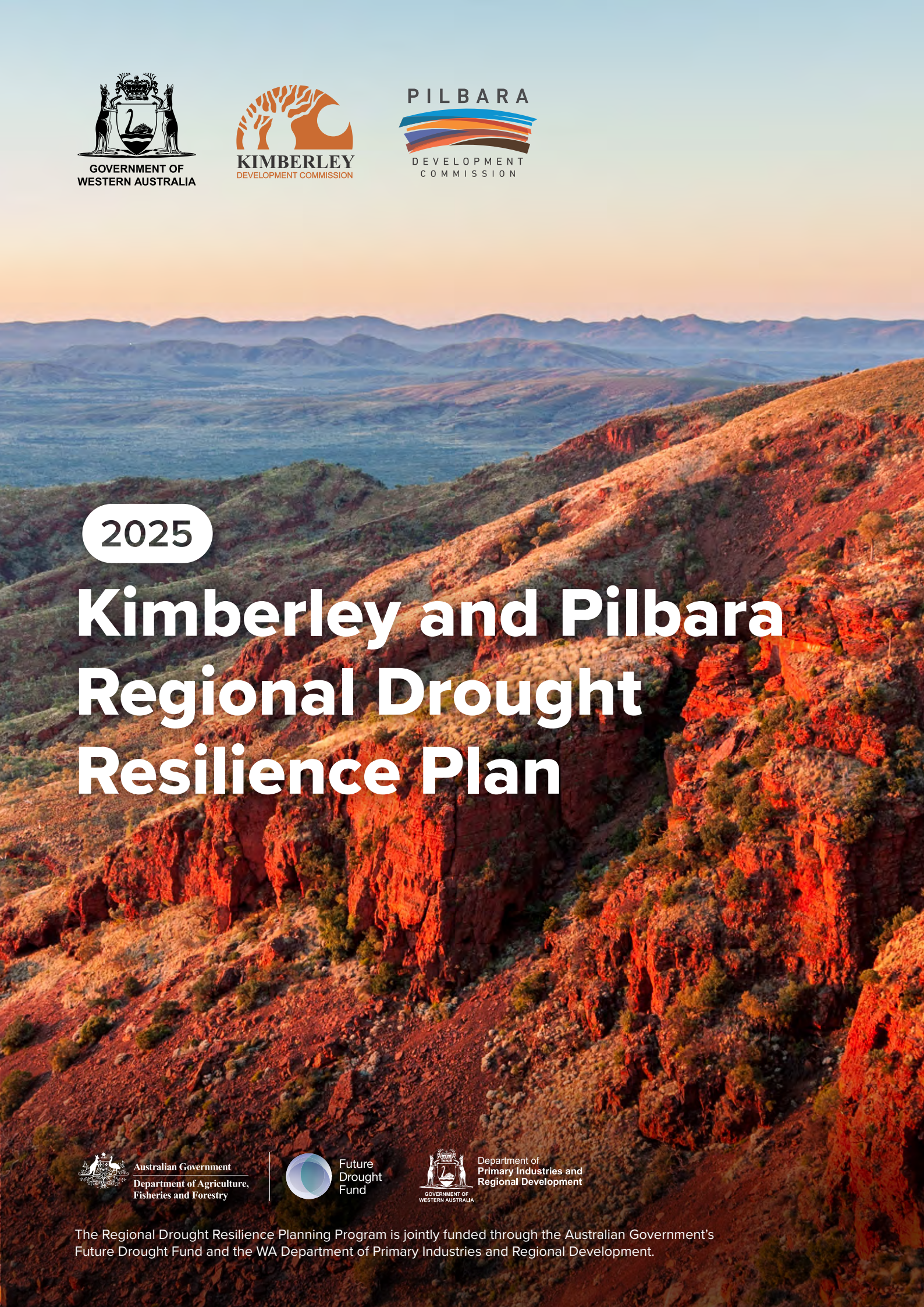
GOVERNMENT OF WESTERN AUSTRALIA

KIMBERLEY DEVELOPMENT COMMISSION

PILBARA DEVELOPMENT COMMISSION



2025

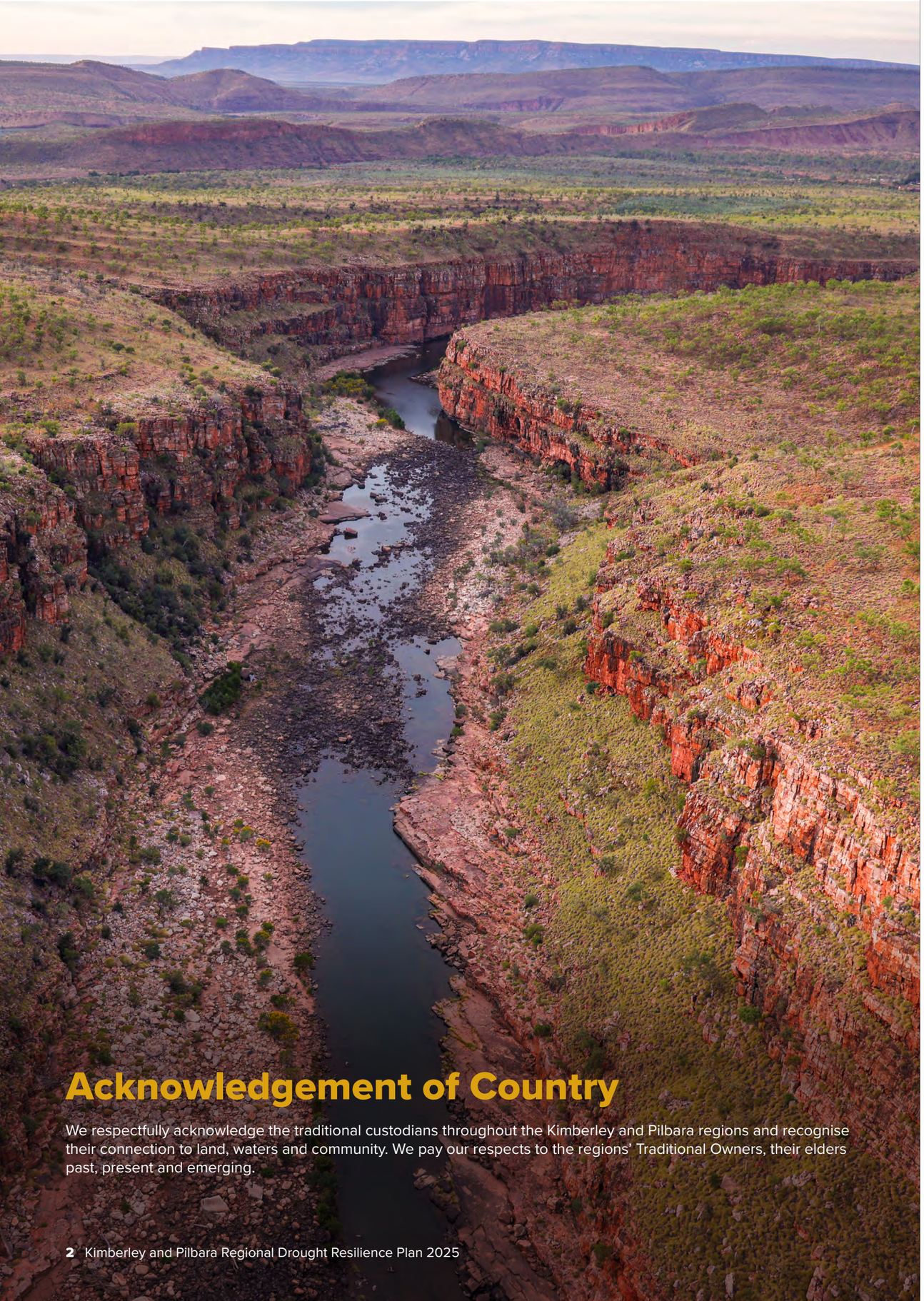
# Kimberley and Pilbara Regional Drought Resilience Plan

Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

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



## Acknowledgement of Country

We respectfully acknowledge the traditional custodians throughout the Kimberley and Pilbara regions and recognise their connection to land, waters and community. We pay our respects to the regions' Traditional Owners, their elders past, present and emerging.



# Acknowledgements

The Regional Drought Resilience Plan (RDRP) for the Kimberley and Pilbara regions is a locally led project that champions drought resilience and preparedness in both regions. The Regional Drought Resilience Planning Program is jointly funded through the Australian Government's Future Drought Fund and the WA Department of Primary Industries and Regional Development (DPIRD).

The development of the Kimberley and Pilbara RDRP has been led by the Pilbara Development Commission working closely with the Kimberley Development Commission.

The Kimberley and Pilbara Development Commissions extend thanks to all members of the Project Advisory Group (PAG) for sharing their time and expertise to ensure the Kimberley and Pilbara RDRP is reflective of both regions' needs. The PAG comprises representatives from a diverse range of local organisations including:

- Department of Biodiversity Conservation and Attractions (and representatives from the Aboriginal Rangers Program)
- Department of Primary Industries and Regional Development
- Department of Water and Environmental Regulation
- Kimberley Agriculture and Pastoral Company
- Kimberley Development Commission
- Kimberley Land Council
- Kimberley-Pilbara Cattlemen's Association
- Kimberley and Pilbara representatives of the Northern WA/NT Drought Resilience Adoption and Innovation Hub
- Pilbara Development Commission
- Pilbara Innovation Partnership
- Rangelands NRM
- RDA Kimberley
- RDA Pilbara
- City of Karratha
- Shire of Ashburton
- Shire of Broome
- Shire of Derby–West Kimberley
- Shire of East Pilbara
- Shire of Halls Creek
- Shire of Wyndham–East Kimberley
- Town of Port Hedland
- Water Corporation
- Yamatji Marlpa Aboriginal Corporation.

We acknowledge all individuals and organisations who contributed rich insights and local knowledge to the development of this RDRP to drive our resilience going forward.

| Version | Date | Prepared by | Approved by |
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# Foreword

Droughts are well-known in Australia with far-reaching impacts, affecting communities, agriculture, ecosystems and the national economy. In the future, more frequent and severe droughts are predicted for many parts of Australia, exacerbated by climate change. Australia is shifting its response from dealing with drought as a crisis to more proactive approaches to build long term drought preparedness and resilience.

Building resilience to drought is critical to the future success and sustainability of our communities, economies, and environments. The Kimberley and Pilbara regions of Western Australia may not fit the conventional image of drought-affected areas, but changing climatic conditions are impacting water availability, communities, natural ecosystems and agriculture. Increasing drought resilience is a vital priority to ensure the long-term prosperity and preparedness of our regions.

The Kimberley Pilbara Regional Drought Resilience Plan (RDRP) was developed under the Regional Drought Resilience Program, which forms part of the Federal Government's Future Drought Fund. Coordinated by the Kimberley and Pilbara Development Commissions, the aim of the Kimberley and Pilbara RDRP is to empower and enable communities to collectively identify key strategies that strengthen resilience and address their needs to be better prepared for the challenges posed by drought and other climate-related stresses.

The development of the Kimberley and Pilbara RDRP was guided by the Project Advisory Group (PAG) chaired by the Pilbara Development Commission, with input from a broad range of stakeholders. The Kimberley and Pilbara RDRP reflects our shared vision of a resilient future for the Kimberley and Pilbara. We believe that by leveraging our regions' strengths and working together, we can build a more sustainable, drought-resilient future for all.

Communities in the North West of Western Australia may experience different challenges to their southern counterparts, however there is common ground in the need for water stress and climate change knowledge and preparedness. Improved understanding and proactive planning are the key to resilience for current and future generations.

We thank all the individuals and organisations whose contributions offered rich insight and local knowledge into drought impacts in the Kimberley and Pilbara regions. This, along with technical research and advice, has guided the development of a range of potential actions, that once implemented will help build our resilience going forward.

The Kimberley and Pilbara Development Commissions are committed to advocacy to enhance our community drought resilience capabilities by leveraging existing strengths and capitalising on new opportunities.

**Michele Pucci**
A/Chief Executive Officer
Kimberley Development Commission

**Simon Taylor**
Chief Executive Officer
Pilbara Development Commission

# Contents

# Executive Summary

The Kimberley and Pilbara Regional Drought Resilience Plan (RDRP) is a community-led strategy developed under the Australian Government's Future Drought Fund (FDF). This long-term investment aims to build drought resilience for farmers, allied industries, and regional communities and allocates funding annually to support drought resilience initiatives.

In Western Australia (WA), the Regional Drought Resilience Program is delivered through a partnership with the Department of Primary Industries and Regional Development (DPIRD) and Regional Development Commissions. It addresses the core outcomes of economic, environmental and social resilience by empowering communities to co-develop evidence-based strategies that focus on climate adaptation, sustainable land management and community well-being.

The unique and complex nature of drought in the Kimberley and Pilbara regions of northern WA has been important in the development of this RDRP. Drought in these regions can be characterised by extreme heat, unpredictable wet seasons, and water scarcity. Climate projections indicate both the Kimberley, and the Pilbara will experience more frequent hot droughts, increasing risks to infrastructure, communities, and local economies, especially for remote and Aboriginal communities.

This RDRP is a collaborative effort involving the Kimberley and Pilbara Development Commissions, local governments, Traditional Owners, community organisations, land managers and industry partners. It is guided by a regional Project Advisory Group and based on detailed Background and Context reports, Drought Vulnerability Assessments (DVAs) and extensive regional engagement. Through strong regional partnerships and extensive community consultation, the RDRP reflects an understanding of each region's unique challenges and strengths, ensuring a solid foundation for ongoing resilience and support.

Strategic, community-driven actions aligned with national drought resilience objectives and local priorities have been identified. These actions are supported by an investment framework designed to promote long-term adaptation and sustainability.

## Five key focus areas form the foundation of the RDRP:

**Resilient Water Systems:** Focusing on supporting water security through cultural knowledge sharing, groundwater monitoring and improved infrastructure.

**Resilient Communities:** Enhancing liveability and adaptive capacity through better access to services, housing, economic diversification and community engagement.

**Resilient Agriculture:** Supporting sustainable grazing, stewardship programs, and business planning for pastoralists and Aboriginal land managers.

**Resilient Landscapes:** Integrating Traditional fire and land management practices alongside regenerative approaches to restore ecosystems and reduce drought impacts.

**Resilient Economy:** Encouraging economic diversification, innovation, and investment in industries such as agritourism, conservation, and small business development.

The Kimberley and Pilbara RDRP provides a shared strategic foundation for building long-term drought resilience. It supports coordinated actions that are locally driven, culturally grounded, and informed by regional strengths and challenges. This RDRP will guide ongoing collaboration, innovation and resilience-building, enabling communities, industries and landscapes to adapt and thrive as they face future droughts and climate variability.

# Definitions

**Adaptive Capacity** – The combined human, natural and physical capital, all of which influence the ability of the region's systems and people to respond now and into the future. This considers the strengths (or potential advantage and resilience), weakness (or potential disadvantage and vulnerability), and opportunities in the region.

**Drought** – As developed in Western Australia: "A prolonged period of abnormally dry conditions that impacts negatively on water availability and agricultural production in a region and, consequently, impacts negatively on the economy and environment of the region and the health and well-being of its residents." (DPIRD Technical Working Group in Mastrantonis, 2022). This was used as a conceptual basis only in this RDRP.

**Drought Impact** – The degree of exposure to drought combined with the regions inherit sensitivity to drought conditions.

**Drought Resilience** – As it relates to the Future Drought Fund Funding Plan, is defined as "the ability to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall and/or changed seasonality of rainfall, for improved economic, environmental and social resilience" (Australian Government, 2024).

**Hot Drought** – "Temperatures exceeding the 9th decile threshold in the maturing season (August-November) and growing season rainfall (April-October) falling below the 1st decile" (Mastrantonis, 2022). As discussed on page 24 this definition has been developed to suit the WA South West Land Division growing season and is not suited to use in the Kimberley and Pilbara RDRP due to differing climate zone and production types. However, the combination of meteorological drought and extreme temperatures was observed in the Kimberley and Pilbara regions in 2019 (see Drought Vulnerability Assessment's (DVAs) for each region).

**IBRA7** – Interim Biogeographic Regionalisation for Australia (IBRA) is a biogeographic regionalisation for Australia developed by the Australian government Department of Sustainability, Environment, Water, Population, and Communities. It is a planning tool which classifies the land surface of Australia based on common climate, geology, landform, native vegetation and species information (DCCEEW, 2023). IBRA7 is the most current version, developed in 2012 and divides Australia into 89 biogeographic regions and 419 subregions.

**Theory of Change** – Refers to theories, causal mechanisms and assumptions that explain how and why outcomes and impacts will be achieved through use, implementation and production of proposed inputs, activities, and outputs.

**Threatened Ecological Communities** – An ecological community (a naturally occurring assemblage of plants, animals or other organisms) that is at risk of being destroyed ('collapsing'). ITEC listings are reviewed annually by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Threatened Ecological Communities Scientific Committee (TECSC).

**Environmental Condition Score** – This is a composite index ranging from 1 to 10 that expresses the relative state of the environment compared to previous years. It is designed to provide a summary measure of environmental conditions, for land-based ecosystems and agriculture, by integrating multiple environmental factors including inundation, streamflow, vegetation growth, leaf area, soil protection, tree cover and the number of hot days (TERN, 2023).

**Socio-Economic Indexes for Areas (SEIFA)** – Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD) has been used, which summarises information about the economic and social conditions of people and households within an area. A low score indicates relatively greater disadvantage and a lack of advantage in general. A high score indicates a relative lack of disadvantage and greater advantage in general.

# Acronyms

| | |
|---|---|
| ACCO | Aboriginal Controlled Community Organisation |
| ACWS | Aboriginal Communities Water Services Program |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| DCCEEW | Department of Climate Change, Energy, the Environment and Water |
| DPIRD | Department of Primary Industries and Regional Development |
| DVA | Drought Vulnerability Assessment |
| DWER | Department of Water and Environmental Regulation |
| EKMG | East Kimberley Marketing Group |
| ESG | Environment Social and Governance |
| FDF | Future Drought Fund (Australian Government) |
| FIFO | Fly-In-Fly-Out |
| KAPCO | Kimberley Agriculture and Pastoral Company |
| KPCA | Kimberley Pilbara Cattlemen's Association |
| KDC | Kimberley Development Commission |
| KLC | Kimberley Land Council |
| LGA | Local Government Area |
| NNSII | Northern Native Seed Industry Initiative |
| NRM | Natural Resource Management |
| OAG | Office of the Auditor General |
| ORIA | Ord River Irrigation Area |
| PAG | Project Advisory Group |
| PBC | Prescribed Bodies Corporate |
| PDC | Pilbara Development Commission |
| PIP | Pilbara Innovation Partnership |
| RDA | Regional Development Australia |
| RDRP | Regional Drought Resilience Plan |
| SME | Small to Medium Enterprise |
| TEC | Threatened Ecological Community |
| TOs | Traditional Owners |
| WA | Western Australia |
| WAITOC | Western Australian Indigenous Tourism Operators Council |
| WONS | Weeds of National Significance |
| YMAC | Yamatji Marlpa Aboriginal Corporation |

# How to Use This Plan

The Kimberley and Pilbara RDRP provides a strategic foundation for the Kimberley and Pilbara regions to define, prioritise and align its drought resilience priorities. The Kimberley and Pilbara RDRP is designed to be used by local communities, industries, all levels of government, not-for-profits and the private sector to:

- Coordinate investment in drought resilience projects.
- Facilitate collaboration to achieve shared regional outcomes.
- Guide future drought resilience projects.
- Inform funding applications.
- Monitor and adapt strategies to enhance drought resilience over time.

This RDRP summarises the information presented in detailed Background and Context Reports, Drought Vulnerability Assessments (DVAs), and the results of extensive stakeholder engagement.

The Background and Context Reports for each region contain an initial map of key stakeholders involved in drought or drought related topics at a range of scales. They also set the context for stakeholder engagement by identifying alignment with key strategies and policies.

DVAs for the Kimberley and Pilbara cover a range of data and statistics to measure and prioritise drought resilience and vulnerability, relative to the different climate types, production context and communities across the regions.

The stakeholder engagement report summarises key issues and provides the full list of project ideas identified by stakeholders through stakeholder engagement interviews.

It is recommended to read the Kimberley and Pilbara RDRP in conjunction with these informing documents which contain information on concepts referred to in the RDRP. These documents can be found on each Development Commissions' website.

### Pilbara Development Commission

https://www.pdc.wa.gov.au/our-focus/projects/the-regional-drought-resilience-planning-rdrp-program.aspx

### Kimberley Development Commission

https://www.kdc.wa.gov.au/our-focus/projects/regional-drought-resilience-planning-program/

The Kimberley and Pilbara RDRP is intended to be a living document, developed at a point in time, but designed to evolve with the regions changing needs. Continuous monitoring, evaluation and knowledge sharing across the region is critical in ensure it remains a community owned resource and we encourage ongoing community commitment.

# Introduction

This Regional Drought Resilience Plan (RDRP) is a collaboration between the Kimberley and Pilbara communities in northern Western Australia (WA) which spans a total area of 930,000km$^2$ and supports nearly 100,000 people. This RDRP brings together industry, Traditional Owners, stakeholders, and communities to develop practical strategies that enhance drought preparedness and support sustainable land and water management. This collaborative approach aims to build stronger, more resilient communities and industries across the region.

## Understanding Drought

There is no universally agreed definition of drought due to the complexities around its measurement, its relatively slow onset, the different types of droughts, and variable geographic contexts. However, the impacts of drought can be significant and serious, and have interconnected environmental, economic and social aspects. Environmental impacts are among the most noticeable effects of drought and can be widespread and long-lasting (Tozer and Leys, 2013). The environment can also be a major determinant of human health (AIHW, 2011).

The Kimberley and Pilbara RDRP adopts the definition of drought developed by the Department of Primary Industries and Regional Development (DPIRD) Technical Working Group for other WA regions. This definition links meteorological and agricultural drought to broader community impacts.

> *"A prolonged period of abnormally dry conditions that impacts negatively on water availability and agricultural production in a region and, consequently, impacts negatively on the economy and environment of the region and the health and well-being of its residents" (Mastrantonis, 2022).*

The Kimberley and Pilbara RDRP also draws on the Australian Drought Monitor developed by the Northern Australia Climate Program (NACP), a multi-index drought monitor that is relevant to the climate and production types in the two regions. Drought Vulnerability Assessments (DVA) specific to the Kimberley and Pilbara regions were also developed, taking into account the complex and interconnected aspects of resilience and vulnerability across each region.

This Kimberley and Pilbara RDRP explores the impacts of three different types of resilience to drought:

- Economic resilience refers to the region's ability to sustain and diversify economic activity during and after drought.
- Social resilience includes the capacity of individuals and communities to cope with and adapt to stressors, particularly in remote and vulnerable populations.
- Environmental resilience refers to the capacity of natural systems to maintain essential functions and recover from drought-related impacts.

These definitions were informed by resilience science and aligned with stakeholder-identified priorities such as water access, liveability, land management, and economic diversification.



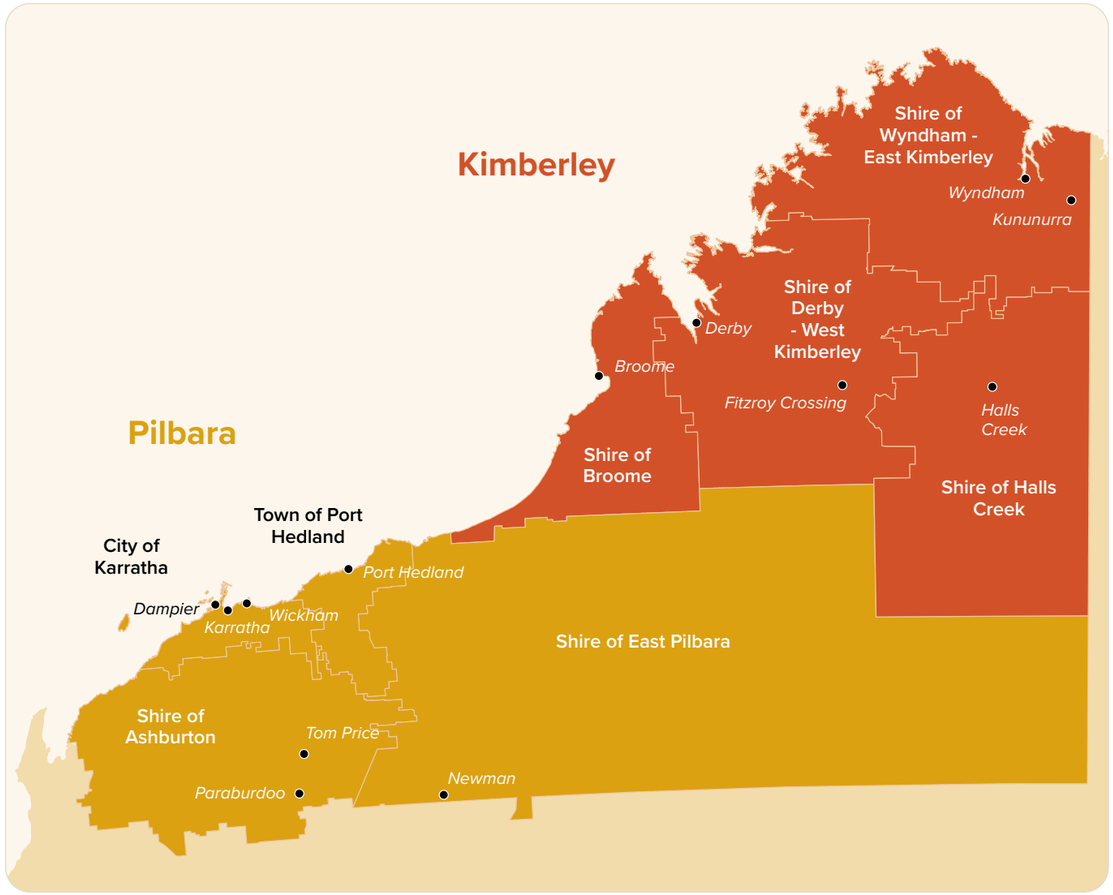



*Figure 1: The Kimberley and Pilbara Regions*

## Regional Drought Resilience Planning Program

The Future Drought Fund (FDF), established by the Australian Government in 2019, represents a significant long-term investment aimed at enhancing drought preparedness and resilience across Australia. This fund provides consistent financial support for various drought resilience programs, with $100 million made available annually for grants and programs.

Initially set up as a $3.9 billion investment, the FDF is expected to grow to $5 billion by 2028-2029 (Australian Government, 2024). The funds aim is to build climate resilience for the broader benefit of the Australian agriculture sector, landscapes, and communities (Australian Government, 2024) and ensure that investments continue to address the evolving challenges from drought conditions across Australia.

A key initiative of the FDF is the Regional Drought Resilience Planning program, which fosters collaboration between federal, state and territory governments to develop comprehensive drought plans for regions. The aim of the RDRP program is to empower regional communities to proactively plan and respond to drought risks, by building capability and resilience through partnerships and identifying actions to prepare for future droughts and climate variability.

In WA, DPIRD oversees the administration of the RDRP Program extension 2022-2025, supported operationally at the regional level by the Regional Development Commissions (RDCs). The WA State Government, through DPIRD, also provides 50% of funding.

# Purpose

The Kimberley and Pilbara RDRP covers the Kimberley and Pilbara regions of northern WA. The purpose of developing this plan is to help our communities prepare for and manage the impacts of future drought. The RDRP program aims to:

- Build economic, environmental and social resilience to future droughts.
- Build on existing planning.
- Be in a stronger position to adapt to climate change.
- Apply best practice data and information to make better decisions.
- Identify actions to prepare for future droughts based on evidence.

The Kimberley and Pilbara RDRP is designed to be community led and owned, ensuring it reflects local needs and priorities. It guides future investments in resilience-building initiatives, supports sustainable natural resource management and promotes innovative approaches to mitigate drought impacts. Through the RDRP stakeholder engagement process, which fostered collaboration among Traditional Owners, governments, industries, and communities, the RDRP enhances regional self-reliance and positions regions well for challenging climatic conditions.

# Governance

The development of the Kimberley and Pilbara RDRP was led and project managed by the Pilbara Development Commission (PDC) working closely with the Kimberley Development Commission (KDC). The governance structure adopted for the Kimberley and Pilbara RDRP is shown in Figure 2.

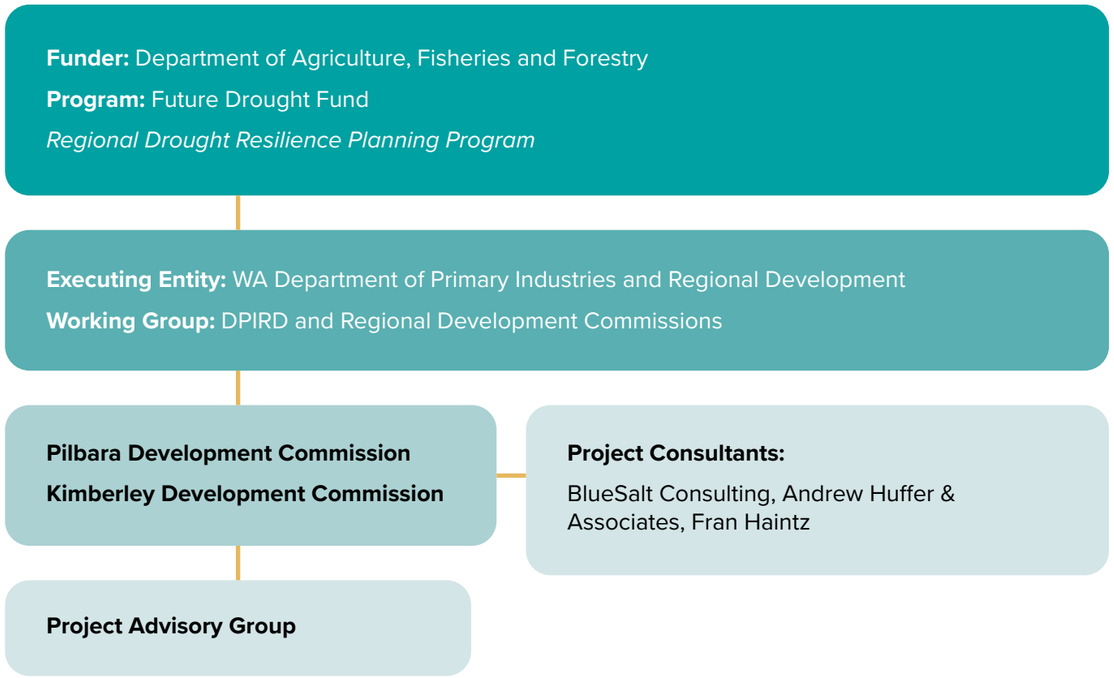



*Figure 2: RDRP Governance and Relationship Between Stakeholders*



The Project Advisory Group (PAG) was established as a focus for partnership, ensuring that the development of the Kimberley and Pilbara RDRP was guided by local and technical knowledge. The PAG was engaged in all stages of the project, with its role being to:

- Inform and be part of the stakeholder engagement process.
- Review and advise on content of the RDRP with a view to informing drought resilience investment in the regions.
- Contribute to the identification of priorities and projects for inclusion in the RDRP arising from the stakeholder engagement process.
- Leverage existing strategic planning and avoid duplication of effort.
- Recognise the diversity of people, businesses and landscapes involved.
- Include primary production knowledge, including First Nations groups and landholders.

The PAG was chaired by the PDC CEO and included representatives from the Kimberley and Pilbara component of the Northern Hub, the Kimberley Pilbara Cattleman's Association (KPCA), local governments, WA state government bodies, Aboriginal corporations, and other key stakeholders.

Specialist consultants were engaged by the PDC and KDC in the areas of stakeholder planning and engagement, literature and context review and drought resilience assessment, and preparation of the report, informed by input from the PAG. Figure 3 illustrates the process and inputs that contributed to the development of this RDRP.

The development of Background and Context Reports and DVAs for each region are vital documents for the framing of the RDRP in terms of context and drought risk assessment.

Extensive stakeholder engagement identified existing and potential actions, with strong participation from First Nations groups across both regions. Potential regional projects were then rigorously reviewed and refined using the Investment Framework developed for this RDRP (see Implementation and Investment Framework section later in this document).

## RDRP Process and Inputs

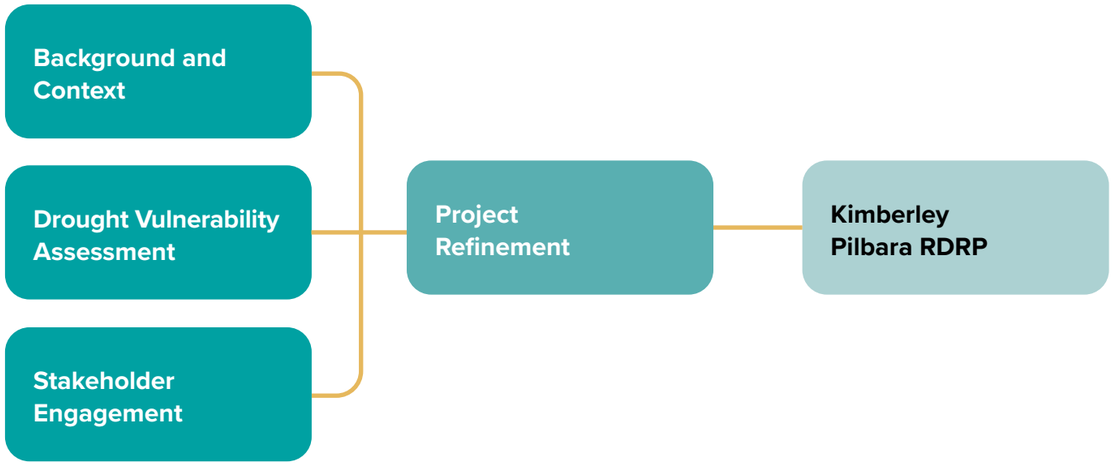



*Figure 3: Process and Inputs for Kimberley and Pilbara RDRP*

## Kimberley Regional Snapshot

**POPULATION (2024)**
**39,934**
*(1.4% of WA)*

**MEDIAN AGE (2024)**
**33**

**ABORIGINAL POPULATION (2021)**
**41%**

**GROSS REGIONAL PRODUCT (2024)**
**$4.521 bn**

**UNEMPLOYMENT RATE (2024)**
**9.1%**

**TOTAL JOBS (2021)**
**15,650**

**TOTAL BUSINESSES (2024)**
**2,343**

**TOP INDUSTRIES**
**Construction, mining, resources and tourism**

## Pilbara Regional Snapshot

**POPULATION (2024)**
**60,746**
*(2.1% of WA)*

**MEDIAN AGE (2024)**
**33**

**ABORIGINAL POPULATION (2022)**
**19%**

**GROSS REGIONAL PRODUCT (2024)**
**$89.985 bn**

**UNEMPLOYMENT RATE (2024)**
**2.2%**

**TOTAL JOBS (2021)**
**59,782**

**TOTAL BUSINESSES (2024)**
**2,530**

**TOP INDUSTRIES**
**Mining, construction, accommodation and food**

*Source: Remplan. ABS 2021 Census Place of Work Employment (Scaled), ABS 2022 / 2023 National Input Output Tables, and ABS June 2024 Gross State Product.*

# Vision and Outcomes

Building on the FDF vision and aim and the key topics identified through the project inputs and stakeholder engagement process, a regional vision and focus was developed for the Kimberley and Pilbara RDRP. The PAG members were collectively involved in the development of the vision statement, contributing their perspectives to create a purpose and direction for drought resilience in the regions.

## Vision

**Through collaborative planning, the Kimberley and Pilbara regions will be more resilient to drought, while supporting the environment, culture and economy for future generations.**

## Outcomes

To deliver on this vision, the Kimberley and Pilbara RDRP is organised into five focus areas which incorporate the overall aim and objectives of the FDF (see Figure 4).

### FDF (2024-2028) Focus

**Aim:** To build drought resilience, including climate resilience for the public good of the Australian agriculture sector, landscapes, and communities

**Strategic objective:** to build economic, environmental, and social resilience

### Kimberley and Pilbara RDRP Focus Areas

- Resilient Water Systems
- Resilient Communities
- Resilient Agriculture
- Resilient Landscapes
- Resilient Economy

*Figure 4: Development of Kimberley and Pilbara RDRP Focus Areas*



Outcomes under each focus area aim to ensure equity while supporting evidence-based action, collaboration and innovation. These outcomes are discussed in the Action Plan section of this report.

## Theory of Change

The FDF Monitoring Evaluation and Learning Framework (DAWE, 2020b) outlines a national theory of change for drought resilience, towards the vision of:

*An innovative and profitable farming sector, a sustainable natural environment and adaptable rural, regional and remote communities - all with increased resilience to the impacts of drought and climate change.*

This is followed by key limitations and a Theory of Change (program logic):

| | | | |
|---|---|---|---|
| **Vision** | An innovative and profitable farming sector, a sustainable natural environment and adaptable rural, regional and remote communities - all with increased resilience to the impacts of drought and climate change. | | |
| **Strategic Priorities** | **Economic resilience** for an innovative and profitable agriculture sector | **Environmental resilience** for sustainable and improved functioning of agricultural landscapes | **Social resilience** for resourceful and adaptable communities |
| **Impact** | Agricultural businesses are self-reliant, productive and profitable | Agricultural landscapes are functional and sustainable, with healthy natural capital | Agricultural communities are resourceful, adaptable |
| **Long-Term Outcomes** | • (EC1) More primary producers adopt transformative strategies and technologies to reduce financial exposure to drought<br>• (EC2) More primary producers adopt risk management practices to improve their sustainability and resilience | • (EN1) More primary producers preserve natural capital while also improving productivity and profitability<br>• (EN2) More primary producers adopt whole-of-system approaches to NRM to improve the natural resource base, for long-term productivity and landscape | • (S1) Stronger connectedness and greater social capital within communities, contributing to wellbeing and security<br>• (S2) Communities implement transformative activities that improve their resilience to drought |
| **Activities** | Online climate and drought data • Digital tools • Natural Resource Management • Research & adoption • Knowledge & Innovation Hubs • Community networks • Leadership training • Farm business planning • Regional drought plans | | |
| **Activities** | Drought Resilience Self-Assessment Tool • Climate Services for Agriculture Program • Natural Resource Management Drought Resilience Program - Landscapes • Natural Resource Management Drought Resilience Program - Grants • Drought Resilience Research and Adoption • Networks to Build Drought Resilience • Drought Resilience Leaders • Farm Business Resilience Program • Regional Drought Resilience Planning | | |

*Figure 5: Theory of Change*

To transition from plan to implementation, discussions will take place to co-design a theory of change for drought resilience adapted to the Kimberley and Pilbara regions, and subsequently a program logic.

This will seek to link and build on the FDF program logic above, while adapting to the regions by linking to the five focus areas and outcomes identified by the stakeholder engagement. The program logic will provide a clear, collaborative and outcomes-based framework to guide project funding and future drought resilience of other aligned investment into the regions.

# Strategic Context

As part of the Background and Context review in developing this Kimberley and Pilbara RDRP, over 50 strategic documents at the sub-regional, regional, state and national scale were synthesised to ensure the RDRP has strong alignment with state, regional and subregional priorities for drought resilience. In addition, a range of technical reports and documents were used in the development of the DVAs for the Kimberley and Pilbara.

## Global Strategies

As droughts become increasingly frequent and severe due to climate change, global strategies for drought resilience are evolving to prioritise proactive, integrated and collaborative approaches that strengthen the capacity of countries, communities and ecosystems to anticipate, withstand and recover from drought impacts.

The United Nations Decade on Ecosystem Restoration spans the years 2021 to 2030. It recognises that ecosystem restoration sits at the core of global (as well as local) efforts to combat biodiversity loss and desertification, from which droughts, floods as well as wildfires are key symptoms of ecological disfunction. Resilience to these symptoms must therefore look to ecosystem restoration to address the root cause as best possible, however wider consideration must also address the inter-dependent socio-economic systems.

The following strategies are recommended by the UNCCD (2019) and IUCN (2024) to enhance the ability of communities and ecosystems to anticipate, prepare for, and adapt to drought conditions, ultimately reducing their vulnerability and improving their resilience.

- **Drought Monitoring and Early Warning Systems:** Implementing reliable drought monitoring and forecasting systems to provide timely alerts and enable proactive measures.
- **Assessing Drought Vulnerability and Risk:** Conducting comprehensive assessments to identify vulnerable areas and populations, and to understand the potential impacts of drought.
- **Sustainable Land and Water Management:** Promoting practices such as soil conservation, efficient irrigation, and water recycling to enhance the sustainability of land and water resources.
- **Diversifying Livelihoods:** Encouraging diversification of income sources to reduce dependency on drought-sensitive activities.
- **Community Engagement and Capacity Building:** Involving local communities in planning and decision-making processes and providing education and training to build local capacity for drought resilience.
- **Policy and Institutional Frameworks:** Developing and implementing policies that support drought resilience, including integrated water resource management and land use planning.
- **Risk Transfer and Insurance:** Establishing mechanisms such as drought insurance to help communities manage financial risks associated with drought.



## National Strategies

Australia has several key initiatives and programs aimed at building national drought resilience, the major ones being:

### Future Drought Fund

The FDF is a significant investment by the Australian Government to enhance drought resilience across the country. Established in 2019 with an initial investment of $3.9 billion, the fund aims to grow to $5 billion by 2028-2029. Each year, $100 million is made available for grants and programs (including this RDRP) focused on:

- **Partnering for Local Solutions:** Collaborating with regions and communities to manage drought and climate risks.
- **Building Knowledge, Skills, and Capability:** Supporting farmers and communities to make informed decisions about drought.
- **Innovating for Transformation:** Trialling innovative solutions and driving transformational change.
- **First Nations Initiatives:** Partnering with First Nations communities to manage drought and climate risks.

The FDF monitoring evaluation and learning framework outlines the Australian Government's approach to building drought resilience (DAFF, 2023), with high level indicators under the following strategic priorities of the FDF:

- **Economic Resilience:** Supporting an innovative and profitable agricultural sector.
- **Environmental Resilience:** Ensuring sustainable and improved functioning of farming landscapes.
- **Social Resilience:** Building resourceful and adaptable communities.

### Drought Resilience Research and Adoption

This program is part of the FDF and focuses on research and the adoption of practices that enhance drought resilience. It includes initiatives to develop and share climate tools, resilient farming practices, and support for regional communities (DAFF, 2025).

The program includes establishment of eight regionally focused Drought Resilience Adoption and Innovation Hubs in major climatic and agricultural zones across Australia to assist farmers and regional communities better prepare for, manage, and recover from drought. Their purpose is to connect farmers with experts, innovations and new practices, and to drive the adoption and extension of drought resilient technologies and strategies. The Hubs also foster collaboration among industry, researchers, farmers, and community groups, ensuring that solutions are tailored to local needs and knowledge is effectively shared and implemented (DAFF, 2021). The Northern Hub is discussed in the following section on State Strategies.

### Australian Government Drought Plan

This plan outlines policies and programs to help farming businesses and communities prepare for, manage, and recover from drought, with a focus on building resilience, enabling preparedness, and providing targeted support during hardship. The plan promotes clear roles and responsibilities across all levels of government, encourages collaboration among stakeholders, and ensures transparent, evidence-based decision-making to address drought challenges effectively. It sets out a drought response framework and describes how the government supports awareness, preparedness, and response activities, including monitoring, evaluation, and learning frameworks.

## National Drought Agreement (2024 – 2029)

This agreement is co-signed with state and territory governments, providing an overarching framework for nationally coordinated drought policy and outlines shared responsibilities and principles for drought preparedness, response and recovery.

## Drought Response and Recovery

The Australian Government's drought response and recovery strategies focus on both immediate relief and long-term resilience. Immediate support includes financial assistance, mental health services, and community support programs (Department of Agriculture, 2019), to help farmers and rural communities manage hardship. Longer-term strategies-such as the FDF and strategic projects, aim to build resilience, improve preparedness, and enable faster recovery from future drought events through investments in infrastructure, climate tools, and collaborative planning with state and territory governments.

## Ecosystem and Soil Restoration

National strategies for ecosystem and soil restoration are essential components in building drought resilience, providing the foundation for sustainable land management, improved water retention, and enhanced landscape capacity to withstand and recover from drought impacts.

**Australia's Strategy for Nature 2024–2030** and the **National Biodiversity Strategy and Action Plan** offer Australia's official framework for biodiversity conservation which focuses on halting biodiversity loss and restoring ecosystems by protecting 30% of land and oceans, preventing extinctions, and promoting sustainable land management. The strategy fosters ecological connectivity, Indigenous stewardship, and landscape restoration – key elements that enhance ecosystem and community resilience to water scarcity and climate extremes (DCCEEW, 2024b).

Australia's strategy for soil health is outlined in the **National Soil Strategy** and the accompanying **National Soil Action Plan** (DAFF, 2024c). The National Soil Strategy sets out how Australia will value, manage, and improve its soil over the next 20 years. The Strategy has three main goals which are to prioritise soil health, empower soil innovation and stewards and strengthen soil knowledge and capability. The National Soil Action Plan (2023-2028) outlines specific actions to achieve the goals of the National Soil Strategy. These aim to ensure that Australia's soil remains healthy and productive, supporting sustainable agriculture, biodiversity, and resilience to climate change and natural disasters.

# State Strategies

At the state and regional level, this Kimberley and Pilbara RDRP has alignment with key strategic plans or documents including:

- Climate Adaptation Strategy 2023 (DWER)
- Foundations for a Stronger Tomorrow: State Infrastructure Strategy 2022 (Infrastructure WA)
- State Planning Strategy 2050 (WAPC/DPLH)
- WA Climate Change Policy 2020 (DWER)
- WA Natural Resource Management Framework 2018 (DPIRD)
- WA Primary Industries Plan 2020-24 (DPIRD)
- WA Regional Development Framework 2023 (DPIRD)
- Rangelands NRM Regional Plan 2017-2022

In addition to the strategic documents above, the Kimberley and Pilbara RDRP aligns with existing activities and priorities of region-wide key stakeholders including the Northern Western Australia and Northern Territory Drought Resilience Adoption and Innovation Hub (Northern Hub). The Northern Hub aims to transform the drought resilience of farmers, Traditional Owners and communities in the Northern Territory and Northern Western Australian Tropical Top End and Rangelands (Australian Government, 2024a). Each hub has several nodes, reaching across their region. Kimberley-Pilbara hub nodes are in Karratha, Broome and Kununurra. The Northern Hub supports rural industries and communities to prepare for drought through the leveraging of expertise and fostering innovation and new practices (Northern Hub, 2023).



The following projects are currently underway through the Northern Hub:

- **Ord Water:** Water Use and Efficiency in the Ord River Irrigation Area (DPIRD).
- **Spinifex Dominated Pastures (KPCA)**
- **Early Career Extension Program:** Supports skills development for early-career extension staff across northern Australia.
- **Next Generation Land Managers:** Delivers on-station training for first- and second-year pastoral staff using property-specific resources.
- **Forestry Human Capacity:** Capacity building and business development project for remote community resilience.
- **Cultivated Agriculture:** Provides crop production training to support diversification of grazing operations.
- **Rain Ready Rangelands 2.0:** Supports land managers to trial sustainable grazing strategies and gather monitoring data.
- **Over-sowing Legumes:** Extends successful QLD technology to WA/NT to improve dry season feed and cattle condition.
- **Rehydration Project:** Demonstration site in the Kimberley showing rehydration practices for degraded pastures.
- **Long-term Co-design:** Facilitates industry-led project generation to meet long-term needs.
- **Consultation, Engagement, Planning for Natural Capital Markets:** Workshops and plain-English resources to support understanding of emerging Natural Capital opportunities.

Other important programs include the Indigenous and Aboriginal Ranger programs, funded by the WA state government and the Australian government. Through these programs, First Nations organisations in the Kimberley and Pilbara regions are managing Country and protecting the environment in partnership with the public and private sectors (NIAA, 2024). The land and sea management activities undertaken in WA (DBCA, 2024) have strong alignment with the goals and intent of the Kimberley and Pilbara RDRP.

This RDRP recognises the importance of both intra-regional and cross-regional collaboration in building drought resilience. Within each region, existing networks—such as the Pilbara and Kimberley RDAs, Land Councils, the Northern Hub, KPCA, DPIRD branches, and local government forums play a vital role in knowledge exchange, coordination, and localised implementation. Beyond the regions, this RDRP supports broader knowledge sharing through engagement with other RDRP regions across WA. The Pilbara and Kimberley Development Commissions have actively shared progress and insights with other regions and have also learned from the experiences of other Development Commissions. These connections aim to strengthen cross-sector learning, identify innovations, and inform long-term resilience strategies through collaborative practice.

Numerous grass-roots efforts and projects on land regeneration, soil conservation, fire mitigation and developing positive grazing management have been undertaken collaboratively in northwest WA through voluntary Land Conservation District Committees (LCDCs), Rangelands NRM, Ranger Groups and other Landcare groups or projects, driven by land managers – namely pastoralists and Rangers in the north west. These grass-roots restorative efforts are documented at the national level by organisations such as Soils for Life (Soils for Life, 2025) highlighting these initiatives through case studies and reports that showcase the practices and outcomes of soil stewards across Australia.

There are some key themes of landscape regeneration which help build resilience to drought. The following case studies explore the themes of regenerative grazing management and proactive burning.

Case Study

### Grazing Management

Grazing management (and agriculture as a whole) is undergoing a revolutionary shift in understanding, stemming from revived reverence for soil and ecosystem processes underpinned by holistic or systems thinking, broadly encompassed by 'regenerative agriculture'.

Cheela Plains Station in the Pilbara region and Kachana Station in the Kimberley region have been recently celebrated as "Soil Health Champions" by Rangelands NRM through a State-wide project on agricultural soil health with short video case studies (https://www.youtube.com/user/RangelandsNRM). Both demonstrate that livestock management can be used as a tool for ecosystem restoration in the region. These add to numerous case studies in Australia by Soils For Life and RCS Australia, as well as globally, of farms and stations which have enhanced ecosystem function with managed grazing (see Stanley et al 2024), enhancing the drought resilience of the land and business.

# Kimberley Strategies

Strategic documents and stakeholders specific to the Kimberley have been incorporated into the focus and investment priorities in the Kimberley and Pilbara RDRP. They include (but not limited to):

- Our North, Our Future 2021-2026 Targeted Growth
- Kimberley Regional Water Plan 2010-2030 (DWER)
- Kimberley Needs Assessment 2022-2024 (WAPHA)
- Kimberley Regional Planning and Infrastructure Framework (RPIF) 2015 (DPLH)
- Kimberley Development Commission Strategic Plan 2024-2026 (KDC)
- RDA Kimberley Strategic Regional Plan (RDA)
- 2036 and Beyond: A Regional Investment Blueprint for the Kimberley
- East Kimberley Tourism Plan 2021 (East Kimberley Marketing Group)

The KDC has articulated a vision for the Kimberley to aspire to a future as one of the world's most successful and sustainable regions. This vision is built around the pillars of people, place and prosperity (KDC, 2024), all of which are relevant to this Kimberley and Pilbara RDRP.

The Kimberley and Pilbara RDRP has also built on the Regional Water Plan developed for the Kimberley by the Government of Western Australia in 2010. The Water Plan acknowledges the cultural and social values of water to the local communities, especially First Nations populations, and emphasises the need for ongoing research to understand water-dependent values for better planning and management (Government of Western Australia, 2010).

**The high-value water-dependent ecological and cultural features of the Kimberley region are maintained while ensuring sustainable management of appropriate water resource development.**

*Kimberley Regional Water Plan 2010-2030 Shared Vision*



# Pilbara Strategies

Strategic documents and stakeholders specific to the Pilbara have been incorporated into the focus and investment priorities in this Kimberley and Pilbara RDRP. They include (but not limited to):

- Our North Our Future 2021-2026 Targeted Growth
- Pilbara Regional Water Plan 2010-2030 (DWER)
- WA Strategic Industrial Areas
- Pilbara Development Commission Strategic Plan 2023-2025 (PDC)
- RDA Pilbara Strategic Plan 2021/22 – 2023/24
- Pilbara Needs Assessment 2022-2024 (WAPHA)
- Ten Year Community Plan for the NGO Sector in the Pilbara 2016 (RDA Pilbara/PDC)
- Pilbara Regional Planning and Infrastructure Framework 2012 (DPLH)

The focus areas of the PDC's Strategic Plan are particularly relevant to drought resilience and include liveability, economic development, diversification and innovation, Aboriginal empowerment and prosperity, climate resilience, low carbon transition, collaboration, and partnerships (PDC, 2023).

The Kimberley and Pilbara RDRP builds on the Pilbara Regional Water Plan 2010-2030 developed by the Government of Western Australia in 2010. The Plan guides water resource management and sets strategic directions for the sustainable management and development of the region's water resources. It outlines a shared vision for water in the Pilbara region, supported by several objectives with long term outcomes relating to water management (Government of Western Australia, 2010a).

**Our precious water resources are managed and developed in a sustainable manner to maintain and enhance our natural environment, our cultural and spiritual values, our quality of life and the economic development of the Pilbara.**

*Pilbara Regional Water Plan 2010-2030 Shared Vision*

Case Study

### Collaborative and proactive burning for healthy Country

The Dampier Peninsula Fire Working Group (DPFWG) has demonstrated the power of collaborative planning, action and review to reduce damaging bushfire impacts, and enhancing biodiversity habitat in the west Kimberley (Wysong et al 2022; https://www.youtube.com/watch?v=DW8QWO6D0-I).

Damaging fire regimes can affect their own 'drought' by wiping out fodder, bushfoods and biodiversity alike, and exposing the land to wind and rain erosion which reduces landscape fertility and function for the next season. Proactive and Traditional fire practices are a powerful tool to manage vegetation towards landscape resilience in northern WA.

## Connections and Opportunities

Many projects and programs in the regions connected to land, water, community resilience and disaster recovery can contribute to drought resilience. The following case study highlights how a project (with various stakeholders) can contribute to overarching drought resilience, which by nature, hinges on diversity and strength of connections.

**Case Study**

### Northern Native Seed Industry Initiative

The Pilbara Development Commission is leading the Northern Native Seed Industry Initiative (NNSII), a $4.4 million dollar program to create a network of sustainable businesses built around the creation of native seed orchards for harvesting and sale. The resource sector, in particular mine revegetation, is identified as a potentially lucrative target market. There are opportunities for reintroduction and protection of native plant species adds to drought resilience both in the natural landscape and in urban areas.

In the natural environment, plants act as a nutrient stripping filter between the land and waterways. This helps keep waterways such as creeks, rivers and lakes clean and reduces algae blooms. Plants also provide vital shade for animals and other plants as well as reducing erosion caused by desertification.

Urban settings with ample shade are many degrees cooler than those without and native plants can provide the necessary shade and amenity that activates outdoor spaces. They also encourage people to walk short distances instead of driving. Positive mental health outcomes are also linked to people's access to parks, gardens and other nature-based spaces.



# Regional Context

The regional context guiding the RDRP has been organised under the five focus areas of water systems, communities, agriculture, landscapes and economy. This section provides a summary of each focus area, with further information on concepts available in the Background and Context Reports and DVAs.

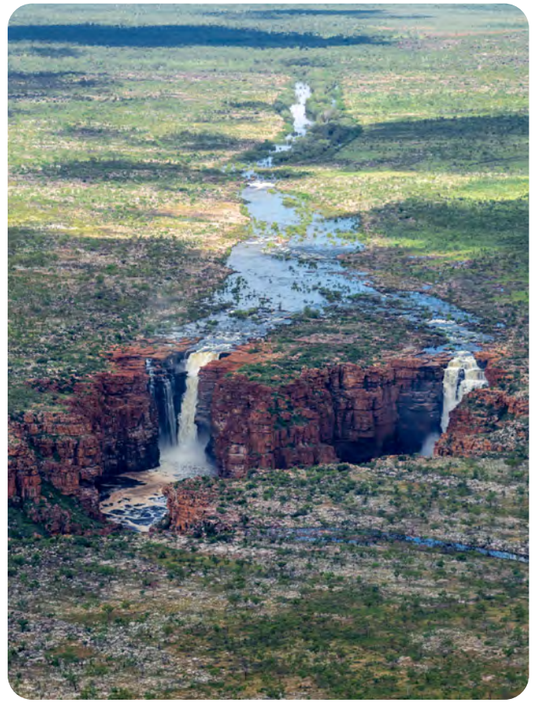
## Water systems

Key drivers of demand for water include mining and minerals processing, population growth, irrigated agriculture and pastoral development and clean energy production.

In the Pilbara, coastal alluvial aquifers are important existing and potential water sources for coastal ports and towns (Government of Western Australia, 2023c). The CSIRO's Pilbara Water Resource Assessment (McFarlane, 2015) found that these aquifers appear capable of withstanding a hotter and drier climate. Future drier climates are also projected to have a limited impact on the main future potential water resource in the west of the region. A range of potentially underutilised water resources are identified in the Assessment (McFarlane, 2015).

Estimations of future water availability for the Kimberley in 2010 concluded that water resources are sufficient to accommodate predicted medium-term growth trends, if a cautious approach to water management is adopted and targeted management strategies are established (Government of Western Australia, 2010).

In the West Kimberley there are several aquifers that sit within the Canning Basin. These water resources are used for drinking water, livestock watering and irrigated agriculture. Several WA Government groundwater allocation plans exist to manage water use in the regions to maintain environmental, social and cultural values (DWER, 2024).



Lake Argyle in the East Kimberley provides a water source for irrigated agriculture, mining, hydroelectric power as well as environmental, social and cultural values. Irrigation is the dominant consumptive use of water from Lake Argyle (Government of Western Australia, n.d.).

Important cultural values are frequently closely associated with both ground and surface water sources in the Kimberley and Pilbara. It is important these values are understood and closely considered with Traditional Owners as part of the management and development of water resources in these two regions.

Provision of water services to Aboriginal communities is an important consideration in the regions. In 2023 the WA Government transferred responsibility for water services for 101 Aboriginal communities in the Kimberley and 26 Aboriginal communities in the Pilbara and Mid-West regions to the Water Corporation (OAG, 2021). Through the Aboriginal Communities Water Services (ACWS) program the Water Corporation plans to work with each community over the next 10 years (2023-2033) in a staged approach (Water Corporation, 2024a).

# Community

The Kimberley and Pilbara are home to a diverse population, with a generally younger population compared to other WA regions.  With an estimated population of 99,350 people – 39,389 in the Kimberley and 59,961 in the Pilbara, almost 25% identify as Aboriginal or Torres Strait Islander. Overall, 16.7% of the population speaks a language other than English (ABS, 2023).

The Pilbara is crucial to WA's economy, particularly through its iron ore and liquefied natural gas industries. The Kimberley also contributes significantly through mining, tourism, agriculture, and pearling.

Both regions have strong and vibrant communities. However, both face complex social and economic challenges, such as community safety and youth wellbeing, and are currently experiencing an acute crisis in housing availability and affordability. Housing is fundamental to the functioning of any economy, enabling labour-force participation and underpinning the wellbeing of families and communities (KDC, 2023).

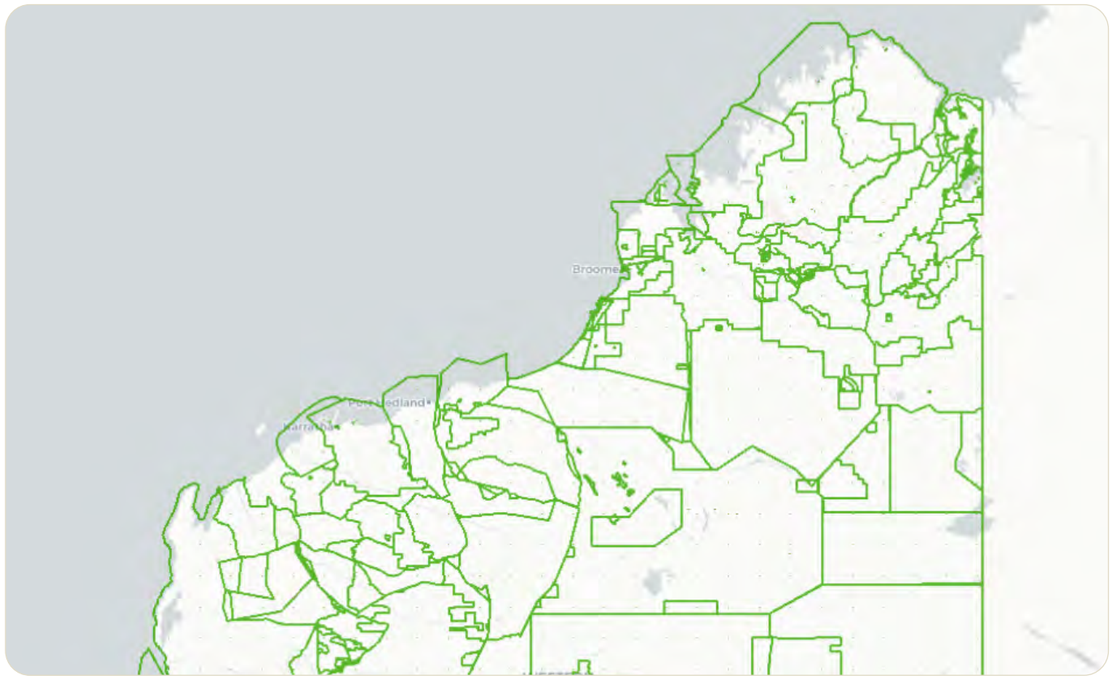



*Figure 6: Native Title Determinations, WA*



The disparity between opportunities and life outcomes between First Nations and non-Aboriginal people remains concerning, with labour force participation rates much lower than non-Aboriginal people. Similar disparities exist across a wide range of social and economic indicators. Strategies to unlock the enormous productive potential of the First Nations workforce and address complex social issues is paramount to regional success.

Both regions have rich cultural history spanning tens of thousands of years. Figure 6 shows the Native Title Applications within WA currently determined by the Federal Court of Australia (Government of Western Australia, 2024). Kimberley Land Council (KLC) is the Native Title Representative Body for the Kimberley region (KLC, 2024) and Yamatji Marlpa Aboriginal Corporation (YMAC) is the native title representative body for the Pilbara. The Kimberley has the majority of WA's 200 remote Aboriginal communities (Government of Western Australia, 2023a). It is essential that management of the region's resources be fully inclusive of First Nation's people through the provision of opportunities to become more involved in all levels of planning, research and wider promotion and appreciation of their cultural and historical legacy.

Fostering social and economic growth while balancing development aspirations with environmental and climate change impacts will present significant management challenges. These challenges will require strong leadership and careful planning for the future. Although there is a compelling case for promoting and facilitating growth, it is equally important to ensure that the region's unique natural environment and cultural history, which are its comparative advantages, are preserved.

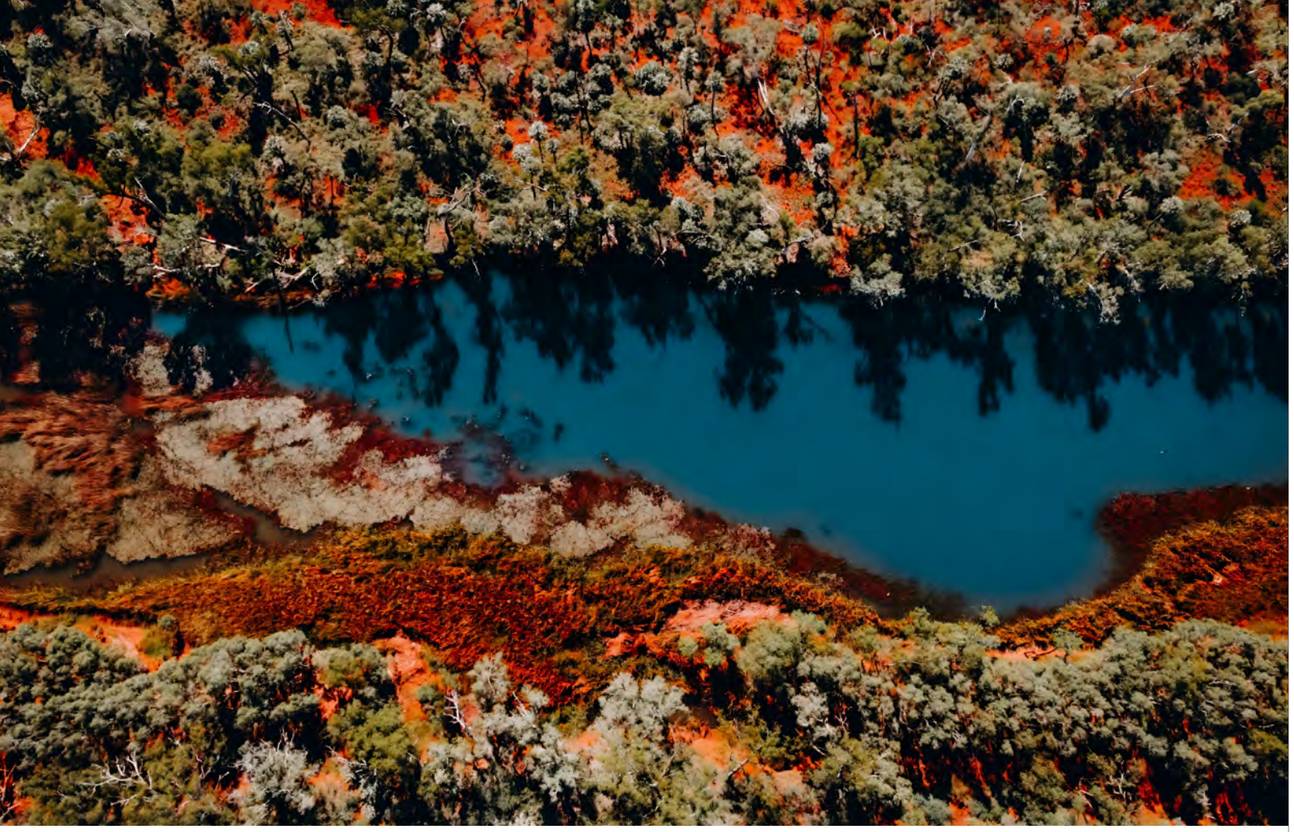
# Agriculture

Across the Kimberley and Pilbara regions almost 35% of land is classified as agricultural, with the gross value of agricultural commodities being $504 million in 2021-22. The Kimberley accounted for $374 million gross value of agricultural commodities, with key producing areas Derby-West Kimberley LGA ($135 million), and Halls Creek LGA ($111 million). The Pilbara produced $130 million, with almost half of this in the East Pilbara LGA (DAFF, 2024a).

In 2021-22 the key production types (and % of gross value of agricultural commodities) were:

- Meat cattle (over 1 million) - $429 million (91%)
- Vegetables (melons, pumpkin, sweet corn, beans) - $30 million (5.9%)
- Fruits and nuts (banana, mango) - $6 million (1.1%)
- Cotton and other oilseeds - $4 million (0.8%).
- Maize - $4 million (0.8%) (DAFF, 2024a).

Tropically adapted meat cattle predominantly graze on native vegetation in the regions (DAFF, 2024a). Pastoral leases are leases over Crown land which give the lessees the right to graze authorised livestock on the natural vegetation (DPLH, 2022). Lessees are obliged to sustainably manage the rangelands (DPLH, 2023).



Average ‘lease and improvement’ values for pastoral leases in the Pilbara increased more than five-fold over the 1992–2005 period (DCCEEW, 2008). An identified trend was for several leases to be operated as a single management unit (SMU), resulting in declines in staffing levels and permanent habitation (DCCEEW, 2008a,b,c). The Western Australian Rangeland Monitoring System (WARMS) has sites distributed across the region and provides reliable, quantitative data for reporting changes impacting on production (DCCEEW, 2008).

Of the 15,650 jobs in the Kimberley region, 897 (5.7%) are in the agriculture sector, with 375 of these in Shire of Wyndham-East Kimberley LGA and 302 in Shire of Broome LGA. Of the 59,782 jobs in the Pilbara region, 256 (0.4%) are in the agricultural sector, 115 of these in Shire of East Pilbara LGA (ABS, 2023).

The Ord River Irrigation Scheme is in the East Kimberley and is a significant agricultural development project aimed at harnessing the abundant water resources of the Ord River. The project constructed 2 major dams; Kununurra Diversion Dam in 1962, the first stage of the scheme, and Ord River Dam, constructed in 1972, creating Lake Argyle, Australia’s largest artificial lake (WA Government, n.d.). Lake Argyle has a capacity of 10,700 GL at spillway level and is managed by the Water Corporation. It provides water for agriculture, mining, hydroelectric power, and other uses.

Water flows from Lake Argyle down the Ord River to Lake Kununurra where it is diverted, and gravity fed through a series of open channels to farms in the Ord River Irrigation Area (ORIA). The scheme initially irrigated 15,150 ha of agricultural land. The Ord-East Kimberley Expansion Project commenced in 2009 and has been implemented in 3 phases. Ord Stage 2 expanded the area to its current 28,000 ha footprint with prospective works expanding infrastructure to irrigate up to 50,000 ha enabling cultivation of a greater area of crops.

Irrigated agriculture is a smaller industry in the West Kimberley with approximately 3,000 ha under irrigation. Groundwater is pumped from large aquifers and used for horticultural and fodder production, predominantly via centre pivot or sub surface drip-irrigation infrastructure. There is also potential for large scale irrigated agriculture fed by the extensive Fitzroy River Catchment area with allocation and management planning underway between the state government and Traditional Owner groups.

The Shire of East Pilbara is a key contributor to the agricultural sector. In 2020-21 the gross value of agricultural commodities for the Pilbara was $130 million, with almost half of this in the East Pilbara LGA. Of the 59,782 jobs in the Pilbara region, 256 (0.4%) are in the agriculture sector, with 115 of these in the East Pilbara LGA.



# Landscapes

The RDRP regions are in the Rangelands NRM area and sit across 12 IBRA7 regions (Interim Biogeographic Regionalisation for Australia) (ALA, 2023). IBRA is a planning tool which classifies the land surface of Australia based on common climate, geology, landform, native vegetation and species information (DCCEEW, 2023). IBRA7 is the most current version, developed in 2012 and divides Australia into 89 biogeographic regions and 419 subregions.

There are three climatic zones across the RDRP regions (see Figure 7):

- Tropical Savanna with Dry Winter (Aw) – north of Kimberley
- Hot Semi-Arid (BSh) – south and south-east Kimberley and parts of Pilbara (Chichester / Tom Price)
- Hot Desert (BWh) – Pilbara (Peel et al 2007).

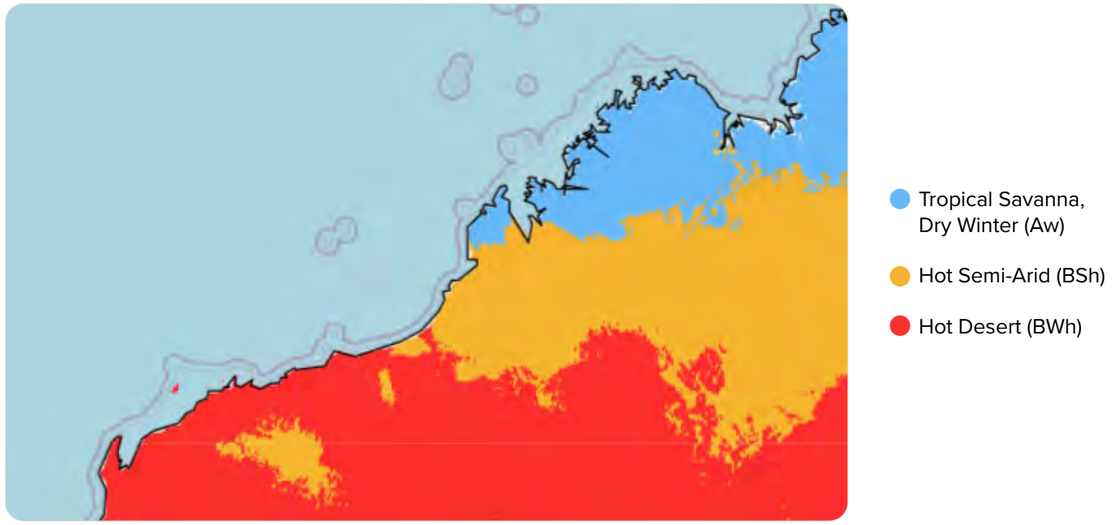



*Figure 7: Climate classifications, Kimberley and Pilbara (Peet et al 2007).*

The Kimberley has an extensive network of rivers and streams influenced primarily by monsoonal rainfall. It also has two of WA’s largest rivers – the Fitzroy River (700km long) and the Ord River (588km long) (Government of Western Australia, 2010). The Pilbara has a network of permanent and ephemeral river systems which are largely driven by cyclonic and tropical depressions (Curtin University, 2023). The Pilbara region includes the Fortescue River (760km long and the State’s third longest river) and the Ashburton River (680km).

Both regions have threatened ecological communities (TEC) with a strong connection to, or reliance on, water – the Kimberley currently has 11 TEC (including six critically endangered), and the Pilbara currently has two TEC (DBCA, 2023). A range of both aquatic and terrestrial ecosystems are highly likely to be reliant on water inflow (in addition to rainfall). In the Pilbara the greatest variety of groundwater dependent ecosystem types, and variability between wet and dry periods, occurs in the Hamersley Range area (McFarlane, 2015).

There are four Ramsar Convention listed wetlands in the Kimberley – Ord River Floodplain, Lakes Argyle and Kununurra, Roebuck Bay and Eighty-mile Beach (Commonwealth of Australia, 2022). The Lakes Argyle and Kununurra site forms a significant wetland ecosystem in the East Kimberley extending from Lake Argyle through the Ord River to Lake Kununurra. Covering approximately 117,000 ha it is one of Australia’s largest artificial wetland systems. These interconnected water bodies play a crucial role in supporting a diverse range of flora and fauna (DCCEEW 2010). The diverse landscape of wetlands, swamps and river channels support a rich biodiversity, providing critical breeding and foraging grounds for birds, reptiles and aquatic life.

The Ramsar Site also plays a crucial role in the region's cultural heritage, with significant importance to local First Nations communities who have a deep connection to the land and water. The area was subject to a native title claim by the Miriwoong and Gajerrong people, which was determined in September 2003 (Government of Western Australia, 2024). As a result of the Ord Final Agreement negotiations, formal processes for First Nations consultation and interaction in management and management planning have commenced via the Joint Management Initiative.

The Fortescue Marsh, approximately 100 km north-west of Newman, is the largest ephemeral wetland in the Pilbara region and is also recognised as nationally important. It is rich in plant and animal species of high conservation value and is part of an ancient and complex array of alluvial aquifers and groundwater systems. It is also at the heart of an important mining province and longstanding pastoral industry and has high cultural and heritage importance to the Indigenous peoples of the region. Fortescue Marsh is being considered for nomination as a Ramsar wetland as per the Fortescue Marsh Management Strategy 2018 – 2024 and the Pilbara Conservation Strategy.

The UNESCO World Heritage Listed Purnululu National Park (UNESCO, 2024) in the Kimberley and the Murujuga Cultural Landscape (nominated for World Heritage Listing) in the Pilbara (UNESCO, 2020) are two of the Kimberley and Pilbara regions' 12 National Parks. Land management of the Kimberley and Pilbara regions is supported by Aboriginal Ranger Groups who aim to maintain the ecological integrity of 13 Indigenous Protected Areas (DCCEEW, 2024a), also providing wellbeing and socio-economic benefits for local communities.

The Kimberley faces high biosecurity risks with regional and localised quarantine restrictions, particularly around horticultural product. Climate change is a significant contributor to increased biosecurity risk in the region (DAWE, 2020a).

# Economy

The Kimberley and Pilbara regions have a combined economic output of $119.24 billion (14.55% of Western Australia's $819.3 billion output) - $111.5 billion of this is from the Pilbara. East Pilbara LGA accounts for 38.7% of annual economic output for the Pilbara, followed by Ashburton with 30.3%. Broome LGA accounts for 44.7% of annual economic output for the Kimberley (REMPLAN, 2024).

At least $85.56 billion (71%) of the economy in the Kimberley and Pilbara regions is considered directly highly or moderately dependent on nature - $82.7 billion (96.7%) in the Pilbara and $2.86 billion (67.4%) in the Kimberley (WEF, 2020).

Mining has the largest economic output for the Kimberley and Pilbara regions. The Pilbara economy is highly reliant on mining, accounting for 87% of the Pilbara region output and over 90% of output within the East Pilbara and Ashburton LGAs. Mining accounts for 58.7% of output in Derby-West Kimberley LGA and 54.75% in Halls Creek LGA (REMPLAN, 2024).

Across the regions over $9.5 billion in mining royalties were collected by the state government in 2022/23 (DEMIRS, 2024). While the regions' mining sector generates both economic output and employment, there is a heavy reliance on Fly-In-Fly-Out models of work. An analysis of total mining employment in the regions compared to local industry employment shows as little as 14% of the workforce may be locally based (DEMIRS, 2024; ABS 2023).

The Kimberley region has greater economic diversity compared to the Pilbara, and the Shire of Broome and the Shire of Wyndham-East Kimberley have greater diversity compared to most parts of regional WA (Australian Government, 2023).

Industries with a reliance on outdoor work are particularly at risk from extreme heat, including agriculture, construction, sport and recreation, hospitality, transport and warehousing, mining, utilities, education, and training (DEMIRS, 2023).

## Tourism

The tourism sector generates $531.139 million (6.8%) of total output in the Kimberley and 2,011 jobs (12.8% of the region). In the Pilbara tourism generates $388.907 million (0.3%) and 1,809 jobs (3% of the region). Tourism in the regions is highly reliant on the natural environment and is built around natural experiences, Indigenous tourism, cultural tourism, ecotourism and agritourism (EKMG, 2021; Destination Pilbara 2024). Both regions are renowned for their environmental features, national parks, waterways and waterholes and these are popular attractions visited by both tourists and locals.

Tourist numbers in the Kimberley and Pilbara are likely to be negatively impacted by the predicted increase in heat stress days (when the Temperature Humidity Index is equal to or greater than 79); and hot days (greater than or equal to 35 °C between 1 May and 31 August).



Many tourism operators in the Kimberley and Pilbara have a high dependence on land-based experiences. Operators will need to assess the impact of increasing temperatures and humidity on outdoor-focused tourism activities, including those involving remote or basic accommodation or 'glamping' style accommodation, where client comfort levels may be compromised. The consultation process found that operators may face a potential 'shrinkage' of the tourism season for overland activities with a much-diminished operating window to work within.

Increased temperatures may pose health risks to tourists, particularly those engaging in outdoor activities like hiking or visiting remote areas. This could discourage visitors from spending extended periods in the region during peak heat periods and conversely, concentrate visitor numbers more intensely during the 'dry season'.

Some of the region's key attractions, like waterfalls, gorges, rivers and national parks, could be impacted by changes in rainfall. For example, lower rainfall during the wet season might reduce the water flow, while increased rainfall might lead to floods, affecting access to popular spots. Many cultural sites, including ancient rock art and sacred places, could be at risk from climate change-related erosion, flooding, or bushfires. This would have a negative impact on Indigenous tourism, a key drawcard for the region.

It has been identified that agritourism, ecotourism and cultural tourism can support economic growth of communities by diversification of income on pastoral leases, creating jobs supporting local businesses and communities. There are approximately 60 stations in the Pilbara and 90 in the Kimberley, and of these stations approximately 20 are offering tourism experiences.

# Local government profiles

This RDRP combines the Kimberley and Pilbara regions bordered by the Northern Territory to the east, the Indian Ocean to the north / west and the Gascoyne, Mid West and Goldfields regions to the south. It covers eight Local Government Areas (LGAs):

- Kimberley: Shires of Broome, Derby-West Kimberley, Halls Creek, and Wyndham-East Kimberley.
- Pilbara: City of Karratha, Shires of Ashburton and East Pilbara and Town of Port Hedland.

Following are profiles for each of the regional local government areas.

*Source: Remplan. Australian Bureau of Statistics 2021 Census of Population and Housing, Census Place of Work Employment (Scaled), ABS 2022 / 2023 National Input Output Tables, and ABS June 2024 Gross State Product Australia's Environment 2024 Report produced by the Australian National University's Centre for Water & Landscape Dynamics. Pilbara Lands Board. 2021 Agriculture Census. DPIRD, ABS and DLPH.*

# Kimberley Local Government Profiles

## Shire of Broome

**POPULATION:**
**16,958**
(48.33% of Kimberley)

**AREA:**
**54,401 km²**

**2021 SEIFA SCORE:**
**962**
(Kimberley = 859)

**ANNUAL ECONOMIC OUTPUT:**
**$3.6 bn**

**TOTAL NUMBER OF JOBS:**
**8,336**

**TREE COVER:**
**3.5%**

**ENVIRONMENTAL CONDITION SCORE:**
**2.3** (2024)

**DAYS OVER 35°C:**
**124.3 p.a.**
(avg 2000-2023)

**PRECIPITATION:**
**652 mm p.a.**
(avg 2000-2023)

**MAIN TOWNSHIPS:**
Broome

**PASTORAL STATIONS:**
Total: **12**
With tourist experiences: **1**
Head of cattle: **58,186**

**LAND USE:**
Grazing native pasture: **33%**
Natural environments: **67%**

**LAND UNDER CULTIVATION AND PRODUCTION:**
Hay & silage, corn, fruit trees, small crops, grapes, aquaponics & turf

**TRADITIONAL LANDS:**
Bardi, Jawi, Bindunbur, Jabirr Jabirr / Ngumbari, Rubib and Yawuru, Joombarn – Buru, Birriman-Gan, and Karajarri Peoples

**ABORIGINAL COMMUNITIES:**
65 Aboriginal communities including Bidyadanga, Djarindjin, Lombadina, Ardyaloon, and Beagle Bay

## Shire of Derby-West Kimberley

**POPULATION:**
**7,074**
(20.16% of Kimberley)

**AREA:**
**119,730 km²**

**2021 SEIFA SCORE:**
**734**
(Kimberley = 859)

**ANNUAL ECONOMIC OUTPUT:**
**$2 bn**

**TOTAL NUMBER OF JOBS:**
**2,585**

**TREE COVER:**
**4.6%**

**ENVIRONMENTAL CONDITION SCORE:**
**4.7** (2024)

**DAYS OVER 35°C:**
**151.3 p.a.**
(avg 2000-2023)

**PRECIPITATION:**
**816 mm p.a.**
(avg 2000-2023)

**MAIN TOWNSHIPS:**
Derby, Fitzroy Crossing

**PASTORAL STATIONS:**
Total: **35**
With tourist experiences: **6**
Head of cattle: **291,445**

**LAND USE:**
Grazing native pasture: **57%**
Natural environments: **42%**

**LAND UNDER CULTIVATION AND PRODUCTION:**
Hay & silage, fruit trees, small crops, grapes, cereals

**TRADITIONAL LANDS:**
Warrwa, Bardi, Jawi, Ngarinyin, Worrorra, Nyikina, Mangala, Unggumi, Bunuba, Walmajarri, Kija, Gooniyandi, Oogardang, Oomeday, Yow Jabi and Wangkatjunka peoples

**ABORIGINAL COMMUNITIES:**
46 Aboriginal communities including Yungngora, Looma and Mowanjum



## Shire of Halls Creek

**POPULATION:**
**3,574**
(10.19% of Kimberley)

**AREA:**
**133,045 km²**

**2021 SEIFA SCORE:**
**540**
(Kimberley = 859)

**ANNUAL ECONOMIC OUTPUT:**
**$658.5 m**

**TOTAL NUMBER OF JOBS:**
**1,095**

**TREE COVER:**
**4.4%**

**ENVIRONMENTAL CONDITION SCORE:**
**8.5** (2024)

**DAYS OVER 35°C:**
**160.7 p.a.**
(avg 2000-2023)

**PRECIPITATION:**
**588 mm p.a.**
(avg 2000-2023)

**MAIN TOWNSHIPS:**
Halls Creek

**PASTORAL STATIONS:**
Total: **26**
With tourist experiences: **0**
Head of cattle: **242,227**

**LAND USE:**
Grazing native pasture: **43%**
Natural environments: **56%**

**LAND UNDER CULTIVATION AND PRODUCTION:**
Nil

**TRADITIONAL LANDS:**
Jaru, Kija, Kukatja, Walmajarri, and Gooniyandi people

**ABORIGINAL COMMUNITIES:**
Balgo (Wirrimanu), Billiluna (Mindibungu), Mulan, Ringer Soak (Kundat Djaru), Warmun (Turkey Creek) and Yiyili

## Shire of Wyndham-East Kimberley

**POPULATION:**
**7,476**
(21.31% of Kimberley)

**AREA:**
**112,066 km²**

**2021 SEIFA SCORE:**
**899**
(Kimberley = 859)

**ANNUAL ECONOMIC OUTPUT:**
**$1.8 bn**

**TOTAL NUMBER OF JOBS:**
**3,634**

**TREE COVER:**
**11.5%**

**ENVIRONMENTAL CONDITION SCORE:**
**8.6** (2024)

**DAYS OVER 35°C:**
**97.3 p.a.**
(avg 2000-2023)

**PRECIPITATION:**
**1127 mm p.a.**
(avg 2000-2023)

**MAIN TOWNSHIPS:**
Kununurra and Wyndham

**PASTORAL STATIONS:**
Total: **22**
With tourist experiences: **7**
Head of cattle: **131,794**

**LAND USE:**
Grazing native pasture: **38%**
Natural environments: **60%**

**LAND UNDER CULTIVATION AND PRODUCTION:**
Sandalwood, cotton, cereals, fruit trees, small crops

**TRADITIONAL LANDS:**
Wanjina-Wunggurr, Balanggarra, Miriwoong and Gajerrong people

**ABORIGINAL COMMUNITIES:**
36 Aboriginal communities including Kalumburu and Doon Doon

# Pilbara Local Government Profiles

## Town of Port Hedland

**POPULATION:**
**15,684**
(28.5% of Pilbara)

**AREA:**
**18,417 km²**

**2021 SEIFA SCORE:**
**1,011**
(Pilbara = 1,016)

**ANNUAL ECONOMIC OUTPUT:**
**$16.588 bn**

**TOTAL NUMBER OF JOBS:**
**11,029**

**TREE COVER:**
**1.2%**

**ENVIRONMENTAL CONDITION SCORE:**
**1.4** (2024)

**DAYS OVER 35°C:**
**137.5 p.a.**
(avg 2000-2023)

**PRECIPITATION:**
**400 mm p.a.**
(avg 2000-2023)

**MAIN TOWNSHIPS:**
Port Hedland, South Hedland

**PASTORAL STATIONS:**
Total: **8**
With tourist experiences: **1**
Head of cattle: **33,995**

**LAND USE:**
Grazing native pasture: **54%**
Natural environments: **42%**

**LAND UNDER CULTIVATION AND PRODUCTION:**
Nil

**TRADITIONAL LANDS:**
Kariyarra, Ngarla, and Nyamal people.

**ABORIGINAL COMMUNITIES:**
Yandeyarra, Jinparinya, Punju Nyamal, Marta Marta, Strelley and Woodstock

## City of Karratha

**POPULATION:**
**22,199**
(40.34% of Pilbara)

**AREA:**
**15,238 km²**

**2021 SEIFA SCORE:**
**1,052**
(Pilbara = 1,016)

**ANNUAL ECONOMIC OUTPUT:**
**$22.201 bn**

**TOTAL NUMBER OF JOBS:**
**14,951**

**TREE COVER:**
**3.1%**

**ENVIRONMENTAL CONDITION SCORE:**
**2.3** (2024)

**DAYS OVER 35°C:**
**100.3 p.a.**
(avg 2000-2023)

**PRECIPITATION:**
**331 mm p.a.**
(avg 2000-2023)

**MAIN TOWNSHIPS:**
Karratha, Dampier, Roebourne, Point Samson, Wickham, Cossack

**PASTORAL STATIONS:**
Total: **7**
With tourist experiences: **0**
Head of cattle: **19,018**

**LAND USE:**
Grazing native pasture: **67%**
Natural environments: **32%**

**LAND UNDER CULTIVATION AND PRODUCTION:**
Nil

**TRADITIONAL LANDS:**
Ngarluma, Mardudhunera and Yindjibarndi peoples

**ABORIGINAL COMMUNITIES:**
Cheeditha, Weymul and Mingullatharndo



## Shire of Ashburton

**POPULATION:**
**7,391**
(13.43% of Pilbara)

**AREA:**
**100,817 km²**

**2021 SEIFA SCORE:**
**1,024**
(Pilbara = 1,016)

**ANNUAL ECONOMIC OUTPUT:**
**$38.189 bn**

**TOTAL NUMBER OF JOBS:**
**14,704**

**TREE COVER:**
**4.3%**

**ENVIRONMENTAL CONDITION SCORE:**
**1.9** (2024)

**DAYS OVER 35°C:**
**146.1 p.a.**
(avg 2000-2023)

**PRECIPITATION:**
**350 mm p.a.**
(avg 2000-2023)

**MAIN TOWNSHIPS:**
Tom Price, Onslow, Pannawonica, and Paraburdoo

**PASTORAL STATIONS:**
Total: **33**
With tourist experiences: **2**
Head of cattle: **97,325**

**LAND USE:**
Grazing native pasture: **61%**
Natural environments: **39%**

**LAND UNDER CULTIVATION AND PRODUCTION:**
Nil

**TRADITIONAL LANDS:**
Banjima, Guruma, Thalanyji, Puutu Kunti Kurrama, Pinikura, Yindjibarndi Yinhawangka peoples

**ABORIGINAL COMMUNITIES:**
Bindi Bindi, Wakathuni, Bellary Springs, Youngaleena and Ngurrawaana

## Shire of East Pilbara

**POPULATION:**
**9,760**
(17.73% of Pilbara)

**AREA:**
**372,295 km²**

**2021 SEIFA SCORE:**
**939**
(Pilbara = 1,016)

**ANNUAL ECONOMIC OUTPUT:**
**$48.433 bn**

**TOTAL NUMBER OF JOBS:**
**19,098**

**TREE COVER:**
**1.8%**

**ENVIRONMENTAL CONDITION SCORE:**
**5.6** (2024)

**DAYS OVER 35°C:**
**161.2 p.a.**
(avg 2000-2023)

**PRECIPITATION:**
**423 mm p.a.**
(avg 2000-2023)

**MAIN TOWNSHIPS:**
Newman, Marble Bar and Nullagine

**PASTORAL STATIONS:**
Total: **21**
With tourist experiences: **1**
Head of cattle: **150,372**

**LAND USE:**
Grazing native pasture: **15%**
Natural environments: **83%**

**LAND UNDER CULTIVATION AND PRODUCTION:**
Fodder crops, hay and silage

**TRADITIONAL LANDS:**
Nyamal, Palyku, Nyangumarta, Nyiyaparli and the Martu peoples

**ABORIGINAL COMMUNITIES:**
Jigalong, Punmu, Kunawarritji, Parnngurr, Goodabinya and Irrungadji

# Drought

Drought vulnerability and resilience are central considerations in regional drought resilience planning. Understanding the factors that contribute to vulnerability and the capacities that enhance resilience is essential for developing effective strategies to mitigate the impacts of drought.

The Kimberley and Pilbara DVA reports each present detailed sections on the following topics:

**Climate and drought in the regions** - defines drought for the purposes of Regional Drought Resilience Planning and details the exposure of this region to drought. A brief analysis of the system (region) is also provided to give context to potential vulnerabilities.

This includes:

- Regional Overview (high level social, economic and environmental features)
- Regional Climate
- Historical Drought and Drought Impacts
- Climate Change and Future Drought

**Drought risk priority areas** - summarises environmental, economic, production and social domains in the region that may in turn affect the adaptive capacity to respond to drought. This is intended to help identify priority areas for investment.

**Stakeholder engagement** – key regional challenges and priority activities identified by high level stakeholders.

**Vulnerability and resilience assessment** - summarises how the combined impact, resilience and vulnerability of each region is measured, specific to the climate, production and context of each region.

Please refer to the Kimberley and Pilbara DVA reports on the PDC and KDC websites for further detail on the topics listed above.

# Conceptual Framework

Understanding drought vulnerability in the Kimberley and Pilbara regions involved an assessment of both current and projected impacts and the adaptive capacity of the people and systems across both regions.

The analysis utilises the overarching DVA conceptual framework from the Pilot phase of the RDRP (Figure 8), which understands overall vulnerability as the relationship between drought impacts (an outcome of sensitivity and exposure), and adaptive capacity parameters (described here as human/social, natural and physical capital). Unlike from the Pilot phase, resilience was specifically included as a pillar in the DVA, with potential sources of resilience (or opportunities) identified alongside vulnerabilities.

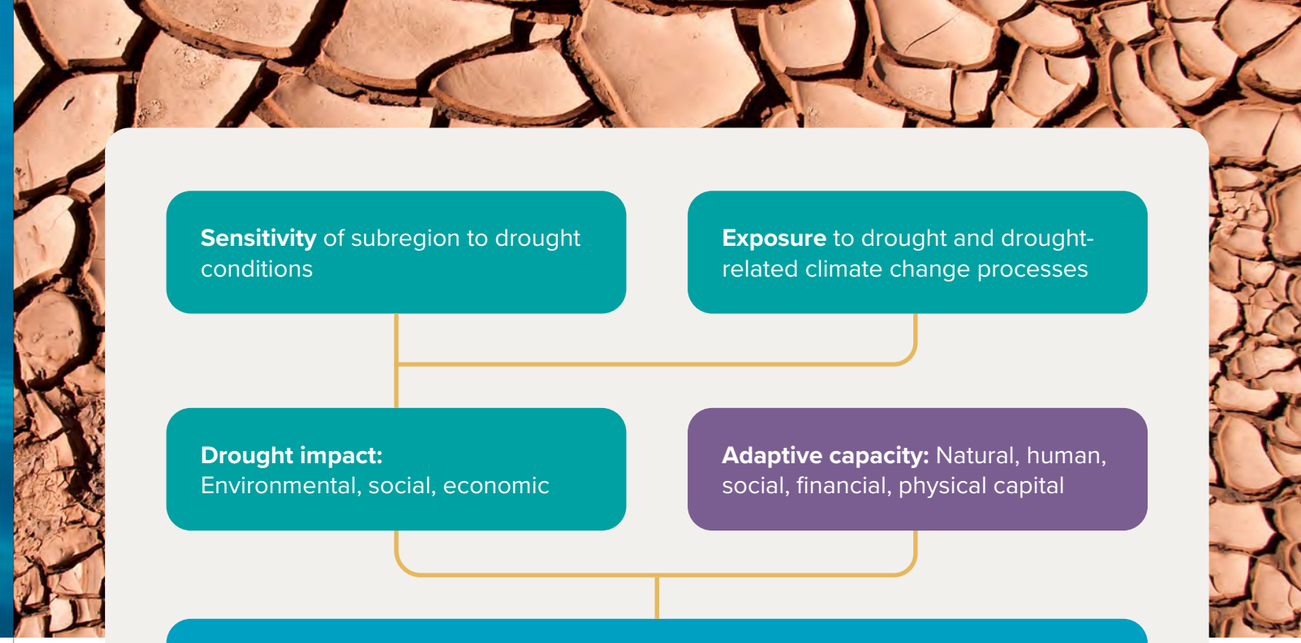



*Figure 8: Conceptual Framework for Drought Vulnerability and Resilience*

# History of Drought

The Kimberley and Pilbara DVAs explore the climate patterns and drought histories for the regions offering detailed insights beyond the overview presented here. In summary, the Kimberley and Pilbara regions experience drought in different ways. While formal drought declarations in the Kimberley have been rare, only one or two since 1980, the impacts, when they occur, can be severe, particularly for remote communities, pastoral operations, and natural systems. In contrast, the Pilbara's naturally low and highly variable rainfall contributes to more persistent and complex drought conditions. Across both regions, high temperatures, erratic rainfall, and compounding events such as fire and flood influence how drought is experienced and managed.

## Pilbara Regional Climate

The Pilbara is one of Australia's hottest and driest regions. Drought conditions here are often prolonged and difficult to define due to naturally low and highly variable rainfall. While river systems such as the Fortescue, Ashburton, and De Grey support life and industry, many communities rely on groundwater sources that are under pressure during extended dry periods.

Key drought-related stressors in the Pilbara include water insecurity, dust storms, land degradation, and heat stress. Towns like Marble Bar and Newman have experienced record-breaking heat and minimal rainfall, reduced soil moisture, limiting vegetation growth, and elevated fire risk. For more detailed data and information, please refer to the Pilbara DVA report.

## Kimberley Regional Climate

The Kimberley's tropical climate is defined by distinct wet and dry seasons but increasing unpredictability in seasonal patterns has heightened drought vulnerability. Shifts in rainfall timing and intensity now pose risks to water access, biodiversity, and food production.

Even though formal drought events have been infrequent, historical impacts include declines in cattle condition, crop failures, and bushfires. Remote communities and Aboriginal settlements are particularly vulnerable due to seasonal access constraints and infrastructure limitations. For more detailed data and information, please refer to the Kimberley DVA report.

# Climate and Drought Snapshot

| INDICATOR | KIMBERLEY | PILBARA |
|---|---|---|
| Rainfall variability | **Moderate to high** | **Very high to extreme** |
| Average annual rainfall mm | **Broome** 630<br>**Fitzroy Crossing** 683<br>**Kalumburu** 1257<br>**Kununurra** 872 | **Karratha** 287<br>**Port Hedland** 314<br>**Marble Bar** 380<br>**Roebourne** 256<br>**Onslow** 303 |
| Average days >25mm rainfall per year | **Broome** 7.2<br>**Fitzroy Crossing** 8.2<br>**Kalumburu** 16.5<br>**Kununurra** 9.9 | **Karratha** 3.1<br>**Port Hedland** 3.1<br>**Marble Bar** 4.4<br>**Roebourne** 2.9<br>**Onslow** 2.7 |
| Rainfall extremes (annual total) | **Broome:** 132 mm (1992) to 1,599 mm (2018); 90% of rain falls Dec–Apr | **Onslow:** 26 mm (1944) to 1,085 mm (1961); recent extremes in 3 of 5 stations |
| Average number of days over 35 | **Broome** 63<br>**Fitzroy Crossing** 227<br>**Kalumburu** 171<br>**Kununurra** 192 | **Karratha** 114<br>**Port Hedland** 141<br>**Marble Bar** 199<br>**Roebourne** 184<br>**Onslow** 108 |
| Projected change in Heat stress days* | **+10** (Kalumburu) to **+19** (Broome) heat stress days by 2050 (RCP4.5) | **+17** (Marble Bar) to **+25** (Karratha) heat stress days by 2050 (RCP4.5) |
| Drought frequency | **1–2 events** (1980–1999); **1 event** (2000–2020) | **8 very dry years** (1980–1999 and 2000–2020) |
| Cyclone influence | **Cyclones frequent Jan–Mar**; significantly influence wet season rainfall | Cyclones contribute **0–86% of summer rainfall**; most cyclone-prone region in Australia |

** (When the Temperature Humidity Index is equal to or greater than 79) under medium emissions (RCP4.5) scenario to 2050*



# Impact of Drought

Drought in northern WA does not always look like drought in the south. It is often experienced through the compounding effects of intense heat, erratic rainfall, water scarcity, dust storms, and bushfires rather than just prolonged dry periods alone. The Kimberley and Pilbara regions are impacted differently due to their climate, geography, and socio-economic profiles, but both face growing risks due to climate change and variability.

## Economic Impacts

In both regions, drought impacts extend beyond agricultural production to affect energy, logistics, tourism, and water services. In the pastoral sector, reduced wet season rainfall limits pasture availability, affects stocking rates, and reduces profitability. Destocking is often used as a proactive strategy to manage feed availability during extended dry periods. Climate change is likely to result in shifts in forage species, heat stress for livestock and workers, and infrastructure risk due to extreme weather events. In the East Kimberley, Lake Argyle's wet season inflows are critical to the Ord River Irrigation Area (ORIA).

While restrictions have been rare since dam construction in the 1970s, dry seasons in 2013 and 2016 triggered hydropower limitations. As water demand grows, particularly from nearby mining and agricultural expansion, there is strong justification for improved water use efficiency, shared infrastructure, and recycling systems. The Pilbara DVA also identifies broader drought risk to mining, small businesses, remote service delivery, and local governments, all of which are sensitive to water availability and heat exposure.

## Environmental Impacts

Environmental impacts of drought are among the most visible and widespread. Decreased rainfall and extreme temperatures result in:

- Reduced vegetation cover, leading to soil erosion and land degradation.
- Lower stream flows and aquifer pressure, impacting water ecosystems.
- Loss of biodiversity and habitat stress.
- Increased bushfire risk due to accumulated dry fuel and lightning.
- Disruption of seasonal environmental indicators such as fruiting and animal breeding.

Environmental condition scores across both regions consistently decline during years of widespread or localised drought. These patterns are expected to intensify under future climate projections of increased temperature causing evaporation and evapotranspiration.

## Social and Cultural Impacts

Drought affects regional wellbeing, cultural continuity, and the viability of remote communities. Financial pressure, uncertainty, and isolation can have significant impacts on mental health, particularly among pastoralists and Aboriginal communities. Water is more than a resource; it holds social, ethical, and spiritual meaning for First Nations peoples. The Living Waters model developed for the Martuwarra (Fitzroy River) shows how water is understood as a relational entity, embedded in law, kinship, language, and responsibility (see Figure 9). Drought can disrupt the ability to carry out cultural obligations, ceremonies, and seasonal activities. In the Kimberley, changes in water flow and drying of culturally significant sites have been observed in native title areas.

For more detailed data and information on impacts, please refer to the Kimberley and Pilbara DVA reports.

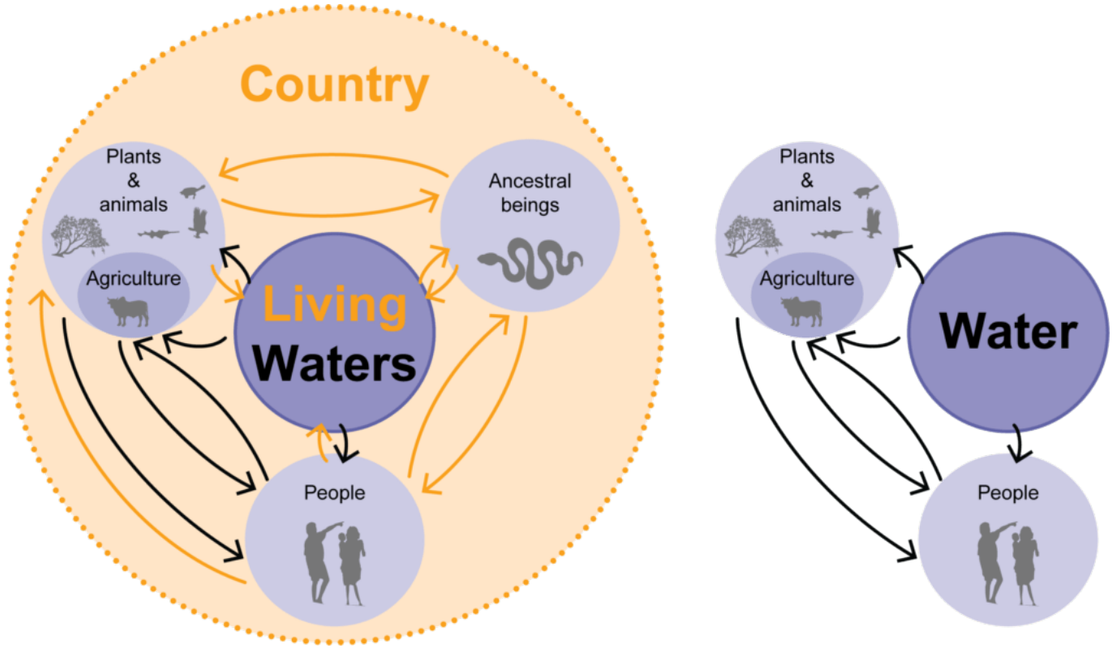



*Figure 9: Relationship with Country. Ochre arrows in the Living Waters model (left) represent connections not generally considered by modern water resource models (right) (NESP, 2024)*



# Climate and Future Drought Risk

The DVAs tell us that both the Pilbara and Kimberley regions face an increasingly unpredictable climate and heightened future drought risk. These risks are not uniform. they reflect the unique climatic patterns and vulnerabilities of each region, shaped by their geography, land use, and community context.

In the Pilbara, a warming climate is intensifying already harsh conditions. Increased temperature extremes, reduced soil moisture, and shifts in cyclone activity are expected to amplify pressure on water supplies, infrastructure, and the pastoral sector.

**"The Pilbara is projected to experience more frequent and intense hot droughts, driven by extreme heat and declining rainfall reliability."**

*Pilbara Drought Vulnerability Assessment, 2024*

In the Kimberley, changes to monsoonal timing, rainfall variability, and extreme heat are expected to disrupt ecosystems, dry season conditions, and community water access, particularly in remote and seasonally isolated areas.

**"The Kimberley's wet-dry seasonal rhythm is becoming less predictable, increasing vulnerability to water stress and ecological disruption."**

*Kimberley Drought Vulnerability Assessment, 2024*

Both regions are projected to see more frequent and compounding drought impacts, making it essential to invest in adaptive strategies that are both regionally specific and informed by long-term climate projections.

While the regions differ in geography and climate, both the Kimberley and Pilbara face increasing drought risk due to climate change. Projected climate models show declining soil moisture, rising temperatures, and greater variability in rainfall by 2050 and beyond.

Historically the Kimberley and Pilbara regions receive most of their rain in the summer (wet season) rains associated with the monsoon, and occasional tropical cyclones. May to October is historically the dry season in the region (NACP, 2024) and from June to September median rainfall across the Kimberley is typically below 10mm (BOM, 2020).

Under a medium emission (RCP4.5) scenario, common projections across the Kimberley and Pilbara regions for the 2050s are:

- An increase in hot days (above 35°C).
- A reduction in cold days (average temperature less than 19°C between 1 January and 31 December).
- Increase in heat stress days (when the Temperature Humidity Index[1] is equal to or greater than 79).

The highest maximum temperatures on record have occurred within the past ten years at two of the four weather monitoring stations analysed in the Kimberley and within the past two years at four of five stations analysed in the Pilbara (see DVAs). Wet season projections are inconclusive for the region (DAFF, 2024b) – there is no widespread, clear trend towards lower annual rainfall. Increasing temperatures could lead to increased evaporation and evapotranspiration (Bastin et al, 2014) meaning that when drought does occur it is more extreme.

An increase in temperatures and evaporation can also result in an increase in soil water deficits which will influence streamflow runoff as well as groundwater recharge thresholds (McFarlane, 2015) with both processes important considerations for risk management. Pilbara hydrology is sensitive to small changes in rainfall, with drier and wetter future climate scenario modelling showing large potential change in runoff (by range of 5 to 50% change in runoff coefficients) and moderate change in groundwater recharge (range of -25% to +3%) (McFarlane, 2015). Additional relevant climate change impacts for the Kimberley are increased intensity of rainfall events and sea level rise (CSIRO, 2024).

[1] *Temperature Humidity Index Forecast and background information – Northern Australia Climate Program.*

Climate forecast tools are in development for Northern Australia, which has typically lagged in research and development (compared to higher populated southern areas). The Combined Drought Indicator (CDI) available through the Northern Australia Climate Program is an example approach for rapid assessment of drought in development.

The CDI is an impact-only assessment that can provide an indication if the region is going into, continues to be in, or is coming out of drought by viewing maps at different time scales – noting May to October is historically the dry season in the region (NACP, 2024). The CDI does not account for adaptive capacity, production or other local contextual factors.

The risk and occurrence of drought varies across the vast Kimberley and Pilbara regions, as shown by the Australian CDI:

- From March 2023 to March 2024 (see far left of Figure 10) western parts of the regions experienced moderate to extreme drought and eastern parts slight to moderate wet, while central parts had near normal conditions.
- From March 2021 to March 2024 (see far right of Figure 10), an isolated western part of the regions experienced drought, central and north of the regions had near normal conditions and eastern and central parts experienced slight to moderate wet (NACP, 2024).

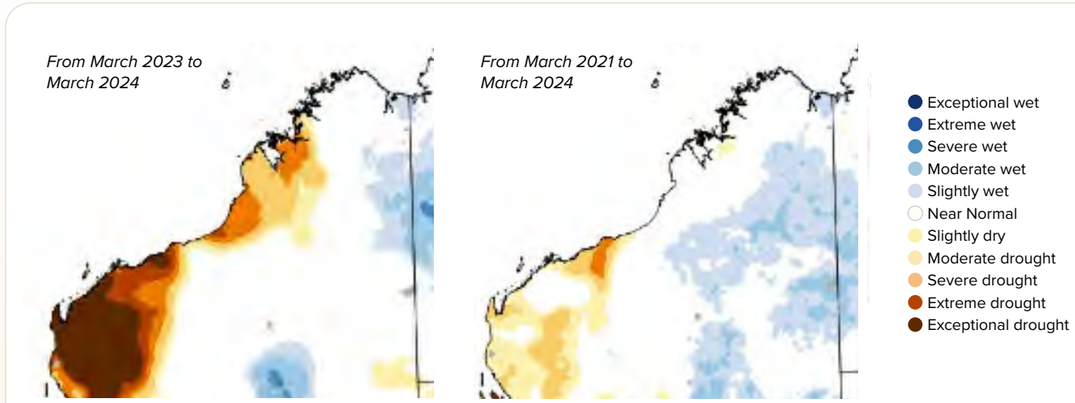



*Figure 10: Kimberley Pilbara Region Drought March 2024 at 12 and 36 months*



# Vulnerability and Resilience Assessment

This section provides a summary of the assessment outcomes from the Kimberley and Pilbara DVAs. Please refer to the DVA reports for full details.

The assessments outline the vulnerability profiles of the Kimberley and Pilbara regions, based on the 12-indicator framework used in the DVAs. While both regions share exposure to heat, variable rainfall, and reliance on natural systems, they differ in social, environmental, and economic context. These differences shape how each region experiences and responds to drought, as well as informing the focus areas and actions within this RDRP.

The results suggest that while the Pilbara demonstrates strengths in economic output and land stewardship, it faces notable challenges in areas such as housing, service access, and environmental condition, highlighting the need for place-based investments to improve social resilience and support long-term drought preparedness.

Findings suggest that while the Kimberley has valuable social and environmental foundations for resilience, particularly through strong cultural identity and natural capital, its drought resilience is constrained by limited infrastructure, variable access to essential services, and heightened vulnerability in remote communities. Addressing these gaps will be critical to improving adaptive capacity and ensuring long-term drought preparedness across the region.

Overall, given inconclusive projected change in rainfall, the two DVA reports 12 indicator assessment points show high economic resilience to drought due to the comparatively low contribution of agricultural workers and production to total regional employment and economic output.

However, high vulnerability is highlighted by the projected impact of increasing hot days, heat stress (livestock and people) and increased evaporative stress leading to more extreme soil water deficits and drought when it does occur. These impacts threaten fundamental liveability, which pose more indirect and compounding economic as well as environmental risks to both regions.

An adaptive and systems approach to understanding drought risk through a collaborative and cross-sectoral working group or similar is recommended to continue building drought resilience in the regions.

# Vulnerability and Resilience Assessment

| Vulnerability and Resilience Assessment areas | Kimberley | Pilbara |
|---|---|---|
| **Human and community**<br>(top 4 of 12 indicators in overall assessment) | ▶ In the Kimberley approximately 41% of the population identify as Aboriginal or Torres Strait Islander, compared to 3.3% in broader WA. See Figure of Domains of Common Disadvantage and Advantage, Kimberley (see Figure 11).<br>▶ Education, social support, and criminal convictions feature as high vulnerability domains for what is recognised as one of the key tourism, agriculture, cultural heritage and natural environment assets of the nation. | ▶ Access to further education and training is a documented infrastructure gap in the region, while Foundations for a Stronger Tomorrow outlines the Pilbara's assets as its globally significant resources sector and the largest regional economy in WA.<br>▶ See Figure 13 of Domains of Common Disadvantage and Advantage, Pilbara. |
| **Environment and Production**<br>(bottom 8 of 12 Drought Vulnerability indicators in overall assessment)[2] | 8 of 12 indicators used in the DVA framework relating to environment and production found High vulnerability in 2 indicators:<br>1. Change in annual hot days, and<br>2. Production risk (livestock and crop).<br>This was common to both regions. See Snapshot assessments for Kimberley and Pilbara. | |
| **Physical / Infrastructure** | ▶ Infrastructure assets identified for the Kimberley are its education and research institutions, energy infrastructure, transport infrastructure and gateway ports.<br>▶ Gaps include broadband and mobile connectivity and the capacity, connectivity and quality of road infrastructure.<br>▶ Tourism, agriculture and food, Aboriginal enterprise, and liveability of remote Aboriginal communities are infrastructure directions of the WA Government.<br>▶ WA State government has transferred responsibility for water and power to 101 Aboriginal communities in the Kimberley, guided by the Aboriginal Communities Water Services (ACWS) program and national Closing the Gap agreement. | ▶ Infrastructure assets identified for the Pilbara are its gateway ports and transport connections. Ports are located at Ashburton, Dampier, Port Hedland and Varanus Island, with Port Hedland the world's largest bulk export port.<br>▶ Infrastructure gaps identified for the Pilbara include the availability, diversity and affordability of housing and the distribution, transmission and generation of energy. The availability of water in the Pilbara is a risk factor in almost all sectors.<br>▶ WA State government has transferred responsibility for water to 26 Aboriginal communities in the Pilbara, guided by the ACWS program and national Closing the Gap agreement. |

*[2] It is noted that the DVA selected limited indicators from the broader list of potential indicators identified for more detailed or industry specific assessment.*



# Kimberley Vulnerability Assessment Insights

The Kimberley DVA reveals a region of high ecological and cultural value with emerging economic pressures. Key insights include:

- The Kimberley scores 3.5/5 on drought vulnerability—slightly higher resilience compared to Pilbara.
- Approximately 67.4% of the $2.86 billion regional value add is nature-dependent.
- Social vulnerability is higher in remote communities, particularly in Shires of Halls Creek and Derby-West Kimberley.
- The region has a strong cultural governance structure through the Kimberley Land Council, which supports integrated land and water management.

The history of Aboriginal people in the Kimberley has been described as one of resistance, adaptation and survival in the face of dramatic change (DCCEEW, 2024). While past research in WA assumes that existing vulnerabilities will be exacerbated by drought (Lester et al., 2022; Spelwinde et al. 2009) and Aboriginal Australians are also likely to be disproportionately affected by drought because of pre-existing health and social disadvantage (Stehlik et al., 1999), an asset-based view also acknowledges the wealth of culture and heritage and demonstrated resilience and adaptation.

Human and Community assessment found common domains of high disadvantage across the region shown in Figure 11, with a more detailed listing under 'Drought Risk Priority Areas' of the DVA. Note this includes domains in all areas of capital (natural, physical and human).


*Figure 11: Domains of common disadvantage and advantage, Kimberley SA2s (Source: Kimberley DVA, 2024)*

## Kimberley Drought Vulnerability Indicators

Areas of high vulnerability or impact derive from increasing hot days and production risks from both an increase in heat stress days for livestock and workers (includes humidity) and less cold days for fruit production, as well income inequality (with this found to have a negative effect on economic development).

Areas of economic resilience or low impact include a comparatively low direct exposure of agriculture workers and economic output, a sound proportion of protected land and a good and improving environmental condition score (9 out of 10 in 2023).

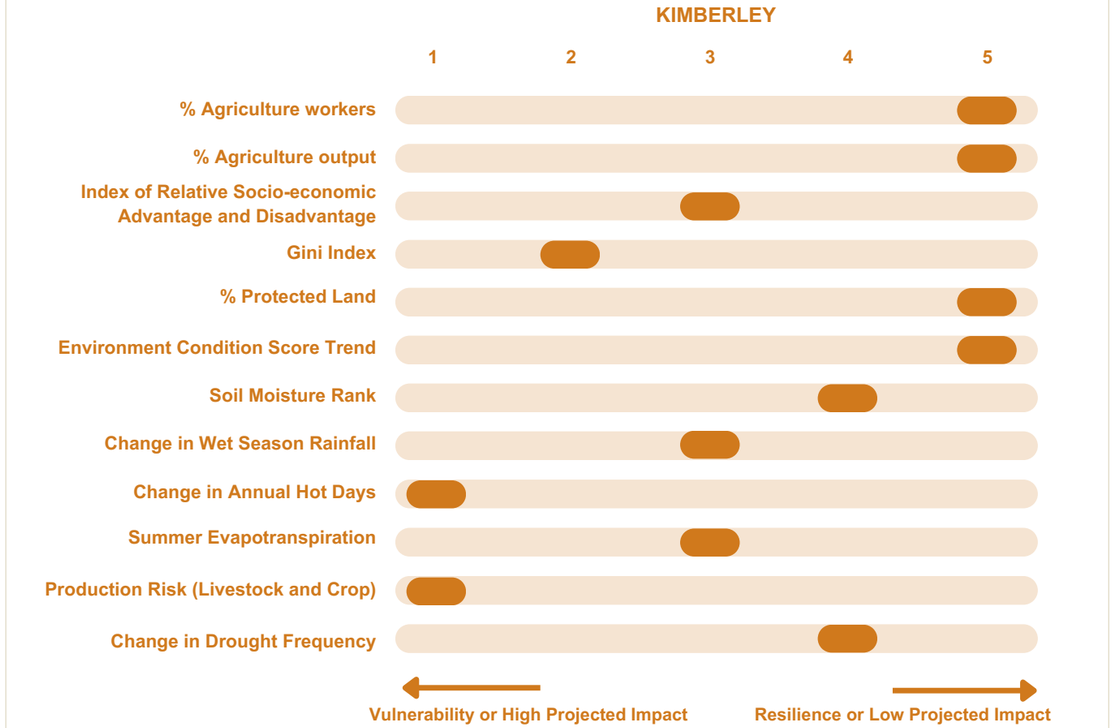



*Figure 12: Snapshot assessment using a range of indicators for the Kimberley (Source: Kimberley DVA, 2024)*

# Pilbara Vulnerability Assessment Insights

The Pilbara DVA highlights the region's exposure to extreme heat, high inter-annual rainfall variability, and dependence on nature-based industries. Key insights include:

- The Pilbara scores 3.33/5 on drought vulnerability, indicating a mix of strengths and risks.
- Over 96% of the Pilbara's $82.7 billion value add is highly or moderately dependent on nature.
- Adaptive capacity varies widely, with strengths in infrastructure and weaknesses in health and social resilience.
- Cultural, environmental and economic interdependencies are pronounced, especially for water and land use.

Overall, sectors most at risk from broader climate change in the region include agriculture, mining, small business and the services sector including transport, water services, and ports. Other services at risk include health, local government and services to remote communities. The availability of water in the Pilbara is a factor in almost all sectors.

Human and Community assessment found common domains of high disadvantage across the regions are shown below, with a more detailed listing under 'Drought Risk Priority Areas' of the DVA. Note this includes domains in all areas of capital (natural, physical and human).

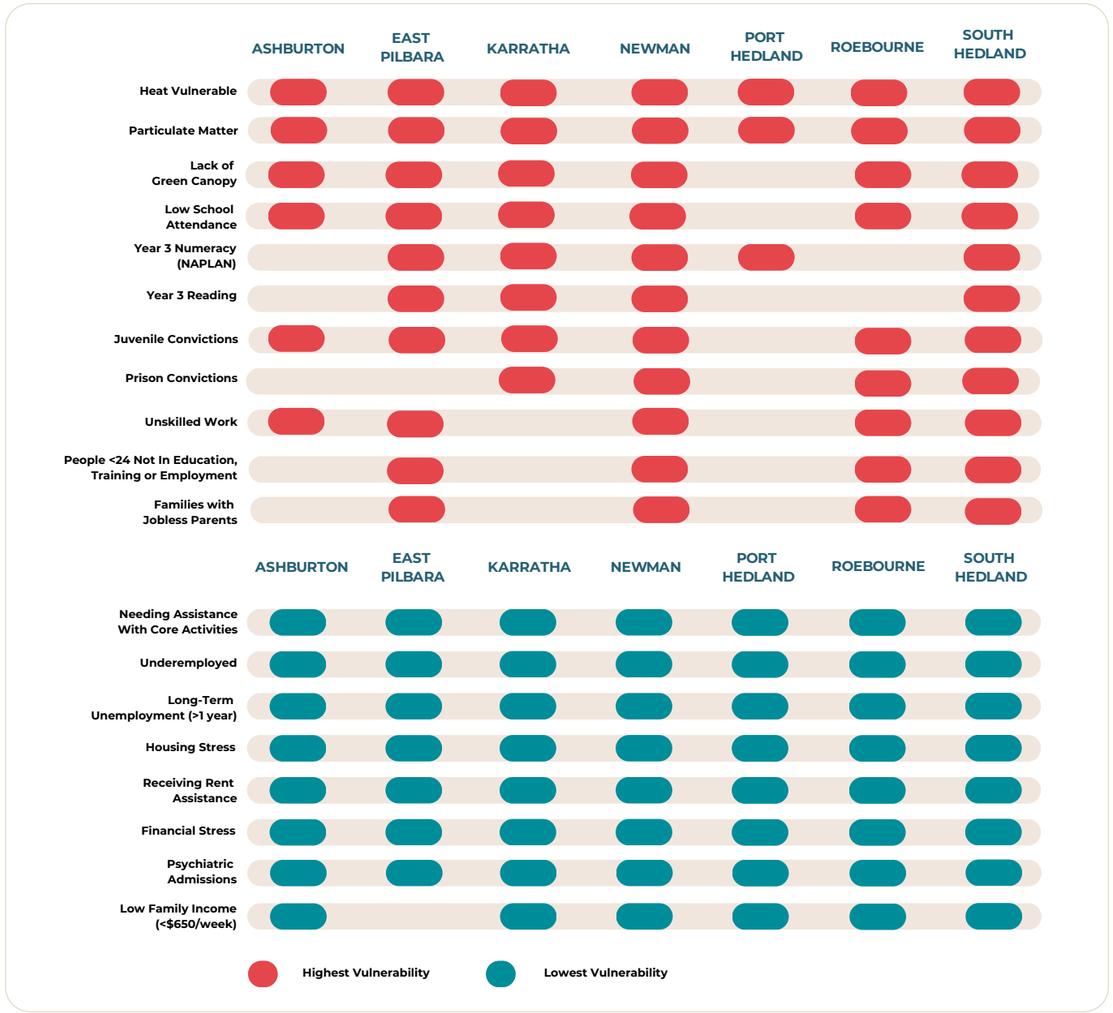



*Figure 13: Domains of common disadvantage and advantage, Pilbara SA2s (Source: Pilbara DVA, 2024)*



# Pilbara Drought Vulnerability Indicators

Areas of high vulnerability or impact derive from increasing hot days and production risks from both an increase in heat stress days for livestock and workers (includes humidity) and less cold days for fruit production. Areas of resilience or low impact include a low direct exposure of agriculture workers and economic output.

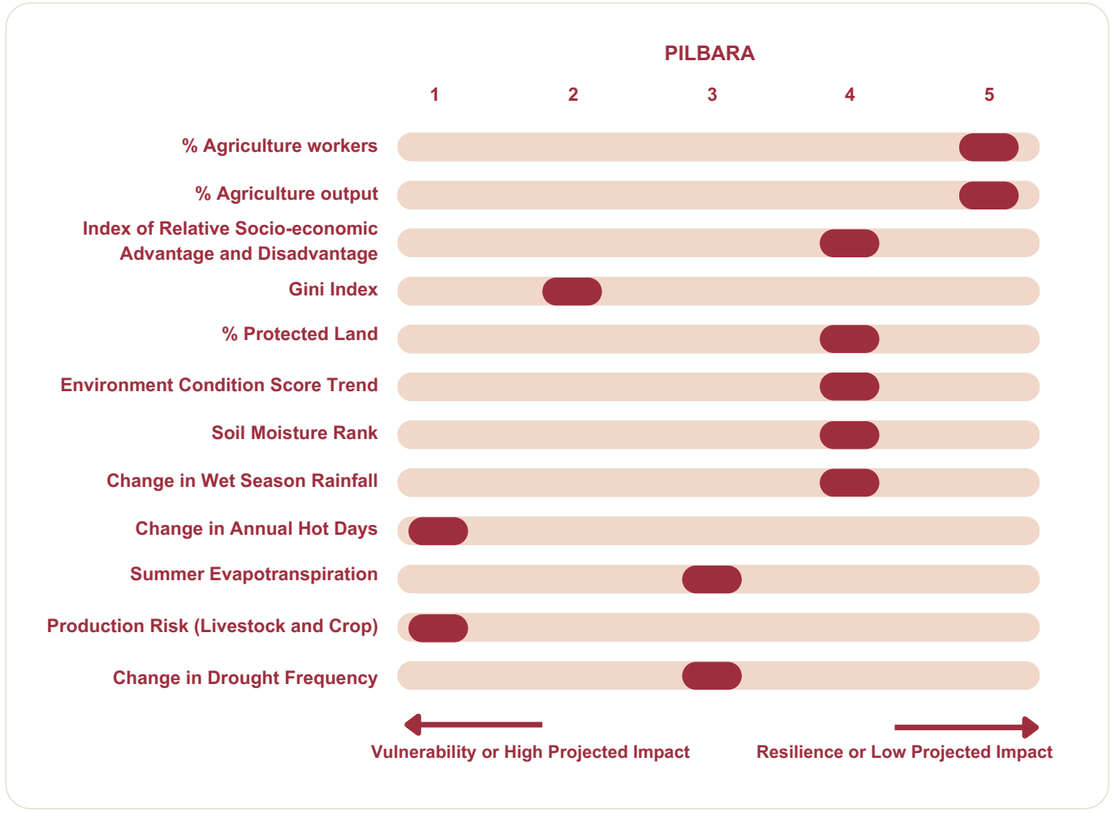



*Figure 14: Snapshot assessment using a range of indicators for the Pilbara (Source: Pilbara DVA, 2024)*

In summary, the Kimberley and Pilbara regions each face distinct drought-related challenges, shaped by their climate, social context, and economic structure. While both regions are highly exposed to heat and rainfall variability, the Kimberley's vulnerability is heightened by geographic isolation and infrastructure limitations, while the Pilbara contends with compounding pressures from intense heat, land degradation, and water scarcity. Despite these challenges, both regions possess important sources of resilience, especially in strong cultural identity, deep knowledge of Country, and emerging innovations in land and water management. Understanding these regional vulnerabilities and strengths provides a foundation for prioritising action, directing investment, and designing drought resilience strategies that are both place-based and future-focused.

# Scenario Planning

The DVAs, along with the Background and Context Reports provide an evidence base for development of this RDRP and Investment Framework. The DVAs also lay the foundation for the development of scenario planning as part of the RDRP development.

A range of areas of disadvantage and potential resilience have been identified through the RDRP process, including the potential for both exacerbated impacts for First Nations people, as well as sources of resilience in relation to adapting to country. The DVAs lay the foundation for participatory community scenario planning as part of the RDRP development, and subsequent implementation.

Scenarios are evidence-based stories about the future which can be useful to contextualise and inform operational and strategic choices. They typically identify multiple futures and therefore can assist in developing actions (such as planning, investment prioritisation, collaboration, or governance structures) required to work towards the desired state.

Scenario development for the regions is recommended for a 2050-time horizon, and the DVAs provide a basis for the current projected states of the two regions (see the Drought in the Region sections of the DVAs). Two axes of change are recommended, which could include significance of impact, degree of uncertainty or alignment with a focal question. An example of this approach can be seen in the CSIRO report *The Future of Australia's Agricultural Workforce* (Wu et al, 2019), where 2 axes of change and technology advancement and uptake across the sector were measured as limited through to substantial to produce four scenarios, see the Figure on the following page.

Another approach to scenario planning is to consider:

- one where we **Do Nothing** – where there is little change and we continue thinking, behaving, and making decisions in the region, much the same as we have in the past.
- one where we **Do More** – where we learn, adapt and modify – where we increase the intensity, scope, size or frequency of our actions. This could mean more people, more money, more often, etc.
- one where we **Do Things Differently** – where we undertake transformative change and where we move towards making systemic changes.

The transition from RDRP plan to implementation will undertake co-design of a theory of change and program logic. This process will also explore assumptions, risks and scenarios as part of the co-design process.

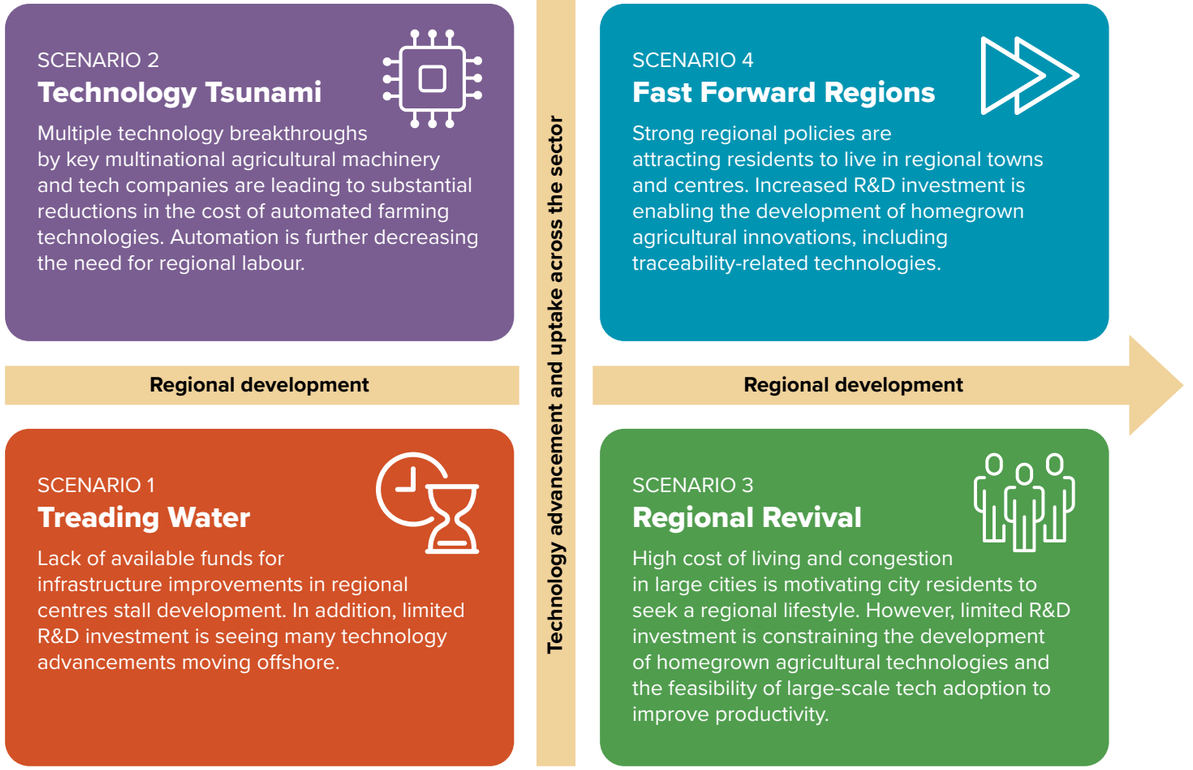



*Figure 15 Example of scenario development from The Future of Australia's Agriculture Workforce (Wu et al, 2019)*

# Stakeholder Engagement

Stakeholder engagement is a critical component of the Kimberley and Pilbara RDRP process to ensure it is a community owned and led plan. The stakeholder engagement process was planned and delivered to suit the regions' context and incorporated the views of a broad range of stakeholders.

The aim of the engagement process was to:

- Build strong stakeholder ownership of the outcomes from the process.
- Understand the core needs of the two regions' stakeholders regarding drought resilience.
- Identify potential projects for inclusion in the Kimberley and Pilbara RDRP.

A tailored 1:1 and small group interview process was used, to enable a more detailed understanding of issues and opportunities. This strategy was undertaken in person which helped to build rapport and gain firsthand observation and stronger understanding of the issues being discussed.

Stakeholders were chosen through a selection process by the PDC and KDC, consultation with the PAG, and drawing on the expertise of the consultants engaged to undertake the engagement and with other key stakeholders. Sectors important to the regions were engaged with and included agriculture, natural resource management, culture and heritage, business and economic development, tourism, social, and local and state government. The goal of the engagement was to interact with stakeholders across economic, social and environmental sectors, ensuring a comprehensive and inclusive process.

Interviews were conducted as a conversation rather than using structured interview questions. However, all conversations focused on:

- Identifying key issues regarding drought resilience
- Considering the major barriers
- Suggesting opportunities and projects for inclusion in the Kimberley and Pilbara RDRP.

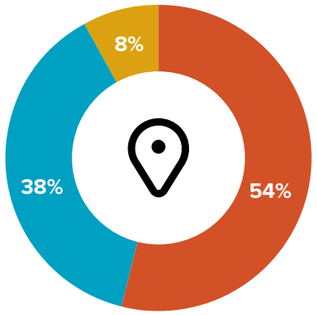
Participant views and ideas were then categorised into the RDRP focus areas and a range of time horizons (short, medium, and longer term).

A total of 87 people from 70 organisations across the Kimberley and Pilbara were interviewed between April to June 2024 (see Figure 16, 17 and Appendix A). This represented a broad range of stakeholder values, interests and perspectives with some of the larger organisational focus areas being culture and heritage, natural resource management and business and economic development (see Figure 17).

Further stakeholder engagement was undertaken throughout the planning phase, following the initial interview process. This included additional 1:1 interviews with stakeholders and technical experts, meetings, a workshop with Kimberley and Pilbara pastoralists and a tailored PAG workshop. All stakeholders consulted were also invited to participate in the public comment period.

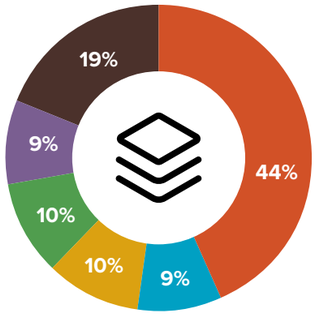


### Location of organisations



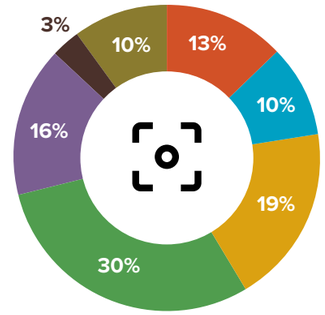

- Pilbara
- Kimberley
- Multi-region

### Types of organisations




- First Nations
- Business
- Fed & State Government
- LGAS
- NFPs
- Peak body

### Focus of organisations




- Agriculture
- Local Government
- NRM
- Culture & Heritage
- Business & Economic Development
- Tourism
- Social

*Figure 16: Location of organisations, their focus and RDRP engagement*

# First Nations Engagement

The engagement also featured a strong commitment to incorporating First Nations voices, demonstrated by a dedicated process conducted by a specialist in First Nations engagement. Engagement with First Nations groups across both regions resulted in high participation from individuals, organisations, foundations, Prescribed Body Corporates (PBCs), Ranger groups and service providers.

This focus has been carried through into the Kimberley and Pilbara RDRP, with a commitment to supporting projects that align with the Closing the Gap priority reforms of:

- Formal partnerships and shared decision making
- Building the community-controlled sector
- Transforming government organisations
- Shared access to data and information at a regional level.

Key critical insights gained from these discussions were:

- The evident knowledge gap regarding drought, drought resilience and climate change, particularly within First Nations communities and organisations.
- Several recurring themes emerged, notably centred around water management, ownership and control of water knowledge, licensing, the impacts of mining, agriculture and pastoralists on traditional lands. Concerns were voiced about the environmental consequences of these activities that are impacting the overall wellbeing of country and in turn the wellbeing of its people.
- Aboriginal Ranger programs in the Kimberley and Pilbara contribute significantly to sustainable land and fire management.

# Engagement Outcomes

Through the engagement process a range of insights were gathered, which were categorised into the five focus areas.

## Resilient Water Systems

The consultation process revealed that accessing information and monitoring groundwater supplies in the region presents several challenges. These include:

- **Isolation –** being remote and sparsely populated makes access to monitoring sites difficult.
- **Geographical and environmental factors –** understanding and mapping the complex water systems is difficult, especially without comprehensive data.
- **Data availability and gaps –** comprehensive, long-term groundwater data is scarce in many parts of the Pilbara. Monitoring programs may be inconsistent, leading to data gaps that hinder a detailed understanding of groundwater trends over time.
- **Regulatory and governance issues –** even when information is available, in some cases it is of a proprietary nature, with no legal requirement to publicly share the information.
- **Limited resources –** government and industry stakeholders face budget constraints, reducing the number and frequency of monitoring stations and studies.

There is also a greater opportunity for traditional knowledge from First Nations communities about water resources to be incorporated into formal groundwater monitoring programs.

Erosion control, soil conservation and landscape rehydration principles and practices offer a wealth of knowledge and resources on landscape-scale water conservation relevant to the Pilbara and Kimberley, particularly around roads and other linear infrastructure which concentrate runoff.

## Resilient Communities

Key challenges identified though the engagement process include:

- **Climate –** both regions experience extremely high temperatures, particularly during the summer months, which can affect comfort and health.
- **Isolation –** communities are remote, with long distances to essential services such as healthcare, education, and basic supplies.
- **Infrastructure –** road and transport links and communications are often inadequate or poorly maintained.
- **High living costs –** including groceries, housing and utilities.
- **Housing availability –** housing is expensive and limited, with shortages in rental properties and high property prices.
- **Health and wellbeing –** access to healthcare services can be limited, with fewer medical facilities and specialists available. Emergency healthcare can also be delayed due to distance.
- **Mental health –** the isolation and harsh environmental conditions can contribute to mental health issues, including stress and anxiety.
- **Community services –** access to adequate community and recreational services is limited which can impact social cohesion and quality of life.

Addressing these challenges requires a multifaceted approach involving improved infrastructure, enhanced access to services, economic diversification and community engagement.

Given the resilient nature of native and endemic plants to a region, there should be a focus on resourcing development projects that can assist the overall plan of improving an areas/community's drought readiness. This could be land restoration and mine rehabilitation projects.

## Resilient Agriculture

Pastoralists across the Kimberley and Pilbara manage significant areas of land that often varies substantially in its productive capacity. To be able to balance rising input costs with varying returns there is a need for pastoralists to sustainably utilise their most productive, high value grazing areas to increase drought resilience whilst maintaining rangeland condition.

A suite of project approaches can be used to support Kimberely and Pilbara pastoralists to improve their strategic grazing management skills and capacity, including:

- Strategic grazing management to increase drought resilience.
- Improved finishing of cattle for expanded market access and reduced reliance on rangeland pasture.
- Capability building for enhanced productivity and profitability, particularly for managers new to the region and station staff building management expertise.
- Diversification of income streams to manage risk, enhance financial stability, and adapt to a changing economic and environmental landscape.
- Strengthened connection, networks and support to exchange ideas between producers dealing with drought.

## Resilient Landscapes

Stakeholder engagement found that Aboriginal Ranger programs in the Kimberley and Pilbara contribute significantly to sustainable land and fire management. Examples shared covered four overarching aspects:

- Traditional knowledge integration.
- Biodiversity conservation.
- Cultural connection.
- Collaboration.

Two key aspects of infrastructure for resilient landscapes were highlighted in the engagement process - an increased number of weather stations and improved road and infrastructure construction to reduce erosion impacts. The engagement also revealed low capacity in the region for weed and feral animal control with contractors sourced from outside the region and interstate.

Simple resources and support mechanisms were identified that could have significant impact on landscape improvement. Using tools and products tailored to First Nations groups can significantly improve the reach and impact of landscape resilience.

## Resilient Economy

Stakeholder consultation highlighted the challenges already faced by regional and remote communities (including developing and maintaining critical infrastructure and affordable housing) are further exacerbated by the impacts of water scarcity and climate change.

Within the scope of the Kimberley and Pilbara RDRP, stakeholders identified the opportunity to improve pastoral property management and expand market access through tailored capacity building along with demonstrations and promotion of improved cattle finishing options.

It has been identified that agritourism can support economic growth of communities by diversification of income, creating jobs, and supporting local businesses and communities.

More stations are offering agritourism experiences, enabling them to diversify income streams through providing quality outback experiences beyond traditional camping. During the winter months of April to October (for most), the stations switch focus to tourism, offering guests remote outback experiences accessible to major towns and attractions. This includes a diverse range of accommodation from seasonal tents to grand old homesteads, paddock to plate dining experiences and bookable guided tours. Each Station offers a unique visitor experience on their property, whether that be their location, their approach to dining and visitor services or their focus to authentic outback touring.

There are approximately 60 stations in the Pilbara and 90 in the Kimberley. Of these, approximately 20 offer tourism experiences. Some stations are a standalone tourist destination. Importantly, stations are adding more beds in regional areas where accommodation supply and investment is constrained. Their growth is creating regional jobs and added value to regional visitor economies.

## Project Ideas

A total of 85 projects ideas were identified through the engagement process. These projects were prioritised by the PAG using the Investment Framework with five prioritisation criteria:

1. Public good
2. Impact on resilience
3. Feasibility and readiness
4. Financial sustainability
5. Stakeholder engagement

Following the prioritisation process, the resulting list of projects was further reviewed to test they were actionable, fit within the scope of the RDRP and not duplicating work already underway in the regions.

# Action Plan

Driving the Kimberley and Pilbara RDRP are key strategic actions, organised under five focus areas of water systems, communities, agriculture, landscapes and economy, but recognises that many of these themes are interconnected.

Each focus area has an outcome – where achievements are interconnected and projects that deliver against multiple outcomes are prioritised in the Investment Framework (see page 73).

## Vision

**"The Kimberley and Pilbara communities are resilient to future drought, while sustaining and enhancing our rich culture, unique landscapes and thriving economy for future generations."**

### 1. Resilient Water Systems

Resilience to future water stress is improved through water resource efficiency and conservation as well as collaborative and climate-responsive planning.

### 2. Resilient Communities

The community has the capacity to respond and recover from water-related stress, with equitable access to water sustaining healthy communities.

### 3. Resilient Agriculture

The prosperity and livelihood of pastoral and agricultural enterprises is preserved and enhanced through sustainable water management and climate adaptation measures.

### 4. Resilient Landscapes

Unique landscapes and water dependent ecosystems are protected and restored through an integration of ecology, sustainable production and Aboriginal knowledge.

### 5. Resilient Economy

A robust economy that is resilient to water scarcity and climate change and creates long-term economic opportunities for communities.

*Figure 17: RDRP Vision, Focus Areas and Outcomes*

The action plan incorporates the views and ideas captured during the stakeholder engagement process which were then prioritised through engagement with the PAG using the prioritisation criteria in the investment framework (page 73).

# Resilient Water Systems

## Outcome

Resilience to future water stress is improved through water resource use efficiency and conservation as well as collaborative and climate-responsive planning.

## Considerations

The Kimberley region experiences moderately low to moderately high annual rainfall variability from year to year. In certain months, such as March to June, this increases to extreme variability. The Pilbara region typically experiences moderate to high rainfall variability from year to year (BOM, 2020) and in certain seasons this increases to extreme variability. Tropical cyclones can contribute up to 86% of summer rainfall (DPIRD, 2021) and the Pilbara sits in the most tropical cyclone-prone region of the Australian coast (BOM, 2024b); During some months evaporation exceeds precipitation and the availability of water is a factor in almost all sectors of the economy (RDA Pilbara, 2020).

Key drivers of demand for water include mining and minerals processing, population growth, irrigated agriculture and pastoral development and clean energy production. This heightens the need for precise and timely groundwater and surface water information to ensure sustainable use. The Pilbara is renowned as being home to some of Australia's largest mining operations, which use significant amounts of groundwater for activities like dewatering, ore processing and dust suppression.

Important cultural values are frequently closely associated with both groundwater and surface water sources in the Kimberley and Pilbara. It is important these values are understood, monitored and closely considered with Traditional Owners as part of the management and development of water resources in these two regions.

Erosion control, soil conservation and landscape rehydration principles and practices offer a wealth of knowledge and resources on landscape-scale water conservation relevant to the Pilbara and Kimberley, particularly around roads and other linear infrastructure which concentrate runoff.

**Timeframe:**

S Short term  M Medium term  L Long term

## Key Actions

All water related activities should be carried out in consultation with the Department of Water and Environmental Regulation (DWER), in particular the North West Region team.

**Objective: To enhance drought resilience preparedness by improving the availability and use of accurate water data, optimizing sustainable water management practices, and ensuring equitable access to water resources.**

| | Priority | Action | Timeframe |
|---|---|---|---|
| 1.1 | Support sustainable water monitoring projects. | ▶ Engage with Jamukurnu Yapalikurnu Aboriginal Corporation to understand the support needed to deliver and complete their current groundwater monitoring project in the Western Desert and assess the opportunity to provide funding support for this final phase of the project. | S |
| 1.2 | Support water information sharing activities. | ▶ Engage with relevant ACCOs and DWER to host Water Forums which aim to share monitoring data and identify gaps, communicate current issues and deepen knowledge and understanding of the risks posed by drought and climate change.<br>▶ Identify intended outcomes and support the planning and delivery of Water Forums. | S |
| 1.3 | Support drought related projects which identify areas of cultural significance and address drought impacts. | ▶ Explore a potential pilot project in the Fortescue Catchment (Pilbara region) with interested TOs, pastoralists and mining companies, to map cultural values for water allocation and support implementation. Engage with DWER and relevant groups to scope the project, considering the need for capacity building in monitoring and reporting. | M |
| 1.4 | Strengthen regional capacity to monitor and manage water resources to protect cultural values. | ▶ Support relevant ACCOs in developing a capacity building project to train Aboriginal rangers in data collection and monitoring to maintain water resources and address drought risks. | S |
| 1.5 | Develop management practices and projects with TOs to assess the status and better understand the health of water systems on Country and address water security. | ▶ Identify interest and location for a pilot project with TOs to assess the status and better understand the health of water systems on Country and address water security. Project to include a coordinated approach, engaging a project manager, expertise of a hydrologist and development of a strategy for information sharing and management.Review project outcomes and identify options for extending across other catchments and First Nations groups. | M |
| 1.6 | Develop Environmental Management Plans (EMPs) for key catchments in each LGA to improve water management, environmental outcomes and drought preparedness. | ▶ Facilitate partnerships between LGAs, Traditional Owners, Rangelands NRM, DWER and DBCA to prioritise catchments for EMPs development and support development of EMPs for these prioritised catchments. | M |

# Resilient Communities

## Outcome

Communities have the capacity to respond and recover from water-related stress, with equitable access to water sustaining healthy communities.

## Considerations

Lifting and normalising living standards and economic development for First Nations people is a shared vision for the region. The Kimberley has the majority of WA's First Nations communities (Government of Western Australia, 2023a).

Efforts to improve liveability in the Kimberley and Pilbara regions should balance the need for economic development with the preservation of the unique environmental and cultural characteristics of these areas. Whilst many aspects of liveability are outside the direct scope of the RDRP, some initiatives can contribute to improved community drought resilience.

Climate change impacts such as extreme heat can have a greater effect on those with existing disadvantage. There are also well researched causal links between extreme heat and increased rates of assault (Mahendran et al., 2021) and domestic violence, with exposure to both heat and family violence influenced by social determinants of health (Stevens et al., 2023).

**Timeframe:**

S Short term  M Medium term  L Long term



## Key Actions

### Objective: To increase community drought resilience by improving community liveability

| | Priority | Action | Timeframe |
|---|---|---|---|
| 2.1 | Support tree planting programs in communities which enhance cooling and shading effects and liveability of towns. | ▶ Support community groups and LGAs with tree planting programs and participation in the Cooler Towns project.<br>▶ Support tree planting projects that combine with stormwater management.<br>▶ Support LGAs to participate in the Urban Greening Grant Program to maximise outcomes. | M |
| 2.2 | Support projects addressing sustainable water security. | ▶ Support feasibility study on installation of an atmospheric water generator to provide quality drinking water for the Cheeditha remote Aboriginal community (Pilbara region), as an alternative to bottled water using a water condensation system. Support further development of this project, if found feasible, including partnerships with other stakeholders (i.e. Charles Darwin University, Water Corporation). | S |

### Objective: To strengthen social connection, collaborative networks and community support systems

| | Priority | Action | Timeframe |
|---|---|---|---|
| 2.3 | Support native seed projects which maximise land restoration. | ▶ Support the development of feasibility studies, business cases and implementation of native seed projects that are closely linked to drought resilience.<br>▶ Partner with relevant Aboriginal Corporations and other stakeholders to support nurseries, native seed planting activities that contribute towards drought resilience.<br>▶ Encourage pastoralists to use native pasture species and native seeds in land management activities to restore biodiversity. | M |
| 2.4 | Support and promote projects which strengthen connection, networks and support between land managers. | ▶ Support forums, field days and events focusing on drought and personal resilience strategies.<br>▶ Support 'Keep in Touch' days to maintain connection and exchange of ideas between producers to support communities when faced with drought. | S |

# Resilient Agriculture

## Outcome

The prosperity and livelihood of pastoral and agricultural enterprises is preserved and enhanced through sustainable water management and climate adaptation measures.

## Considerations

Drought resilient pastoral business in the Kimberley or Pilbara need to integrate a variety of features and strategies to effectively manage the challenges they face to ensure long-term sustainability and productivity. Achieving this requires both strengthening the drought resilience of agribusiness, and resilient people.

Critical areas to be addressed include:

- As per McCosker et al (2021) projects ought to address people, business then land management to achieve holistic improvement.
- Support and adapt sustainable grazing practices to prevent overgrazing and to allow country to recover.
- Having a strategy for supplementary feeding, including access to quality supplements during periods of feed scarcity.
- Water infrastructure - investing in reliable and drought-proof water sources such as bores, tanks, and troughs.
- Using weather forecasts and climate data to anticipate drought conditions and make informed decisions.
- Regularly monitoring livestock condition and feed quality to make timely adjustments to management practices.
- Financial planning and management to help manage the economic impact of drought.

**Timeframe:**

S Short term  M Medium term  L Long term

## Key Actions

**Objective: To enhance drought resilience in pastoral systems by implementing strategic grazing management practices that optimise land health and sustain productivity.**

| | Priority | Action | Timeframe |
|---|---|---|---|
| **3.1** | Support pastoralists with technology-based grazing management tools and management options to support decision making when facing drought events. | ▶ Partner with relevant stakeholders to promote access to mapping tools that assist grazing management decisions and planning, establish an information sharing platform, and prepare and promote relevant case studies. | M |
| **3.2** | Support pastoralists to participate in 'whole of business' training in integrated grazing, land and business management programs, as well as market/economic diversification forums. | ▶ Promote participation in 'whole of business' management programs such as Ecologically Sustainable Rangeland Management (ESRM) Planning, and Resource Consulting Services 'Grazing for Profit' programs, as well as accessing information on emerging biodiversity market opportunities. | M |
| **3.3** | Support pastoralists to access best management grazing, land condition, nutrition and pasture assessment tools. | ▶ Support planning and delivery of workshops, webinars, events or activities focussing on knowledge and training gaps in key management topics to improve rangeland condition. | S |
| **3.4** | Support mentoring and knowledge sharing programs focussed on drought resilience. | ▶ Provide mentoring and peer-to-peer learning opportunities such as 1:1 or group events that support pastoralists to trial, share and collectively learn and adapt management approaches to improve rangelands condition (i.e. grazing management, landscape rehydration, fire management).<br>▶ Support social network building opportunities for community drought resilience. | S |

# Resilient Landscapes

## Outcome

Unique landscapes and water dependent ecosystems are protected and restored through an integration of ecology, sustainable production and Traditional Owner knowledge.

## Considerations

Sustainable fire management in the Kimberley and Pilbara regions was identified as a strong focus in the engagement process and involves navigating a complex set of issues, including:

- **Biodiversity Conservation –** balancing prevention of destructive wildfires with the protection of sensitive species and habitats.
- **Cultural Practices –** integrating traditional knowledge systems with modern fire management practices.
- **Increased Fire Frequency and Intensity –** climate change is leading to hotter and drier conditions, which can increase the frequency and intensity of fires,
- **Land Use –** overgrazing and clearing for mining operations can reduce vegetation cover and change species composition, potentially leading to more intense fires,
- **Resource allocation and coordination –** effective fire management requires resources for planning, implementation, and monitoring. Ensuring adequate funding and coordination among various stakeholders is a significant challenge.

Collaborating with First Nations people who have traditional fire management practices can enhance sustainability and improve drought resilience. Their knowledge and experience are invaluable for developing culturally appropriate and effective fire management strategies. This approach, complemented by sound community engagement practices and awareness raising about fire risks and safety can improve overall drought resilience.

Observations by Traditional Owners already include a shifting of seasonal indicators, with the drying of water sources and a shift in seasonal fruit blooming and animal breeding times (KLC, n.d.).

**Timeframe:**

S Short term  M Medium term  L Long term

## Key Actions

**Objective: To enhance drought resilience by improving fire management through stronger partnerships, First Nations knowledge and healthier ecosystems.**

| | Priority | Action | Timeframe |
|---|---|---|---|
| 4.1 | Strengthen the capacity of existing fire management groups and pastoralists in fire management. | ▶ Support fire management groups and pastoralists to deepen their knowledge of TO fire management and implementation of early season prescribed burning.<br>▶ Engage with Dampier Peninsula and Fitzroy Fire Working Groups to identify strategies to increase capacity, knowledge and resources.<br>▶ Support workshops on fire management focused on management options.<br>▶ Investigate the establishment of a Pilbara Fire Management Group. | M |
| 4.2 | Strengthen understanding of sustainable fire management practices of applicable land managers. | ▶ Create and share educational resources on strategies and tips for sustainable fire and grazing management, using knowledge gathered from Kimberley and Pilbara station owners. | S |
| 4.3 | Support projects addressing ecosystem health, sustainable water management and Aboriginal led conservation practices, which contribute to improved hydrological understanding and climate adaptation. | ▶ Prepare a feasibility study to develop a research hub dedicated to the sustainability and ecosystem regeneration of the Fitzroy River. | L |

**Objective: To support ranger programs focusing on sustainable water, fire and ecosystem management.**

| | Priority | Action | Timeframe |
|---|---|---|---|
| 4.4 | Support First Nations Ranger programs to build capacity and engagement. | ▶ Build capacity of rangers in fire and land management with a focus on drought resilience. | S |

## Key Actions (continued)

**Objective: To build drought resilience through proactive, inclusive and data-driven strategies that empower First Nations communities and pastoralists to adapt to climate risks.**

| | Priority | Action | Timeframe |
|---|---|---|---|
| **4.5** | Enable proactive, data driven adaptation to drought risk by leveraging climate monitoring and analysis. | ▶ Installation of radar and weather stations to build climate and drought resilience by providing greater opportunities for informed decision making and proactive management.<br>▶ Investigate co-investment options between BoM and mining companies in radar and weather station installation the regions.<br>▶ Collaborate with DWER North West Region on location advice to optimise co-benefits in improving river and groundwater monitoring activities and flood predictions. | M |
| **4.6** | Develop informative materials and tools on climate change for First Nations people. | ▶ Create and share a highly visual-style educational document on impacts of climate change on TO landscapes, including culturally appropriate engagement, communication and education strategies. | S |
| **4.7** | Support projects with First Nations groups which improve land condition. | ▶ Provide training, engagement and support to First Nations contracting businesses to increase knowledge and capacity in weed and feral management for the improvement of land condition. | M |
| **4.8** | Support locally led innovative, cross sector collaborative drought resilience projects focused on pastoralist empowerment. | ▶ Support the Pilbara Innovation Partnership to adopt a station-led community-driven approach to develop, test and implement sustainable drought management practices which empowers pastoralists.<br>▶ Pilbara Development Commission to support the Pilbara and Northern Gascoyne Future Drought Fund Long Term Drought Resilience Trials as a consortium member. | S |

# Resilient Economy

## Outcome

A robust economy that is resilient to water scarcity and climate change and creates long term economic opportunities for communities.

## Considerations

At least 71% of the economy in the Kimberley and Pilbara regions is considered directly highly or moderately dependent on nature – made up of 96.7% in the Pilbara and 67.4% in the Kimberley (WEF, 2020). Tourism in the Kimberley is highly reliant on the natural environment including natural experiences, indigenous tourism, heritage tourism and agritourism (EKMG, 2021). Income from tourism has also provided a substantial proportion of pastoralists' livelihood in some locations (DCCEEW, 2008).

## Key Actions

**Timeframe:**

S Short term  M Medium term  L Long term

**Objective: To strengthen adaptive capacity, foster innovation and integrate sustainable resource management across pastoral and regional communities.**

| | Priority | Action | Timeframe |
|---|---|---|---|
| **5.1** | Strengthen pastoralists capacity to anticipate, adapt to, and recover from drought through skills development, business resilience and knowledge sharing. | ▶ Provide pastoralists with intensive capacity building opportunities to improve property management which enables increased productivity and long-term drought resilience.<br>▶ Facilitate delivery of the 'Business of Farm Business' program.<br>▶ Prepare case studies and develop resources related to property management during drought and communicate to the pastoral industry. | M |
| **5.2** | Enhance LGA capacity to respond to and mitigate the impact of drought through innovative and sustainable approaches addressing water management, infrastructure and planning. | ▶ Support LGAs in implementing transformational and innovative climate change projects to improve drought resilience.<br>▶ Support LGA projects related to wastewater treatment systems and reuse or stormwater capture and reuse, irrigation practices and infrastructure. As well as vertical farming and innovative shading systems.<br>▶ Support LGA development projects through that include drought resilience in their planning. | M |

**Objective: To improve cattle finishing systems for expanded market access.**

| | Priority | Action | Timeframe |
|---|---|---|---|
| **5.3** | Reduce reliance on rangelands pastures to improve land condition and enhance drought resilience. | ▶ Promote current DPIRD pasture trials focusing on the finishing of cattle for expanded market access.<br>▶ Design and deliver farm trials, demonstrations, field days, pilot projects, study tours and discussion groups on finishing options.<br>▶ Promote the increasing range of supplements available to the northern beef industry including access to cotton seed.<br>▶ Investigate a pilot project to link East Kimberley cotton and cattle producers for the supply of cotton seed as a feed supplement. | M |

**Objective: to enhance climate resilience of tourism operators by integrating adaptive strategies.**

| | Priority | Action | Timeframe |
|---|---|---|---|
| **5.4** | Upskill tourism operators to plan and adapt operations to a changing climate. | ▶ Provide training and development for tourism operators to better understand climate predictions to plan for a viable tourism experience.<br>▶ Develop stronger linkages between chambers of commerce, tourism operators and WAITOC across Kimberley and Pilbara regions.<br>▶ Provide support for operators to gain sustainability accreditations (e.g. B Corp Certification, eco-tourism Australia) through mentoring or fee subsidies. | M |
| **5.5** | Support diversification of tourism operators to build drought resilience. | ▶ Develop a 'guide to agritourism' document aimed at pastoralists, which covers information on how to set up a station stay, including regulation requirements. Explore opportunity to partner with Tourism WA for a whole of WA document.<br>▶ Encourage Kimberley and Pilbara stations to undertake mentoring in agritourism, for example the WA Station Stay Collective, a selection of 'trade-ready' agritourism enterprises enabling the stations to diversify their income streams through providing quality outback experiences. | M |

# Implementation, Monitoring and Evaluation

This Kimberley and Pilbara RDRP is intended as a guide for action and investment in drought resilience for the Kimberley and Pilbara regions. Given the practical challenges of staff attraction, recruitment and retention, as well as the additional costs of delivery in the Kimberley and Pilbara regions, an emphasis was placed on projects that utilise existing work, information and resources wherever possible. In addition, projects that feature collaboration, co-funding and clear project leads to drive action were highly regarded. The Pilbara and Kimberley Development Commissions are the coordinating agencies for implementing the Kimberley and Pilbara RDRP at the regional/ local level.

## Implementation and Investment Framework

Implementation of the Kimberley and Pilbara RDRP will be driven by the collaborative and multidisciplinary PAG in conjunction with the Kimberley and Pilbara Development Commissions.

An Implementation Plan will be developed by the Pilbara and Kimberley Development Commissions, in collaboration with the PAG which includes prioritised actions from this Kimberley and Pilbara RDRP. These actions for implementation will be:

- delivered within an agreed timeframe.
- aim to improve drought resilience in the region's agriculture sector and/or the region's supporting communities and supply chains.
- take place within the region, or may be considered outside of the region, if the activity applies to the region (e.g. a feasibility study conducted for the region by specialist advisors outside of the region).
- deliver a demonstrated public benefit.

The process for distribution of funding for implementation will be determined by the PDC, KDC and PAG during preparation of the Implementation Plan. Activities presented for funding will be assessed against criteria focussed on the Investment Framework, and must be able to meet the following requirements:

- Must explicitly aim to improve drought resilience in the regions' agriculture sector and/or the regions' supporting communities and supply chains, in line with the guidelines.
- Must have partnerships in place and evidence the activities have not received previous funding.
- Must be able to demonstrate an expected public benefit (i.e. benefits generated by the funding must be able to be accessed and/or shared by many, rather than be captured solely by individual businesses or industries for private commercial gain).
- Must demonstrate value for money by providing evidence of cost-effectiveness, competitive pricing, quality, risk management, and long-term sustainability. This approach ensures that the selected option maximises overall benefits within budget constraints.

Further detail on the implementation process will be made available via the RDRP page on the Kimberley and Pilbara Development Commissions' websites.



The Kimberley and Pilbara RDRP has been developed with regional stakeholders to identify priority projects to build drought resilience. Many projects and activities were identified through the engagement process for inclusion in the Kimberley and Pilbara RDRP. These were prioritised by the PAG using the Investment Framework below (Figure 18):

**INVESTMENT CATEGORIES**

**Infrastructure**
Support the development and upgrade of infrastructure that addresses key issues like water availability, desalination, and irrigation development.

**Policy & Program**
Support initiatives for strategic policy and regulatory review and redesign. Invest in programs that enhance community cohesion and build capacity, improve access to safe water, and build capacity to respond to climate impacts. Focus on projects that restore landscapes, improve ecological health, and integrate Aboriginal knowledge into land and water management.

**Innovation & Research**
Invest in the development and deployment of new technologies, practices, and research initiatives that enhance drought resilience.

**PRIORITISATION CRITERIA**

**Infrastructure**
Support the development and upgrade of infrastructure that addresses key issues like water availability, desalination, and irrigation development.

**Impact on Resilience**
Prioritise investments that have the highest potential to enhance drought resilience across the region and, preferably, combine building economic, environmental and social resilience.

**Feasibility & Readiness**
Funded projects should have an identified project lead, clear timelines, available resources, risk assessment and stakeholder support.

Prioritisation should be given to projects with:

- High technical feasibility
- Cost-effectiveness
- Acceptable risk profile
- Demonstrated readiness for implementation
- Significant confirmed cash co-contribution via other partners

**Financial Sustainability**
Preference should be given to projects that can demonstrate financiall viability in the long term. In projects which address existing inequalities or vulnerable populations, viability could be demonstrated through public good or other evidence-based benefits.

**Stakeholder Engagement**
Ensure investments are informed by, and/or tightly align with, the extensive stakeholder engagement conducted during the RDRP process. Prioritise projects that have broad support from local communities, Traditional Owners, and industry groups.

**Closing the Gap**
Ensure that supported projects align with the Closing the Gap priority reforms of:

- Formal partnerships and shared decision making
- Building the community-controlled sector
- Transforming government organisations
- Shared access to data and information at a regional level

**Monitoring & Evaluation**
Projects must have clear metrics to assess the performance of investments in terms of their contribution to drought resilience. MEL Plan hould be provided with specific indicators aligned with the in relevant RDRP outcomes, data collection methods and evaluation timeline.

**Adaptive Management**
This framework adopts an adaptive management approach that allows for adjustments to the investment strategy based on ongoing monitoring of funded projects, stakeholder feedback, and changing contextual conditions.

*Figure 18: Investment Framework*

# Monitoring and Evaluation

## Approach

The FDF approach to Monitoring, Evaluation and Learning (MEL) has been adopted for the Kimberley and Pilbara RDRP and is represented in Figure 19. As part of the implementation process, a Theory of Change approach will underpin MEL planning.

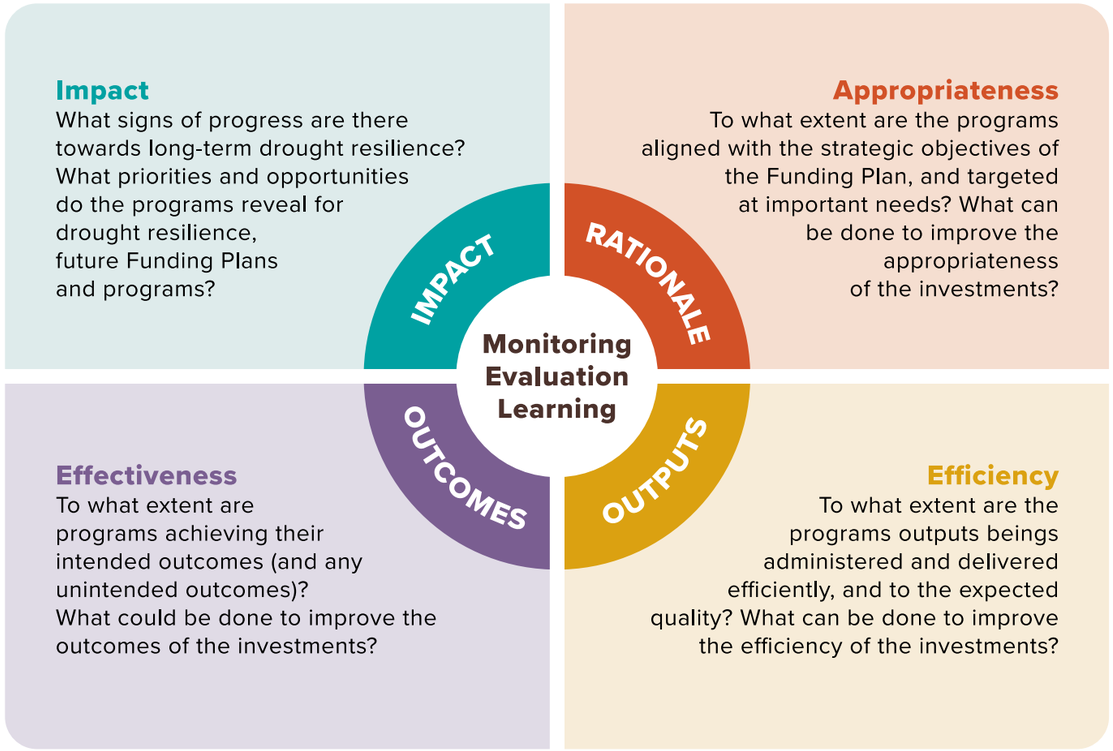



*Figure 19: Monitoring, Evaluation and Learning*

The Kimberley and Pilbara RDRP aims to support the regions to:

- Build economic, environmental and social resilience to future droughts.
- Be in a stronger position to adapt to climate change.
- Form stronger connections and networks within and between regions.
- Apply best practice data and information to make better decisions.

To ensure its effectiveness and for ongoing adaptive management of the Kimberley and Pilbara RDRP, a strong monitoring, evaluation and learning cycle is needed.

The Kimberley and Pilbara RDRP integrates actions across five focus areas, with governance (PAG), monitoring and evaluation, and stakeholder engagement processes working across all components. For example, land restoration (Landscape) also supports cultural resilience (Social) and economic opportunity (Economic). Integration is supported through the grant process and assessment criteria, which consider multiple resilience domains and stakeholder perspectives.



The following table (Figure 20) describes how governance, MEL, stakeholder input, and actions work together across the Kimberley and Pilbara RDRP through Theory of Change. It demonstrates how each action supports multiple dimensions of resilience and reinforces its alignment with the FDF's definition of resilience.

| Action/ Focus Area | Resilience Domain | Expected Outcome | MEL Indicator Example | Social Resilience | Economic Resilience | Environ-mental Resilience | Cross-cutting Outcome |
|---|---|---|---|---|---|---|---|
| Water Systems – Groundwater monitoring | Environmental | Improved water data for decision-making and cultural protection | Increase in shared groundwater data use | Yes | No | Yes | Improved planning, cultural water stewardship |
| Communities – Urban greening projects | Social | Cooler towns, improved liveability, community cohesion | Tree canopy coverage, wellbeing survey scores | Yes | Yes | Yes | Cooler towns, liveability, jobs, wellbeing |
| Agriculture – Agritourism mentoring | Economic | Diversified income streams and local employment | Number of agritourism businesses started | Yes | Yes | No | Diversification of income, regional pride |
| Landscapes – Native seed planting | Environmental + Social | Restored land, stronger cultural connections, jobs in revegetation | Hectares restored, community engagement metrics | Yes | Yes | Yes | Land restoration, cultural reconnection, revegetation jobs |
| Economy – Support for climate adaptation business | Economic + Social | Increased adaptive capacity of regional enterprises | Uptake of climate adaptation measures | Yes | Yes | No | Business adaptation, regional economic resilience |

*Figure 20: Relationship between Focus Areas and Social, Economic and Environmental Resilience*

## Key Evaluation Questions

The key evaluation questions for the Kimberley and Pilbara RDRP are:

1. To what extent has the Kimberley and Pilbara RDRP been implemented and has impacted on the regional stakeholders' capacity and resources to better plan, manage and recover from climate challenges?
2. What changes/support are needed to ensure that the Kimberley and Pilbara RDRP best provides an effective framework for action and stakeholders can effectively work together towards implementing those actions?

### Assumptions underpinning the implementation of the Kimberley and Pilbara RDRP

The FDF MEL plan identified the following assumptions for the Kimberley and Pilbara RDRP to be effectively implemented.

Key assumptions affecting outcomes from 1–2-years:

- Regional stakeholders have the capacity and capability to participate in strategic planning.
- Regional stakeholders are willing to cooperate with each other on regional planning.
- Program design is sufficient to give regional stakeholders opportunities to identify and communicate regional drought resilience needs.
- Relevant planning at other scales can be aligned.
- Regional communities are motivated to take ownership of completed plans and actively seek to implement them.
- Communities are willing to share learnings with other regions.
- There are sufficient learnings to inform future program design.

Key assumptions affecting outcomes from 2+ years:

- Supporting consortia of local governments/ stakeholders representing a region will result in changes in practice through those regions.
- There are sufficient opportunities for regions to implement elements of plans.
- Plans contain implementable activities to build drought resilience across Australia.
- Regions continue to review, update and implement their plans.

These assumptions will need to be monitored during the implementation phase to provide feedback and highlight areas that require further intervention.

### MEL Data Collection Methods

The Kimberley and Pilbara RDRP will employ a comprehensive data collection strategy, incorporating both qualitative and quantitative methods. Data will be gathered at predetermined intervals and integrated into a collaborative process of planning, analysis, and review. This will involve utilising a combination of surveys, interviews, focus groups, and case studies to provide a rich and nuanced understanding of the program's impact. By carefully balancing these approaches, we aim to capture a comprehensive picture of the program's effectiveness and identify areas for improvement.



# Table of Figures

# References


ABS (2023). Data by Region: Kimberley, East Pilbara, West Pilbara SA3s. Estimated resident population for 2023 used. Jobs in Australia data used. Retrieved from: https://dbr.abs.gov.au/index.html

AIHW (2011). Health and the environment: a compilation of evidence. Australian Institute of Health and Welfare. Cat. no. PHE 136. Canberra: AIHW. Retrieved from: https://www.aihw.gov.au/reports/environment-and-health/health-environment-compilation-of-evidence/summary

ALA (2023). Spatial Portal, Atlas of Living Australia. Retrieved from: https://www.ala.org.au/

Anderton, L. (2022). The economic impacts of drought. A report for Regional Drought Resilience Planning 2022.

ANU (2024). Australia's Environment Explorer: Soil Moisture – 2023 (Rank). Retrieved from: https://ausenv.tern.org.au/aex/#/2023/Soil_moisture/Region/Rank/Local_Government percent20Areas/bar,options/-21.38/121.50/6/Karratha percent20(C)/Roadmap/Opaque

Aqueduct (2024). Water Risk Atlas. Retrieved from: https://www.wri.org/applications/aqueduct/water-risk-atlas/#/?advanced=false&basemap=hydro&indicator=w_awr_def_tot_cat&lat=30&lng=-80&mapMode=view&month=1&opacity=0.5&ponderation=DEF&predefined=false&projection=absolute&scenario=optimistic&scope=baseline&threshold&timeScale=annual&year=baseline&zoom=3

Aslin H. & Russell J. (2008). Social impacts of drought: review of literature. Bureau of Rural Sciences, Canberra. Retrieved from: www.agriculture.gov.au

Australian Government (2023). Understanding regional data: Industry. Department of Infrastructure, Transport, Regional Development, Communications & The Arts. March 2023. Retrieved from: https://www.infrastructure.gov.au/sites/default/files/documents/bcarr-understanding-regional-data-industry-march2023.pdf

Australian Government (2024). Future Drought Fund: Drought Resilience Funding Plan 2024-2028) Determination 2024 and Explanatory Statement. Retrieved from: https://www.legislation.gov.au/F2024L00150/asmade/downloads

Bastin G, Stokes C, Green D and Forrest K. (2014) Australian rangelands and climate change – pastoral production and adaptation. Ninti One Limited and CSIRO, Alice Springs.

BoM (2020). Rainfall Variability Map: Annual, 1900-2019, Australian Bureau of Meteorology, Issued 28/07/2020. Retrieved from: http://www.bom.gov.au/climate/maps/averages/rainfall-variability/?period=an

BoM (2024a). Climate Data Online (selected station locations listed). Bureau of Meteorology. Retrieved from: http://www.bom.gov.au/climate/data/

BOM (2024b). Tropical cyclone climatology. Bureau of Meteorology. Retrieved from: http://www.bom.gov.au/cyclone/tropical-cyclone-knowledge-centre/history/climatology/

Campbell, A., Alexandra, J., Curtis, D. (2017). Reflections on four decades of land restoration in Australia. The Rangeland Journal 39, 405-416. https://doi.org/10.1071/RJ17056Commonwealth of Australia (2022). Ramsar Sites Australia, DCCEEW. Retrieved from: https://www.dcceew.gov.au/sites/default/files/documents/ramsar-sites-australia.pdf

CSIRO (2009), Water in Northern Australia: Summary of reports to the Australian Government from the CSIRO Northern Australia Sustainable Yields Project, CSIRO, Australia in Government of Western Australia, 2010.

CSIRO (2024). Climate Change in Australia: Projections – North Rangelands. Retrieved from: https://www.climatechangeinaustralia.gov.au/en/projections-tools/regional-climate-change-explorer/sub-clusters/?current=RLNC&tooltip=true&popup=true

Curtin University (2023). Pilbara Water Resources: Background Review of Publicly Available Information for Water Resources Situational Analysis. Retrieved from: https://storymaps.arcgis.com/stories/d094bb09545a40a0bddfadc3ec3621a4

DAFF (2021). Drought Resilience Adoption and Innovation Hubs. Australian Government. Retrieved from: https://www.agriculture.gov.au/agriculture-land/farm-food-drought/drought/future-drought-fund/research-adoption-program/adoption-innovation-hubs

DAFF (2023). ABARES – Drought Resilience. Australian Government: Department of Agriculture, Fisheries and Forestry. Retrieved on 9/4/2025 from: https://www.agriculture.gov.au/abares/research-topics/climate/drought/resilience

DAFF (2024a), ABARES – Australian Agricultural Census 2020-21 visualisation – LGA. Australian Government: Department of Agriculture, Fisheries and Forestry. Retrieved from: https://www.agriculture.gov.au/abares/aclump/land-use/agriculture-census-dashboards-lga

DAFF (2024b). Drought Resilience Adoption and Innovation Hubs. Department of Agriculture, Fisheries and Forestry. Retrieved from: https://www.agriculture.gov.au/agriculture-land/farm-food-drought/drought/future-drought-fund/research-adoption-program/adoption-innovation-hubs

DAFF (2024c). National Soil Strategy. Retrieved on 10/4/2025 from: https://www.agriculture.gov.au/agriculture-land/farm-food-drought/natural-resources/soils

DAFF (2025). Future Drought Fund. Australian Government. Retrieved on 9/4/2025 from: https://www.agriculture.gov.au/agriculture-land/farm-food-drought/drought/future-drought-fund

DAWE (2020a). Northern Australia Biosecurity Strategy 2030. Northern Australia Biosecurity Framework Reference Group. Department of Agriculture, Water and the Environment. Retrieved from: https://www.agriculture.gov.au/sites/default/files/documents/Northern%20Australia%20Biosecurity%20Strategy%202030.pdf

DAWE (2020b). Future Drought Fund. Monitoring, Evaluation and Learning Framework. Retrieved from: https://www.agriculture.gov.au/sites/default/files/documents/mel-framework.pdf

DBCA (2023). Threated Ecological Communities, updated 23 Nov 2023. Retrieved from: https://www.dbca.wa.gov.au/wildlife-and-ecosystems/threatened-ecological-communities/list-threatened-ecological-communities

DBCA (2024). Aboriginal Ranger Program. Department of Biodiversity, Conservation and Attractions. Retrieved from: https://www.dbca.wa.gov.au/management/aboriginal-engagement/aboriginal-ranger-program

DCCEEW (2008). Rangelands 2008 Taking the Pulse: Pilbara Bioregion. Retrieved from: https://www.dcceew.gov.au/sites/default/files/env/resources/a8015c25-4aa2-4833-ad9c-e98d09e2ab52/files/bioregion-pilbara.pdf

DCCEEW (2008b). Rangelands 2008 Taking the Pulse: Central Kimberley Bioregion. Retrieved from: https://www.dcceew.gov.au/sites/default/files/env/resources/a8015c25-4aa2-4833-ad9c-e98d09e2ab52/files/bioregion-central-kimberley.pdf

DCCEEW (2008c). Rangelands 2008 Taking the Pulse: Northern Kimberley Bioregion. Retrieved from: https://www.dcceew.gov.au/sites/default/files/env/resources/a8015c25-4aa2-4833-ad9c-e98d09e2ab52/files/bioregion-northern-kimberley.pdf

DCCEEW (2023). Australia's bioregions (IBRA). Department of Climate Change, Energy, the Environment and Water. 14 July 2023. Retrieved from: https://www.dcceew.gov.au/environment/land/nrs/science/ibra

DCCEEW (2024a). Indigenous Protected Areas National Map: August 2024. Department of Climate Change, Energy, the Environment and Water. Retrieved from: https://www.dcceew.gov.au/sites/default/files/documents/ipa-national-map.pdf

DCCEEW (2024b). Australia's Strategy for Nature 2024-2030. Retrieved 10/4/2025, from https://www.dcceew.gov.au/environment/biodiversity/conservation/strategy

Department of Agriculture (2019). Australian Government Drought Response, Resilience and Preparedness Plan. Canberra. November. Retrieved on 9/4/2025 from: https://www.agriculture.gov.au/sites/default/files/documents/aust-govt-drought-response-plan_0.pdf

Destination Pilbara (2024). Destination Pilbara: Powered by Nature. Retrieved from: https://destinationpilbara.com.au/

DEMIRS (2023). WorkSafe SmartMove Knowledge. Outdoor workers: Working safely in the sun and heat. Western Australian Government. Retrieved from: https://smartmove.safetyline.wa.gov.au/wp-content/uploads/SM-Outdoor-Workers-study-guide-2023-2.pdf

DEMIRS (2024). Royalty Receipts by Region Financial Year (Kimberley and Pilbara). Retrieved from: https://www.dmp.wa.gov.au/about-us-careers/latest-statistics-release-4081.aspx

Department of Water (2010). Reservoir simulations in the Ord River catchment, Western Australia. Department of Water. Retrieved from: https://www.wa.gov.au/system/files/2022-10/Reservoir-simulations-in-the-Ord-River-catchment.pdf

DPIRD (2021). Climate change in the Pilbara region of Western Australia. Department of Primary Industries and Regional Development. Retrieved from: https://www.agric.wa.gov.au/climate-change/climate-pilbara-region-western-australia

DPIRD (2023). Climate change and the pastoral industry in Western Australia. Department of Primary Industries and Regional Development. Published 14 April 2023. Retrieved from: https://www.agric.wa.gov.au/climate-change/climate-change-and-pastoral-industry-western-australia

DPLH (2022). Pastoral land lessee information and compliance. Department of Planning, Lands and Heritage. Retrieved from: https://www.wa.gov.au/government/document-collections/pastoral-land-lessee-information-and-compliance

DPLH (2023). Pastoral land and leases. Department of Planning, Lands and Heritage. Retrieved from: https://www.wa.gov.au/organisation/department-of-planning-lands-and-heritage/pastoral-land-and-leases

DWER (2024). Groundwater allocation plans - North West region. Retrieved from: https://www.wa.gov.au/service/natural-resources/water-resources/water-allocation-plans-north-west-region

EKMG (2021). East Kimberley Tourism Plan 2025. Shire of Wyndham-East Kimberley and East Kimberley Marketing Group. Retrieved from: https://www.swek.wa.gov.au/Profiles/swek/Assets/ClientData/East_Kimberley_Tourism_Plan_2025.pdf

Government of Western Australia (2010). Kimberley Regional Water Plan 2010-2030. Retrieved from: https://acrobat.adobe.com/id/urn:aaid:sc:AP:d80f3407-c116-48fd-a64c-c716043dfd-1b?viewer%21megaVerb=group-discover

Government of Western Australia (2010a). Pilbara Regional Water Plan 2010-2030.

Government of Western Australia (n.d.) Managing Water from the Ord River. Retrieved from: https://www.wa.gov.au/system/files/2022-07/Managing-water-from-the-Ord-River.pdf

Government of Western Australia (2022). Foundations for a Stronger Tomorrow: State Infrastructure Strategy. Retrieved from: https://prod-iwa-public-files.s3.ap-southeast-2.amazonaws.com/public/2022-07/strategy_download/2022%20Final%20SIS.pdf

Government of Western Australia (2023a). Remote Aboriginal communities. Retrieved from: https://www.wa.gov.au/organisation/department-of-communities/remote-aboriginal-communities

Government of Western Australia (2023c). Pilbara groundwater allocation plan. Page last updated January 2023. Retrieved from: https://www.wa.gov.au/service/natural-resources/water-resources/pilbara-groundwater-allocation-plan

Government of Western Australia (2024). Map: Native Title Determination LGATE-066. Retrieved from: https://catalogue.data.wa.gov.au/dataset/native-title-determination-lgate-066 last updated 1 August 2024

Hanigan IC, Butler CD, Kokic PN, Hutchinson MF. (2012) Suicide and drought in New South Wales, Australia, 1970-2007. Proc Natl Acad Sci U S A. 2012 Aug 28;109(35):13950-5. doi: 10.1073/pnas.1112965109. Epub 2012 Aug 13. PMID: 22891347; PMCID: PMC3435226. Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3435226/

IMF (2017). A New Twist in the Link Between Inequality and Economic Development. International Monetary Fund, Blog. Retrieved from: https://www.imf.org/en/Blogs/Articles/2017/05/11/a-new-twist-in-the-link-between-inequality-and-economic-development

IUCN (2024). Commission on Ecosystem Management. Restoring ecosystems to reduce drought risk: Nature-based Solutions for drought. Gland, Switzerland: International Union for Conservation of Nature. Retrieved from: https://iucn.org/resources/publication/restoring-ecosystems-reduce-drought-risk

KC (2023). Residential Housing and Land Snapshot. Kimberley Development Commission. Retrieved from: https://www.kdc.wa.gov.au/wp-content/uploads/2023/11/Kimberley-Land-and-Housing-Snapshot-Final-Version.pdf

KDC (2024). Kimberley Development Commission Strategic Plan 2024-26. Kimberley Development Commission. Retrieved from: https://www.kdc.wa.gov.au/wp-content/uploads/2024/04/KDC-Strategic-Plan-2024-26.pdf

KLC (2024). Kimberley Land Council website. Retrieved from: https://www.klc.org.au/

Kimberley Land Council (nd). Valuing Indigenous People in Climate Change – Nolan Hunter. Retrieved from: https://static1.squarespace.com/static/59fecece017db2ab70aa1874/t/5c736927c83025124243c322/1551067438077/Nulungu+lecture_final.pdf

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

Mahendran, R., Rongbin, X., Shanshan, L., Yuming G. (2021). Interpersonal violence associated with hot weather. The Lancet: Volume 5, Issue 9e571-e572September 2021. Retrieved from: https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00210-2/fulltext

Peel, M., Finlayson, L &, T. A. Mcmahon, (2007). Updated world map of the Köppen-Geiger climate classification. Hydrology and Earth System Sciences Discussions, 2007, 4 (2), pp.439-473. Retrieved from: https://hal.science/file/index/docid/298818/filename/hessd-4-439-2007.pdf

Mastrantonis, S. (2022). Defining Drought in Western Australia. Centre for Crop and Disease Management, School of Molecular and Life Science, Curtin University, Bentley, WA. April 2022.

McCosker, T.H., Richardson, P., Curcio, A., Davidson, B. (2021). Grazing Systems - Recent Findings Australia. NRM in the Rangelands: Shaping our Future. Available at: https://www.rcsaustralia.com.au/wp-content/uploads/Grazing-systems-%E2%80%93-Recent-Findings-in-Australia-2022.pdf

McFarlane, D. (2015) Pilbara WRA Whole of Pilbara Factsheet. CSIRO website: CSIRO; 2015. CSIRO:EP157490. https://doi.org/10.5072/83/5849a2c9dfa54

NACP (n.d.). Climate Savvy for Grazing Management: Kimberley and Pilbara. Northern Australia Climate Program: MLA, USQ, Qld Government. Retrieved from: https://nacp.org.au/static/regional_guides/Regional%20Guide%20-%20Kimberley%20&%20Pilbara.pdf

NACP (2024). Drought Monitor. Northern Australia Climate Program. Retrieved from: https://www.nacp.org.au/drought_monitor

NIAA (2024). Indigenous Rangers Program. Australian Government: National Indigenous Australians Agency. Retrieved from: https://www.niaa.gov.au/our-work/environment-and-land/indigenous-rangers

Northern Hub (2023). Drought Projects. Retrieved from: https://northernhub.au/

OAG (2021). Delivering Essential Services to Remote Aboriginal Communities – Follow-up. Western Australian Auditor General's Report. Retrieved from: https://audit.wa.gov.au/wp-content/uploads/2021/05/Report-25_Delivering-Essential-Services-to-Remote-Aboriginal-Communities-–-Follow-up.pdf

PDC (2023). Strategic Plan 2023-25. Pilbara Development Commission. Retrieved from: https://www.pdc.wa.gov.au/Profiles/pdc/Assets/ClientData/PDC_StrategicPlan_2023-2025_SCREEN_Singles.pdf

Rafferty, F. (2021). The road to Jigalong: an exploration into the effect of altered landscapes in the Pilbara on place-identity. Thesis for Master of Philosophy, Curtin University. December 2021. Retrieved from: https://espace.curtin.edu.au/bitstream/handle/20.500.11937/86764/Rafferty percent20F-percent202021.pdf?sequence=1&isAllowed=y

RDA Pilbara, (2021). Strategic Plan 2021/22-2023/24. Retrieved from: https://www.rdapilbara.org.au/_files/ugd/c14dc8_ad9b335c5f254d6eb1cdb003496be9cf.pdf

REMPLAN, (2024). Community and Economy Profiles. Retrieved from: https://app.remplan.com.au/pilbararegion/economy/summary?state=WZPpFw0lPl7owpXCnE1dORtYh2hplq

Rigby CW, Rosen A, Berry HL, Hart CR. (2011) If the land's sick, we're sick the impact of prolonged drought on the social and emotional well-being of Aboriginal communities in rural New South Wales. Aust J Rural Health. 2011 Oct;19(5):249-54. doi: 10.1111/j.1440-1584.2011.01223.x. PMID: 219333

Shelter WA (2021). Housing the hot topic in Port Hedland. Retrieved from: https://www.shelterwa.org.au/housing-the-hot-topic-in-port-hedland/

Shelter WA (2022). Shelter WA in Broome. Retrieved from: https://www.shelterwa.org.au/shelter-wa-in-broome/

Shelter WA (2023). Kimberley regional engagement trip. Retrieved from: https://www.shelterwa.org.au/kimberley-regional-engagement-trip/

Soils For Life (2025). Retrieved from: https://soilsforlife.org.au/

Spelwinde, Peter C.; Angus Cook; Peter Davies; Philip Weinstein. (2009). A relationship between environmental degradation and mental health in rural Western Australia. Health & Place 15(3): 880-887. Retrieved from: https://pubmed.ncbi.nlm.nih.gov/19345135/

Stevens, H., Beggs, P. and Graham, P (2023). As the temperature rises, so do rates of domestic violence. RACGP. 12 Dec 2023. Retrieved from: https://www1.racgp.org.au/newsgp/clinical/as-the-temperature-rises-so-do-rates-of-domestic-v

Tanton, R., Dare, L., Miranti, R., Vidyattama, Y., Yule, A. and McCabe, M. (2021). Dropping Off the Edge 2021: Persistent and multilayered disadvantage in Australia, Jesuit Social Services: Melbourne. Retrieved from: https://www.dote.org.au/s/WA_final.xlsx

Taylor, M. & Poelina, A. (2021). Living Waters, Law First: Nyikina and Mangala water governance in the Kimberley, Western Australia. Australasian Journal of Water Resources, 25(1), 40–56. https://doi.org/10.1080/13241583.2021.1880538

TERN (2023). Australia's Environment 2022 Report. ANU and TERN. Retrieved from: https://www.tern.org.au/australias-environment-in-2022/

Tozer P & J Leys. (2013). Dust storms – what do they really cost? The Rangeland Journal 35: 131-142. Retrieved from: https://www.publish.csiro.au/rj/Fulltext/rj12085

UNCCD (2019). United Nations Convention to Combat Desertification. Drought Resilience, Adaptation and Management Policy (DRAMP) Framework: Technical Guidelines. Bonn: UNCCE Secretariat. Retrieved from: https://www.unccd.int/sites/default/files/relevant-links/2019-09/190906%20UNCCD%20drought%20resilience%20technical%20guideline%20EN.pdf

Stanley, P. L., Wilson, C., Patterson, E., Machmuller, M. B., & Cotrufo, M. F. (2024). Ruminating on soil carbon: Applying current understanding to inform grazing management. Global change biology, 30(3), e17223. https://doi.org/10.1111/gcb.17223

UNESCO (2024). Purnululu National Park. UNESCO World Heritage Centre. Retrieved from: https://whc.unesco.org/en/list/1094

UNESCO (2020). Murujuga Cultural Landscape. UNESCO World Heritage Centre. Retrieved from https://whc.unesco.org/en/tentativelists/6445/

Water Corporation, (2024). Climate and the North West. Retrieved from: https://www.watercorporation.com.au/Our-water/Climate-change-and-WA/Climate-and-the-North-West

Water Corporation, (2024a). Aboriginal Communities Water Services. Retrieved from: https://www.watercorporation.com.au/Outages-and-works/Ongoing-Works/Aboriginal-Communities-Water-Services

WEF, (2020). Calculated for Kimberley and Pilbara based on the findings of: Nature Risk Rising. World Economic Forum. Retrieved from: https://www.weforum.org/publications/nature-risk-rising-why-the-crisis-engulfing-nature-matters-for-business-and-the-economy/

Wysong Michael, Legge Sarah, Clark Alex, Maier Stefan, Bardi Jawi Rangers, Nyul Nyul RangersH, Yawuru Country Managers A, Cowell Stuart, Mackay Grey (2022) The sum of small parts: changing landscape fire regimes across multiple small landholdings in north-western Australia with collaborative fire management. International Journal of Wildland Fire 31, 97-111.

Wu, W., Dawson, D., Fleming-Muñoz, D., Schleiger, E., & Horton, J. (2019). The future of Australia's agricultural workforce. CSIRO Data61, Canberra, Australia. Retrieved from: https://www.researchgate.net/publication/355770042_THE_FUTURE_OF_AUSTRALIA'S_AGRICULTURAL_WORKFORCE_Report_prepared_by_Australia's_Innovation_Catalyst_CITATION_COPYRIGHT_AND_DISCLAIMER

# Appendix A: List of Stakeholder Engagement Participants

The following organisations were engaged in the development of this RDRP.

| Organisation | Category | Region | Sector |
|---|---|---|---|
| Australia's North West | Peak Body / Member Group | Multi-region | Tourism |
| Broome Chamber of Commerce and Industry | Peak Body / Member Group | Kimberley | Economic Development |
| Cambridge Gulf Limited | Business | Kimberley | Economic Development |
| Care for Hedland | Community | Pilbara | Environmental |
| Dambimangari Aboriginal Corporation | Aboriginal Org | Kimberley | NRM |
| Department of Biodiversity, Conservation and Attractions | State Government | Multi-region | Government |
| Department of Energy, Mines, Industry Regulation and Safety | State Government | Pilbara | Government |
| Department of Primary Industries and Regional Development | State Government | Multi-region | Government |
| Department of Water and Environmental Regulation | State Government | Pilbara | Government |
| East Kimberley Chamber of Commerce & Industry | Peak Body / Member Group | Kimberley | Economic Development |
| Emama Nguda Aboriginal Corporation | Aboriginal Org | Kimberley | Agriculture |
| Empowered Communities East Kimberley - backbone organisation Binarri-binyja yarrawoo (BBY) | Peak Body / Member Group | Kimberley | Social |
| Gelganyem Group | Aboriginal Org | Kimberley | Culture & Heritage |
| Gobawarrah Yinhawangka Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| IBN | Aboriginal Org | Pilbara | Social |
| Jamukurnu-Yapalikurnu Aboriginal Corporation (Western Desert Lands) RNTBC | Aboriginal Org | Pilbara | PBC |
| Job Pathways | NFP | Kimberley | Employment |
| Juluwarlu Aboriginal Corporation | Aboriginal Org | Pilbara | Culture & Heritage |
| Kanyirninpa Jukurrpa (KJ) | Aboriginal Org | Pilbara | NRM |
| Karajarri Traditional Lands Association (KTLA) | Aboriginal Org | Kimberley | PBC |
| Kariyarra Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| Karlka Nyiyaparli Aboriginal Corporation | Aboriginal Org | Pilbara | PBC |
| Karlka Nyiyaparli Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| Karratha and Districts CCI | Peak Body / Member Group | Pilbara | Economic Development |
| Kimberley Agricultural Investment | Business | Kimberley | Agriculture |
| Kimberley Agriculture and Pastoral Company (KAPCO) | Aboriginal Org | Kimberley | Agriculture |
| Kimberley Boab | Business | Kimberley | Agriculture |
| Kimberley Land Council | Aboriginal Org | Kimberley | Culture & Heritage |
| Kimberley RDA | NFP | Kimberley | Economic development |
| Kimberley-Pilbara Cattlemen's Association | Peak Body / Member Group | Multi-region | Agriculture |
| Kulyakartu (Aboriginal Corporation) RNTBC | Aboriginal Org | Pilbara | PBC |
| Legislative Assembly | State Government | Pilbara | Government |
| Marputu Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| Mira Consulting | Business | Kimberley | Culture & Heritage |
| Murujuga AC | Aboriginal Org | Pilbara | Culture & Heritage |
| Ngarliyarndu Bindirri Aboriginal Corporation (NBAC) | Aboriginal Org | Pilbara | Economic Development |
| Ngarluma Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| Northern WA/ NT Drought Resilience Adoption and Innovation Hub (NWANT) | Peak Body / Member Group | Multi-region | NRM |
| Nyamal Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| Nyangumarta Warrarn Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| Oasis Farms | Business | Kimberley | Agriculture |
| Onslow CCI | Peak Body / Member Group | Pilbara | Economic Development |
| Palyku-Jartayi Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| Pilbara Aboriginal Health Alliance (PAHA) | Peak Body / Member Group | Pilbara | Social |
| Pilbara Mesquite Management Committee | NFP | Pilbara | NRM |
| Pilbara Ranger Network | Peak Body / Member Group | Pilbara | NRM |
| Pilbara Regional Biosecurity Group (PRBG) | NFP | Pilbara | NRM |

| Organisation | Category | Region | Sector |
|---|---|---|---|
| Rangelands NRM | NFP | Multi-region | NRM |
| RDA Pilbara | NFP | Pilbara | Economic Development |
| Robe River Kuruma Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| RRR Network | Peak Body / Member Group | Kimberley | Social |
| Shire of Ashburton | Local Government | Pilbara | Government |
| Shire of Broome | Local Govt | Kimberley | Government |
| Shire of Derby–West Kimberley | Local Govt | Kimberley | Government |
| Shire of East Pilbara | Local Government | Pilbara | Government |
| Shire of Wyndham–East Kimberley | Local Government | Kimberley | Government |
| Town of Port Hedland | Local Government | Pilbara | Government |
| WA Indigenous Tourism Operators Council | Peak Body / Member Group | Kimberley | Tourism |
| WA Primary Health Alliance (WAPHA) | Fed Government | Pilbara | Social |
| WACOSS Pilbara | Peak Body / Member Group | Pilbara | Social |
| Walalakoo Aboriginal Corporation | Aboriginal Org | Kimberley | PBC |
| Wangka Maya Pilbara Aboriginal Language Centre | Aboriginal Org | Pilbara | Culture & Heritage |
| Water Corporation | State Government | Multi-region | Government |
| Wirraka Maya Health Service | Aboriginal Org | Pilbara | Health |
| Wunan Foundation | Aboriginal Org | Kimberley | Economic Development |
| Yawuru Aboriginal Corporation | Aboriginal Org | Kimberley | PBC |
| Yindjibarndi Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |
| Yindjibarndi Ngurra Aboriginal Corporation RNTBC | Aboriginal Org | Pilbara | PBC |



# Appendix B: Key Aspects for Consideration in Future Plan Iterations

The following suggestions from CSIRO's independent review of the Pilbara and Kimberley Regional Drought Resilience Plan have been noted for future consideration. While they are not addressed in the current draft, they are recognised as important and will help shape future iterations of the Plan as the program evolves into implementation and long-term monitoring phases.

| CSIRO Suggestion | Summary of Feedback | Future Consideration Rationale |
|---|---|---|
| 3.2 | Assess quality of stakeholder engagement to inform more community-driven actions | Will be considered in future engagement phases during implementation |
| 4.2 | Clarify roles and responsibilities of implementation partners | To be determined in collaboration with PAG during implementation planning |
| 5.2 | Establish structured learning as part of MEL framework | Governance and learning mechanisms to evolve with PAG and stakeholder engagement |
| 6.1 & 6.2 | Apply adaptive governance principles to future plan design and governance structures | Will be developed with input from PAG; requires broader collaboration and time |
| 7.2 | Include wider social/economic indicators, e.g. housing, wellbeing, First Nations data | To be integrated as MEL framework is expanded |
| 8.1 | Strengthen integration with other regional plans and policies | Cross-referencing and regional alignment will be improved in future planning stages |
| 9.2 | Deeper analysis of drought effects on different stakeholder groups | Will require targeted engagement and social research |
| 10.1 | Develop resilience assessment using time-based indicators and graphs | May be incorporated through future data and evaluation efforts |
| 11.1 | Include participatory scenario planning for future drought contexts | Not feasible in current plan timeframe, but a priority for future engagement |
| 12.2 | Show how actions build spare capacity and options for future resilience | Future work to build deeper understanding of systems-based resilience approaches |
| 13.2 | Prioritise and sequence actions into pathways with triggers for change | Implementation planning will explore sequencing and adaptive decision-making |
| 14.2 | Identify innovative intervention options through scenario analysis | Dependent on resourcing and further engagement |
| 15.2 | Show how proposed actions contribute to resilience goals within MEL framework | Expanded theory of change and MEL indicators to be considered |
| 16.1 | Develop robust, evidence-based theory of change with impact pathways | Guidance from Future Drought Fund MEL tools will inform this work |
| 17.2 | Include broader MEL indicators aligned with ABS/SEIFA and economic data | Will inform long-term monitoring framework |
| 18.2 | Explore cross-component interactions more explicitly | Will be included in next iteration based on governance and outcome learnings |

GOVERNMENT OF WESTERN AUSTRALIA

KIMBERLEY DEVELOPMENT COMMISSION

PILBARA DEVELOPMENT COMMISSION