WIMMERA SOUTHERN MALLEE DROUGHT RESILIENCE PLAN

Acknowledgement of Country

We acknowledge the Wotjobaluk, Jaadwa, Jadawadjali, Wergaia, Jupagulk, Tjap Warrung, Dja Dja Wurrung and Gunditj Mirring Peoples as the Traditional Owners of Country that the activities of the Wimmera Southern Mallee Regional Drought Resilience Plan are being held on. We respect their ongoing connection to lands and waterways upon which we depend, and we pay respects to their culture and their Elders past, present, and future. We acknowledge that Aboriginal self-determination is a human right enshrined in the United Nations Declaration on the Rights of Indigenous Peoples, and we are committed to working towards social, economic, and cultural equity for Aboriginal Victorians.

This Plan was jointly funded by the Victorian and Commonwealth Government under the Future Drought Fund.

Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

AGRICULTURE VICTORIA

Preface

Drought causes significant financial, social and environmental impact on people, communities and the region. The Wimmera Southern Mallee region is committed to taking steps now to ensure well considered strategies are in place to prepare for and manage through future dry periods.

The Wimmera Southern Mallee Drought Resilience Plan (the Plan) was developed under the Regional Drought Resilience Planning (RDRP) Program, which forms part of Future Drought Fund. The RDRP Program is supporting the development of regional drought resilience plans throughout Australia over 2021 to 2024.

The aim of the Plan is to empower and enable communities to collectively identify and address their needs to be better prepared for and able to manage future dry seasonal conditions and droughts. The Plan may inform future investments in regional drought resilience. This Plan builds on the Wimmera Southern Mallee's historic and recent experiences of drought and related strategies, programs and activities.

The $5 billion Future Drought Fund invests in a wide range of drought resilience initiatives to help Australian farms and communities prepare for the impacts of drought. These are implemented through a suite of programs under five focus areas:

1. Harnessing innovation
2. Better risk management
3. Better climate information
4. More resilient communities
5. Better land management.

The RDRP program is included under 'better risk management'. Regional drought resilience includes elements that cover all focal areas. The Wimmera Southern Mallee Drought Resilience Plan therefore bridges all Future Drought Fund categories and identifies actions the community proposed to build drought resilience.

Agriculture Victoria in partnership with regional communities facilitated the development of this Plan, which was jointly funded by the Victorian and Commonwealth Government under the Future Drought Fund.

This Plan should be read in conjunction with the *Drought in the Wimmera Southern Mallee Region* report.

Contents

INTRODUCTION

Agricultural systems in the Wimmera Southern Mallee have been developed in the context of a highly variable climate and many farmers have lived experience of coping through drought. Broadacre cropping is the primary land use in the Wimmera Southern Mallee region (55 per cent of agricultural production) followed by livestock (mostly sheep and lambs at 23 per cent of agricultural production). Dryland cropping in the Wimmera Southern Mallee is highly dependent on the timing and quantity of rainfall.

During the Millennium drought key stakeholders came together to advocate for and coordinate drought support; this group was known as the Horsham Dry Seasonal Conditions Group. Despite the name of the group, it had representation from across the Wimmera Southern Mallee region. Many people from the Group have been involved in the development of this Plan and we acknowledge the work that the Horsham Dry Seasonal Conditions Group has done in supporting local people and communities through drought.

Regional Drought Resilience (RDR) Plans are developed with an ear to the local community and regional stakeholders and aligned with Victorian and Commonwealth government principles and approaches to drought preparedness and response. The Plan supports communities of the Wimmera Southern Mallee region to be better prepared to respond to future drought events. RDR Plans leverage regional strengths and address vulnerabilities in the region's ability to prosper during dry seasons and droughts.

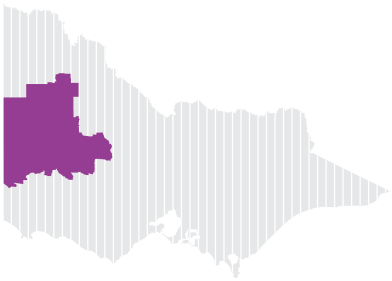
RDR Plans are aligned to the strategic priorities of:

- *economic resilience* for an innovative and profitable agricultural sector
- *environmental resilience* for sustainable and improved functioning of landscapes
- *social resilience* for resourceful and adaptable communities.

Although Agriculture Victoria coordinated the development of the RDR Plan it, is very much guided by a Reference Group consisting of representatives from community, industry and government. The Reference Group members and their affiliated organisations guided drought resilience thinking and ensured that the plan can respond to change through adaptive planning and community engagement processes. The Reference Group had four workshop style meetings to guide the plan content and develop actions. A summary of the Reference Group discussions can be found in Appendix 1. The Group also provided access to local reports, regional priorities and ensured coordination of place-based strategies. Additional regional stakeholders were also engaged to inform the development of the plan.

Agriculture Victoria employed Facilitators for each region to capture key ideas and opportunities for improvement from community engagement and Reference Group discussions. As a result of the engagement process, six key resilience themes emerged.

1. People and communities
2. Farm enterprises
3. Industry and businesses
4. Infrastructure
5. Government and agencies
6. Landscape.



The Wimmera Southern Mallee region

The Wimmera Southern Mallee Regional Partnership area and key population and employment statistics.

For the purpose of this plan, the Wimmera Southern Mallee region is defined by the Wimmera Southern Mallee Regional Partnership boundary and includes the five Local Government Areas (LGAs): West Wimmera Shire, Hindmarsh Shire, Horsham Rural City, Yarriambiack Shire, Northern Grampians Shire. Table 1. includes high level geographic, demographic and economic information for these LGAs.

The Wimmera Southern Mallee region in central western Victoria encompasses large grain growing areas. It is home to many small, vibrant communities and is served by the major regional centres of Horsham and Stawell. The region has relatively low levels of unemployment and provides residents and visitors with recreational and outdoor pursuits in vast and open landscapes. Home to some of Victoria's iconic natural attractions, including the Grampians National Park, the Wimmera River, major deserts, wetlands and lakes, the region serves a population of 47,400 and contributes to the Victorian economy with a Gross Regional Product of $2.493 billion (RDV, 2022).

Table 1. Key details of the region's five LGAs

LOCAL GOVERNMENT AREA	MAIN SHIRE SERVICE CENTRES	AREA SQ KM	POPULATION	ECONOMIC OUTPUT ($ MILLION)
Horsham	Horsham, Natimuk	4,267	20,000	2,816
Northern Grampians	Stawell, St. Arnaud	5,730	11,400	1,800
Yarriambiack	Warracknabeal, Hopetoun, Rupanyup	7,326	6,600	461
Hindmarsh	Nhill, Dimboola, Rainbow, Jeparit	7,524	5,600	708
West Wimmera	Edenhope, Kaniva	9,101	3800	519

POPULATION
(2022)

47,400

TOTAL AREA
SQ KM

33,948

GROSS REGIONAL PRODUCT
(2022)

$2.5 billion

BUILDING DROUGHT RESILIENCE

What is drought?

Many definitions of drought exist, generally depending on what indicators are used to describe it. Meteorological drought relates to the lack of rainfall, at least below expected rainfall. Hydrological drought relates to the lack of runoff, measured by river and creek flow volumes, a lack of groundwater availability, and a lack of water storage in catchments. Agricultural drought can be defined by the lack of productivity on-farm resulting from a lack of water. Other definitions include institutional drought, where decisions on water allocation have induced a water shortage, economic drought, which is defined by an economic downturn resulting from a lack of water availability. Green droughts exist where limited rainfall shows the appearance of green paddocks, but insufficient water is available for agricultural crop production.

Definitions of drought are important because they help define the issues to be addressed. For this Plan no single definition will be used, since the Plan aims to build regional resilience to drought. Every individual, business, organisation and community will have their own unique drought experience. For example, the impact of drought is felt differently in broadacre cropping than in livestock farming and the health care sector requires a different approach to the educational sector to cope with drought. This Plan aims to build resilience across communities, businesses and sectors, however each experiences the impact of drought differently.

It is important to note that duration and intensity of drought have an impact on how resilient a community can be. While on-farm drought management can be effective for a seasonal drought, it may be less effective for a 5-year drought. A meteorological drought with 'only' low rainfall may have less impact than a hydrological drought combined with heatwaves, dust storms and fires.

An integrated assessment of the socio-economic and environmental impacts of past, present and future droughts is available in the supplementary report: *Drought in the Wimmera Southern Mallee region; Information to support the Wimmera Southern Mallee Regional Drought Resilience Plan.* This assessment is based on an analysis that considers how drought affects farms and the wider community.

In the development of this plan organisations and individuals came together to discuss drought and chart a course for a smarter, more resilient future. The plan was not developed to deal with an emergency, or an acute drought. It was developed to assist the Wimmera Southern Mallee community creatively prepare, respond to and recover from drought. The Plan proposes actions that individuals, communities, industry and government can take to be better prepared for future droughts.

At livestock auctions, farmers have begun offloading stock because of the high cost of feed. Federal Government forecasters have predicted that Australia is heading for its worst wheat crop since the drought of 1994–95, with production likely to be cut almost in half in the year ahead. According to the Australian Bureau of Agricultural and Resource Economics, Victoria's wheat belt is in "serious drought".

— The Age, Droughts and the unexpected, September 15, 2002

Resilience

For the purpose of this document, resilience is defined as the ability of a system to effectively respond to disruptions, like drought, while maintaining function. It is about being able to consistently and collectively develop, hone and create the tools to adapt, thrive and take advantage of opportunities when encountering change. Rather than 'persistent maintenance' of the current situation resilience includes the ability to adapt and potentially transform the way things are done during periods of uncertainty and change.

There is no one-size-fits-all solution to becoming a resilient community. However, certain community characteristics are known to contribute to resilience. These characteristics have been used to build the suite of actions documented in the Plan.

Resilient communities demonstrate some, or all, of the following characteristics:

- Local leadership and initiative
- Governance that embraces change
- Connection through formal and informal networks

Resilient communities:

- Work together in the pursuit of common goals
- Foster self-responsibility
- Are adaptable and learn lessons from change
- Can anticipate issues and effectively manage risk
- Consider different perspectives and options to solve complex problems.

WIMMERA SOUTHERN MALLEE DROUGHT RESILIENCE THEMES, OUTCOMES AND ACTIONS

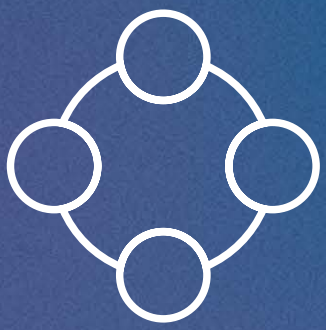
Thematic Framework

This Plan is founded on six themes underpinned by outcome statements and priority actions to build drought resilience in the region.

The Wimmera Southern Mallee stakeholders identified these actions as those with the greatest opportunity to build regional drought resilience. Not all actions will be implemented straight away. Some actions are already underway, others require new or further investment and some may require further planning to design and implement.

Theme 1

COMMUNITIES AND PEOPLE



Under the theme of 'communities and people' actions are captured which help communities prepare for and build resilience towards drought. It includes actions that contribute to better health and well-being outcomes, access to and use of primary care services and actions focused on improving liveability and connectivity within communities. The theme also focuses on the areas of employment, education and skill development.

The West Wimmera shire has the lowest population density in Victoria with farms and communities being relatively isolated. More than half the population is employed in the agricultural sector. Hindmarsh shire has the second lowest population density in Victoria. Employment in agriculture contributes to 30 per cent of total jobs in Hindmarsh. Yarriambiack shire employment also relies heavily on agriculture. In the Northern Grampians shire agriculture contributes 13 per cent to the shire's economic output, with manufacturing and mining providing a larger output and 40 per cent total to the shire's economic output.

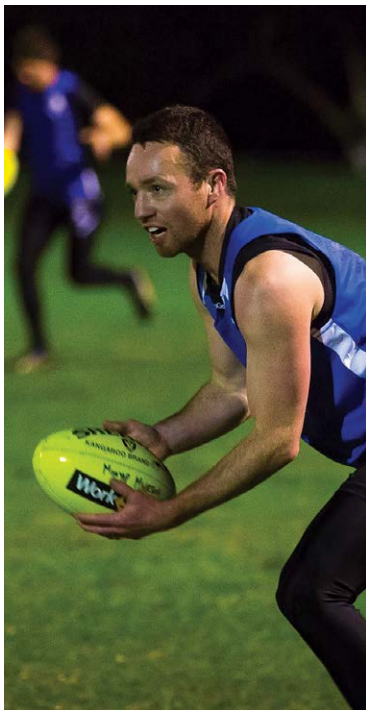
Horsham Rural City has the highest population density in the Wimmera Southern Mallee, with 4.7 persons per square kilometre, but still faces significant challenges in providing services and creating social, digital and economic connectivity compared to other regions in Victoria. Employment in agriculture contributes to 8 per cent of total jobs with health care, retail and construction sectors providing more job opportunities and contributing 40 per cent of total jobs.

The Wimmera Southern Mallee region includes the traditional lands of the Wotjobaluk, Jaadwa, Jadawadjali, Wergaia and Jupagulk peoples, around St Arnaud the Dja Dja Wurrung people, in the Gariwerd (Grampians) the Tjap Wurrung people, and in the Southern part of the West Wimmera shire the Gunditj Mirring People. The Barengi Gadjin Land Council has legislative responsibilities relating to the management of Aboriginal cultural heritage places in the Wimmera Southern Mallee region, the Eastern Maar Aboriginal Corporation has legislative responsibilities in the Gariwerd region, the Dja Dja Warrung Clans Aboriginal Corporation has legislative responsibility in an area near St Arnaud and the Gunditj Mirring Traditional Owners Aboriginal Corporation in the South of the West Wimmera shire.

Outcomes:

Communities and people in the Wimmera Southern Mallee are resilient to drought events.

This outcome supports the mental health and physical well-being of people, as well as liveable and vibrant communities. Opportunities are available to connect socially and digital access to services are readily available, including remote areas. Support is available to ensure the cultural and spiritual values of water and landscape are maintained during drought periods. There are many opportunities for recreation, social networks are strong and people are willing to step in and help each other during difficult times.



Focus Areas for action
Continued investment in community leadership programs
Ensure local sport and cultural events in the region remain organised during drought periods and ensure the infrastructure remains serviced
Promote events and activities to share drought experiences
Maintain access to recreational water and park areas during times of drought when their impact on community mental and physical health, environment and recreation is most critical
Build and strengthen programs to support mental health and create awareness of support options for the whole community
Ensure continuing training and education on the use of digital tools, to reduce the digital divide
Increase awareness and build respect for cultural and spiritual values of Country and protect areas of significance from drought impact
Build awareness of the actions that can be taken to increase resilience to drought
Continue to include drought resilience, preparation and response options in regional education and training, particularly as it applies in a local context

Theme 2

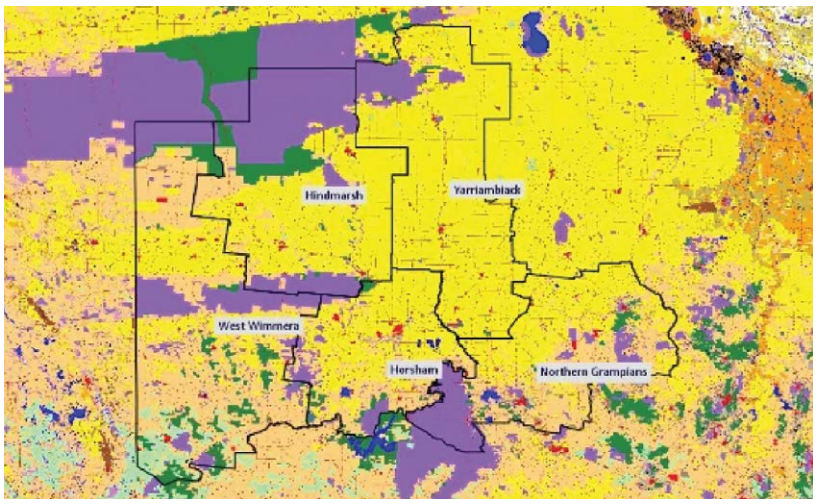
FARMING ENTERPRISES

The ‘farming enterprises’ theme covers farm planning and business management and includes actions related to innovation and adoption, tools, information and data to support decision making, and diversified income streams for farmers.

The Wimmera Southern Mallee is primarily reliant on dryland cropping and livestock grazing (Figure 1), producing more than a quarter of Victoria’s grain and sheep meat, respectively (DJPR, 2022). Broadacre cropping includes grains, pulses and oil crops like canola. Livestock farmed in the area is primarily sheep.

As a result of expanding farm sizes, competition for land is increasing in the Wimmera Southern Mallee. Farm size growth is often accomplished by leasing additional land and purchasing land when it becomes available on the market. Increasing farm size is expected to result in a stronger business with improved economies of scale and a stronger market position. Land price increases in the northwest region of Victoria reflect this increased demand for land ownership.

Resilience of the agriculture sector over the past decade has been enhanced by the conversion of the channels systems to a rural pipeline network. This has enabled a return of stocking levels in the region that are more reflective of the 1980’s and 1990’s.



- Nature conservation
- Managed resource protection
- Other minimal use
- Grazing native vegetation
- Production native forests
- Grazing modified pastures
- Plantation forests (commercial and other)
- Dryland cropping
- Dryland horticulture
- Land in transition
- Irrigated pastures
- Irrigated cropping
- Irrigated horticulture
- Urban intensive uses
- Intensive horticulture and animal production
- Rural residential and farm infrastructure
- Mining and waste
- Water

Figure 1. Land cover types in Wimmera Southern Mallee in 2020

Data source: ABARES 2021, Catchment Scale Land Use of Australia – Update December 2020

Outcomes:

Farms and other businesses are financially sound and contribute to strong economies that are well prepared for and more resilient to the effect of future drought. Jobs on farms and in the agriculture sector are more attractive, accessible and reliable, especially to youth. The agricultural sector is productive and integrated in the regional landscape.

Focus Areas for action
Advocate for support of financial advice and counselling services to enable farm and other businesses to make timely business decisions
Assist farm businesses with whole of farm planning, including drought preparedness, treatment of drought as a business risk, system and income diversification, and alternative income streams, especially in periods of non-drought
Encourage and support Wimmera Southern Mallee community members to access and utilise financial advice and counselling services
Encourage and support on farm drought preparedness activities related to land, crop and livestock management that are specific to the Wimmera Southern Mallee farming systems, climate and environment
Strengthen and expand locally specific and relevant agricultural research, development and extension
Support youth and careers in agriculture through workshops, career days, meet and greets and on-farm traineeships
Encourage entrepreneurship in farming businesses, both in family farms and enterprises through ‘skilling up’

Theme 3

INDUSTRY AND BUSINESSES

The ‘industry and business’ theme includes actions to build resilience in businesses and industries involved in the agricultural value chain, but also those that are affected by drought impact on the agricultural sector. Especially in the Wimmera Southern Mallee, small and medium businesses are an integrated part of the community and regularly provide essential services.

Businesses in the Wimmera Southern Mallee show a wide variety of profiles. Many businesses have links to agriculture or the agricultural value chain. Smaller communities often host businesses supplying essential services, like the bakery, local hardware shop, and businesses providing hospitality services (such as restaurants, hotels, pubs).

The manufacturing sector is less concentrated in the region compared to the Victorian average. However, it shows a significant specialisation for food product manufacturing, likely supported by regional output from the food processing centres in Stawell, Nhill and Horsham. There is a strong link between the agriculture sector and local food product manufacturing, which is focused on grain mills, cereal products and meat processing. The food manufacturing sub-sector is a significant contributor to regional gross value added and accounts for about 81.2 per cent of total manufacturing exports (DJPR, 2022).

Outcomes:

Industries and businesses are financially sound and contribute to strong local economies that are well prepared for and more resilient to the effect of future drought. Rural communities have access to essential services and the local economy supports the well-being and liveability in the community.

Focus Areas for action
Advocate for support for financial advice and counselling services to enable industry and small businesses to make timely business decisions
Support for commercial services to provide a drought lens to discussions with all businesses, including larger firms
Promote and retain local business leadership/management located in the region for better informed decision making and early detection of drought impact
Support networking of industry, businesses, and the financial sector to focus on drought preparedness
Work closely with the financial sector to support customers with high drought impact risks

Theme 4

GOVERNMENTS AND AGENCIES

The theme of ‘governments and agencies’ includes actions which all levels of government and various agencies can undertake to build resilience within their own institutions and staff, as well as the services they provide to community.

The Wimmera Southern Mallee region includes five local government authorities (LGAs). Each has a council and supporting organisations, often with more than one service centre to allow access and service provision to remote areas. Due to large areas and low population density, rate payments only cover minimal operational costs.

In addition to LGAs, several other government and not-for-profit organisations operate in the region, providing health services, training and emergency response and recovery. The Wimmera Primary Care Partnership is made up of 30 member agencies including local government, welfare, disability and education. There are five health services spread over fourteen campuses, two bush nursing centres and an Aboriginal controlled health cooperative.

Outcomes:

Agencies and governments are prepared for the impact of drought on people, the environment and the economy. Preparedness supports resilience within agencies and governments by ensuring contingency plans are in place and resources are available.

Focus Areas for action
Maintain and regularly review plans for drought response and recovery
Promote inter-agency planning for preparation and response to drought periods
Focus government and agency preparations on being pro-active
Maintain formal and informal networks of key stakeholders on drought preparedness and resilience building
Ensure that any funding provided is targeting the needs of local communities

Theme 5

INFRASTRUCTURE

Infrastructure for water providing stock and domestic needs and access to emergency water points are included in this theme. However, regional infrastructure that contributes to regional resilience also includes digital infrastructure, housing, energy and transportation.

The Wimmera Mallee pipeline, transport infrastructure, access to digital services, energy infrastructure and appropriate and sufficient housing have been identified as key infrastructure to support drought resilience in the Wimmera Southern Mallee.

GWM-Water is responsible for delivering stock, domestic and agricultural water to customers in Western Victoria. The service area covered by GWM-Water is approximately 25 per cent of the state. The Wimmera Mallee Pipeline was constructed between 2006 and 2010 and replaced open water channels with pipeline. This saves water from leakage and evaporation and improved water service reliability and quality. The pipeline construction and operation is identified by GWM-Water as the largest infrastructure project contributing to building drought resilience in the Wimmera Southern Mallee region through improved security and reliability of access.

Water carting during periods of water scarcity and bushfires is made available through emergency water points. New emergency water points are now controlled by swipe card access, ensuring proper water charges are applied where required. An interactive map with emergency water supply points in Victoria is accessible through a Victoria state website (DELWP, 2022).

Groundwater resources are critical for providing stock and domestic supply, particularly in the west of the region. Mining companies also regularly use groundwater for their operations. Groundwater is critical to groundwater dependent ecosystems like the saline wetlands in the Natimuk Douglas chain of lakes.

Housing availability and affordability is considered an important factor in the economic resilience of the region. The first release of 2022 census data shows that population in major towns and communities in the Wimmera Southern Mallee has generally risen compared to 2016. Approximately 20 per cent of the population lives in rental accommodation, while 75 per cent own a property. Almost 75 per cent of households have 1 to 2 people, while 20 per cent of the dwellings have 1 to 2 bedrooms (WDA, 2022).

The Western Highway, one of only two major interstates freight routes, provides the main road transport corridor in the region. It connects Horsham, Stawell and Nhill with Melbourne (via Ballarat) and Adelaide. Farming, grain production, regional visitation and a range of manufacturing services rely heavily on this highway. The Henty Highway runs north south through the region and provides access to the Port of Portland to export bulk commodities such as grain and mineral sands. The region also has several regional airports including Horsham and Stawell, servicing emergency medical, fire and rescue, and agriculture and related businesses. The transport infrastructure in Wimmera Southern Mallee provides strong links to the neighbouring regions (DJPR, 2022).

Outcomes:

An infrastructure network in the Wimmera Southern Mallee that supports water access reliability and security, housing that is affordable and attracts skills and people to the region, a (renewable) energy infrastructure that is distributed and supports peak demand in droughts, and a digital network that allows remote access to services and peer-support to increase drought resilience.

Focus Areas for action
Investigate feasibility of expansion of Wimmera Mallee pipeline to increase resilience
Investigate further support for investments to increase efficiencies in water distribution and management
Strengthen communications infrastructure to support digital access
Promote sufficient and affordable housing in the Wimmera Southern Mallee region
Explore opportunities to expand localised, reliable, renewable energy generation and storage
Further expand mobility options and public transportation to support opportunities for social interaction for isolated or vulnerable groups of people
Maintain the road networks to enable economic activity despite lower rate income during droughts
Ensure community halls and houses are safe and accessible for everyone in the community

Theme 6

LANDSCAPE

The ‘landscape’ theme relates to managing natural resources including soil, water and biodiversity at a landscape scale, both in the form of natural capital as well as in ecosystem services. The landscape in the region is not limited to nature areas like national parks but also the agricultural landscape.

Different types of landscape can be identified in the Wimmera Southern Mallee. While the agricultural landscape covers the largest area, several national parks (Grampians, Little Dessert, Kara Kara) show a more untouched version of the landscape. The region has a diverse range of natural landscapes, including grassy plains, mountains, wetlands, deserts and forests. Environmental assets include Wyperfeld National Park, Little Desert National Park, the Pink Lake, the Wimmera River and Mount Arapiles. The Grampians National Park (Gariwerd) is a popular destination and provides a significant contribution to the region’s visitation and economy.

The region has a wide range of soil types from heavy clays to sandy soils and their management influences the productivity of agricultural enterprises as well as the health of natural assets. Soils that are exposed, due to a lack of ground cover, are prone to wind and water erosion which negatively impacts on soil fertility and productivity, biodiversity values, as well as human health. Exposed soils tend to result from land management practices like cultivation, stubble burning and over grazing. Impacts of climate change are predicted to negatively impact ground cover levels, particularly during droughts and dry seasons.

Rivers and streams are critical to the social, environmental and economic wellbeing of the Wimmera Southern Mallee region. Many townships are located close to rivers and streams for their ability to provide water, recreational opportunities and create a pleasant place to live. Waterways also provide habitat for much of the region’s wildlife including endangered flora and fauna and important international migratory birds. While there are some waterways that are in good condition, many of them have issues with poor water quality, lack of flow, erosion and depleted streamside vegetation.

While the region has been highly modified to support agriculture, the remaining biodiversity within the Wimmera is very resilient and continues to support an array of regionally and nationally significant species and ecological communities.

Barengi Gadjin Land Council is the trustee for the Native Title rights and interest of the Wotjobaluk, Jaadwa, Jadawadjali, Wergai and Japagulk peoples, collectively known as the Wotjobaluk peoples as recognised in the Consent Determination on 13 December 2005 (BGLC, 2022).

The Determination recognised non-exclusive Native Title rights to hunt, fish, gather and camp within an area known as Determination Area A being roughly described as the Wimmera River from the head of the Yarriambiack Creek through to Outlet Creek at the northern end of Lake Albacutya and including Lake Hindmarsh (Gurru) and Albacutya (Ngalpakatia/Ngelpagutya). BGLC and the Wotjobaluk people entered into an Indigenous Land Use Agreement (ILUA) with the Victorian and Federal Government. This was registered in November 2005. The ILUA ensures that the Wotjobaluk, Jaadwa, Jadawadjali, Wergaia and Jupagalk peoples will continue to have a say about certain types of developments in the area where their native title rights have been recognised.

Outcomes:

A landscape that is diverse, healthy and resilient and adaptive to drought. An environment that supports nature, people, communities and industry through extreme conditions, like drought.

Focus Areas for action
Support an interconnected network of drought refuges for flora and fauna to maintain an ecologically healthy community during drought
Encourage the establishment of stock containment areas and promote planned grazing management to reduce soil erosion
Promote the maintenance of ground cover to support healthy soils that are more resilient during droughts
Support Landcare and Caring for Country practices based on traditional land management approaches

ENABLING ACTIONS TO BUILD DROUGHT RESILIENCE

Existing constraints to the delivery of actions in this plan include access to financial and human resources, policy uncertainty, local leadership and limited digital connectivity. Many of these constraints can be overcome by focusing on collaboration between stakeholders, empowering local leaders and maintaining a strong network for communication and shared planning.

The creation of an enabling environment is critical to success of the Plan and requires broad participation and cooperation from governments (all levels), agencies, statutory bodies, not-for-profit organisations, and the private sector.

The Plan reflects the input of the community and has wide ranging support. Implementation of the plan will contribute to resilience building through the principles of managing connectivity, actively planning across sectors and promoting connected governance.

NEXT STEPS FOR THE WIMMERA SOUTHERN MALLEE DROUGHT RESILIENCE PLAN

This Plan takes the first step in providing the necessary framework for the Wimmera Southern Mallee to identify and communicate its drought resilience needs and priorities. Continued collective and deliberate action is necessary for these needs to be met.

This Plan has been drafted for and by the Wimmera Southern Mallee community. Community members and organisations therefore have an important part to play in realising its vision for a more drought resilient region.

This Plan can be used by the Wimmera Southern Mallee community – in collaboration with industry, the non-profit sector, and all levels of government – to:

- coordinate investment
- collaborate for shared outcomes
- inform future drought resilience priorities
- develop drought resilience programs
- monitor resilience to future droughts

Some of the actions identified can be addressed directly by the community, while others will require broader cooperation from governments, agencies, statutory bodies, Not for Profit organisations, and the private sector. The Plan contains unfunded activities, and some actions can only be addressed with further investment.

The Plan is an important step in building regional drought resilience. A supplementary document *'Regional monitoring, evaluation and learning'* is provided to guide how progress towards regional outcomes is measured and communicated.

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APPENDIX 1

Insights for building drought resilience in the Wimmera Southern Mallee

Between January and June 2022, Agriculture Victoria engaged with a wide range of stakeholders to develop the RDR Plan. This is a summary of the discussions with stakeholders that informed the six resilience themes, outcomes and actions identified in the RDR Plan. It includes observations, local studies and recommendations from local stakeholders. Not all the topics presented here resulted in the development of priority actions, but they are included as a record of the engagement and discussions that took place.

Communities and people

Maintaining connectivity before and during droughts is important to ensure open channels of communication and support. Several recommendations have come from the aftermath of the Millennium Drought, as well as from more recent community engagements by the different organisations in the Wimmera Southern Mallee.

Community leadership

One of the difficulties in a sparsely populated area is the retention of community leaders. Further attention to development and strengthening these leaders helps in creating resilience of the region. The leadership development and strengthening should focus on 'leadership by action' rather than 'leadership by status'. In the theme of emergency response local leadership has shown great benefits, hence its importance in resilience building. Leadership development opportunities should focus on agricultural and remote areas and take into account the large distances that people have to travel. Resilience in leadership focuses on social aspects, financial resilience and learning. Creating new leaders creates more diversity in governance of the region. It is important that these programs are continuous, and not one-off.

Sharing of experience

The Wimmera Southern Mallee community experienced severe impacts of droughts, especially the Millennium Drought. Experiences from communities have been collected to be shared with new generations and regions outside the Wimmera Southern Mallee. Reducing the 'unknown and uncertainty' can help build resilience. Knowing what to expect helps in preparation. Experiences have been collected through recorded stories, as well as through the project "Climate Eyes", which will result in the publication of a book that documents drought related experiences in the Wimmera Southern Mallee.

Mental health

Financial stress, worries about the future and uncertainty about the present can negatively impact people's mental health. The Millennium Drought has focused more attention on mental health management. In addition to making the topic more accessible through discussion, there are now Mental Health First Aid courses, portals to provide access to professional health care providers, awareness raising within communities and agricultural service providers to recognise the onset of mental health issues as well as improved referral systems. Drought resilience is strengthened through a setup of services that can be accessed by the whole community, including farmers.

Digital connectivity

Digital connectivity, ensuring that digital infrastructure is available as well as bridging the digital divide in the community helps people in isolation to reach out and be reached (Regional Partnerships Wimmera Southern Mallee, 2020; Wimmera PCP, 2020a; Tischler et al., 2022). Digital connectivity also allows access to services remotely. Telehealth services, having been successfully tested during Covid lockdowns, also provide access to medical information for families in remote areas. Digital connectivity, in the form of video conferencing, has also become more popular as a result of Covid-induced closure of borders and lockdowns. Another benefit of digital connectivity is access to climate data and tools and remote monitoring of parameters like soil moisture. Bridging the digital divide requires access to training and education for people who have not used these services before or are unfamiliar with digital services.

Social connectivity

Social events that bring people and communities together help in reducing stress. Ensuring that music and art events are organised during droughts allow a moment of sharing experiences and lessening stress. Small grants provided though the 'Look over the Farm Gate' project in the 2016 drought provided critical social connections for drought affected farmers and communities which were important for mental health. In the Wimmera Southern Mallee, shared art project building, including decorating structures with different pulses and cereal seeds, is one way of supporting each other during the drought. Community halls provide infrastructure for gatherings and are suggested cool locations where people can gather during heat wave emergencies.

Recreational areas

Another lesson learned from the Millennium Drought is the importance of recreational areas, including water bodies. A study published by the Wimmera Development Association in 2020 showed that the majority of recreational users are from the region itself, and that the physical and mental health benefits from recreational activities reduce pressure on health care services (WDA, 2020b). Similar to water allocation to sport facilities, water allocation to recreational areas cannot be expected at the same levels during droughts. Discussions, communication and shared decision making with local communities before drought helps to reduce uncertainty and supports resilience building.

Sporting events

Due to Wimmera Southern Mallee's low population density compared to other regions in Victoria, large farm properties and long distances between communities, sporting events play an important role in bringing people together. From the population in Hindmarsh, West Wimmera and Yarriambiack, 45 per cent participates in sport groups or teams (Wimmera PCP, 2020b). Sport brings a competitive element to communities and draws them together around a common goal. Previous droughts have impacted sporting facilities, resulting in cancelled sport events. There is an opportunity for the Wimmera Southern Mallee community to identify facilities that are crucial to community connectivity before droughts occur. This will allow both participation in the decision process, as well as clear communication on decisions of water allocation to be made during a drought.

Volunteer organisations

Volunteer organisations bring people together with a shared goal. Their meetings have a similar effect on making people feel connected as sporting events do. One issue that has been mentioned in relation to volunteer organisations in rural areas is that the growth of farm size results in smaller populations, which makes it more difficult to find sufficient participants for volunteer organisations. Despite often having small populations, volunteering levels in the Wimmera Southern Mallee are the highest in the State (DHHS, 2017).

Cultural and spiritual value

Land, water, people, the past are all related and have a cultural and spiritual value, especially in traditional society (Griffin and Muir, 2018). The Barengi Gadji Land Council (BGLC) represents a large group of Traditional Owners. BGLC's mission statement is "Traditional Owners working together as custodians of culture, country, heritage, law and language." Building drought resilience includes the protection of cultural and historical sites from drought specific risks (e.g. dust and erosion) as well as water allocation to traditional title.

Education and learning

One of the principles of resilience building is to encourage learning. Learning is encouraged through many of the activities described previously. In addition, The Wimmera Southern Mallee has many formal education opportunities, including Longerenong Agricultural College, Federation University and vocational training. The Skills Audit assessment (2022) evaluated educational needs for the region and identified actions required to strengthen education in the Wimmera Southern Mallee. Drought experience and resilience should be included in specialised curricula, contributing to drought resilience building in the region.

Farming enterprises

Broadacre cropping and livestock, or a combination of the two, are the most common agricultural systems in the Wimmera Southern Mallee region. Numerous actions have been identified that can help reduce drought risks on farms through management of operations and business planning.

Diversification of income streams is an effective strategy to build financial resilience in family farms. This combines the core farming business with other on-farm and off-farm incomes, recognising that time availability can become a constraint in this approach.

There is no single solution to build farm business resilience to drought and other shocks. Aims, goals and objectives will be different for individual families and businesses. Individual agronomic, economic and business continuity decisions must be made by on a case-by-case basis.

Financial tools and services

Farming can experience strong fluctuations in yields, income and expenses. For long term business planning, this requires the build-up of financial reserves in the 'fat' years, to buffer the lower profits in the 'lean' years. Although this sounds like a common sense approach, in year-to-year operations it is difficult to know how much reserve to build, how to balance the requirement for maintenance, infrastructure investment and building a financial reserve. A variety of financial tools and aids are available to cope with the high income and cost fluctuations. The Rural Financial Counselling Service provides support for farm businesses experiencing, or at risk of, hardship including financial and business planning.

Farming system diversification

Although farming systems are often described as either broadacre cropping systems or livestock-based farming systems, there are many mixed farming systems in the Wimmera Southern Mallee region. Different farms made different decisions during and after the Millennium Drought. Some decided to reduce or eliminate livestock management from the farm, while others chose to specialise further in cropping or livestock management. Individual businesses make individual choices based on the conditions and situation that applies to them. At regional level, having a diverse set of farming systems helps build regional resilience to droughts and other shocks.

Research, innovation and implementation

Agricultural research provides insights in drought tolerant crop varieties, maximising productivity through improved agronomic management, improved grazing and supporting livestock management. Research from a range of industry groups, like Birchip Cropping Group, the Smart Farm initiative in Horsham and VicNoTill provides farmers with knowledge and tools to improve their drought resilience. Field days, training events and networking events are organised around the research results and support networking and knowledge sharing between farms. Youth-targeted events ensure that next generation farmers are provided with peer support, as well as the latest innovations in farming.

Industries and businesses

Businesses providing access to goods and services that improve the liveability of the communities in the Wimmera Southern Mallee are critical to the resilience of the region.

Small business essential services

Many small businesses in the Wimmera Southern Mallee contribute to the regions resilience by providing essential services. For example, the local hardware store is often a distributor for gas. Small local businesses also function as a place for community connection. The existence of viable and vibrant local businesses support resilience of the region.

Financial support industry

The availability of banks, insurance, accountants and other businesses in the financial industry is essential for the resilience of the local community. A financial sector that is familiar with the agricultural industry and its associated variability in cash flow is essential for a resilient economy.

Financial and administrative management

Currently the Rural Financial Counselling Services (RFCS) program has expanded to small businesses. As with farming enterprises, RFCS provides support for businesses to make informed business decisions. Healthy businesses provide a stronger resilience to shocks induced by droughts, resulting in less negative economic impact in the region.

Local leadership

As with governance, business leadership residing in the region results in more timely and targeted decisions related to drought impact and leads to a more flexible business approach. Business leadership is improved by encouraging local entrepreneurship through training opportunities and the creation of favourable business conditions.

Networking

Similar to community networking, business networks have an added value in improving communication, shared learning and collective representation. In some cases, local Chambers of Commerce have taken the lead in creating local business networks, while at the same time creating favourable conditions to attract new businesses.

Governments and agencies

Droughts introduce new and increased pressure on existing local government resources. Local governments and other agencies encounter more distress and increased incidents of family violence in the region during periods of drought. Agency and local government staff often take leave due to increased work stress, and it becomes harder to recruit new staff while their services are more critical and in demand during drought periods.

Emergency readiness plans

Most of the governments, agencies and organisations in the Wimmera Southern Mallee have some type of emergency readiness plan. It is important to note that under the Commonwealth and Victoria State definitions, drought is not classified as an emergency. However, in several agencies in the Wimmera Southern Mallee, drought response is part of their emergency planning process. Ongoing revision of the plans, evaluating them from the perspective of different emergencies supports the readiness of the organisations

Inter-agency collaboration and networking

Connected governance helps in preparing for and responding to drought. Despite many agencies in the Wimmera Southern Mallee being stretched for time and resources, regular meetings and networking events help to ensure support and services to the community are more coordinated. If formal agreements for collaboration are required, these can be prepared in advance as framework agreements. Maintaining the network between governments, agencies and organisations in addition to the private business and financial sector requires time and resources but builds greater resilience in the region. The Wimmera Southern Mallee Seasonal Conditions Group is a good example of a network with the aim to coordinate drought preparedness and response.

Infrastructure

Infrastructure that contributes to resilience in the Wimmera Southern Mallee includes water pipelines, energy generation and distribution, digital connectivity, road and rail networks.

Expansion of the pipeline service area

Not all customers in the Wimmera Southern Mallee are serviced by the existing pipeline and there are continuing requests for expansion of the pipeline service. One of these proposals expands the service area for the pipeline to an area south of the current pipeline, covering an area from Edenhope in the west to the Grampians east of Balmoral.

The potential for gains in water security and reliability should be explored by investigating operational distribution and management improvements of the system to increase efficiencies and reduce water and energy losses.

Emergency water points

GWM-Water have indicated that in the area serviced by the pipeline there is a sufficient density of emergency water access points. Water can be extracted for fire control, but also for large remote construction projects, including wind farms, where the concrete base of the wind towers requires large volumes of water and dust control during road construction.

Reuse and desalination

Although there are small-scale opportunities for reuse of water or desalination of groundwater, these options likely have limited impact on the regions water security and reliability, and issues with waste-stream management need to be carefully considered. Reuse and desalination are often brought up as options to reduce water shortages, but the general opinion in the Wimmera Southern Mallee is that this option does not contribute significantly to drought resilience building.

Energy

Droughts are often associated with higher temperatures and heatwaves. An increased demand for cooling results in higher energy demand. Energy reliability is important to ensure the community does not experience unnecessary heat stress. In the low-density areas of the Wimmera Southern Mallee, distributed energy production and storage, especially with a focus on renewable energy solutions, could contribute to a more resilient community.

Digital infrastructure

The Wimmera Southern Mallee Digital plan has identified several key digital connectivity issues, including inadequate mobile coverage, a gap in digital divide, the low uptake of the Internet of Things, and a lack of NBN business-grade services (Regional Partnerships Wimmera Southern Mallee, 2020). Digital exclusion is a significant barrier to the uptake of agriculture technology and increased productivity (Tischler et at, 2022). Analysis of digital access and quality of connectivity across primary production in the region, including for cropping, wool and sheep meat and food processing enterprises, confirmed major shortfalls in digital inclusion and connectivity as impediments to addressing the region's primary production needs.

Specifically aimed at agriculture, Longerenong College established a digital laboratory within the AgTide project that aimed to improve uptake of digital access and tools, including tools related to precision agriculture. In parallel to improving the digital infrastructure, reducing the digital divide in the region is also identified as critical to resilient communities in the Wimmera Southern Mallee.

Sufficient and affordable housing

Both the Regional Economic Development Strategy (DJPR, 2022) and the Wimmera Southern Mallee Regional Housing Review 2020 (WDA, 2020a) identify housing as a requirement to maintain and expand the region's liveability and economic viability. Low population densities in the region can result in more vulnerable communities, and an increased population in these areas will thus result in a stronger social canvas to build resilience upon.

For the Wimmera Southern Mallee these elements are considered critical in strengthening resilience to drought. Expanding housing opportunities is a requirement to be able to maintain and attract a regional workforce in the Wimmera Southern Mallee. While areas for housing development can be assigned, councils are required to expand the essential infrastructure like water and sewage connections, footpaths, street lighting and drainage. Several initiatives are supporting this in the Wimmera Southern Mallee, including the Regional Jobs and Infrastructure Fund, the Regional Workforce Pilots, and the Affordable Housing Solutions through the Regional Recovery Fund.

Transportation and mobility

Maintaining roads and transport infrastructure is an important enabler to the local economy. There are specific difficulties related to council road management due to the large distances of roads, low rate-payer density, and heavy agricultural equipment moving between farms.

As part of the liveability review conducted by the Wimmera Primary Care Partnership (2020a) access to public transportation is important to ensure access to health services and social events. The region is not serviced by passenger rail and commercial airlines services. Regional priorities have been identified to developed to establish passenger rail services. Where public transportation is limited, volunteer community transport is being developed.

A focus on improved mobility through improved local transport options as well as regional transportation improvements, identified in the Horsham Rail plan, are identified as important enablers for regional drought resilience.

Community halls and houses

Especially for remote communities, community halls provide a location to get together, attend events, undertake training, and serve as shelter in emergencies and during heatwaves. Proactive maintenance and support to create a safe and accessible location is an important aspect of community resilience.

Childcare and after school care

Large distances between home and school and limited available childcare and after school care puts additional strains on families and communities. Accessible childcare and after school programs are identified as required to allow more flexibility in personal and work life. Experience during COVID lockdowns and restrictions showed a similar recommendation for better childcare and after school care programs to improve the region's resilience.

Landscape

Biodiversity river pools and drought refuges

Drought and a drying climate leave wetlands susceptible to damaging activities like cropping and overgrazing. An assessment of climate change vulnerabilities for wetlands found that the interval between wetland inundation events could increase from once every one to two years, to once every four years (WCMA, 2021). Maintaining designated pools and refuges to receive environmental water during droughts is one approach to reduce drought impact on the environment. Environmental water targets are required to ensure the operation of river pools and refuges during droughts (Integrated Water Resources Forums, 2020).

Stock containment areas

A drought results in lower biomass production, and can lead to overgrazing and soil erosion, with potential regional impacts like dust storms and soil degradation. One approach to reduce the impact of overgrazing is to create stock containment areas and combine this with active grazing management. Stock containment areas require an investment in physical barriers as well as an accompanying change in grazing operations. The establishment of the pipeline has assisted in the establishment of containment areas through more reliable water access for livestock.

Ground cover

A reliable approach to limit soil erosion and reduce dust is to maintain ground cover wherever possible. Although during droughts the lack of rain will make it difficult to maintain a ground cover, the practice during wetter years will improve soil health, improve soil water storage, and create a soil structure that is less prone to wind erosion in dry years.

Care for Country

A holistic approach to caring for country is provided by Traditional Owners, represented by Barengi Gadjin Land Council in the Wimmera Southern Mallee (BGLC, 2017). This is implemented through close collaboration with the Catchment Management Authorities on developing plans for the protection and rehabilitation of waterways and wetlands, joint management with Parks Victoria, and influencing land management on private land through organisations like With Trust for Nature, Greening Australia, Landcare and other non-government organisations. This is highlighted in the Growing What Is Good Country Plan, with a focus on farmers adjacent to reserves to create buffer zones to prevent pest plant and animal spread.


MT ZERO RD
TO HALLS GAP
MT ZERO RD
PICNIC AREA
TO WESTERN HWY

For more information on the Future Drought Fund visit:
www.awe.gov.au/fdf

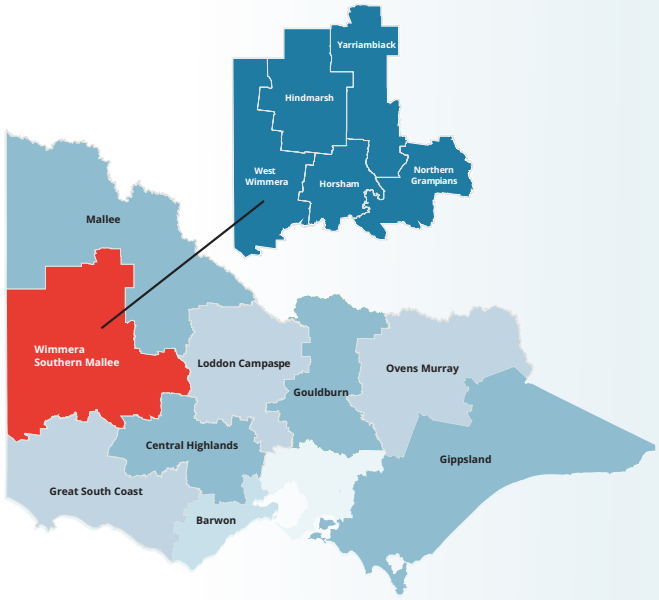
For more information on Victoria's Regional Drought Resilience Planning program visit:
www.agriculture.vic.gov.au/futuredroughtfund

frontier economics

Drought in the Wimmera Southern Mallee Region

Information to support the Wimmera Southern Mallee Regional Drought Resilience Plan | June 2022

This research was jointly funded by the Australian Government and Victorian Government under the Future Drought Fund.



Regional summary

The Wimmera Southern Mallee region comprises of a range of small to medium sized diverse communities with a strong agricultural presence The region has diverse natural assets with the Grampains National Park, Wimmera River, deserts, wetlands and lakes.The region encompasses the local government areas (LGAs) of Hindmarsh, Horsham, Northern Grampians, West Wimmera and Yarriambiack. The 2016 census reported a population of 47,379 and a Gross Regional Product of $2.5bn.

Key industries in the Wimmera Southern Mallee region include agriculture, forestry and fishery (17%) and health care and social assistance (17%).

There are no longer any irrigation districts following decommissioning of the Wimmera Southern Stock and Domestic channel in 2018. The Wimmera Mallee pipeline is instrumental in deliving water to the region.

The region experienced drought and dry seasonal conditions during the Millennium drought, 2014-2015 and 2017-2019.

Assessing the impacts of drought

The Regional Drought Resilience Planning Program (RDRP Program) is about planning with communities at the regional level to better prepare for drought and forms part of the Commonwealth Government's Future Drought Fund.

Economic analysis, research and stakeholder discussions have been undertaken to consider three questions:

The prevalence, severity and impacts of drought in the past

How this may change in the future

The Goulburn region's vulnerabilities and gaps in preparedness for drought

Consultation with local stakeholders was a key factor to the analysis, which enabled a better and more localised understanding of how droughts impact the region.

This research was jointly funded by the Australian Government and Victorian Government under the Future Drought Fund.

Drought

The definition of drought varies depending on region, needs and disciplines. Below are 4 ways to measure whether a region is in drought.

1. Meteorological drought: degree of dryness or rainfall deficit

2. Hydrological drought: precipitation shortfalls on surface or subsurface water supply

3. Agricultural drought: links various characteristics of meteorological (or hydrological) drought to agricultural impacts

4. Socioeconomic drought: associates the supply and demand of some economic good with elements of meteorological, hydrological, and agricultural drought.

The first three approaches deal with ways to measure drought as a physical phenomenon. The last deals with drought in terms of supply and demand, tracking the effects of water shortfall as it ripples through socioeconomic systems.

However, there is no one definition that encompasses all factors that bring rise to drought conditions — and the resultant impacts on regions and communities. Drought is complex and dynamic, meaning a universal 'definition' is near impossible. For example, when referring to the Millennium drought in practice it was a combination of the types of drought listed above.

Assessment framework

In order to consider how drought affects farms and the wider community, the following analytical framework distinguishes between agricultural impacts and non-agricultural impacts of drought. The framework is designed to consider the implications of specific drought impacts and what the outcomes of these implications will be. Within the two distinctions, the framework considers the social, economic and environmental impacts, to develop a more complete understanding of how drought impacts flow through the community.

Figure 1 demonstrates how this analytical framework can be applied to agriculture. Drought reduces agricultural productivity, which results in a reduction in primary production on farm. This impacts farm income, consumption of farm inputs, and production of farm outputs. These on-farm implications of drought flow through to the community to generate a range of outcomes. The existence of agricultural markets (e.g. sheep and cattle prices, crop prices, etc) means the impact of drought on agriculture is easier to quantify than other non-market impacts of drought.

Figure 1 also considers how drought impacts non-agricultural settings. Drought can lead to significant water restrictions and low availability of water in lakes, rivers and dams. A reduction in water availability may mean community greenspace is reduced which will in turn reduce liveability benefits in the community and the amenity values from the green space. Furthermore, there are flow on effects if parks and sportsgrounds cannot be used including impact on community health and cohesiveness. A lack of water in lakes, rivers and dams could also hurt tourism in the region as there is a reduced ability to boat, water ski or fish. This in turn reduces the income and spending within the regional economy.

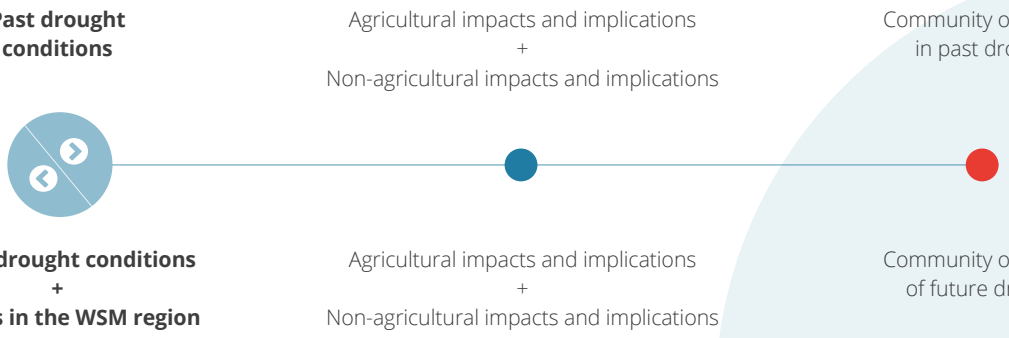
Figure 2 demonstrates the structure of the analysis for both past and future drought periods, with considerations from both agricultural and non-agricultural impacts of drought flowing through to community outcomes.

Figure 1 Impacts of drought and flow on effects

Drought impact	Implications	Outcomes	
Change in agricultural productivity	• Change in primary production • Change in farm income • Change in farm inputs • Change in farm outputs	• Reduced spending in the community • Reduced demand for ag farm services (but could increase in demand for feed) • Reduced output associated	• transport, processing/ manufacturing • Reduced primary production for distribution and value-add • Mental toll (and potential migration)
Water restrictions	• Households: outdoor water use • Community green assets: parklands and sportsgrounds	• Liveability and mental health • Mental toll • Potential migration	• Access to green space and flow on effects (i.e. footy clubs, parent groups etc) • Amenity values from green space
Water availability in lakes, rivers & dams	• Less water available for recreation (boating, water skiing, etc) • Reduced fishing opportunities	• Reduced recreation and tourism	

Note: this summary does not provide an exhaustive list of impacts, but rather is about providing a consistent evidence base across Victoria's nine regions

Figure 2 Structure of analysis



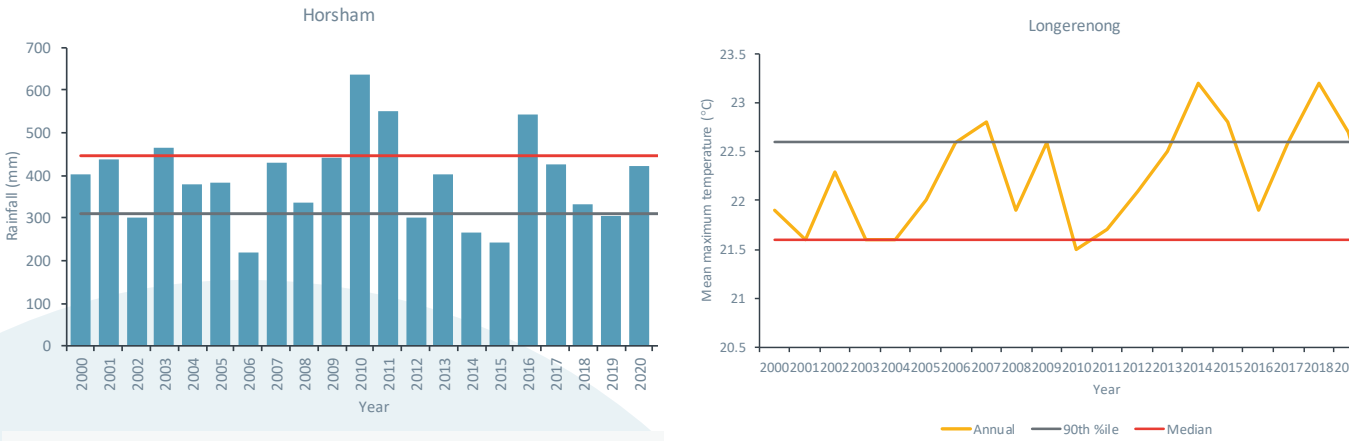
01 Past drought conditions

Large drought events have had wide effects across Victoria, with each drought being different in its regional severity and distribution. Timing of rainfall is important to agricultural production which is difficult to extrapolate through yearly data. Additionally, dry conditions are associated with frosts which has further impacts on the yield of crops. The Wimmera Southern Mallee experienced a devastating drought in 2014 and 2015 which had a significant impact on agricultural productivity including wheat production. Drought conditions were also experienced during the Millennium Drought (1997-2009) and the 2017-19 dry periods.

Wimmera Southern Mallee region is vast and diverse, and as such individual areas within the region may experience different meteorological conditions. The timing of rainfall is instrumental to germinating, growing and yield crops. The historical rainfall and temperature charts provide evidence of the severity of these recent drought events. 2014 and 2015 were particularly hot and dry experiencing below 10th percentile, and at the same time the average maximum temperature was well above the 90th percentile.

There was also a lack of rainfall during the millennium drought and 2017-19 dry period, with only the years of 2003, 2010, 2011 and 2016 receiving rainfall above the median. The average maximum temperature was also above the median for the entire period of the millennium drought (except for 2010 and 2020).

Figure 3 Annual rainfall and average maximum temperature



Recently experienced droughts in the region:

- Millennium drought
- 2014-15
- 2017-19

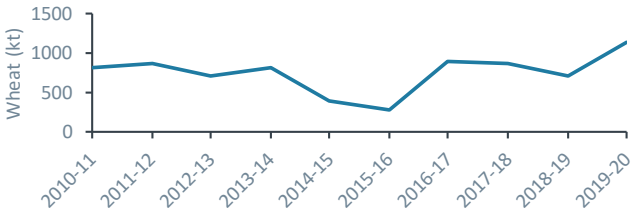
02 Drought agricultural impacts and implications + Non-agricultural impacts and implications

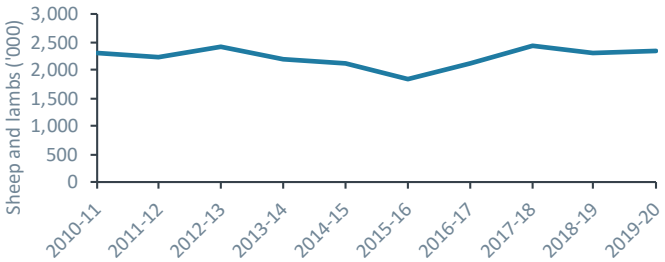
Broadacre cropping is the primary agricultural commodity in the Wimmera Southern Mallee region (55% of agricultural production) followed by livestock (mostly sheep and lambs) (23% of agricultural production). Farmers in the Wimmera Southern Mallee can diversify between broadacre cropping and livestock to assist drought resilience. However, reduced agricultural productivity as a result of drought impacts farm cash income and farm business profit, with ABARES data showing a downturn in farm cash income and profit during both the Millennium drought and during 2014-2015.

Dryland cropping in the Wimmera Southern Mallee region is highly dependent on the timing and quantity of rainfall. Long dry periods can impact output and productivity for farmers. Wheat production in the Wimmera natural resource management (NRM) region experienced a significant decline during the 2014-15 drought. There was a slight decline during 2017-19, but the region experienced a very strong recovery in 2019-20 to the highest production in the region since 2007-08. The number of sheep and lambs in the region also declined during the 2014 and 2015 drought.

Wimmera Southern Mallee farmers have developed resilience measures following recent droughts which assist them in mitigating drought impacts including enlarging on-farm dams, storing silage and growing forage crops.

Figure 4 Key industries production in the Wimmera NRM region





The Wimmera Mallee pipeline provides increased water security for the region, enabling farmers to supplement cropping operations with livestock and therefore manage variability in seasonal conditions and commodity prices. This is a major development for drought resilience and will assist in alleviating the economic, social and environmental impacts of drought within the region.

Town water

There were severe water restrictions during the Millennium drought across the region. However, since the Wimmera Mallee Pipeline has been in use agriculture and town water supply has been significantly more drought resilient. Since 2016 there have not been restrictions in the region. Despite this, there are limited options for water trade and carryover, with the region being a net exporter of water via the Wimmera-Mallee Pipeline.

Recreation and Tourism

Some tourism opportunities in the region are reliant on lakes and the Wimmera River. The Wimmera Mallee Pipeline supplies to 12 recreational lakes and weir pools. This recreation water was delivered through the pipeline mainly for tourism benefits. The Silo Art Trail provides a drought resilient tourist attraction for the region.

Environment

Wimmera Southern Mallee has a number of ecologically and recreationally important wetlands. There is still a contested space around recreational water and environmental water and the trade off between agricultural and town water use. Wetland, recreational and Commonwealth environmental 'entitlements' have generally received zero water allocations in the past decade.

03 Community outcomes in past droughts

Farming communities are severely impacted during periods of drought, due to:

Financial pressures resulting from reduced on-farm income and increased costs

- On-farm issues mostly relating to lack of water and feed for stock
- Pressures from invasive native and pest animals on farms
- Physical and mental health and wellbeing impacts on individuals and families
- Flow on financial pressures being experienced by supporting businesses in the community.

Agriculture is a significant employer in the region, accounting for 17% of all jobs. This is smaller in Horsham (9.2%) where the economy is more diversified compared to West Wimmera for example (44.0%). The high economic reliance of the region on agriculture as a main employer and main value add driver, means the economic impacts of drought have the potential to be significant. Changes in agricultural production in the region will have downstream impacts on businesses that depend on farming productivity. Farm labourers, agricultural related jobs and casual labourers in the region are likely to first experience these impacts. Farmers may need to seek additional employment in the local community to create a secondary source of income for the farm.

The added stress during times of drought impacts financial and broader mental wellbeing. This is exacerbated due to the uncertainty of drought as it is unknown when the pressure is going to be released. Rural Financial Counselling Services experience higher demand during times of drought. The mental health impacts of this are exacerbated if there are no employment opportunities in the local towns which may cause a migration away from drought-affected areas.

Reduced income and returns to employment reduce spending in region. Decreased expenditure in farm-reliant businesses coupled with decreased farming expenditure throughout the local communities translates into decreased income and expenditure in non-agricultural related businesses. This cumulates in financial pressure and small business closures. Importantly, the impacts of drought, via reduced spending in the region, on small businesses are more difficult to manage as they do not have the resources or tools available to manage their income variability (perhaps compared to farmers). As such, the local and regional economies experience a contraction during times of drought. This was confirmed by stakeholder discussions and is quantified in economic modelling of future drought.

The Wimmera Mallee pipeline meant that the dry conditions in 2014 and 2015 were managed without the need for restrictions on the towns that required enduring Stage 4 restrictions during the Millennium drought. Further, the inflows into the Grampians reservoirs from 2017 to 2022 were on par with the poor Millennium drought conditions and no restrictions (beyond the Permanent Water Saving Rules) have been required.

The water allocation framework prioritises town water supply and domestic and stock supply before environmental and recreation water. As such, during times of drought environmental outcomes can suffer — with low allocations to Wetlands, Recreation and the Commonwealth Environmental Water Holder observed in most years since 2010.

01 **Future drought conditions + Changes in the WSM region**

02 Agricultural impacts and implications + non-agricultural impacts and implications

03 Community outcomes of future drought

Future Impacts of drought

Future impacts will differ from past impacts depending on the severity of future droughts, and the changes in the characteristics of the Wimmera Southern Mallee region and its communities.

01 Future drought conditions

Climate change is likely to increase the variability of the weather in the Wimmera Southern Mallee region with future droughts expected to be longer, more frequent and more severe. Climate projections in Figure 5 show that by 2050 the Wimmera Southern Mallee region on average will be hotter, drier and be exposed to a growing number of fire danger days. Similar to the past, the region and sub-regions will continue to face variable conditions within and across seasons — however in the future this variability will be around a lower average rainfall and higher average temperature than previously experienced. This means that, compared to current conditions, it is likely that parts of the Wimmera Southern Mallee will face some seasons with rainfall significantly below and temperatures significantly above current averages.

The low levels of irrigation throughout the region is likely to expose the region to the impacts of drought, even during short periods. However, the Wimmera Mallee Pipeline offers significant drought resilience to the region's towns, intensive agriculture and stock, yet this reliability may come under stress in future droughts.

Changes in the Wimmera Southern Mallee region

Following devastating droughts, the Wimmera Southern Mallee region developed more diversified practices to assist in drought resilience, including:

- Farming systems becoming more opportunistic and flexible
- Investment in Wimmera Mallee Pipeline since Millennium drought
- Continuation of long-term trends of reduced proportional contribution of agriculture to employment and economy
- Covid population changes and regional tourism opportunities
- Developing leading innovation hubs and other research and development
- Changes to the relationship between rainfall and inflows

However, future weather conditions predict longer and more severe droughts which will test these resilience measures.

Figure 5 Projections of future climate in Wimmera Southern Mallee

Future droughts are likely to be longer, more frequent and more severe: By the 2050s

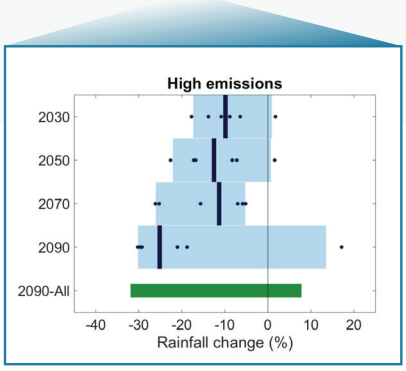
1.6 to 2.2 °C ↑
in average maximum temperatures

More heat extremes expected
Number of days over 38°C are expected to increase from 7.3 days to 11-19 days.

Decrease in frost risk expected, with effect of cold clear nights outweighed by increasing minimum temperatures

5-12% ↓
on average

Rainfall will continue to be very variable, around a lower average – so increased risk of extreme dry



48% ↑
Number of very high fire danger days expected to increase by 8.7 days per year

02 Drought agricultural impacts and implications + Non-agricultural impacts and implications

The agricultural system in the Wimmera Southern Mallee has been developed in the context of a highly variable climate with farmers already having many strategies to manage drought. However, in the face of future droughts, extension is still important to support ongoing adaption in agriculture.

Should the long term trend continue of decreased reliance on the agricultural sector for employment, this will reduce the flow through impacts of drought into the community. However, conversely there will be a higher reliance on economic diversification and employment opportunities in towns and regional centres. Declining population density in smaller, agricultural-based towns may put them at higher risk of drought impacts.

Future implications of drought are likely to continue to impact the wellbeing and mental health of the local communities. Farmers and community businesses are likely to continue to rely on financial counselling services and the broader community will continue to rely on mental health services.

Town water

Town water security planning has improved building on lessons from drought and Urban Water Strategies incorporating future impacts of climate change (including potential droughts). Additionally, the Wimmera Mallee Pipeline provides increased water security to the region for the use of towns, stock, environment, recreation and tourism. However, given future climate projections, water security is still at risk.

Recreation and Tourism

Tourism initiatives that are not dependent on water availability will continue to provide income to the Wimmera Southern Mallee region. COVID-19 has provided a boost to regional travel and relocation.

Environment

Lakes, rivers and dams are likely to be at lower levels during times of drought which will impact the native biodiversity living in and relying on these water bodies. There is likely to be a lack of food and drinking water for wild animals living in the national and state parks in the region. Environmental water delivers positive environmental values, however currently due to reliability and allocations the Commonwealth Environmental Water Holder (CEWH) rarely receives water. With future climate projections in consideration, it seems unlikely that the CEWH will receive their full entitlement regularly moving forward.

03 Community outcomes in future droughts

The increased likelihood and severity of drought in the future will mean that the drought impacts on the community from agricultural consequences of drought are expected to be larger than have been historically observed. In contrast, the Wimmera Mallee Pipeline is expected to ensure that town water supply and stock water access would not be affected to the same degree as during the Millennium drought.

When agricultural businesses seek to reduce costs to endure the drought periods, this will result in employment impacts and spending impacts throughout the region. Local businesses will continue to feel the impact of decreased regional spending. Economic modelling of potential future drought across northern and western Victoria found the Wimmera-Southern Mallee to be the most severely affected region, with GDP in the region falling 20% and a fall in employment of 7.2%. This flowed through the region reducing consumption/ spending by 12%. The modelled 3 year drought, while prolonged, is not equivalent to the most severe recorded in Victoria.

Access to local mental health services will be vital as drought conditions become more prevalent. Not only are mental health services important during times of drought, but improved mental health increase a person's ability to adapt. This can improve drought resilience by allowing people to effectively plan for future drought conditions.

Greenspace and associated community sport are drivers of community spirit and liveability within local communities in the region. Grampians Wimmera Mallee Water and local governments have a strong understanding of the importance of greenspace for their communities so water availability will have to be at high risk before community greenspace areas do not receive water. However, should town water supply not allow watering of gardens this will have a mental health toll on residents.

If the future drought conditions result in a more-than-proportionate reduction to inflows to the reservoirs that support the regulated surface water system, then this raises significant concerns about the reliability of town water supplies and water for stock and intensive agriculture. Shortfalls in these would have more drastic community outcomes.

Overall the Wimmera Southern Mallee region's high exposure to agricultural industries creates the potential for significant community impacts from future drought.

Vulnerabilities and gaps in preparedness

The Wimmera Southern Mallee's combination of infrastructure, large-scale agricultural land and economies of scale have enabled large agricultural output in the region.

This suggest that agricultural research, development and extension will remain important to support ongoing adaptation in agriculture, and will aid preparedness to future drought. There is also a wide range in the capacity of farmers, in terms of the skills to maintain more adaptive farming practices and in the ability to maintain buffers of financial assets or feed stocks to manage drought conditions when they arise.

Prior to 2020, farmers in the Wimmera Southern Mallee had to rely on radar stations at Mount Gambier and Mildura, which are unable to track rain bands sweeping across Victoria's central west. This made it challenging to anticipate when and how much rain will fall — to make the best use of limited rainfall during drought. This has, however, been addressed with the construction of a Bureau of Meteorology Doppler radar station near Rainbow.

A remaining vulnerability is the limited adaptive capacity of local businesses to manage the reduced spending associated with drought periods. There is a need to develop planning or support measures to assist them effectively manage the inevitable income volatility. The local economies in the Wimmera Southern Mallee region need to be prepared and able to bounce back after the next drought.

A potential information gap noted by stakeholders is the changing relationship between rainfall and inflows. This could be a result of catchment condition and may also be potentially associated with land use change. This has significant potential consequences on the most reliable water supplies (via the Wimmera Mallee Pipeline) in the region — and a step-change reduction of 58% has been observed in inflows to the headworks storages in the region (1997-2021, as compared to 50 years prior).

Diversification is a key mechanism for the regional economy to contain the drought impacts flowing from agricultural sector. Towns throughout the Wimmera Southern Mallee region have varying degrees of diversification with larger, centrally located towns more likely to experience these benefits. Specifically:

- The major regional centre of Horsham will provide somewhat of a buffer as it is a more diverse economy. This can flow through to townships close to Horsham. Townships within an approximately 50 km radius provide people with the attraction of living in a smaller community, lower cost of housing but having employment opportunities in the larger centre.
- Medium sized communities such as Stawell, the region's second largest town with a population of 6,032 offers a smaller level of diversification to the region.
- Smaller sized communities: such as St Arnaud (2,193), Murtoa (865), Warracknabeal (2,438), Dimboola (1,424), Nhill (1,749), Kaniva (803) and Edenhope (946) are all highly dependent on agriculture. As such, these communities will be more severely impacted by drought, as there are limited alternatives that can replace the people and economic activity provided by irrigated agriculture. However, the smaller nature of these communities means services are limited currently, noting most communities have a small supermarket and health services.

Access to services such as mental health and Rural Financial Counselling are particularly important to manage drought and will be vital as drought conditions become more prevalent. These kinds of health services have long wait times in the region, even outside of drought, with more local services required. Not only are mental health services important during times of drought, but improved mental health increase a person's ability to adapt. This can improve drought resilience by allowing people to effectively plan for future drought conditions.

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