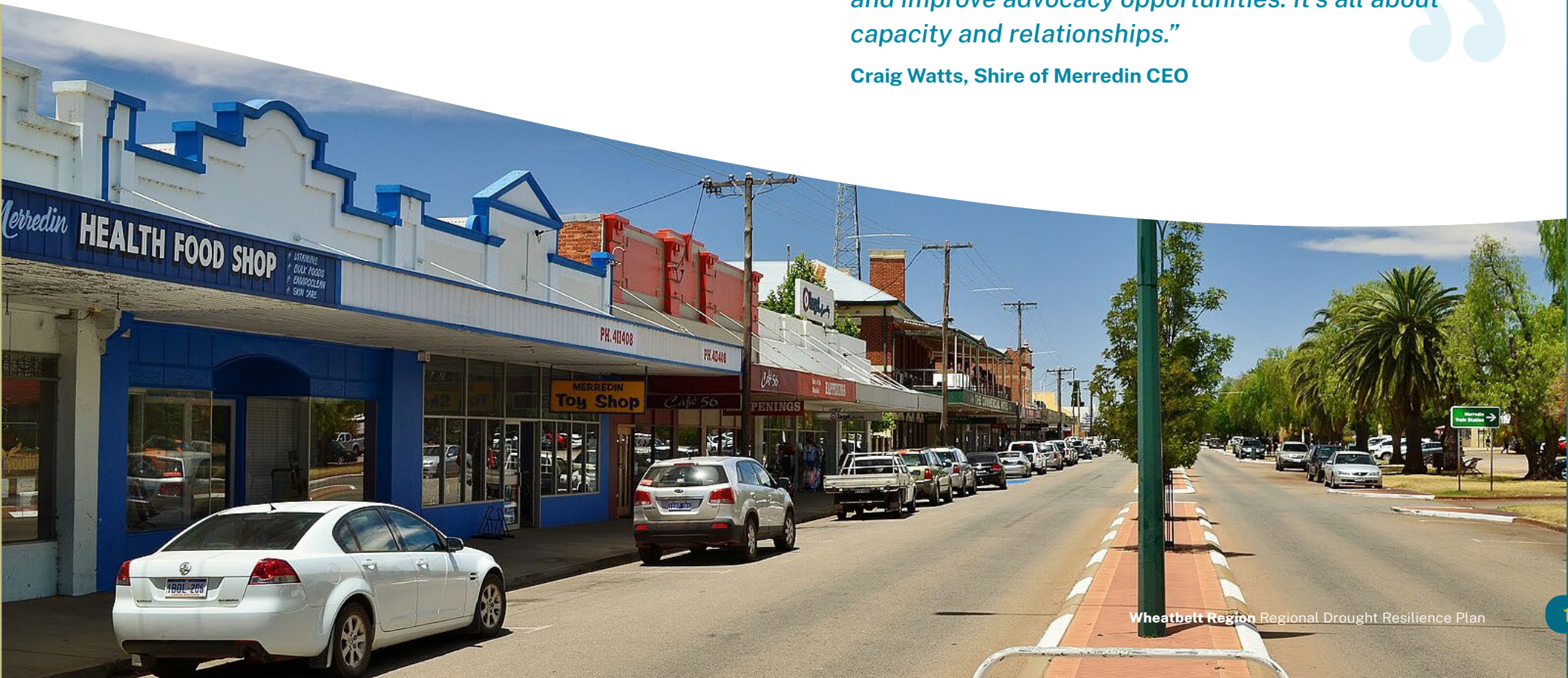
In collaboration with six shires from the Wheatbelt East Regional Organisation of Councils (WEROC), the Merredin shire with support from the Community Water Supply Program (administered by the Department of Water and Environmental Regulation) will develop water security plans for each shire and access water infrastructure to help secure drought resilience for local towns.

"We need to know what our water supply and demand is — where the pinch points are in the system."

Craig believes local governments have critical role to play in drought resilience and that a collective approach to governance works best in the Wheatbelt. "We need to help communities lift capacity around water planning and become water smart as the climate changes."

"We've already got a strong framework for governance in the Wheatbelt, and we want to build on that and support it. It all comes down to local government capacity and access to funds to do feasibility studies and improve advocacy opportunities. It's all about capacity and relationships."

Craig Watts, Shire of Merredin CEO



Recycled wastewater

Across the Wheatbelt only a small amount of recycled wastewater is generated — but where it is produced, it is highly valued as an alternative to scheme water use on public amenities.

Just half of the 42 Wheatbelt LGAs have operating wastewater recycling systems and, of these, eight are not generating any recycled water (Figure 22). The wastewater treatment systems operate at a range of efficiencies — with some reclaiming 70–100% of wastewater generated by the town and others less than 50% (Figure 22).

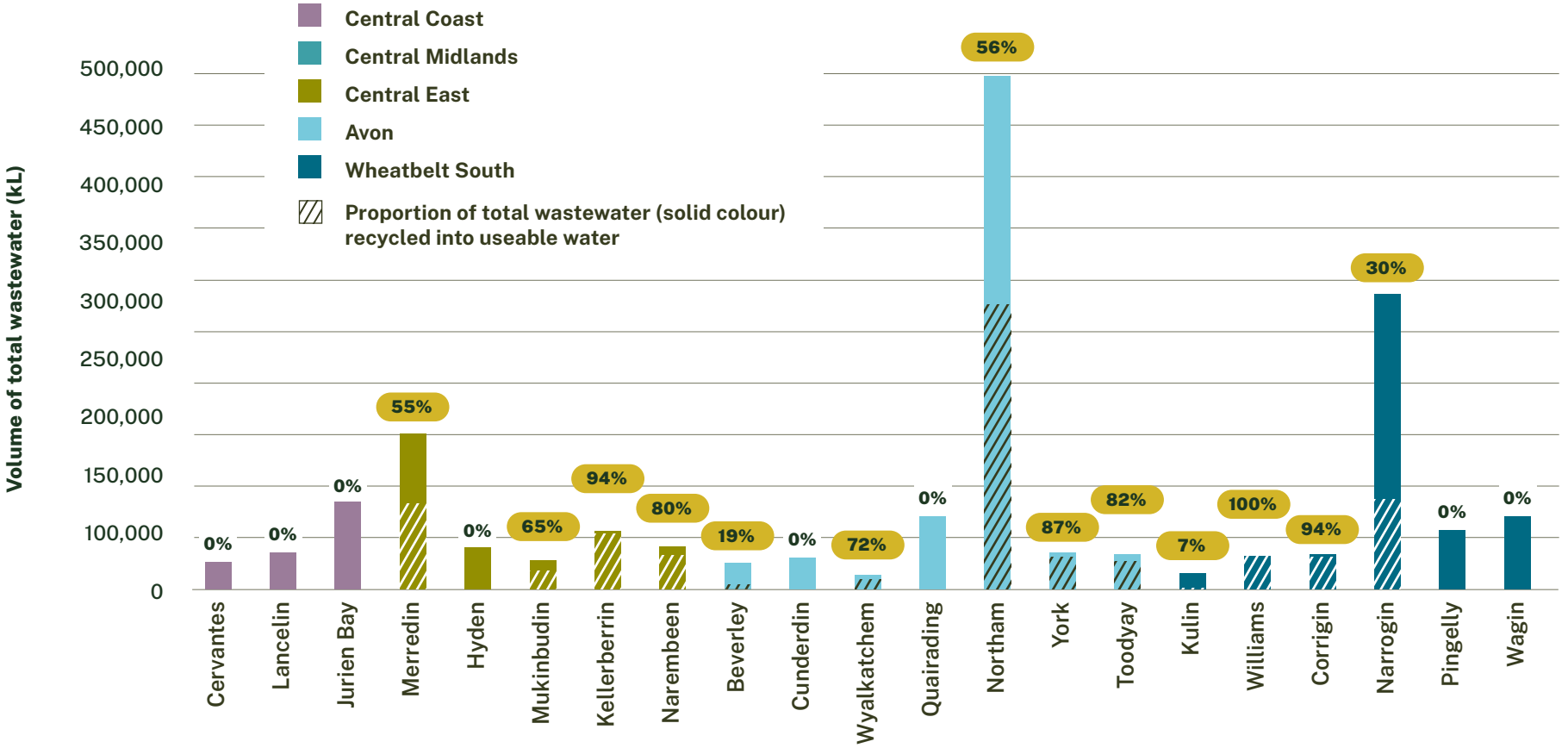


FIGURE 22 Total volume of wastewater entering wastewater recycling plants in Wheatbelt shires and the proportion (hashed pattern) of recycled water generated for irrigation of green spaces. *Note: eight shires are not currently generating any recycled wastewater from their treatment plants — investigating the reasons for this could help build drought resilience at the shire level.* ***Data source: Water Corporation***

A major factor holding back wastewater recycling in the Wheatbelt includes the infrastructure costs required to store and distribute the wastewater to green spaces.

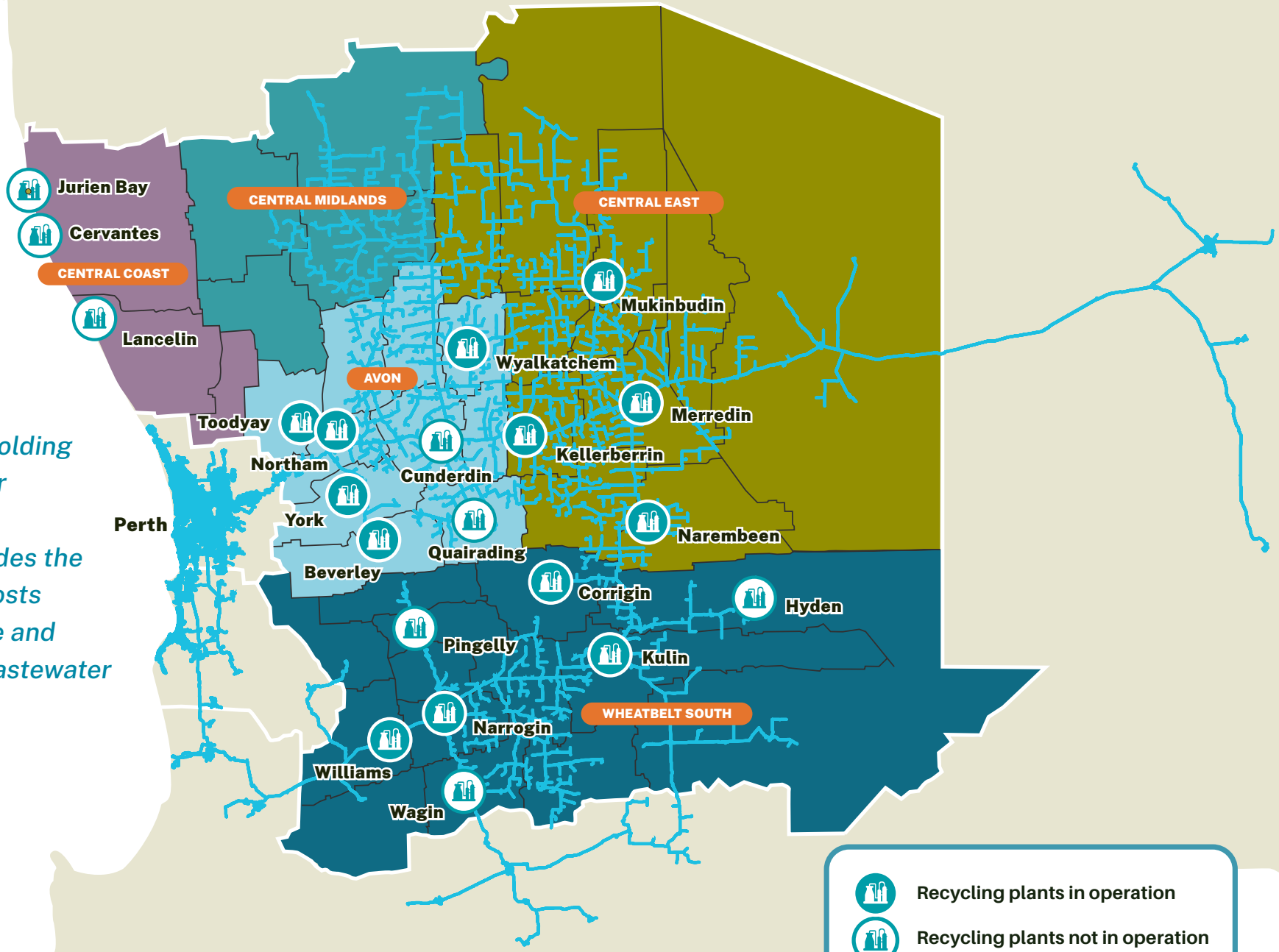
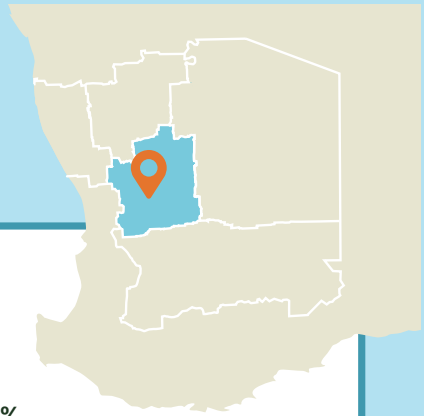


FIGURE 23 Location of wastewater recycling plants across the Wheatbelt. *Note: eight of the 21 treatment plants are not currently generating any recycled water.*
Data source: Water Corporation.

Northam Shire



Sub-Region: Avon

Population (2021): 11,358

Population growth (2016-2021): 2.2%

Industries: Agriculture (dryland); manufacturing; mining; public administration; tourism

Annual rainfall: 424 mm

Potable water use (2023): 2.01 GL per year; ~ 38.6 million litres/week

Recycled wastewater production: ~1 GL per year



Image courtesy: Shire of Northam

Northam is the largest regional centre of the Wheatbelt and was one of the first local governments to establish a recycled wastewater system — about 40 years ago. The system currently generates about one gigalitre of irrigation water for the town (Figure 24).

Shire of Northam executive manager of development and community services, Chadd Hunt, says upgrading the ageing wastewater infrastructure is a major focus for the town.

"The Water Corporation is undertaking a major upgrade of their wastewater treatment plant and facilities, which will provide the shire with more recycled water and for longer throughout the year but our current wastewater distribution and storage infrastructure will not be capable of accepting the increasing supply."

If the additional recycled water cannot be used it will be sent down the Avon River that runs through the Northam townsite.

"The recycled water irrigates our two main ovals and our main parks and reserves in town, and it is used by the high school, the Harness Racing Club and the Turf Club, so it is a significant community asset."

Chadd sees increasing wastewater storage capacity as critical given the challenges faced by a drying climate, and longer summers.

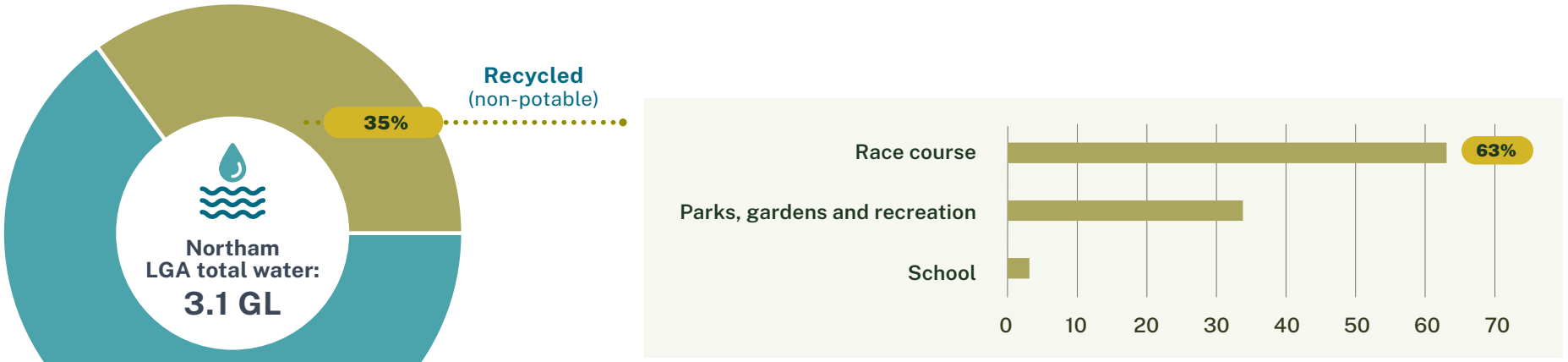


FIGURE 24 Volume and use of Northam Shire potable (scheme) water and recycled wastewater (2022–2023).

Data source: Northam Shire

"In some dry seasons we have to supplement the recycled water with scheme water at a significant cost."

Chad Hunt, Northam Shire Executive Manager

An engineering consultancy commissioned by the shire has identified a need for significant investment to upgrade the wastewater distribution and storage facilities.

Northam Shire CEO Debbie Terelink says it will cost about $10 million to replace the wastewater distribution infrastructure and potentially expand the town's storage capacity. "We don't have the funding to do that so have been advocating quite hard with the State Government because if we can't take the water, it will end up down the river and we will need to use the scheme to water our assets."

Chadd says the local Turf Club supplements its wastewater use with harvested stormwater. "A fairly major upgrade was done about ten years ago through Royalties for Regions where they constructed a large storage dam and a pipeline to feed the dam."

In winter months when there is no demand for the reuse water town, it is pumped from the Water Corporation treatment plant out to the racecourse and stored in the large dam use for use in summer, rather than being discharged to the river.

"But even with that extra dam storage, there is still some discharge into the river in the winter so the challenge for us is storage and this will be exacerbated once the Water Corporation boost capacity of the wastewater plant in the next few years."

Chad says while funding is crucial, the shire also need technical assistance in the form of project management and engineering skills to negotiate the upgrades needed and ensure the system is fit for purpose.

“We have some in-house expertise but given the scope of this project we would require external assistance, whether that’s done as part of the funding or grant agreement, or another mechanism.

“From our perspective, the priority is boosting the recycled water system so we can take the pressure off scheme water for other users.”

Chad Hunt, Northam Shire Executive Manager

Footnote: *At the time of writing (September 2025) the Wheatbelt Development Commission indicated that it would be assisting the Northam Shire in 2026 to develop a business case to attract funding for their water recycling infrastructure.*



Image courtesy: Shire of Northam



Image courtesy: Angie Roe, Austockphoto

Capturing and storing more water in the Wheatbelt

To help mitigate the decline in annual rainfall and increase in drought months predicted for the Wheatbelt over the next few decades, a widespread and strategic approach to water harvesting and storage, both on-farm and in communities, will be critical.

Farm water

'WaterSmart Dams — making dams work again' was initiated by the Grower Group Alliance in WA in 2022 to develop improved technology and water planning tools to ensure farm dams can capture, harvest and store enough water to meet industry needs in a drying climate. Until relatively recently, the Wheatbelt's 200,000 private farm dams reliably serviced the water needs of the region's agricultural enterprises. However, prolonged dry conditions over the three years to 2021 resulted in many farm dams failing to capture enough water which, in turn, resulted in a record 12 water deficiency declarations across the region and the carting of $3.3 million emergency water supplies for livestock.

The project involves 12 demonstration sites, building farm-based water planning tools, workshops, field days and industry training. Activities include renovating existing dams, building new dams, and implementing evaporation suppression and runoff technologies.

Community water

A network of strategic community water supplies — dams, tanks, bores and other assets — have been developed across WA's dryland agricultural areas to provide a source of emergency non-potable water for livestock and firefighting needs during times of low rainfall (Figure 23). Vesting of the emergency water supplies and assets varies, with some sites owned by the local government authority, the Water Corporation, or by private entities where an agreement has been made to allow access.

A rebuilt ‘roaded catchment’, dam and silt trap at Kukerin in the south-east Wheatbelt (between Dumbleyung and Lake Grace). The compacted surface of roaded catchment results in water run-off on about 8–12mm of rainfall compared to the 25mm required with older dam technology. Lining catchments with recycled CBH tarps enables run-off following rainfall events of just 0.8mm.

Photo: Peter Clifton, Grower Group Alliance.



Image courtesy: Shire of Kondinin

Strategic community dams are a subset of the so-called 'agricultural area' (AA) dams constructed during the late 1920s and 1940s as part of the soldier settlement agricultural expansion after WW1 and WW2. The network was extended in the 1960s and 1970s in response to severe droughts. There are about 480 of the original 681 AA dams that range from high value to no value in terms of their condition and serviceability. An AA dam is classified as strategic if (1) it contains water of acceptable quality for livestock use and a capacity, depth and catchment which will maximise the availability of water in low rainfall years, and (2) if it forms part of a network within which most farmers not connected to a Water Corporation piped scheme can obtain water at a distance of less than 40 kilometres. The WA Department of Water and Environmental Regulation (DWER) uses LGA maps to determine which sites are worth upgrading and to identify priority areas to develop new strategic community water supplies.

Strategic community water supplies have received significant funding and upgrades over the past 25 years through the Community Water Supplies Partnership program (administered by DWER) (see Figure 25 and Table 1). The program provides grants of up to $100,000 for community water supply improvements in dryland agricultural areas receiving less than 600 mm average annual rainfall. The aim of the program is to encourage the planning and establishment of reliable non-potable water supplies to meet emergency farmland and firefighting water needs and reduce scheme water use.

Since 2000, the Wheatbelt has received about $9.4 million in funding across 38 of its 42 LGAs (Figure 26) with the Wheatbelt South sub-region receiving the bulk of the funding (Figure 27).



Image courtesy: Allan Godley, Prodrone Worx

Wheatbelt strategic community supply (AA) dams currently (2022) have a collective storage capacity of 0.8 GL with Lake Grace community dams accounting for 40% of this (0.3 GL).

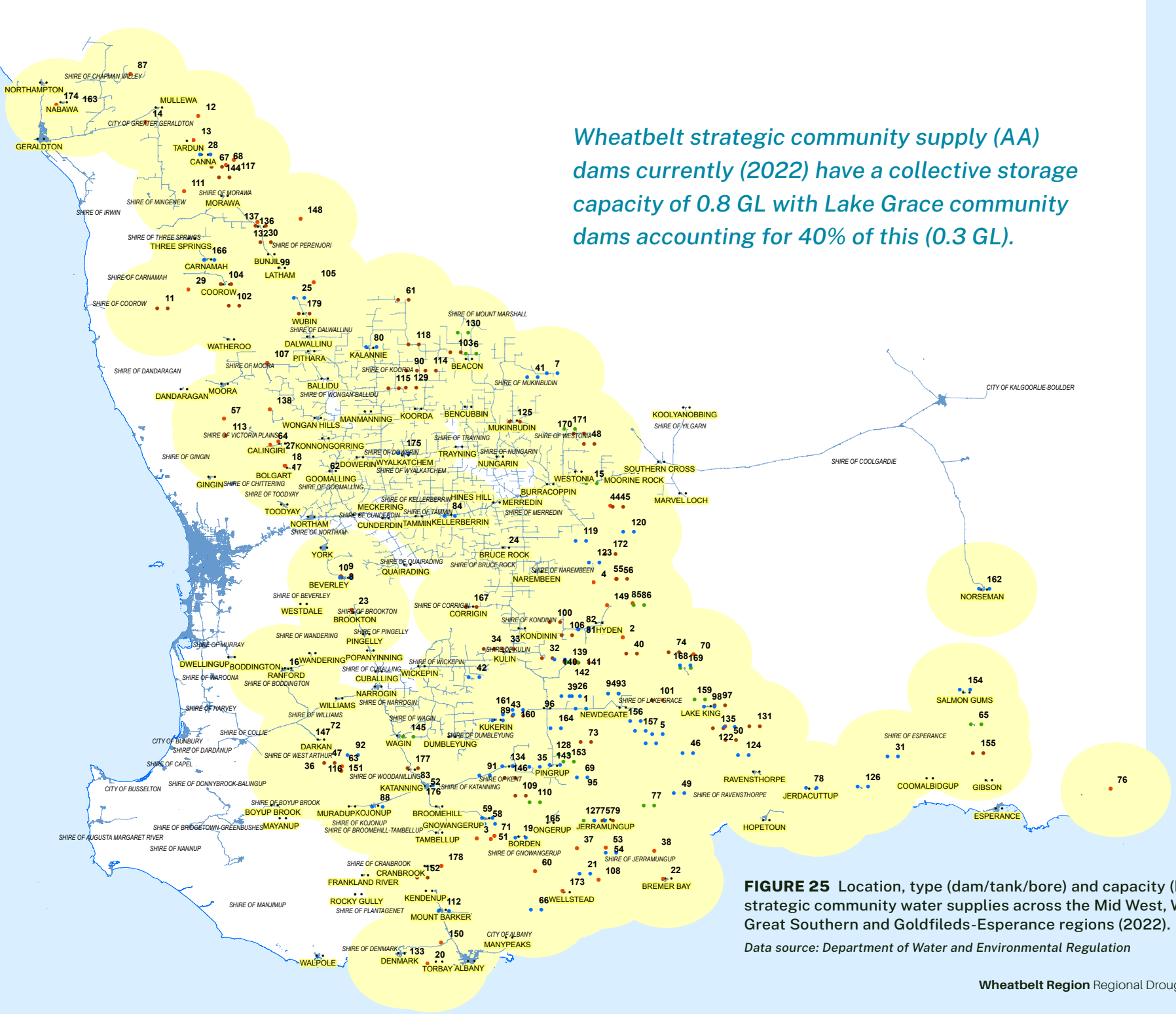


FIGURE 25 Location, type (dam/tank/bore) and capacity (kL) of strategic community water supplies across the Mid West, Wheatbelt, Great Southern and Goldfileds-Esperance regions (2022).

Data source: Department of Water and Environmental Regulation

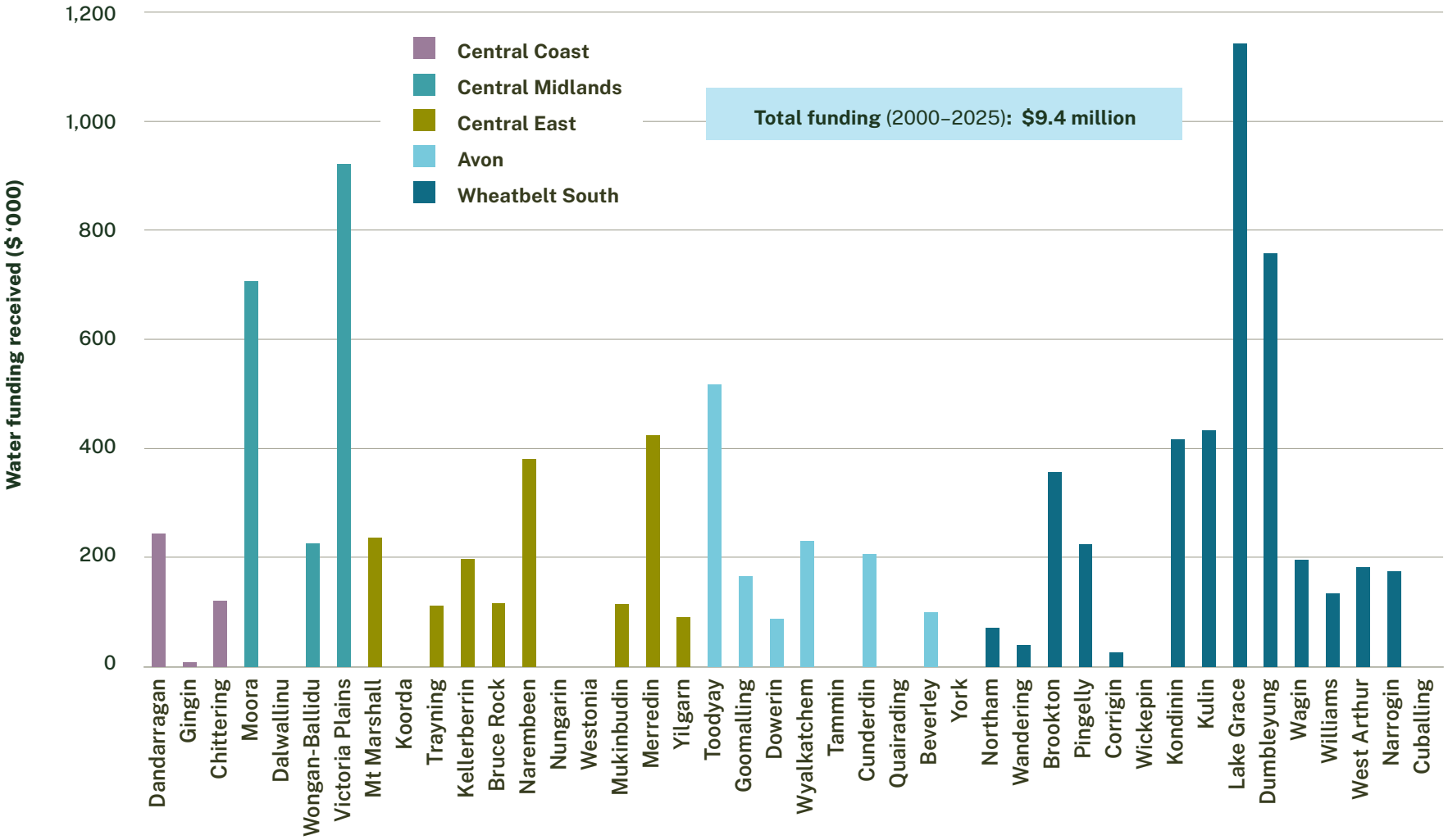


FIGURE 26 Water infrastructure funding received by each Wheatbelt LGA over the past 25 years (2000–2025).

Data source: Department of Water and Environmental Regulation annual reports

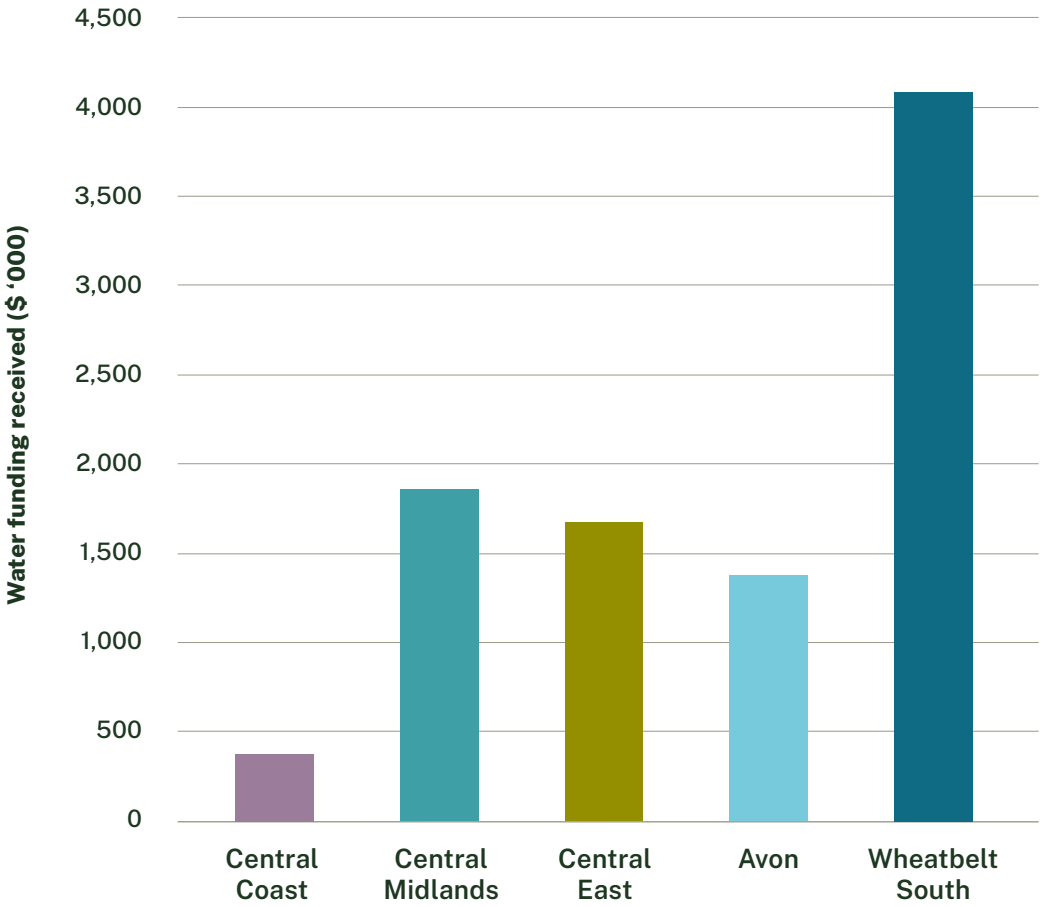


FIGURE 27 Water infrastructure funding received by Wheatbelt sub-regions over the past 25 years (2000–2025).

Data source: Department of Water and Environmental Regulation annual reports

Building water resilience

To ensure community and farm water needs are met during consecutive dry seasons, the Wheatbelt requires coordinated and evidence-based planning and investment in water infrastructure and water-use efficiency measures.



Image courtesy: Wheatbelt Way

TABLE 1. Water infrastructure projects funded in the Wheatbelt via the Department of Water and Environmental Regulation (2015–2025)

Shire	Sub-Region	Water infrastructure project
Wyalkatchem	**Avon**	• Refurbishment of White dam (16,000 kL) to improve water harvesting. • Distribution of dam water to two new storage tanks (100kL and 175 kL) for use in emergency livestock water, firefighting, green spaces. • Stormwater infrastructure upgrades.
Beverley	**Avon**	• Installation of two stormwater retention basins with combined capacity of 4,000 kL to capture water from town's street catchment for use on green spaces and emergency water needs.
Goomalling	**Avon**	• Upgrade stormwater drain run-off and construct new 1000 kL dam. • Water from dam is now redirected to a new 250 kL tank and blended with treated wastewater.
Toodyay	**Avon**	• Stormwater harvesting infrastructure and storage installed at three fire stations. • Install new rainwater tanks to supply firefighting water. • Install new water tanks for firefighting and Shire roadworks use.
Cunderdin	**Avon**	• Construction of new dam and stormwater harvesting infrastructure. • Install two new 150,000 litre water tanks for firefighting at Cunderdin Airport.
Dowerin	**Avon**	• Improve capacity of Dowerin townsite irrigation scheme.
Dandaragan	**Central Coast**	• Fund stage two of the Jurien Bay Irrigation Development Plan Project which will supply 200 kL of water annually and reduce pressure on scheme water supply. • Fund stage four of the Jurien Bay Irrigation Development Plan Project to supply water for green spaces and firefighting.
Chittering	**Central Coast**	• Install two new 100 kL water tanks and pipe and pump infrastructure to existing soak site.
Merredin	**Central East**	• Upgrade Merredin Recycled Water Network allowing for increased use of water from the Water Corporation's Merredin wastewater treatment plant for irrigation. Use of wastewater for irrigation of oval will save about 190 kL of high quality harvested stormwater/day.
Bruce Rock	**Central East**	• Refurbishment of community dam catchment.
Mukinbudin	**Central East**	• Stormwater infrastructure upgrades.
Merredin	**Central East**	• Aged stormwater infrastructure upgraded to improve water harvesting efficiency and water quality for irrigation of green spaces.

TABLE 1. Water infrastructure projects funded in the Wheatbelt via the Department of Water and Environmental Regulation (2015–2025) (continued)

Shire	Sub-Region	Water infrastructure project
Trayning	**Central East**	• Two 200 kL storage tanks installed to receive water from nearby 3000 kL CBH dam. • Refurbishment of dam catchment area to improve water harvesting. • Realign and upgrade catchment feeding into town site dams (42 million kL).
Mount Marshall	**Central East**	• Pipework and pumping infrastructure installed to improve water transfer from town dam to Beacon capture dam for irrigation of green spaces. • Refurbishment of 25,000 kL Beacon town dam catchment. • Installation of piping, pumping and storage infrastructure to improve distribution of stormwater between Bencubbin railway dam and town dam for green space irrigation.
Victoria Plains	**Central Midlands**	• Soak development to supply storage tanks with non-potable emergency water for livestock, firefighting, irrigation. • Refurbish desalination plant in Piawaning to provide emergency livestock and firefighting water. • Implement a Strategic Water Plan.
Wongan-Ballidu	**Central Midlands**	• Partnership between Wongan Hills District High School and Shire to use Morcady dam water to irrigate school grounds, supplement town irrigation and provide emergency livestock and firefighting water.
Moora	**Central Midlands**	• Reinforce dam walls to ensure continued irrigation supply for town green spaces.
Corrigin	**Wheatbelt South**	• Maximise stormwater harvesting - install 300kL storage tank to reduce reliance on scheme water
Kondinin	**Wheatbelt South**	• High-volume pump installed at Hyden CBH to quickly transfer water to a large community storage dam (20 000 kL) and provide water for oval irrigation emergency farm water supplies. • Refurbish disused Water Corporation dam and gravity feed dam water to 100 kL storage tank • Desilt and reseal Woorkakanin dam and grade catchment to increase water harvest and storage of water for emergency farm supplies and oval irrigation. • Fit standpipes to three 110kL emergency water supply tanks and install swipe card access to manage water access.
Kulin	**Wheatbelt South**	• Enlarge Dudinin dam from 12,000 kL to 25,000 kL and refurbish catchment area to improve water harvesting. • Install 120 kL tank and pump infrastructure to provide emergency non-potable farm and firefighting water.
Wagin	**Wheatbelt South**	• Pipe installed from local (un-used) Putapin dam to supply emergency water into storage tanks to alleviate scheme water use on town recreation and green spaces • Installation of 47kL tank for emergency livestock water. • Installation of two 250 kL storage tanks and pipework to transfer desalinated water from UniGrain feed company. UniGrain receives and desalinates saline water pumped from under Wagin townsite to control groundwater rise. The desalinated water is used for irrigation and emergency livestock water.

TABLE 1. Water infrastructure projects funded in the Wheatbelt via the Department of Water and Environmental Regulation (2015–2025) (continued)

Shire	Sub-Region	Water infrastructure project
Lace Grace	**Wheatbelt South**	• Pipe installed to distribute water from an unused Water Corporation dam to a 50 kL tank fitted with a swipe card to monitor usage of emergency farm water supplies. • Stormwater infrastructure upgrades. • Construct a new dam in Newdegate for emergency livestock and firefighting water.
West Arthur	**Wheatbelt South**	• Pumps and pipework infrastructure on two groundwater bores to provide emergency livestock water. • Improved road access to Gorn Rd and Reed Rd non-potable bores and install new pipe and pump infrastructure.
Dumbleyung	**Wheatbelt South**	• Upgrade stormwater capture and storage for use as emergency livestock and firefighting water supply. • Upgrade Tarin Rock Siding dam for emergency livestock water in Kukerin area. • Desilt Kukerin stock dam and upgrade catchment to improve rainfall run-off and storage capacity. • Refurbishment of water catchment area and installation of tank.
Brookton	**Wheatbelt South**	• Pipe and pumping infrastructure installed on unused Water Corporation bore to supply emergency livestock, community and firefighting water. • Install 200,000 litre water tank to existing licensed bore and motorised valves linked to sensors to remotely control water transfer. • Extend non-potable bore water supply to several location in Brookton town to eliminate reliance on scheme water for irrigation (and save $49,515/year).
Pingelly	**Wheatbelt South**	• Channel stormwater to Realm Street dam for irrigation of town oval and town green spaces.
Narrogin	**Wheatbelt South**	• Capture stormwater (up to 147 million litres/year) from townsite catchment and divert to catchment dam for use in irrigation of town green spaces and sporting oval.
Williams	**Wheatbelt South**	• Connect two tanks (250,000 litres) to existing bore (50,000 litres/day) for farm and community use. • Install new water tanks for firefighting water.

Summary of water issues across the Wheatbelt

Water issues vary significantly across the Wheatbelt and addressing these will require tailored approaches at both a local and sub-regional level.

TABLE 2. Summary of water challenges at Wheatbelt town, farm and sub-regional levels

Scale	Water user	Water challenges	RDRP Consultancy feedback
Sub-regions	**Avon**	• Growing population: increased water demand for houses, new industries, roads • Compromised dams, fit-for-purpose water for public open spaces, WUE, ageing pipeline	• *Maintaining parks and gardens during drought is challenging but access to green spaces is critical for community well-being, underscoring the need for sustainable irrigation solutions* **(Water Corp)**
	Central Coast	• Growing population, groundwater competition/caps (mining/agriculture/towns)	• *Local governments (LGAs) often lack detailed water strategies, leading to reactive rather than proactive measures. Forward planning, including water audits, is needed to understand current resources and future needs* **(DWER)**
	Central East	• Groundwater competition (mining/agriculture), compromised dams, ageing pipeline	• *Upgrading non-potable water sites and maintaining infrastructure, such as dam desilting, installing tanks and solar pumps, is critical for long-term drought resilience* **(DWER)**
	Central Midlands	• Groundwater competition (mining/agriculture/towns), compromised dams	• *Ensuring resilience requires balancing infrastructure, water availability, and business strategies across farms and communities* **(UWA)**
	Wheatbelt South	• Fit-for-purpose livestock water, compromised dams	• *Repeated hot, dry conditions in recent years highlight the need to plan for multi-year droughts at regional and farm level. There is a need for comprehensive water readiness plans that anticipate supply disruptions and drought scenarios (DPIRD). Farm businesses should assess their storage infrastructure to ensure it will meet future demand for stock and spraying across a range of climate scenarios* **(Water Corp)**

TABLE 2. Summary of water challenges at Wheatbelt town, farm and sub-regional levels (continued)

Scale	Water user		Water challenges	RDRP Consultancy feedback
Towns	**Domestic**		• Growing population (CC/Avon) • Pressure on water supply • Water use efficiency (WUE)	• *Demand for subdivisions in the west of the Northam Shire is growing, which will lead to more water demand in the construction and operational phase* **(Northam Shire CEO)**
	Public		• Over reliance on scheme water • Cost and logistics of alternatives (desal/recycling) • WUE • Storm water capture/CBH capture • Water for roads • LGA capacity to identify and manage water issues	• *We want our Northam community to have green parks and reserves, but our recycled water infrastructure needs $10 million in upgrades to keep working and we don't have the funding. If we don't use the recycled water, it will end up in the river instead* **(Northam Shire CEO)** • *Addressing capacity gaps in LGAs by providing technical advice, predictive modelling tools, and strategic planning support is crucial* **(DWER)**
	Commercial		• Water availability + cost • Alternative water supplies (desal/recycling)	• *Businesses (and potentially large businesses) are wanting to come to Northam but one of the constraints on development is access to water and the cost (and ownership) of infrastructure to access water* **(Northam Shire CEO)** • *Secure water supplies are needed for industries like feedlots and abattoirs to create economic diversification* **(DPIRD)**
Farms	**Livestock**	**Intensive**	• Water supply, cost of alternatives (desalination/wastewater re-use)	• *Water demand of intensive chicken and pork operations will increase in a drying climate*
		Broadacre	• Water supply/quality for livestock, compromised water capture into farm dams	• *Water carting for agriculture is increasing in frequency and cost/kilolitre due to drier seasons. Alternatives to potable water are needed for livestock and weed control* **(Water Corp)**
	Cropping	**Rain-fed**	• Water supply/quality for spraying, compromised water capture into farm dams	• *Modern farming systems need large, well-maintained dams with reliable catchments. High-quality water is critical to herbicide performance* **(UWA)**
		Horticulture	• Groundwater competition (mining/renewables), most groundwater fully allocated	• *We don't know if there is enough groundwater to supply domestic needs, ongoing food production, and prospective new projects. We need to adopt a long-term perspective that considers the highest and best uses of water. Are we using potable water for non-potable needs* **(Moora Shire President)**

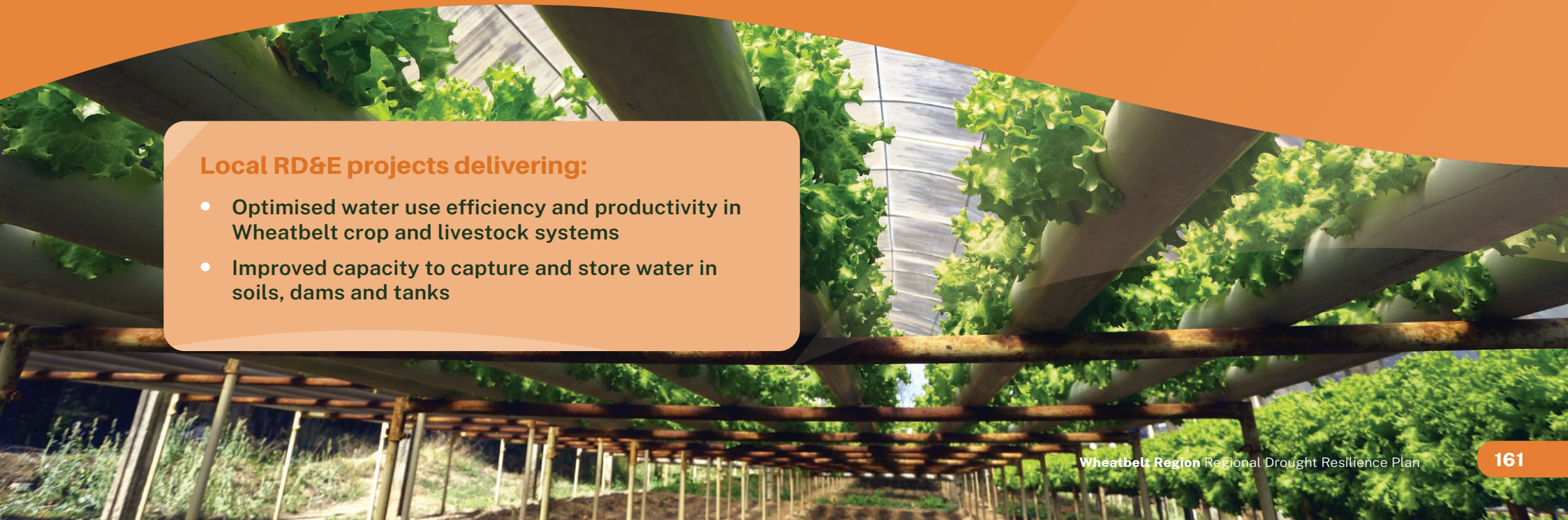
Action required

- **Communicate the main findings of the Wheatbelt Drought Resilience Plan** (including the Wheatbelt water story) at a community and sub-regional level to encourage continued adaptation to a drier, hotter climate with higher incidences of drought
- **Undertake community and sub-regional** water needs analyses to develop a better understanding of current and future water use and critical issues at the local government and sub-regional level
- **Identify and advocate** for new water supply opportunities
- **Complete a region-wide** 'resilient green spaces' audit to assess usage, condition, drought resilience
- **Develop the 'WaterSmart Regions' initiative** based on coordination and communication across current water programs
- **Develop a Wheatbelt Water Security Plan**

For details on each of the actions above see *Implementing the Plan* in Section 10 of this report.

6. Primary industries — overview

Quantifying and communicating water use in rainfed and intensive agricultural industries to drive efficiencies and encourage innovation



Local RD&E projects delivering:

- Optimised water use efficiency and productivity in Wheatbelt crop and livestock systems
- Improved capacity to capture and store water in soils, dams and tanks



Image courtesy: Ben White

Wheatbelt primary industries at a glance:

- **Agriculture underpins the economy of the Wheatbelt** contributing more than 25% of the region's annual gross value added (GVA)
- **Agriculture is the largest employer across all Wheatbelt sub-regions** and about 45% of all Wheatbelt businesses are connected with the agricultural industry
- **Broadacre cropping and livestock** account for about 80% of the Wheatbelt's annual agricultural production value and rely totally on seasonal rainfall for their success
- **Horticulture and intensive livestock production** make up the remaining 20% of the Wheatbelt's annual agricultural production value and rely almost entirely on fresh groundwater supplies in aquifers under the Wheatbelt's Central Coast sub-region

Implementation plan themes covered in this section:



Introduction

As the name suggests, the Wheatbelt was built on agriculture, and while the region's economy has since diversified, agriculture remains a mainstay of the economy — with $4.4 billion in total production value generated in 2021.

The Wheatbelt's primary industries are underpinned by:

- **A large export-oriented broadacre grains industry dominated by wheat, barley and canola**
- **A broadacre livestock industry dominated by about six million sheep and about 150,000 cattle**
- **Rising poultry (>800,000) and pig numbers (190,000)**
- **A significant and growing horticultural sector with oranges, carrots, lettuce and broccoli representing the most valuable crops**

This section details the relative size and value of the primary industries across the Wheatbelt and highlights their dependence on seasonal rainfall and fresh groundwater supplies.

Broadacre dryland cropping and hay production is the largest agricultural industry — generating 75% of the region's total agricultural production value. Livestock for meat (lamb, beef, chicken and pork) and products (wool, eggs) account for about a fifth of the annual production value and horticulture for the remaining five percent (Figure 1).

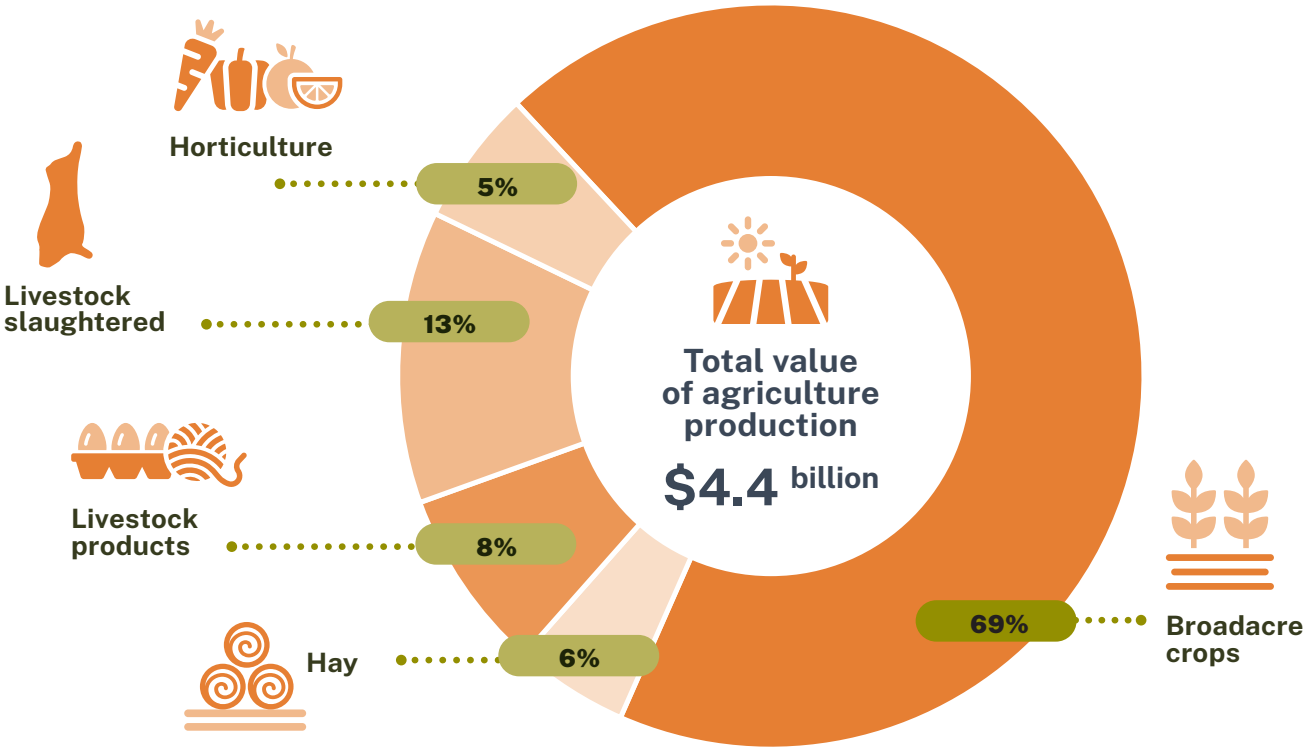


FIGURE 1 Relative value of agricultural production in the Wheatbelt in 2021

Data source: ABS (2021); Adapted from DPIRD Regional Intelligence and Adoption Team (2023) Broadacre agriculture regional snapshot: Wheatbelt, Western Australia.

Wheatbelt — broadacre grains

Broadacre grain and sheep dominate the Avon, Central Midlands and Central East sub-regions while the Central Coast sub-region is responsible for most of the horticultural and intensive livestock (pork, poultry) produced in the Wheatbelt.

About half of the Wheatbelt's annual grain production value comes from wheat (51%) followed by feed and malt barley (25%) canola (14%), oats (5%) and lupin (4%). Legume pulse crops (field peas, faba beans and chickpeas) make up a small but growing sector of the broadacre grains industry (Figure 2).

Broadacre grains are produced under rainfed conditions and annual yields depend solely on the amount and timing of seasonal rainfall.



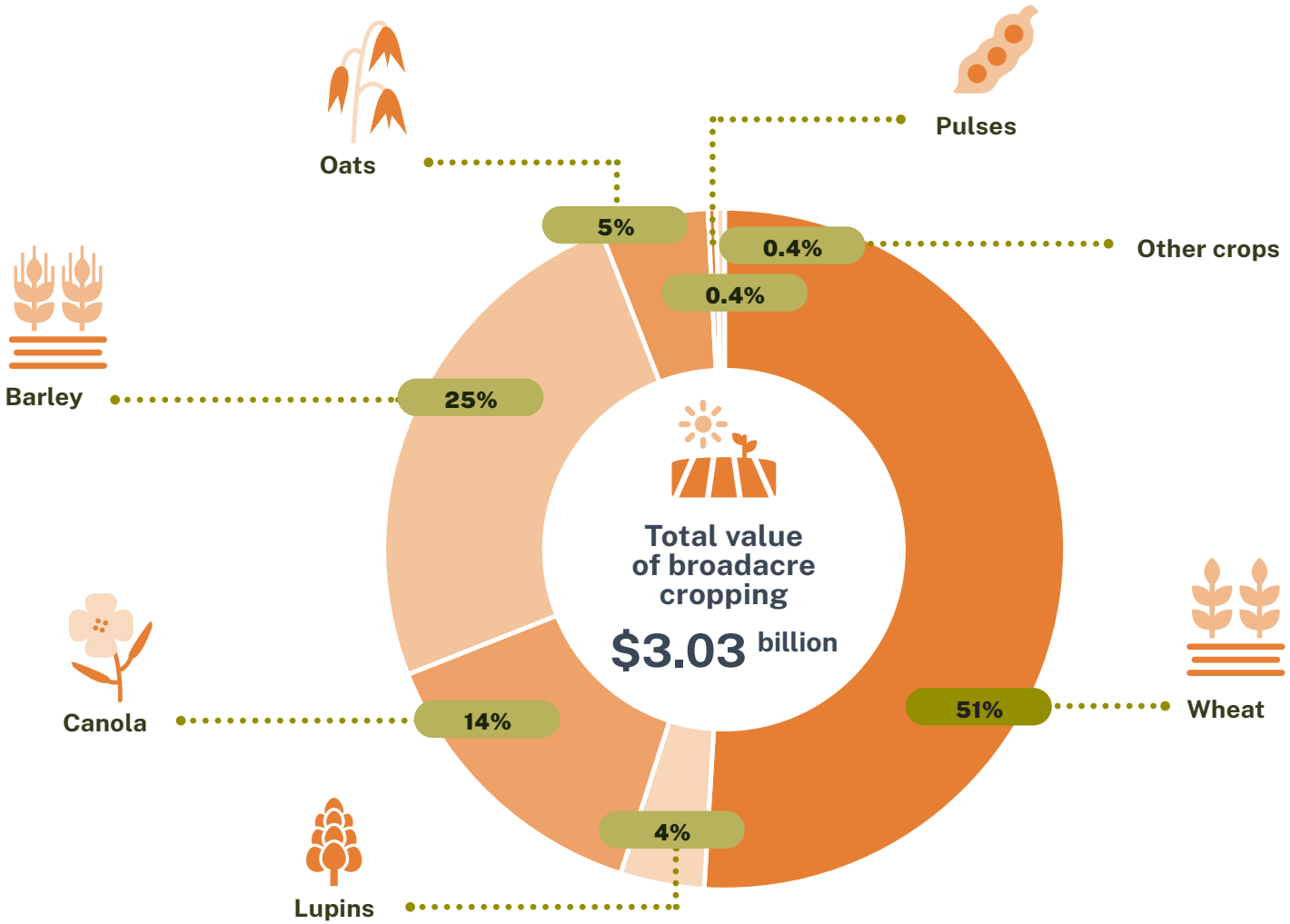
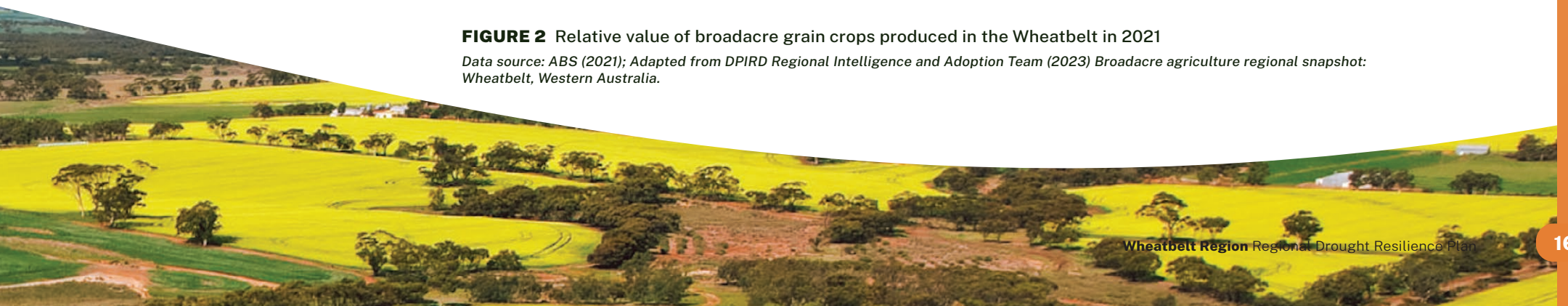


FIGURE 2 Relative value of broadacre grain crops produced in the Wheatbelt in 2021

Data source: ABS (2021); Adapted from DPIRD Regional Intelligence and Adoption Team (2023) Broadacre agriculture regional snapshot: Wheatbelt, Western Australia.



Wheatbelt — livestock industries

Livestock enterprises account for about 20% of the annual production value in the Wheatbelt (Figure 3).

Sheep for wool and meat generate almost 70% of the livestock production value in the Wheatbelt. Most of the region's sheep and cattle industry rely almost exclusively on rain-fed farm dams for water supply.

WA manages about 20% (~12 million) of the national sheep flock and the Wheatbelt has the highest sheep density in WA — about 6 million sheep.



Image courtesy: Megan Hele

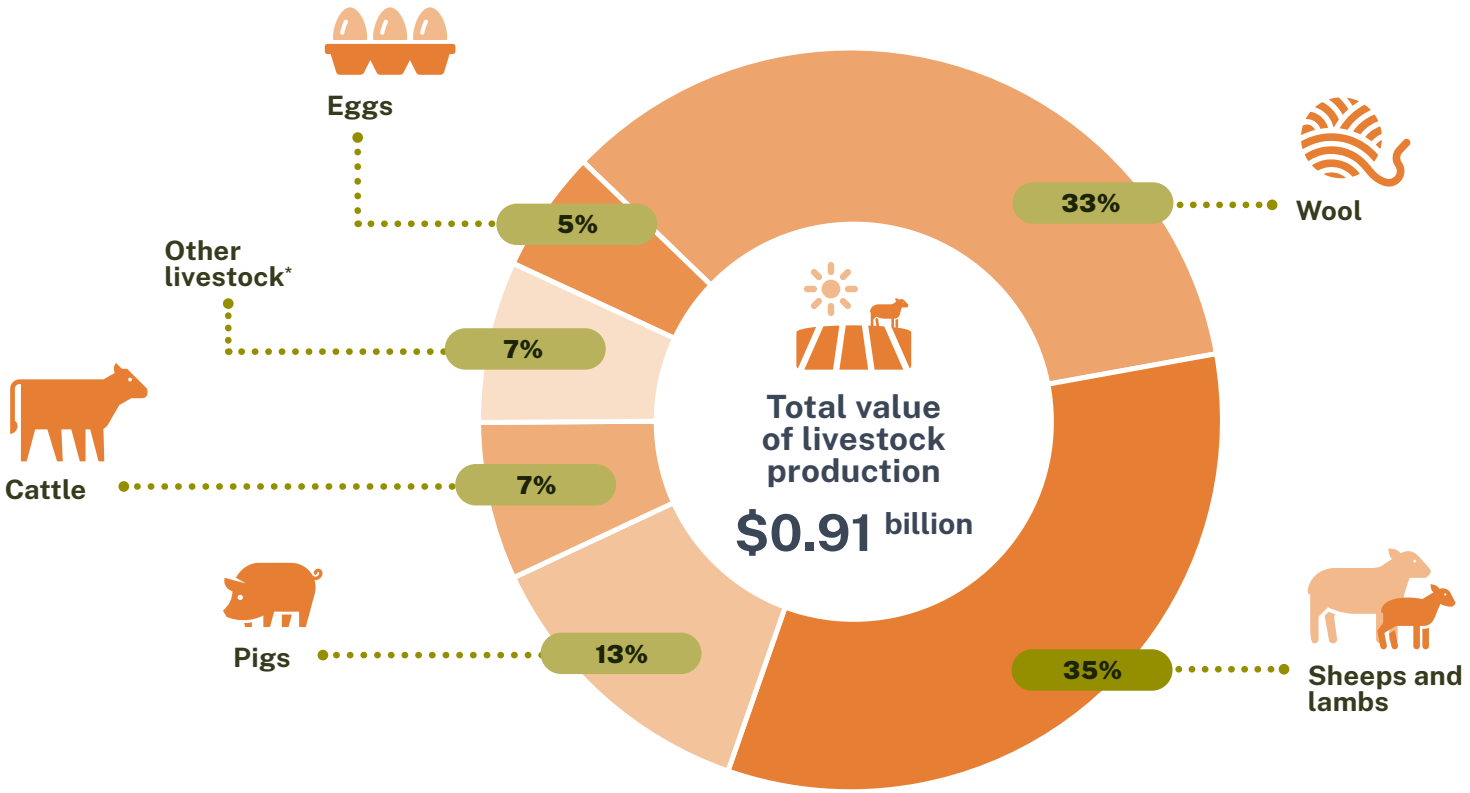
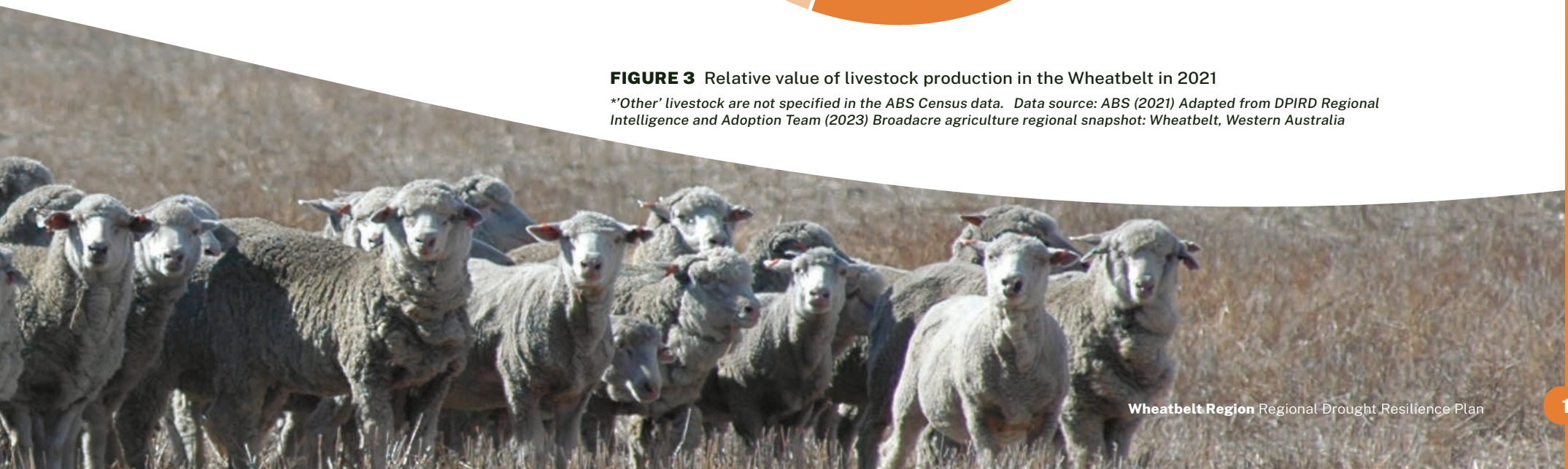


FIGURE 3 Relative value of livestock production in the Wheatbelt in 2021

**'Other' livestock are not specified in the ABS Census data. Data source: ABS (2021) Adapted from DPIRD Regional Intelligence and Adoption Team (2023) Broadacre agriculture regional snapshot: Wheatbelt, Western Australia*



The Wheatbelt's intensive pig and chicken industries are concentrated in the Central Coast sub-region, which manages about a fifth of WA's pig and chicken meat numbers and produces nearly 90% of WA's eggs (Figure 4).

These industries rely on fresh groundwater that is increasingly in demand from population growth and mining and renewable energy developments — water saving and recycling measures will become increasingly important as the climate dries.

The Wheatbelt's Central Coast sub-region is responsible for nearly 90% of WA's egg production.



FIGURE 4 Proportion of WA's intensive livestock production generated in the Central Coast sub-region (Gingin and Dandaragan shires)

**A further 32% of WA pigs are in the Wheatbelt South (Narrogin/Wagin). Data source: ABS (2021)*



Wheatbelt — horticulture industries

Commercial vegetable and fruit production in the Wheatbelt is irrigated from bores and farm dams licensed to use an annual maximum volume of water extraction.

The Wheatbelt generates about 15% of WA's annual horticultural value (Figure 5) — predominantly in the Central Coast sub-region (Gingin and Dandaragan) (Figure 6) with a smaller amount produced near Moora in the Central Midlands sub-region.

Wheatbelt horticultural industries rely solely on fresh groundwater, which is increasingly in demand from growing populations north of Perth, and mining and renewable energy developments.

Water use efficiency measures in the horticultural industry will become increasingly important as the climate dries.

Image courtesy: DPIRD



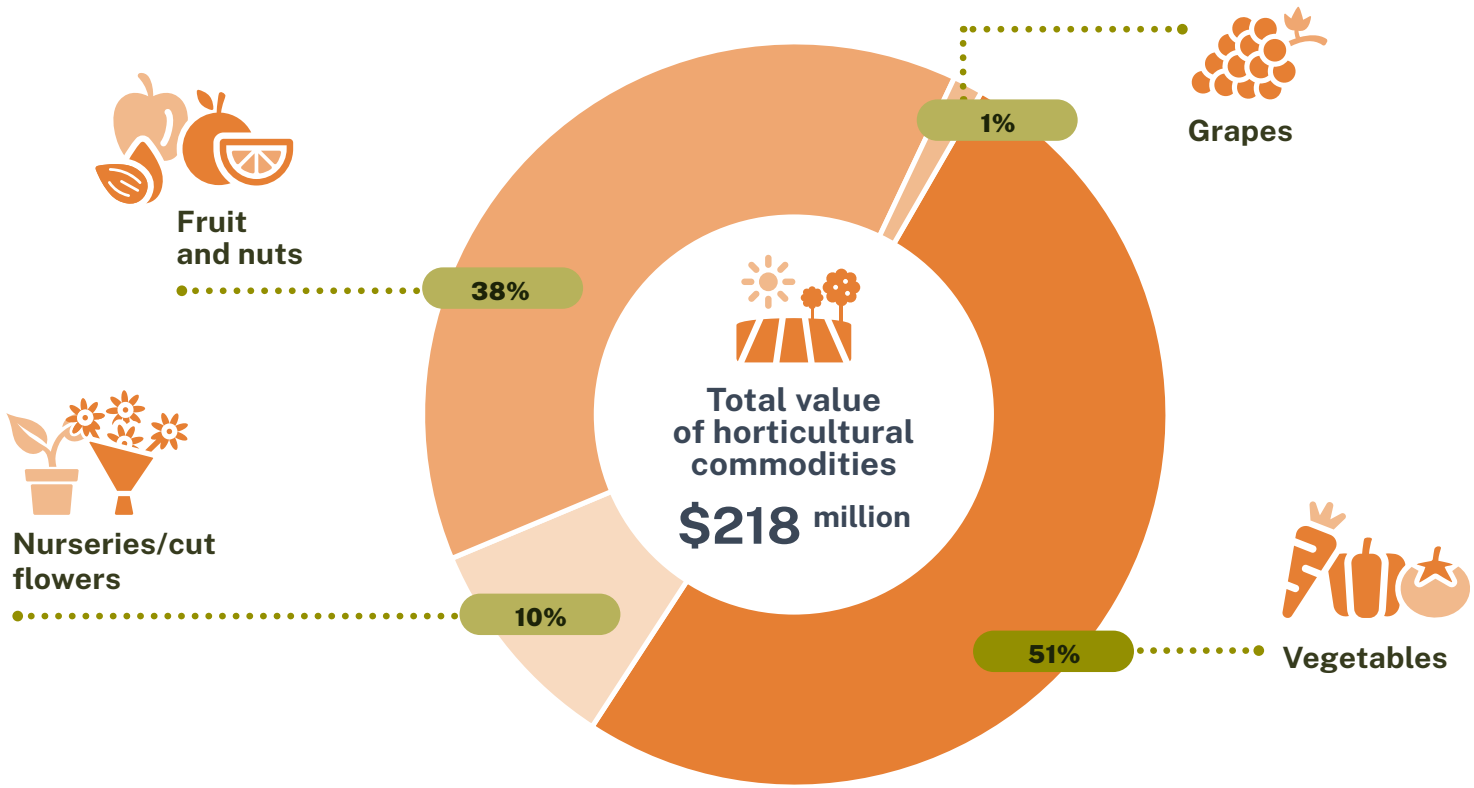
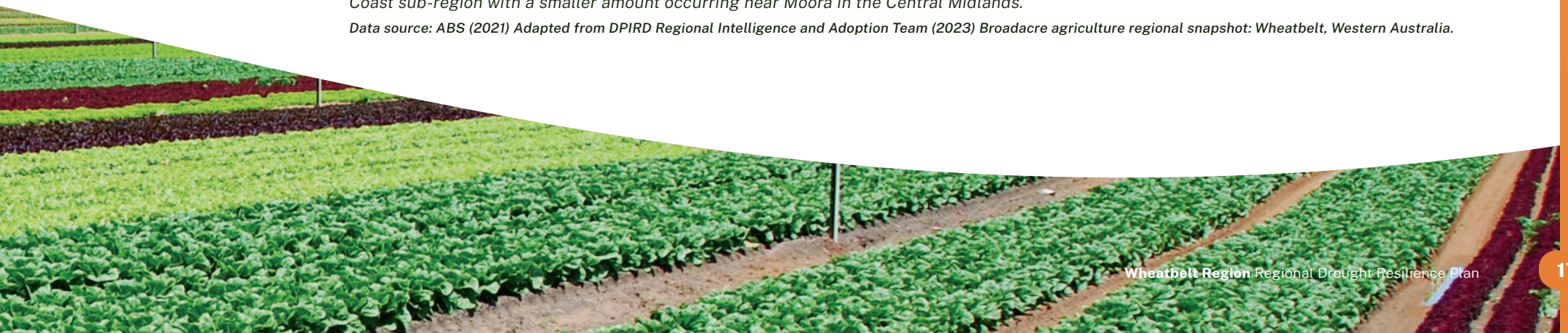
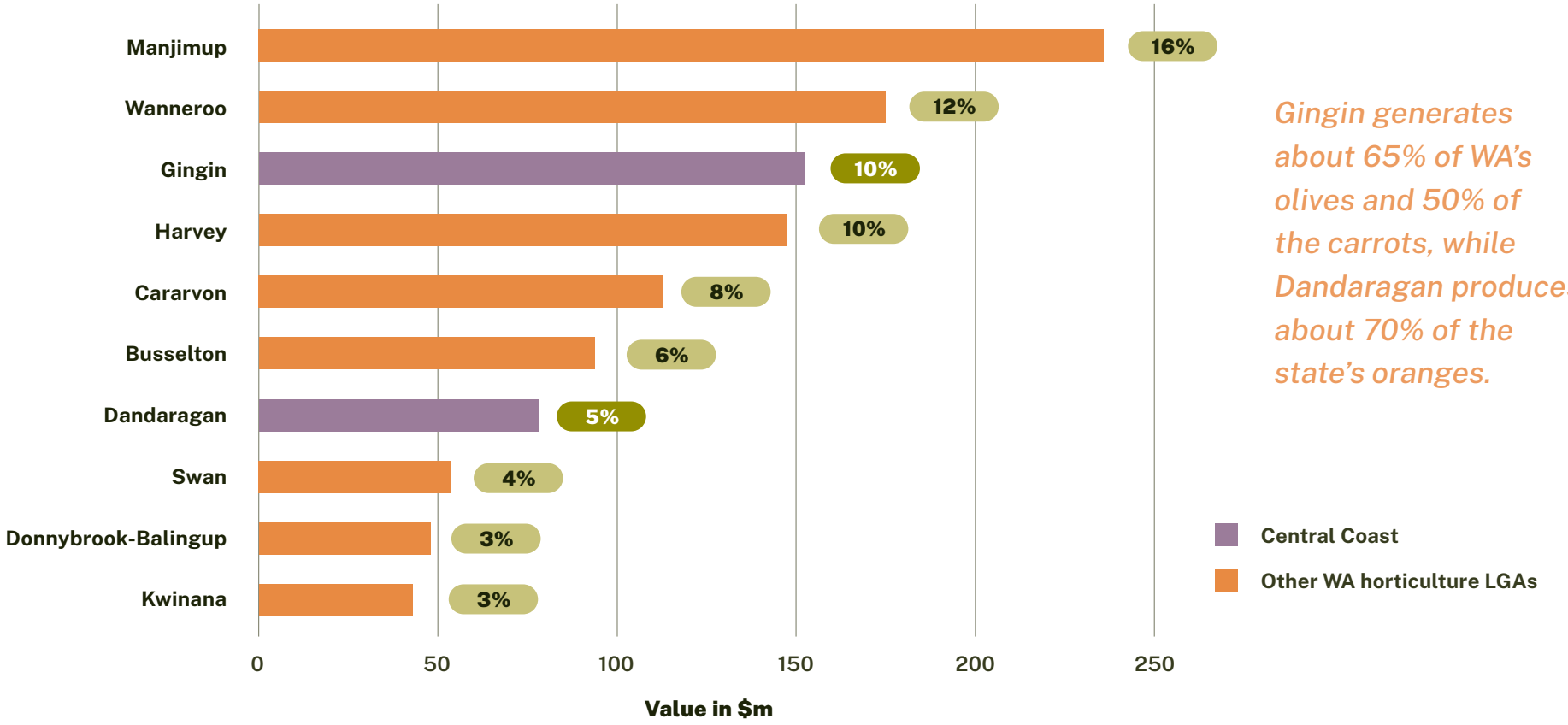


FIGURE 5 Relative value of horticultural production in the Wheatbelt (2021). *Note: most horticultural production occurs in the Central Coast sub-region with a smaller amount occurring near Moora in the Central Midlands.*

Data source: ABS (2021) Adapted from DPIRD Regional Intelligence and Adoption Team (2023) Broadacre agriculture regional snapshot: Wheatbelt, Western Australia.



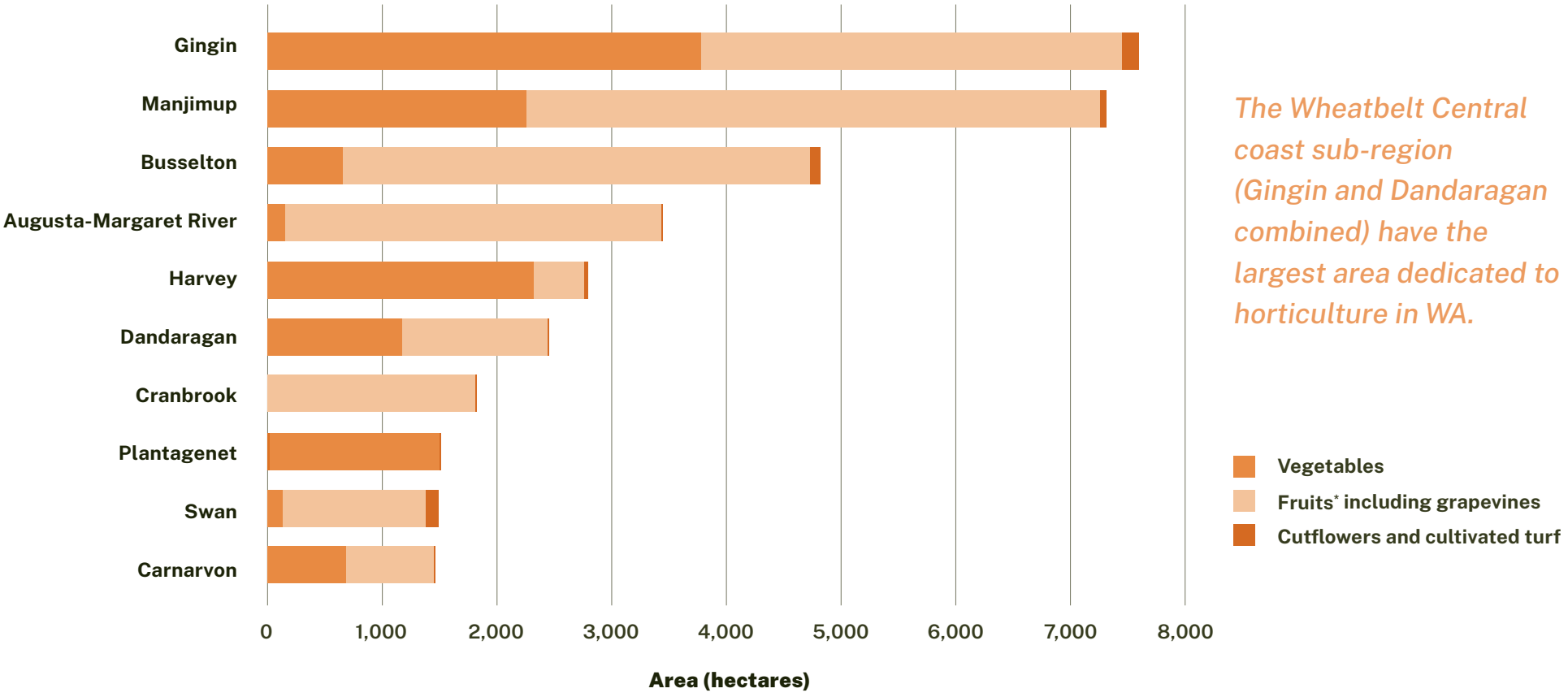


Gingin generates about 65% of WA's olives and 50% of the carrots, while Dandaragan produces about 70% of the state's oranges.

FIGURE 6 Relative horticultural value generated across the top 10 horticultural LGAs in WA (2020).
Note: Gingin and Dandaragan (Wheatbelt Central Coast sub-region) generate 15% of WA's annual horticultural value.
Data source: Department of Primary Industries and Regional Development



Image courtesy: DPIRD



The Wheatbelt Central coast sub-region (Gingin and Dandaragan combined) have the largest area dedicated to horticulture in WA.

FIGURE 7 Area dedicated to horticultural production across the top 10 WA horticultural LGAs.

** Strawberries are included under vegetables. Data source: Department of Primary Industries and Regional Development*



Action required

- **Communicate the main findings of the Wheatbelt Drought Resilience Plan** across government agencies and Wheatbelt industries to raise awareness of emerging water supply challenges across the region and the need for strategic water planning at a local, sub-regional and regional levels
- **Encourage locally-relevant R&D** that tackles production, business and infrastructure issues specific to Wheatbelt primary industries — especially those related to water and drought resilience

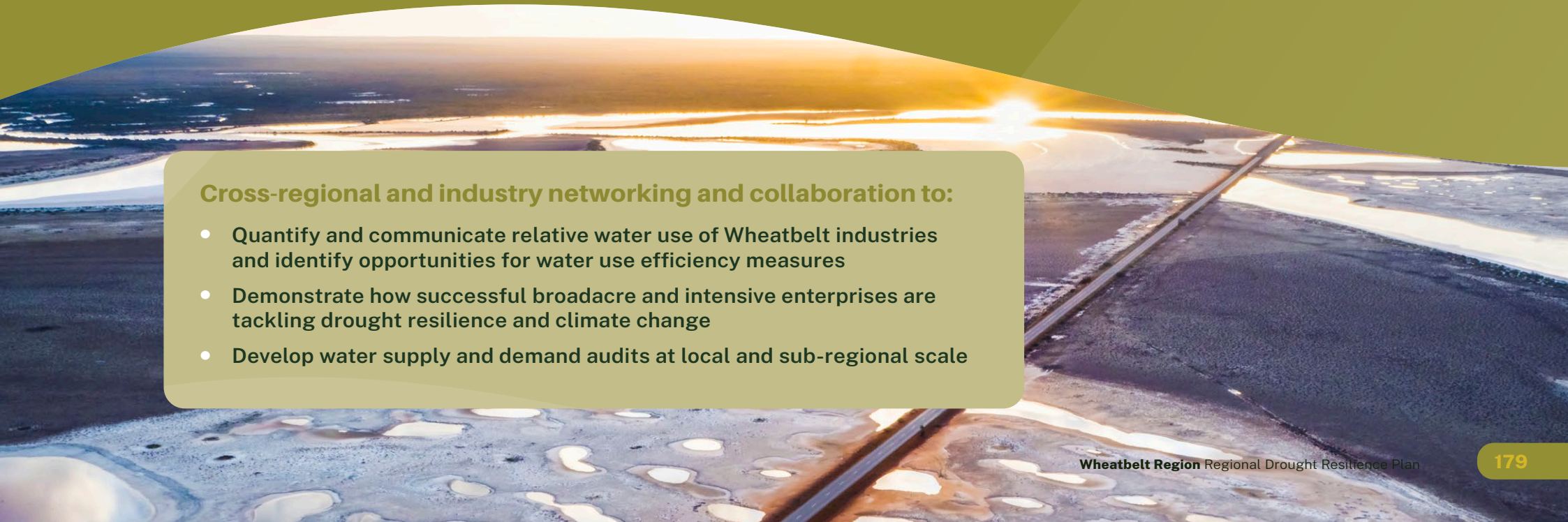
For details on each of the actions above see *Implementing the Plan* in Section 10 of this report.



Image courtesy: Megan Hele

7. Primary industries — building drought resilience

Embedding profitable water use efficiency measures at the heart of rainfed and intensive crop and livestock industries across the Wheatbelt



Cross-regional and industry networking and collaboration to:

- Quantify and communicate relative water use of Wheatbelt industries and identify opportunities for water use efficiency measures
- Demonstrate how successful broadacre and intensive enterprises are tackling drought resilience and climate change
- Develop water supply and demand audits at local and sub-regional scale



Primary industries drought resilience at a glance:

- **The Wheatbelt's largest industry — broadacre agriculture** has adapted extremely well to climate change but the gap between potential and realised grain yield is closing and seasons and on-farm water supplies are becoming more variable
- **Optimising the profitable conversion of rainfall** into grain yield underpins production and business success in rainfed cropping enterprises — especially in low rainfall areas and drought years
- **Water use efficiency in horticultural enterprises and intensive livestock operations** will become increasingly important as the climate dries and competition for groundwater grows between mining and renewable developments and rising populations in the Central Coast sub-region

Implementation plan themes covered in this section:



Embedding resilience thinking | Securing the region's water future | Building capacity of businesses and communities | Growing a diverse and resilient economy | Strengthening agricultural resilience and innovation | Restoring and valuing natural environment

Introduction

Water use efficiency lies at the heart of successful primary industries in the Wheatbelt.

Drought resilient primary industries are underpinned by:

- High water use efficiency
- Best practice agronomy and livestock management
- High equity
- Strong financial and risk management
- Economies of scale (broadacre agriculture, horticulture and livestock)
- High productivity per unit of arable land (horticulture enterprises)

This section outlines the characteristics of successful primary industries and the action needed to lift drought resilience across Wheatbelt horticultural and broadacre enterprises.

"A drought resilient Wheatbelt is one where farm businesses have the financial capacity to invest in their businesses and their communities, year on year."

Wheatbelt RDRP consultancy feedback



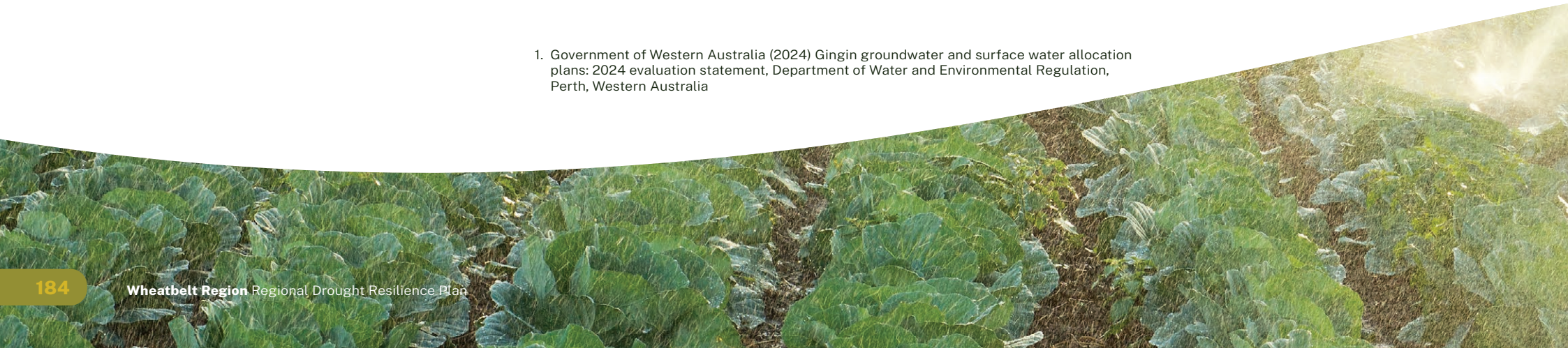
Building drought resilience — horticulture

Significant opportunity exists for improved water use efficiency in Wheatbelt horticultural enterprises.

The Central Coast sub-region accounts for nearly three quarters of the Wheatbelt's annual water use with horticulture using 75% of the sub-region's annual 113.5 GL (see Section 5 *Wheatbelt Water Demand*). The Leederville–Parmelia aquifer running underneath the Wheatbelt horticultural areas of Gingin to Dandaragan is now fully allocated and licence trading rules were updated in 2024 to further protect aquifer levels and the groundwater dependent ecosystems they support.[1]

A fast-growing Central Coast population (15.4% in the past decade) and increasing groundwater competition from mining and renewables developments coupled with declining rainfall, groundwater recharge and streamflow, underpins the need for strategic planning and water audits in this sub-region to better understand current and future water needs from industry developments, horticulture, and housing.

1. Government of Western Australia (2024) Gingin groundwater and surface water allocation plans: 2024 evaluation statement, Department of Water and Environmental Regulation, Perth, Western Australia



Along with water use, there is also considerable scope to lift drought resilience through improvements in productivity across Wheatbelt horticultural businesses. The 2023 Planfarm WA horticultural benchmarks (to which growers in the Wheatbelt contributed) indicate that horticultural businesses across the state are facing an unsustainable operating environment and are currently using a high risk business model.

Businesses in the highest performing benchmarking cohort were characterised by:

- **Productivity:** conversion of a high proportion of arable land to income — with this metric outweighing crop type, scale and location.
- **Strong supply agreements:** strong relationships and contracts with buyers outweighed crop type, scale and location.

The 2023 Planfarm data indicated that:

- operating expenses of the average business had increased by nearly a third (28%) between 2019–2023
- operating profits had declined from 22% to 16% since 2019 — due predominantly to inflationary pressures, high interest rates and increasing labour costs
- return on capital dropped by half — from 6.3% to 3% (with this ratio being impacted by rising land asset values)

Monitoring and improving water use efficiency and building business and production capacity within the horticultural industry will become increasingly important as the climate dries and water competition between industries and peri-urban population growth increases.



Building drought resilience — broadacre industries

Despite a 20% drop in rainfall across south-west WA since the 1970s grain yields have continued to increase (Figure 1).

Improved genetics, agronomy, machinery and economies of scale mean growers now achieve returns from seasons that would have been loss makers decades ago. However, yield increases in the 2000s have been smaller and more variable than previous decades — especially in the northern and eastern areas of the wheatbelt.

Kingwell et al (2013)[1] found that nearly two-thirds of a diverse set of 249 farm businesses across south-west WA (which includes the Wheatbelt) were classed as 'growing' or 'strong' despite a decade (2002–2011) of challenging weather years (see Figure 1).

Farm profitability improved over the study period despite no underlying improvement in terms of trade.

The authors point out that this profitability was achieved through better use of existing technologies, including those that offered economies of scale and a switch to more cropping (wheat) in favour of livestock (sheep).

1. Kingwell, R, Anderton, L, Islam, N, Xayavong, V, Wardell-Johnson, A, Feldman, D & Speijers, J 2013, Broadacre farmers adapting to a changing climate, National Climate Change Adaptation Research Facility, Gold Coast, 171 pp.



Image courtesy: Megan Hele

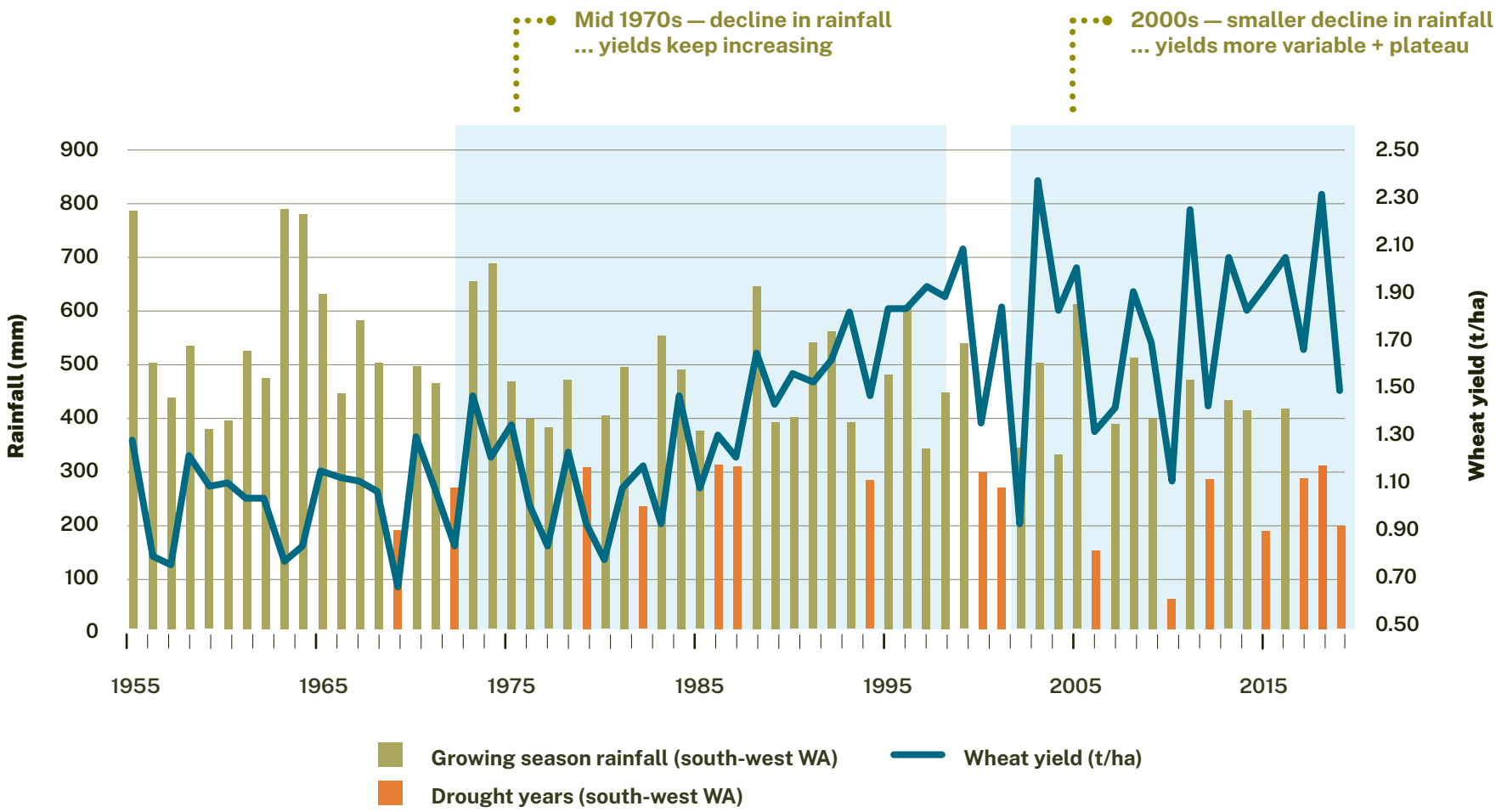


FIGURE 1 Wheat yields vs growing season rainfall in south-west WA (1955-2019). *Note: wheat yields doubled between 1970 and 1999 despite five 'drought' years and a drop in average growing season rainfall. However, since 2000 yield increases have been smaller and are starting to plateau.*

Data source: Department of Primary Industries and Regional Development

"Farmers whose businesses grew strongly over the study period also displayed (on average) superior management capabilities and choices in many areas of farm management and were often more connected to their local community and achieved greater work-life balance."

Kingwell et al (2013)[2]

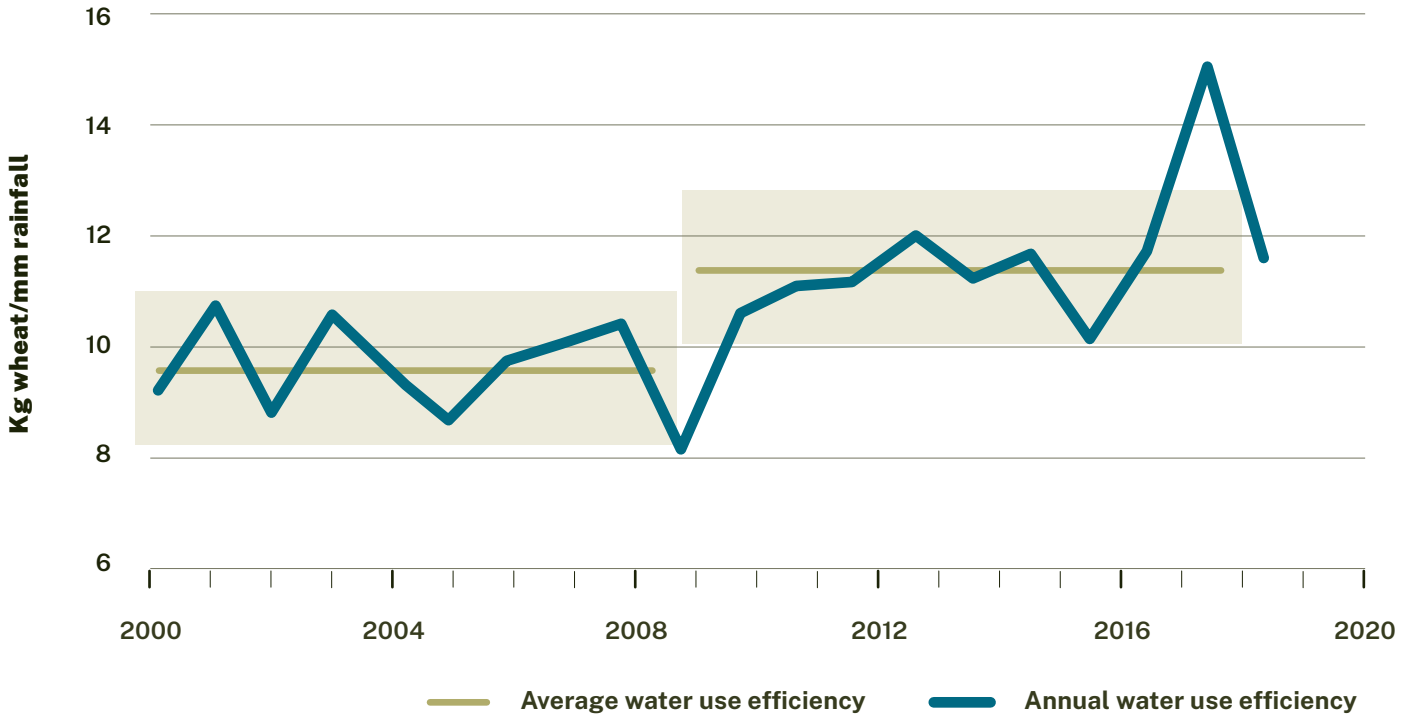
In work commissioned by the Wheatbelt Development Commission for the Wheatbelt RDRP, farm consultancy group Planfarm discuss the period from 2010 to 2014 (which delivered three seasons of drought or below-average rainfall across much of the Wheatbelt), and the 2018 and 2019 seasons for which frost was an issue in some areas and low rainfall in others. During this period, farms were also impacted by rising input costs and falling commodity prices. Despite the difficult seasons, the best performing Planfarm clients improved their productivity (water use efficiency) by about two kilograms of wheat per millimetre of rainfall (Figure 2).

In a broader benchmark survey of Wheatbelt farms between 2018–2024, 75% of Planfarm clients were rated as having 'high profit-high equity' and only 0.5% were rated 'high profit-low equity'. About a fifth (21%) of those surveyed were rated as 'low profit-high equity' and 3.5% were in a vulnerable 'low profit-low equity' position (Figure 3). Interestingly, most of the poorer performing farms were in medium to high rainfall zones, and not low rainfall areas.

2. Kingwell, R, Anderton, L, Islam, N, Xayavong, V, Wardell-Johnson, A, Feldman, D & Speijers, J 2013, Broadacre farmers adapting to a changing climate, National Climate Change Adaptation Research Facility, Gold Coast, 171 pp.



Image courtesy: Megan Hele



Despite several poor seasons over the past 20 years, average WUE increased from about 9 kg wheat per millimetre of rainfall in 2000–2008 to 11 kg wheat per millimetre of rainfall in 2009–2019.

FIGURE 2 Water use efficiency (WUE) of wheat production for Planfarm benchmark clients (2000–2019).

Data source: Planfarm



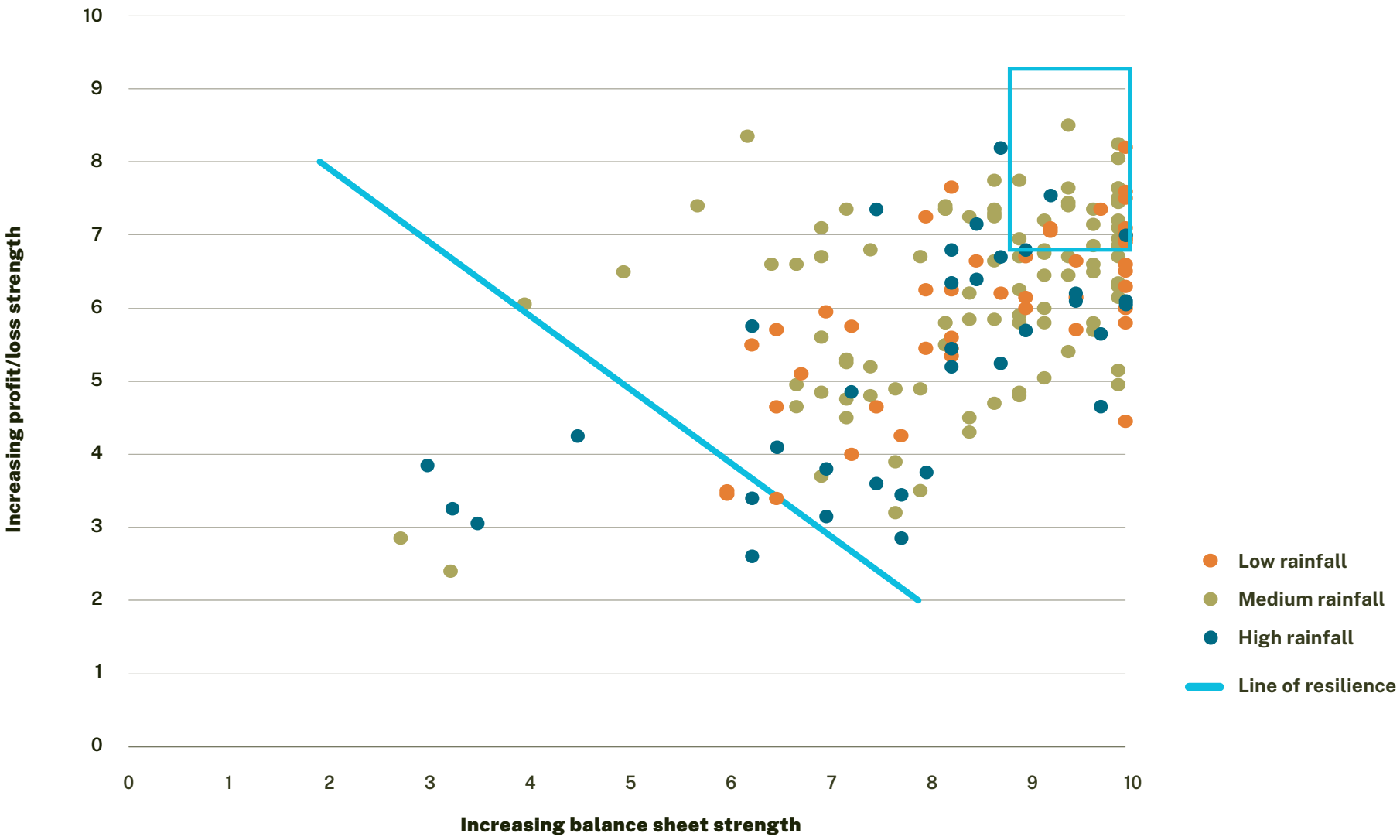


FIGURE 3 Financial performance of Planfarm benchmarking clients across a range of rainfall zones. *Note: more than 75% of clients were classed as operating with high profit and high equity. The top 25% of clients are identified within the boxed section.*

Data source: adapted from Planfarm unpublished report for the Wheatbelt Development Commission



The top 25% of Planfarm clients in the north-eastern wheatbelt (which includes the Central East sub-region) achieved 15.1% return on capital in the decade 2009–2019 compared with an average for the benchmarked region of 9.1%.

Image courtesy: Angie Roe, Austockphoto

The Planfarm authors determined that the best performing businesses had used their profits to improve soil condition and acquire machinery that enabled sowing time to be optimised for productivity *"Their focus is on increasing profits to acquire additional land, which has stretched their advantage beyond the bulk of the group."* The report authors conclude that while farm business equity (brought about largely through significant increases in land values over the past decade) *"has, to some degree, increased drought resilience, unprofitable businesses cannot rely on increasing asset values for resilience. It continues to be important for farm businesses to create and retain profits to manage the financial pressures of drought."*

To date, the Wheatbelt has not experienced more than two consecutive years of drought across the entire region (Figure 4) but most climate models predict that southern Australia (and therefore the Wheatbelt) is at increased risk of drought in coming decades.[3]

Farm equity of two-thirds of 120 studied farms in the northern and eastern grain growing areas of WA (which includes part of the Wheatbelt's Central East sub-region) declined following the consecutive low rainfall years of 2006 and 2007 however, more than half of the farms had more than 80% equity to start with so were able to absorb the poor seasons. Farms that remained resilient, despite the serious droughts were those *"that cropped more than 50% of their farm area, were prudent in their expenditure, maintained some enterprise diversity and often generated wheat yields in each year that were near the yield potential for that year"*.[4]

In another study investigating characteristics of farm business success during dry seasons, Kingwell et al (2013)[5] state that *'Growing and strong farms, when compared to less secure or secure farms have, on average, made greater use of leasing, contractors, superannuation funds, succession planning, Farm Management Deposits (FMDs), and off-farm assets. They also, on average, adopt and make greater use of farm business software, marketing strategies, decision support tools, precision technology, electronic paddock recording and GPS technology'.*

3. Grose, M. R., Narsey, S., Delage, F. P., Dowdy, A. J., Bador, M., Boschat, G., et al. (2020). Insights from CMIP6 for Australia's future climate. *Earth's Future*, 8
4. Lawes, R., and Kingwell, R. (2012) A longitudinal examination of business performance indicators for drought-affected farms, Agricultural Systems, Volume 106, Issue 1
5. Kingwell, R, Anderton, L, Islam, N, Xayavong, V, Wardell-Johnson, A, Feldman, D & Speijers, J 2013, Broadacre farmers adapting to a changing climate, National Climate Change Adaptation Research Facility, Gold Coast, 171 pp



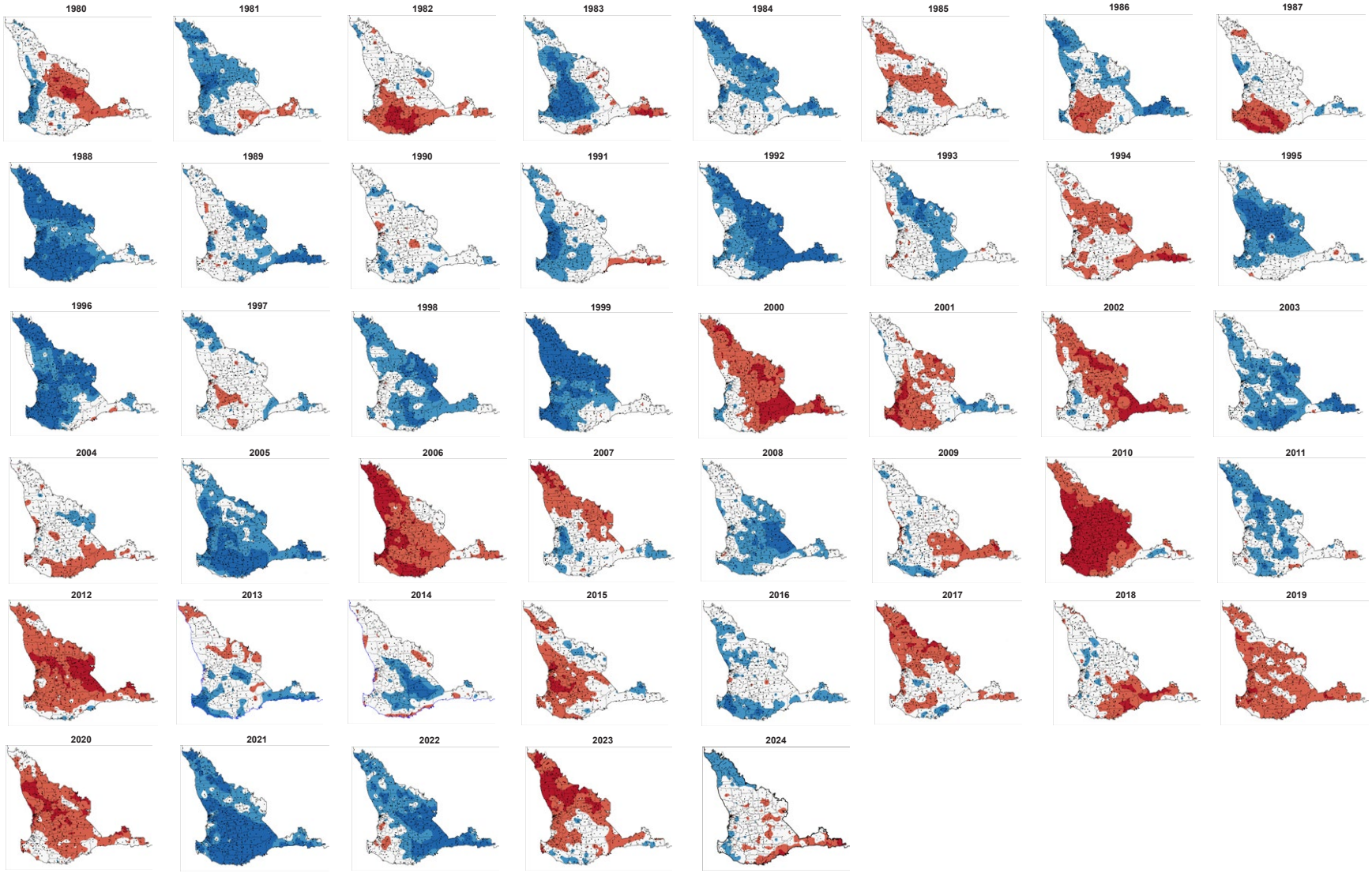


FIGURE 4 January to December annual rainfall deciles for the South West Land Division (including the Wheatbelt) between 1975 and 2024.
Note: The Wheatbelt is yet to experience more than two consecutive drought years across the whole region.

Data source: Department of Primary Industries and Regional Development



In the very low rainfall seasons of 2018 and 2019, many southern wheatbelt properties almost ran out of water, causing a record destocking of sheep from the region (Figure 5). Without the rain that fell in 2021 (see Figure 4) many farmers would have been forced to completely destock their properties.

Building drought resilience in the broadacre livestock sector will require more efficient dams and scenario planning to ensure farms are self-sufficient in water during dry seasons.

To date, broadacre farms across the Wheatbelt have adapted well to a drying climate — due to adoption of new genetics, improved crop and livestock management, amelioration of soil constraints, economies of scale and machinery and technology advances.

However, the gap between realised and potential grain yields is beginning to close (Figure 6) and new farming technologies and systems will be required to lift yield potential and capture and store more water for livestock as the climate continues to dry and seasons become more variable.

Image courtesy: Megan Hele

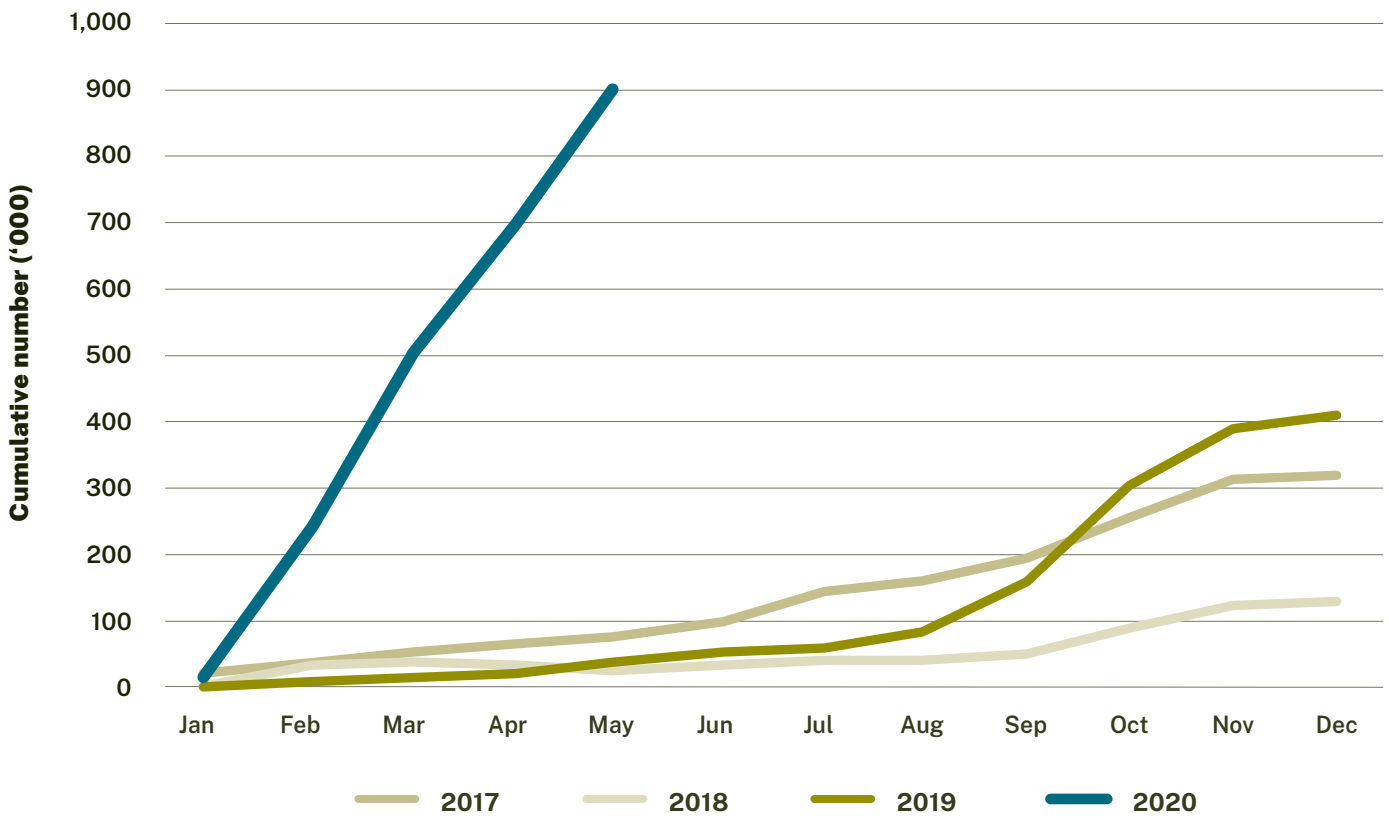


FIGURE 5 Cumulative number of sheep leaving WA for the eastern states between 2017 and 2020.
Data source: Department of Primary Industries and Regions

A record number of sheep were exported east from WA in 2020 due to the cumulative impacts of dry seasons in 2018 and 2019 on farm water supplies.

Image courtesy: Angie Roe, Austockphoto

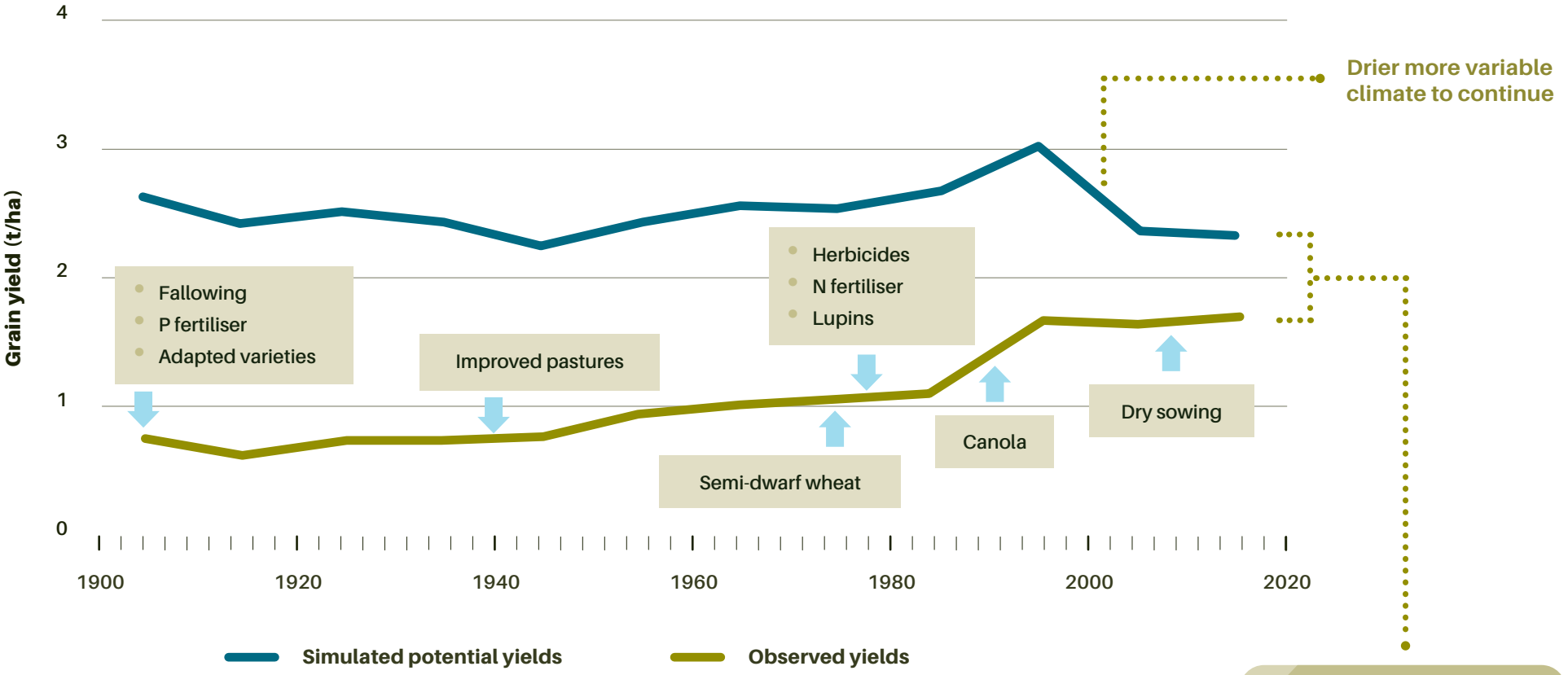


FIGURE 6 Impact of historical advances in farming systems on realised yields in WA cropping systems versus simulated potential yields over the same period. *Note: potential yields are starting to fall in response to a drier and more variable climate and the gap between realised and potential yields is closing. New technologies and farming systems and perhaps transformational change in some areas will be needed to lift potential yields as the climate continues to change.*

Data source: Andrew Fletcher et al (2020) Has historic climate change affected the spatial distribution of water-limited wheat yield across Western Australia?. Climatic Change. 159(3):347-364.

Farmanco farm management consultant Rob Sands characterises top-performing agricultural businesses as:

- Understanding the profit drivers of their farming system that increase water use efficiency.
- Being uncompromising in achieving the right timing, rate, and product for every situation.
- Achieving each farming operation more quickly, more efficiently, and at a lower cost.
- Keeping a tight control on all costs.
- Buying and leasing more land based on performance and not on rainfall alone.

How do the top 25% of Wheatbelt farmers in the low rainfall zone manage seasonal and market variability? Can their approach and experience be transferred to higher rainfall areas in the Wheatbelt facing less rainfall and more variable seasons as the climate continues to dry?



Image courtesy: Ben White

Action required

- **Apply a regional and sub-regional lens to climate R&D** to ensure research programs and outputs are matched to the specific needs of Wheatbelt agricultural industries
- **Undertake local and sub-regional water needs analyses** to quantify industry and community water demands and ensure water is being used efficiently and productively
- **Support cross-regional networks** through grower tours, workshops, and events to build drought resilience in medium-high rainfall areas facing drier, more variable seasons as the climate continues to change
- **Develop a horticulture growth plan focused on water use efficiency and business success** to increase productivity per unit of land and water input

For details on each of the actions above see *Implementing the Plan* in Section 10 of this report.



8. Community resilience

Building local capacity and regional collaborations to drive positive change across Wheabelt towns

Developing a tailored response to community resilience that:

- Addresses the specific vulnerabilities of Wheatbelt shires
- Identifies ways to better link and enhance services, economies, infrastructure, and environmental assets within and across sub-regions




COMMUNITY
KULIN
KULIN COMMUNITY BANK

Community resilience at a glance:

- **Drivers of community resilience in Wheatbelt towns** are varied and complex
- **Maintenance of green spaces** over summer and during dry seasons is critical to community cohesion
- **The Wheatbelt has the highest volunteer workforce** in WA but volunteer fatigue is growing
- **Capacity building and strategic planning needed** at local government level and amongst community groups to bolster drought resilience and support volunteer workforce

Implementation plan themes covered in this section:



Embedding resilience thinking



Securing the region's water future



Building capacity of businesses and communities

Growing a diverse and resilient economy

Strengthening agricultural resilience and innovation

Restoring and valuing natural environment

Introduction

Resilience is complex and often includes unobservable attributes that contribute to its advancement or impede its progress.

Community resilience (which includes drought resilience) is underpinned by:

- Social connection
- Strong leadership
- Self reliance
- Capacity to adapt to change
- Capacity to learn from experience

"Despite having one of the strongest economies in Western Australia with a gross regional product of $7.9 billion in 2022 (18% growth since 2018), low unemployment (3.7%) and a population growth of 2% since 2018, more than half the Wheatbelt population lives in areas with socio-economic indexes (SEIFA) related to the highest relative disadvantage; compared to 15% for the WA state average."

Wheatbelt District Leadership Group Community Needs Assessment (2024)[1]

1. The Wheatbelt Community Needs Assessment is available upon request at: wbhealthpromotion@health.wa.gov.au



Image courtesy: Kulin Bush Races

Wheatbelt socio-economic status

Socio-economic determinants of community resilience are varied and complex and it is beyond the scope of this report to explore in detail how they play out across the Wheatbelt.[2]

Drought and the effects of climate change will (and do) exacerbate the vulnerabilities of Wheatbelt communities through their impacts on water supplies, maintenance of green spaces for sport and recreation, mental health, excessive heat and extreme weather events, and the economic viability of the region's major industry — broadacre agriculture.[3]

Figure 1 outlines the 2021 Australian Bureau of Statistics socio-economic (SEIFA) scores of all 42 Wheatbelt LGAs (900-1050) and compares these with the Wheatbelt (980) and state (1020) averages.

About 55% of the 42 Wheatbelt LGAs fall below the WA average for socio-economic score while about 20% sit at or above the state average.

2. The SWWA Drought Hub has recently been funded to lead a WA regional (including the Wheatbelt) component of the national project '*Early Insights for More Resilient Communities*' (2025-2026). The project aims to improve availability of relevant data so that rural, remote and regional communities can track how their resilience is changing over time.

3. Lester L., Flatau P., & Kyron M. (2022). Understanding the social impact of drought. Perth: The University of Western Australia



Image courtesy: Shire of Williams

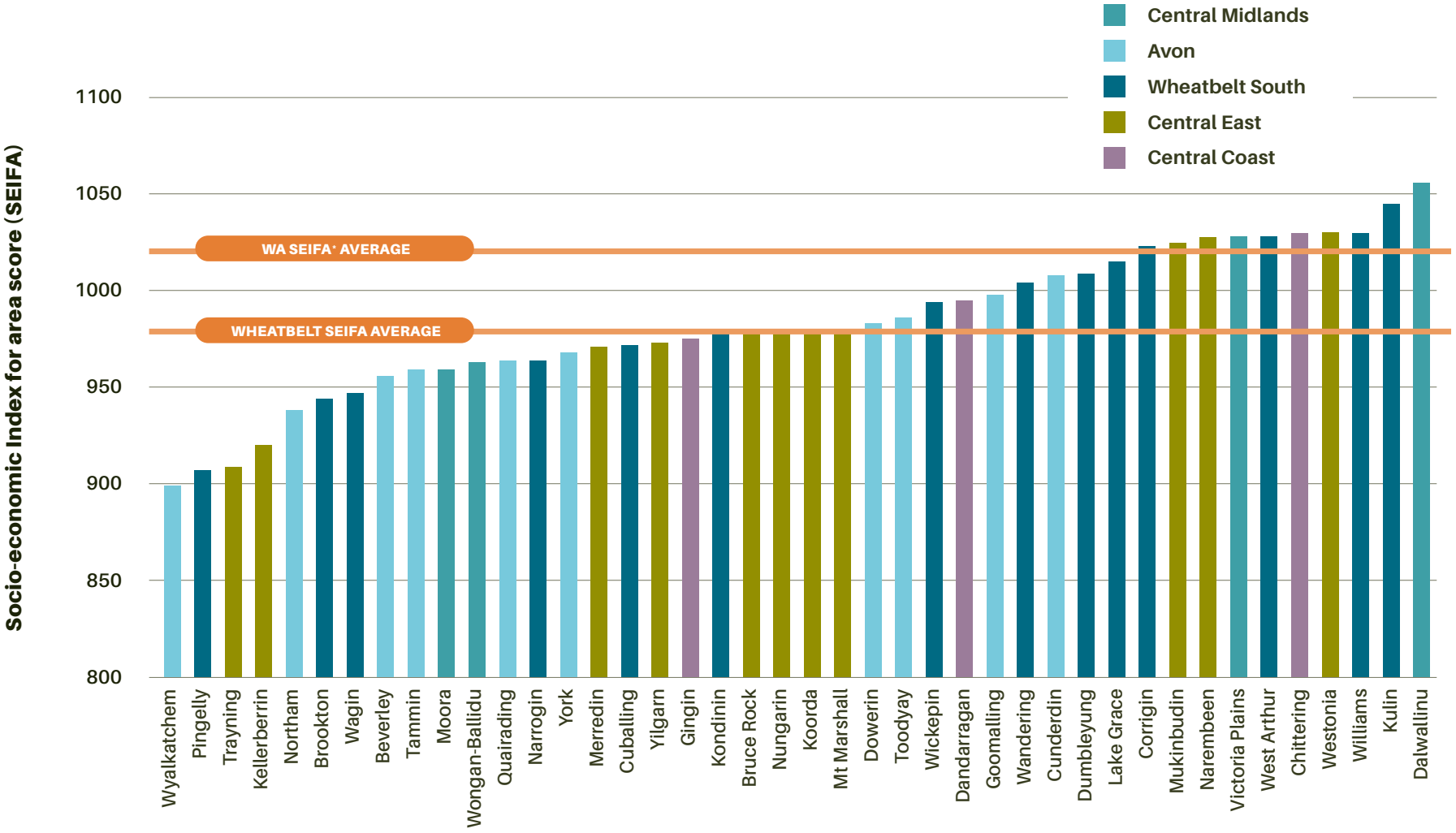


FIGURE 1 Socio-economic scores for each of the Wheatbelt's 42 local government authorities and their relationship to state and Wheatbelt averages

** SEIFA = Socio-Economic Index For Area. Data source: ABS 2021*

Drivers of community drought resilience

Understanding and quantifying the factors that drive drought and climate change resilience across the Wheatbelt is critical to developing policies and procedures that safeguard the region's capacity to adapt to a drier, more variable climate.

At a farm-level, drought resilience and climate change adaptation has, and is, receiving considerable focus — through federal, state and local research, development and extension. However, at the local government level there has been significantly less work done to understand and quantify the factors driving drought and climate change vulnerability and resilience in local communities.

Consultation with local governments as part of the Wheatbelt RDRP process has revealed a significant and comprehensive issue at the LGA level in terms of water for green spaces during dry years and concern in some LGAs around the growing competition for water between towns and renewable energy and mining developments.

Green spaces hold significant value in Wheatbelt communities — especially those associated with sport and recreation, where communities gather socially to connect and support one another. Community participation in organised sport and recreation contributes to what is known as 'social capital' — the social fabric, or glue that ties members together in a given locality[4]. Maintaining green ovals and sporting grounds is seen as a priority for many Wheatbelt communities — even during drought when the costs of using scheme water can add tens of thousands of dollars to local council expenditure.

"Last year we had to switch to scheme water (to water the town oval) in early April and it cost us $20,000. Other shires without recycled wastewater systems are paying $50,000 to $100,000 or more each year to irrigate their ovals."

Peter Stubbs, CEO, Williams Shire

4. Cox, E., & Australian Broadcasting Corporation. (1995). A truly civil society / Eva Cox. ABC Books.

"Scheme water is expensive but we are willing to pay as having access to a quality sports oval during the winter sports season is non-negotiable."

Gavin Treasure, CEO, Dumbleyung Shire

"Without the water there is no oval, no sport. With no sport, people have to travel. And when you have water, people stay. That's why it's important."

Dave Williams, Desalination Project Manager, Dumbleyung Shire



Image courtesy: Shire of Dumleyung



Carrying out LGA-level audits of water supply and demand would provide the baseline data needed for local communities to plan for their water needs into the future. However, capacity building and funding at the LGA level will be needed to achieve this — as local shires have little to no hydrological, engineering and program management expertise to carry out such assessments.

"Across the Wheatbelt we don't have a strategic outlook in terms of how our water supplies are changing — we know the climate is warmer and drier and we know it's impacting agriculture and our towns — but we are responding through very project-specific eyes. We need to take a step back and look at things across the board, at a macro strategic level, and try and come up with a plan to understand and respond to our water shortfall."

Gavin Treasure, CEO, Dumbleyung Shire

"As a small shire, we don't have the staff to develop and implement sound water strategies. We're going through the budget now and I don't even have the money I need to maintain the roads we've got. So basically whatever help is out there, we need it."

Ruth March, Operations and Assets Executive Manager, Gingin Shire



Image courtesy: Shire of Dumleyung



Image courtesy: Shire of Gingin

Case study

Ageing Wheatbelt swimming pools face uncertain future

"Community hubs, like sport and recreation centres, play an important role during trying times. Communities need safe places and spaces to gather during drought."

Wheatbelt RDRP consultancy feedback

About half of the 39 pools across the Wheatbelt have now exceeded the average 50-year lifespan for aquatic facilities. Most Wheatbelt pools are owned by local governments, which are responsible for their maintenance and replacement.

The cost of upgrading pools often exceeds the budgets of small regional councils, leading to delays or neglect of essential repairs and replacements. As a result, many Wheatbelt shires are facing significant financial strain to maintain or upgrade their pools — putting the future of these community assets at serious risk of closure.

The *State of Australian Aquatic Facilities 2025* report states that for each dollar spent on pool operations and maintenance $5.46 is returned in social value through the support of healthier, safer and more connected communities. The first of four recommendations arising from the report is to "*establish a National Public Pool Investment Program and secure sustainable, dedicated funding to upgrade, expand, and replace aging aquatic facilities*"[5].

At a ratio of one aquatic facility per 2,013 people, the Wheatbelt has a relatively high number of swimming pools compared to its population: reflecting the vast geographic spread of its 200+ communities and a strong historical investment in aquatic infrastructure across the region. Over the past



Image courtesy: Shire of Dumbleyung

5. Houston, R., Koon, W., & Scarr, J. (2025). State of Australian Aquatic Facilities 2025: Benchmarking Social, Health & Economic Value, Access Equity & Sustainability. Royal Life Saving Society — Australia, Sydney.

decade, the average water consumption per patron visit at Wheatbelt pools was 567 litres — the highest rate of any region in the state and significantly higher than the state average of 99 litres per patron visit.

Adopting water and energy-smart technologies and addressing the issues associated with aging infrastructure will be critical to ensuring local governments can continue to operate and manage their aquatic centres across the Wheatbelt. The Water Corporation's '*Waterwise Aquatic Centre Program*', which started in 2012, enables aquatic centres across Western Australia to be recognised for their commitment to water efficiency. The program includes 58 participants, 27 of these being in the Perth Metropolitan area and 31 in regional Western Australia. To date, there are only eight water wise aquatic facilities in the Wheatbelt.

In recent years, nearly $3 million in funding for Wheatbelt pool refurbishment has been made available through the state government's *Community Sport and Recreation Facilities Fund*, which remains a valuable opportunity for local governments to secure funding support for community pool upgrades. Wheatbelt local governments have also had recent success in securing funding for pools from the federal government through the *Growing Regions Program* — with the shires of Cunderdin and Dumbleyung receiving about $4.5 million between them to redevelop their aquatic facilities.

Developing an audit of Wheatbelt pools in terms of age, condition, water and power use across the region's LGAs and linking local communities with funding opportunities for pool refurbishments and efficiency upgrades would help secure these important social and health hubs across the region — especially as the climate dries and becomes hotter.

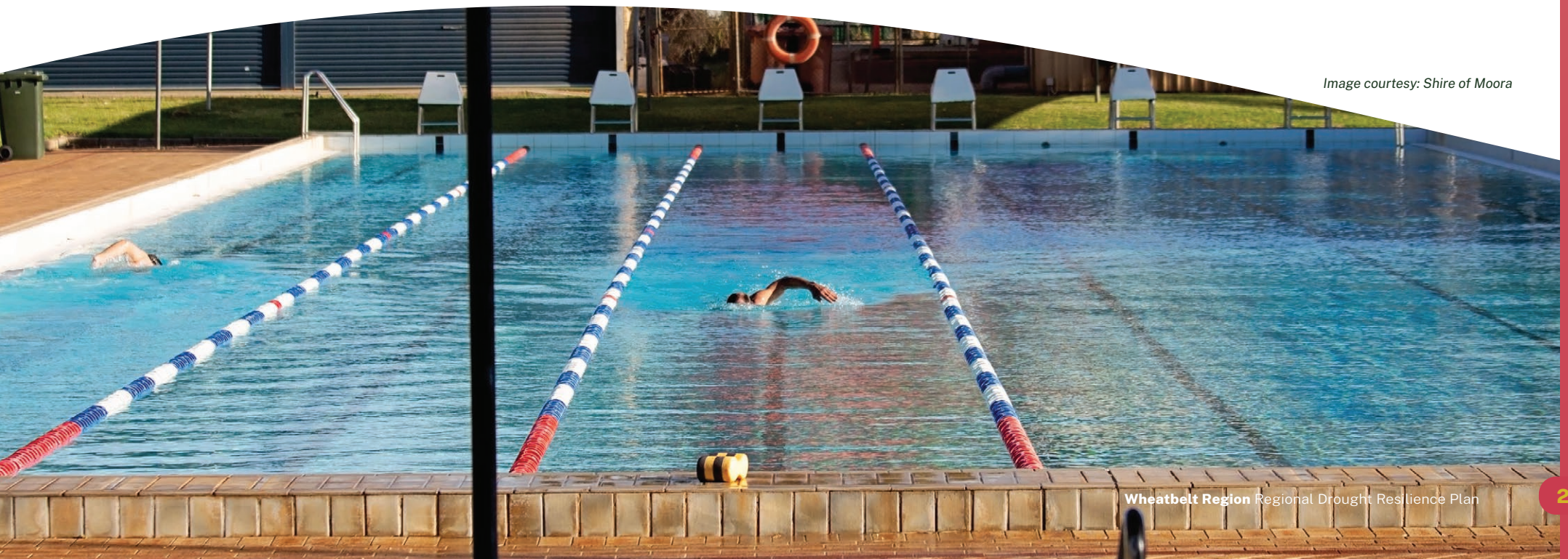


Image courtesy: Shire of Moora

What is community resilience?

Quantifying and understanding resilience are complex tasks — and it is difficult to generate a single measure of resilience to compare communities.[6]

Community resilience is best understood as a dynamic process of adaptation and recovery rather than a static outcome — it is built steadily, through coordinated action and policies and is underpinned by strong social cohesion and connectedness.

A community is considered resilient when 'members of its population are connected to one another and work together, so that they are able to function and sustain critical systems, even under stress; adapt to changes in the physical, social or economic environment; be self-reliant if external resources are limited or cut off; and learn from experience to improve itself over time'.[7]

Many inspirational examples of the Arbon et al (2016)[7] community resilience definition can be found across the Wheatbelt's communities and local government authorities (LGAs) — from individuals banding together to buy local grocery shops and pubs on behalf of their towns through to local government alliances that build agency and capacity, innovative aged care and childcare systems developed using local expertise; locally-developed wireless telecommunication systems; primary industries based on First Nation's cultural and environmental values; and the many thousands of committed, long-term volunteers underpinning the region's sporting, fire-fighting, ambulance and social clubs.

6. How. G, & Houghton, K. (2021). Reviewing Indices of Resilience and Adaptability. Canberra, The Regional Australia Institute.
7. Arbon, P., Steenkamp, M., Cornell, V., Cusack, L. & Gebbie, K. (2016). Measuring disaster resilience in communities and households: Pragmatic tools developed in Australia. International Journal of Disaster Resilience in the Built Environment. 7. 201-215.



The WA government has recently committed an additional $2.1 million (to 2028) towards the state's *Volunteering Development Services* (VDS) program, established in 2001 to '*develop the capability of individuals, community groups and organisations to respond to their communities*' needs through volunteer involvement.' Part of the VDS funding will go towards developing the *Town Team Movement* in the Wheatbelt — a WA initiative that works collaboratively with local governments to improve a place or area.

A Town Team is a group of locals — businesses, residents, landowners and community members — working together with their local government to make their town or main street more vibrant, inclusive and connected.

There are currently 179 Town Teams across WA with a dozen or so across the Wheatbelt. The North East Wheatbelt Region of Council (NEWROC) has recently partnered with the *Town Team Movement* to fund a Wheatbelt Town Team Builder — a dedicated person working with local governments and communities across the region to "*help activate town centres, build local capacity, and bring ideas to life.*"

Case study

Wheatbelt volunteer workforce largest in WA

"Volunteering is critical to the survival and success of rural communities in Western Australia. The past two decades have seen an increase in the community services delivered by volunteers and demand on the volunteer workforce has intensified. Yet, according to data collected by the Australian Bureau of Statistics over the same period there has been a decline in volunteer participation across Australia, resulting in a shortage of volunteer labour."[8]

The Wheatbelt Region has the highest volunteering rate of all WA regions — with nearly 25% of residents involved in volunteer work of some kind compared to 16% for the state average (Figure 2).

Volunteers underpin the sporting, social and emergency services across the Wheatbelt but the region's ageing and slow-growing population presents challenges for both volunteer supply and demand. Volunteer burnout is considered a major risk facing rural volunteer organisations.

Holmes et al (2019)[8] conclude that there is a need to better understand the type, frequency and intensity of volunteer participation across regional WA and that volunteer organisations need support to develop strategic plans so they can better manage the threats and opportunities facing the changing environment of the volunteering sector.

Drought years and ongoing climate change will continue to place pressure on volunteer services in the Wheatbelt — particularly fire and emergency services but also social and sporting services. Capacity building and strategic planning will be crucial to maintaining the viability of local volunteer organisations in the region.

8. Kirsten Holmes, Amanda Davies, Leonie Lockstone-Binney, Mary O'Halloran, Faith Ong (2019). The social and economic sustainability of WA's rural volunteer workforce. BCEC Research Report No. 22/19

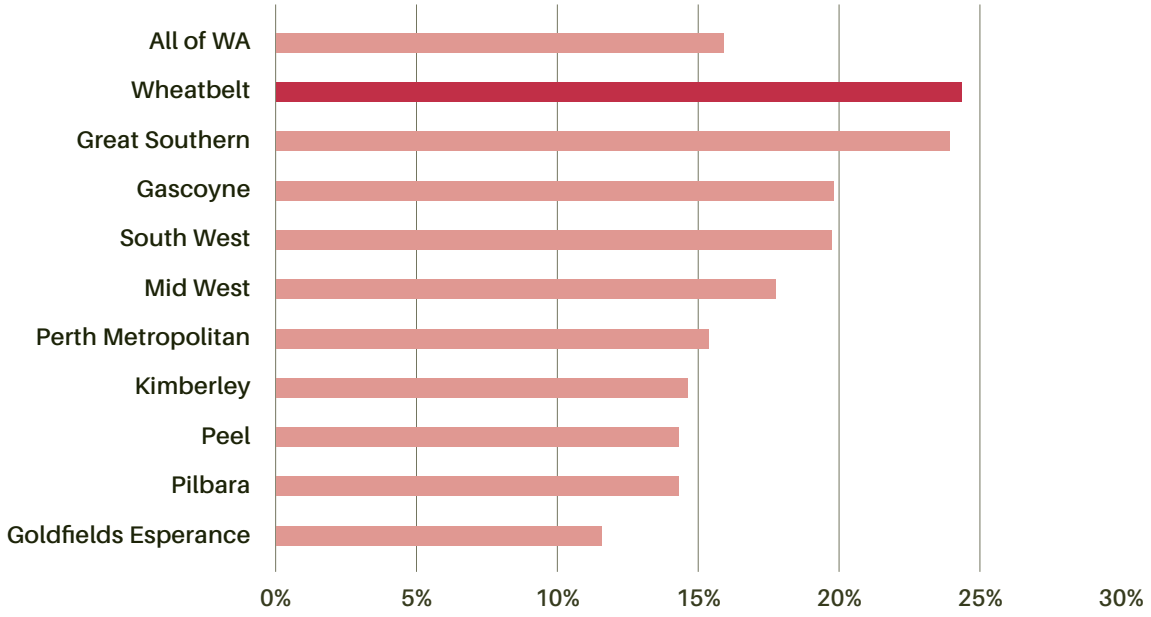


FIGURE 2 Volunteer rates (%) of WA regions compared with the state average.

Data source: extracted from the WA Community Impact Hub via the Australian Bureau of Statistics

Image courtesy: Shire of Northam

Characteristics of a resilient community

The resilience of many Wheatbelt towns is under pressure from social, economic and infrastructure challenges — and many of these will (and already have) become more acute in the face of climate change and drought years.

Each Wheatbelt LGA faces its own particular set of drought-and climate-related challenges; with some lacking infrastructure and services and others lacking human capital or economic diversity.

Building an effective drought resilience plan for the Wheatbelt requires an ongoing and iterative process that unpacks and addresses the vulnerabilities of each LGA, while also identifying ways to better link and enhance services, economies, infrastructure and environmental assets within and across sub-regions.



Image: Darkan Hotel Community Project



The International Red Cross has identified 11 dimensions of a resilient community:

1. **Risk management:** a resilient community knows and manages its risks.
2. **Health:** a resilient community is healthy — mentally and physically.
3. **Water and sanitation:** a resilient community can meet its basic water and sanitation needs.
4. **Shelter:** a resilient community can meet its basic shelter needs.
5. **Food and nutrition security:** a resilient community can meet its basic food needs.
6. **Economic opportunities:** a resilient community has diverse economic opportunities.
7. **Infrastructure and services:** a resilient community has well-maintained and accessible infrastructure and services.
8. **Natural resource management:** a resilient community has access to, manages and uses its natural assets in a sustainable manner.
9. **Social cohesion:** a resilient community draws on formal and informal community networks to act for the good of all in the community.
10. **Inclusion:** a resilient community fights exclusion on any basis, including gender, ability, ethnicity, religion, political view etc.
11. **Connectedness:** a resilient community has strong and supportive relationships with local government authorities and other external organisations, as well as access to information.

How does the Wheatbelt region as a whole and its 42 LGAs, 200+ communities and 77,000 people fare in terms of these characteristics? And how do these characteristics play out in terms of drought resilience at a community, LGA and regional level?

- Do Wheatbelt communities know and understand their drought risks?
- How can resilience thinking be embedded into regional policy and planning?
- How can Wheatbelt schools, houses, green spaces and pools be optimised for liveability and sustainability as the climate dries and becomes hotter?
- Where is drought and community resilience being done well? And how can these success stories best be shared to foster pride and stronger resilience at a sub-regional and regional level?

Case study

Local leadership and commitment saves Wheatbelt social hub

"We need to empower Wheatbelt people to design and change their future — with a focus on collaboration, collective knowledge and working together."

Wheatbelt RDRP consultancy feedback

In 2022, the small Wheatbelt community of Darkan, in the Shire of West Arthur, experienced a significant setback when the town's only pub closed its doors. Built in 1906, the Darkan Hotel is a defining feature of the town's character and visual identity and has long been regarded as the social hub of the community. The hotel is also a key economic contributor, serving as the cornerstone of the town's tourism sector and providing valuable local employment.

When the hotel's lessee decided not to renew the lease, the business was listed for sale by the owners but the poor condition of the property — which had lacked repairs and maintenance over many years — did not attract any serious buyers. Recognising the pivotal role of the hotel to the social and economic fabric of the town, and aware of the limited buyer interest, a small group of motivated residents formed a committee to oversee the project to purchase, restore and re-open the hotel.

Advice was sought from a local lawyer and accountant on possible investment structures to fund the project. Following community consultation, a board for the project was formally elected and a consultant engaged to develop a clear vision and purpose and establish operational guidelines. A company was established and shares in a unit trust were sold to 42 community investors, raising over $760,000. Most investors were local farmers and residents, many with no previous experience in the hospitality industry. The project also received a $182,350 grant from the *Regional Economic Development* (RED) program to construct adjacent accommodation, addressing the shortage of short-stay options in the area.

Beyond the initial financial investment and professional expertise, the project's operation was driven by dedicated volunteers — from project planning and management to the hands-on labour involved in restoring the property. The elected board met frequently, overseeing all aspects of planning, finance, and communications. Regular updates were provided to keep both investors and the wider community informed. The refurbished Darkan Hotel reopened in September 2024, offering meals, drinks, and accommodation. The revival of the pub not only restored a cherished social venue but also stimulated local economic activity.



Image courtesy: Darkan Hotel Community Project

Case study

Regional resilience compromised by vulnerable infrastructure

"The telecommunications network is already sub-standard and heavily impacted by seasonal events such as summer storms. Online connectivity is essential for individuals in rural communities for health, work, education and social connectedness. We need an infrastructure plan for drought resilience across the region."

Wheatbelt RDRP consultancy feedback

The North Eastern Wheatbelt Region of Councils (NEWROC) is a voluntary alliance of seven local governments in the north-eastern Wheatbelt formed to strengthen regional cooperation. NEWROC brings together the shires of Dowerin, Koorda, Mount Marshall, Mukinbudin, Nungarin, Trayning and Wyalkatchem (Figure 3).

A key focus of the NEWROC alliance is securing essential infrastructure capacity for the region.

In January 2024, a severe storm struck WA's Wheatbelt and Goldfields regions, causing a widespread and extended power outage that impacted more than 34,000 households and businesses[9]. The storm caused major damage to critical infrastructure, including the collapse of transmission towers and disruption to essential services such as water supply, healthcare, fuel access, and telecommunications.

Power was not fully restored for nine days.

The outage raised serious concerns about the long-term resilience of infrastructure in regional and remote areas in the face of increasing severe storms linked to climate change.

NEWROC engaged economics consultants Econosis to undertake an impact assessment of the storm-induced power outage. The analysis revealed a loss of $11.1 million in economic output over just six days. This consisted of $4.6m in lost local economic outputs, followed by $1.1m in first round and supply chain impacts and a further $5.4m in production and consumption impacts.

Wheatbelt doctor Michael Livingston said when the power first went off at his Narembeen practice he started seeing patients in the dark but after losing phone and internet access was unable to proceed. The blackout is estimated to have cost the practice more than $20,000, partly because vaccines and medicines were spoiled.[9]

9. https://www.abc.net.au/news/2024-01-19/kalgoorlie-blackout-explainer/103365870

The scale of loss from just a single outage — exacerbated by climate volatility — underpins the need for urgent investment in resilient energy and communication systems across the Wheatbelt.

The Australian Energy Market Operator has warned of increased risks to national power supply due to aging infrastructure, extreme weather events, and the complexities of integrating renewable energy.[10] If outages continue annually at current rates, the projected economic loss for the NEWROC region could reach $125.9 million in present value terms over 20 years (based on a six-day annual outage).

NEWROC has taken proactive steps to mitigate outage impacts and build local resilience.

In collaboration with local Wheatbelt company *Crisp Wireless*, NEWROC has expanded a telecommunications network capable of operating independently of the mains power grid. During the January outage, this system enabled continued internet access and phone connectivity for those connected — demonstrating the value of locally led solutions.

NEWROC has also submitted two market-led proposals, applying for federal funding, and engaging with Western Power and state energy ministers, however their calls for broader infrastructure investment in the north-eastern Wheatbelt have yet to be matched by state or national commitments.

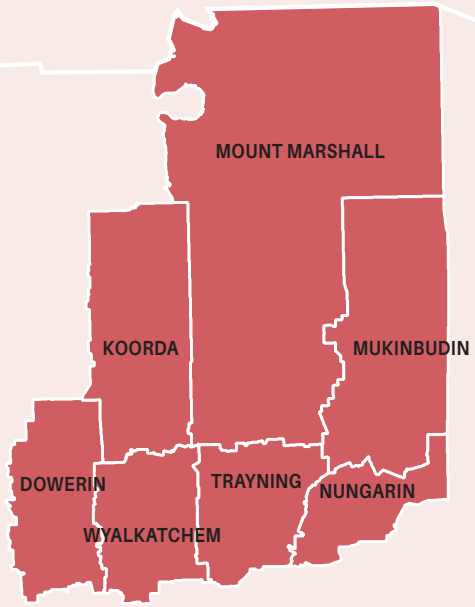


FIGURE 3 Map showing location of Wheatbelt shires involved in the North Eastern Wheatbelt Region of Councils (NEWROC) alliance.



Image: Telstra Exchange, Mukinbudin (courtesy WDC)

10. AEMO 2025 | 2025 General Power System Risk Review Report

Action required

- **Complete a region-wide** 'resilient green spaces' audit
- **Deliver a 'Resilient Wheatbelt' small grants scheme** to fund locally-driven drought resilience initiatives
- **Develop and deliver** a small business climate resilience program
- **In conjunction with the Wheatbelt District Leadership Group,** implement climate resilience actions from the 'Living Well in the Wheatbelt' (2025-2035) strategy
- **Develop and communicate Wheatbelt resilience stories** to enhance awareness of local leaders taking proactive steps to build resilience in their communities, industry and region
- **Leverage existing leadership networks and programs** to build capacity of Wheatbelt leaders and embed resilience thinking and climate scenarios into strategic planning and policy development

For details on each of the actions above see *Implementing the Plan* in Section 10 of this report.

9. Regional resilience

Strengthening and diversifying the Wheatbelt's economic, social and environmental foundations



Building collective advocacy and critical mass across the Wheatbelt to:

- Diversify and drought-proof the economy
- Fund quality infrastructure and attract new industries, services and people
- Create a flexible, year-round Wheatbelt workforce that meets the needs of multiple industries (agriculture, mining, manufacturing, renewables)
- Restore, value and promote the region's unique natural environment



Image courtesy: Prices Fabrication and Steel Williams

Regional resilience at a glance:

- **The Wheatbelt economy and its 200+ communities** are highly reliant on rainfed agriculture
- **Economic diversification is needed** to build drought resilience across the region
- **Attracting new industries and people** into the Wheatbelt will require quality infrastructure and social services
- **The region's natural environment is globally unique** and offers significant social, cultural and economic benefits but its health and sustainability must be prioritised

Implementation plan themes covered in this section:



Embedding resilience thinking | Securing the region's water future | Building capacity of businesses and communities | Growing a diverse and resilient economy | Strengthening agricultural resilience and innovation | Restoring and valuing natural environment

Introduction

The Wheatbelt's ongoing resilience will be underpinned by local leaders working collectively to future-proof the region's economic, environmental and social success in the face of a drying climate.

Regional resilience (which includes drought resilience) is underpinned by:

- Good governance
- Economic diversity
- Quality infrastructure — housing, communications, energy, transport and water
- Availability and interconnectedness of support services and social networks
- Valued and healthy natural environment

This section places a drought lens over each of the five resilience measures listed above and highlights what is working well in the Wheatbelt and what is needed to strengthen drought resilience across the region.

"A resilient Wheatbelt embraces innovation, diversity and collaboration — enabling communities and industries to withstand external pressures while continuing to grow."

Wheatbelt RDRP consultancy feedback


HIRE SPACE
POP-UP SHOP
WALSH
MILLER
MACQUEEN
J.K. WILLIAMS & CO
DOWERIN

Wheatbelt governance

The Wheatbelt region is classified into five sub-regions: Avon, Central Coast, Wheatbelt South, Central East and Central Midlands and has 42 local governments overseeing communities varying from fewer than 200 to 11,000 people.

Within the Wheatbelt, the Wheatbelt Development Commission (WDC) represents the state government and Regional Development Australia (RDA) represents the federal government. The WDC and RDA play key roles in economic and community development across the Wheatbelt and both organisations engage closely with the region's LGAs.

Wheatbelt Natural Resource Management (Wheatbelt NRM) is a not-for-profit group established to address environmental challenges across the Wheatbelt.

The Ballardong, Yued and Gnala Karla Boodja Aboriginal corporations manage and maximise opportunities for aboriginal people across the Noongar estate in the region.

A range of sub-regional forums exist that bring Wheatbelt LGAs and regional organisations together to discuss common issues, support advocacy and problem solving:

WA Local Government Authority (WALGA) Zones — Central Country, Great Eastern and Avon-Midland Zones are sub-regional bodies that provide a framework to facilitate input on key matters impacting their local and regional areas into WALGA policy formulation. WALGA representatives are often called upon to represent their regions on regional level committees or groups, including the Wheatbelt District Leadership Group.

Image courtesy: Shire of Merredin



Regional Organisation of Councils (ROCs) and Regional Alliances — not-for-profit collaborations of local governments focussed on economic growth and community development in specific geographic areas of the Wheatbelt. These groups undertake federal and state government advocacy and strategic planning work in service delivery (e.g. aged care, housing, communications), tourism development, natural resource management and land use planning:

- **Avon ROC** — Toodyay, Goomalling, Northam, York and Victoria Plains
- **Wheatbelt East ROC** — Bruce Rock, Cunderdin, Kellerberrin, Merredin, Tammin, Westonia and Yilgarn
- **North Eastern Wheatbelt ROC** — Dowerin, Koorda, Mount Marshall, Mukinbudin, Nungarin, Trayning and Wyalkatchem.
- **4WDL ROC** — Wagin, West Arthur, Williams, Woodanilling, Dumbleyung and Lake Grace
- **South East Avon ROC** — Beverley, Cunderdin, Quairading, York
- **Hotham-Williams Economic Development Alliance** — Boddington, Wandering and Williams
- **Northern Growth Alliance** — Chittering, Dandaragan and Gingin

Topic specific groups exist to progress key opportunities such as tourism (e.g. NEWTRAVEL and ROE Tourism), health (Rural Local Government Health Alliance), housing (Central East Accommodation and Care Alliance), transport (Wheatbelt Secondary Freight Network) and water (Rural Water Council).

These forums are essential in building collective advocacy and critical mass to attract attention and investment into place-based solutions.

Examples of successful collaborative projects undertaken across the Wheatbelt include:

- **The Wheatbelt Secondary Freight Network (WSFN)** involving all 42 Wheatbelt LGAs. The WSFN attracted funding to improve road safety and efficiency across 4400 kilometres of high-priority, locally managed routes in the region.
- **The Central East Accommodation and Care Alliance (11 LGAs)** successfully built a case and attracted funding to build 71 independent living units across their communities and will be building on this success by adding another 54 units in coming years.
- **The Wheatbelt Regional Housing initiative (10 LGAs)** recently attracted funding to develop 200 lots in preparation for 400 new houses.

While the region's well connected governance system has fostered innovative responses to complex challenges, maintaining this capacity in the long term will be critical in the face of population pressures on services and resources, climate change, and a gradual consolidation of the agricultural industry, all of which have impacted the region's ability to attract and retain skilled professionals and services.



Economic diversity

The Wheatbelt's diversification index currently reflects a moderate level of economic diversity — with significant strengths in agriculture and mineral sands mining — and emerging opportunities in downstream processing of agricultural and mining commodities, renewable energy, biofuels, and manufacturing hubs.[1]

Dryland agriculture and horticulture underpin the Wheatbelt's economy and employment — generating nearly a third of the region's annual economic output, employing nearly a quarter of all employed and responsible for 45% of all businesses (Figure 1). Wheatbelt mining operations generate about the same annual economic output as agriculture and create economic diversity for the region — but mining employs 75% fewer people and accounts for just 1% of all Wheatbelt businesses (Figure 1).

Lifting drought resilience across the Wheatbelt's agricultural and horticultural industries will be critical to the ongoing economic success of the region.

Drought compromises the viability of dryland agricultural enterprises through its impacts on rainfall for annual crops and water supply for broadacre livestock production. Lawes and Kingwell (2012)[2] found that consecutive drought years in 2006 and 2007 greatly challenged the profitability of farm businesses in the northeast (low rainfall) part of WA's grainbelt (which includes parts of the eastern Wheatbelt) — with almost two-thirds of farms in this area experiencing a decline in business equity between 2004 and 2009. Such declines in equity have obvious flow on effects to local communities in terms of money spent on local businesses and population dynamics.

1. Economic Diversification in the Wheatbelt (2025) Bankwest Curtin Economic Centre
2. Lawes, R. & Kingwell, R. (2012) A longitudinal examination of business performance indicators for drought-affected farms, Agricultural Systems, Volume 106, Issue 1.



Image courtesy: Jana Schoenknecht

However, in other research across the entire southwest agricultural area of WA (which includes the whole of the Wheatbelt), Kingwell et al (2013)[3] found that nearly two-thirds of a diverse set of 249 farm businesses were classed as growing or strong despite a decade (2002–2011) of challenging weather years underpinned by a warming and drying trend. Farm profitability improved over the study period despite no underlying improvement in terms of trade. This profitability was achieved through better use of existing technologies, including those that offered economies of scale and a switch to more cropping (wheat) in favour of livestock (sheep). Farmers whose businesses grew strongly over the study period also displayed (on average) superior management capabilities and choices in many areas of farm management and were often more connected to their local community and achieved greater work-life balance.

To date, the Wheatbelt has not experienced more than two consecutive years of drought across the entire region but most climate models indicate an increased prevalence of drought and southern Australia, in particular, is predicted to be at increased risk of drought in coming decades.[4]

Encouraging greater diversity in the Wheatbelt economy while continuing to develop and implement drought resilience measures in agricultural industries will be critical to bolstering the region's drought resilience.

3. Kingwell, R, Anderton, L, Islam, N, Xayavong, V, Wardell-Johnson, A, Feldman, D & Speijers, J 2013, Broadacre farmers adapting to a changing climate, National Climate Change Adaptation Research Facility, Gold Coast, 171 pp.

4. Grose, M. R., Narsey, S., Delage, F. P., Dowdy, A. J., Bador, M., Boschat, G., et al. (2020). Insights from CMIP6 for Australia's future climate. *Earth's Future*, 8.

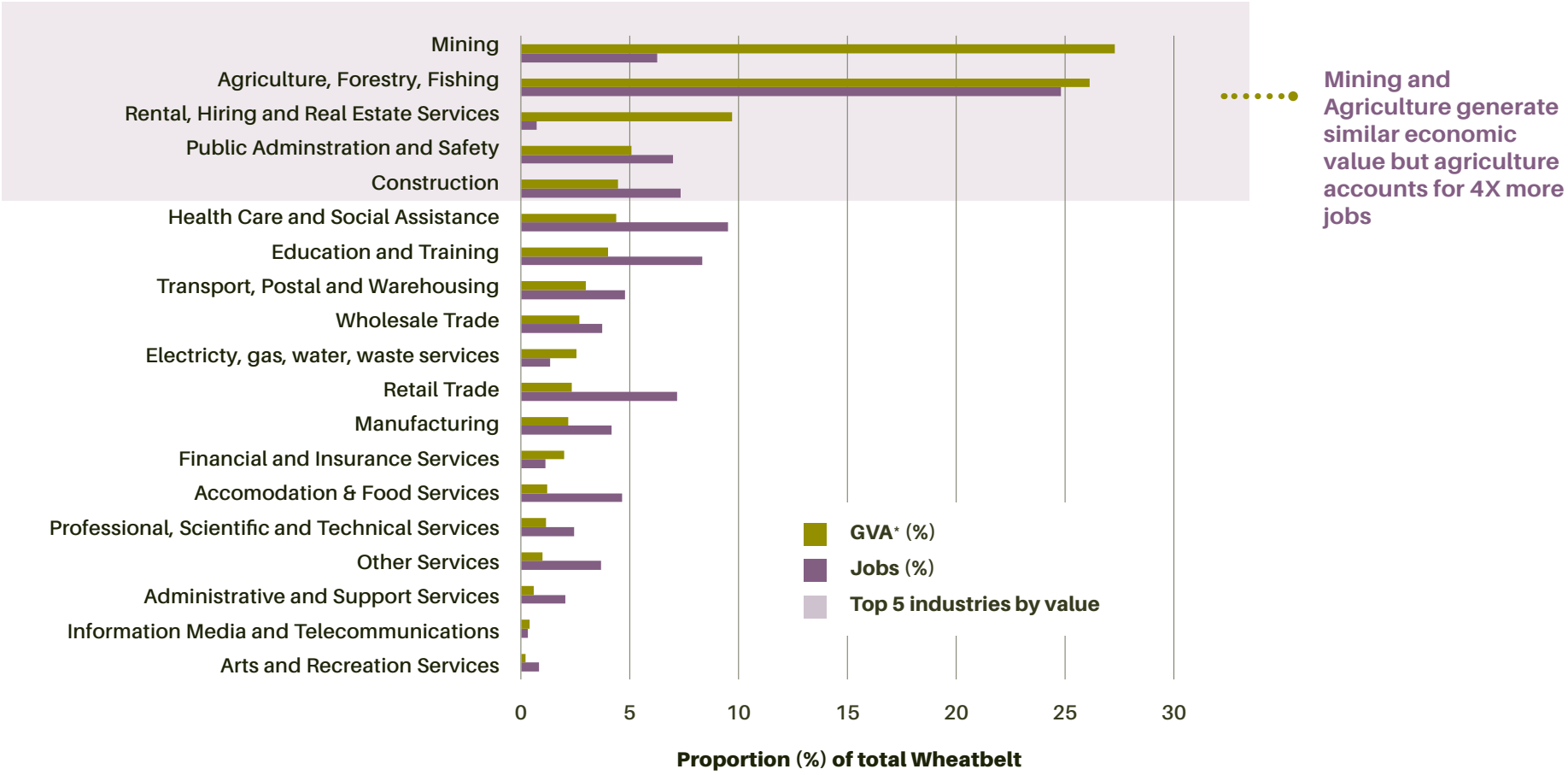


FIGURE 1 a) Relative economic value and employment across Wheatbelt industry sectors (2023).

Data source: Bankwest Curtin Economic Centre

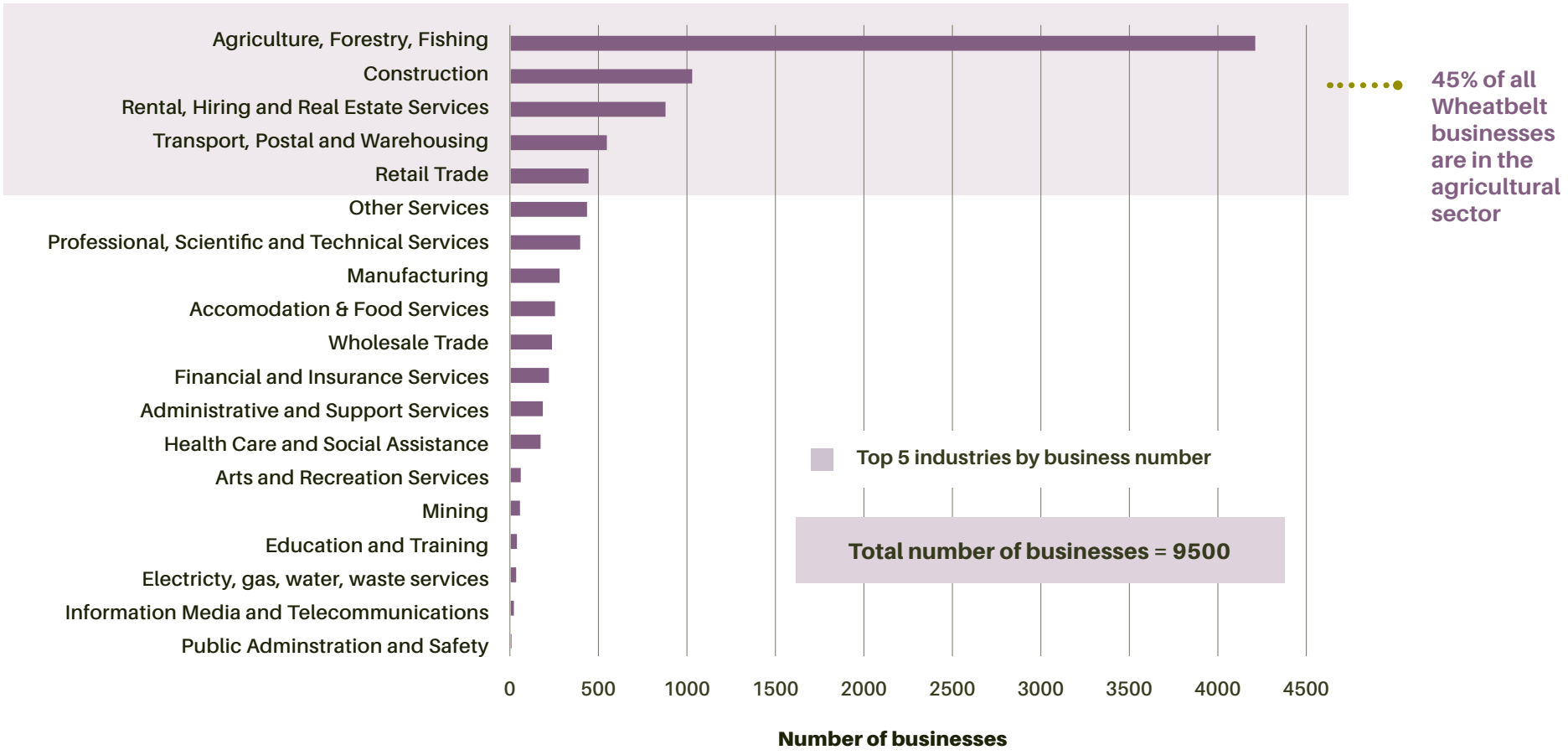


FIGURE 1 b) Total Wheatbelt business numbers per industry sector (2023).

Data source: Bankwest Curtin Economic Centre

Infrastructure

Harnessing the Wheatbelt's full economic potential will require intervention and effort to overcome key barriers including housing availability, and transport and other enabling infrastructure networks including digital connectivity, power, and water across the region.

Housing

Lack of housing for workers is currently seen as one the most pressing barriers to business success in the Wheatbelt — with about 50% of respondents to the Chamber of Commerce and Industry WA (CCIWA) business confidence survey indicating housing shortages were thwarting their ability to attract and retain staff compared to 20% of all WA respondents (Figure 2)[5]. The Wheatbelt Development Commission is working with 32 of the Wheatbelt's 42 local governments to analyse housing needs across the region.

About 60% of businesses surveyed (representing 16% of all Wheatbelt businesses) indicated that they require, on average, 1.4 additional workers to meet current needs. This amounts to a demand for more than 1,300 houses to 2031.

A lack of serviced land, high costs and availability of builders and construction trades are major barriers to the development of new housing stock in the Wheatbelt.[6]

Work completed by the WDC with the 4WDL Regional Organisation of Councils in 2024 identified a shortfall of $50,000 to $90,000 between the costs of lot development and their developed market value, representing significant market failure. The opportunity cost of not having housing for critical workers was estimated at $265,000 per worker.[7]

5. 2025 Chamber of Commerce and Industry WA (CCIWA) business confidence survey.
6. JE Planning Services WEROC housing analysis, 2025.
7. JE Planning Service and Chadwick Consulting (2024) 4WDL Local housing plans and key worker housing investment concepts Technical Appendix to 4WDL Preliminary Business Case — Key Worker Housing 2023–2024.

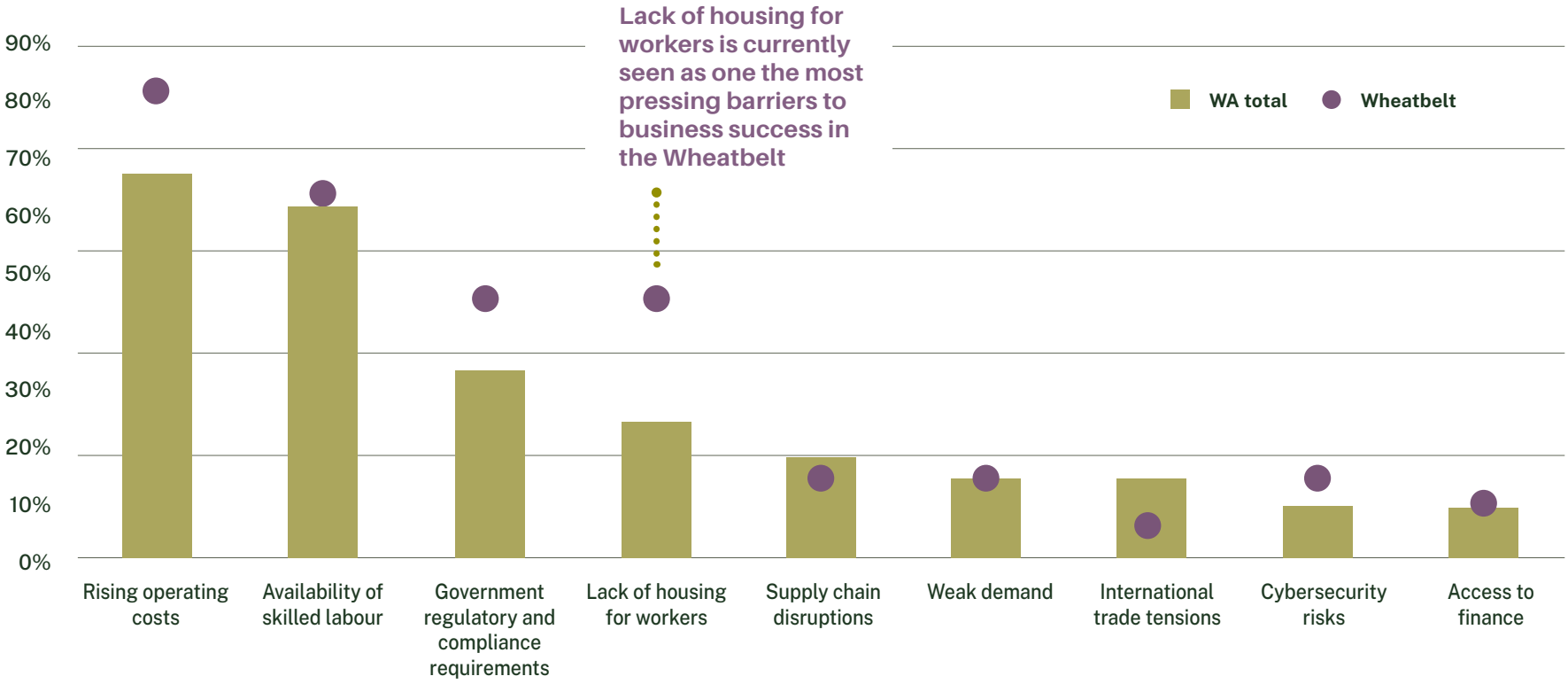


FIGURE 2 Barriers to businesses in the Wheatbelt from the 2025 Chamber of Commerce and Industry WA Business Confidence Survey

Data source: Chamber of Commerce and Industry WA (2025)

Wheatbelt LGAs are working collaboratively to address housing challenges. For example, in 2025, led by the Shire of Victoria Plains, a group of 10 Wheatbelt LGAs attracted funding from the *Federal Government Housing Support Program* for up to 200 residential lots with the capacity to support 400 new houses. In the Central East Wheatbelt sub-region, the Central East Aged Care Alliance (CEACA) is adding 54 independent living units to its 71-unit development across 11 LGAs in the eastern Wheatbelt.

A combination of low rates of land development and housing construction, together with a growing demand for housing, has caused a severe shortage of housing in regional WA.

Digital connectivity

Mobile phone coverage and internet connectivity remain overriding issues for businesses and households in the Wheatbelt — with each of the region's LGAs falling below the average 'digital inclusion index' for Australia (Figure 3).

Internet connectivity in the Wheatbelt currently occurs via Sky Muster, ADSL or fixed wireless services and mobile Wi-Fi. However, the growing number of Sky Muster users has resulted in reduced data speeds and limited data allowances. To address poor data speeds and allowances, local solutions using privately owned base stations or fibre optic connections have emerged (e.g., Crisp Wireless). Introduction of satellite technology through Starlink is also showing potential to help meet the demand for better connectivity.

Telstra has predicted there will be a 20–30% year-on-year growth in demand for data in Australia until 2031.[8]

Telecommunications infrastructure now drives economic development and underpins social connection and community safety. With data storage for most businesses having moved to the cloud, access to higher data speeds and reliable internet connections has become essential.

Access to connectivity is also critical to ongoing productivity of the Wheatbelt's key industry — agriculture. The uptake of digital technologies by the agricultural sector is estimated to increase gross value of production by more than $20 billion annually across Australia. Farm machinery automation, edge of field and remote monitoring, traceability technology and drone usage all require access to quality reliable internet.[9]

WA's *Digital Industries Acceleration Strategy*[10] aligns with and supports the state's economic framework *Diversify WA* and identifies a raft of projects aimed at accelerating digital transformation and uplifting WA businesses and industries. Efforts are also underway to improve regional connectivity through national and state programs such as the NBN upgrades, the *Mobile Black Spot Program*, the *Regional Connectivity Program*, and the *Mobile Network Hardening Program*. In addition, digital advancements, such as the Telstra intercity dark fibre network offering ultra-fast speeds of up to 83.6 terra bytes per second will position towns like Northam and Merredin as hubs for data-driven industries.

However, while these initiatives are making a difference — particularly in areas close to Perth and major regional centres — their impact can be uneven, with many Wheatbelt businesses still facing challenges like poor coverage, satellite congestion, and long wait times for new services.[11]

8. https://infraco.telstra.com.au/infraco-insights/technology/network-innovations-for-the-future. Accessed 10 November 2025
9. DAWE 2022, Digital Foundations for Agriculture Strategy: Driving the development and uptake of digital technologies in the Australian agriculture, fisheries and forestry industry, Department of Agriculture, Water and the Environment, Canberra, March. CC BY 4.0.
10. Department of Jobs, Tourism, Science and Innovation (JTSI) (2024) WA: Digitally Evolved Digital Industries Acceleration Strategy. Accessed 10 November 2025: https://www.wa.gov.au/system/files/202408/digital_indusrties_acceleration_strategy_aug2024_web.pdf
11. Thomas, R (2025) presentation to the 2025 Wheatbelt Futures Forum accessed 10 November 2025: https://wheatbeltfuturesforum.com.au/post-event-info-2025

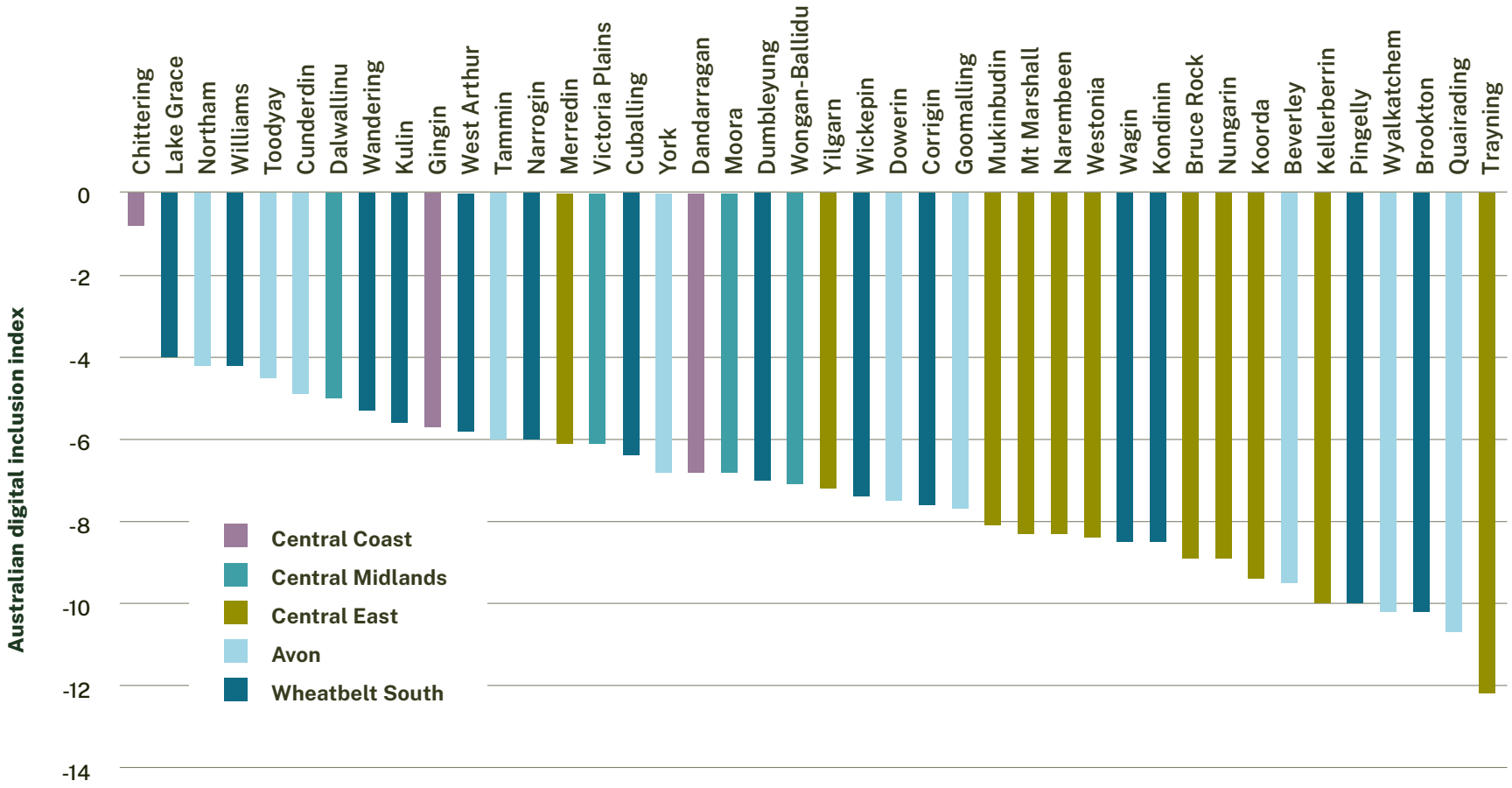


FIGURE 3 Digital connectivity of the Wheatbelt's 42 local government areas compared with the Australian average. *Note: The Australian Digital Inclusion Index uses survey data to measure digital inclusion across three dimensions: access, affordability and digital ability.*

Data source: Australian digital inclusion index (2022)

Case study

Population density underpins connectivity

Telecommunications investment is influenced by population density and delivery of new and upgraded mobile coverage is prioritised where population densities are highest. But many Wheatbelt LGAs have small and even declining populations — making access to services and infrastructure increasingly challenging.

"In rural and remote settings, the cost of providing telecommunications infrastructure increases, and the returns reduce, as population densities decline. In some cases, this limits the scope for universal coverage by commercially-focused private sector operators, without government intervention" — Australian Infrastructure Audit (2019).[12]

The North Eastern Wheatbelt Region of Councils (NEWROC) is home to just over 2500 people and generates an annual gross regional product of about $305 million (2023) with a total economic output in excess of $600 million — about 4% of the Wheatbelt's annual economic output. In its 2024 submission to the WA Senate's Inquiry into regional telecommunications in Western Australia, NEWROC argued that the economic wealth delivered by residents and businesses in the Wheatbelt should also inform essential services investment (such as telecommunications). "Additionally the (investment) criteria should include mechanisms to improve the safety of residents and resilience during climatic events. Telecommunications investment is not the responsibility of local government, however local government is consistently asked to co-contribute funds to initiate phone and internet improvements because the carrier's return on investment is low. With only one main provider of landlines and mobile phones in the NEWROC, these providers have substantial control over the communication infrastructure and limited competition or accountability to invest in our rural communities, relying on local, state and federal government to offset the costs."



Image courtesy: DPIRD

12. https://www.infrastructureaustralia.gov.au/publications/australian-infrastructure-audit-2019


LOCAVORE STORE
Meals in-a-box
Asian Salad Mix
Mizuna
Radicchio
Swiss Chard
Tatsoi
The Loos

Case study

Wireless telecommunications maintain connections

In 2017, NEWROC successfully applied for *Building Better Regions Funding* from the federal government ($701,875) to partner with a WA business (Crisp Wireless) to install a data centre and 11 repeater stations, operated by solar power, across NEWROC's seven local governments.

The Crisp Wireless network provides a reliable internet service and is also designed to be used for wireless phone calls over internet. Crisp Wireless was conceived by a group of local individuals who viewed the need for greater connectivity in the regions, with a local workforce capable of addressing issues in a timely manner through their close geographical network.

NEWROC contributed $256,625 of their own funds to activate the project enabling the wireless communications network to be expanded to 15 repeater stations across the seven shires. In addition, neighbouring Wheatbelt shires (Merredin, Westonia, Yilgarn, Kellerberrin, Narembeen, Bruce Rock, Quairading, Dalwallinu) have also connected to the NEWROC wireless network by attracting state funds and matching these with their own local government funds.

The new infrastructure has connected businesses and the wider community to enhanced opportunities for business diversification, tourism growth, online education and professional development, while reducing social isolation and ultimately making the area a better place to live, work and invest. Most importantly, the wireless network withstood the January 2024 storms that caused six-days of telecommunication outages in the north-eastern Wheatbelt and was the only internet (and WiFi calling) service that did not experience downtime, because it was supplied by solar power and battery storage.



Image courtesy: CRISP Wireless

Local governments are generally not providers of utility services such as telecommunications but telecommunications services underpin the capacity of local governments to deliver their emergency management responsibilities, economic development objectives and to create safe, attractive, liveable places.

The supercell thunderstorm that occurred across the eastern Wheatbelt region in January 2024 highlighted the need for robust back-up systems to enhance regional telecommunications infrastructure at the shire level, ensuring that essential services and communication remain operational during future emergencies. In response to the storm event, and with strong advocacy from NEWROC, the WA Government and Telstra invested $2.9M in the *Automated Transfer Unit Pilot Program*, that resulted in 80 ATUs being installed across strategic Telstra mobile towers and exchanges across the Wheatbelt and western Goldfields regions. [13]

[13] https://www.wa.gov.au/government/media-statements/Cook%20Labor%20Government/Regional-telecommunications-boosted-in-Wheatbelt-and-Goldfields-20241110



Image courtesy: Western Power

Energy infrastructure

Access to reliable and affordable power is critical to the success of the Wheatbelt's major industries — agriculture, mining and manufacturing — while also ensuring delivery of vital services such as telecommunications and water and ensuring the region's liveability, especially during hot summer months.

Western Australia's energy system is becoming decentralised and more diverse with energy generation shifting from centrally derived thermal sources (coal and gas), to dispersed roof top solar, large-scale wind and solar and battery storage.

Renewable energy now accounts for about 38% of the electricity entering the South West Interconnected System (SWIS) network compared with just 10% a decade ago and will play an increasing role as the state transitions to net zero emissions by 2050 (Figure 4).

The SWIS is WA's main electricity network, serving 1.2 million customers across the South West Land Division, including the entire Wheatbelt, and comprises more than 7,750 kilometres of transmission lines (Figure 5) and a further 90,000+ kilometres of distribution lines. The SWIS is a self-contained system, which means it is not interconnected with other electricity networks and therefore has no outside support or backup.



Image courtesy: BIA Energy Solutions

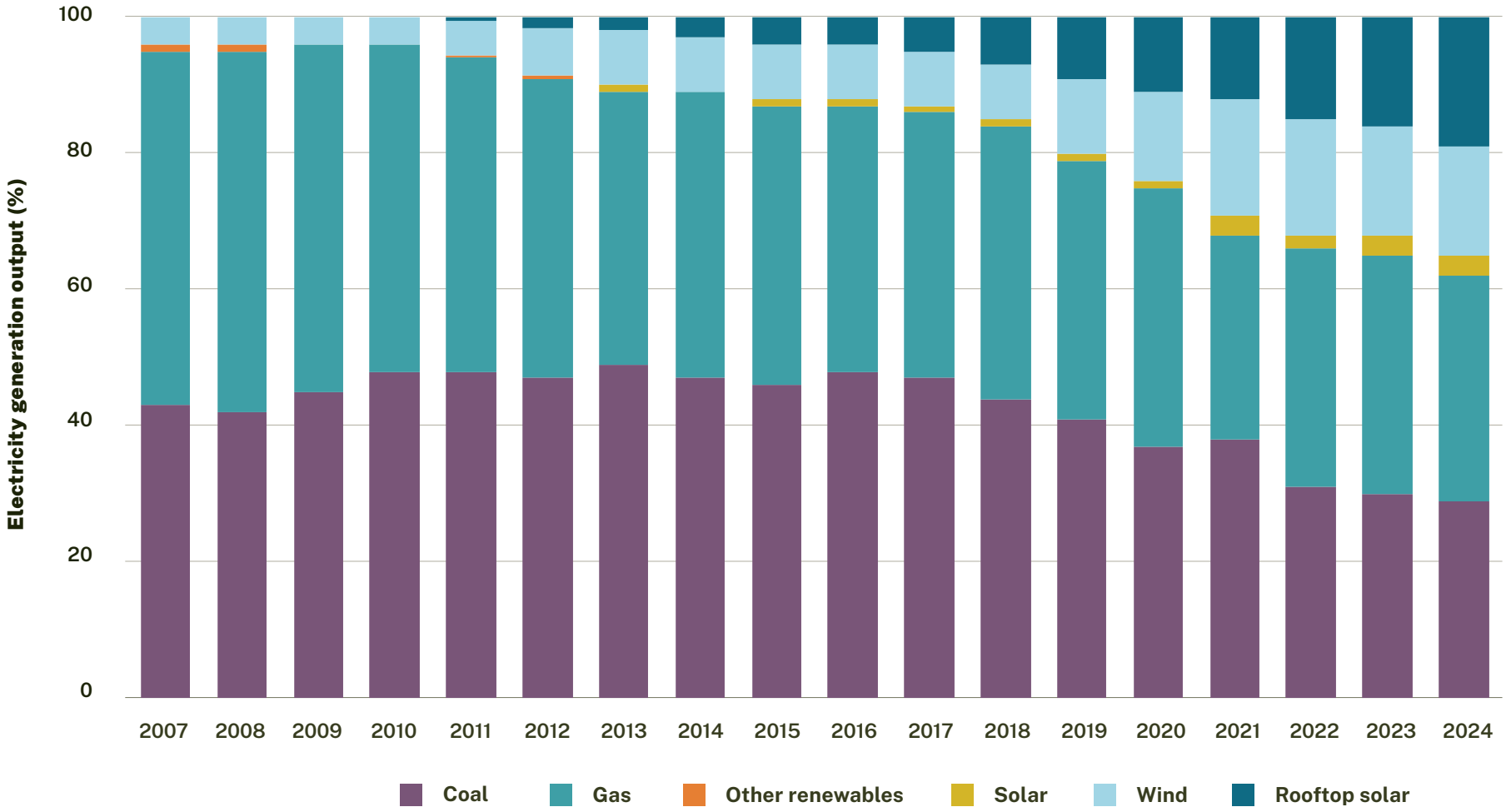


FIGURE 4 Electricity generation by source in the South West Integrated Supply (SWIS) network (which supplies the Wheatbelt) (2007–2024).

Data source: Department of Energy, Mines, Industry Regulation and Safety Energy Policy WA



Image courtesy: Megan Hele

The vast geographic reach of the SWIS means supply can be variable in the extremes of the network and the almost 800,000 wooden power poles create ongoing maintenance and operational issues.

The SWIS was originally developed around centralised, large-scale electricity generation from coal-fired stations but with the move to decentralised renewable wind and solar energy production, and utility scale battery storage, major technical and infrastructure upgrades are required to integrate the new electricity sources into the network.

The Australian Energy Market Operator (AEMO) has identified that ongoing investment in electricity generation, battery storage and transmission infrastructure will be critical to managing WA's growing electricity demand and offsetting the electricity losses incurred from retiring coal power stations.

More than 4,000 kilometres of new high-capacity transmission lines and 50 GW of new electricity generation (wind, solar, firming gas) and battery storage will be needed in the SWIS network over the next 20 years to accommodate the expected five-fold annual demand for electricity by 2042.[14] The scale of work required is unprecedented in the history of the SWIS.

To shore up power reliability across south-west WA (including the Wheatbelt), Western Power is overseeing the development of a 'modular grid' system to complement and in some cases replace the 'poles and wires' of the traditional SWIS grid. The modular grid will comprise a mix of microgrids, stand-alone power systems, battery storage systems and the existing transmission network. Much of the Wheatbelt sits within the so-called proposed 'autonomous network', which will be a mix of stand-alone power systems independent of the grid and microgrids integrated with the transmission network.

14. CMEWA (2024) Energy costs in transition: Decarbonising Western Australia's South West Interconnected System (SWIS). Accessed 10 November 2025: https://cmewa.com.au/wp-content/uploads/2025/07/CME-SWIS-Energy-Report-1.pdf

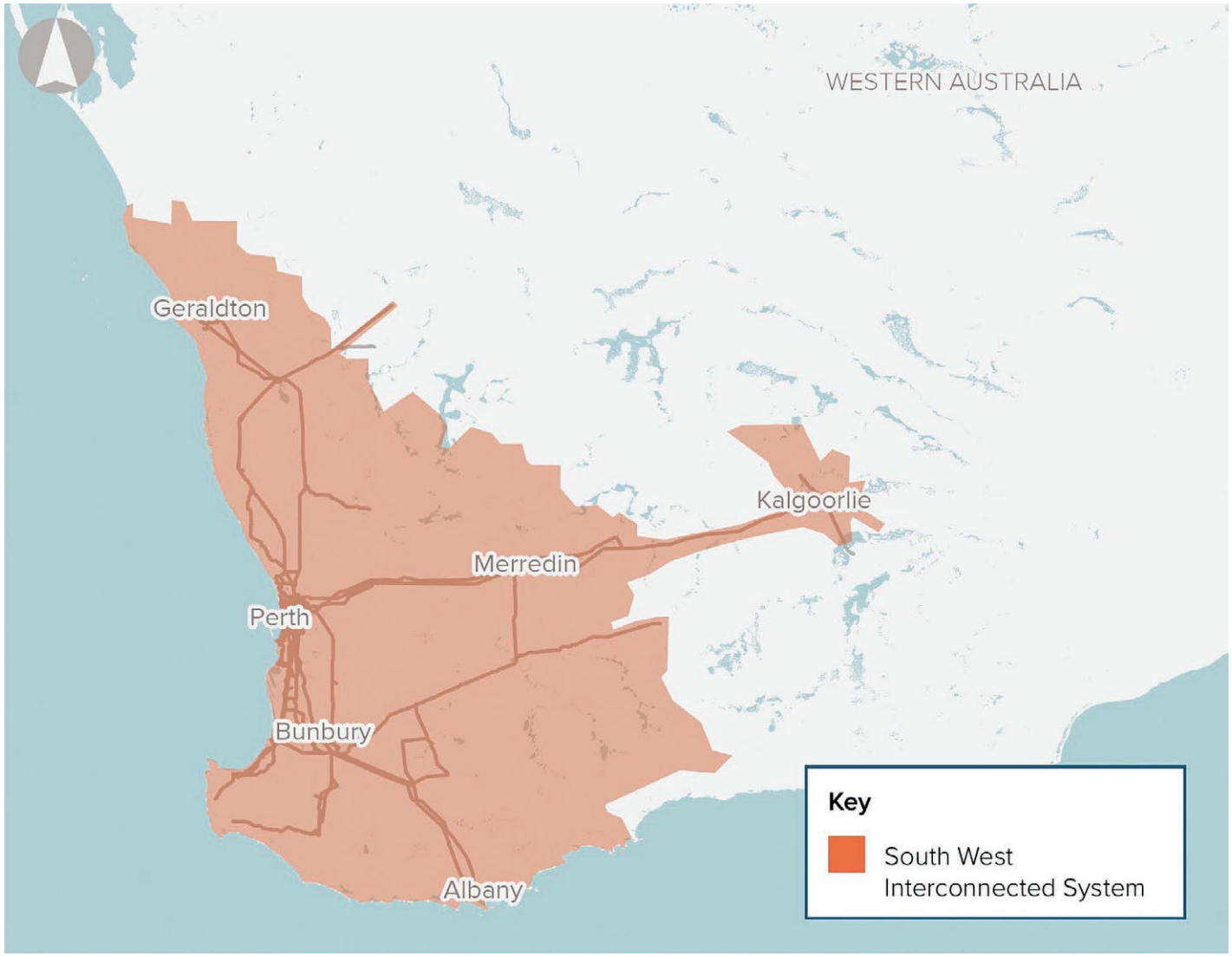


FIGURE 5 Geographic spread of the 7,750 kilometres of transmission lines that make up the South West Interconnected System (SWIS) for electricity production and distribution. A further 90,000+ kilometres of distribution lines (not shown) feed off the transmission line network to deliver electricity into Wheatbelt communities.

Data source: Infrastructure Australia

Case study
Wheatbelt power outages

Reliability and resilience of power supplies in rural, regional and remote Western Australia is significantly worse than in urban and CBD areas. Data published by the WA state-owned Western Power corporation show the duration and frequency of power outages in rural areas were four to five times higher than in urban areas during 2022–2023.

Of the 10 poorest performing LGAs on the SWIS in 2022–2023, four were in the Wheatbelt where customers experienced 9 to 16 outages over the year with each outage lasting an average 18 to 69 hours in duration (Table 1).

TABLE 1. Number and average length of electricity outages across the four worst-performing Wheatbelt shires in 2022–2023

Shire	Number of outages	Average length of outage
Quairading	16	68 hours and 46 minutes
Lake Grace	11	52 hours and 12 minutes
Dandaragan	10	25 hours and 58 minutes
Dalwallinu	9	17 hours and 54 minutes

Date source: Western Power

Of the 10 worst performing shires, Quairading experienced 40% more outages than the average (16 days vs 11.5 days) with each outage more than double the average for duration (70 hours vs 30 hours). A five-day power outage in 2022, which also affected fuel access and mobile phone reception, prompted the shire of Quairading to write to the State Energy Minister to seek a move to a microgrid for the town which would provide power sourced from a solar generator attached to a battery and enable the town to transition away from poles and wires. There are currently four microgrids in regional WA — Kalbarri, Perenjori, Bremer Bay and Ravensthorpe but none in the Wheatbelt. A WA parliamentary committee in 2020 found microgrids could provide significant benefits to regional communities including more reliable power and reduced bushfire risks.[15]

Microgrids use local renewable generation and storage and remain connected to the SWIS network but have the ability to be 'islanded' as an autonomous system if the main grid goes down. Microgrids can also reduce maintenance costs for the SWIS by deferring — or entirely removing — the need to invest in costly pole and wire replacement programs.

Western Power's 2023–2024 reliability and power quality report outlines multiple severe weather events that impacted the SWIS network resulting in more than double the outages (>12 hours) of the previous year. About 7000 customers, predominantly from the Wheatbelt, experienced more than 16 outages during the year, almost four times the outage frequency

15. Shaw, J.J. (2020) Taking charge: Western Australia's transition to a distributed energy future. Western Australia Parliament. Legislative Assembly. Economics and Industry Standing Committee. Report 8



of the previous year. Between January 13–18 2024, the SWIS network infrastructure was damaged by bushfires, lightning strikes, and strong winds which resulted in the collapse of five transmission towers. The network also recorded six of the 10 highest demand days in the history of the Wholesale Electricity Market, with multiple days of temperatures above 40 degrees. Outages were longer in the regions, averaging 290 minutes or almost five hours, while the Perth CBD averaged outages of 30 minutes.

Image courtesy: Megan Hele

Renewable energy

With conditions conducive to wind, solar and biomass generation, and high voltage transmission infrastructure traversing the region the Wheatbelt has significant prospects in renewable energy production, already contributing to over 50% of the state's renewable energy from wind and solar farms. The region hosts the state's largest wind farm with a strong pipeline of projects to expand capacity. Renewable fuels is also an emerging sub-sector, with Wheatbelt considered ideal for large scale production.[16]

The Wheatbelt region is critical to the transition of the SWIS to renewables. Wind and solar generation in the region is expected to grow to just under 9000 MW over the next 15 years (95% wind and 5% solar). As of June 2024, the Wheatbelt region was generating about 1000 MW of renewable energy over eight operating projects with 22 additional projects in varying phases of feasibility, construction and development. Projects are clustered in zones in the Central Coast and Central Midlands sub-regions near the Clean Energy Link — North transmission line and in the Wheatbelt South near the Clean Energy Link — East transmission line.

Operational projects include the Collgar Wind Farm (222 MW), Emu Downs Wind Farm (80 MW), Yandin Wind Farm (212 MW), Merredin Solar Farm (100 MW) and Cunderdin Hybrid Solar Battery Facility (128 MW). Projects in pre-construction and construction phases as of March 2026 include the King Rocks Wind Farm at Hyden (150 MW), Merredin Big Battery (100 MW) and Narrogin Solar Farm and BESS (200 MW). There are numerous projects in feasibility, planning and approval stages. Connection to the SWIS is dependent on upgrades to the transmission infrastructure.



Image: Cunderdin Hybrid Solar Battery Facility

WA's transition to renewable energy offers significant economic and community benefits to Wheatbelt communities, including diversification, new industries, jobs, and localised growth. However, LGAs and private landholders are seeking guidance on how best to interact with developers — to capture opportunities and minimise negative imapcts. Cumulative impact of multiple projects on local services and infrastructure, community benefits and transparent planning are key concerns of those Wheatbelt LGAs in areas being targeted by renewable energy companies and Western Power.

A review commissioned by federal energy minister Chris Bowen in 2023 found that repeated instances of poor community engagement had led to a 'material distrust' of renewable energy project developers and, in particular, developers of major new grid transmission projects. The review was based on more than 75 meetings with 700-plus participants and received more than 500 submissions.[17]

16. Infrastructure Australia (2022) Regional Strengths and Infrastructure Gaps report. Accessed 10 November 2025: https://www.infrastructureaustralia.gov.au/2022-regional-strengths-and-infrastructure-gaps-WA

17. Andrew Dyer, Australian Energy Infrastructure Commissioner, 2023, Community Engagement Review Report, on behalf of the Department of Climate Change, Energy, the Environment and Water, Canberra, 2 February 2024. CC BY 4.0.



The Wheatbelt is poised to play a significant role in WA's renewable energy production — with wind and solar generation in the region expected to grow to just under 9000 MW over the next 15 years (95% wind and 5% solar).

"Local governments are responsible for navigating industry consultations regarding renewable energy projects and are having to create policy on the run."

Regional Australia Institute (2024)[18]

Industry consultation as part of the Wheatbelt Regional Drought Resilience Plan also heard concerns around lack of engagement at the LGA-level and the local resources required to support renewable energy projects:

"There are plans to construct 400 or 500 turbines in our area and they will need something like 500 kilolitres of water for every footing that is built — on top of that is water demand for dust suppression.

There is a lack of planning and definitely a lack of consultation and engagement with local government about these water requirements. We really want to be

18. Regional Australia Institute. (2024). Towards Net Zero: Empowering Regional Communities ISBN: 978-0-6459363-5-3.



prepared because we are getting very close to these renewable projects commencing and we run the risk of being too late in our water planning process; how do we plan rapidly but still be accurate? One of the renewables developers is going to build over 100 turbines on one property and then bring the turbine blades into Moora from Geraldton. This will require about 1500 trucks driving over un-sealed roads and placing a huge demand for maintenance and water for dust suppression. And then there is the new high voltage transmission tower for the transmission line from Moora, which again, will place another demand on dust suppression and road management."

Tracy Lefroy, Former Moora Shire President

"There's lots of renewable energy projects in the eastern Wheatbelt. First Nations people want greater involvement beyond heritage assessment and community grants. We want the chance to sit down and talk to people at the start of projects to make the most of opportunities for First Nations people. Potential equity partnerships that can fund local First Nations projects to create jobs, provide social programs and improve community health and reduce dependence on government funding. A small percentage of project equity could generate huge social impact for the eastern Wheatbelt"

Michael Hayden, Eastern Wheatbelt Rangers



Case study

Harnessing community benefits from Wheatbelt windfarms

"Wheatbelt communities have a central role to play in the renewable energy transition, but the resources and capacity of most local government authorities are not commensurate with the task at hand."

Lu Allan, Regional Energy Alliance

The Shire of West Arthur (Wheatbelt South sub-region) has been a focal point for renewable energy developers since April 2023. West Arthur is considered an ideal location for wind farm developments due to the ability of renewable energy generators to connect to the South West Interconnected System (SWIS) and its consistently positive wind test readings. Four large-scale windfarm renewable energy projects are currently in development within the shire (Table 2).

Shire of West Arthur farmer and deputy Shire president Karen Harrington attended a national Regional Leaders Summit in August 2025 organised by the Renewable Energy Alliance (RE-Alliance) — an independent not-for-profit group helping regional communities and energy companies work together to ensure the shift to renewable energy delivers a lasting legacy to rural and regional Australia.

Held in Newcastle, NSW, the summit was attended by 90 regional leaders from across Australia working both inside and outside local government — Shire staff and councillors and also not-for-profit and regional development organisations. A major focus of the two-day summit was determining how local governments and community groups could work to ensure community needs and aspirations are realised in the shift to renewable energy.



TABLE 2. Current renewable energy projects in the West Arthur Shire (Wheatbelt South sub-region)

Project	Status (Sept 2025)	Capacity	Jobs
Green Wind Renewables — Ambrosia Project	Early development (1-2 years)	600+ MW	• 300 construction • 20 permanent
Acciona Energia — Bellwether Project	Construction to start in 2028	3 GW (400 turbines)	• 400 construction • 100 permanent
RES — Dardaline	Construction to start 2027	1200+ MW (168 turbines)	• 400 construction • 15 permanent
Lacour Energy — West Arthur Wind Farm	Construction to start 2027	70–100 turbines	• 250 construction • 15–20 permanent

Date source: Shire of West Arthur

"West Arthur Shire is a small local government with limited capacity. We need support from both state and federal government to resource our Shire to build capacity within our community before the construction phase. The potential benefits from the energy transition is on a scale that could set our shire up for the next generation."

Karen wanted to attend the summit as she was aware of the amount of regional experience that would be in the room — and the lessons that could be shared to help West Arthur navigate through its own energy transition.

"Learning from other communities at the summit really gave us some ideas — and the network we have now formed within WA will be really beneficial going forward as we transition to renewable energy."

Karen came away from the summit with a goal of developing an energy plan and strategy for the West Arthur Shire and to establish ways to ensure that West Arthur benefits not only from hosting the projects but also from the manufacturing side of the renewable energy transition.

"Our Shire CEO has reached out to the manufacturing people involved with the wind farms to see how we can build manufacturing capacity in our local government area and enable the community to benefit from the construction phase of the wind farms."

"Our town is small and we don't have manufacturing capacity at the moment — how can we position ourselves to attract manufacturing businesses into town or encourage interested residents to establish the businesses required to be part of the construction phase?"

"The transition to renewable energy also brings significant challenges and it is important that developers and the state government work collaboratively with local government to ensure community is actively involved in the transition journey. The reality is not all people will be positively impacted by the energy transition. How can our shire support these people without dividing our community?"

Karen believes the renewable energy transition holds exciting outcomes for the Wheatbelt.

"There is still a long way to go with the transition but we are off to a good start — the renewable energy industry could really set up our shire for the next generation."

Karen Harrington, Shire of West Arthur Shire President

Case study

Windfarm could deliver drought and community resilience

"The renewable energy transition will play out in 20–30 LGAs across the Wheatbelt — how can we harness some of the economic value that will come from the transition to enhance our water, telecommunications, power, housing infrastructure and provide opportunities for local suppliers to build their businesses? The renewable energy transition offers huge opportunities for the Wheatbelt — but we need to plan and collaborate to generate the benefits for our local communities and natural ecosystems."

Renee Manning Director, Wheatbelt Development Commission

Wheatbelt windfarm developer and farmer Tim Stevenson's initial motivation to enter the renewable energy industry was to drought-proof his family's Dandaragan farming operation in the Central Coast sub-region.

But realising the capacity for the windfarm to have broader social impacts, his company Parron Developments invested early in a community framework that will ensure the proposed windfarm generates a financial legacy for his local shire. If approved, the Parron Windfarm has committed to the establishment of a community benefit fund that would see funding of $1,000 per MW per year of energy produced delivered to the Shire of Dandaragan over the 35-year life of the project — about $500,000 each year. The fund will establish appropriate governance including representatives from local government, traditional owners, community, and developers. Other community benefits will include the jobs created as part of the project, with a focus on local procurement, and funds to support local housing and partnerships.

Many of the renewable energy and storage projects planned for WA will be built in regional locations — often in areas unfamiliar with hosting large-scale infrastructure projects. This will invariably create both challenges and opportunities in regional WA.

Wheatbelt communities have much to gain from renewable energy developments but there is an urgent need for capacity building and support at the LGA-level to ensure the energy transition delivers sustained and tangible regional benefits as well as clean energy for WA.

The recently released SWIS Transmission Plan (2025)[19] identifies key areas of focus for upgraded infrastructure, providing more certainty for communities and developers. The state government has developed community benefit guidelines to support communities and developers in creating positive and lasting regional outcomes.

[19] Accessed 10 November 2025: https://www.wa.gov.au/organisation/energy-policy-wa/the-south-west-interconnected-system-transmission-plan-future-ready-transmission-network-was-main-electricity-system



Transport infrastructure

With more than 80% of Wheatbelt agricultural produce and a growing volume of mining commodities exported each year, road and rail infrastructure lie at the heart of the Wheatbelt's economy.

Broadacre grains (wheat, barley, canola, oats and pulses) generate nearly 70% of the Wheatbelt's annual agricultural value ($4.4 billion) — and account for most of the region's agricultural freight and rail freight costs each year. Mining operations associated with the green energy sector are also expanding in the Wheatbelt with Chalice mining (Moora) alone expected to be producing and transporting 5–10 mega-tonnes of green metals per year along Wheatbelt transport routes.

Improving the efficiency with which agricultural and mining commodities and inputs are transported into and out of the Wheatbelt is critical to the ongoing resilience of the region's economy.



Image courtesy: Ben White

The Wheatbelt's road and rail freight network faces several challenges:

- ageing and under-performing road, rail and bridge infrastructure
- consolidation of grain receival sites (down from 200 to 100 in the past 30 years) resulting in grain trucks having to travel further to deliver grain
- price disparity between rail and road making it cheaper to transport grain by road
- larger farm operations needing to move greater volumes of grain and machinery over larger distances
- closure of Tier-3 railway lines (in 2014) forcing grain to travel further by road to receival sites and port
- increasing number and use of larger vehicles on roads originally designed for much smaller load limits
- small rate-payer base of many Wheatbelt local government authorities charged with maintaining and upgrading road and bridge infrastructure



The WA Government's *Revitalising Agricultural Region Freight Strategy* (2020)[20] emphasises the economic imperative of improving the efficiency and effectiveness of WA agricultural supply chains:

Farm size, agricultural machinery, heavy vehicle combinations and train lengths have expanded rapidly (but) supply chain infrastructure has not kept pace. This includes road networks, rail networks, interfaces such as intermodal terminals, and regulatory systems and processes. Improving efficiency, safety and productivity along supply chains is central to Australia's ability to compete in international markets. Global competition is increasing, and without a cost-effective supply chain Western Australia's global competitiveness will fall.

Revitalising Agricultural Region Freight Strategy
(WA Government, 2020)

Wheatbelt road network

The Wheatbelt contains about 30% (41,000 km) of WA's total road network with the region's 42 local government authorities responsible for about 90% of the network and the state government responsible for funding and managing roads classed as 'highways' and 'main roads' (about 3,500 km in total) (Figure 6).

Wheatbelt LGAs are charged with the responsibility for funding, planning, designing and operating the road networks and nearly all bridge structures in their local areas.

About 25% of local government Wheatbelt roads are sealed while 75% are unsealed (gravelled, formed or unformed).

Just over 70% of the local Wheatbelt road network functions as 'access roads' — residential roads providing access to properties. A further 11% of the local network (about 4,700 km) functions as 'regional distributor' roads that link significant destinations within and outside the Wheatbelt. Regional distributor roads are critical for moving agricultural and mining freight. The remaining 20% of the road network is known as 'local distributers' — roads that act in a connecting capacity to 'regional distributor' roads. Local distributor roads are designed to serve traffic generated within a specific area.

20. Accessed 10 November 2025: https://www.transport.wa.gov.au/getmedia/39DE3A1F-5245-4987-9D2B-4D3B33F466E9/fre_p_fs_revagriregionfreightstrategy_final.pdf



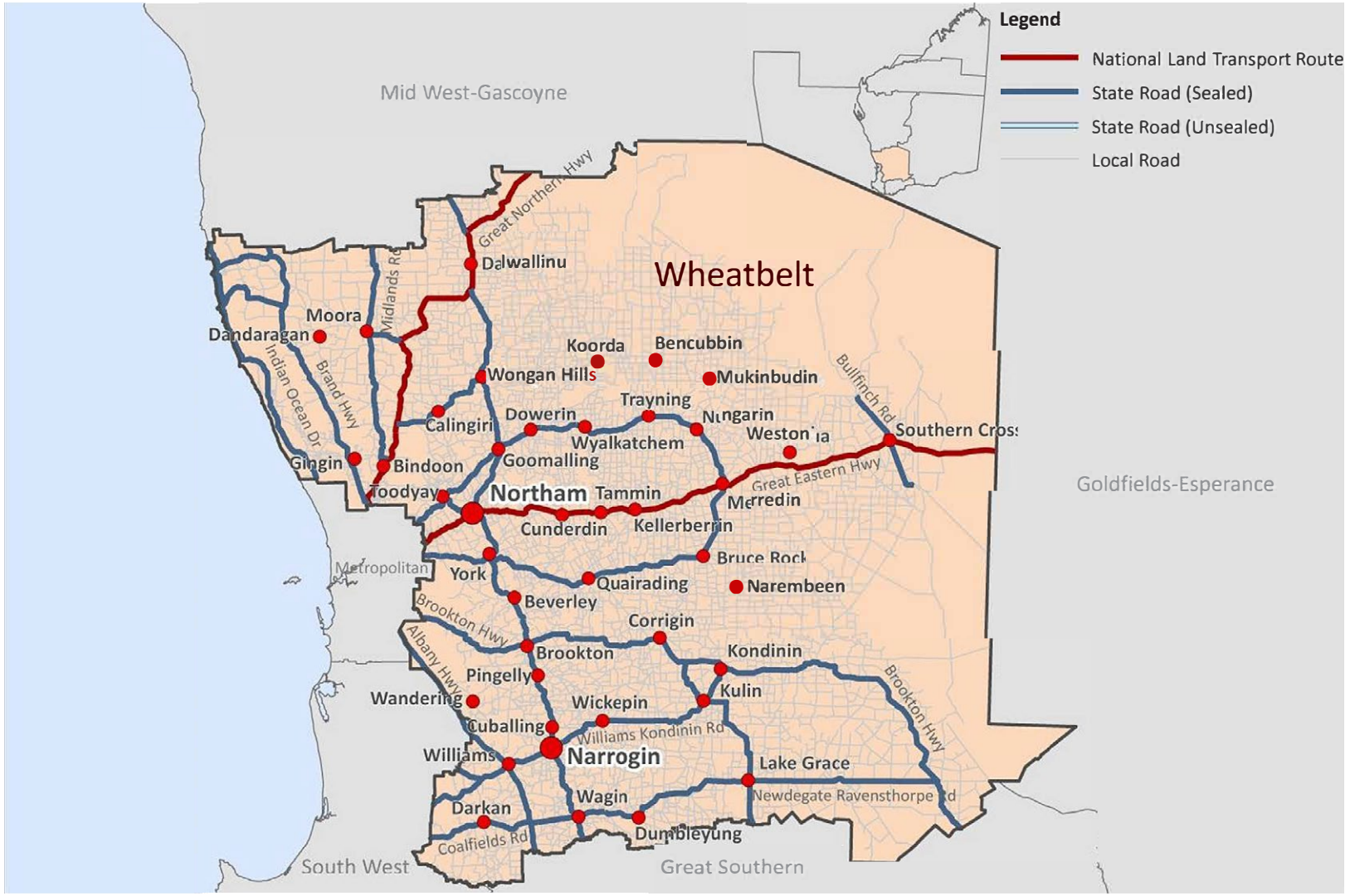


FIGURE 6 National, state and local road network in the Wheatbelt. The region's 42 local government authorities are responsible for maintaining 90% of the network (about 37,000 km).

Source: Main Roads Western Australia

Wheatbelt grain rail network

WA's grain rail network covers 5,500 km and is categorised into three 'tiers' (Figure 7):

- **Tier 1 lines:** high-volume lines that form the core of the network
- **Tier 2 lines:** lines that are economically viable and competitive with road transport
- **Tier 3 lines:** unviable and uncompetitive lines that are no longer operational (closed in June 2014)

About half of the 5,500 km rail network (Tier 1 and Tier 2 lines) is dedicated solely to grain transport.

The Tier 2 lines are the focus of infrastructure upgrades through the Agricultural Supply Chain Improvements (ASCI) program (which is the implementation phase of the Revitalising Agricultural Region Freight Strategy). The ASCI is a $200 million federal and state government initiative to upgrade regional freight rail infrastructure in WA's agricultural areas — including the Wheatbelt. Key projects include $68 million to upgrade 11 rail sidings at CBH grain receival sites to enable faster grain loading onto trains with the upgrades said to halve the time taken to load grain into train wagons.

About $70 million is being used to investigate the potential recommissioning of the Tier 3 rail line in the Narrogin-Wickepin-Kulin area.

WA grain exporters currently compete year-round with emerging lower cost northern hemisphere producers.

Improved supply chain efficiency would help ensure that local grain harvests can ship to international customers quickly, at peak periods of demand, to secure higher prices and export earnings.

More than 70% of respondents surveyed as part of the WA government's Revitalising Agricultural Region Freight Strategy (2020)[21] supported increased investment in rail infrastructure, including intermodal terminals, and there was a strong sentiment towards reinstating the Tier 3 railway lines, which were put into care and maintenance in 2014 by the current lessee Arc Infrastructure. Rail is the most efficient and productive means of transporting large volumes of homogeneous goods, such as grain, over large distances with a 120-wagon grain train able to deliver in one trip the same amount of grain as 86 triple truck road trains (Figure 8). However, current price discrepancies between road (which is heavily subsidised by non-freight users) and rail make transporting grain via road in large trucks considerably cheaper even for long journeys.

[21] Accessed 10 November 2025: https://www.transport.wa.gov.au/getmedia/39DE3A1F-5245-4987-9D2B-4D3B33F466E9/fre_p_fs_revagriregionfreightstrategy_final.pdf



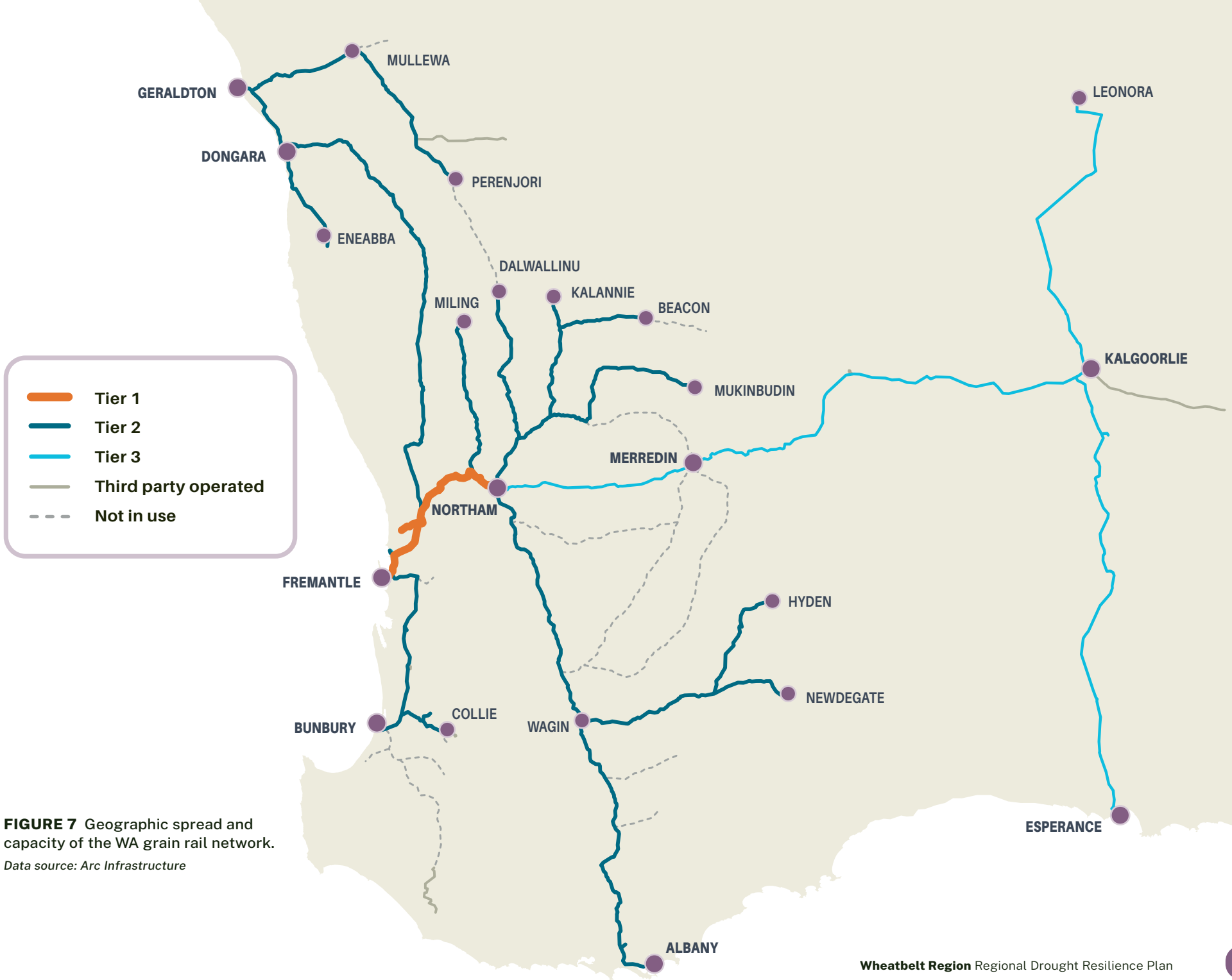
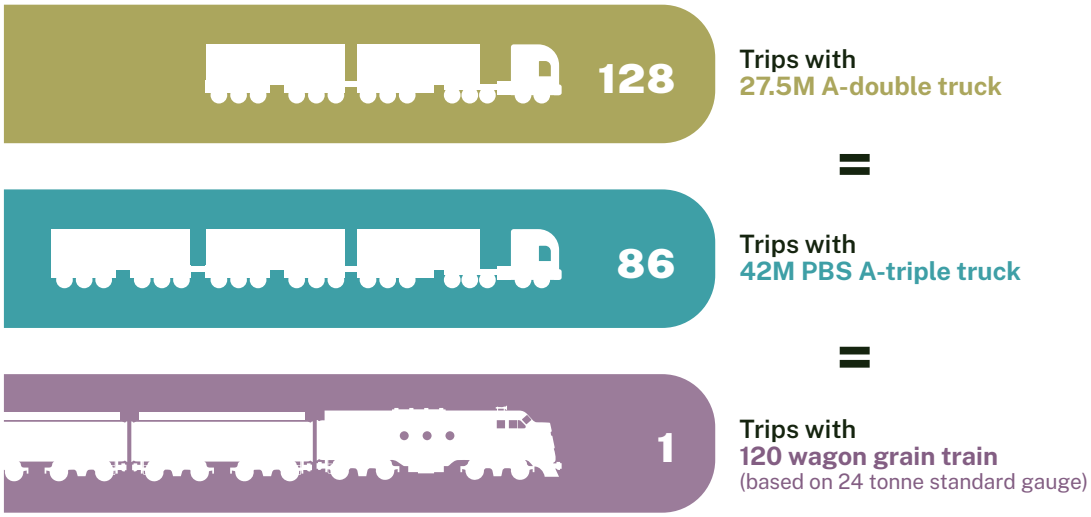


FIGURE 7 Geographic spread and capacity of the WA grain rail network.

Data source: Arc Infrastructure

(a)



(b)



FIGURE 8 (a) Relative grain-delivery efficiency of trains vs trucks and **(b)** rail siding upgrade at one of the 11 rail sidings in the Wheatbelt and Great Southern regions being funding via the $200 million Agricultural Supply Chain Improvements program. Rail siding upgrades at Brookton and Konnongorring are already complete and work is underway at Cranbrook and Moora. The upgrades will halve the time to load grain onto train wagons and increase the efficiency of transporting grain to port.

Data source: Adapted from WA Government Revitalising Agricultural Region Freight Strategy. Image courtesy: CBH Group

Road maintenance

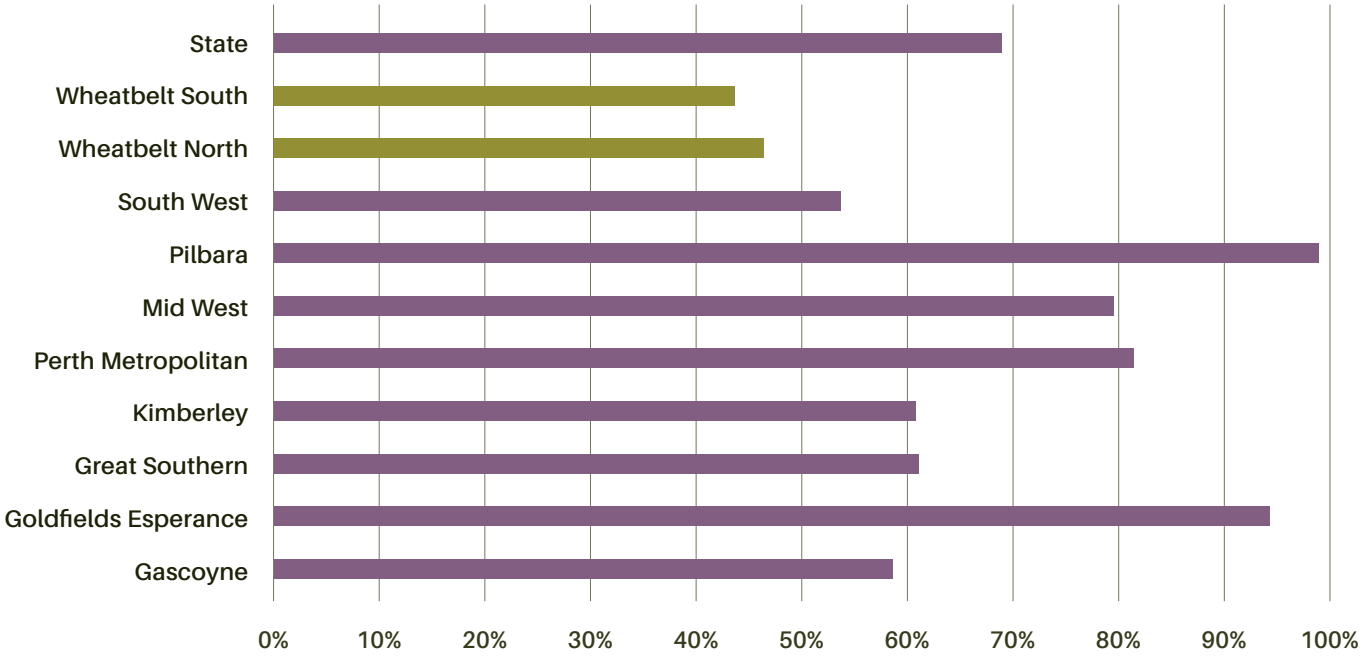
The Wheatbelt's 42 LGAs spent a collective $158 million on road maintenance and improvements in 2023–2024 with about 45% of this coming from federal funding, 30% from state funding and 25% from local government budgets.[22] About 70% of the funds were spent on 'road preservation' — expenditure that either maintains the road asset through repair of potholes or grading and/or increases the service potential or life of a road through resealing or gravel re-sheeting. Less than 30% was spent on road upgrades such as road or bridge widening, or bridge replacement to allow greater traffic capacity.

The Wheatbelt contains more than 320 bridges (36% of the WA total) with nearly a third of these wooden and built more than 70 years ago. Less than $2 million was spent on bridge preservation across the whole of the Wheatbelt in 2023–2024. Ageing, wooden bridges act as 'fuses' within the Wheatbelt road network by restricting the type of vehicles that can drive on the roads.

22. Local Government Association (WALGA) (2025) Report on Local Government Road Assets and Expenditure 2023–2024.

WALGA (2025)[23] estimate that Wheatbelt road expenditure in 2023–2024 was less than half that required to maintain the region's roads at their current condition (Figure 9). At a state level, local governments spent about 69% of the amount required to maintain their roads in their current condition. The metropolitan region spent just under 82% of that required to maintain their roads (prior to 2019–2020 this figure was always above 100%). The Pilbara region achieved the highest preservation performance in the state of 99% while the Wheatbelt (south and north) achieved the lowest performance (Figure 9).

Road maintenance performance also differed widely between Wheatbelt LGAs in 2023–2024; ranging from less than 20% of the funding required to maintain roads in their current condition through to 70–90% in a few shires (Figure 10).



The Wheatbelt is estimated to have needed more than double its 2023–2024 road expenditure just to maintain its road network in its current state.

FIGURE 9 Proportion (%) of required funding spent on preserving current condition of road network across WA regions in 2023-2024.

Data source: : WALGA (2025)

[23] Local Government Association (WALGA) (2025) Report on Local Government Road Assets and Expenditure 2023-2024.

Wheatbelt LGAs are estimated to spend less than half the required amount to maintain the region's roads in their current condition.

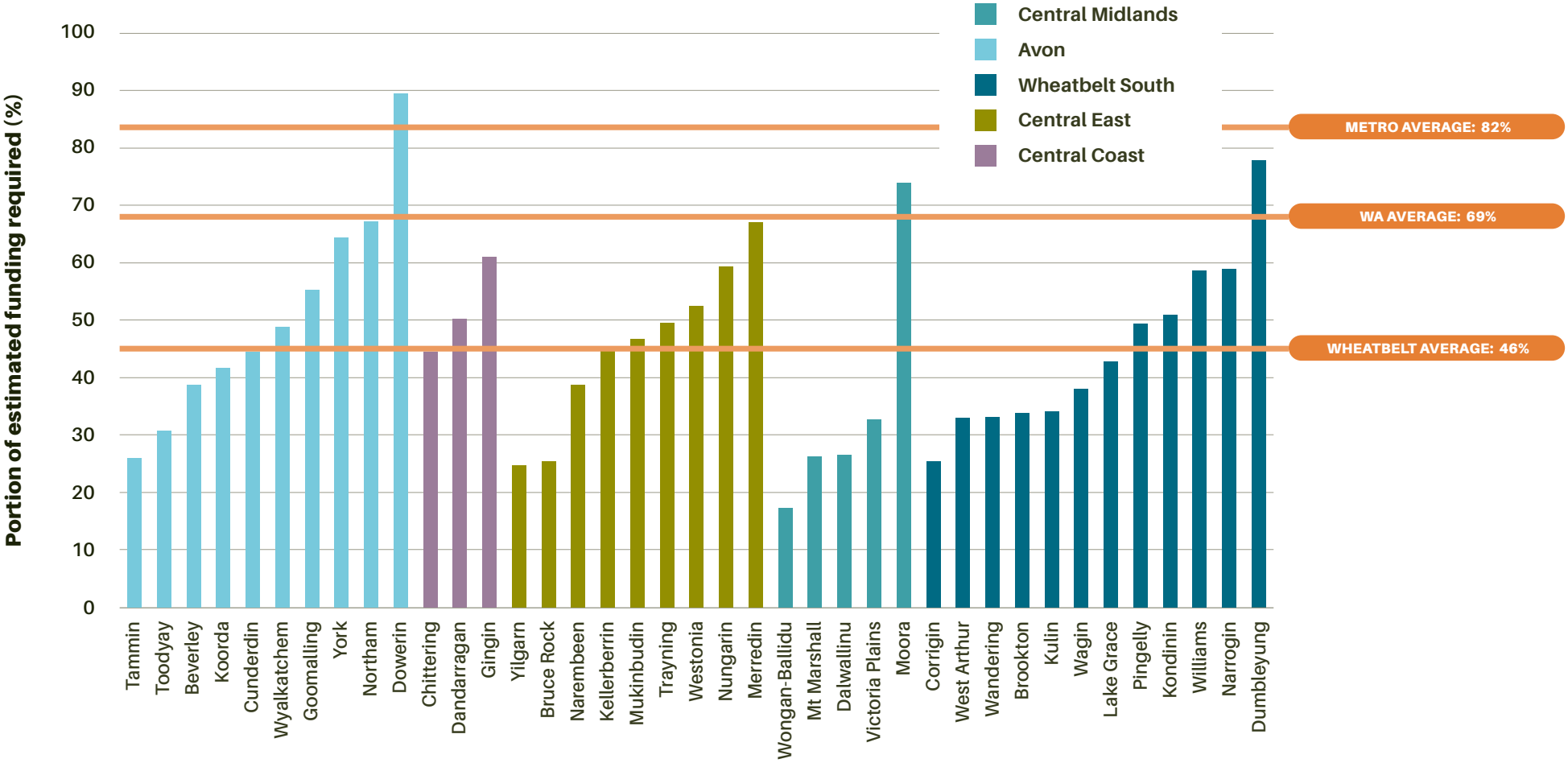


FIGURE 10 Proportion (%) of estimated funding required to preserve Wheatbelt roads in their current condition spent across Wheatbelt LGAs in 2023–2024 compared with the metro and state averages.

Data source: WALGA (2025)

Annual Wheatbelt car crashes more than five times State average

The Wheatbelt has the worst road safety statistics of any region in WA with an average annual 'killed or seriously injured' (KSI) rate between 2019–2023 of 188 compared with 32 for the state average (Figure 11).

The most prevalent crash types resulting in a KSI crash in regional areas are 'runoff-road' crashes.

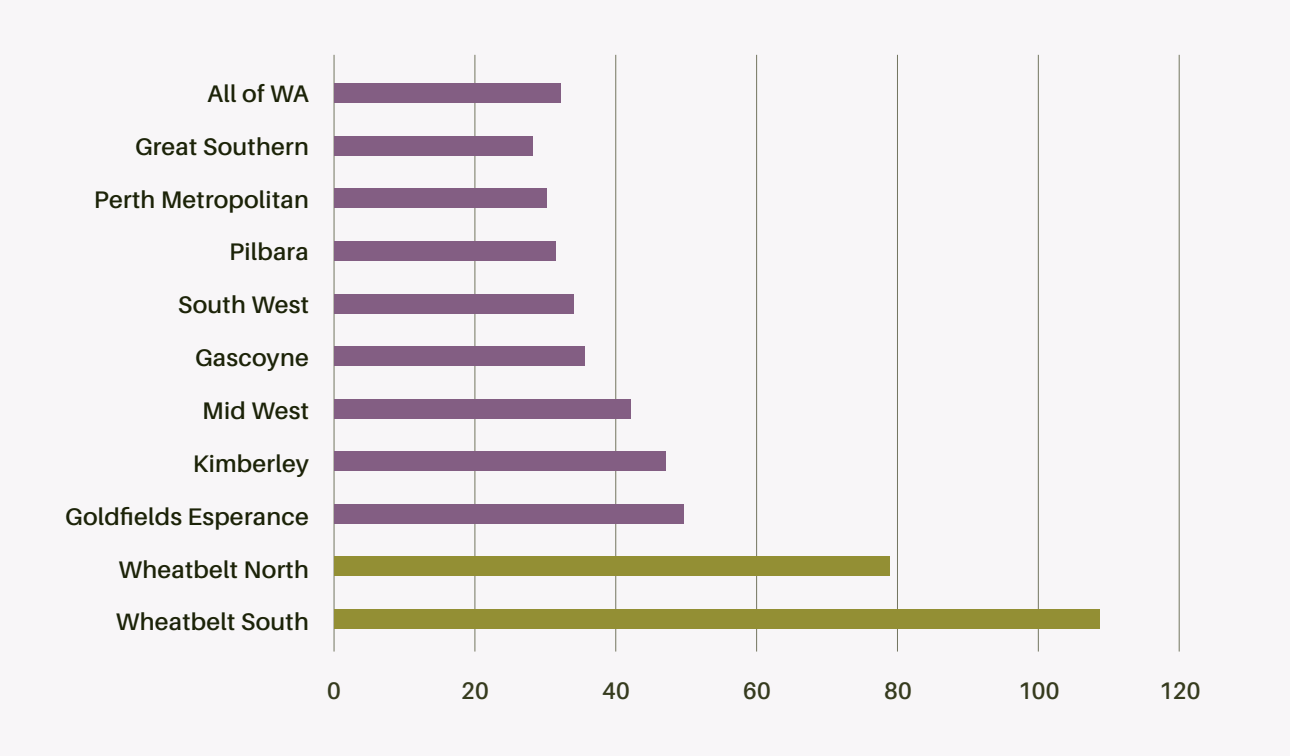


FIGURE 11 Average annual number of people killed or seriously injured per 100,000 population on local government roads in WA regions (2019–2023).

Data source: : Road Safety Commission (December 2024)

Freight network efficiencies

Local government revenue is a function of rate payer numbers. At a WA state level there are 23 people for every kilometre of roads managed by local government. In NSW there are 57 people for every kilometre and in Victoria there are 52 people per kilometre. In the Wheatbelt there are just 1.9 people per kilometre of local government roads.

The Wheatbelt's road and rail network underpins the agricultural sector, both in terms of supplying production inputs such as lime, fertiliser, herbicide and fuel and delivering agricultural commodities to receival points and on to ports for export. At a national level, freight and logistics costs for grain producers are estimated to account for nearly a third (27.5%) of gross farm production, the highest of any agricultural bulk product, with about 34% of these costs occurring predominantly on local government roads.[24] Sauer (2021)[25] used these findings to estimate that the costs attributable to transporting freight along local government roads in the Wheatbelt were in the order of $500 million per year.

"Even small savings (in freight and logistics costs) would translate to large benefits for the (agricultural) industry — for example, a 10% improvement in freight efficiency would result in a $50 million saving that could be distributed between all participants throughout the supply chain."[25]



24. AgriFutures (2019) The Impact of Freight Costs on Australian Farms Publication No. 19-005
25. https://www.westonia.wa.gov.au/council-meetings/ordinary-meeting/july-ordinary-council-meeting-2021/49/documents/0721-bulletin-july.pdf


FuelDistributors
9419 8599

Case study

Strategic approach bolsters road funding

To counter the disadvantage faced by many small local governments in maintaining their road networks, the 42 Wheatbelt LGAs have made a commitment to work together to improve freight routes across the region. The resultant Wheatbelt Secondary Freight Network (WSFN) project is the largest known collaboration between local governments in Australia — an innovative approach that could be used to address other challenges across the Wheatbelt.



Jointly funded between the 42 Wheatbelt LGAs and the state and federal governments, the focus of the collaboration is a network of 80 connecting freight routes covering more than 4400 km of roads (Figure 12). The project has completed a high-level analysis of the current condition of each road and what is needed to make these roads fit for purpose. Many of the roads in the Wheatbelt region were not designed for and are unable to safely accommodate the increase in size and mass of the vehicles required by industry to remain competitive. The upgraded road network will enable these larger, high productivity trucks safe and cost-effective access through the Wheatbelt.

The long-term goal is to obtain funding support for a broadly estimated $500 million capital works program across 2,850 km of the network over a 10–20 year timeframe.

To date (2025) $187.5 million has been sourced with $82,45 million expended on 87 upgrades, with numerous other projects currently in development. Upgrades include the construction of overtaking lanes, road and bridge upgrades, shoulder sealing and road train assembly parking bays. While the focus is on providing better connections between agricultural regions and ports to assist the agricultural sector, the program will also improve access and safety for tourism, mining and other sectors.

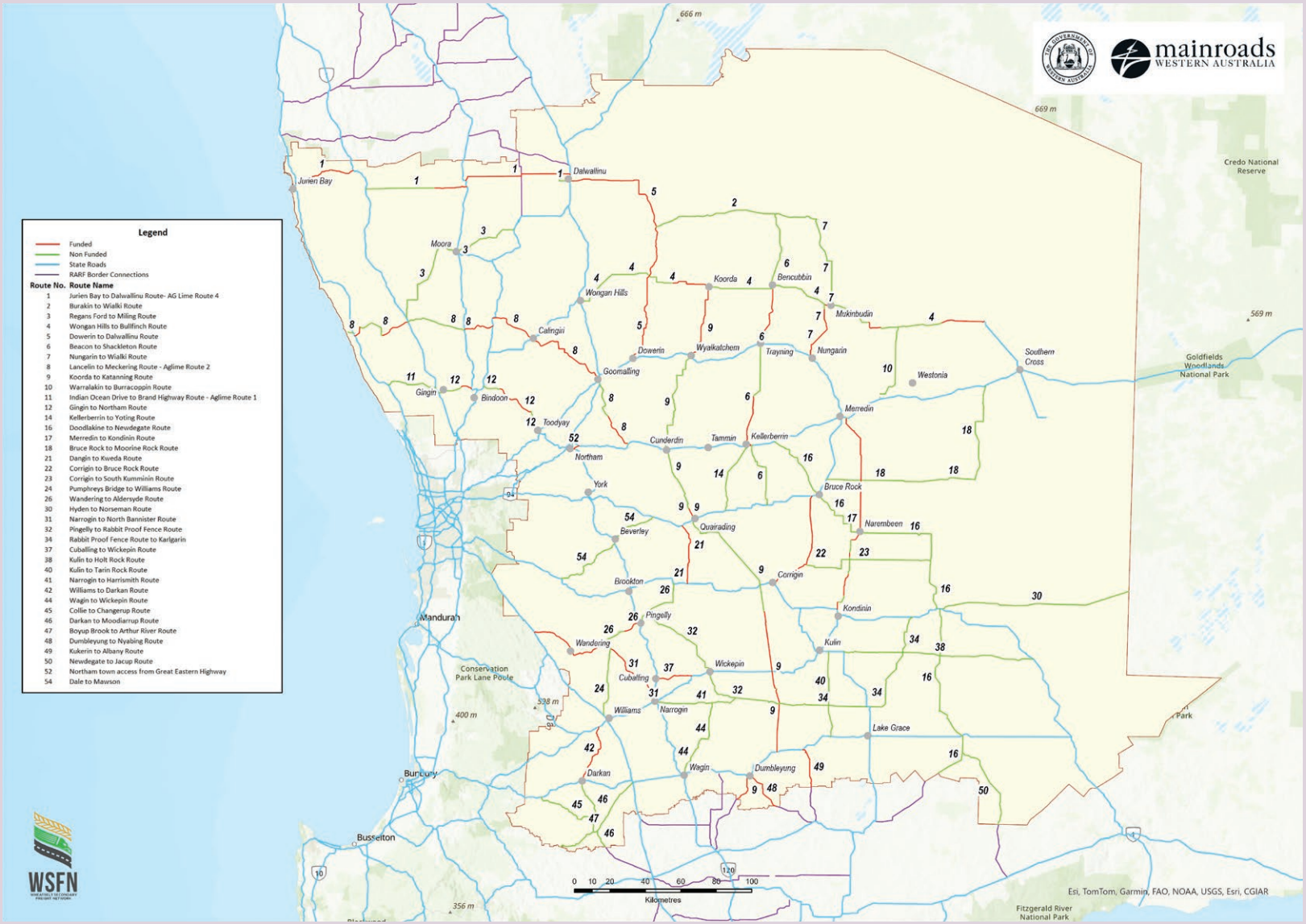


FIGURE 12 Map showing the area covered by the 4,400 km Wheatbelt Secondary Freight Network jointly funded between the 42 Wheatbelt LGAs and the state and federal governments. Upgrades to the network will enable high productivity trucks safe and cost-effective access through the Wheatbelt and lift the efficiency and effectiveness of the Wheatbelt freight network.

Source: Main Roads Western Australia

Case study
Northam freight hub

Three-trailer RAV (Restricted Access Vehicle) 7 road trains (36.5 metres), which carry a significant proportion of WA's domestic freight, are limited to certain roads and cannot enter the Perth area. Road trains destined for Perth from the eastern states are currently required to break up their loads at the road train assembly area in Northam on the outskirts of Perth and then deliver 'dog run' loads to the city, before returning east with another load. This activity and mandatory rest breaks effectively delays the driver and linehaul equipment for up to three days at Northam.

The Wheatbelt Development Commission and Development WA, with guidance from the Avon Industrial Park Advisory Committee, have completed and funded a study examining the potential for Northam to further develop as a freight and logistics hub.

The Northam Freight Hub project aims to facilitate infrastructure investment in the Avon sub-region, while offering the prospect of relocating freight-related industries from the eastern suburbs of Perth to a strategically advantageous location in the peri-urban Wheatbelt. The initiative seeks to optimise operational efficiency and enhance the overall effectiveness of the region's transportation network.

Interest in developing the freight hub has been driven, in part, by CBH Group's purchase of 100 hectares at the Avon Industrial Park to build the Meenaar grain receival site. CBH's development is supported by $6.5 million funding for a rail spur under the Agricultural Supply Chain Improvement (ASCI) program. Further, private developer Procon Developments is currently constructing AvonWest: an integrated logistics and enterprise hub at the Yilgarn Avenue road train assembly area.



Avon Industrial Park, Northam

The proposal creates an opportunity to improve east-west road transport efficiency and reduce the movement of large vehicle combinations into the Perth metropolitan area. It would also increase speed to market by up to 48 hours and enable a further 20–25 interstate crossings per year.



Economic diversification is critical to building drought resilience in the Wheatbelt but will require quality transport infrastructure and logistics to export and import goods across and within the vast region. A growing Perth population also means the Wheatbelt is increasingly being relied upon to facilitate freight transport from a wide range of interstate and intrastate industry supply chains. Investing in Wheatbelt freight infrastructure and precincts will improve the efficiency of these supply chains and encourage new and drought resilient economic activity in the Wheatbelt.

Social services

Droughts, climate change, industry development and population dynamics are all expected to place added pressure on service delivery across the Wheatbelt.

The remoteness and population decline of some Wheatbelt towns makes it difficult to attract and sustain human services while other towns closer to the coast and Perth are growing with retirees, 'tree changers', tourists and renewable energy and mining developments — all of which increase demand for social services, housing and infrastructure.

Different levels of government are addressing some of these challenges through various initiatives and programs including:

Living Well in the Wheatbelt — Towards 2035[26] — (released September 2025) a report and implementation plan developed by the Wheatbelt District Leadership Group to outline the vision, priorities and actions needed to improve social, health and wellbeing outcomes and human service delivery in the Wheatbelt.

Wheatbelt Regional Planning and Infrastructure Framework[27] — identifying infrastructure and planning initiatives that will help diversify the Wheatbelt economy through a shift to value-adding of primary industries, tourism and freight and logistics sectors.

Regional Economic Development Grants (RED Grants)[28] — a WA state government $50.85 million program over nine years investing in local projects to expand/diversify regional industries and develop workforce skills/capacity, increase business productivity and attract new investments.

26. https://wheatbelt.wa.gov.au/wp-content/uploads/2025/09/PRINT_LWITWS_0010_Web.pdf
27. https://www.wa.gov.au/system/files/2021 07/WBT_Wheatbelt_Regional_Planning_and_Infrastructure_Framework_Part_A.pdf
28. https://wheatbelt.wa.gov.au/regional-economic-development-grants/

The number of GPs in the Wheatbelt declined from 89 (2021) to 85 in 2023 and emergency departments activity is increasing year-on-year by an average 3% — however half of ED activity in the region was triaged at a low urgence and could potentially have been seen by a GP or other primary health service. Overall, the health and aged care workforce in the Wheatbelt is ageing and there has been a far higher usage of agency nurses, allied health and locum doctors since 2020–21.[29]

Some Wheatbelt towns are self-funding attractive packages to attract GPs and allied health professionals. Quairading in the Avon sub-region recently advertised for a GP offering a base salary of $300,000 (supplemented by consulting fees) with all costs associated with running the practice covered by the shire and a rent-free four bedroom home.

The total package is worth in the order of $800,000 per year. Shire president Peter Smith is reported to have said of the initiative:

> *'If we don't have a doctor, we won't have a medical clinic. Then we won't have a hospital, we won't have a chemist and so the demise will begin.'*[30]

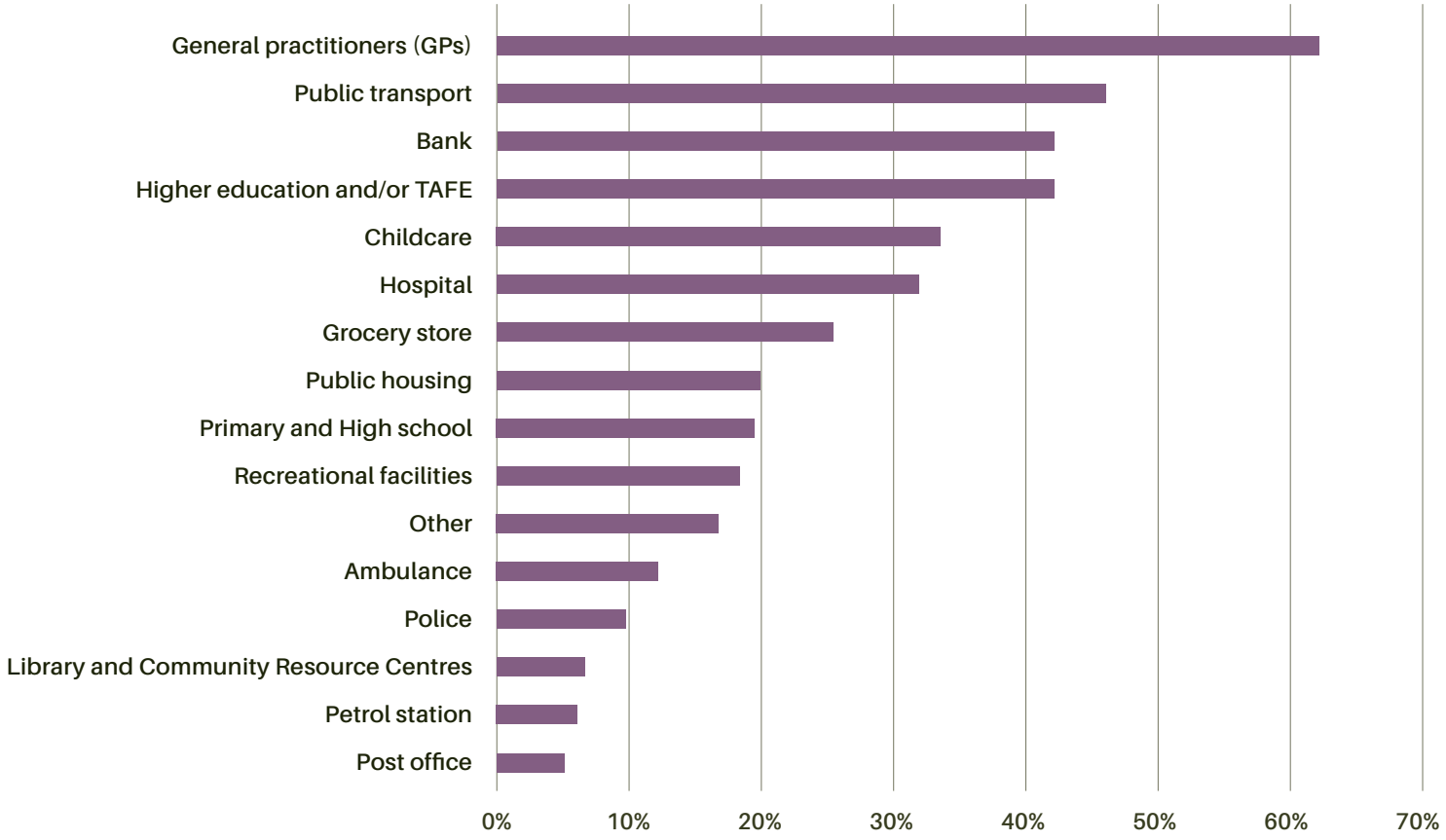
Nearly all participants surveyed as part of the inaugural RRR Network (rural, regional and remote) 'What RRR Women Want' 2024 survey[31] (of which nearly 40% lived in the Wheatbelt) cited difficulty in accessing essential services regionally — with 60% of participants citing lack of access to health services as the most problematic (Figure 13).

29. The Wheatbelt Community Needs Assessment is available upon request at: wbhealthpromotion@health.wa.gov.au

30. https://www1.racgp.org.au/newsgp/professional/reports-of-million-dollar-gp-packages-labelled-can

31. https://www.rrrnetwork.com.au/what-rrr-women-want-survey/





More than 60% of regional and remote women surveyed as part of the inaugural 2025 RRR What Western Australian Women Want *survey indicated that access to health care was their most pressing issue.*

FIGURE 13 Services RRR (Rural, Regional and Remote) Women find challenging to access.

Data source: RRR Network survey (2024)

High priority service delivery issues identified by the Wheatbelt District Leadership Group via the 2023–24 Wheatbelt Community Needs Assessment include:

- Access to GPs and allied health professionals
- Access to community and residential aged care
- Access to dental services
- Community transport — access to appointments
- Access to housing (community and workforce)
- Digital and mobile access

While addressing these issues is beyond the scope of the Wheatbelt RDRP, improving service delivery across the Wheatbelt will be critical to supporting a more diverse regional economy, maintaining and growing Wheatbelt populations, and building drought and climate change resilience.



Case study

Aged care model keeps Wheatbelt residents at home

"Staying in Place is a powerful example of what happens when communities work together and draw on their local assets and relationships to solve local issues."

Jane Harwood, CEO Linkwest

Older people in regional Western Australia have long faced significant barriers to accessing even basic aged care, largely due to limited local services and chronic workforce shortages. These challenges are compounded by government policies and service delivery models that are primarily designed for urban environments, where higher population density and infrastructure enable greater efficiency and scale.

In many cases, the care of older Australians in the regions remains under-served, forcing families to shoulder the burden of care or resulting in older people being displaced from their homes and communities to access the services they require as they age and their care needs increase.

Witnessing firsthand the impact this was having in their own community, the Pingelly Community Resource Centre (CRC) worked with local aged groups to devise a way for older people to age safely and positively in the community.

The Pingelly Somerset Alliance was formed by merging Pingelly Cottage Homes and the Pingelly Frail Aged Hostel group to create a single advocacy group that then worked with the CRC to attract funding for a place-based aged care model. The Commonwealth Department of Social Services expressed interest in the concept and following a cost-benefit-analysis of the proposal funding was secured for a pilot program.

Staying in Place is a community-led, place-based aged care model that enables older residents to remain in their homes while receiving holistic care through local services.

The initiative currently supports 90 clients and has 25+ part-time support workers and eight full-time employees. The total value of the care packages provided is about $4 million with most of the funding benefiting the local economy. The Pingelly CRC, which coordinates the services, generates about $400,000 annually to support the service.

The Pingelly community has gained significant economic and social benefit from the program including the creation of additional employment opportunities for local people, upskilling of the local workforce with locally based training, creation of new businesses to cater to client needs and the introduction and expansion of activities designed to help older residents maintain physical health, mental wellbeing, and social connection.

There are currently 20 towns in the Wheatbelt coordinating care to their residents through the model, catalysed by a 'kick start program' funded by the State government.



The success of the Staying in Place project in Pingelly has enabled LinkWest to secure funding to support the expansion of the concept to 10 communities in more remote areas of Western Australia.

Images courtesy: Pingelly CRC

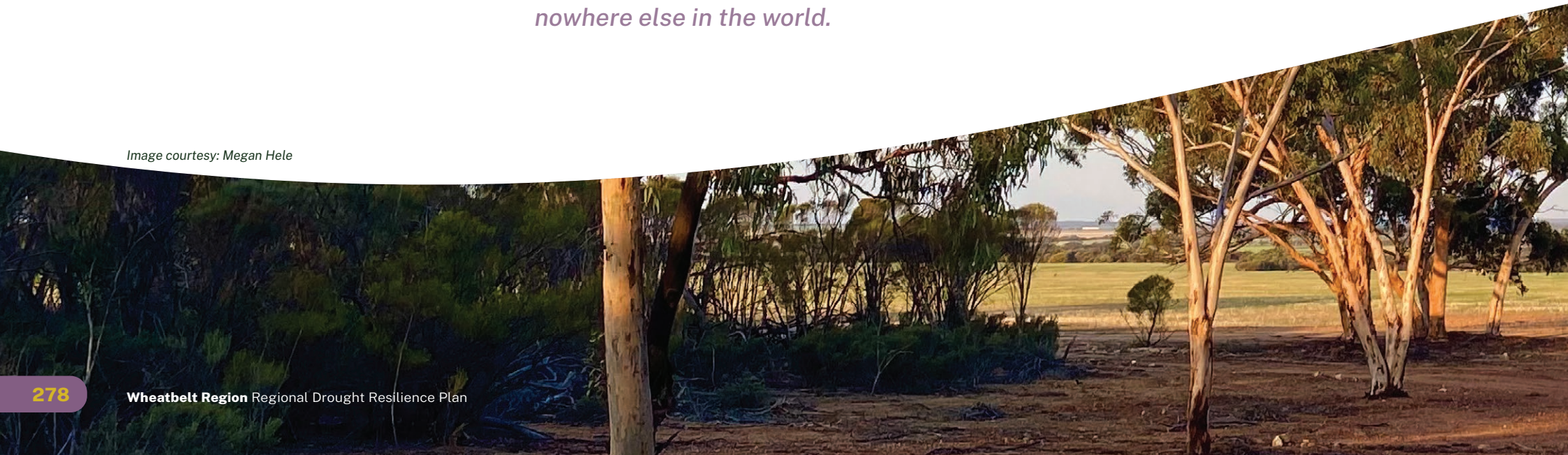
Natural environment resilience

The Wheatbelt Region sits within the South West Botanical Province of Western Australia — one of just 36 globally-recognised biodiversity hotspots.

At a national level, the Central and Eastern Avon Wheatbelt are recognised as one of Australia's 15 national biodiversity hotspots — containing the threatened eucalypt woodlands and the internationally-recognised Ramsar wetland of Toolibin Lake, the largest remaining wetland of its type in south-west Western Australia (Figure 14).

Biodiversity hot spots are defined as areas with high species richness and high vulnerability. To qualify as a biodiversity hotspot an area must contain at least 1,500 vascular plant species and have lost more than 70% of its original habitat. Many of the plant and animal species in the Wheatbelt are found nowhere else in the world.

Image courtesy: Megan Hele



While widespread clearing of the Wheatbelt's natural vegetation from the early 1900s has resulted in one of the most productive cropping regions in Australia, some local government areas have less than 5% of original native vegetation remaining. Eucalypt woodlands that once dominated the region are now restricted to small, fragmented remnants on reserves, roadsides and private property. About two-thirds of these remnant patches are less than one hectare and fewer than one per cent are greater than 100 ha (Figure 15 a and b).



FIGURE 14 Tooliban Lake in the Shire of Wickepin is an intenationally-recognised Ramsar wetland and the last remaining freshwater wetland in south-west WA.

Source: Department of Climate Change, Energy, the Environment and Water



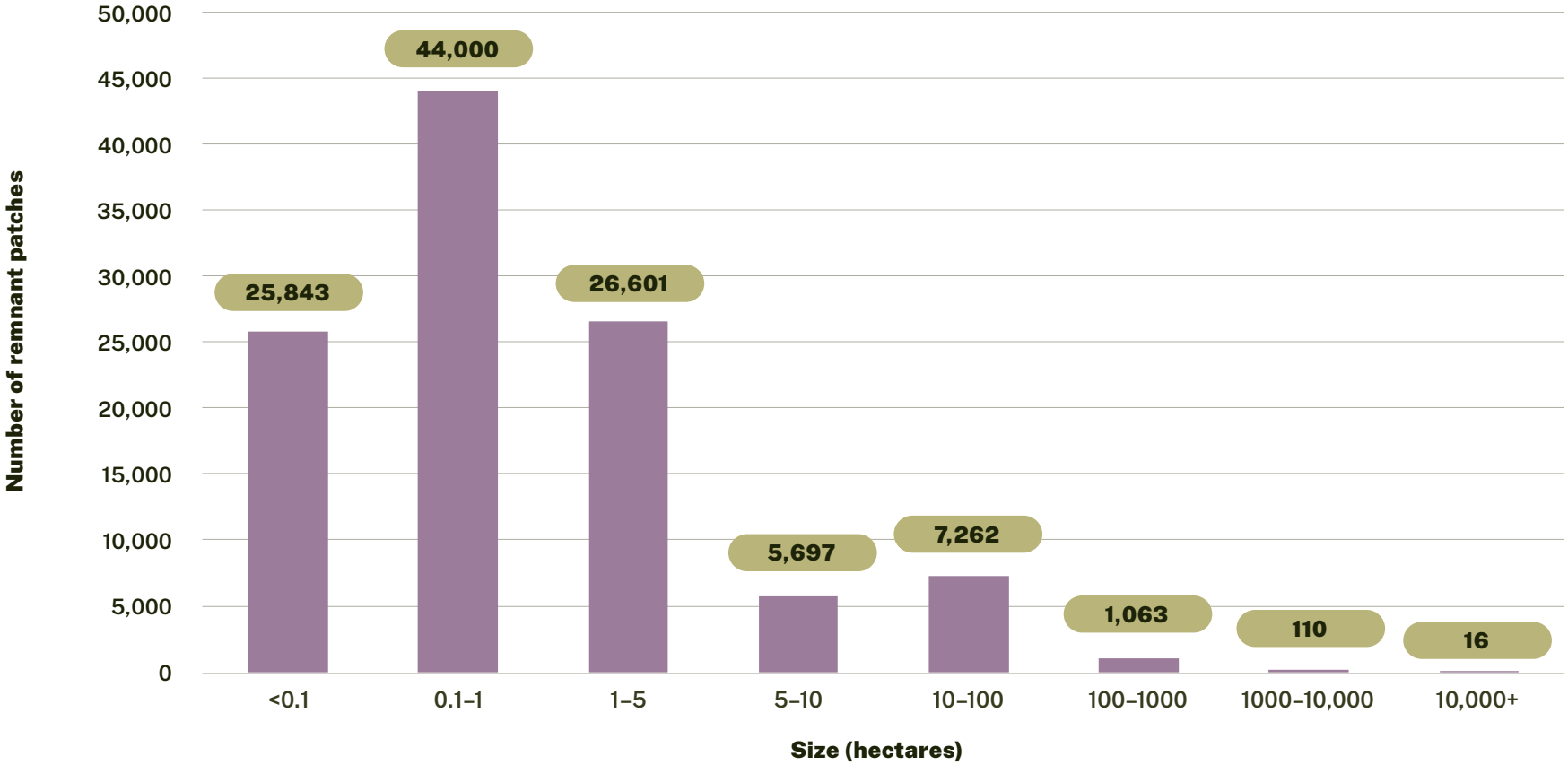


FIGURE 15 a) Number of remnant native vegetation patches within each size class (0.1 ha to 10,000+ ha) across the agricultural area of the Avon NRM region. *Note: Most remnant patches are less than 10 ha.*

Data source: Wheatbelt NRM

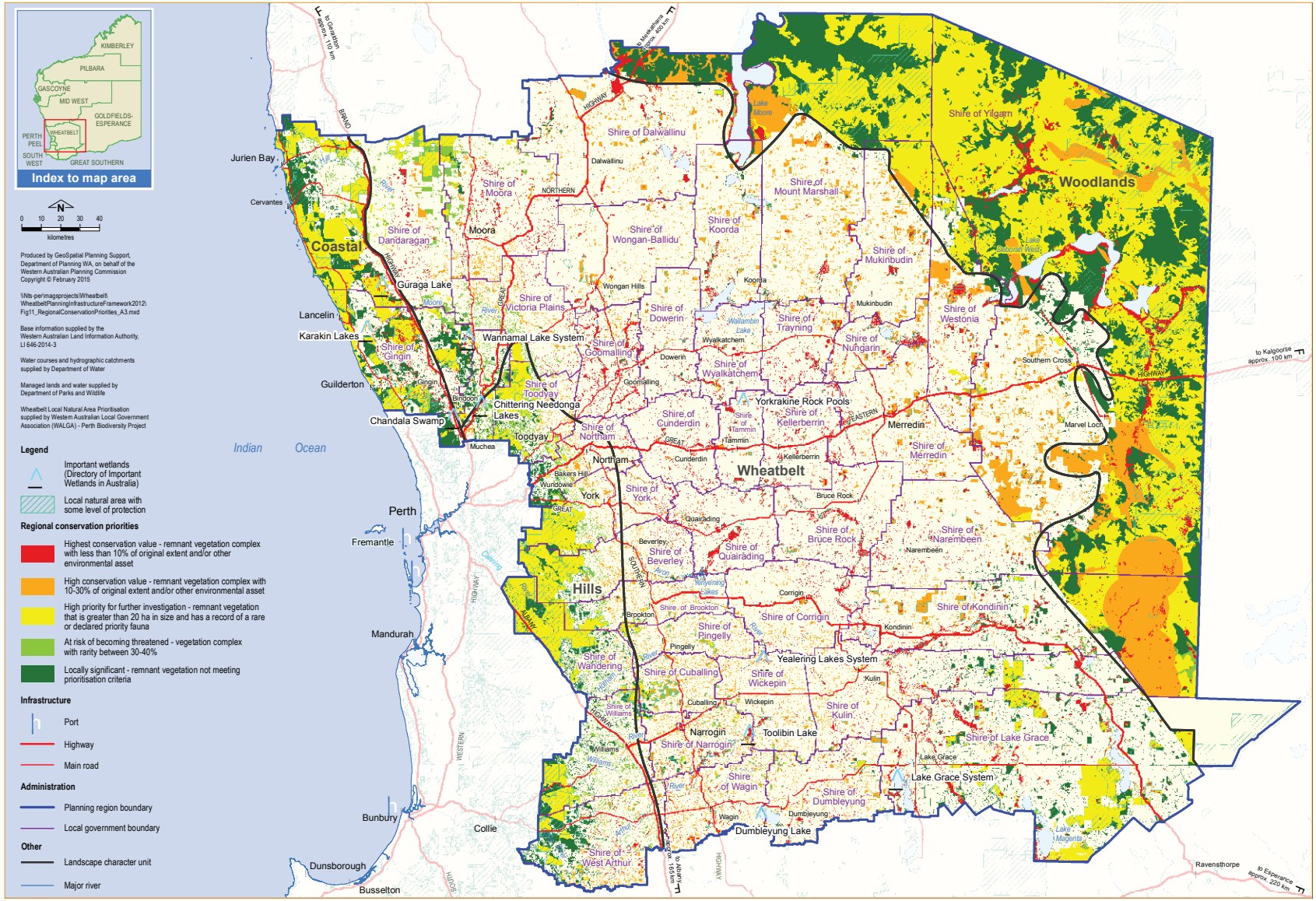


FIGURE 15 b) Wheatbelt conservation priorities showing fragmented nature of high conservation remnants (red areas) — most of which are less than 10 ha.

Source: Wheatbelt Regional Planning and Infrastructure Framework (Western Australian Planning Commission, 2015)

The remnant Wheatbelt woodlands are home to more than 200 threatened animal and plant species including the Carnaby's cockatoo, chuditch, numbat, and malleefowl and are one of just 20 places across Australia prioritised by the Federal Government's Threatened Species Action Plan (2022–2032).[32]

Local Wheatbelt communities often develop very personal attachments to specific reserves, and use granite outcrops, lookouts, breakaways, woodlands, lakes and river pools for recreation.[33]

The mass wildflower displays of the unique woodlands and shrublands are a major tourist attraction across the Wheatbelt with the region attracting more than a million visitors in 2023 spending an estimated $400 million.[34]

Native vegetation on agricultural land provides important windbreaks, reduces erosion and salinity and creates habitat for native fauna — including beneficial insects and birds.[35]

32. https://www.dcceew.gov.au/environment/biodiversity/threatened/publications/action-plan-2022-2032

33. Department of Biodiversity, Conservation and Attractions (2021) Wheatbelt Region parks and reserves management plan 95 2021. Department of Biodiversity, Conservation and Attractions, Perth.

34. Tourism WA (2024) The Wheatbelt Region Overnight Visitor Factsheet. Accessed 10 November 2025: https://assets-us-01.kc-usercontent.com/53c284ed-8b6d-0077-d7d1-762b0c10baee/d1e8ad98-5606-497b-a317-b89be98822b9/RDC%20Visitor%20Factsheet%202023%20-%20Wheatbelt.pdf

34. Baker, T.P. et al. (2018) Impacts of windbreak shelter on crop and livestock production. Crop and Pasture Science 69(8): 785-796.

Image: Monitoring of Malleefowl sites, Beacon. (courtesy Megan Hele)



Image: Monitoring and releasing numbats in the Peel-Harvey catchment (courtesy Peel Harvey Catchment Council)

"We need to be able to monetise changes in ecosystem condition; how do we measure the impact of large-scale commercially driven projects on landscape or farm health?."

Wheatbelt NRM RDRP consultancy feedback



Image courtesy: Wheatbelt Way

"I can remember the old Miley pool — it was our swimming pool and we'd catch fish, there was turtles, there was beautiful big bull rushes and it was really full of water all the year round that I could remember but then it suddenly started drying up and now it's just a dry pool, absolutely no life there. It was our main place for social gatherings we'd take our dinners down there, mothers would take their billy cans and pots and camp ovens and they'd make dampers and kangaroo or whatever they had then they'd all share. I'd love the younger ones to hear this story — you know, to remember our culture and to remember the heritage."

Faye Slater (nee Collard), Ballardong Noongar Boodja

"Waterways were a meeting ground for our people — I know myself as a young kid growing up swimming around water holes and main rivers and today you can't do that and a lot's changed in that time but I think our rangers along with our elders are playing a really strong part in rebuilding — it's not going to change everything but I think if we can all work to together as a collective we can try and mend country as quick as we can."

Jermaine Davis, Ballardong Noongar Boodja



Image: courtesy: Wheatbelt NRM

The Regional Natural Resource Management Strategy for the Avon River Basin (2013)[36] highlights the challenges facing each of the five sub-catchments within the region and outlines the action needed to protect and enhance existing biodiversity (Figure 16). Despite being released more than a decade ago, the strategy's main recommendations are still relevant — underscoring the investment and coordination needed to enhance and protect the Wheatbelt's unique and dispersed natural environment. Placing a true value on the region's natural environment through biodiversity and carbon offset schemes could help drive environmental investment.

"The river was like a shopping centre for us in those days."

Janet Collard, Ballardong Noongar Boodja

36. https://www.nrmstrategy.com.au/about-strategy accessed 11 December 2025

Images: courtesy: Peel Harvey Catchment Council





FIGURE 16 Location of the Avon River Basin (Wheatbelt) and (right hand page) natural resource management issues across sub-regions of the Avon River Basin requiring ongoing restoration and protection action

Data source: Wheatbelt NRM

"We need an online platform that curates environmental projects across the Wheatbelt so we know who's doing what — we need to leverage resources and avoid duplication wherever possible. We need to strengthen partnerships between First Nations property owners involved in native foods and carbon-credit projects so we can better understand what each other is doing."

Michael Hayden, Eastern Wheatbelt Rangers

Avon Arc:

11% remaining bushland, 9% remnant patches >10 ha, 99% of Avon River fenced

Enhance, protect and manage fragmented, at-risk biodiversity, improve fertiliser efficiency on agricultural landscapes, riparian management on major tributaries, manage peri-urban encroachment.

Central Wheatbelt:

6% remaining bushland, 6% remnant patches >10 ha, limited fencing on major river tributary

Make productive use of saline land, manage modified biodiverse systems, address soil acidity, improve fertiliser efficiency on agricultural landscapes, fence/re-vegetate major tributaries.

Eastern Wheatbelt:

17% remaining bushland, 13% remnant patches >10 ha, limited fencing on major river tributary

Enhance, protect and manage remaining biodiversity, prevent further salinity expansion, manage soil acidity, improve fertiliser efficiency on agricultural landscapes, fence/re-vegetate major tributaries.

Great Western Woodlands:

99% remaining bushland, all over 10 ha

Protect and manage impacts on intact native vegetation.
Covering almost 16 million hectares the Great Western Woodlands are the largest remaining area of intact Mediterranean-climate woodland on Earth. The goal of the Gondwana Link project is to link the woodlands with remnant vegetation to the south near Ravensthorpe and Esperance. Most of the Great Western Woodlands area is located immediately east of the Wheatbelt.

Southern Wheatbelt:

20% remaining bushland, 17% remnant patches >10 ha, limited fencing on major river tributary

Enhance, protect and manage important biodiversity refuges, address soil acidity issues, prevent further salinity expansion, support land use planning, fence/re-vegetate major tributaries

"There's 760 nature reserves across Wheatbelt but their health and biodiversity is poor. We need to activate seed banks through burning programs. Nature reserves are the last vestiges of what was here before — we need to improve water quality through riparian plantings and collect and propagate plant species for the Wheatbelt. We need to map priority reserves and overlay these with road, rail and reserve vegetation corridors."

Mathew Wilson, Ballardong Aboriginal Corporation

Drought impacts

Drought and the drying climate have impacted, and will continue to impact, native vegetation communities across the Wheatbelt. Deep-rooted species like salmon gums and eucalypt woodlands are increasingly vulnerable to extended dry conditions, which combined with higher fire risk and greater reliance on shallow groundwater, can lead to canopy dieback and loss of habitat.

Integrating a range of conservation approaches at the regional (ecosystem), community (or landscape) and species (or operational) level could help improve the survival and resilience of species, communities and ecosystems, increase the likelihood of successful adaptation and decrease their vulnerability to climate change[37]*:*

Regional level: strategies include adding areas of native vegetation to the conservation reserve system, preserving and linking vegetation corridors and implementing species recovery programs. This is the approach of the Gondwana Link project a landscape-scale conservation project in south-western Australia, which is reconnecting fragmented habitats across a 1,000 km swathe of land, from the wet forests of the far southwest to the dry woodlands bordering the Nullarbor Plain in the east. The Wheatbelt lies to the north and west of the project. More than 100 organisations are involved in the Gondwana Link, which began in 2002 and focuses on *"protecting remaining bushland and restoring degraded areas to create a healthy, connected ecosystem that is resilient to climate change and supports local biodiversity."* Could something similar work in the Wheatbelt Region?

[37] Department of Biodiversity, Conservation and Attractions (2021) Wheatbelt Region parks and reserves management plan 95 2021. Department of Biodiversity, Conservation and Attractions, Perth.

Image: courtesy: Peel Harvey Catchment Council



Community or landscape level: strategies include improving resilience by increasing and refining existing management of pressures such as invasive plants and animals, diseases and inappropriate fire regimes. The Western Australian Aboriginal Ranger Program provides funding to Aboriginal organisations leading ranger programs through the allocation of competitive grants. About $100 million has been allocated to the program since its inception in 2017 with an additional $69.5 million committed for four years from 2026. The program has funded Aboriginal organisations to employ and train rangers and other staff, to undertake activities from seed collecting, restoration and weed management through to ecological monitoring, research and fire management.

The Noongar Boodja Ranger Team was established in 2014 to provide Aboriginal community members with ongoing work on Boodjar (country) across the Wheatbelt. Rangers are trained across multiple skill sets including safety, operating equipment, native seed collection, weed control and plant identification.

Species or operational level: collecting seed and captive fauna breeding programs provide a fall-back mechanism for long-term species survival and potential re-introduction projects (see case study following page).

Image: courtesy: Wheatbelt NRM



Case study
Boola Boornap tree nursery

As the carbon offset market grows and interest in land restoration increases, so too has the demand for native seedlings.

Noongar Land Enterprise (NLE)'s Boola Boornap native tree nursery is seeking to address the native seedling shortfall and become a leader in the burgeoning restoration industry. NLE's Boola Boornap (meaning 'The place of many trees' in Noongar) native tree nursery received $100,000 in funding to complete irrigation and seedling infrastructure upgrades through Round 4 of the RED Grants program.

Since November 2020 Boola Boornap has produced about one million seedlings from 50 native plant species. Servicing a range of customers involved in land rehabilitation, carbon sequestration and sandalwood production, the funding will allow NLE to undertake much-needed upgrades to meet growing demand.

The grant will assist with the expansion of the tree nursery, increasing production capacity to two million seedlings per year, and allow the enterprise to gain accreditation that will enable direct sales to the public. Australia's first not-for-profit, Aboriginal-led grower group, NLE strives to facilitate a collective approach to land management enterprise development on Noongar land. Seeking to reclaim the relationship between people and Country, about 70% of Boola Boornap's staff are Aboriginal, with most hailing from the local Ballardong Noongar community.



Image: courtesy: Wheatbelt NRM

The upgrades will improve the viability and profitability of the business, allowing Boola Boornap to take on more staff as the business grows. Long term, it is hoped that Boola Boornap, together with other initiatives, will enable NLE to become a self-sustaining organisation and branch out to other aspects of the supply chain.

The challenges facing natural resource management across the Wheatbelt are extensive and multidimensional, demanding a coordinated, landscape-scale, whole-of-community response.[38] Sites most at risk from the cascading impacts of dry seasons, shallow soils, and groundwater depletion need to be prioritised and monitored. Landholders, Aboriginal ranger teams, and community groups need support to identify and buffer critical remnant vegetation — including threatened ecological communities, riparian zones, and deep-rooted woodlands such as Salmon Gum and York Gum.

> *"We need to develop an online space or platform to document the different projects that everyone is doing and identify areas for collaboration. We need a collective approach to map out future projects, and develop a stronger case for funding."*
>
> **Mathew Wilson, Ballardong Aboriginal Corporation**

38. https://www.nrmstrategy.com.au/about-strategy accessed 11 December 2025



Image: courtesy: Wheatbelt NRM

Action required

- **Modernise existing Wheatbelt sub-regional economic development strategies** and growth plans so they reflect current economic, environmental and social drivers
- **Support delivery on recommendations** in the Wheatbelt Economic Diversification study (Bankwest Curtin Economic Centre)
- **Support LGAs to undertake evidence-based studies** into priority infrastructure needs and in progressing project ready business case proposals
- **Coordinate development of sub-regional infrastructure plans** across water, power, housing, transport and telecommunications
- **Explore feasibility of tax incentives (e.g. FMDs)** for small-medium enterprises in areas dependent on agriculture
- **Deliver an 'agile Wheatbelt workforce' initiative** with industry, education and training providers
- **Encourage sharing of emergency response and recovery learning** to strengthen regional networks and build emergency response capacity
- **Bring together** First Nation groups, NRM agencies and community groups, grower groups and private investors to explore ways to expand the nature-based and land restoration economy

For details on each of the actions above see *Implementing the Plan* in Section 10 of this report.

10. Implementing the Plan

Building long-lasting drought resilience at local, sub-regional and regional scales across the Wheatbelt



Coordinating and implementing:

- Targeted solutions to locally-identified resilience issues
- Long-lasting, scaled drought resilience solutions across the Wheatbelt

Image courtesy: Shire of Dumbleyung


AUBURN
VALLEY
CATS

Wheatbelt implemention plan at a glance:

- **The Wheatbelt RDRP process** has resulted in 31 priority actions for building drought resilience across the Wheatbelt
- **The actions cover 'foundational'-type activities** involving data collection and modelling work; 'quick wins' targeted at solving specific local issues and 'future pathways' focussed on delivering solutions to region-wide drought resilient issues



Introduction

Implementing the Wheatbelt RDRP will be underpinned by regional collaborations and alignment with Future Drought Fund programs.

The drought resilience actions identified in this plan are the culmination of hundreds of discussions held in 2024 and 2025, and were informed through data analysis, expert advice and current state and federal policy frameworks. They are a snapshot of needs from a region that has recently achieved several record-breaking grain production seasons, while also facing multiple infrastructure and capacity challenges to manage growth, environmental health and critical service delivery to its residents.

Note that the identified actions also incorporate the interventions identified in the Southern Wheatbelt RDRP. The Southern Wheatbelt RDRP is available from the Wheatbelt Development Commission.

The Wheatbelt RDRP stakeholder engagement process resulted in about 75 resilience-building actions being identified across the region's agricultural, community, water, landscape and economic sectors.

1. **Embedding** Embedding resilience thinking
2. **Securing** Securing the region's water future
3. **Building** Building capacity of businesses and communities
4. **Growing** Growing a diverse and resilient economy
5. **Strengthening** Strengthening agricultural resilience and innovation
6. **Restoring and valuing** Restoring and valuing natural environment



The themes will be used to guide a collaborative approach to advocating for, and funding the changes needed, to secure drought resilience across the Wheatbelt.

The 75+ actions developed during the stakeholder engagement process were refined down to 31 actions by the Wheatbelt RDRP steering committee, using the following criteria:

Alignment of the project with building drought resilience	Impact on resilience including scale of benefits expected	Feasibility – including opportunity to secure or leverage funding and readiness
Strength and quality of partnerships to deliver	Ability to build local capacity	Geographical impact
Addressing resource use efficiency		

The 31 actions (see Table 1) outline the drought resilience focus required for the Wheatbelt in the short, medium and long term:

- **Foundational activities** – improve understanding, build knowledge or networks and raise awareness to inform quick win or future pathways (Table 2).
- **Quick wins** – targeted actions that address specific challenges or opportunities and are most likely driven by regional stakeholders with ability to leverage existing programs (Table 3)
- **Future pathways** – are longer-term actions involving multiple partners, and which may depend on completion of foundational activities (Table 4)





TABLE 1. Summary of Wheatbelt RDRP implementation themes and prioritised actions

THEME	Prioritised actions		
	Foundational	**Quick win**	**Future pathways**
Embedding	• Apply a regional lens to State climate adaptation planning. • Update sub-regional economic development strategies and sub-regional growth plans. • Build a WA Drought Indicators platform to support drought and resilience management and monitoring. • Develop an infrastructure planning and advocacy framework.	• Develop sub-regional infrastructure plans. • Deliver small grant fund to support priority infrastructure feasibility and economic impact assessment.	• Update the Drought Vulnerability Assessment with latest social, environmental and economic data.
Securing	• Complete LGA and sub-region water needs analysis.	• Identify new water supply opportunities. • Develop the WaterSmart Regions project – coordination and communication across water programs.	• Develop a Wheatbelt water security plan.
Building	• Extend and communicate the Wheatbelt RDRP. • Carry out a resilient 'green spaces' audit across the Wheatbel.	• Deliver a small business climate and drought resilience program. • Deliver a resilient Wheatbelt community small grants program. • Communicate resilient Wheatbelt stories. • Build strong cross regional networks to streamline and support the planning and delivery of regional events.	• Develop a First Nations economic and cultural enterprise development initiative. • Deliver/facilitate a resilient Wheatbelt leaders program. • Implement climate initiatives from the Living Well in the Wheatbelt Strategy.
Growing	• Explore financial mechanisms to support resilience of small-to-medium enterprises – e.g. farm management deposits (FMDs) for agricultural businesses. • Build regional readiness to maximise the benefits of emerging industries through development of community or sub-regional readiness plans.	• Workforce development ecosystem — explore opportunities to build cross-sectoral training and employment. • Encourage regional collaboration to support tourism product development. • Support business development through grass roots business incubation initiatives.	• Expand the nature based and visitor attraction economy – foster new industries focused on land restoration, tourism, cultural and environmental services.

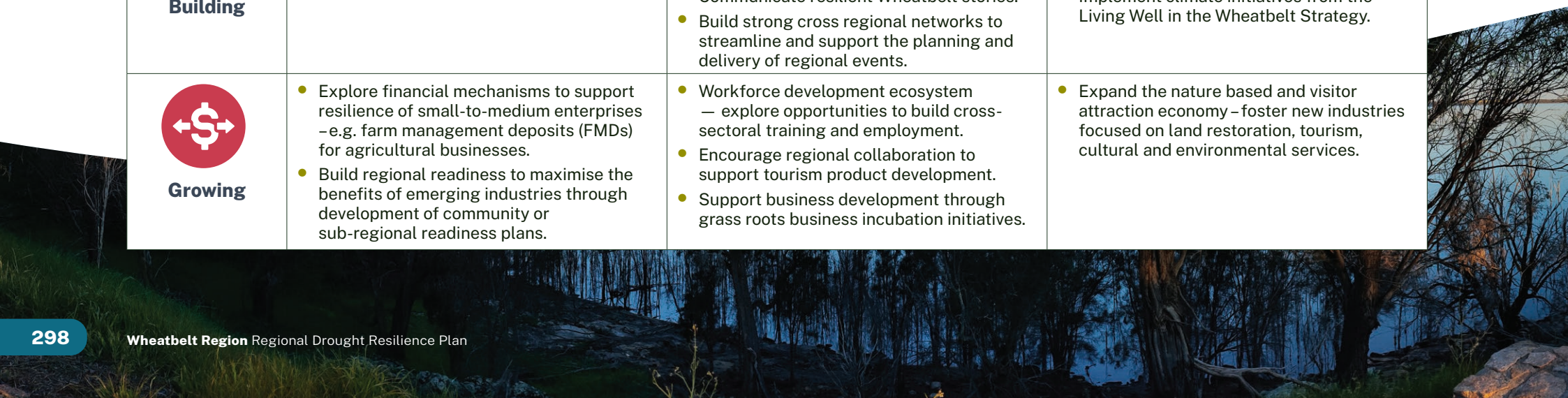


TABLE 1. Summary of Wheatbelt RDRP implementation themes and prioritised actions

THEME	Prioritised actions		
	Foundational	**Quick win**	**Future pathways**
Strengthening	• Wheatbelt R&D - advance locally relevant research, development and extension through strengthened regional partnerships.	• Sector readiness - build sector readiness for emerging risks and markets.	• Demonstrate and share climate smart agricultural practices. • Horticulture Growth plan - develop a horticulture growth plan for the Central Coast and Central Midlands.
Restoring and valuing	• Build an online platforms to improve awareness of carbon, biodiversity and offset projects across the region • Target tree planting — identify at risk areas of the landscape land to target planting (including for carbon, nature repair or biodiversity market projects). • Develop a natural resource condition monitoring report card and build capacity to undertake resource condition monitoring across the region.	• Prepared communities – sharing learning from emergency response and recovery. • Landscape scale preparedness - protect high value remnant vegetation through landscape scale planning. • Getting nature on the balance sheet – improve landholder knowledge of carbon and natural capital opportunities.	• "Gondwana Link" for the Wheatbelt - coordinate landscape scale restoration across catchments. • Healthy waterways – improve water quality through riparian planting. • Identify transformative agricultural land uses that could operate in areas of high risk to drought.



Image courtesy: Shire of Dumbleyung

TABLE 2. Details of priority 'foundational' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Apply a regional lens to State Climate Adaptation planning and policy	State Climate Adaptation policy is considerate of Wheatbelt needs.	• Integrate regional data and risks into WA adaptation frameworks. • Actively participate in consultations and working groups and policy submissions to highlight vulnerabilities, strengths, and actions.	 Embedding	• Social, Economic, Environmental	WDC, DPIRD	Very high
Update sub-regional economic development strategies and sub-regional growth plans	A climate and drought management lens is incorporated into sub-regional planning.	• Review and update sub-regional economic and growth plans to reflect climate risks, demographic trends, and emerging industries • Engage regional stakeholders to validate priorities, identify emerging drivers and priorities for workforce development and infrastructure upgrades to strengthen drought resilience.	 Embedding	• Economic	WDC	Very high
Infrastructure planning and advocacy framework	A coordinated and future-climate proof infrastructure network that addresses water, power, transport, housing, and service needs through collaborative governance and strategic investment.	• Consider establishing a regional planning group based on sub-regional areas, building on existing structures. • Create a framework for ongoing infrastructure planning across the Wheatbelt which allows for identifying and advocacy for priorities at the sub-region level.	 Embedding	• Social, Environmental	WDC	Medium
Build a WA Drought Indicators platform to support drought and resilience management and monitoring	Improved industry and community capacity to anticipate, prepare and respond to drought	• Adapt the national climate/drought indicators for WA, including community resilience indicators. • Undertake longitudinal monitoring of the impacts of drought and adaptive capacity. • Evaluate the impact of drought support programs on farm business and community resilience.	 Embedding	• Social, Economic, Environmental	DPIRD, BOM, DAFF	High

TABLE 2. Details of priority 'foundational' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Local and sub-regional water needs analysis	Improved understanding of current and future water use and critical issues at the local government and sub-regional level.	• Identify critical water security issues in the region. • Engage DWER and Water Corporation to extend the situational analysis on future supply and demand. • Review local solutions to share knowledge and develop practical responses. • Establish a regional water reference group to coordinate advocacy and investment priorities. • Advocate for the continuation or development of programs that incentivise the uptake of on farm water and household water supply improvement.	Securing	• Social, Economic, Environmental	WDC, DWER, Water Corporation, Rural Water Council	Very high
RDRP extension	Increase awareness of the Wheatbelt RDRP and its implementation themes with stakeholders.	• Promote RDRP strategies at key forums and engage partners to identify aligned opportunities. • Provide follow-up communications to share outcomes, strengthen awareness, and maintain cross-sector collaboration.	Building	• Social, Economic, Environmental	WDC	Very high
'Green Oasis' — resilient green spaces audit	Increase understanding of vulnerable community assets to inform investment decisions.	• Audit public green spaces across Wheatbelt towns to assess usage, condition, drought resilience, and gaps. • Prioritise investments in shade, drought-tolerant plantings, and water-efficient irrigation. • Consult community groups to design culturally aligned upgrades, and advocate for green spaces as essential infrastructure for climate resilience, emergency response, and community wellbeing.	Building	• Social, Economic, Environmental	WDC, Water Corporation Waterwise Councils program, LGAs	Very high

TABLE 2. Details of priority 'foundational' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Farm management deposits for SMEs	Investigate the application of the FMD concept to rural or agriculturally dependent SMEs, to provide a flexible financial tool that supports long-term planning and buffering ability to manage cash flow during downturns caused by drought-related disruptions.	• Commission a feasibility review on extending Farm Management Deposit principles to non-farm rural SMEs. • Engage ATO, Treasury, and industry bodies to explore regulatory options for adapting FMD mechanisms or creating a parallel scheme. • Investigate co-contribution or matched savings models linked to drought declarations, drawing on natural disaster support frameworks.	Growing	• Economic	DPIRD RBDC, Wheatbelt Business Network	Very high
Build regional readiness to maximise the benefits of emerging industries through development of community or sub-regional readiness plans	Communities maximise opportunities of new industries, strengthening economic diversity and capturing community benefits.	• Build and understanding of emerging industry opportunities. • Engage across local government, community, business, First Nations and industry stakeholders to develop community and sub-regional level readiness plans.	Growing	• Social, Economic	WDC, groups of LGAs industry proponent	High



TABLE 2. Details of priority 'foundational' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Wheatbelt focused R&D	Advance locally relevant agricultural and natural resource management R&D, and encourage co-investment in long-term, applied research that directly supports climate resilience in regional production systems.	• Facilitate a Wheatbelt-wide research partnership to develop a region-specific R&D plan for all primary industries, with a strong focus on soil health. • Support trials of acid-tolerant crops and pastures, new feedlot models for dry seasons, and Mediterranean-adapted feed systems. • Advocate for investment in plant breeding, soil health, production system trials, and ag-tech adoption. • Identify opportunities for R&D on traditional owner producer properties and collate Wheatbelt R&D priorities across sectors.	**Strengthening**	• Economic, Environmental	DPIRD, SWWA Drought Hub, GGA, WNRM	High
Resilience projects platform	Improve awareness of resilience projects across the region to foster learning and connection.	• Build an online platforms to improve awareness of drought and climate resilience projects, including carbon, biodiversity and offset projects across the region.	**Restoring and valuing**	• Environmental	DPIRD, WNRM, PBCs	Medium
Targeted tree planting	Known areas of vulnerability mapped to support improved targeting of tree planting for maximum environmental outcomes.	• Identify and communicate at-risk areas of the landscape to target planting (including for carbon, nature repair or biodiversity market projects).	**Restoring and valuing**	• Environmental	DPIRD, WNRM, DBCA, PBCs	Medium

TABLE 3. Details of priority 'quick win' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Develop sub-regional infrastructure plans	A coordinated and future-climate proof infrastructure network that addresses water, power, transport, housing, and service needs through collaborative governance and strategic investment.	• Complete an audit of infrastructure across LGAs using WARDA mapping, validate findings with local governments. • Collate and prioritise constraints and opportunities into advocacy documents, review existing studies and plans, and develop standard templates for sub-regional planning. • Produce sub-regional infrastructure plans with clear priorities, cost estimates, and funding pathways to guide investment and advocacy.	 **Embedding**	• Economic	WDC, DPIRD Regional Data Group	Very high
Strategic initiatives for priority infrastructure	LGAs and regional organisations equipped with an improved evidence base to support decision making and advocacy for infrastructure planning and investment.	• Implement a targeted grant round for local governments, regional organisations, and industry groups to deliver feasibility studies, business cases and strategic analyses supporting infrastructure and economic diversification. • Develop clear submission guidelines, evaluate proposals against drought resilience and regional economic priorities, and use project outcomes to inform advocacy and funding strategies.	 **Embedding**	• Social, Economic, Environmental	WDC	Very high
New water supply opportunities	Identify and enable new water supply opportunities.	• Explore opportunities for new supply and sustainable water resources for Wheatbelt. • Investigate and collaborate across region to access National Water Grid Funding for Community Water Infrastructure.	 **Securing**	• Social, Economic, Environmental	DPIRD, DWER, Water Corporation, LGAs	Medium

TABLE 3. Details of priority 'quick win' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
WaterSmart Region Initiative	Coordination and communication across various water programs to improve awareness and knowledge of activities, encourage shared learning and identify potential collaborative future actions.	• Align and communicate existing water programs under a WaterSmart Region banner, including DWER WaterWise and DPIRD WaterSmart initiatives. • Implement pilot projects and encourage LGA participation through SWWA Drought Hub Community Currents project. • Support the Rural Water Council to develop an advocacy plan addressing grassroots water management challenges, and promote adoption of water efficiency measures across farms, communities, and businesses.	 Securing	• Social, Economic, Environmental	WDC, DPIRD, DWER	Very high
Small business climate resilience program	Ensure climate and drought resilience is embedded into existing small business service provider offerings.	• Engage partners and commission a training needs analysis for Wheatbelt SMEs. • Design and deliver a program to strengthen financial literacy and decision-making for drought and climate resilience, including regional workshops on cashflow management, peer networking groups for business support, and workforce planning training for SMEs and farm businesses.	 Building	• Economic	SBDC, Regional Business Networks, RuralWest	High
Resilient Wheatbelt Small Grants Scheme	Community that understands and invests in infrastructure to build climate and drought resilience.	• Deliver a region-wide small grants program for practical, place-based drought resilience projects, prioritising initiatives that build local capability, enhance climate adaptation, improve water and land management, support vulnerable groups, and foster innovation. • Note this action aligns with the Foundational for Regional and Rural Renewal Community Impact Program due to commence in July 2026.	 Building	• Social	WDC, FRRR	High

TABLE 3. Details of priority 'quick win' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Prepared communities – sharing emergency response learning	Increased skills and knowledge to manage and recover from increasingly extreme climate events.	• Create a forum for sharing of response and recovery efforts across communities, including developing a case study on the emergency response and recovery framework tested in Corrigin and Bruce Rock fire recovery program.	 **Restoring and valuing**	• Social, Environmental	DFES, WDC, WALGA	Very high
Resilient Wheatbelt stories	Create a Regional Storytelling and Knowledge Sharing Initiative.	• Expand Voices of the Wheatbelt podcast series. • Implement social media storytelling campaigns featuring local innovation and resilience. • Foster media partnerships to promote diverse resilience stories.	 **Building**	• Social	WDC, WNRM, WBN, SWWA Drought Hub, FRRR, LGAs	High
Build strong cross regional networks to streamline and support the planning and delivery of regional events	Strong networks and improved capacity to plan and deliver regional events.	• Undertake an audit of existing regional events including identification of capacity, resourcing and hosting constraints Investigate and facilitate fast "stand up" of localised community events to support volunteers during drought. • Develop an innovative and flexible community events funding program. • Develop a program to share skills across communities and NFPs.	 **Building**	• Social, Economic	NFPs, LGAs, Tourism associations	High
Workforce development ecosystem	Explore opportunities to encourage cross sectoral training and employment.	• Develop a network of partnerships and initiatives working to promote a thriving workforce development ecosystem, that helps workers build transferable skills and supports pathways for employment. • Ensure State Training Plan is considerate of regional idiosyncrasies.	 **Growing**	• Economic	DTWD Regional Coordinating Committee, DPIRD	High

TABLE 3. Details of priority 'quick win' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Encourage regional collaboration to support tourism product development	Expansion of the regional tourism industry to support economic diversification and amenity improvement.	• Encourage regional collaboration for tourism product development and planning related to key experiences across the region. • Analyse successful sub-regional tourism models and support adaptation to different parts of the region.	 Growing	• Social, Economic, Environmental	Tourism associations, TourismWA, Groups of LGAs, tourism operators	Medium
Support business development through grass roots business incubation initiatives	Enhance ability for businesses to develop and succeed in times of drought, strengthening the economic base of the region.	• Quantify impact of SMEs in the region and true dependency on agriculture. • Develop a program that supports local business development, including exploration of business incubation models appropriate for the Wheatbelt region.	 Growing	• Social, Economic, Environmental	Business networks and CCIs, SBDC, WDC, Community Resource Centres	Medium
Sector Readiness	Build sector readiness for emerging risks and markets.	• Build sector readiness for emerging risks and markets by delivering targeted training programs, including pilots on tech tools for feed supply prediction and drought planning. • Promote existing programs such as Grazing Matcher, SMARTBEEF, and farm business resilience planning workshops. Enhance visibility of opportunities through stakeholder platforms. • Explore tax incentives for drought resilience with industry partners. • Increase awareness of Drought Hub activities.	 Strengthening	• Economic	DPIRD, SWWA Drought Hub	Medium

TABLE 4. Details of priority 'future pathways' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Update the Drought Vulnerability Assessment	Wheatbelt Drought Vulnerability Assessment is kept up to date as new data emerges.	• Regularly update the DVA with current climatic, economic, social, and environmental data, integrating local insights from community groups, LGAs, and industry bodies. • Enhance accessibility through interactive maps, visualisations, and tailored summaries for planners, funders, and community organisations. • Use the updated DVA to guide infrastructure planning, funding applications, emergency management, and investment prioritisation.	Embedding	• Economic, Social, Environmental	DPIRD, WDC	Medium
Wheatbelt Water Security Plan	A strategic and shared Wheatbelt Water Security Plan, that considers both potable and non-potable water supply and is fit for purpose use.	• Through the establishment of a Wheatbelt water working group, secure support to develop of a Wheatbelt wide security plan. • Consolidate sub-regional analysis to map supply and future demand under different climate scenarios.	Securing	• Social, Economic, Environmental	DWER, Water Corporation, WDC	Very high
First Nations economic and cultural enterprise development	Enhance the incorporation of First Nations knowledge and skills to drive enterprise and employment in drought and climate resilience related initiatives.	• Collaborate with Ballardong, Yued, GKB and NCCI to Identify training pathways, enhance visibility of aboriginal businesses, support expansion of land restoration economy opportunities and enterprise development. • Leverage existing carbon planting and DBCA land management initiatives.	Building	• Social, Economic, Environmental	Ballardong, Yued, GKB, NCCI, DBCA, WNRM, WDC	Medium

TABLE 4. Details of priority 'future pathways' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Living Well in the Wheatbelt implementation	Actions related to climate and drought resilience within the Living Well in the Wheatbelt plan are implemented to enhance wellbeing outcomes for Wheatbelt residents.	• Engage with the DLG to identify and fund actions and implementation pathways in the Living Well in the Wheatbelt Strategy that can enhance climate resilience.	Building	• Social	District Leadership Group, WDC	High
Resilient Wheatbelt leaders	Leverage Changemakers program and include a sub-regional scenario planning bootcamp that incorporates climate and drought resilience action planning.	• Work with the FRRR and ALRF Community Impacts Program to ensure appropriate drought and climate lens applied to planned leadership program rollouts.	Building	• Social	FRRR, ARLF, WDC	Medium
Expand the nature based economy	Fostering new industries, particularly in tourism, culture, and environmental services to support diversification of the Wheatbelt economy.	• Facilitate cross regional First Nations knowledge sharing. Align Ranger Programs, conservation initiatives, and applied NRM research to create synergies. • Via sub-regional tourism associations, encourage tourism experiences that showcase broadacre agriculture and biodiversity, such as nature walks and trail tourism. • Partner with stakeholders to identify economic opportunities via natural capital and biodiversity drivers. • Identify, shortlist and achieve project readiness (to business case level) new visitor attraction opportunities to drive significant tourism growth at scale.	Growing	• Social, Economic, Environmental	WNRM, PBCs, DBCA, Tourism	Medium

TABLE 4. Details of priority 'future pathways' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
Share climate smart practices	Increasing knowledge and awareness of climate smart and drought smart practices across the region to support network strengthening and encourage adoption to enhance resilience.	• Demonstrate and scale climate-smart farm practices, and advocate for access to electromagnetic surveys to guide land use and input decisions. • Support cross regional networks through grower tours, workshops and events. • Enhance visibility of existing opportunities through stakeholder platforms.	Strengthening	• Economic, Environmental	DPIRD, SWWA Drought Hub	Medium
Develop a Horticulture growth plan	Develop and implement a strategic, evidence-based horticulture growth plan that supports sustainable intensification in the Central Coast and Central Midlands regions, with a focus on land and water planning, infrastructure policy alignment, climate adaptation, and capacity building.	• Conduct infrastructure gap analysis to identify water, transport, and energy bottlenecks and align planning priorities. • Develop a regional horticulture land use framework and investment prospectus to guide sustainable expansion and attract resilient horticulture investment. • Implement R&D trials and training programs to address climate risks, promote resilient crop genetics and irrigation technologies, and model water demand to inform regional water security strategies integrated with sub-regional planning.	Strengthening	• Economic, Environmental	DPIRD, DWER, SWWA Drought Hub	Very high

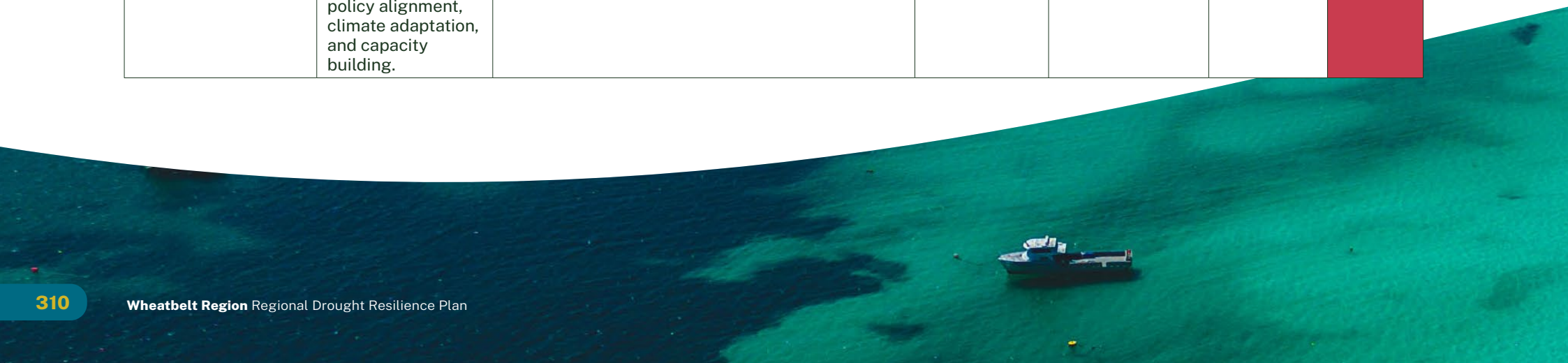


TABLE 4. Details of priority 'future pathways' actions developed through the Wheatbelt RDRP process

Action	Outcome	Suggested implementation pathway	RDRP themes	DAFF Resilience target	Partners	Priority
'Gondwana Link' for the Wheatbelt	Coordinate landscape scale restoration across catchments to enhance landscape scale resilience.	• Facilitate collaboration between neighbouring catchments, First Nations groups, local governments, and landholders to identify priority areas for coordinated land restoration. • Support revegetation, salinity mitigation, native species regeneration, and improved soil and water function. • Incorporate financial incentives for private landholders, integrate traditional ecological knowledge, and align actions with sub-regional NRM priorities.	**Restoring and valuing**	• Social, Economic, Environmental	DPIRD, DBCA, WNRM	Medium
Healthy waterways	Improve water quality through riparian planting along Wheatbelt waterways.	• Support targeted revegetation efforts along key river and creek systems across the Wheatbelt — identify priority sites, provide native seedlings, and implement community planting programs.	**Restoring and valuing**	• Social, Environmental	WNRM, Ranger Programs	Medium



Monitoring and evaluating the RDRP plan

The following monitoring and evaluation framework outlines how progress and outcomes from the Wheatbelt RDRP will be measured, analysed and communicated.

The framework aligns with the Department of Agriculture, Fisheries and Forestry (DAFF) Future Drought Fund (FDF) Monitoring, Evaluation and Learning (MEL) framework.

DAFF's MEL framework involves three outcome levels:

- **Long-term:** Improved resilience and reduced impacts of drought
- **Medium-term:** Enhanced capability, planning, networks, and decision-making
- **Short-term:** Improved knowledge, tools, engagement, and access to resources

The Wheatbelt RDRP M&E framework maps each of the plan's priority actions to the DAFF outcomes.

The ultimate goal is a Wheatbelt region in which communities, landscapes and industries can anticipate, absorb and adapt to drought conditions while maintaining wellbeing, economic stability and environmental sustainability.

Key evaluation questions

Evaluation of the Wheatbelt RDRP will be done annually and use key evaluation questions or KEQs to guide information gathering and analysis and identify insights and lessons.

Long-term questions:

- To what extent has the Wheatbelt region strengthened its resilience to drought across economic, environmental, social, and institutional systems?
- How effectively have the actions reduced vulnerabilities identified through the Drought Vulnerability Assessment?

Medium-term questions:

- Are local governments, agencies, businesses, and communities better equipped to plan for and manage drought conditions?
- Have governance, partnerships, and cross-regional coordination improved?

Short-term questions:

- Have activities been delivered as intended?
- Has awareness, capability, and access to tools improved?

Indicators of progress and data sources

Indicators are grouped by theme and outcome level (short, medium, long). Data will be collected using project logs, passive and active monitoring activities, surveys and interviews, statistical data sourced from ABS, REMPLAN, and agencies including DPIRD, DWER, Water Corporation and DBCA (Table 5).

"A resilient Wheatbelt is one that is prepared for drought conditions and has strategies in place to identify and attend to areas most at risk."

Wheatbelt RDRP consultancy feedback



TABLE 5. Short-, medium- and long-term indicators of drought resilience progress across the Wheatbelt and the data sources that will be drawn upon to monitor and measure progress

THEME	Short term	Medium term	Long term	Data sources
Embedding	• DVA updates completed including integration of new datasets (climate, economic, social). • Number of LGAs and agencies engaged in consultations. • Number of submissions/ briefing notes prepared for State adaptation planning.	• LGAs using updated DVA in planning, funding bids, and emergency planning. • Number of updated sub-regional economic strategies incorporating climate adaptation. • Formation of sub-regional infrastructure planning mechanisms.	• Evidence of reduced drought vulnerability in sub-regional profiles over time.	• DVA updates • LGA plans • Consultation reports • Submissions to government • Early Insights Dashboard • ABS data
Securing	• Number of situational analyses completed with DWER/Water Corp. • Number of LGAs supported to access Community Water Supply Partnership Program.	• Number of feasibility studies and business cases delivered; number progressing to investment or construction. • Regional Water Security Plan completed and used for advocacy. • Increased investment in community water infrastructure (National Water Grid, DWER programs).	• Reduced number/frequency of critical water shortages for priority towns. • Increased diversity of water sources (reuse, desalination, stormwater, groundwater security).	• DWER data • Water audits and reports • Feasibility study outputs • Project tracking
Building	• Number of leadership programs delivered; participation by community, First Nations, SMEs. • SME training needs analysis completed; workshops delivered.	• Increased business capability in financial resilience, workforce planning, drought risk management. • Improved governance and collaboration through regional alliances, ROCs, WBN, PBCs.	• More resilient regional workforce and business ecosystem, evidenced by survivability and continued economic activity during dry periods.	• Workshop attendance • Surveys • WBN/SBDC reports • Before-after capability assessments

TABLE 5. Short-, medium- and long-term indicators of drought resilience progress across the Wheatbelt and the data sources that will be drawn upon to monitor and measure progress

THEME	Short term	Medium term	Long term	Data sources
Growing	• Number of diversification initiatives supported (tourism, cultural economy, natural capital). • Engagement with PBCs, Wheatbelt NRM, Tourism WA.	• Growth in non-seasonal industries (tourism, cultural enterprises, NRM services). • Increased investment in natural capital and restoration projects.	• Broader economic base reduces sensitivity to seasonal conditions.	• Business development data • Project reports • WA tourism metrics
Strengthening	• Number of R&D trials, field days, demonstrations. • Farmer participation in training programs (feedbase, climate tools, precision ag).	• Increased adoption of climate-smart practices (WUE, soil health, resilience crops). • Increased use of decision-support tools (Pastures from Space, biomass tools).	• Increased production resilience and reduced climate-related yield variability.	• DPIRD trial data • GGA participation metrics • Grower surveys
Restoring and valuing	• Number of restoration/ rehabilitation projects initiated. • Number of landholders receiving carbon/natural capital training.	• Area of revegetation, restoration, or protected remnant vegetation. • Uptake of carbon farming / natural capital tools.	• Improved ecological condition, biodiversity, soil health, and groundwater recharge.	• Wheatbelt NRM monitoring • DPIRD resilience programs • Carbon aggregator datasets

CROSS-CUTTING MONITORING ELEMENTS		
Governance and partnerships	**Community engagement**	**Learning and knowledge**
• Strength and number of cross-agency partnerships • Effectiveness of networks and regional coordination	• Participation levels • Stakeholder satisfaction	• Reflection and learning briefs • Integration of findings into planning

Monitoring and evaluation framework

Monitoring and evaluation will be repeated every 12-months for five years.

Year 1 will be used to establish benchmark data for refined assessments of drought vulnerability, water security, local capacity and economic resilience. Reviews in years 2–3 will be used to assess progress against indicators (Table 5), document learnings and refine priorities. Reviews in years 4–5 will again assess progress against indicators (Table 5) and assess long-term changes in resilience across the Wheatbelt.

Reporting methods will include annual progress reports; outcome harvesting reports; regional learning briefs and a final evaluation report.

"Resilient communities have the skills, social cohesion and infrastructure needed to manage climate change."

Wheatbelt RDRP consultancy feedback



Image courtesy: Shire of Pingelly

Baseline Evaluation
Year 1

Establish benchmarks for vulnerability, water security, local capacity and economic resilience

Mid-Term Review
Year 2–3

Assess progress, document learnings, and refine priorities

End-of-Cycle Evaluation
Year 4–5

Assess outcomes and long-term resilience changes

Year 1

Annual check in – collect information and evidence against KEQs and indicators; assess delivery, share findings and review and update MEL

Year 2

Annual check in – collect information and evidence against KEQs and indicators; assess delivery, share findings and review and update MEL

Year 3

Annual check in – collect information and evidence against KEQs and indicators; assess delivery, share findings and review and update MEL

Year 4

Annual check in – collect information and evidence against KEQs and indicators; assess delivery, share findings and review and update MEL

Year 5

Annual check in – collect information and evidence against KEQs and indicators; assess delivery, share findings and review and update MEL

Annual progress reports → **Outcome harvesting reports** → **Regional learning briefs** → **Final evaluation report**

Real-time learning reviews: Conducted after pilots or major initiatives

Southern Wheatbelt RDRP summary

The Wheatbelt Development Commission (WDC) partnered with the Department of Primary Industries and Regional Development (DPIRD) to support the delivery of the Southern Wheatbelt Regional Drought Resilience Plan (SW RDRP). The SW RDRP encompassed the Shires of Dumbleyung, Wagin, Lake Grace, Kulin and Kondinin.

Stakeholder consultation facilitated the contribution of more than 330 individuals, representing 150 organisations, to the SW RDRP and Drought Vulnerability Assessment (DVA). The DVA informs and should be read in conjunction with the SW RDRP. (Links to both documents provided on page 320).

The Southern Wheatbelt region's agricultural sector has a history of active engagement in climate adaptation and drought preparedness. It is recognised that more can be done to build on existing drought resilience.

The Southern Wheatbelt RDRP has five key themes, with a range of interventions and suggested actions identified and listed in detail within the SW RDRP shown in Table 6.



Image courtesy: Shire of Northam

TABLE 6. Southern Wheatbelt RDRP themes, interventions and pathways

	Maintain	Modify	Transform
Resilient Water	• Southern Wheatbelt small water infrastructure projects	• Future looking and coordinated total water management planning. • Better water data to support planning and better regional development outcomes • Incentivise the uptake of on farm and household water supply improvement	• Alternative non-potable water source investigation and development to 'climate proof' water supplies in the region
Resilient Communities	• Maintain spaces and places to build connection • Small town-big events program • Reduced red tape to hold impromptu events	• Development of local leadership capacity • Build cultural connections to integrate traditional owner knowledge • Increasing community capacity to understand, plan and manage for drought • Community building activities to engage all ages	• Refine the Drought Vulnerability Assessment model to better incorporate social indicators and implement longitudinal monitoring in vulnerable cohorts
Resilient Agriculture Systems	• Farm Business Resilience and Small Business climate resilience planning workshops in the region	• Building drought, climate, and carbon literacy to support risk management planning • Articulating research and development needs for the region • Build a better understanding of business and climate risk	• WA Drought Indicators Platform and longitudinal monitoring program • Identify transformative agricultural land uses that could operate in areas of high risk to drought
Resilient Landscapes	• Monitor impact of drought on natural resources • Community activities that bring people together and support environmental and economic outcomes such as Red Card for the Red Fox • Explore diversification options to increase value of marginal land at risk of drought	• Natural resource condition report card and natural capital accounting for the regions • Best bet land and infrastructure design uses to support improved natural resource functioning	• Building regional capacity to manage natural resources • Attract projects that support wide scale landscape benefits such as wide scale woody vegetation planting for biofuel production • Strategic region wide revegetation program in vulnerable and less productive areas
Resilient Regional Economy	• Monitor impact of drought on infrastructure	• Addressing constraining enabling infrastructure to support industry growth and regional resilience to climate change • Regional collaboration to support tourism product development • Quantify and qualify the impact of SMEs and business and industry diversity on climate/drought resilience	• Supporting business development through grass roots business incubation • Encouragement and maximisation of community and economic benefit of emerging industry investment in the region

The SW RDRP proposed interventions aligned strongly with the Future Drought Fund's strategic priorities and objectives.

Notably, Southern Wheatbelt stakeholders identified improving water system resilience and reliability as the number one priority to build drought resilience in the region. There was also a desire to better articulate agricultural systems research and development needs and build strengthened connections within and across the region.

The themes and interventions within the Plan provided exposure to a broad range of investment opportunities and have an evidence base to support engagement with stakeholders on implementation. These themes and interventions will now be incorporated into the Wheatbelt Regional Development Plan (Wheatbelt RDRP) and be actioned accordingly through future investment and initiatives.

WDC website link:

- Regional Drought Resilience Planning Program

Document links:

- Southern Wheatbelt Drought Resilience Plan
- Southern Wheatbelt Drought Vulnerability Assessment







Image courtesy: Shire of Lake Grace



wheatbelt.wa.gov.au