



RMCG

# GMID Strategic Plan: Regional Insights

Department of Jobs, Precincts and Regions

## Introduction

### *Project purpose*

The Goulburn Murray Irrigation District (GMID) as a regional system is changing. While some of the change is outside our control (climate, global markets, technological change), we can shape the trajectory of change, rather than being forced to change in a particular unwanted direction.

The GMID Resilience Master Plan project is an effort by regional leaders to create a plan to strengthen the region, making it more resilient to a range of possible futures.

What we do now in our region will impact our ability to respond to change for years to come. This is our opportunity to make sure that our region is able to do well in the face of change.

### *Project team*

RMCG and our associates Paul Ryan and Garry Smith have been engaged to work with GMID leaders and stakeholders to deliver the region's Master Plan project.

### *This paper*

This paper will be used as the basis for stakeholder engagement and contains the following:

- **Resilience concepts:** The concepts and principles that that will be used to shape the Master Plan
- **Regional profile:** A summary of GMID agricultural industries, water resources and climate
- **Operating context:** Policy context, global trends and regional stakeholders
- **Resilience insights:** How the profile and operating context influence GMID regional resilience
- **Discussion points:** The questions that will be raised during round one engagement

## Resilience Master Plan

The Resilience Master Plan will be used to guide and support continued adaptation and long term resilience and prosperity across the agriculture and land management sector.

The Master Plan will contain:

- A shared vision for resilience and transformation of the region
- Priority actions for building regional resilience
- A clear governance framework for the implementation of the Master Plan.

### *Scope*

*The Master Plan will be focused on agriculture and land management. It will not focus in depth on broader regional sectors such as retail, health and education, except where those sectors impact on agriculture and land management.*

*Whilst the notional geographic boundary for this Master Plan is the boundary of the GMID, this is not a hard boundary. This is in part because the footprint of irrigation infrastructure in the region is likely to change over time. It is also because solutions that will impact the resilience of the GMID may sit just outside the irrigation region.*



The image is a vertical split composition. The left half shows a dark, stormy night landscape with a dark sky and a dark field. The right half shows a bright, sunny landscape with a field of yellow flowers in the foreground and a blue sky with a rainbow in the background. The text "1. Resilience concepts" is overlaid on the left side of the image.

# 1. Resilience concepts

## Resilience concepts

In this chapter, we will describe resilience concepts and show how they can be used to help us describe and design the future that we would like to see in the GMID. During the engagement phase of this project, we will use these concepts to guide discussion about how and what this region can change to become more resilient.

### What is Resilience?

#### *Definition*

**Resilience is the capacity of system (in this case the GMID) to cope with change while creating opportunities towards a shared vision.**

This definition raises lots of questions. What is the GMID? Is it just the physical boundary of the irrigation footprint, or is there a functional boundary beyond that? What types of changes are we most concerned about? What about unknown changes? How do we create a shared vision of the future and what do we need to do to achieve that vision?

As we develop the GMID Resilience Master Plan we will be addressing these types of questions. We will draw on our understanding of resilience principles and the current resilience of the region.

#### *Types of resilience*

Resilience encompasses a system or the components within a system's capacity to:

- **Persist:** Capacity to stay essentially the same in the face of change. Assumes that things will at some point return to "normal". E.g. Dryland farmers reducing spending during a dry period in anticipation of future rainfall.
- **Adapt:** Capacity to deliberately adapt to change. Adaptation assumes that change will endure but that the same overall identity can continue. E.g. shifting from pastured dairy to shedded dairy on the prediction that rainfall patterns have changed.
- **Transform:** Capacity to fundamentally transform in response to change. Transformation is a product of deliberate, significant change in response to enduring change. E.g. Shifting land use from agriculture to energy production.

In the face of major drivers of change, some parts of industries within our region will be focused on persisting. However it is more likely that we will need to continually adapt. And sometimes we will need to fundamentally transform.

## Resilience concepts, cont'd

The following concepts are the foundation for a resilience based approach to planning.

### *The region is a complex system*

The GMID region is a complex system of people, skills, resources, businesses, communities, ecosystems and infrastructure. These elements are tightly linked and change and evolve over time in relation to each other. With such complexity, no one organisation has control and we cannot be certain that any action we take will deliver the outcome we want. We also cannot be sure how other parts of the system may change in response to particular actions. The best approach in such complex situations is to work together, share our knowledge and learn together how best to act.

### *Uncertainty and ambiguity are the norm*

The world is changing more quickly than ever before. It is impossible to predict exactly how the region will change in the future. Resilience thinking requires us to be prepared for a range of changes: some anticipated and some unanticipated; some negative and some positive. Traditional approaches to planning are not well suited to these uncertain conditions. The best approach is to build our region's capacity to cope with a wide range of possible futures.

### *Many futures are possible*

A core concept of resilience planning is that many futures are possible. We cannot perfectly predict the future, but we can appreciate that a range of futures are possible.

The changes that will lead to the future are largely out of our control. But it is possible to improve how our region responds to change. A region that is able to respond well is a resilient region, and therefore more likely to be a prosperous region.

In this project we will talk about 'possible', 'plausible' and 'preferable' futures.

- **Possible futures** are the full range of futures that changes could lead to
- **Plausible futures** are the futures that we think are probable.
- **Preferable futures** are the futures that we wish to steer towards.

## Regional resilience principles

The following principles describe the factors that support regional resilience. They will underpin stakeholder engagement discussions and influence the content of the Master Plan.

### **Principle 1: Develop a 'complexity' view of the world**

A region is more than the sum of its many parts. It is created by interactions between social, economic and environmental systems. Understanding the complex interactions between social, economic and environmental factors is central to building more resilient futures.

### **Principle 2: Develop governance that embraces change**

In an increasingly dynamic and uncertain world, developing governance approaches that embrace change helps a region to prepare for, respond to and learn from change. While no community is completely immune from the impacts of unexpected events and disasters, those that can work together and are able to self organise with limited external assistance are more resilient.

### **Principle 3: Foster cohesion, self-organisation and local responsibility**

Cohesive communities that have internal capacity to self organise to find solutions, are more able to prepare for and recover from disturbance and to capitalise on opportunities.

### **Principle 4: Design for flexibility**

Designing for flexibility allows for easier future adaptation when required. Inflexible or rigid systems are less able to respond to change, becoming 'brittle' and prone to more costly failure over time.

### **Principle 5: Manage networks and connectivity**

Networks and connections between and across people, organisations, decision makers, industries and ecosystems allow 'flows' between parts of a system, including flows of resources, knowledge and information, social norms and emotions and genetic material.

### **Principle 6: Value, retain and build response and recovery capacity**

The least vulnerable systems are those that have buffers, reserves, diversity and redundancy (multiple ways of doing and thinking; diverse of people, cultures, institutions; diverse landscapes, land uses, industries and climates; buffers of resources etc.). When a system experiences a shock or stress, response and recovery capacity act like a shock absorber, 'soaking up' and minimising impact and improving the chance of rapid recovery.

### **Principle 7: Orientate towards slow variables, leverage & tipping points**

In complex systems, focusing more attention on slow changing dynamics and the presence of leverage and tipping points improves effectiveness of governance and management.

### **Principle 8: Learn for change**

Deliberate, structured learning is central for innovating and dealing with change and uncertainty. It allows regional leaders to extend knowledge and develop innovative ways of addressing blockers to desired futures.

*NB: Some examples of these principles are given on pages 24 and 25*



## 2. Regional Profile

## Overview

The GMID is a major irrigation district comprising 15,000 properties. The gross value of irrigated agricultural production is around \$1.4 billion per year. The main enterprises are horticulture, dairy, mixed cropping and grazing.

The region supports a population of 170,000 people and includes regional centres and towns such as Shepparton, Echuca, Kerang, Cobram and Swan Hill.

The region is part of the southern connected Murray Darling Basin and the amount of water available to the GMID is highly influenced by the water available in the southern connected Murray Darling Basin and trade across this wider area.

Agriculture is one of the biggest employers in the region, both directly, and in food manufacturing. The food processing industry is a major Victorian employer and its main exporter. There are sixteen dairy factories in the region. Other important sectors include health care and social assistance (the region's largest employer) and retail (third largest).

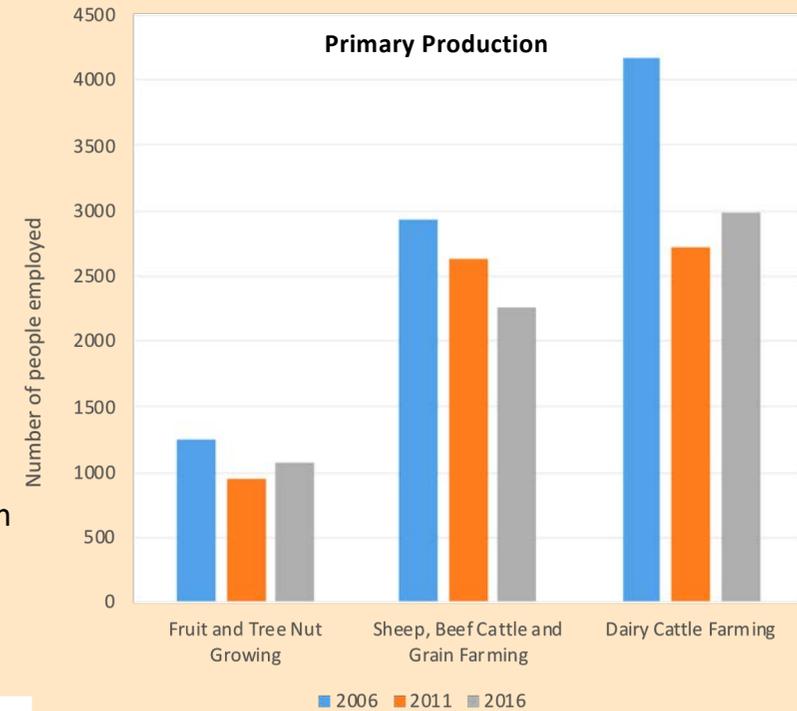
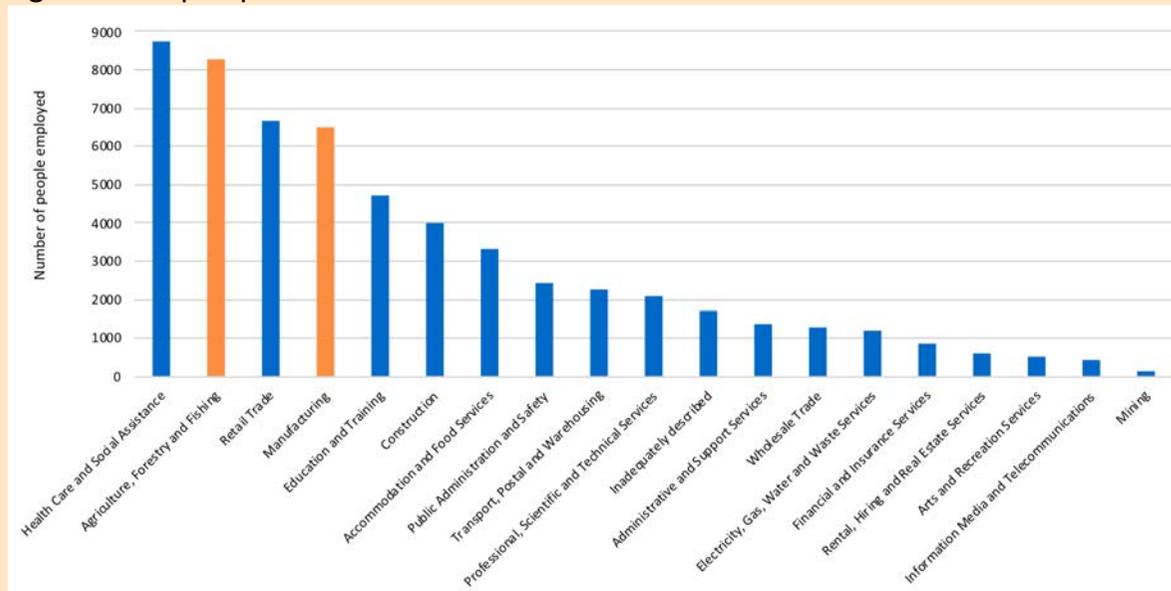


## Employment & the local economy

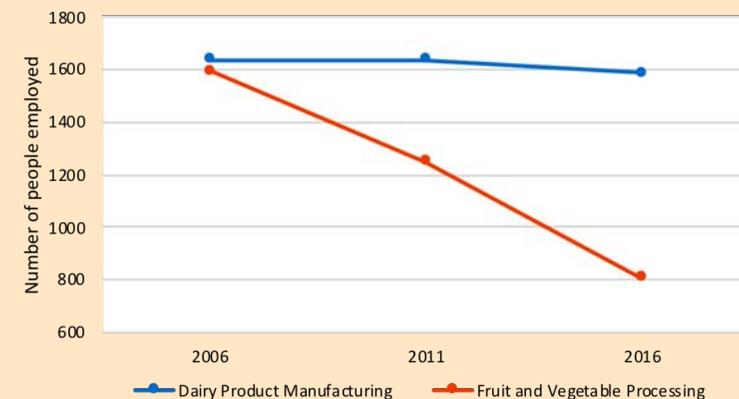
Regional employment is highly dependent upon irrigation, especially in dairy and horticulture, which support substantial regional processing jobs. In the western half of the GMID, there is a less diversified economy due to lack of major processing centres. Farm jobs are more important part of the western employment picture.

Although there has been an increase in agricultural employment since 2011, the region's agricultural industries have not recovered to pre-drought levels, and manufacturing employment has declined.

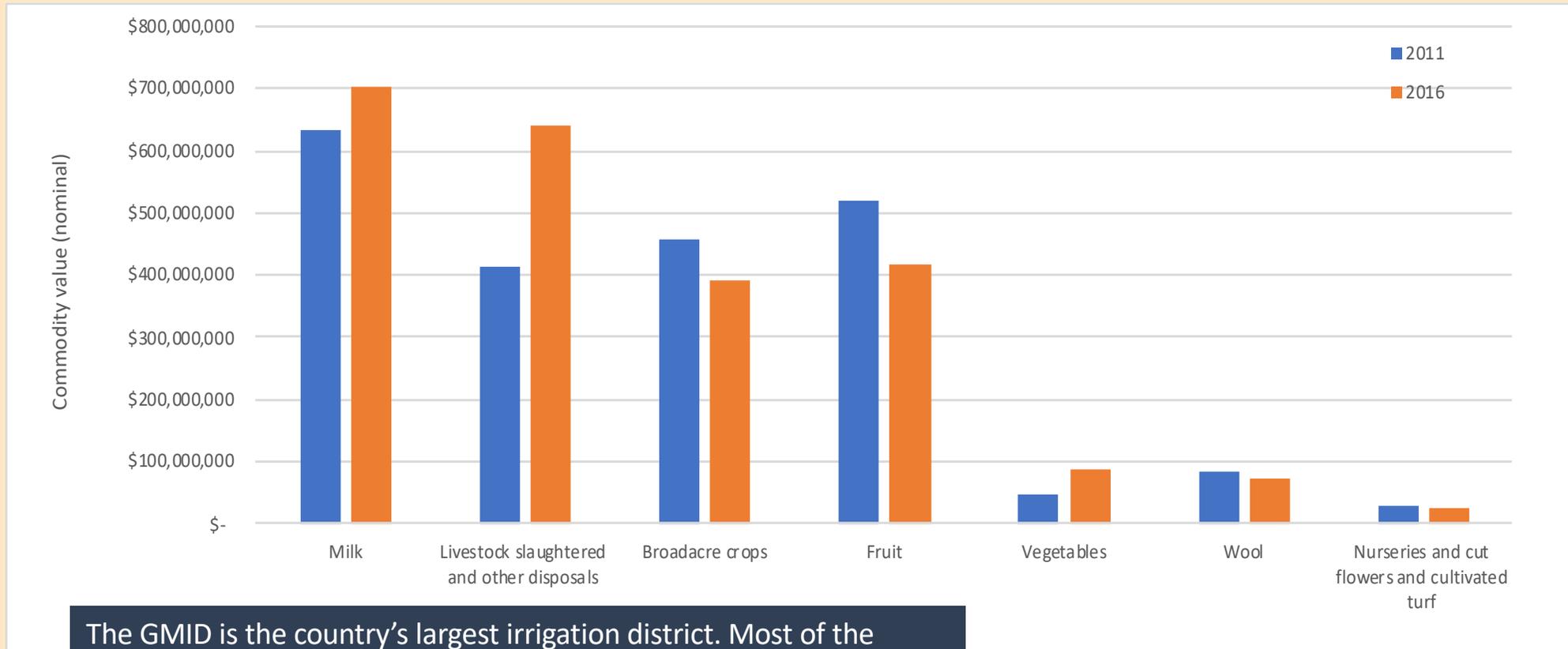
Fruit and vegetable processing has declined significantly with a shift to higher value fresh produce markets, taking jobs with it. While dairy industry employment has been steadier, it is highly exposed to global commodity markets with most production exported in processed goods. The region is has a relatively small number of large processors who require scale to achieve competitive costs. They are under pressure against cheap imports.



Fruit and vegetable processing decline is offset by employment growth in the fresh market



## Agricultural Sectors



The GMID is the country's largest irrigation district. Most of the production shown in this graph relies on the irrigation system, especially dairy, fruit and vegetables.

The region produces more of Australia's fruit and dairy produce than any other region. Irrigated agriculture generates an estimated \$1.4 billion. There is also additional production from non-irrigated land in the region.

## Agricultural Trends

### *Dairy*

Irrigated dairying in the GMID peaked in the early 2000s. Milk production levels have since reduced by a third. Over the last 15 years, there has been a steady evolution away from predominately grazing to partial mixed rations with some moving to total mixed rations fed in barns.

There is also increasing complexity in the mix of pastures/crops irrigated. This is in response to decreasing water availability and affordability alongside climate change.

### *Horticulture*

Horticulture has continued to slowly expand and increase its water use over the last 50 years. This is likely to continue. The predominant industry is fresh market fruit, a departure from previous decades where most fruit production was processed. The trend for fresh fruit will continue due to higher values and a renewed interest in fresh fruit export.

Whilst still relatively small in terms of area and water use, expansion of annual horticulture is occurring with vegetable production moving further from Melbourne.

### *Other industries*

There is growth in intensive industries in the region, including glasshouses, barn dairy, piggeries, chickens, nuts, medicinal crops and cotton.

### *Farm trends*

In line with national trends, there are fewer and larger farms, with increasing production efficiency and increasing technology. Larger properties comprise 10 - 15% of the number of properties in the GMID, but use around 70% of the water available.

At the other end of the scale, there are also increasing numbers of rural residential properties that are supported by off farm income. With reduced water availability, this trend is accelerated as there are more small scale dryland blocks that are usually only attractive for rural residential buyers. Growth in this land use is particularly strong close to the larger towns.

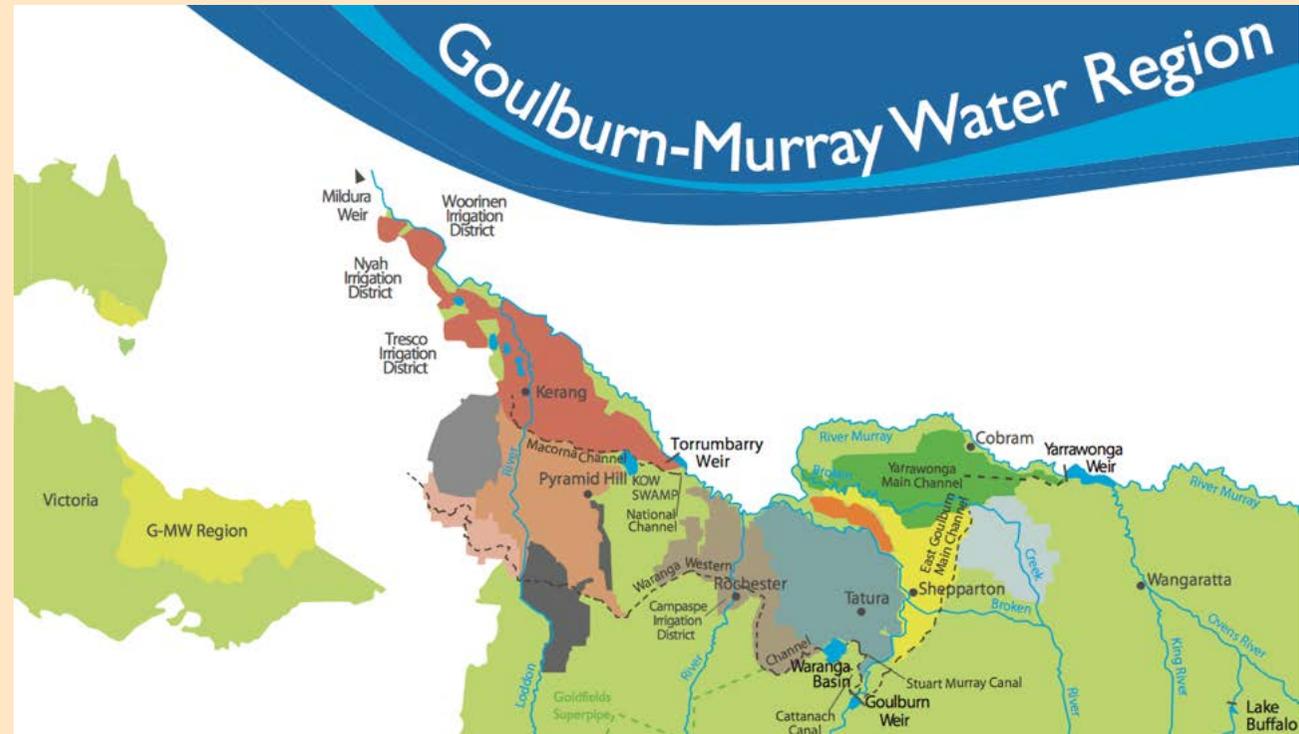
In and around centres such as Shepparton the desire of those retiring from farming to retain the family property has led to further fragmentation of agricultural land parcels.

2017 Analysis of GMW meter usage and channel data shows that that 20% of channels account for 82% of deliveries. Additionally, 43% of channels held less than 2 delivery shares per channel and account for only 4% of the total number of delivery shares. This indicates that the system is underused.

## Water in the GMID

The GMID comprises six gravity irrigation districts in north central Victoria where Goulburn-Murray Water (GMW) delivers water through major channel systems and three smaller pumped districts at Nyah, Tresco and Woorinen, in the western portion of the GMID.

GMW's "water region" is broader than the GMID as it covers licensing of private diverters across an area the size of Tasmania.



## Water as a key driver in the region

Supply and demand determine water price and competing industries buy or sell water in the southern connected Murray Darling Basin at different price points.

Horticulture returns are significantly higher than other agricultural enterprises. When supply is limited, the horticulture industry will have more capacity to pay for water than other industries. However, this does not apply to horticulture across the board. Almonds, dried fruit and canning pears are generally lower value per ML than other horticulture.

Some barn style dairy, which involves cut and carry systems, is underway in the region. If it proves to be profitable, it may be competitive with medium value horticulture. However, it is very different to traditional dairying and requires a lot of capital, new skills and higher appetite for risk. It could provide a very real opportunity for the GMID to remain competitive in the water market.

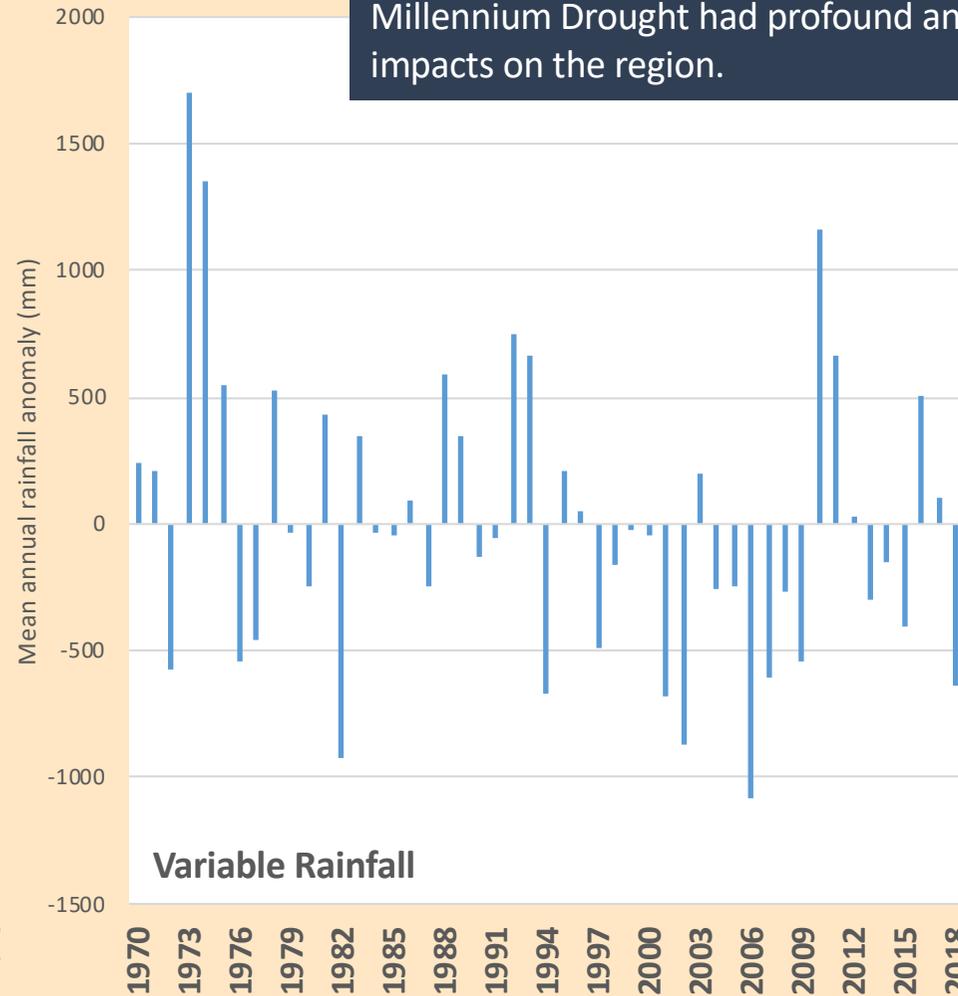
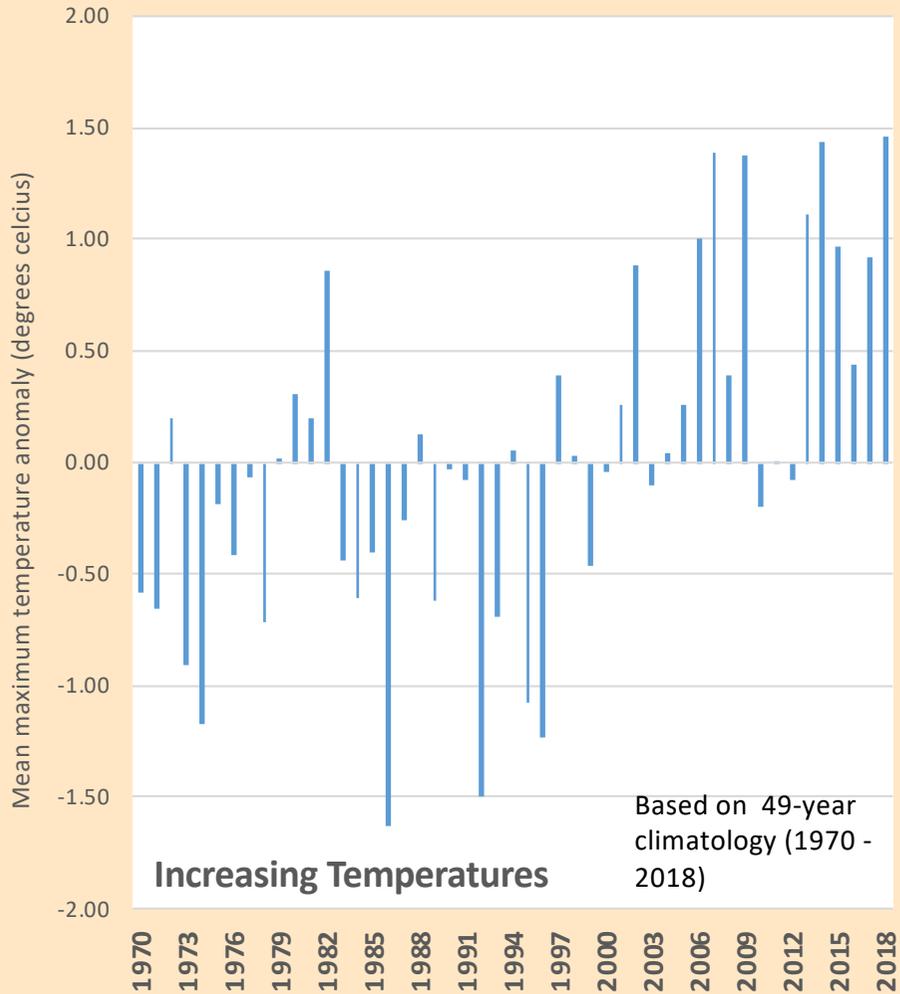
### *Water trading in a wider market*

The GMID forms part of the southern connected Murray Darling Basin, a larger water trading market covering northern Victoria, southern NSW and South Australia.

This trading zone covers the River Murray, the Goulburn, the Murrumbidgee and the lower portion of the Darling, as well as a number of smaller river and creek systems.

This wider zone now effectively operates as a single, interconnected market. The factors that drive the relative distribution of water between different irrigated sectors operate at this scale. The analysis in this study, therefore, starts at this wider scale and then translates the findings to the GMID.

# Climate



Increasing average temperatures and variable rainfall are trends that are already shaping agriculture within the GMID. In particular, the Millennium Drought had profound and lasting impacts on the region.

Source: BoM Climate data online (Kerang, Echuca, Tatura)

## Climate & water resources

The following table identifies the range in future water scenarios based on last 12 years. These apply across the southern connected Murray Darling Basin.

Climate Scenario	Similar Recent Years	Projected total water allocated (GL)	Projected Price (\$/ML)	Comment
Very Wet	10/11, 11/12, 12/13	5,300	50	Carryover increased
Wet	13/14, 16/17	5,000	70	Rice expands
Average	14/15, 17/18	4,000	130	Rice sits on allocation
Dry	09/10, 15/16	3,300	210	Rice sells to dairy/cotton
Drought	06/07, 07/08, 08/09	1,700	600	Cotton/dairy sell to horticulture.

Over the last twenty years, the GMID has had a net decline in water resources of 1,000 GL/y (almost 50%). Half of this is due to the Basin Plan and the rest due to water trade, climate, carryover, new reserve policies and pre Basin Plan water recovery.

Living with variability in water availability is already a feature of agriculture in the GMID. In dry/drought years when availability is low and prices high, trading tends to shift water away from cropping, and even dairy, to high value horticulture.

The next drought may limit perennial horticultural growth (across the southern connected Murray Darling Basin) as horticultural demand is likely to be capped by the total water available on the market in dry years.

<sup>[1]</sup> \*The “actual” refers to what happened in those particular years (pre water recovery), whereas “projected” refers to what would happen if repeated today.

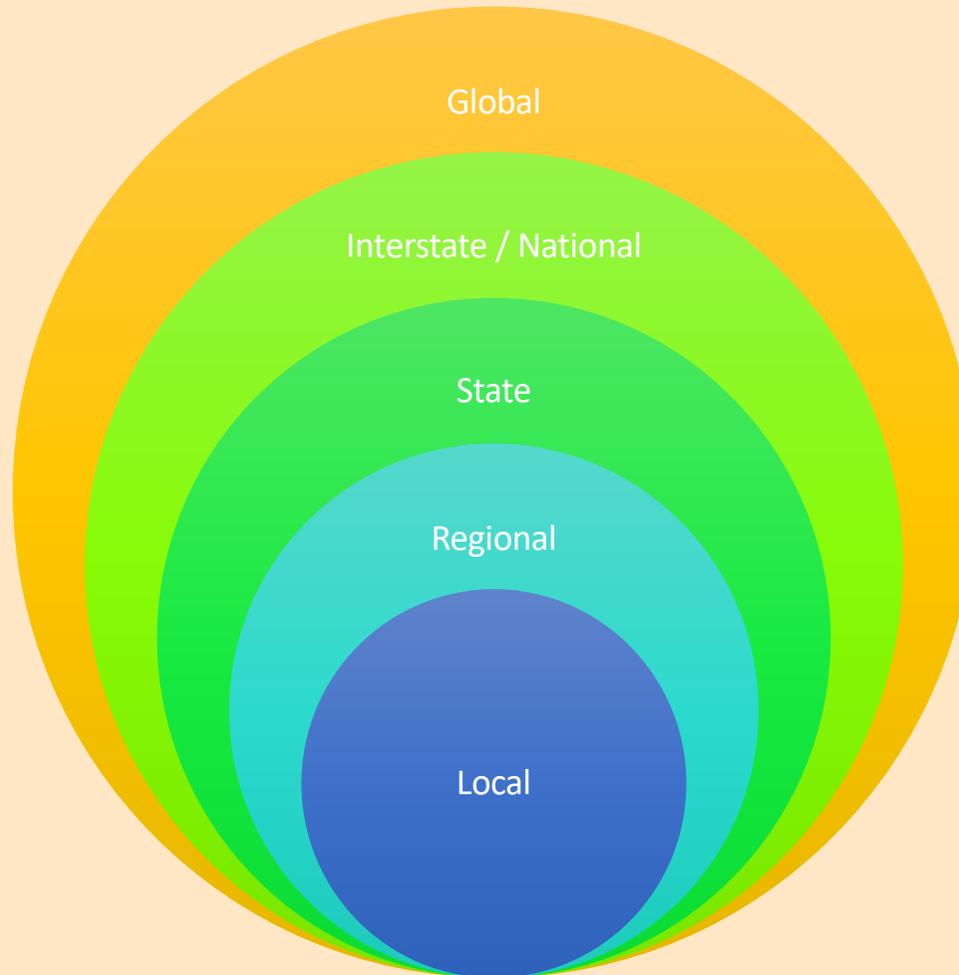
# 3. Operating Context

The image is a landscape photograph split vertically down the middle. The left half is in deep shadow, appearing almost black, with a dark horizon line. The right half is brightly lit, showing a vibrant field of yellow flowers in the middle ground and a golden-brown field in the foreground. The sky is a mix of dark and light tones, suggesting a sunset or sunrise. The text '3. Operating Context' is overlaid on the dark left side in white.

## Wider Policy Context

There are a wide range of interacting influences that shape the region. The ability to influence change decreases as you move from local to global.

The GMID can increase resilience by developing governance that helps the region to change and adapt within this complex system.



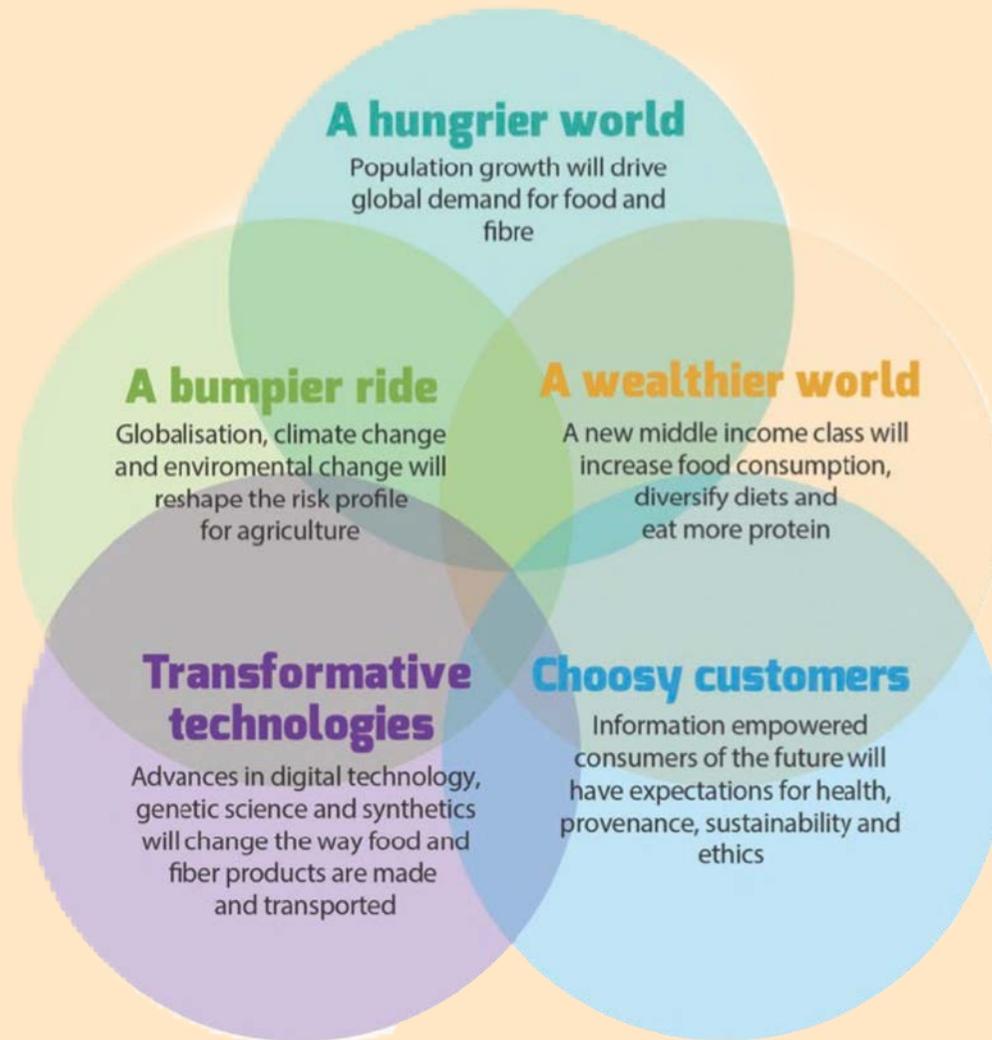
- Markets and macro-economic trends
- Global climate trends and policies

- Climate change, trade, immigration
- Murray Darling Basin Plan

- Infrastructure, planning and sustainable development, environment (incl. e-water), skills/training, key service delivery
- Environmental legislation/regulation

- CMA-ed Regional Catchment Strategies
- Industry and GMW Strategies
- Local Council planning policies
- Local Council Strategic Plans

## Global drivers & trends for agriculture



The implications of these megatrends are that there will be continuing pressure to:

- Improve product quality for export
- Invest in new technology and skills
- Improve water use efficiency
- Respond to customer demands

Source: Hajkowicz & Eady (2015) Rural Industry Futures: Megatrends impacting Australian agriculture over the coming twenty years, CSIRO

## Key Stakeholders

There are many stakeholders with influence over the complex dynamic system that is the GMID. This section gives an overview of stakeholder groups that we will engage with in developing the Master Plan and the key drivers and issues of importance to each.

### Water leadership

- Goulburn Murray Water
- DELWP
- Goulburn Broken and North Central CMAs
- MDBA
- Agriculture Victoria
- VEWH and CEWH

### *Key Drivers/Issues*

- Water quality
- Water availability
- Environmental water
- Infrastructure planning/investment
- Sustainable agriculture
- Climate change adaptation/mitigation
- Community/Customer service provision
- CMAs play a coordination role in relation to water for the environment

### Local Government

- Campaspe
- Moira
- Gannawarra
- Loddon
- Swan Hill
- Greater Shepparton

### *Key Drivers/Issues*

- Planning
- Infrastructure and development
- Economic development and jobs
- Tourism / recreation
- Climate change adaptation
- Emergency management
- Community / service provision

## Key Stakeholders

### Agricultural industries

- Dairy Sector
- Horticulture
- Irrigated cropping / grains

#### *Key Drivers/Issues:*

- Profitability
- Water availability
- Land prices / availability
- Resource use efficiency / environmental impact
- Labour and skills
- Market access / pricing
- Processing
- Investment and infrastructure planning
- Research and development

### Farming sub-groups

- Young Farmers
- Niche Industries
- Non-Commercial Landholders
- Agricultural Investment community

#### *Key Drivers/Issues:*

As per agricultural industries, plus:

- New and emerging opportunities
- Changing practices
- Niche / value-add products
- Agri-tourism opportunities
- Liveability
- Return on investment

## Key Stakeholders

### Traditional Owners

- Taungurung
- Yorta Yorta
- Dja Dja Wurrung
- Barapa Barapa
- Wemba Wemba

### *Key Drivers/Issues*

- Self determination of their people
- Caring for Country
- Opportunities for Traditional Owner involvement in agriculture and land management
- Opportunities for economic development and job creation
- Different perspective of resilience / sustainable land management

### Others

- Non agricultural land managers
- Welfare/Health Sector
- Education Sector
- Infrastructure Providers
- Engineering/Manufacturing
- Goulburn Regional Partnership
- Regional and Rural Victoria (as part of DJPR)

### *Key Drivers/Issues:*

- Drivers vary across these groups
- For non-agricultural land managers like Parks Victoria, drivers include biodiversity and recreational goals
- Many are driven by sustainable regional development outcomes including prosperity and the health and wellbeing of rural and regional communities
- Future investment directions/opportunities
- Localise research and development meeting the needs of regional agriculture industries

# 4. Resilience insights

The image is a vertical split composition. The left half shows a dark, stormy night over a field, with a dark sky and a dark horizon. The right half shows a bright, sunny day over a field, with a clear blue sky and a bright horizon. The split is a vertical line down the center. The text '4. Resilience insights' is overlaid on the left side of the image.

## Current factors that influence GMID resilience: Strengthening

There are several factors that influence the resilience of the GMID region. Referring to the resilience principles, the following list contains examples of current factors that *strengthen* the resilience of the GMID:

### Governance that embraces change (principle 2)

- The GMID Region Vision Forum is driving this project and other projects that anticipate and embrace change

### Regional cohesion, self-organisation and local responsibility (principle 3)

- A variety of government, industry and community leaders are committed to working collaboratively on the region

### Flexibility of regional systems (principle 4)

- Low energy water distribution systems that are relatively less constrained than further downstream
- Mix of farming systems and industries that can adjust to changing water availability
- Plentiful and highly capable land for variety of irrigated and non-irrigated agriculture
- Ample processing and value-add capacity for agricultural commodities
- Modernised irrigation system enables adoption of more efficient and higher value crops

### Networks and connections across people, places and organisations (principle 5)

- Cross sector forums such as the Regional Partnership

### Systems with diversity and reserves (principle 6)

- Higher rainfall relative to other regions in the southern connected Murray Darling Basin
- Multiple water sources including high reliability surface water entitlements and access to reliable groundwater
- Low pollution externalities associated with irrigation (e.g. low irrigation induced salinity impacts)
- Diverse supporting services sector
- Corporate agriculture provides capital for investment in infrastructure and systems to mitigate risk
- Farm management deposit scheme gives a buffer in poor years

### Learn for change (principle 8)

- Many leading farmers are open to change and quick learners
- Horticultural and dairy industries invest in research and development (via a levy) to innovate and address issues

## Current factors that influence GMID resilience: Reducing

Referring to the resilience principles, the following list contains examples of current factors that *reduce* the resilience of the GMID:

### **Governance that embraces change (principle 2)**

- Some governance decision making processes are rigid. Change can be very slow and tends towards persistence rather than adaptation or transformation.

### **Regional cohesion, self-organisation and local responsibility (principle 3)**

- While the current governance structure is well set up for increasing local decision making and responsibility, the prevailing trend is for decision making to be centralised
- Horticulture, in part due to its diversity, does not have a single industry voice.

### **Flexibility of regional systems (principle 4)**

- Relatively small size of irrigated land parcels are uncompetitive when the market demands large-scale production
- Increasing regulatory compliance systems and requirements, often test the administration capabilities and resources of small businesses
- Consistency of milk supply is a key issue for dairy manufacturers success
- Drive for efficiency reduces redundancy and flexibility

### **Networks and connections across people, places and organisations (principle 5)**

- Social licence to operate is a challenge confronting intensive livestock industries
- Transport limitations such as channel crossings, narrow roads and poorly maintained roads – contrasting with increased demand for heavy vehicle access to farms

### **Systems with diversity and reserves (principle 6)**

- Types of employment are changing – no longer traditional farm owner/operator model. Different management structures and more specialised skills will be required as farms grow in scale.
- Low and declining regional irrigation water availability and uncertainty about future water availability in the GMID is hampering investment.

### **Orientate towards slow variables, leverage & tipping points (principle 7)**

- Lower prices over time reduce farm capital reserves which reduces their ability to invest in change

## Possible futures

The system that is the GMID region is going to change in response to a range of factors. The following list contains some possible futures. This list will be expanded during stakeholder engagement for this project. We will discuss which futures are plausible and which are the preferred futures that the region should steer towards.

### Technology

- Increased on-farm automation could drastically reduce unskilled labour requirements.
- Automation/robots in horticulture could enable fresh fruit to become more globally competitive.
- New technologies could significantly reduce costs, improve product quality, manage risk and make supply chains operate more efficient.

### Global markets

- Income growth in Asia would see diets diversify. This coupled with Free Trade Agreements could increase demand for protein and increase demand for what are currently niche markets.

### Climate change

- More volatile seasonal conditions will pose a risk to production and supply chains.
- Climate change results in a long period with no medium reliability water and hotter, drier summers.

### Industry development

- There could be significant growth high value horticulture including crops such as nuts, medicinal crops, industrial hemp..
- Increased production of maize as a fodder source for dairy as the crop offers very high dry matter production per ML.
- Vegetable growers relocate large parts of their production to the GMID
- Barn style dairy could expand and attract further water use to support its feed requirements.
- Traditional dairy could decline due to poor market milk price relative to almonds and/or cotton.
- Growth in demand for alternative energy production such as solar and bio-digesters could stimulate new industry
- GMID becomes a research and development centre for agriculture

# 5. Next Steps



## Stakeholder engagement: Exploring resilience in the GMID

In July 2019, regional resilience champions and the consulting team will be talking to stakeholders across the GMID, exploring the following discussion points:

### 1. Understanding resilience

- The GMID as a regional system is changing
- While some of the change is outside our control, we can shape the trajectory of change, rather than being forced to change in a particular direction.
- The Resilience Master Plan aims to strengthen the region
- What we do now will impact the region for years to come.

### 2. Preferred futures

- What is your vision for your [farm's/industry's/organisation's] future in this region?
- What is your vision for the region as a whole?
- What don't you want to happen in the future?

### 3. Understanding the current system

- What aspects of the GMID system support your [farm's/industry's/organisation's] resilience?
- What aspects of the GMID system reduce your [farm's/industry's/organisation's] resilience?
- What aspects of the GMID system reduce regional resilience?

### 4. Building resilience

- What can we change to build resilience in our region (using the principles to guide discussion)?
- What parts of our systems require persistence? Adaptation? Transformation?