

Irrigation Futures

of the Goulburn Broken Catchment



Final Report 6 – Scenario planning for individuals and businesses

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Documents in this series.

Final Report – Summary

Provides a brief introduction to the project and how the project objectives have been met.

Final Report 1 – Scenarios of the Future: Irrigation in the Goulburn Broken Region

Provides an overview of the region, drivers for change, scenarios, implications and strategies.

Final Report 2 – Regional scenario planning in practice: Irrigation futures of the Goulburn Broken Region

Provides a manual of project methodology for next-users.

Final Report 3 – Perspectives of future irrigation

Describes scenario implications for irrigation supply infrastructure.

Final Report 4 – Handbook of flexible technologies for irrigation infrastructure

Provides guidelines and tools for irrigation supply infrastructure design.

Final Report 5 – Scenario implications for catchment management

Describes scenario implications and strategies for catchment management.

Final Report 6 – Scenario planning for individuals and businesses

Tool to assist individuals and businesses to assess the scenario implications for their enterprise.

Final Report 7 – Hand book of project plans

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Irrigation Futures of the Goulburn Broken Catchment
Final Report 6 – Scenario planning for individuals and businesses

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Introduction

Irrigation Futures of the Goulburn Broken Catchment

The Goulburn Broken Catchment is known as the food bowl of Australia. It covers 2.4 million hectares and has a population of around 200,000 people (Department of Sustainability and Environment 2005). Irrigated agriculture is a major business engine in the Goulburn Broken region, producing more than \$1.2 billion at the farm gate in 2001-2002 from about 280,000 hectares of irrigated agricultural land. Investment in on-farm and processing infrastructure is about A\$100 million per annum (Young 1995). The region is therefore a major contributor to the state and national economies and the quality of life of consumers.

The region faces significant challenges and opportunities. Issues such as free trade agreements, climate change, water reform, and technological developments will have a significant influence on the future. As one of the oldest gravity irrigation systems in Australia, Goulburn-Murray Water's irrigation system needs substantial renewal of its ageing infrastructure in the next 20 years. The consequences of these pressures for the region are highly uncertain and will include impacts on the region's economy, environmental assets and social fabric. Therefore, it is critical that the region develops a sound plan to strategically position itself for irrigation in the future.

Regional planning is highly challenging. In addition to the complexity of issues and high level of uncertainty, a diverse range of stakeholders have interests in the planning process and its outcomes. Enabling all stakeholders access to the planning process is important to managing their expectations and developing plans that are robust and likely to be adopted.

The Goulburn Broken Irrigation Futures project was established to assist the regional community to plan for the future. It was a regional initiative, funded by the Goulburn Broken Catchment Management Authority, Goulburn-Murray Water, Victorian Department of Primary Industries, Victorian Department of Sustainability and Environment, and National Program for Sustainable Irrigation. The project adopted a scenario planning approach in collaboration with the region's stakeholders to:

- develop a shared vision for the future of irrigation in the Goulburn Broken catchment over the next 30 years;
- identify scenarios of major constraints and opportunities and of regional response options;
- understand the social, economic and environmental consequences of various scenarios; and
- facilitate key stakeholders to build consensus on preferred regional strategies for future irrigation.

Scenario planning is a relatively new approach to strategic planning developed and applied famously by the Royal Dutch Shell Company to anticipate and plan profitably for the oil shocks of the 1970s (O'Brien 2000; van der Heijden 1996). Scenario planning explicitly acknowledges ambiguity and uncertainty in the strategic question by creating a set of scenarios that describe plausible, coherent pictures of alternative futures. These scenarios become a powerful tool for testing the robustness of strategies, as well as for generating new strategic options. Scenario planning also provides a useful means for organisational learning. While scenario planning has become widely used by private

corporations and public organisations (O'Brien 2000), there are few examples of its application for regional planning.

The Goulburn Broken Irrigation Futures project used scenario planning in conjunction with the regional community to explore and plan for the future of irrigation in the region. The project was undertaken in four stages. Following an initial stage that developed the project, community perspectives on the future for irrigation were captured by an extensive stakeholder-engagement program. The third stage involved developing detailed scenarios and examining their regional implications. The final stage involved examining the implications of the scenarios for specific issues, in collaboration with the region's agencies and organisations.

Using scenarios to plan for an uncertain future

The future is inherently uncertain. This uncertainty presents a significant challenge for any business, particularly when planning for the future. What will I do when the drought breaks? How will I manage if it keeps going? How will changes such as irrigation system reconfiguration, the cost of water, climate change, Government policy, affect my business?

Scenario planning is a tool that can help you deal with this uncertainty. *Scenario Planning for individuals and businesses* outlines a number of scenarios of how the future might unfold, and gives you the opportunity to think through – ‘what do those futures mean for the way that we operate our farm or business, our business plan, and our family welfare?’ and ‘what do we need to do about it?’

How the scenarios were developed

The scenarios were developed in late 2004 by asking about 120 people involved in irrigated agriculture in the Goulburn Broken (including primary producers, processors, environment, business, community welfare and agency people) – ‘what are the challenges and opportunities that you think the region will have to face over the next 30 years?’ Those challenges and opportunities were used to build 4 different stories (or scenarios) of how the future might unfold. The scenarios were checked to make sure that they were plausible. Some of the scenario elements are happening already (eg corporations are buying dairy farms, water allocations on the Goulburn are less than 30%, the Federal Government is moving to take over water etc). So the scenarios are very real. They have been used by a number of agencies as a part of their business and strategic planning. They are now available for use by individuals and businesses.

How to use this tool

Individuals and businesses

Individuals and businesses can use this publication to assess the vulnerabilities and strengths of their plans. A number of steps are suggested below. Individuals may like to seek the advice and support of a trained professional to help them through the process. The following process is suggested, it is recommended that you use the worksheets to record your answers:

1. Consider your personal, family and business goals and aspirations
 - What personal or business objectives that you are seeking to achieve.
 - How do you plan to achieve those goals?
2. Read each scenario. Identify the 5 or 6 most important elements (in terms of their impact on your business), and consider the questions at the end of each scenario. If this scenario happened:
 - What changes would you need to make to your plans – particularly your farming system and your business plan
 - How would those changes impact on your health, lifestyle and community?
3. Future uncertainty means that any of these scenarios may happen. Stop for a time and ponder: What are the general things that you have learned about the strengths and vulnerabilities of your business? Are there any opportunities that you hadn't seen before? In the light of that reflection:
 - What changes might you make to your farming system and business plans, so that they are more robust, and better able to deal with future uncertainty?
 - What are the flow-on changes that you might need to make to your lifestyle?
 - What are the changes that need to be made in your community? How can you make a difference?
4. With your family, and maybe your accountant, prepare an action plan considering:
 - What needs to be done?
 - Who will do it?
 - When will they do it?
 - When will it be completed?

The answers to these questions are not set in stone. You can and should change it. Make it an on-going process, so that you update your plans when circumstances change.

Good luck

Personal and business goals and aspirations

Think about what you would like to achieve for your self, your family and your business.

What are your personal objectives?

(Consider issues like your health, the health of your family, kids schooling etc)

What are your business objectives?

(Consider issues like the size and type of your business, your profitability etc)

How do you plan to achieve those goals?

Scenario 1 - Moving on

2005-2020: The cost-price squeeze continues to drive the development of agriculture. The signing of bilateral free trade agreements offers respite for industries that are internationally competitive, but hastens the decline in profitability of industries that focus on protected domestic markets. Expanding market opportunities in Asia and the United States relieve price pressures for the dairy industry, while international imports of processed products threaten the viability of the horticultural industry. Demand for biofuels and alternative energy sources create new opportunities for agriculture.

Climate changes become increasingly evident. Annual rainfall totals decline, while the intensity of rainfall events during summer increases. Average temperatures continue to rise causing a decrease in the number of chill hours. Changes in both rainfall and temperatures severely impact the yield and quality of horticultural products.

The demand for residential properties in aesthetically attractive areas moves inland as the affordability of coastal properties decreases. Inland waterways increasingly become a focus for tourism.

Governments show preference for market forces to direct outcomes and intervene only when market failure is significant. As a result, exceptional circumstances support from government decreases.

Agriculture continues to adapt to declining terms of trade. Agribusinesses increase production efficiencies by becoming larger and using new technologies. Smaller farms that find it difficult to adapt exit their industries. The number of dairy farms decreases from about 2000 in 2005 to 1200 in 2020, while average herd sizes increase from 250 to 480 cows. The value of agricultural production continues to increase for all industries, which attracts takeovers of the region's processing facilities by multinational corporations.

Small towns within the region slowly decline as the demand for labour decreases. The small increase in the number of lifestyle residents cannot prevent the closure of banks, supermarkets and petrol stations in small towns. Communities demonstrate less willingness to participate in voluntary activities. Services dependent on volunteers, such as fire brigades and sporting clubs, are progressively disbanded or amalgamated.

Irrigation infrastructure within the region is reconfigured to manage the effects of water trade. Infrastructure is rationalised in some areas and enhanced in others.

2020-2035: International trade opportunities improve as trade barriers continue to be removed and opportunities for markets in Asia expand. The marketing environment is highly competitive, with product differentials changing rapidly. Consumers are increasingly concerned for their own health and for the welfare of animals. International trade is enhanced by improvements in electronic communication technology that enables rapid trade.

Irrigation water delivery infrastructure is privatised. The new owners increase water tariffs and further rationalise infrastructure to obtain a commercial return on their investment. The region continues to remain attractive to agribusiness investors due to relatively low land prices and the availability of irrigation water.

The climate remains drier than the long-term average, with summer rainfall occurring in intense events. The drier climate reduces the risk posed by salinity to agricultural production and infrastructure in the region.

Traditional agricultural industries continue to exist in the region. To maintain their competitiveness, agricultural businesses develop highly controlled production systems that enable them to increase production and reduce waste. The dairy industry increasingly uses controlled rationing and automatic milking systems to increase productivity, while horticultural producers use hydroponic and controlled-environment technologies. The number of agricultural businesses continues to decrease due to the large financial investment required for highly controlled production systems. The total value of agricultural production continues to increase.

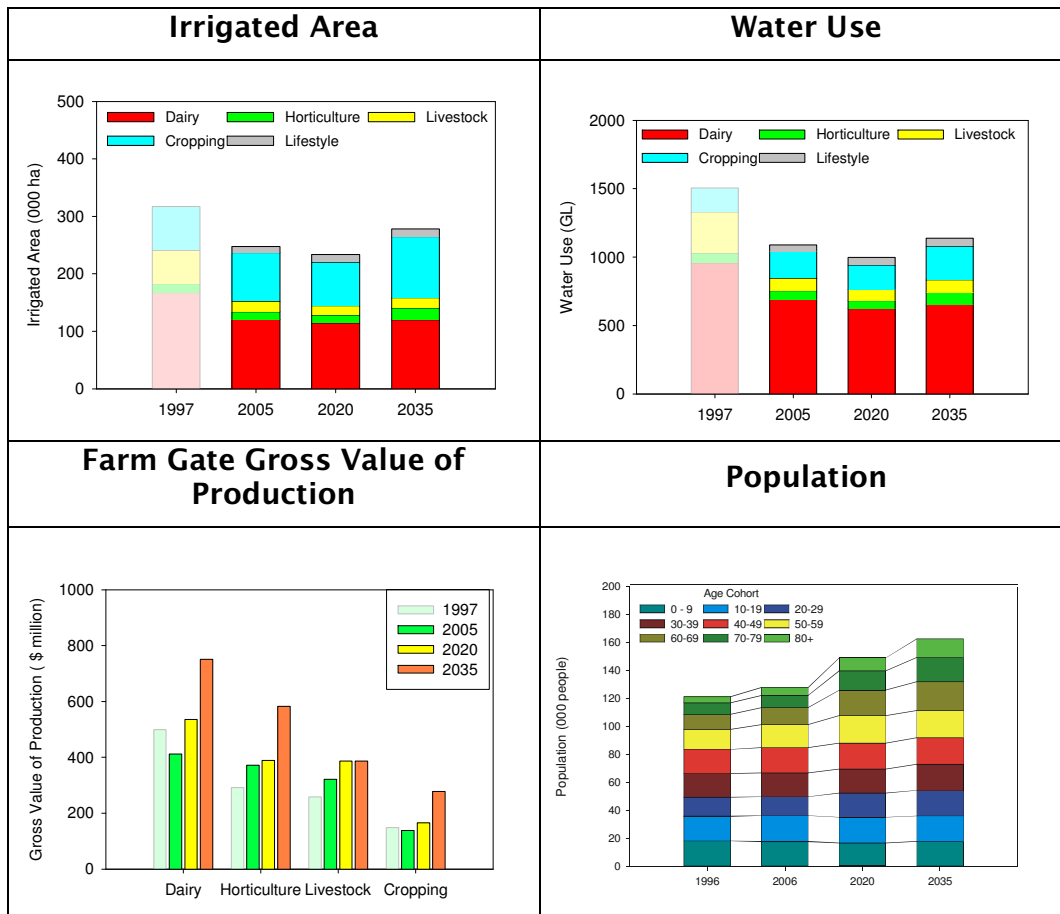
Individual landholders have primary responsibility for land management. Tension arises between landholders when adjoining land uses are incompatible, or when neighbours perceive land management practices as inappropriate. Conflict also arises over environmental management, particularly in understanding the distinction between natural and anthropogenic features.

The influence of agriculture on governments and in the community decreases, as the number of people involved in agricultural production decreases.

The community places a high value on leisure time. Location-based community groups, with fixed meeting times, are forced to consolidate their activities. Electronic communities of interest flourish due to their flexible participation arrangements.

Throughout this scenario, the region remains economically prosperous, with low unemployment. The population continues to grow steadily, with an increasing proportion aged over 50. Environmental impacts of agriculture are minimised though the use of technology.

Projections for Scenario 1 - Moving on



Impacts of Scenario 1 - Moving on

If this scenario occurs, what changes might you need to make to:

The way that you operate your farm or business?

(For example, if you are a farmer, consider issues like the area that you irrigate, the irrigation layout, watering system, feed system etc)

Your business plan?

(Consider issues like changes to income stream, changes to cost structures etc)

If you do those things, what will be the impact on you and your family?

(Consider issues like your health, the health of family members, kids schooling etc)

If you do those things, what will be the impact on your community?

(Consider issues like social networks, schools, sporting clubs etc)

Scenario 2 - New Frontiers

2005 – 2020: 3G and 4G communications technologies radically alter the nature of work, enabling workers to telecommute to workplaces throughout the world. Many people seek to establish home offices on small blocks of land close to essential services, in areas of pleasing amenity, such as near waterways and forested areas. In the Goulburn Valley, properties adjacent to rivers and streams are in high demand.

Urban communities and new lifestyle residents are politically influential and express concerns for the environment, animal welfare, personal health and food safety. Governments respond by increasing regulation on all industries and creating zones of industrial agriculture. Agricultural industries have restrictions placed on the location and nature of developments. Agricultural practices, such as harvesting, spraying and tillage, are also tightly controlled to ensure the levels of amenity desired by lifestyle residents are achieved.

Free trade agreements are signed with a number of international trade partners, providing agriculture with new markets. However, Australia loses markets in the Middle East due to our alliance with the United States and our continuing involvement with conflicts. Middle Eastern conflicts also cause oil prices to continue to increase.

Governments introduce a new wave of water reform. Barriers to interstate water trade are removed and environmental flow entitlements increased. Irrigators are provided with an opportunity to exchange medium-reliability entitlements for high-reliability at an appropriate exchange rate. The availability of water remains relatively low as the climate remains drier than the historical average.

Agricultural businesses in the region struggle to adapt to the increasingly tight business environment. Compliance with regulation increases production costs substantially. Many small farms leave the industry as only large and highly efficient businesses can afford to comply with regulations. These farms are highly focused on production and have little time or money to invest in environmental improvements. The pome fruit industry is decimated by an outbreak of fire blight. Overall, the farm-gate value of agricultural production in the region declines, led by the decline of both the dairy and horticultural industries.

Lifestyle residents purchase increasing amounts of land and water in the region; the value of both land and water rapidly escalates. The owners of some agricultural businesses fund their retirement through the sale of their properties to new lifestyle residents. The influx of lifestyle residents brings new sources of income, ideas and energy into the region. Schools prosper and a range of vibrant community groups contributes to the region. These lifestyle residents have a strong influence on local agencies and authorities.

The region continues to remain prosperous. The strength of the regional economy is less dependent on the fortunes of agriculture.

2020-2035: Technological developments enable laboratory-based food production systems that cheaply create sophisticated foods from basic carbohydrates. To assist in lowering the cost of raw ingredients, such as grains and pulses, governments permit the use of genetically modified organisms for agriculture. In view of the changed nature of agricultural production, the World Trade Organization agrees to remove all agricultural production subsidies. A limited number of affluent consumers continue to demand authentic food

products. However it becomes increasingly difficult to supply authentic food products that are free of modified genetics.

Continuing conflict in the Middle East encourages Australia to invest in biofuel production to secure energy supplies, particularly for the transport industry.

The climate continues to become drier, reducing irrigation water availability. The barrages at the mouth of the Murray River are removed to improve the health of the river, freeing up water entitlement for irrigators and the environment and lifting the limits on salt disposal from the region.

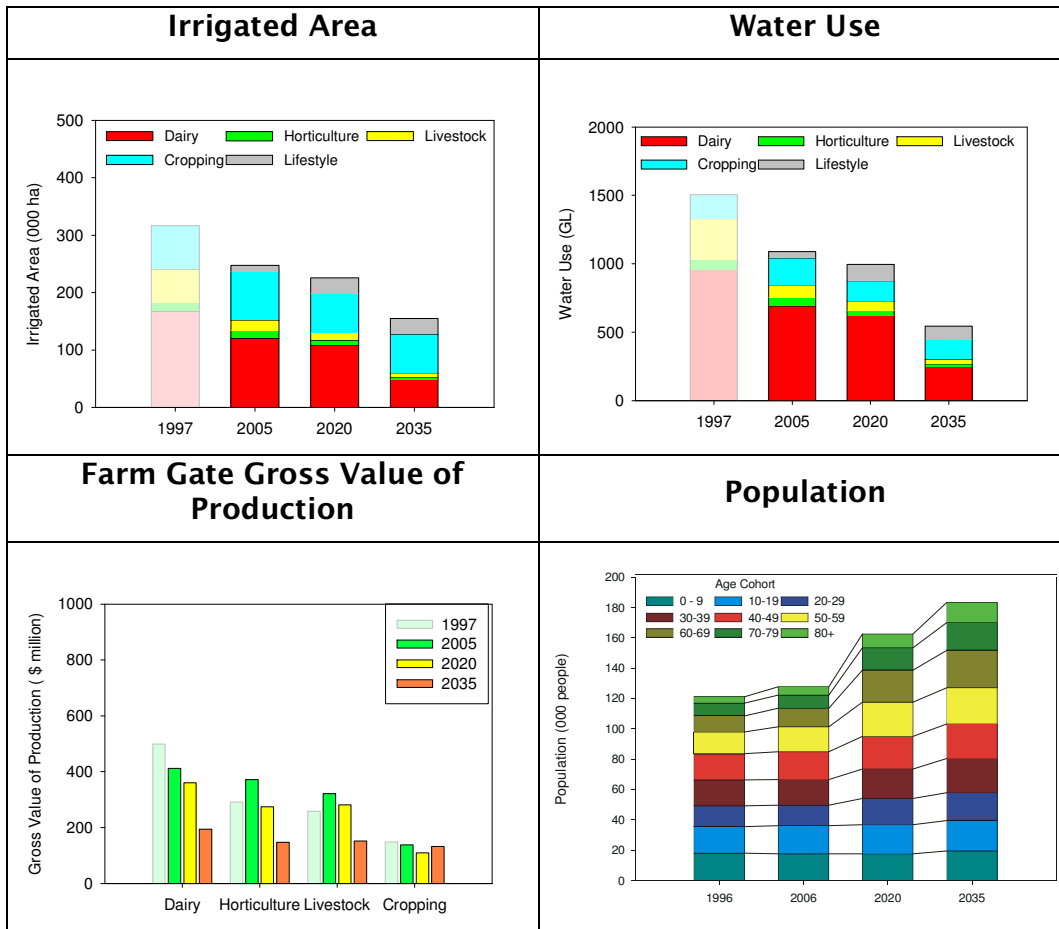
Urban and lifestyle residents are unsatisfied with environmental outcomes achieved through regulation of agricultural practice and encourage governments to purchase agricultural land for environmental purposes. Land is purchased to create buffer zones between industrial agriculture and lifestyle zones, while agricultural zones are further divided to create areas free of modified genetic material.

Agriculture production in the region changes significantly. The traditional dairy and horticultural industries experience a major contraction due to their replacement by laboratory-produced foods. A boutique authentic food industry enables some dairy and horticultural producers to survive. Cropping industries expand to support the production of laboratory food and biofuel industries. The limited availability of large land parcels suitable for cropping within the traditional irrigation areas causes large volumes of water to be traded out of the region to southern New South Wales and north-western Victoria.

The risk posed by salinity decreases as regional watertables drop due to dry climatic conditions and lower irrigation water use in the catchment. The area of native vegetation in the region increases through the development of buffer zones.

Throughout the scenario the population of the region grows strongly with the influx of lifestyle residents. Community groups are strengthened by new membership, particularly new retirees who have time to volunteer. The region continues to be prosperous, with a decreased reliance on agriculture.

Projections for Scenario 2 - New frontiers



Business impacts of Scenario 2 – New frontiers

If this scenario occurs, what changes might you need to make to:

The way that you operate your farm or business?

(For example, if you are a farmer, consider issues like the area that you irrigate, the irrigation layout, watering system, feed system etc)

Your business plan?

(Consider issues like changes to income stream, changes to cost structures etc)

If you do those things, what will be the impact on you and your family?

(Consider issues like your health, the health of family members, kids schooling etc)

If you do those things, what will be the impact on your community?

(Consider issues like social networks, schools, sporting clubs etc)

Scenario 3 - Pendulum

2005-2020: Federal and state elections deliver the balance of political power to green parties. Governments purchase 1500 GL of irrigation water entitlement from Victoria and remove all institutional barriers to interstate water trade. To manage the social impacts associated with the withdrawal of irrigation water, governments also support the restructuring of irrigation infrastructure and properties. Irrigation infrastructure is withdrawn from some parts of the region, while land that is retired from irrigation is resumed, amalgamated and resold as dry-land farms.

Following the ratification of the Kyoto Protocol and subsequent agreements, governments establish markets to enable the trade of environmental credits and services, starting with carbon, but later extending to biodiversity. These markets provide agricultural business with opportunities to diversify into new markets and products. The planting of native vegetation becomes a commercially attractive investment.

Global demand for fossil fuels begins to exceed available supplies, causing energy prices to rise. The production of biofuels becomes an increasingly economic prospect providing additional possibilities for the cropping industry.

The loss of water from the region causes the area of irrigated agriculture in the region to decrease substantially. The number of businesses supporting agriculture also contracts. Confidence in all agricultural industries declines resulting in reduced investment on farms. Remaining agricultural businesses improve their risk management by adopting a more flexible approach to managing their land and assets, and seeking long-term supply contracts. Processors invest in the development of differentiated products to increase profitability and carefully protect their intellectual property. The value of agricultural production in the region declines, particularly in the livestock and cropping industries.

The health of the environment in the region improves substantially. Recreational fishermen report increasing catches of native species and the region becomes a focal point for ornithologists from throughout Australia. The withdrawal of irrigation water causes regional water tables to decline and the risk of salinity throughout the region to decrease.

Divisions between residents of rural and urban areas intensify as rural communities resent ill-informed attitudes of urban communities, particularly toward the environment. The prosperity of the region declines and many shops in the towns close. Population growth slows to a minimum as young people leave the region to seek employment elsewhere.

2020 -2035: A conservative federal government, concerned with reinvigorating regional economies, perceives that increased environmental flows are not worth the economic cost. The federal government assumes control over the management of water and reallocates water entitlements from the environmental reserve, auctioning entitlements on the open market. Proceeds of the auction are used to rebuild and rehabilitate irrigation infrastructure in partnership with irrigator co-operatives.

The region experiences an extended period of higher than average rainfall. Floods occur in successive years, inundating large parts of the landscape, and enabling full irrigation allocations for the first time in many years.

After many years of economic reforms, China floats its currency on the open market. The value of the Australian dollar weakens considerably. Australian agricultural products become increasingly competitive in all Asian markets.

Internationally, consumers become increasingly concerned about the perceived side effects of genetically modified foods on human health. Australian governments retain a ban on the use of genetically modified organisms in agriculture. The ban creates many new export opportunities for producers.

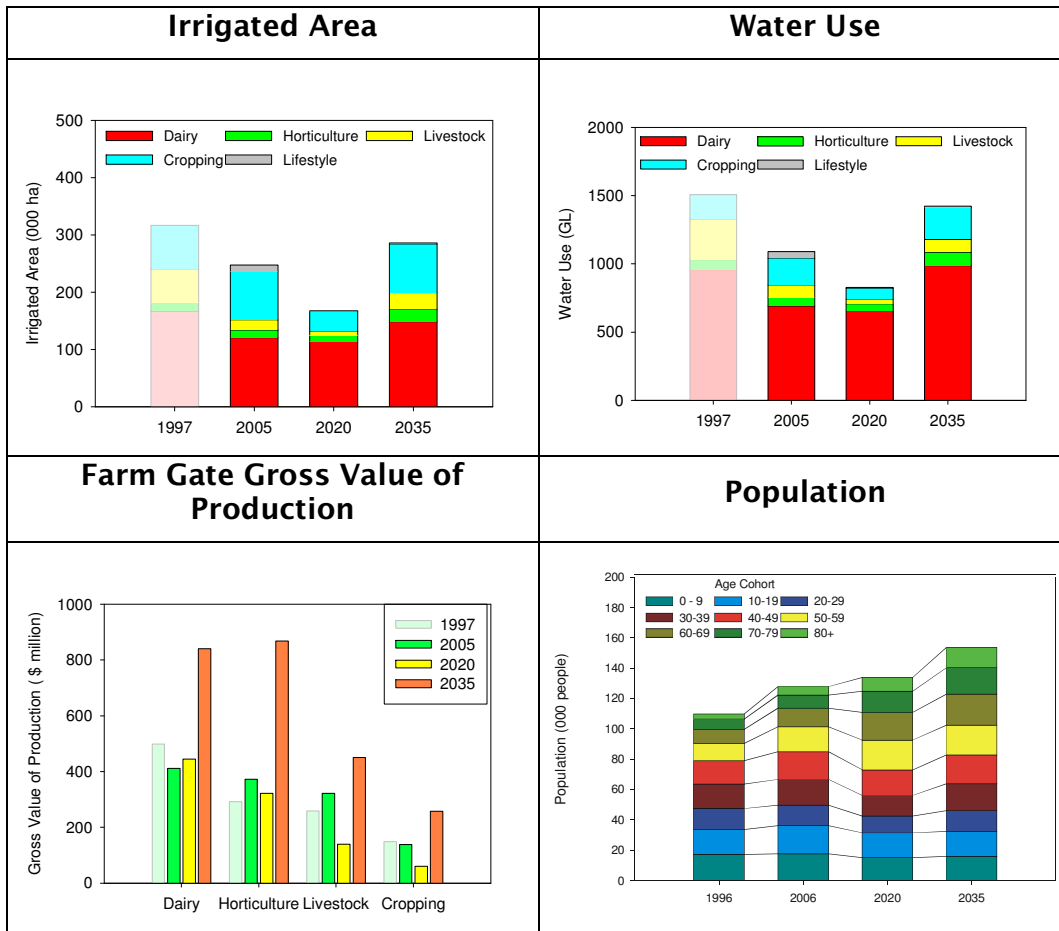
Agriculture within the region goes through a renaissance. Irrigated production expands throughout the region, including in the middle and upper parts of the catchment. The expansion is carefully planned so that irrigation occurs only in areas that are most suitable, using the most appropriate technologies. Agricultural producers use a diverse range of production systems and create a variety of products as industries target different market niches. Boutique cheese factories and pick-your-own horticultural producers emerge to cater for domestic markets.

The redevelopment of irrigated agriculture in the region creates an abundance of employment opportunities. Low population growth between 2005 and 2020 results in shortages of labour, slowing the pace of development. International and domestic migrants are attracted to the region by the possibility of making their fortune in an expanding economy.

While environmental controls for managing the offsite impact of irrigated agriculture are strongly enforced, increasing irrigation intensity and above-average rainfall result in rising regional watertables and increasing salinity risks. Wetter than average conditions enable terrestrial and riparian vegetation to thrive and aquatic biodiversity to prosper. Native fauna slowly colonise revegetated areas, as do introduced pests.

The region slowly regains its former prosperity.

Projections for Scenario 3 - Pendulum



Business impacts of Scenario 3 - Pendulum

If this scenario occurs, what changes might you need to make to:

The way that you operate your farm or business?

(For example, if you are a farmer, consider issues like the area that you irrigate, the irrigation layout, watering system, feed system etc)

Your business plan?

(Consider issues like changes to income stream, changes to cost structures etc)

If you do those things, what will be the impact on you and your family?

(Consider issues like your health, the health of family members, kids schooling etc)

If you do those things, what will be the impact on your community?

(Consider issues like social networks, schools, sporting clubs etc)

Scenario 4 - Drying Up

2005 - 2012: A major recession in the United States of America causes the value of the US dollar to decline. US agricultural products become increasingly attractive in international markets and encroach on traditional Australian markets for dairy, meat and grain products. China begins to control international export markets for labour-intensive and high-value horticultural products, while importing land-intensive bulk agricultural commodities.

Agricultural producers in the region lose many of their export markets and experience increasing competition in domestic markets. These industries seek market niches that enable them to maintain viability. Horticultural industries focus on high-quality fresh fruit for the domestic market, while the dairy industry attempts to capitalise on markets for value-added products, such as “nutraceuticals”.

2013 - 2020: The region experiences an extended period of severe drought. Record low rainfall over many years sees irrigation allocations below 100 per cent for 5 consecutive years, with the lowest allocation of 30 per cent.

Governments remain willing to support and provide financial assistance to communities experiencing exceptional hardship. Across the wider community the sense of egalitarianism declines with people less willing to help out those in need. However, local communities are drawn together to battle through the adverse conditions.

Agriculture producers experience extreme hardship. Initially, all producers scale back production to meet their available water. As the drought continues, many producers are forced to sell assets to make ends meet, while others rely on government assistance to put food on the table. Agricultural production in the region is decimated. Many producers leave the industry, some of those leave willingly, while others are forced off the land by banks foreclosing.

Governments introduce a moratorium on the payment of irrigation infrastructure charges to reduce the financial burden on agricultural producers. Irrigation infrastructure rapidly deteriorates as investment in maintenance and redevelopment is put on hold.

Low rainfall and surface-water availability causes the regional water table to decline throughout the region. Tributaries of the Goulburn River dry up completely and minimum environmental flows are not delivered for two consecutive years. Populations of fish and aquatic birds decline and recreational activities, including fishing, are restricted to minimise damage to ecosystems.

Regional population growth drops to zero as young people leave the region to seek employment elsewhere. Divisions exist within the community between those with wealth and employment and those without.

2020 - 2035: The global economy experiences a period of strong growth. Many Asian and South American countries become increasingly affluent as the balance of wealth across the globe becomes more uniform. Increased global affluence enables the World Trade Organization to agree to remove all agricultural production subsidies.

International and domestic consumers increasingly demand food with credence values, particularly those offering health benefits and produce using natural genetic stock. The Australian government ban on genetically modified organisms ensures local producers have a competitive advantage in international markets.

Governments provide assistance to rural communities to rebuild and take advantage of market opportunities, by investing in infrastructure to support agricultural production.

Conditions for agricultural production improve substantially. Above average rainfall allows full allocations of high-reliability irrigation entitlements and some allocations of medium-reliability entitlements.

Agricultural industries cautiously expand and intensify production systems. Many producers choose to invest in greenfield developments in preference to redeveloping in areas with a legacy of poor-quality infrastructure. Private and public companies invest in agricultural businesses on the expectation of long-term growth and profitability. The livestock industry is particularly successful at expanding production to capture new market opportunities, due to its relatively low capital requirements. The value of production of all agricultural industries grows substantially.

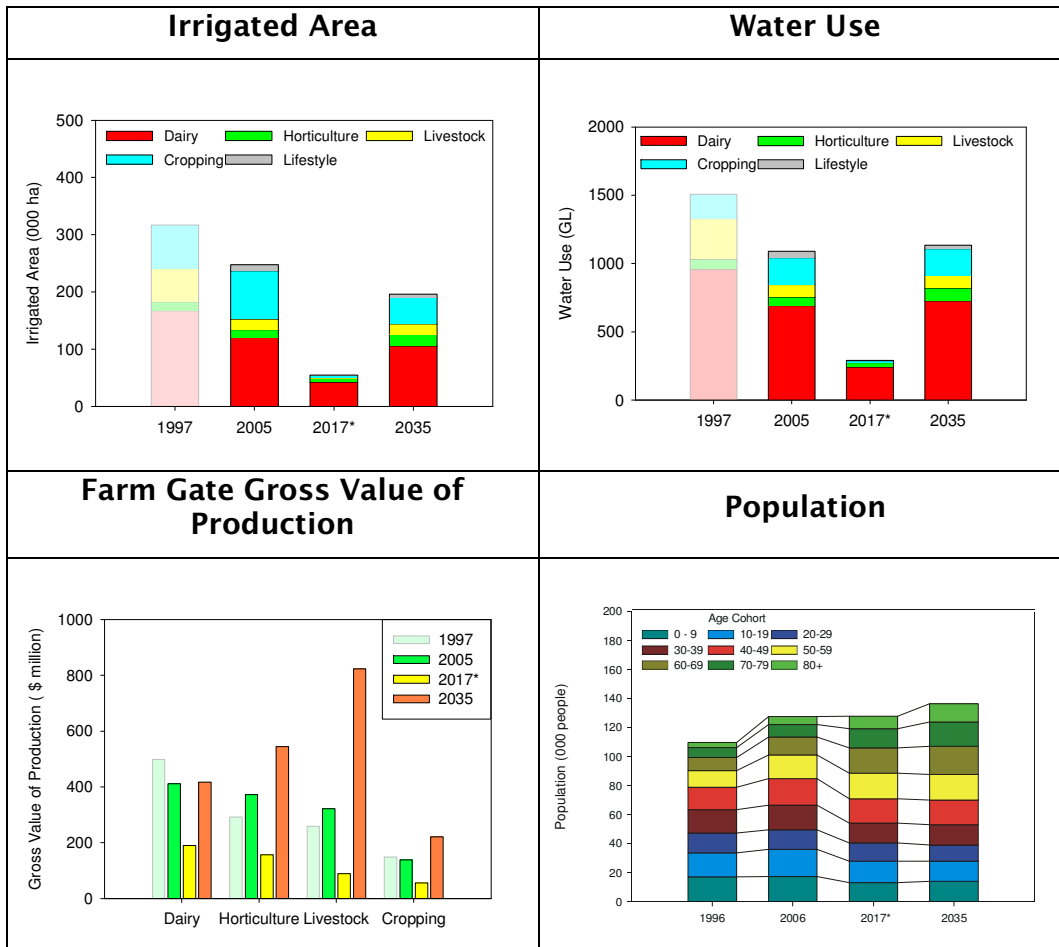
As agricultural industries expand, labour is in short supply. Governments facilitate and support the importation of guest workers to fill shortages of manual labourers. Population growth in the region is very low due to the continued decline in the number of young people.

Communities fundamentally change. Developments in communications technology cause the evolution of a new culture and set of social skills. Communities are formed around interests rather than locations. Many guest workers retain their links with their communities of origin rather than becoming involved in the region.

Wetter climate and increasing irrigation allocations cause the regional watertable to rise and the risk of soil and wetland salinisation to increase. Flows in the Murray and Goulburn Rivers increase allowing fish and aquatic bird populations to recover. The improving prosperity of agricultural producers and market signals encourages investment in improved land and environmental management.

Little by little, the prosperity of the region slowly recovers.

Projections for Scenario 4 - Drying up



Business impacts of Scenario 4 - Drying up

If this scenario occurs, what changes might you need to make to:

The way that you operate your farm or business?

(For example, if you are a farmer, consider issues like the area that you irrigate, the irrigation layout, watering system, feed system etc)

Your business plan?

(Consider issues like changes to income stream, changes to cost structures etc)

If you do those things, what will be the impact on you and your family?

(Consider issues like your health, the health of family members, kids schooling etc)

If you do those things, what will be the impact on your community?

(Consider issues like social networks, schools, sporting clubs etc)

Business impacts across all scenarios

Looking back across all the scenarios (the land/water etc effects are summarised on the next pages), what things might you do, and who might you talk with in relation to:

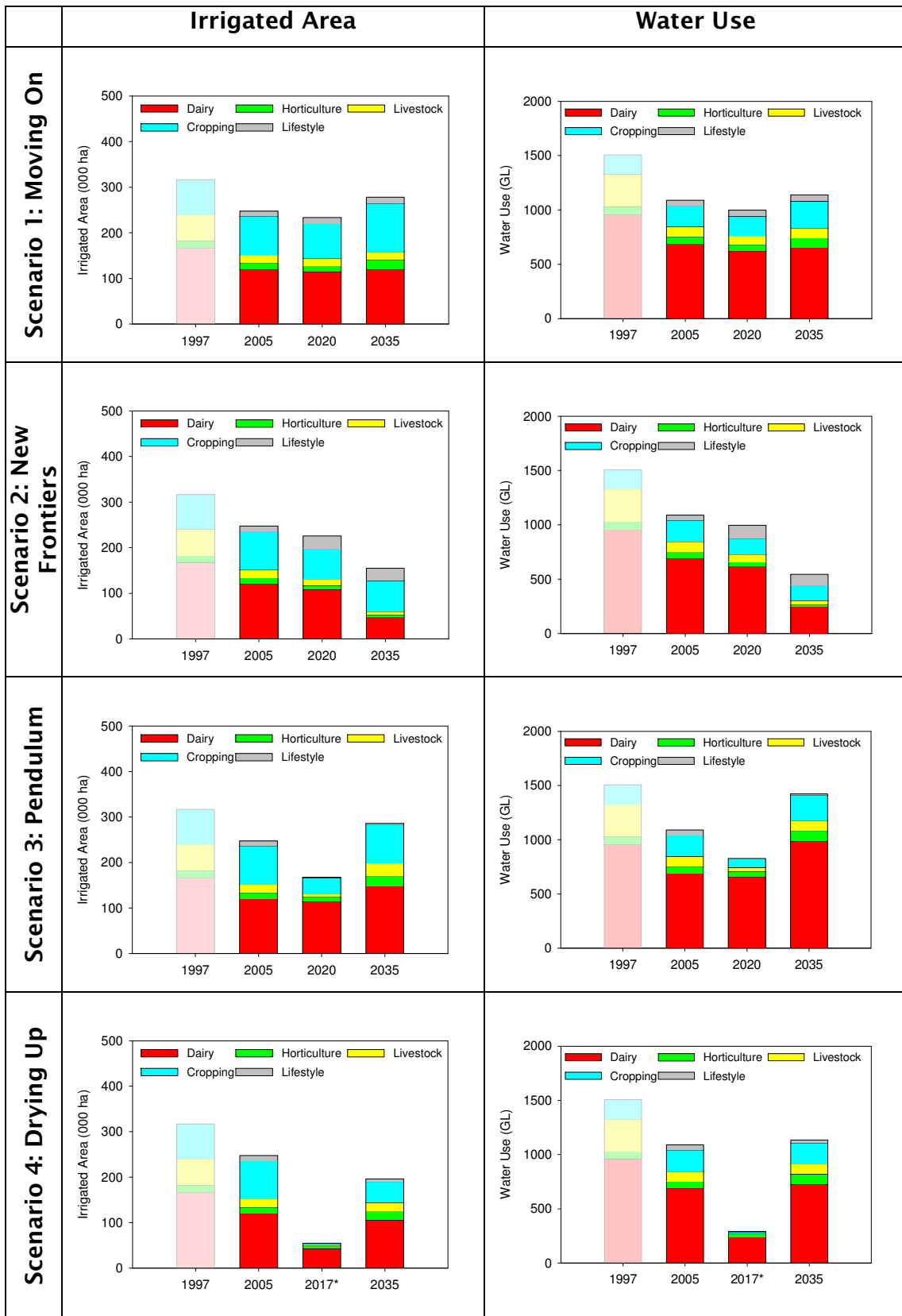
The way that you operate your farm or business?

Your business plan?

What about the family?

What about the community?

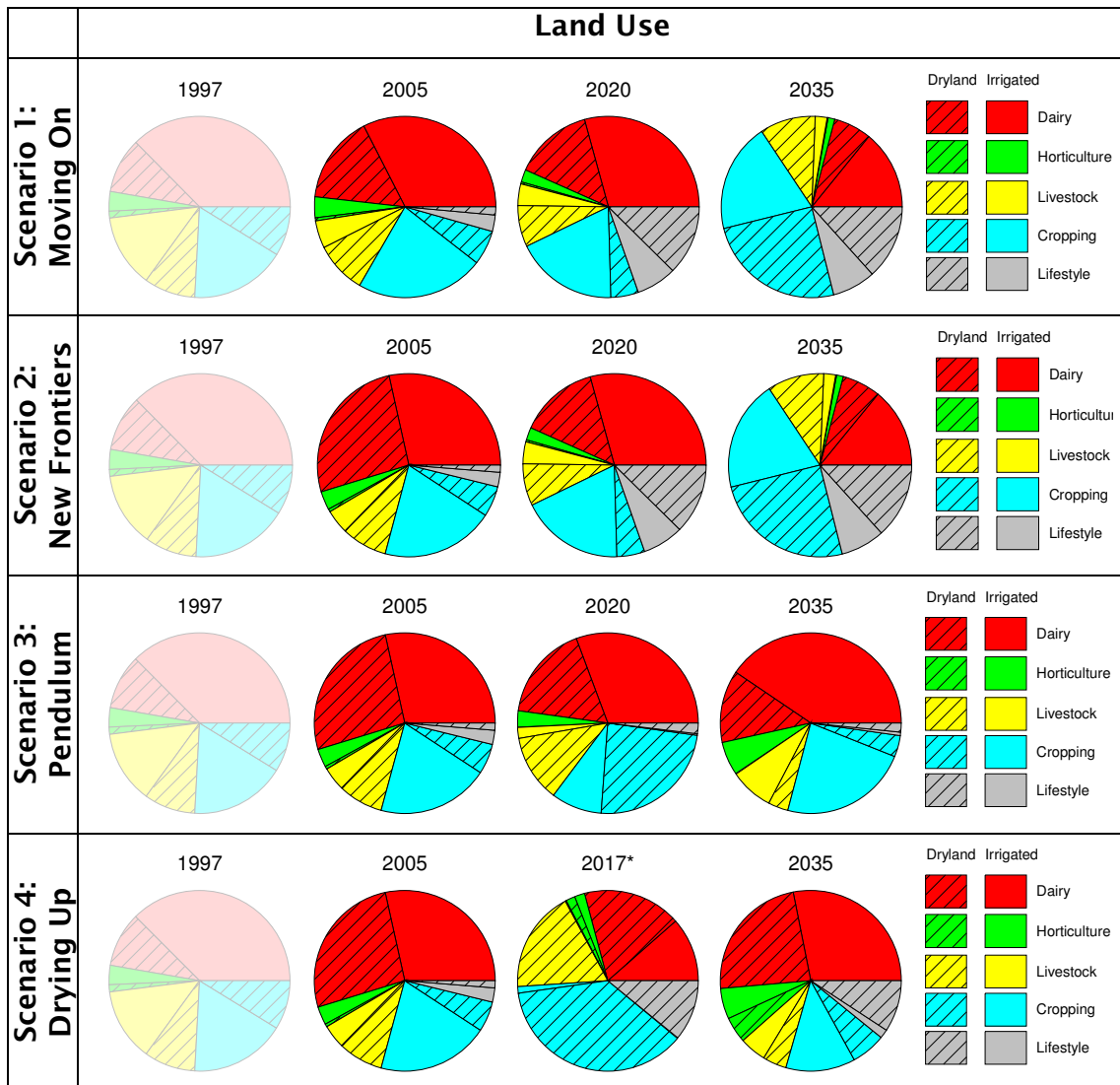
Projections across all scenarios for the Shepparton Irrigation Region



Projections across all scenarios for the Shepparton Irrigation Region

	Farm Gate Gross Value of Production	Population
Scenario 1: Moving On	<p>Gross Value of Production (\$ million)</p> <p>1997 2005 2020 2035</p> <p>Dairy Horticulture Livestock Cropping</p>	<p>Age Cohort</p> <p>0 - 9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 80+</p> <p>Population (000 people)</p> <p>1996 2006 2020 2035</p>
Scenario 2: New Frontiers	<p>Gross Value of Production (\$ million)</p> <p>1997 2005 2020 2035</p> <p>Dairy Horticulture Livestock Cropping</p>	<p>Age Cohort</p> <p>0 - 9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 80+</p> <p>Population (000 people)</p> <p>1996 2006 2020 2035</p>
Scenario 3: Pendulum	<p>Gross Value of Production (\$ million)</p> <p>1997 2005 2020 2035</p> <p>Dairy Horticulture Livestock Cropping</p>	<p>Age Cohort</p> <p>0 - 9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 80+</p> <p>Population (000 people)</p> <p>1996 2006 2020 2035</p>
Scenario 4: Drying Up	<p>Gross Value of Production (\$ million)</p> <p>1997 2005 2017* 2035</p> <p>Dairy Horticulture Livestock Cropping</p>	<p>Age Cohort</p> <p>0 - 9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 80+</p> <p>Population (000 people)</p> <p>1996 2006 2017* 2035</p>

Projections across all scenarios for the Shepparton Irrigation Region



Action Planning

Develop an action plan of the changes you need to make to your business, personal and community life. As you develop the action plan, you may want to seek advice and support from your family, accountant or other specialist advisor. The following template may help in your development of an action plan.

What needs to be done?	Who will do it?	When will they start doing it?	When will it be completed?	How will it be successful?

Further information and reading

Numerous sources are available to provide more information about the concepts of scenario, business and personal planning. The following are some information sources that may prove to be useful.

Business and personal planning

FarmBIS programs (<http://www.farmbis.ruralfinance.com.au>)

Local government small business development programs

Scenario Planning

Schwartz, P (1996) *The Art of the Long View, Planning for the Future in an Uncertain World*, Doubleday, New York.

van der Heijden, K (1996) *Scenarios – The Art of Strategic Conversation*, John Wiley and Sons Ltd, England.

Irrigation Futures Project

Robertson DE, Wang QJ, Soste L, Chaffe R, (2007) *Scenarios of the Future: Irrigation in the Goulburn Broken Region*, Land and Water Australia, Canberra.

Wang QJ, Robertson DE, Soste L, Chaffe R, (2007) *Regional Scenario Planning in Practice: Irrigation Futures of the Goulburn Broken Region*, Land and Water Australia, Canberra.

References

Department of Sustainability and Environment (2005) 'Know Your Area'.
Department of Sustainability and Environment, Melbourne

O'Brien P (2000) 'Scenario Planning: A Strategic Tool.' Bureau of Rural Sciences
Kingston, ACT.

van der Heijden K (1996) 'Scenarios: The art of strategic conversation.' John Wiley
& Sons Ltd.: Chichester, England

Young M (1995) 'Shepparton Irrigation Region Land and Water Salinity
Management Plan: The second five years (1995/95 - 1999/2000).' Institute of
Sustainable Irrigated Agriculture, Department of Agriculture, Energy and
Minerals.: Tatura.