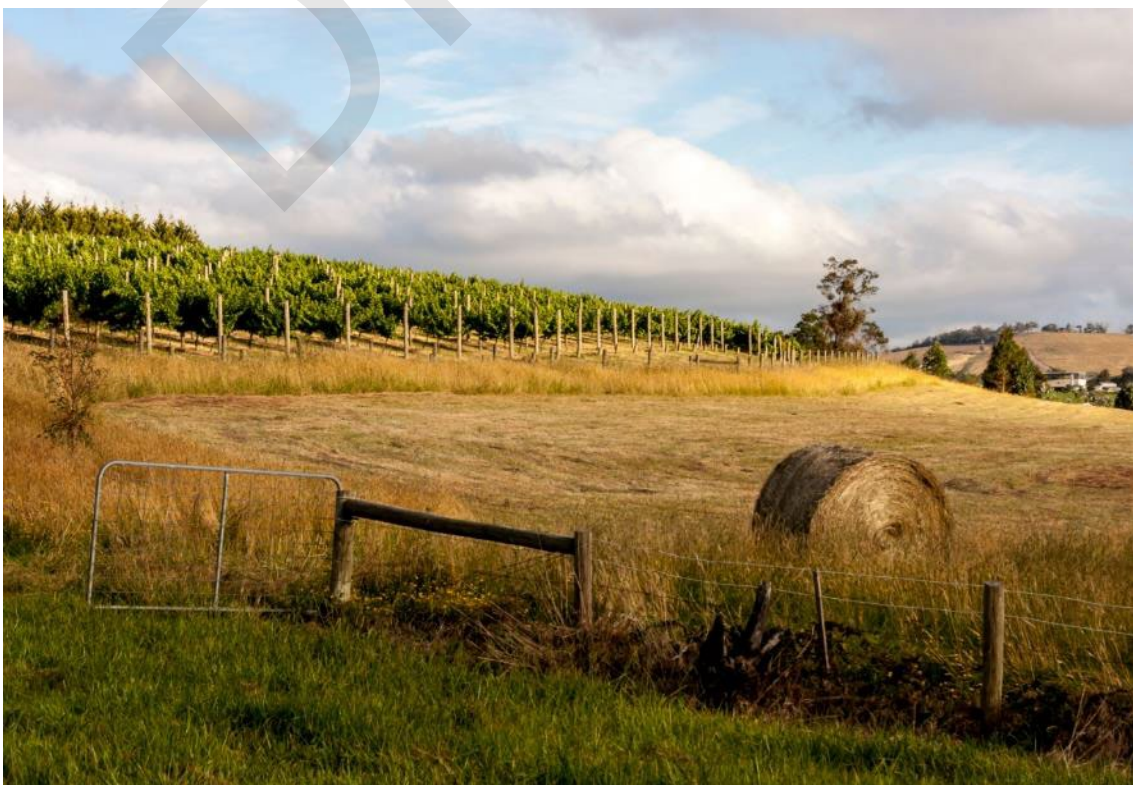


DRAFT Adelaide Hills Fleurieu Kangaroo Island Regional Drought Resilience Plan

A Framework to Guide Future Effort and Investment to Support Regional Communities, Industries and Environments.



DRAFT Adelaide Hills Fleurieu Kangaroo Island Regional Drought Resilience Plan

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This plan has been prepared by URPS for the Adelaide Hills, Fleurieu and Kangaroo Island (AHFKI) Regional Drought Resilience Steering Committee. The Steering Committee was chaired by Steve Shotton, Regional Development Australia Adelaide Hills, Fleurieu & Kangaroo Island (RDA AHFKI) with members including Brett Mayne (RDA AHFKI), Graeme Martin (Southern and Hills LGA), Jo Sullivan (Kangaroo Island Landscapes Board), Lyn Doyle (PIRSA), John Butler (Hills and Fleurieu Landscape Board), Stephanie Wurst, Tom Cosentino and Tony Randall (SA Drought Hub)

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Acknowledgement of Country

The Adelaide Hills, Fleurieu and Kangaroo Island Drought Resilience Steering Committee acknowledges the Traditional Custodians of the land on which we work, live and play and their continuing connection to land, sea, culture and community. We pay respect to Elders past and present, and we extend that respect to all Aboriginal and Torres Strait Islander people in our community.

In particular, we acknowledge the Traditional Owners of the Adelaide Hills, Fleurieu and Kangaroo Island region covered by this Plan, including the Kurna, Peramangk, Ngarrindjeri and Ramindjeri peoples.

DRAFT

1. Introduction

The Adelaide Hills, Fleurieu and Kangaroo Island (AHFKI) region produces world-renowned food, fibre and wine and its scenic landscapes attract significant numbers of tourists. The diverse and highly productive agriculture, horticulture and viticulture industries established early in the settlement of South Australia relying on reliable winter rainfall and warm, dry summers. Recent decades have seen declines in annual, winter and spring rainfall across the region and an increase in average maximum temperatures. Climate projections indicate these trends will continue to the end of the century, including with more time spent in drought.

Drought resilience refers to the ability of individuals, communities, industries, or environments to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall, and changed seasonality of rainfall, to maintain or improve economic, environmental, or social wellbeing.

Building, maintaining and enhancing drought resilience as the climate changes and rainfall patterns change and become more variable and unpredictable is essential for the future of the region's agriculture and supporting industries and communities. Actions to strengthen drought need to reflect the diversity in the region's landscapes, community and climate and the unique challenges their communities face.

In last 10 years the region has been impacted by significant disruptions. Drought during 2018-19 was followed by bushfires that burnt across the Adelaide Hills and burnt nearly half of Kangaroo Island (2019-20). The ensuing COVID-19 pandemic saw further disruption to the economy and community.

Enhancing drought resilience will also help the AHFKI region prepare for, respond to, and recover from other stresses or pressures.

This Plan has been prepared as a framework or prospectus to guide future effort and investment in regional drought resilience. Its preparation has been led by the Adelaide Hills, Fleurieu and Kangaroo Island (AHFKI) Regional Drought Resilience Steering Committee and informed by the ideas and experiences of stakeholders from across the region.



1.1 Preparing this Plan

This Plan was informed by information collated through the following tasks:

- Literature review.
- Regional in-person engagement with 55 people across the AHFKI region.
- Key informant interview with 12 local subject matter experts
- Key informant interviews with drought resilience planners from other regions
- Regular Steering Committee meetings.

This Plan contains a summary of the information gathered from these tasks. Further detail and findings from all tasks are described in the Background Paper (included as an attachment to this Plan).

The regional engagement helped the project team to understand:

- How has/does drought impact the AHFKI region?
- What makes individuals, communities, and regions resilient to drought?
- How can the resilience of the AHFKI region to drought be maintained and enhanced?

Community members and stakeholders shared a wide diversity of perspectives, experiences and priorities. These are summarised in the Engagement Summary Report that is included as an Appendix to the Background Paper and embedded through this Plan.

Quotes from community members and stakeholders collected through the engagement activities are included in the green speech bubbles throughout this Plan reflecting personal experiences and views of drought in their own words.

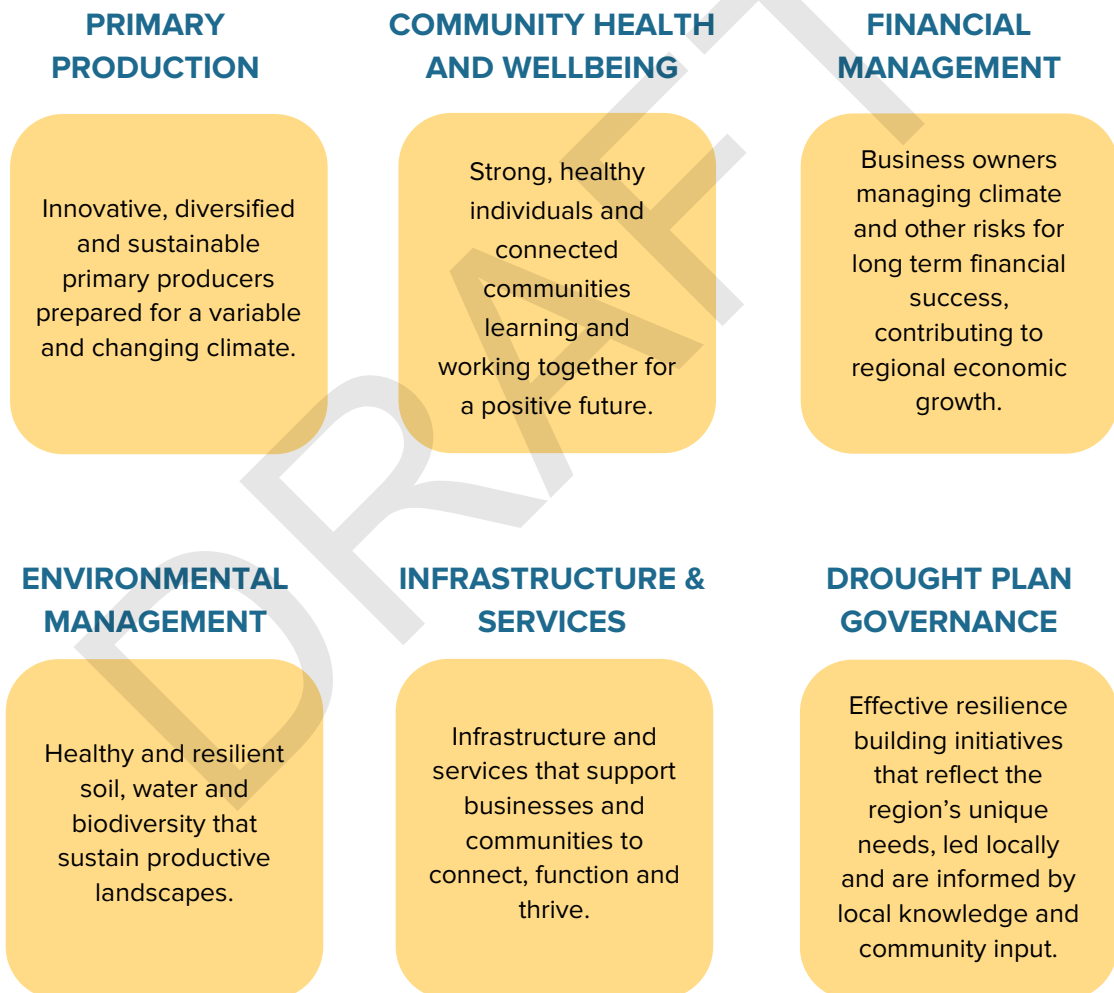


2. Summary of goals

Our vision for the AHFKI region

Diverse, smart, connected primary producers that understand drought risks and are taking action to build drought resilient farms, communities, economies and environments.

Our goals



3. The AHFKI region

The AHFKI Regional Drought Resilience Plan covers the sub-regions Adelaide Hills, Fleurieu Peninsula, McLaren Vale and Kangaroo Island as shown in Figure 1 below.



Figure 1 Location map

The Adelaide Hills' cooler climate provide ideal growing conditions for vineyards and apple, pear and cherry orchards. The Adelaide Hills picturesque agricultural and natural landscapes and high-quality local food and wine production attract tourists from around the world. Significant population growth has occurred over the past decade and further growth particularly around Mount Barker is projected.

On the Fleurieu Peninsula vineyards and the wine regions of McLaren Vale, Langhorne Creek and Currency Creek, cropping and dairy and livestock farms flourish alongside a thriving tourism industry. The Fleurieu Peninsula's population has grown at a rate double the state average over the past decade.

Kangaroo Island, Australia's third-largest island, lies off the coast of Fleurieu Peninsula. The island is noted for its unique wildlife, conservation areas, and sustainable agriculture, particularly sheep, grains, beef cattle farming. The island is separated from the Fleurieu Peninsula by Backstairs Passage, requiring a ferry transfer or plane flight to access from the mainland.

3.1 Key features of the AHFKI region

Through the research and engagement, a number of key features of the AHFKI region relating to agriculture and communities have been identified. These are summarised below and described further in the following sections.

- A growing population – growing faster than the rest of the State and project to continue to grow to 2041.
- Low rates of unemployment.
- Higher rates of volunteering, particularly on Kangaroo Island.
- A diverse economy at a regional scale but Kangaroo Island in particular less diverse where 21% of employment is in the agricultural sector, and 33% of economic output is from agriculture.
- 44% of land in the region used for livestock farming.
- Very high proportions of State apple, pear, cherry and strawberry production, established and reliant on milder climates, irrigation and reliable rainfall.
- Internationally renowned grape growing and wine production, in scenic landscapes attracting significant numbers of tourists.
- Significant cropping production including wheat, canola, beans, barley and oats.
- Declining annual rainfall and increasing average maximum temperatures from the period 1964-1983 to 1984-2023.
- Although crop yields are generally better when growing season rainfall is high, there have been some seasons when other factors contributed to higher yields despite lower rainfall.
- Mainland communities are generally well serviced by electricity, water, telecommunications and transport infrastructure however Kangaroo Island communities are less well serviced.
- Kangaroo Island industries are highly reliant on road and ferry transport which can be disrupted by extreme weather and mechanical issues.

3.2 People and economy

The region's population varies between sub-regions. The Adelaide Hills' proximity to the city means residents can work in Adelaide and live in the hills. The population is larger and younger than other sub-regions, with higher levels of education and higher average income. The Fleurieu Peninsula has an older population with a larger proportion of the population needing assistance with core activities, high income levels and high projected growth. Kangaroo Island has a smaller population, high rates of volunteering and lower income.

The economy of the sub-regions is similarly diverse, dominated by household service industries, agriculture, construction, and manufacturing.

Agriculture, forestry, & fishing is the top industry of employment on Kangaroo Island, accounting for 21% of jobs and nearly 33% of economic output. The sector provides 8% of jobs of the Fleurieu Peninsula and 6.3% of jobs in the Adelaide Hills. Only 1.1% of jobs in McLaren Vale are within agriculture, forestry and fishing.

Table 1 Key demographics for the AHFKI region and SA^{1,2,3}

	Adelaide Hills	Fleurieu Peninsula	Kangaroo Island	McLaren Vale	Total AHFKI region	South Australia
Resident population 2021	79,723 people	50,704 people	4,894 people	13,677 people	148,998 people	1,781,516 people
Projected population 2041 – medium growth scenario	34.5% increase	37.1% increase	20.0% increase	Not available for this area	35.0% increase (excluding McLaren Vale)	22.0% increase
Median age	42 years	56 years	50 years	47 years	47 years	41 years
Volunteering rate	19.7%	19.6%	27.7%	18.1%	19.8%	14.1%
Employment in agriculture, forestry and fishing	1,440 (6.3% of sub-region labour force)	1,508 (7.9%)	486 (21.2%)	553 (7.7%)	3,987 5.7% of region	31,637

3.3 Agriculture, horticulture and viticulture

Agriculture is a significant contributor to the region. Viticulture, horticulture, livestock and cropping contribute through both their outputs and employment and the reputation of the area as a premier food and wine destination. Around 57% of the region's land is used for agricultural purposes. Viticulture, horticulture and pasture across the Adelaide Hills and Fleurieu rely on irrigation, from groundwater, surface water captured and stored in dams, and recycled water. There is very little irrigated agriculture on Kangaroo Island.

In 2021/22, the sector generated \$1.47 billion in gross revenue across the region, accounting for 11.2% of total regional output (Table 2). On Kangaroo Island, the sector contributes one third of regional output.

Table 2 Output from agriculture, forestry & fishing 2021-22⁴

	Adelaide Hills	Fleurieu Peninsula	Kangaroo Island
Agriculture, forestry and fishing output (\$)	\$595.96 million	\$647.12 million	\$227.74 million
Agriculture as proportion of regional output	7.4%	14.8%	33.0%

Livestock, wool and dairy

Sheep and lambs (for meat and wool) and beef cattle are raised on farms across the region, with a number of dairy farms (cows), mostly on the Fleurieu Peninsula and a small number of goat dairies. In 2022/23 there were 86 dairy farms in the Central region (Adelaide Hills, Fleurieu Peninsula, Murray Swamps & Meningie Lakes) producing 34% of the State's milk production.⁵ Other livestock raised in the region include poultry and pigs.



Grapes

The AHFKI includes six recognised winegrape growing regions:

- Adelaide Hills
- McLaren Vale
- Southern Fleurieu
- Currency Creek
- Langhorne Creek
- Kangaroo Island.

These regions produce grapes for internationally recognised wines. The differing climate between regions result in different varieties planted and different strengths and challenges. Historically irrigation water supply for vines in McLaren Vale relied on groundwater however alternate supply of treated wastewater from the Willunga Basin Water Company now supplies around 65% of irrigation demand⁶.



Cropping

The most common dryland (non-irrigated) crops produced in the region include wheat, canola, beans, barley and oats, predominantly on Kangaroo Island and the eastern Mount Lofty Ranges.

Apples, pears, cherries and strawberries

Centred on the Lenswood Valley, the Adelaide Hills region is South Australia's most important and longest established apple growing area, with nearly 80% of the State's growers in this region.⁷ The Adelaide Hills is also the main region for pear orchards in South Australia.⁸

The Adelaide Hills region produces 90-95% of South Australia's cherry production. Microclimate variations across the Hills mean maturity can vary for the same variety which is beneficial as cherries are picked ripe and cannot be stored as long as apples and pears.

The region is the only area in South Australia where strawberries are grown, with a number of farms in the Adelaide Hills and Fleurieu.



Food and wine manufacturing

Across the AHFKI region food and wine manufacturing using regional produce creates wine, gin, beer, juice, milk products, jams and condiments, bakery products and more for local, national and international markets⁹.

3.4 Climate

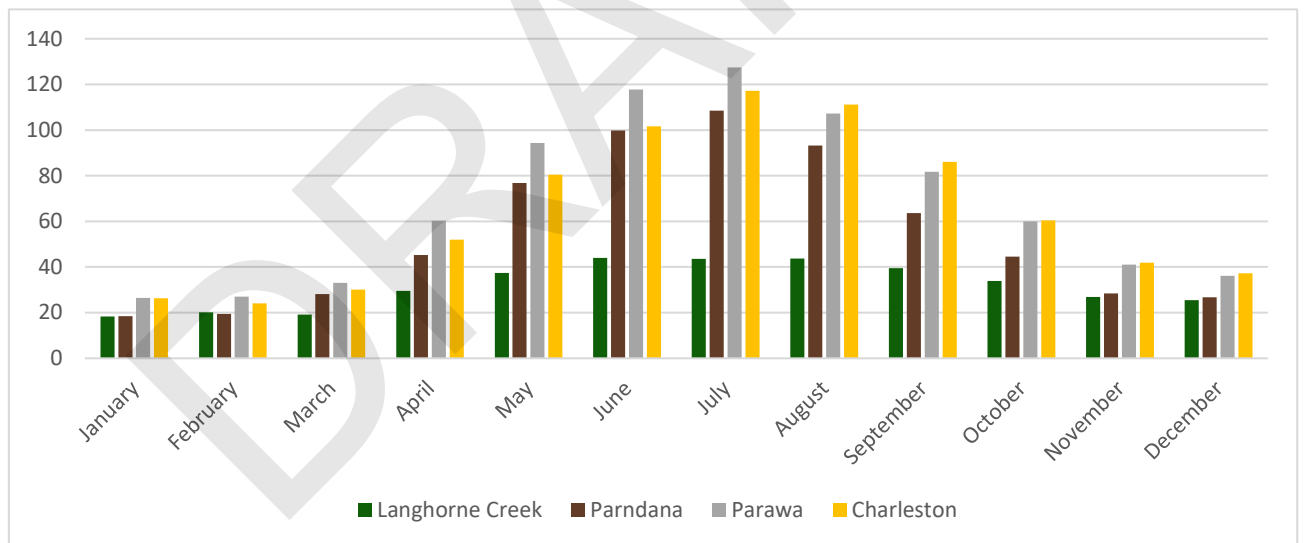
Rainfall

The region experiences a Mediterranean climate characterised by warm, dry summers and mild wet winters. The Adelaide Hills, due to its elevation, tends to be cooler and wetter compared to the coastal areas, with more significant rainfall supporting vegetation and agriculture. The Fleurieu Peninsula enjoys a moderate climate, with coastal areas benefiting from proximity to the ocean which influences that moderate temperatures and provide consistent rainfall. Kangaroo Island's climate is similarly moderated by the surrounding ocean, leading to mild temperatures year-round and historically reliable winter rainfall.

Rainfall reduces moving east across the region due to the influence of the Mt. Lofty Ranges, with annual rainfall in Langhorne Creek less than half of that at Parawa.

Figure 2 shows average monthly rainfall at four locations in the region from 1964 to 2023. Winter rainfall is significantly lower at Langhorne Creek.

Figure 2 Average monthly rainfall 1964 to 2023



Rainfall has been decreasing in recent decades. Data from myclimateview.com.au shown in Table 3 shows rainfall has reduced from the period 1964-1983 to 1984-2023.

Table 3 Rainfall change 1964 to 2023¹⁰

Location	Average annual rainfall 1964 – 1993 (mm)	Average annual rainfall 1994 – 2023 (mm)	Change (mm)	Change (%)
Langhorne Creek	373	335	38	-10.2%
Parndana	672	634	38	-5.7%
Parawa	838	787	51	-6.1%
Charleston	794	743	51	-6.4%

Temperature

The AHFKI region experiences moderate temperatures, with most of the region experiencing average annual maximum temperatures of approximately 19-22°C.¹¹

Temperature has been increasing in recent decades. Table 4 shows the increase in average annual maximum temperature from the period 1964-1983 to 1984-2023.


Table 4 Temperature change 1964 – 2023¹⁰

Location	Average annual maximum temperature 1964 – 1993 (°C)	Average annual maximum temperature 1994 – 2023 (°C)	Change (°C)	Change (%)
Langhorne Creek	21.6	22.2	+0.6	+2.7
Parndana	18.7	19.3	+0.6	+3.2
Parawa	18.4	18.9	+0.5	+2.7
Charleston	19.2	19.9	+0.7	+3.6

3.5 Water resources

Water resources are critical to support agricultural and other economic, community and environmental needs in the region. Table 5 summarises key features and characteristics of water resources in the AHFKI region. The taking of surface water and groundwater is controlled through several water allocation plans that apply to Western Mount Lofty Ranges (WMLR) and Eastern Mount Lofty Ranges Water Resource Areas (EMLR) and Prescribed Wells Areas (PWAs) including: Angas-Bremer, McLaren Vale (partly), Central Adelaide (partly). Water resources on Kangaroo Island are not prescribed.

Table 5 Water resources – key features and characteristics

Water resource	Key features and characteristics
Surface water	<p>Surface water is used extensively through the region for stock and domestic use and irrigation of pastures, grapes and horticulture. Farm dams are important to many farms, allowing for storage of surface water for stock use and irrigation, and often supplemented with groundwater.</p> <p>The Onkaparinga and Torrens Rivers in the Adelaide Hills are key sources of water for the Adelaide population. Their catchments include large water storage reservoirs fed by catchment inflows and supplemented by water piped from the River Murray. The River Murray, in addition to its drinking water supply, provides irrigation water along the River and Lower Lakes.</p> 
Groundwater ^{12,13}	<p>Irrigation in the Adelaide Hills and Fleurieu Peninsula relies heavily on groundwater sources due to limited surface water availability, particularly during dry seasons. The Eastern Mount Lofty Ranges contain aquifers that are utilised for both agricultural and domestic purposes. The McLaren Vale region historically relied upon groundwater resources for irrigation however expansion of the irrigated area has driven a need for an alternate supply to supplement the use of groundwater.</p> <p>Groundwater resources on Kangaroo Island are limited and generally saline.</p>
Wetlands	<p>Wetlands in the region play critical roles in biodiversity conservation and water purification. The Fleurieu Peninsula is home to nationally and internationally significant wetlands such as Fleurieu Swamps and parts of the Ramsar listed Coorong and Lower Lakes system. Kangaroo Island has 15 wetlands of national significance including the Flinders Chase River Systems, American River Wetland System, and Murray Lagoon.</p>

3.6 The AHFKI 'system'

The AHFKI region is a complex system of connections and interactions between people, industries and the natural environment. These connections and interactions mean that when one feature is impacted, flow on effects will be experienced by other features in the system. Considering these connections and interactions is called 'systems thinking'. Systems thinking helps to identify the factors that make the system resilient or vulnerable to change.

Figure 3 illustrates key features of the AHFKI system. Key features include water resources and agriculture (horticulture and viticulture, cropping and livestock). Maintaining agriculture and its connections to other features is integral to the viability of the region, as is provision of secure water supplies. Without viable agriculture and water to support the population, community groups, social fabric, service provision and the regional economy will be at risk.

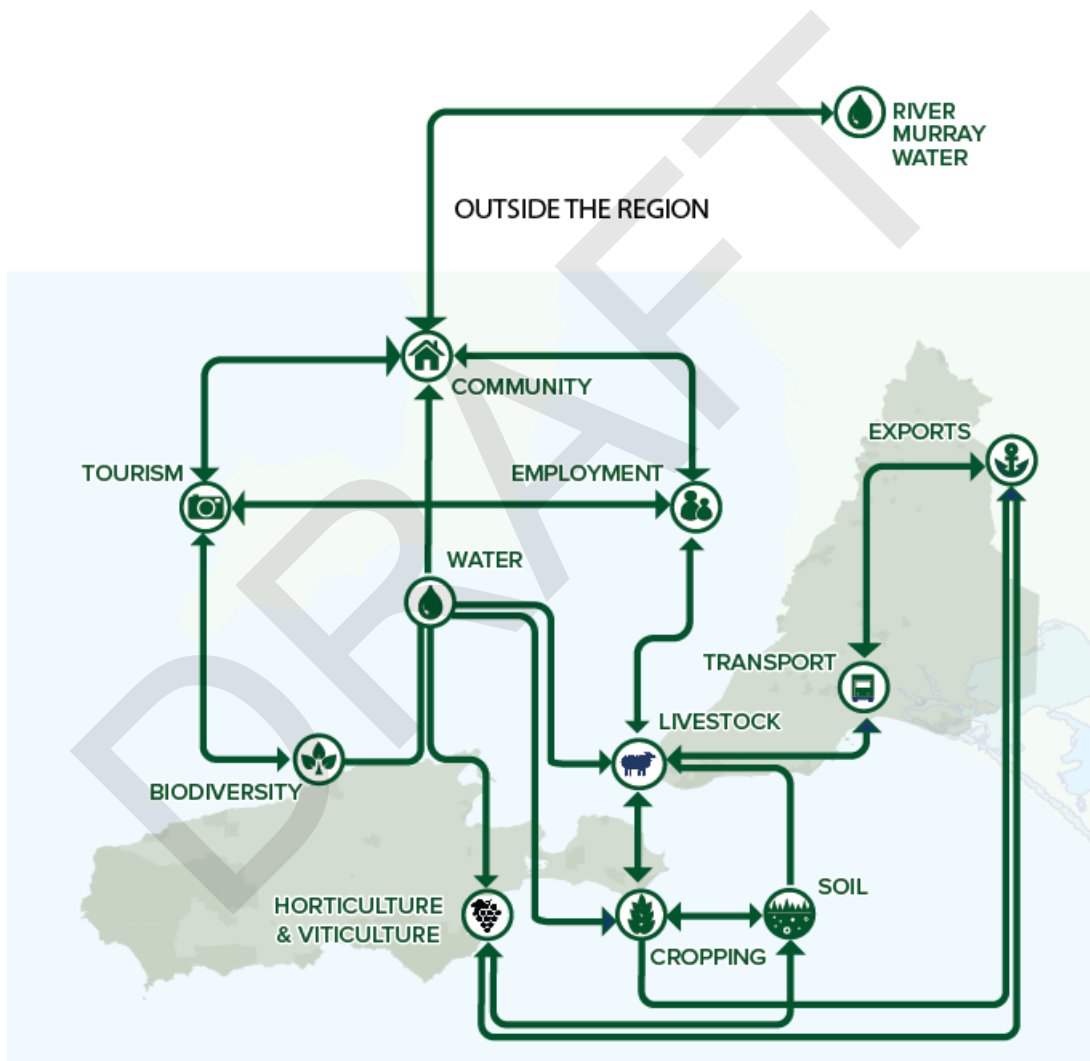


Figure 3 The AHFKI 'system'

4. Drought

Drought is not simply low rainfall. Drought is a comparatively dry period compared to normal conditions, when people, businesses and the environment that rely on that water are affected.

For this plan, drought is defined as:

A 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.



4.1 Drought in the AHFKI region

Drought in the AHFKI region is caused by a number of natural atmospheric conditions including the Positive Indian Ocean Dipole and El Niño-Southern Oscillation. Anthropogenic climate change is also projected to influence on drought conditions.

The Background Paper summarises information on these climate drivers developed by the Bureau of Meteorology.

Before European colonisation, the region would have experienced numerous drought periods. Since meteorological records began, the region has experienced a number of significant declared droughts including:¹⁴

- The Federation drought: 1895 to 1902
- The 1914 to 1915 drought
- The World War II drought: 1937 to 1945
- The 1965 to 1968 drought (particularly affecting the Adelaide Hills and Fleurieu Peninsula)
- The 1982 to 1983 drought
- The Millennium drought: 1997 to 2009
- The 2017 to 2019 drought (the Tinderbox drought).

"During drought, everyone takes a hit"

The 2017 to 2019 drought, whilst one of the shortest on record, was severe in eastern South Australia including the AHFKI region. The region experienced rainfall deciles that were very much below average and high temperatures. The drought caused significant stress on water resources, agriculture, and natural ecosystems in the area. The hot conditions further combined with the dry landscape and strong winds to produce dangerous fire weather conditions during December 2019 into early January 2020, including the 2020 Adelaide Hills and Kangaroo Island bushfires.

"The drought led to high stress and eventually forced me to cease business operations".



4.2 Drought impacts on the AHFKI region

Through the stakeholder engagement undertaken for this project, the impacts of drought on the region described in Table 6 were identified.

Table 6 Drought impacts

Theme	Impact
Social impacts	Reduced self-confidence, increased anxiety and mental stress, leading to physical health issues, increased family and relationship breakdowns, and higher suicide rates.
	Withdrawal from community settings which leads to reduced social interaction and division within the community.
	Reduced feelings of positivity and optimism associated with living in a drought affected landscape.
	Decrease in holidays and time off, with people working seven days a week, leading to increased workload and burnout and less time for friends and family.
Agricultural impacts	Decrease in water availability for stock consumption, irrigation, milking shed hygiene and potential increase in salinity of water sources. Livestock health deteriorates due to inadequate feed and water.
	Exacerbated impacts of heat, resulting in Increased fruit/crop damage from extreme heat and reduced yields.
	Increased spending on buying feed, trucking water, and other essential resources and lower income can lead to debt and reduced financial stability, making it difficult to manage regular expenses and invest in future operations.
	Farmers often engage in 'fire sales' to get rid of stock and then have to buy back at a premium or have lost herd genetic diversity.
Environmental impacts	Changes in distribution and number of pest plants and animals and increased grazing pressure.
	Increase in bushfire risk caused by dry vegetation.
	Adverse impacts on condition of native plants and animals.
	Reduced land cover leading to increased erosion risk, decrease in topsoil and decline in soil health.
	Decrease in quality and availability of surface water, reduced flows and impacts on native fish
	Increase in wildlife and human interaction, increase in biosecurity risk.

"The drought caused significant financial costs, stress, and mental health challenges"

"Drought taught me a huge lesson. It was a very hard time."

Theme	Impact
Economic impacts	Lower farm incomes lead to decreased spending in local shops and businesses that provide services and supplies to farms,
	Increase in need for off farm jobs.
	Job losses in primary production, with people leaving the area to seek employment elsewhere.
	Serious strain on Kangaroo Island's logistics, affecting the transport of goods and resources.
Infrastructure impacts	Damage to farm infrastructure and equipment from poor roads worsened by drought conditions.
	Deterioration of infrastructure due to compounding natural hazards following drought, including bushfire and floods.
	Decrease in on-farm capital and repairs.

In late December 2019, catastrophic bushfires started in Cudlee Creek (Adelaide Hills) and Kangaroo Island that had significant impacts on the environment and regional economy. Research following these events and other bushfires across eastern Australia at the same time has investigated the impacts of weather conditions leading into the fires. The research concluded that:

“the drought and heatwave conditions experienced in the lead up to and during the Kangaroo Island fires were a key factor in priming the landscape for extreme fire behaviour, but local weather conditions were also important when combined with the very dry vegetation¹⁵.



4.3 Climate projections and drought

Climate projections describe what the future climate could be like, sourced from multiple climate models, and based on numerous assumptions about the factors that influence climate and the trajectory of change in greenhouse gas emissions in the atmosphere. Each model uses different assumptions and algorithms to project how climate variables such as temperature, rainfall and evapotranspiration will respond in different emissions scenarios over different time frames. The projections presented in online tools and viewers each use a different combination of global climate models and show slightly different results.

For this Plan we have used the projections described by the CSIRO and Bureau of Meteorology in Climate Change in Australia, and used to downscale data presented in MyClimateView.

Climate change is projected to increase time spent in drought in the region. Annual rainfall is projected to decrease, and temperatures to increase.

Climate Change in Australia provides the following climate projection statements for large “cluster” areas across Australia. Most of the AHFKI region (including western Adelaide Hills, western Fleurieu Peninsula and Kangaroo Island) is within the Southern and South-Western Flatlands East sub-cluster which has the following climate projections.

Table 7 Climate projections for the AHFKI region¹⁶

Weather event		Projection	Confidence
Rainfall	Annual rainfall	Decreasing annual rainfall	High
	Winter rainfall	Decreasing winter rainfall	High
	Spring rainfall	Decreasing spring rainfall	High
	Summer and autumn rainfall	Unclear, although downscaling results suggest a continuation of the observed autumn declines.	Low
Drought		Increasing time spent in drought	High
Extreme rainfall events		Increasing intensity of extreme rainfall events	High
Average, maximum and minimum temperatures		Substantial increase in mean, maximum and minimum temperatures	Very high
Hot days and heatwaves		More hot days and warm spells	Very high
Frost		Fewer frost risk days	High
Potential evapotranspiration		Increased potential evapotranspiration in all seasons	High
Bushfire		Harsher fire-weather climate	High

A portion of the eastern Adelaide Hills and eastern Fleurieu peninsula are captured within the Murray-Basin sub-cluster. Key climate projection messages for this cluster include:

- Time spent in drought is projected, with medium confidence, to increase over the course of the century.
- By late in the century, less rainfall is projected during the cool season, with high confidence. There is medium confidence that rainfall will remain unchanged in the warm season.
- Increased intensity of extreme rainfall events is projected, with high confidence.
- More hot days and warm spells are projected with very high confidence.

Climate projections for particular locations in the region can be sourced from

<http://myclimateview.com.au>.

Rainfall and temperature projections for four locations in the region at 2050 using RCP 8.5 are shown in Table 8.

Table 8 Selected climate projections for three AHFKI region locations

Climate variable	Langhorne Creek		Parndana		Parawa		Charleston	
	(1994 – 2023)	2050s average	(1994 – 2023)	2050s average	(1994 – 2023)	2050s average	(1994 – 2023)	2050s average
Total annual rainfall	373 mm	335 mm	634 mm	591 mm	787 mm	731 mm	743 mm	737 mm
Summer rainfall	64 mm	52 mm	68 mm	54 mm	91 mm	75 mm	86 mm	75 mm
Autumn rainfall	90 mm	82 mm	140 mm	139 mm	174 mm	161 mm	151 mm	149 mm
Winter rainfall	130 mm	120 mm	294 mm	275 mm	343 mm	331 mm	329 mm	337 mm
Spring rainfall	98 mm	86 mm	130 mm	122 mm	178 mm	162 mm	177 mm	172 mm
Average maximum temperature	22.2°C	23.6°C	19.3°C	20.4°C	18.9°C	20.1°C	19.9°C	21.3°C
Annual hot days (over 35oC)	17 days	24 days	5 days	6 days	5 days	8 days	11 days	18 days

4.4 Implications for agriculture

The impact of future drought on agriculture is varied and depends on many factors including (but not limited to):

- Current climate regime (e.g. already drier and more variable climates may be more susceptible).
- Type of water source and availability of alternatives (e.g. groundwater resources can be more resilient than surface water resources in extended dry periods).
- Type of agriculture (some crops are more vulnerable to water stress).
- Whether there is irrigation or dryland agriculture.

In irrigated areas, drought can generally mean higher evaporative demand from crops. Dry spring and autumn periods mean irrigation seasons can be longer. This can present issues where annual allocations are limited and temporary trade of water is needed to meet demand.

Where water sources become severely limited such as during the Millenium drought, irrigation may not be possible and strategies to save more valuable perennial crops may need to be put in place.

Irrigators in the Langhorne Creek area had to invest in strategies to access and store water supplies during this time. This included dredging channels to water that had receded in Lake Alexandrina, storing water via managed aquifer recovery schemes and building new pipelines to the River Murray.

Regions that have access to better quality groundwater and alternative water supplies including recycled water, such as McLaren Vale, appear to be more resilient to drought.

It has been reported that irrigation with higher salinity water has occurred in times of severe water shortage (e.g. Langhorne Creek) resulting in a build-up of salt in the root zone. It takes several years of subsequent irrigation to return soil salinity to healthy levels.

Extended or seasonal dry conditions in dryland agricultural areas can deplete soil moisture storage leading to lack of production of crops, reducing feed for stock and livestock losing condition where feed cannot be imported and destocking is not undertaken.

Soil health can deteriorate during drought making production following a drought more difficult. Lack of cover on dry soils increases erosion potential, causes compaction (creating problems for root penetration) and potentially leads to increased water repellence.

Drought also reduces the availability of sources of water for stock watering.

An increasing frequency and intensity of drought will further exacerbate these impacts. Various agricultural practices that are considered leading edge will provide some measure of adaptation in the short term. However, long term adaptation may require more transformational responses.

5. Other drivers of change

Global, national and regional influences are driving changes in markets, technology, governance arrangements, values, and social factors. Key drivers and their implications for the AHFKI region are described in Table 9 Drivers of change

, with additional information available in the Background Report.

Table 9 Drivers of change

Global drivers ^{17,18,19}	
Climate change and decarbonisation	Responding to climate change requires a shift in the global economy to reduce carbon emissions and Australia has committed to reducing its greenhouse gas emissions. In the region, agriculture and transport are key sources of emissions that are likely to see transformation change over the next thirty years.
Technological disruption	A digital world provides opportunities for online work and study, telehealth, commerce and digital currency. A greater reliance on technology for work, business and study means that outages and service issues can have a significant impact on operations.
Trade disruptions	Sudden and unexpected widespread trade disruptions brought through global pandemics, conflict, geopolitical tensions, or similar events can have significant impacts on supply chains, demand, and commodity prices. The COVID-19 pandemic had a significant impact on the tourism industry globally, with impacts also felt across the whole region.
Consumer focus	Globally there is a strong consumer push for decision makers to consider trust, transparency, fairness, and environmental and social governance. Demand for sustainable meat is growing and in response the Australian red meat and livestock industry has set a target to be carbon neutral by 2030. On Kangaroo Island their GM-free status allows them to access Japan's high-priced market for GM-free grain ²⁰ (Hough, 2020).
Increased demand for meat	As many developing countries become wealthier and individuals receive more income, demand for meat is increasing. In the AHFKI region, pastoralists have an opportunity the contribute to meeting this demand.
National and state drivers ^{21,22}	
Increased cost of living	Increasing costs of living is placing pressure on Australians to fund their everyday needs. There is high variability in the income security of the AHFKI community and this driver will be felt differently in different communities.
Health challenges	One in five Australians report high or very high levels of psychological distress. Responding to our health risks and improving health outcomes is becoming more and more important. The research and engagement for this project highlighted the significant adverse impacts on the mental health of the people and communities experiencing drought and the need for increased services.

Regional drivers ^{23,24,25,26}

Ageing population and labour force shortage	There is a growing demand for highly qualified workers and healthcare professionals, driven by the increasing need to support an ageing population. The COVID-19 outbreak positively impacted population growth, but there is a risk of losing younger working-age residents as cities draw people back.
Increased tourism	Tourism is a key contributor to the region's economy however tourists also place increased pressure on natural resources, landscapes and infrastructure. Tourism visitation to the region is increasing twice as fast as the state average. Ensuring infrastructure improvements keep up with growing visitation is critical to the sustainability of the region.
Export-oriented industry growth	The region has experienced strong growth in its highly competitive export-oriented industries including agriculture and food and beverage manufacturing, which has increased job creation, economic value, and productivity.
Education and training	The region benefits from a diverse educational landscape, including a blend of public and private secondary schools. Additionally, the presence of TAFE campuses in Mount Barker and Victor Harbor and availability of online courses provides valuable opportunities for vocational and skills training, supporting the region's educational and workforce development needs.
Managing bushfire risks and recovery	Catastrophic bushfires are an increasing risk in the AHFKI region. Managing this risk without compromising biodiversity values requires careful and strategic changes in land and fire management.
Demand for transport and freight	The AHFKI region, particularly Kangaroo Island, is experiencing increasing demand for transport and freight services. Investment in transport infrastructure and logistics is crucial to support the region's economic growth and connectivity with broader markets.
Urbanisation and population growth	Larger towns and cities and high amenity areas continue to draw population growth and economic activity away from many smaller towns. The entire region is projected to experience an increase in population. This growth, particularly in the Adelaide Hills and Fleurieu Peninsula areas, will result in an increased demand for residential and commercial land.

6. Drought resilience

6.1 A definition of drought resilience

The term 'resilience' is used in numerous domains, from health and wellbeing to natural resources and the economy. For this Plan, drought resilience is defined as the following:

Drought resilience means the ability to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall and changed seasonality of rainfall, for improved economic, environmental and social wellbeing²⁷.

Resilience is more than just bouncing back. In some cases, disruption can be seen as an opportunity to move in a new direction, not just recover back to a previous state. Resilience is about proactively changing in order not to be changed involuntarily.

Building resilience will help the AHFKI region to endure droughts with less negative impacts and recover from them sooner.

The AHFKI Drought Resilience Plan is focused on drought resilience. However, enhancing drought resilience will help the region respond to and recover from other stresses or pressures such as bushfire, flooding rains, pandemics, and economic market changes.

6.2 The importance of drought resilience

Past droughts have had major consequences for jobs and income, mental health and wellbeing, the ability to feed livestock or grow crops, and the health of the environment. With climate projections predicting more frequent and more intense drought, building resilience is crucial.

Resilience is about taking action to try to avoid or minimise these negative impacts before they happen rather than waiting until they do occur to act, or just focusing on recovery. Building resilience can help to create economic, social, and environmental development opportunities.

6.3 Characteristics of drought resilience

It is important to consider resilience at a variety of scales from the individual to the community and the whole region. Resilience looks different for every community depending on its unique experience, attributes, risks, and characteristics. Common attributes drought resilience identified by stakeholders, community (see Appendix A – Regional Engagement Summary Report) and the literature are described below:^{28,29,30.}

Drought resilient individuals are or have:

- Strong social connections, networks and relationships with friends, family, and the wider community, having multiple touch points.
- Willingness to try doing things differently, learn from past droughts and adapt to different conditions.
- Diverse sources of household or farm income, long term financial planning and capacity to save for more difficult times
- Embracing innovation and implementation of new techniques, tools, and technology.
- Implementing soil water efficiency practices and increasing soil carbon.
- Understand drought is likely to occur and proactively prepare for it
- Access to good education, healthcare, and digital connectivity.

“Planning from previous experiences helps as well as on farm strategies such as confinement, paddock subdivision, water infrastructure”

Drought resilience communities are or have:

- Strong, connected, caring communities that help each other in times of need.
- Access to regional centres with health, education, and support services.
- Sharing knowledge and celebrating sustainable practices.
- Investment in projects that give good return to the community and employ local people.
- Local employment opportunities that support people to stay in the community.
- Community spaces that enable people to come together.
- Access to efficient community services and affordable commodities.
- Good education and career pathways in agriculture.
- Efficient transportation and special needs services during crises.
- Place-based collaborative, long-term approaches and support from external agencies in ways that meet the unique needs of each community.
- Implementing community-led initiatives with engagement at all levels.

“Drought resilient farmers have the ability to gather and collaborate with other farmers, get support from service providers, industry bodies and suppliers – to help understand the conditions being experienced”

Drought resilient regions are or have:

- Strategic investment in infrastructure (e.g., water, transport, power, telecommunication, etc.).
- Access to a good platform for information and updates on drought including weather forecasting.
- Diverse economies
- Low populations of pest/overabundant animals through proactive management before drought.
- Attracting and retaining workers in the region.
- Strategic and proactive preparation for drought.
- Policies that reflect regional needs and support community-driven solutions.



6.4 A new approach to resilience through the National Drought Agreement

In the past, the Government of South Australia made declarations of drought with associated Exceptional Circumstances support and focused the majority of their drought programs on the 'during' and 'after' phases of drought.

This approach has recently changed, through the new National Drought Agreement (2024-2029).³¹

All Australian, state and territory governments have agreed to and signed this Agreement which explains how they are working together to help Australian agriculture better withstand drought.

A key feature of the agreement is a greater focus on enhancing drought resilience before drought, to enable farms, people, businesses and the environment to minimise the impact of drought rather than waiting until drought hits to act.

Another is the elimination of drought and Exceptional Circumstances declarations. Previous drought declarations necessitated the drawing of lines on maps to identify regions in drought. Community and stakeholders recognised that this approach was challenging, in many cases inaccurate, and resulted in farmers in need being ineligible to access support. The new approach recognises that support needs are highly variable, and eligibility should be based on need, not activated by drought declarations.³²

The development of this Plan is consistent with the Agreement's objectives to prioritise objectives and outcomes that enhance long-term preparedness, sustainability, resilience and risk management for farming businesses and farming communities in Australia.

7. The Drought Resilience Strategy

7.1 Vision

The AHFKI region's vision is for:


Diverse, smart, connected primary producers that understand drought risks and are taking action to build drought resilient farms, communities, economies and environments.



7.2 Delivery principles

Through the community and stakeholder engagement, a number of ideas were consistently raised and have been used to inform the following drought resilience planning and delivery principles, all of which are consistent with the principles of the National Drought Agreement:

- The region is diverse and communities have different needs. Planning, design and delivery of drought resilience building projects must be tailored to each community or landscape, reflecting their unique characteristics and needs. Local community involvement is key to provide each community with what they need to be resilient.
- Communication and collaboration are critical to success and means the region can take advantage of existing networks. There are many organisations, associations, groups and agencies working on projects that can contribute to drought resilience. Ensuring all these groups are working together and there is no duplication of effort means more can be done with the resources available.
- Investment in drought resilience projects will focus on enhancing long-term preparedness and resilience. Resilience building outcomes will be optimised when project delivery occurs when times are good and the community has energy and focus.
- Support will be available to everyone that needs it. Sometimes even the most prepared and resilient need support and they will not disadvantage.



"Our region has missed out on support in the past due to being a high rainfall region despite having been greatly impacted by dry conditions."

7.3 Delivery arrangements

It is proposed that the AHFKI Regional Drought Resilience Steering Committee established to develop this plan will lead the implementation of the opportunities identified in this Plan. Individual leads will be identified once the plan is approved and ongoing governance arrangements confirmed.

7.4 Goals, strategies and opportunities

The goals, strategies and opportunities to build drought resilience in the AHFKI region are described in the following sections. The strategies seek to leverage existing strategic planning and avoid duplication of effort by referring to the implementation of other regional plans. Strategies are high level to provide flexibility to accommodate changing circumstances, new evidence and evolving knowledge while remaining accountable to stated goals, vision, and regional values.

The practical and implementable opportunities to build drought resilience have been developed with the region's community and stakeholders who have identified and supported them because they believe they will be effective.

While targeted at the impacts of drought, this support provides co-benefits for broader resilience and adaptation.

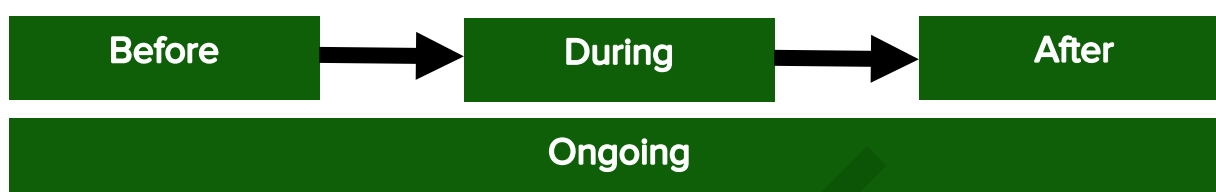
The goals, strategies and opportunities are presented under the following themes:

- Agriculture, horticulture and viticulture
- Community health and wellbeing

- Financial management and economic development
- Environmental management
- Infrastructure and services
- Governance and Advocacy

Timing

The timing for delivery of each opportunity has been categorised according to when it would fit within the drought cycle:



The Plan places a focus on actions to be undertaken before drought hits. By focusing effort and investment in the phase, farmers, communities, businesses and environments across the region will be better set up to minimise the impacts of drought, rather than bearing them when they come. This approach will help to support the long-term preparedness, sustainability and resilience of farm businesses and communities. Nonetheless, it is recognised that support will still be needed during and after drought, and this plan will help deliver this support particularly during extended, severe droughts.

Responsibility

A lead for each opportunity has been identified. Lead organisations are members of the AHFKI Drought Resilience Advisory Group. Lead organisations will often partner with those identified in the potential partner list to deliver the opportunities.

Priority strategies



Priority strategies that have potential to have the greatest influence in building drought resilience are identified with a **star icon**. *These priorities will be identified by stakeholders through engagement on the draft plan and added to the final plan.*

Individual action



Opportunities in the plan have been scoped as actions to be taken at an organisational, regional or sub-regional level. However, many of these can also be progressed at an individual level. For example, while regional organisations may provide training and grants for household income diversification, farms and families would also be able to diversify their income themselves without external support. These sorts of actions are identified with a **person icon**.

New initiatives



Many of the strategies relate to work that is already underway, and either needs to be extended, expanded, promoted or accelerated to have greater benefit. Other strategies present opportunities that are limited in their current application or are not at all part of current action in the region. These present new opportunities that could lead to significant or transformational change for the region and are flagged with a lightbulb icon.

7.5 Primary production

Seasonal variability and extreme weather have always influenced primary production in the region. Different sectors have adapted differently however managing soil health, water use efficiency monitoring and selecting drought resilient varieties are common to most.


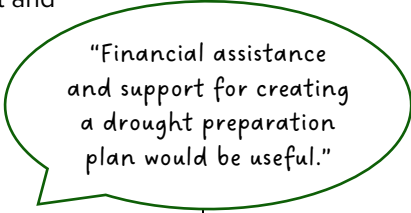
Holistic land management approaches that aim to enhance sustainability and resilience, such as regenerative, biodynamic and permaculture farming, are being applied across the region and demonstrating improvements in soil and livestock condition. Regenerative agriculture aims to protect and enhance topsoil by regenerating key landscape functions³³.

The World Economic Forum and United Nations have identified biodiversity loss as a major risk to businesses and financial capital³⁴. Global conservation organizations, institutes, and business and finance coalitions are seeking a target of nature positive by 2030³⁵. A market for biodiversity credits is emerging and may present opportunities for regional landholders to receive financial benefit from taking nature-positive action.



Carbon farming projects are being initiated across South Australia that include practices that increase the amount of carbon stored in soil and vegetation (sequestration) or avoid or reduce greenhouse gas emissions. These can be achieved through revegetation or rotational grazing with extended rest spells that allow vegetation cover to recover. Carbon farmers can receive revenue from carbon farming by selling carbon credits through the Australian Government's Emissions Reduction Fund or to private investors or businesses, providing an opportunity for alternative on-farm income³⁶.

Landscapes SA (Hills and Fleurieu and Kangaroo Island), PIRSA and the Drought Hub all have a role to play in providing education and support to land managers to build drought resilience, through supporting and delivering capacity building and promoting research and innovation.

Implementation of the opportunities for this theme will benefit from partnerships with organisations, associations and groups including Adelaide Hills and McLaren Vale Wine Regions, Wine Grape Council of SA, Grain Producers SA, Livestock SA, SA Dairyfarmers' Association, Apple and Pear Growers Association of SA, Horticulture Coalition of SA, regenerative agriculture farmer groups, and Landcare groups.

GOAL: Innovative, diversified and sustainable primary producers prepared for a variable and changing climate		
Strategy	Opportunity for action	Timing
Support primary producers to plan and implement farm and land management actions that build resilience	Support primary producers to prepare property/farm management plans that guide land management and resource use efficiency to deliver profitable production, including triggers or thresholds to support decision making leading in to and during drought and actions to prepare for, respond to and recover from drought and other adverse weather events (eg frost, heatwave, bushfire or flood) 	Before 








GOAL: Innovative, diversified and sustainable primary producers prepared for a variable and changing climate

Strategy	Opportunity for action	Timing
	<p>Support, promote and build capacity of land managers to implement techniques that will enhance productivity and resilience including pest plant and animal and disease control, planting low water use or more drought resilience varieties, establishing shelterbelts and native vegetation corridors, adoption of alternate farming systems, clay spreading and biochar application.</p> 	<p>Before</p>
	<p>Support land managers to improve on-farm data measurement and monitoring to make informed decisions and identifying opportunities for improvement, for example installing soil moisture monitoring and seasonal evaluation of crop performance.</p> 	<p>Before</p>
<p>Support construction of farm-scale infrastructure that enhances drought resilience</p>	<p>Provide support, including financial incentives for infrastructure improvements that enhance drought resilience, such as environmental covers and netting, farm scale water infrastructure, containment feedlots, on-farm crop and grain storage, on-farm weather stations or renewable energy generation and storage.</p>	<p>Before and during</p>
<p>Undertake research and development</p>	<p>Identify and communicate research and development priorities and support research, extension and application of action to adapt or improve productivity, including relating to plant/crop varieties, agronomic management and better use of weather forecasts to develop solutions to frost, heat stress and drought.</p>	<p>Ongoing</p>
<p>Learn from local experiences</p>	<p>Facilitate opportunities to learn from previous drought experiences, including documenting case studies, compiling research findings and holding events to share experiences and connect more and less experienced primary producers.</p>	<p>Before and after</p>

“Long-term resource planning and careful water management helped me get through the drought.”

“Using strategies from previous experiences, such as confinement, paddock subdivision, and improving water infrastructure, has been effective.”

GOAL: Innovative, diversified and sustainable primary producers prepared for a variable and changing climate

Strategy	Opportunity for action	Timing
Improve resilience of grazing enterprises through fodder management	Support the uptake of practices that produce more fodder for example sowing permanent pastures and summer fodder crops, rotational grazing and resting paddocks with net zero grazing losses and feed budgeting, and increase fodder stores, for example through silage or hay storage. 	Before
Enhance integration of biodiversity-positive land management 	Investigate and support the uptake of agricultural practises that increase biodiversity and take advantage of emerging opportunities to benefit from biodiversity credits and nature positive outcomes. 	Before
Support primary producers to reduce emissions and investigate opportunities to support the transition to net zero 	Investigate and support farmers to measure their farm emissions profile and develop strategies to manage on-farm emissions.	Before
	Build carbon farming literacy through delivery of workshops, demonstration sites and accessible information.	Before
Investigate models for community cooperatives or shared infrastructure 	Investigate models for community cooperatives and collaborative and shared farm infrastructure such as community owned and run feed storage facilities, that reduce costs and benefit communities.	Before
Support diversification of primary production enterprises 	Investigate opportunities for production of new crops or varieties to meet current or changing market demand and consumer preferences and research and apply	Before
	Investigate and support on-farm circular economy opportunities including reuse of waste products.	Before
	Support primary producers to diversify their income, for example through agri-tourism, food and beverage manufacturing or off-farm employment. 	Before
Share and celebrate stories about resilience building	Celebrate farming and community successes, promoting good practice that will or is strengthening drought resilience.	Ongoing

7.6 Community health and wellbeing

The AHFKI region is home to nearly 150,000 residents. On Kangaroo Island and further from Adelaide, more residents have lived in their local area for many years, often following generations of family members. In these areas communities have higher rates of volunteering and strong connections.

The Cuddlee Creek and Kangaroo Island bushfires had a profound impact on local communities, with homes, livelihoods and the environment damaged and destroyed. Through the fires and in their aftermath, individuals and groups came together to support each other through the crisis and the recovery process.

Community and stakeholders across the region shared the lasting impacts of droughts on the community and acknowledged that drought-breaking rains do not mean the impacts of drought immediately reduce. Recovery can take significant time – individuals, families and businesses can still be recovering well after the environment has recovered.

The LGA and councils, Landscapes SA (Hills and Fleurieu and Kangaroo Island) and RDA all have a role to play in maintaining and strengthening community connections and supporting community health and wellbeing. Implementation of the opportunities for this theme will benefit from partnerships with organisations, associations and groups including local community, sporting and special interest groups, schools and other education services and health services.

GOAL: Strong, healthy individuals and connected communities learning and working together for a positive future		
Strategy	Opportunity for action	Timing
Foster community collaboration and build social connection	Work with community groups and organisations to prepare and deliver a program of free or low-cost events and activities that bring the community together, tailored to community needs and different audiences, for example workshops, presentations, comedy shows, family fun days, sport and art initiatives.	Before, during and after
	Foster coordination and collaboration between organisations in the region including not-for-profit organisations, government agencies, health and education service providers and financial institutions.	Before
	Continue to support local sport and cultural events in the region during drought periods and ensure ongoing maintenance of community infrastructure.	During
Support mental health and wellbeing	Build and strengthen initiatives to support mental health and create awareness of support options for the whole community. <div data-bbox="699 1666 1174 1966" style="border: 1px solid green; border-radius: 50%; padding: 10px; display: inline-block; margin-top: 10px;"> <p>"Talking with others affected and seeking support from the local council has helped."</p> </div>	Before, during and after

GOAL: Strong, healthy individuals and connected communities learning and working together for a positive future		
Strategy	Opportunity for action	Timing
	Promote the importance of self-care during drought, including available counselling or support services and importance of physical and mental health, exercise, sleep, and time away from work.	During
Promote available support, initiatives and resources	Develop and implement a communications strategy that promotes support, initiatives or resources that can contribute to drought resilience, including government and industry programs, business information and resources, community health services	Before and ongoing
Foster and support community leaders	Continue investment, support and promotion of community leadership programs that empower community leaders to take proactive roles.	Before




7.7 Financial management

The long term economic success of the region relies on the financial sustainability of regional businesses. Businesses that understand the risks, including climate risks, to their operations, supply chains and markets, and take proactive steps to prepare for shocks or market changes will be better able to get through when challenges arise.

Regional Development Australia Adelaide Hills, Fleurieu and Kangaroo Island (RDA AHFKI) has a key role to play in developing a more successful, resilient and sustainable economy through their work in supporting existing businesses and attracting new business and infrastructure investment. The RDA's Strategic Plan identifies agriculture, tourism and manufacturing as the three most competitive industries in the region and a focus for effort.

Implementation of the opportunities for this theme will benefit from partnerships with organisations, associations and groups including councils, industry groups and associations, business and commerce groups and networks, and individual businesses.

GOAL: Business owners managing climate and other risks for long term financial success, contributing to regional economic growth		
Strategy	Opportunity for action	Timing
Enhance business financial and risk management literacy and planning	Support and promote education and training initiatives to enhance primary producers and related businesses' financial and business management skills with an aim to prepare a business plan and addresses risk management, debt reduction, tax management and forward and succession planning, for example through the 'Our Farm Our Plan' project.	Before
	Support programs to increase the digital literacy of people employed in primary production and related businesses	Before
	Support the provision of financial advice and counselling services to enable farm and other businesses to make timely business decisions	Before
	Support networking of industry, businesses, and the financial sector to focus on drought preparedness, building reserves and building greater adaptability to seasonal conditions.	Before
Work with financial institutions to increase their understanding of drought impacts 	Support regional finance representatives in understanding drought impacts on individuals, supporting customers with high drought risk and adopting different roles during drought stress periods, including business planning guidance and direction to mental health support.	Before

GOAL: Business owners managing climate and other risks for long term financial success, contributing to regional economic growth		
Strategy	Opportunity for action	Timing
Advocate for changes that will support the region's communities and businesses	Advocate for changes to financial mechanisms including mechanisms to build savings and manage tax.	Before
Promote the region and local businesses	Encourage continued spending within the region by locals and visitors, for example through a campaign to support local community such as 'buy from the bush' or do 'local business'.	Ongoing



7.8 Environmental management

The AHFKI region's natural environment includes a diversity of forests, shrub lands and grasslands, and coastlines that create a unique and ecologically rich environment that supports both biodiversity and primary production. The Mount Lofty Ranges is one of Australia's 15 biodiversity hotspots and Kangaroo Island is home to more endemic plant species than any other region in the state.

The Kangaroo Island and Hills and Fleurieu Landscape Boards plays a key role in managing the region's natural resources. Working in partnership with Landscape Groups, local organisations and landholders and Traditional Owner groups, the Boards delivers programs and projects to improve land and water management, biodiversity and pest animal and plant control. The Department for Environment and Water through the National Parks and Wildlife Service are responsible for the management of the 77 conservation reserves and national parks that cover just over 15% of the region. Biodiversity is also protected on private land through Heritage Agreements and on a number of privately owned or managed reserves and sanctuaries.

GOAL: Healthy and resilient soil, water and biodiversity that sustain productive landscapes		
Strategy	Opportunity for action	Timing
Manage pest plants and animals	Implement a regional approach to pest plant and animal management (including insects) that impact primary production and the environment, including provision of bait for pest animals, support for netting or environmental covers, and culling of overabundant native species.	Ongoing
Establish and protect biodiversity drought refuges	Support an interconnected network of drought refuges for flora and fauna to maintain ecologically healthy communities during drought	Before
Future-proof water resource management plans	Ensure water resource planning consider recent trends in rainfall, runoff and water demand with future projections of rainfall, and is evaluated against scenarios of increased time spent in drought.	Before
Build resilience of valued natural and cultural sites	Increase awareness and build respect for cultural and spiritual values of Country and protect areas of significance from drought impacts.	Before
Support regional bushfire risk management	Continue to monitor vegetation condition, drying and fuel loads to inform vegetation (fuel load) management that balances biodiversity conservation and asset protection.	Ongoing

7.9 Infrastructure and services

The resilience of the AHFKI region is dependent on infrastructure that can function effectively, deliver essential services and support supply chains under all conditions.


Infrastructure provision for essential services (power, water and telecommunications) is generally good however opportunities to improve telecommunications and water security on Kangaroo Island have been identified and are being progressed through SA Power Network's construction of an undersea fibre optic cable from Cape Jervis to Kangaroo Island, and SA Water's construction of a desalination plant at Penneshaw.

There are multiple organisations with responsibility for regional infrastructure. Implementation of the opportunities for this theme will require the region to advocate to or work in partnership with these organisations.

Infrastructure and services that support businesses and communities to connect, function and thrive		
Strategy	Opportunity for action	Timing
Improve regional water security	Support work to enhance water security, through initiatives to augment water storage and delivery infrastructure, demand management and identification of alternative water sources.	Before
	Optimise the use of fit for purpose water by industries and communities including wastewater reuse in towns to irrigate green spaces	Before
	Advocate for policy that requires cost-benefit analysis for regional water infrastructure to consider future climate and water quality implications.	Before
Improve regional weather and soil moisture data collection and forecasting	Advocate for interpretation of available short- and long-term weather forecasts that support agricultural decision making in the region.	Before
	Expand the soil moisture monitoring network and make data available to all land managers to inform decision making	Before
Improve the services and infrastructure that support and maintain communities	Communicate with service providers and infrastructure owners about emerging drought issues and implications for effective service function and delivery.	Before
	Explore opportunities to expand localised, reliable, renewable energy generation and storage	Before
	Provide efficient road networks and reliable and cost-effective freight services, including strategies to increase capacity and subsidies for sea freight during critical periods.	Before and during
	Advocate for improved communications infrastructure to support reliable region-wide digital access	Before

7.10 Drought plan governance

Successful implementation of this plan will require effective governance that facilitates efficient and effective resource use without duplication of effort. With clear leadership, coordination and communication the plan can deliver on its goals in a way that delivers what is most needed on the ground. Engagement with communities to understand what they need and how to deliver this in a way that suits them is central to this. Continuing the Drought Resilience Steering Committee is a vital mechanism for this.

Effective resilience building initiatives that reflect the region's unique needs, led locally and informed by local knowledge and community input.		
Strategy	Opportunity for action	Timing
Establish effective drought governance to support drought plan implementation and local decision-making 	Continue the AHFKI Drought Resilience Steering Committee and explore opportunities to expand membership to include the health sector and regional climate partnership. Drive implementation, monitoring and evaluation of this plan including: <ul style="list-style-type: none"> – Advocate for and support long-term funding, review and improvement processes to ensure partner organisations and agencies learn from drought experiences. – Collaborate with other government agencies, not-for-profit organisations and private companies to identify opportunities for resource sharing and inter-agency implementation of this plan, particularly where organisations have shared/common goals. – Engage with and obtain support from regional primary production and other stakeholder groups to implement this plan. – Regularly review, revise and report on the Drought Plan 	Before
	Seek funding for a project officer to coordinate and support the delivery of drought resilience project funding applications and project delivery, and improve the coordination and funding of programs from different agencies to maximise efficiency and effectiveness. <div style="border: 1px solid green; border-radius: 50%; padding: 10px; margin-top: 10px;"> <p>"Our region has missed out on support in the past due to being a high rainfall region despite having been greatly impacted by dry conditions."</p> </div>	Before

Effective resilience building initiatives that reflect the region's unique needs, led locally and informed by local knowledge and community input.

Strategy	Opportunity for action	Timing
	Clarify and document drought definition, accountabilities, shared responsibilities, regional governance and coordination arrangements and share with the community	Before
Work in partnership with First Nations to build drought resilience	Engage and collaborate with First Nations individuals and groups to understand their needs and what would assist in enhancing the drought resilience of the environment and support the delivery of identified projects.	Ongoing

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8. Implementation, monitoring and evaluation

8.1 Implementation

This Plan has been prepared as a framework or prospectus to guide future effort and investment in regional drought resilience.

The opportunities identified in this Plan are unfunded and some may only be progressed with further investment. It is the intention that the implementation of this Plan will be addressed by several different delivery partners. The AHFKI community will be able to address some, while others will require coordination and cooperation between government agencies, non-government organisations and the private sector.

Through the engagement to support the development of this Plan we have heard clearly that farmers and communities want to be involved in the decisions that affect them. Planning the delivery of all projects will include the community from the start, to get buy-in and support and more beneficial outcomes.

8.2 Governance

It is proposed that the AHFKI Regional Drought Resilience Steering Committee established to develop this plan will continue to coordinate and support project funding applications and project delivery to avoid duplication of effort and maximise local and regional benefits. Additional membership may be investigated, particularly to support community health and wellbeing projects.

It is proposed the group meets regularly to maintain an ongoing shared understanding of emerging issues as well as being ready to support funding applications from any available source.

8.3 Monitoring, evaluation and reporting

This Plan and its implementation will be monitored, evaluated and reported on according to the *Regional Monitoring, Evaluation and Learning Guide* prepared by the Department for Primary Industries and Regions for the South Australian Regional Drought Resilience Plans.

Monitoring and evaluation are essential parts of delivering any plan, project, or program. Undertaking monitoring and evaluation will help the Advisory Group, stakeholders and the community understand if the vision and goals are being progressed and assist in refining the project approaches to optimise outcomes. It also ensures accountability and provides information to share with partners and stakeholders to demonstrate program value.

This monitoring and evaluation framework is based upon a program logic approach. Program logic illustrates cause and effect relationships to provide understanding of how program resources are used to produce outputs and deliver outcomes in the short to long term. The model also acknowledges the interaction of assumptions and external factors with outputs and outcomes. The elements of the program logic model shown in Figure 4 Program logic model for the delivery of the Plan is defined below.

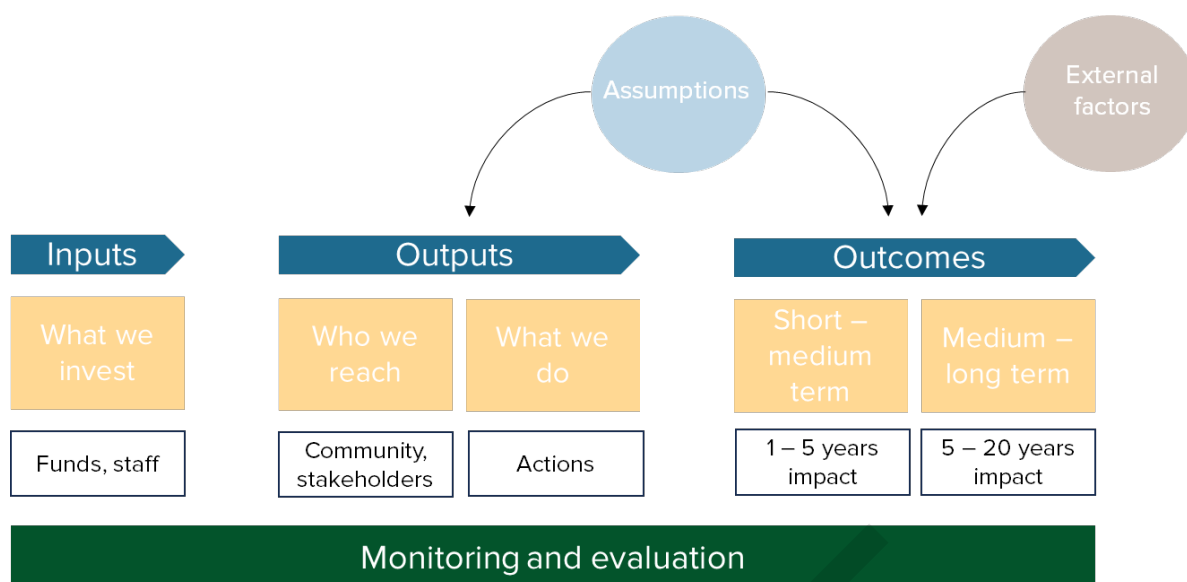


Figure 4 Program logic model for the delivery of the Plan

Outputs: measurement of the direct actions taken, for example the activities and events delivered, the services provided, and the funds spent. Output measures include both activities and associated participation.

Assumptions: the expectations we have that the actions we take, and the participants involved will lead to the outcomes or change we seek to achieve.

Outcomes: the desired results of direct actions on individuals, groups, communities, organisations and the environment in the short-medium and medium-long term. Outcomes in the medium-long term are often influenced more by external factors (actions undertaken by others or changes in environmental, social or governance factors).

External Factors: the uncontrollable factors in the wider environment surrounding our programs that may interact with and influence outcomes.

The program logic and monitoring indicators for the priority strategies of the AHFKI Regional Drought Resilience Plan are provided in Appendix A. This will be reviewed and revised as projects are funded and planning for delivery commences.

As projects are scoped for funding and then implemented, an evaluation process will be established that will consider:

- How effective was the project/program in achieving its intended outputs and outcomes?
- To what extent did the project/program contribute to the relevant goals, and what other things helped or hindered its implementation?

Once implementation commences, a biannual evaluation of the AHFKI Drought Resilience Plan itself will be initiated that will consider:

- To what extent has the Plan been implemented and has impacted on regional stakeholders' capacity and resources to better plan, manage and recover from drought?
- What changes/support are/is needed to ensure that the Plan best provides an effective framework for action and stakeholders can effectively work together towards implementing those actions?

9. Glossary

Adaptation	Adjustment or modification in natural and/or human systems in response to actual or expected shocks and stresses to moderate harm, reduce vulnerability and/or exploit beneficial opportunities.
Climate projection	A scenario of future climate, generally resulting from running a global climate model with a specified greenhouse gas concentration scenario (or RCP). A projection differs from a prediction in that it is conditional on the representation of a particular global climate model and the uncertain assumptions of the model inputs (primarily the greenhouse gas concentration scenario, or RCP). ³⁷
Carbon farming	Carbon farming includes: <ul style="list-style-type: none"> • sequestering carbon in the landscape through regeneration and planting of native vegetation; farm and plantation forestry; and improving soil management to ensure that carbon inputs exceed outputs • reducing emissions, such as livestock methane emissions; fertiliser emissions and through manure management.³⁸
Decarbonisation	The removal or reduction of carbon dioxide and other greenhouse gases output into the atmosphere.
Drought	A 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 resilience	The ability of communities, economies and environments to withstand the impacts of drought and adapt and find new and potentially transformational ways of doing things, enabling functions and values to be sustained over the longer term.
El Niño-Southern Oscillation	El Niño refers to the extensive warming of the central and eastern Pacific Ocean that leads to a major shift in weather patterns across the Pacific. In Australia (particularly eastern Australia), El Niño events are associated with an increased probability of drier conditions. ³⁹
Governance	Governance is the structures and processes by which individuals, groups and agencies in a society share power and make decisions. It can be formally institutionalised, or informal.
Indian Ocean Dipole	he Indian Ocean Dipole (IOD) is defined by the difference in sea surface temperatures between the eastern and western tropical Indian Ocean. A negative phase typically sees above average winter-spring rainfall in Australia, while a positive phase brings drier than average seasons. ⁴⁰

Transformational change	The process of radically changing or building a new system with different structure, functions, feedbacks and identity.
Trigger point	A pre-agreed situation or event, that when met, activates a management intervention. Trigger points are usually defined in the planning phase.

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