

Irrigation Futures

of the Goulburn Broken Catchment



Final Report - Summary

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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.

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Provides project plans including the funding bid, participation, communication and evaluation plans.

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Irrigation Futures of the Goulburn Broken Catchment

Final Report - Summary

Abstract

The Goulburn Broken Irrigation Futures project used scenario planning with extensive stakeholder engagement to develop a vision for irrigated agriculture in the region over the next 30 years and strategies to assist achieving that vision. Scenario planning enabled the complex interactions that occur within the region and uncertainties associated with future systems to be considered in the development of the vision and strategies. Stakeholder engagement ensured that local knowledge, stakeholder values and ownership was built into project outputs.

The project developed four scenarios of how the future might unfold over the next 30 years. It then provided a broad assessment of the scenario implications for business, the environment, communities and the key competencies of the region. A suite of regional response strategies were developed. The assessment process was then focussed to consider the implications for the strategic planning and operational activities of particular agencies dealing with irrigated agriculture, with each agency developing appropriate response strategies.

A key finding is that the region will need to build its adaptive capacity if it is to realise the community's aspirations and to deal effectively with the challenges and opportunities of the future. This adaptive capacity will require individuals, businesses and organisations to be both flexible and adaptable. A wide range of mechanisms are available to increase flexibility and adaptability within the region. These include the innovative use of technology, infrastructure and management arrangements. To illustrate how this might be implemented, the project has developed a number of tools for organisations, businesses and individuals in the region.

The extensive engagement and communication program has resulted in many of the project findings being embedded in the strategic and business plans of organisations in the region. However, the region needs to carefully consider the best way to implement those strategies that do not currently have a natural owner.

The project has demonstrated that scenario planning can be used with communities for regional planning. It has developed a methodology for regional scenario planning that can be used by other regional communities. The methodology provides a step-by-step guide to the processes used in the Goulburn Broken Irrigation Futures project, and the lessons learnt by the project team through their implementation.

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Cooperative Research Centre for Irrigation Futures

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Project title:

Irrigation Futures of the Goulburn Broken Catchment (VPI3)

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Introduction

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 (Michael Young and Associates 2001). The region is 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 are highly uncertain and will impact 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, the National Action Plan for Salinity and Water Quality, the Cooperative Research Centre for Irrigation Futures and National Program for Sustainable Irrigation. The project adopted a scenario planning approach in collaboration with the region's stakeholders. The project objectives were to:

- Facilitate key stakeholders to develop a shared vision for the future of irrigation in the Goulburn Broken Region over the next 30 years, and to identify scenarios of major constraints and opportunities and of regional response options.
- Understand the social, economic and environmental consequences of various scenarios through impact assessment that integrates the best available knowledge.
- Facilitate key stakeholders to build consensus on preferred regional options for future irrigation, and recommend regional follow-up actions.
- Develop a methodology that can be applied elsewhere in Australia for sustainable irrigation planning at a catchment scale.

This document provides a brief overview of the *Irrigation Futures of the Goulburn Broken Catchment* project and highlights the key findings and knowledge assets generated. This first section provides the background to the project and introduces the project objectives. The second section provides a brief summary of the project methodology. The third section summarises the key findings and knowledge assets

generated by the project. The final section describes the companion reports to this final report and lists the conference papers produced during the project.

Summary of methods

This section provides an overview of the project stages, the processes used within each stage, and the lessons learned.

Overview

The project used a scenario planning approach to work with key stakeholders and the community in the Goulburn Broken Region to plan for the future of irrigated agriculture over the next 30 years. The main features of the scenario planning approach are:

- Stakeholder participation,
- Systems analysis, and
- Integration with the strategic planning cycles of key stakeholder groups.

A detailed description of the project methodology is given in *Final Report 2 - Regional scenario planning in practice: Irrigation futures of the Goulburn Broken Region*.

The project was implemented in four principal stages:

Stage 1 Project development – The project team worked closely with key stakeholder and community groups to develop project details. This work involved developing and refining project plans and establishing project governance structures. Extensive communication activities were then undertaken to publicise the project, and secure stakeholder and community commitment.

Stage 2 Capturing community perspectives – The project team engaged a wide range of stakeholder and community members to explore community aspirations, future scenarios and regional response options. This work was undertaken through a program of four Irrigation Futures Forum workshops held at six locations throughout the region. Interviews with business leaders were also undertaken.

Stage 3 Conducting analysis – The project team then worked with a skill-based Technical Working Group to analyse and further develop the ideas generated during Stage 2. Four scenarios were constructed to represent plausible futures of external drivers, regional responses and consequences. Implications of these scenarios for key regional competency areas were explored. A suite of strategies to protect and enhance the key regional competency areas was developed for the region.

Stage 4 Enabling change – The project team worked closely with targeted organisations and groups to build the learning from the project into their business and strategic plans. This was achieved through a series of focussed investigations and communication activities. A number of tools and processes to support change were also developed.

An overview of the timing and activities undertaken within each of the four stages of the project is provided in Table 1.

Lessons

At the commencement of the project, a clear project organisational structure was established. This organisational structure defined separate groups to oversee project investment and governance decisions (Governance Committee) and to oversee stakeholder engagement processes (Stakeholder Reference Committee). Additional working groups and forums were also used to facilitate community and agency involvement in the project. Clearly defining the project organisation structure allowed all participants to understand the project governance

arrangements and the relationships between different project groups. This provided participants with confidence that their contributions would be used and that their commitment to the project was manageable.

As the project progressed, we found that it was necessary for the project methodology to evolve. This evolution was the result of the exploratory nature of the project and was due to a number of reasons. The nature of the output from Stage 2 was substantially different to what was anticipated, with regional options being complementary rather than alternative. The literature review undertaken to develop the detailed methodology for Stage 3 identifying an alternative approach that was more suitable than that which was initially proposed. The combination of these two factors meant that the approach to Stage 4 was redesigned. Stage 4 focused on engaging with agencies in their strategic planning processes and supporting their implementation of the project findings, rather than building consensus on a preferred plan within the community. The project Governance Committee was supportive of these changes provided that the original objectives of the project were not compromised, and they had sufficient evidence to justify the adaptive changes. The ability to adapt enabled the project to maintain the commitment of participants, and also to deliver a wide range of practical outcomes to stakeholders.

Table 1 Irrigation Futures project overview

Stage	1. Project Development	2. Capturing community perspectives	3. Conducting analysis		4. Enabling change	
	2003	2004	2005	2006	2007	
Aims	<ul style="list-style-type: none"> Develop detailed project plans Secure stakeholder commitment 	<p>Work with stakeholders to capture perspectives on</p> <ul style="list-style-type: none"> aspirations for the future what the future might hold, and the options available to the region 	<ul style="list-style-type: none"> Develop detailed scenarios describing regional responses and consequences Identify regional competencies and scenario implications Refine strategies. Communicate aspirations, scenarios, and regional strategies to key stakeholders. 	<ul style="list-style-type: none"> Incorporate scenarios in strategic planning processes of regional agencies Communicate findings to key regional stakeholders. Develop practical tools with stakeholders 		
Methods	<ul style="list-style-type: none"> Establish governance structures Communication with stakeholder organisations Development and review of project plans 	<ul style="list-style-type: none"> Series of 4 workshops held at 6 locations throughout the region. Targeted programs for under represented groups. Synthesis of outputs by Stakeholder Reference Committee 	<ul style="list-style-type: none"> Use Technical Working Group to: Develop scenario stories that include external scenarios, the region's responses and the regional social, environmental and economic consequences of these responses. Identify implications for regional competencies. Provide briefings for key regional stakeholders and umbrella groups. 	<ul style="list-style-type: none"> Work with regional agencies to: assess the scenario implications develop appropriate response strategies. develop practical tools to support implementation of strategies. Develop material to promote project findings. 		
Output	<ul style="list-style-type: none"> Project plan Stakeholder participation plan Evaluation plan Communication plan 	<ul style="list-style-type: none"> Regional aspirations 4 plausible external scenarios Collation of regional assets Suite of regional strategies Collation of stakeholder options 	<ul style="list-style-type: none"> Detailed scenarios describing regional responses and consequences developed. Broad scenario implications and regional strategies identified. 	<ul style="list-style-type: none"> Scenario implications for catchment management, irrigation infrastructure, land use planning Tools for agencies. Scenario planning methodology. Scenario book. Scenario kit. 		

Project results

The project produced results in five major areas:

- Stakeholder engagement;
- Regional aspirations, scenarios and strategies;
- Practical guidelines and tools;
- Scenario planning methodology and
- Communication and adoption.

This section provides a summary of the output generated and lessons learned for each of the five major result areas.

Stakeholder engagement

Summary

A wide cross section of the community and stakeholder organisations contributed their knowledge and ideas to the exploration of the future of irrigation in the region, while also building their capacity to deal with what the future might hold.

Output

A large number of stakeholders and community members were engaged during the life of the project to ensure a broad representation of community views and values. The details of the approach to stakeholder engagement and the lessons learnt by the project team through its implementation are described in *Final Report 2 – Regional scenario planning in practice: Irrigation futures of the Goulburn Broken Region*.

The project captured the knowledge and values of the regional community through several workshop programs. During Stage 2 of the project, more than 120 members of the regional community contributed over 500 person days to the Irrigation Futures Forums. These forums discussed aspirations for the future of irrigation in the Goulburn Broken Region, the major constraints and opportunities facing the region and the response options the region could take to prepare for the future. During Stage 3, 25 members of the Technical Working Group met on at least 10 occasions to discuss how the region may respond to the scenarios and plausible consequences of the scenarios. During Stage 4 of the project, workshops involving over 90 people, including agency staff and community members, were involved in identifying the scenario implications for specific issues. The knowledge and values captured within these workshop programs is contained within the final output of the project.

The project also enhanced the capacity of participants to deal with opportunities and challenges that the future may hold. Participant's involvement in the workshop programs exposed them to new ideas and alternative points of view and provided them with opportunities to expand their industry and social networks. The project team also ran an Invited Speakers Day which provided participants with expert perspectives on international market developments and community development. Details of the increased community capacity are provided in *Final Report 8 – Project evaluations*.

The project ensured that stakeholders were kept informed of project progress throughout the life of the project with regular newsletters and briefings. This

continued communication developed ownership of the project findings and output in the regional community. At the conclusion of the project, numerous participants volunteered to act as champions within their community group or provide a community conduit to senior politicians and policy makers.

To maximise the diversity of community views and values, the project engaged many people who had not traditionally been involved with agricultural and natural resource management organisations. Special activities were also held for young people and women in agriculture. However, engagement of the region's indigenous communities proved to be beyond the resources of the project.

Lessons

The project team learnt a number of lessons about engaging the community in the development of the shared vision, scenarios and regional response options.

Stakeholders were keen to participate in an exploration of the future. Retention rates for all workshop programs were greater than 80%, with some participants in the Irrigation Futures Forums requesting additional workshops so they could make a greater contribution to the project. We found that stakeholders were willing to engage for a number of reasons. Many do not often have the opportunity to contribute to strategic planning processes. As a result, they were enthusiastic about having some influence over the future directions of the region. The project also established important principles for the participation process. This meant that the role of the project team was one of facilitating the capture of stakeholder views, and that processes were to be as inclusive and equitable as possible. While initially some participants found this confronting and difficult to appreciate, the fact that their opinions were respected and faithfully represented encouraged their continued contribution to the project. High participation rates were also helped by the high level of communication maintained with each member of the project groups.

We found that many of the ideas generated by the community were complementary and in some instances convergent. This complementarity and convergence can be attributed to the use of workshop processes that revealed participant's underlying values and ambitions, rather than their immediate concerns. These types of workshop processes, where tasks were not approached directly, allowed participants to find common ground and openly debate issues without being antagonistic or resulting in conflict. Further detail of the techniques used in workshops is described in *Final Report 2 – Regional scenario planning in practice: Irrigation futures of the Goulburn Broken Region*.

Regional aspirations, scenarios and strategies

Summary

The community and organisational stakeholders articulated their aspirations for the future of the region, the challenges and opportunities that the future may present, and strategies to build the region's capability to manage those potential opportunities and challenges.

Output

The principal output of the project is described in *Final Report 1 - Scenarios of the future – Irrigation in the Goulburn Broken Region*. This output includes:

- A set of *community aspirations* that describe how the community would like to see itself in 30 years time.
- Four *scenarios* that describe the unfolding of plausible alternative futures for the region. These scenarios include the evolution of driving forces, responses of the region's residents and organisations, and the impacts of the driving forces and responses on the social, economic and environmental well-being of the region.
- *Challenges and opportunities* that the scenarios present for the key regional competency areas. These describe features of the region that provide a competitive advantage.
- A suite of *regional strategies* that describe how the region can protect and strengthen the regional competency areas over the next 30 years.

The community aspirations were articulated by the Irrigation Futures Forums. There was substantial convergence in these aspirations and their subsequent presentation to a range of stakeholders suggests that they representative of the views of the wider community.

The four scenarios describe the evolution of very different futures for the region. The social, economic and environmental consequences vary considerably between the four scenarios. The variation in the consequences for the region arises from the different driving forces, variation in the region's human responses to those driving forces, and alternative plausible responses of social, environmental and economic systems to the drivers and responses. The contrasting social, economic and environmental consequences between the scenarios highlight that the future is uncertain. Therefore, individuals, businesses and organisations need to consider a range of possible futures in their long-term planning. The scenarios provide a sound base for the planning of individuals, businesses and organisations. They provide a range of possible environments where robust strategies can be developed, or where the robustness of strategies can be assessed.

The scenarios were developed in a multi-stage process. During Stage 2, the project team worked in collaboration with the Stakeholder Reference Committee to develop external scenarios describing the evolution of external driving forces, from ideas generated by the Irrigation Future Forums.

During Stage 3, the external scenarios were then transformed into full scenarios that describe the interplay between external driving forces, the responses of individuals, businesses and organisations and the social, economic and environmental well being of the region. The full scenarios were developed by integrating a range of knowledge and analysis. Qualitative analysis was undertaken by a skill-based Technical Working Group, who used their knowledge and

experience to describe the expected responses of individuals, businesses and organisations and the expected impacts for the social, economic and environmental well being of the region. This was complemented by quantitative systems analysis and modelling undertaken by the project team. The quantitative analysis used selected indicators to provide illustrative examples of the magnitude of the social, economic and environmental consequences of the scenarios.

The project developed a suite of regional strategies that describe the broad implications of the scenarios for the region as a whole. These regional strategies originated with response options suggested by the Irrigation Futures Forums and were further developed and refined through subsequent project processes including the Technical Working Group, and feedback from communications activities. The regional strategies have been presented to, and discussed with, a broad range of agencies and community groups. They represent a consensus of opinion on regional options that should be pursued in order to prepare for change.

The regional strategies are underpinned by the ideas of building the adaptive capacity of the region. This adaptive capacity requires individuals, businesses and organisations to be both flexible and adaptable. Flexibility can be built into systems through such mechanisms as innovative use of technology, infrastructure, organisational structures, financial arrangements and management systems. Adaptability requires the ability to operationally recognise and understand changes that may occur, and once change has been identified, to consciously make informed choices about the future.

Building the region's adaptive capacity includes creating an environment where organisations, businesses and individuals can capitalise on the opportunities that may present. For example, the physical conditions within the region, such as soils, climate and topography, are highly suited to a wide range of agricultural and other land intensive industries. As the future unfolds, opportunities will emerge for the development of new industries, for example biofuel production, and the evolution of existing industries. Attracting and retaining these new and evolving industries in the region will require planning and support systems that are responsive to the needs of these industries. Areas that are of immediate importance to the creation of an environment that will allow the region to capitalise on emerging opportunities include land use planning, infrastructure improvement and work force development. Detailed descriptions of how the adaptive capacity of the region can be developed are provided in a number of the companion reports at the rear of this document.

Lessons

Several lessons were learnt by the project team in developing regional aspirations and scenarios and identifying appropriate regional strategies. The detail of these lessons is described in *Final Report 1- Regional scenario planning in practice: Irrigation futures of the Goulburn Broken Region*.

Many of the issues and concepts dealt with in developing the scenarios and identifying their implications for the region were complex. This meant that participants required time to understand and come to terms with many of the issues and concepts that were discussed. We found that allowing time, within and between workshops, for participants to reflect on the issues and concepts enabled their thinking to develop and change. For example, at the start of the Technical Working Group process, many participants thought lifestyle residents were a threat to the agricultural productivity of the region. At the conclusion of the process the attitude of many participants' had changed, with lifestyle residents being viewed as valuable contributors to the regional economy and community. These changes in

thinking around potentially controversial issues had a significant influence on the nature of the regional strategies developed, and improved the quality of the project findings considerably.

The scenarios provided a solid foundation for discussing how the region could prepare for the future. As the project progressed, several of the challenges and opportunities described in the scenarios became reality. For example, one of the scenarios suggested that the Federal Government would take over responsibility for water resources, while another suggested a drought with water allocations as low as 30%. The occurrence of these projections did not diminish the value of the scenarios, but gave participants confidence that scenario planning was a useful tool, and reinforced the necessity of the strategies that had been identified. However, this does highlight the fact that scenarios have a finite life, and other projects need to develop their own scenarios. This is supported by the practices of leading organisations, such as Royal Dutch Shell, who update their scenarios every four to five years.

Practical outcomes, guidelines and tools

Summary

The project team collaborated with stakeholder groups to embed project findings in their strategic plans, and to develop practical tools to support the adoption of these findings.

Output

To foster the adoption of project findings, the project team collaborated with key regional stakeholder groups in their strategic planning exercises. These collaborations included Goulburn-Murray Water, Goulburn Broken Catchment Management Authority and the local governments in the north of the Goulburn Broken Region. As a result, many of the regional strategies developed are now embedded in the strategic and operational plans of the collaborating organisations. This ensures that follow up actions are implemented at the conclusion of the project. The output of these collaborations is summarised in the following reports:

- *Final Report 3 - Perspectives of future irrigation*
- *Final Report 5 - Scenario implications for catchment management*
- *Final Report 9 - Scenario implications for land use planning*

These collaborations have resulted in practical outcomes for key regional stakeholder groups. For examples, Goulburn-Murray Water is now considering mechanisms to provide different levels of service to irrigators as a part of their irrigation reconfiguration planning processes. They are also recognising that parts of the irrigation supply system may have different life expectancies, and are building the consideration of flexibility into their selection of technologies and design processes.

The collaboration also resulted in the development of a number of tools and processes. These provide practical means for organisations and individuals in the region to implement the project findings in their routine planning and activities. These tools and processes are contained in the following companion reports:

- *Scenarios of the future: Irrigation in the Goulburn Broken Region* (Final Report 1). This provides a summary of the project findings, including an overview of the region, drivers for change, scenarios, implications and strategies, and how they might be applied by individuals and organisations in the region
- *Handbook of flexible technologies for irrigation infrastructure* (Final Report 4). This provides guidelines and tools for irrigation supply infrastructure design.
- *A framework for R&D to support adaptive management in the Goulburn Broken Catchment* (in Final Report 5).
- *Scenario planning for individuals and businesses* (Final Report 6). This provides a tool to assist individuals and businesses to assess the scenario implications for their enterprise.
- *Business futures* (Final Report 10). This identifies the issues which need to be considered by businesses and agencies to support the development of differentiated products in the region.
- *Water and food: futures thinking* (Final Report 11). This provides curriculum material for secondary school students.

Lessons

The participation of stakeholders was essential in the development of the practical outcomes, guidelines and tools. Through their participation in the development of the practical outcomes and tools, the capacity of stakeholders to understand what the future may hold and the nature of the strategies that are required to prepare for the future was substantially enhanced. These strategies, about building the adaptive capacity of the region, are not immediately apparent to people who have not participated in the scenario planning process. This was illustrated by several significant shifts in the thinking of organisations within the region and the strategic directions they plan to take. For example, the Sub-surface Drainage Program of the Catchment Management Authority identified that they need to develop methods to decommission and mothball groundwater pumps and identify when it is appropriate to do so. Stakeholder participation in the development of the practical outcomes and tools also ensured that the region has ownership of the findings and output from the project. This will allow the project to have a substantial and perpetual impact on the future direction of the region.

Scenario planning methodology

Summary

The project has developed, documented and tested a regional scenario planning methodology that can be used by communities for regional planning.

Output

The project developed and tested a methodology for regional scenario planning. The detailed methodology is documented in the book *Regional scenario planning in practice: Irrigation futures of the Goulburn Broken Region* (Final Report 2). The book summarises the activities undertaken within each project theme, and the lessons learnt by the project team in the implementation of each theme. It provides a guide for other organisations wishing to undertake scenario planning at a catchment scale.

The project team has worked with organisations in other regions, specifically the Mallee and Northeast Catchment Management Authorities, to support their development of similar scenario planning projects. The methodology has also been incorporated into a new project looking at how agricultural industries can potentially adapt to climate change being run by the Victorian Department of Primary Industries.

Detailed plans were developed for each of the principal stages of the project. To support others in undertaking similar regional planning projects we have made available these project plans in *Final Report 7 – Handbook of project plans*. Independent evaluation of participant satisfaction and of project processes was also undertaken. These evaluations highlight some of the features of the methodology which are important to the project's success. The evaluation reports are included in *Final Report 8 – Project evaluations*.

Lessons

We found scenario planning to be a useful tool to engage stakeholders and the community in strategic conversations about the future. It provided a strong framework to conceptualise and discuss the complex systems that operate within the region and to consider how these systems may evolve in the future. We observed that those who participated in the scenario planning process developed their capacity to understand and prepare for the future. We also observed that it allowed the thinking of organisations in the region to evolve, and encouraged these organisations to gain a deeper understanding of their roles and activities.

Linking with the strategic planning of stakeholder groups proved to be one of the key factors contributing to the success of the project methodology. This allowed the strategies that were identified through the project to become embedded in the strategic plans of the major organisations in the region. As a result the project findings were made directly relevant to the participant organisations in such a way that they will have a lasting legacy for the region.

We found that the focussed investigations provided a useful vehicle to demonstrate the specific implications of the broad regional strategies. The regional strategies were often too general for agencies to identify their role and responsibilities in strategy implementation. The focussed investigations allowed stakeholder agencies to 'personalise' the regional strategies by exploring the implications of the scenarios for their activities, and to develop the tools and processes needed to

support the implementation of the broad strategies. This proved to be extremely valuable in providing the practical outcomes sought by managers within stakeholder organisations.

Communication and adoption of project findings

Summary

The adoption of project findings was encouraged through stakeholder participation, integration with regional strategic planning activities, the collaborative development of practical tools, and an extensive program of communication activities.

Output

Stakeholders were actively involved in the project throughout its life. These participatory processes built stakeholder ownership of the project and its findings, and therefore encouraged the adoption of project outputs. In addition, participation built stakeholder capacity to deal with challenges and opportunities, and to understand the systems that operate within the region.

The project worked closely with key stakeholder groups to integrate project findings with the strategic and operational plans of regional organisations. Project findings were incorporated into Goulburn-Murray Water's infrastructure reconfiguration planning, the GBCMA's regional catchment strategy, and a Rural Strategy for the City of Greater Shepparton and Shires of Campaspe and Moira. This integration resulted in the region's organisations endorsing the project findings and embedding them in to their strategic directions for the future.

The project team worked collaboratively with stakeholders to develop tools and process to assist with the adoption of the project findings. Two major publications that describe the principal project findings are:

- *Scenarios of the future: Irrigation in the Goulburn Broken Region* (Final Report 1) and
- *Regional scenario planning in practice: Irrigation futures of the Goulburn Broken Region* (Final Report 2).

Processes and tools have also been developed to support the adoption of the project findings by specific organisations. For example, a *Framework for research and development to support adaptive catchment management* (in Final Report 5) was developed for the GBCMA and a *Handbook of flexible technologies for irrigation infrastructure* (Final Report 4) was developed for Goulburn-Murray Water. These tools and processes have been developed with stakeholder organisations to meet their specific needs, and are therefore likely to be adopted.

To assist the wider community use the project findings, the project has produced a booklet on *Scenario planning for individuals and businesses* (Final Report 6). This publication will be delivered to primary producers and other businesses through industry associations and extension programs. Curriculum material for secondary schools is also being produced in the booklet *Water and food: futures thinking* (Final Report 11).

The project has also made extensive efforts to communicate findings to members of the community and organisations who have not directly participated in project activities. Information sessions were held throughout the region to assist the community and regional agencies understand the project findings and their relevance for their personal and organisational planning. These communications have also encouraged the region's organisations and the community to consider how the regional strategies that do not fall within the 'core business' of a single organisation, can be adopted by the region.

Throughout the life of the project, briefings on project progress and findings were continually provided to Departmental Ministers and Secretaries, the Department of Sustainability and Environment and local governments in the region.

Communication activities have also been undertaken to support and encourage the use of scenario planning by other organisations. The project methodology and findings have also been presented at several national and international conferences. These conferences include:

- Department of Primary Industries - Linking Research and Extension Conference
- Australian National Committee on Irrigation and Drainage Conferences
- ABARE Outlook Conference
- Australasia-Pacific Extension Network Conference
- Beijing International Symposium on Water Resources Management
- Sustainable Economic Growth for Regional Australia
- Water 07

Lessons

We found communicating the usefulness of scenarios to the range of audiences within the region to be challenging. To assist with such communication, it was necessary to produce several different versions of differing length and complexity. We found that graphics and particularly the graphical results of the scenario modelling were powerful in gaining stakeholder acceptance and understanding of the scenarios. Even though the modelling results were indicative, the graphs provided people with a 'feel' for the quantitative impacts of the scenarios for the region in a manner that written text could not. The simple graphical depictions of the scenario names also assisted in communicating the underlying themes of the scenarios. Verbal descriptions also assisted people to understand the written scenarios. These descriptions could be varied between audiences allowing the level of detail described to be commensurate with audience interests.

Conclusions

The Goulburn Broken Irrigation Futures project used scenario planning to explore how the Goulburn Broken Region can prepare for the opportunities and challenges in irrigated agriculture over the next 30 years. The scenario planning approach had three main features: Stakeholder participation, Systems analysis and Integration with the strategic planning of key stakeholder groups.

A wide range of stakeholders were engaged throughout the life of the project. These stakeholders included a large number of people who have traditionally not been involved with the region's agricultural and natural resource management organisations. The involvement of stakeholders has enabled the use of local knowledge and values, built the region's capacity to deal with the challenges and opportunities that the future might hold, fostered regional ownership of the project outputs and findings, and established a network champions to support the implementation of project findings.

The project has developed a wide range of strategies and tools which will assist organisations, businesses and individuals in the region prepare for the future. The principal output from the project includes aspirations for the future of irrigated agriculture, a set of four scenarios that describe plausible alternative futures for the region, and suite of strategies that describe how the region can protect and strengthen the features that make it attractive for living and business.

The principal finding is that the region will need to build its adaptive capacity to ensure it can realise its aspirations and deal with the challenges and opportunities the future may present. This adaptive capacity will require individuals, businesses and organisations to be both flexible and adaptable. A wide range of mechanisms are available to the region to increase flexibility and adaptability. They include the innovative use of technology, infrastructure and management arrangements. The project has collaborated with a range of regional stakeholders to identify how these project findings can be translated into practical outcomes and tools for organisations, businesses and individuals in the region.

Communication and adoption activities undertaken have enabled many of the project findings to become embedded in the strategic and business plans of organisations in the region. However, there are still a significant number regional strategies for which there is currently no single responsible organisation (for example, regional knowledge management). For the region to realise the maximum benefit from this work, champions will be required to promote the adoption of these strategies.

The project has developed and documented a methodology for regional scenario planning, which can be used by other communities. This is based on the approach used for the Goulburn Broken Irrigation Futures project and the lessons learnt by the project team through its implementation. Several other regions are currently developing scenario planning projects, and propose to use this scenario planning methodology as a model.

Summary of supporting documentation

Several companion publications provide the details of the project methods and output.

Final Reports

Final Report 1 - Scenarios of the Future

A comprehensive review of irrigation in the region, the drivers for change, the scenarios developed, their implications for the region and how individuals and organisations can use the project findings in their planning.

Final Report 2 - Regional scenario planning in practice

An outline of project methodology used and the lessons learned by the project team in implementing the project methodology.

Final Report 3 - Perspectives of future irrigation

An assessment of scenario implications for planning and operation of irrigation supply infrastructure.

Final Report 4 - Handbook of flexible technologies for irrigation infrastructure

A framework and tools for the provision of flexibility in the design and operation of irrigation supply infrastructure.

Final Report 5 - Scenario implications for catchment management

A summary of the scenario implications for catchment management in the Shepparton Irrigation Region and a framework for research and development to support adaptive catchment management.

Final Report 6 - Scenario planning for individuals and businesses

A tool that can be used by industry extension providers to assist irrigators assess the scenario implications for their business.

Final Report 7 - Project plans

The plans developed within the project as a model for others: Project proposal, Participation Plan, Communication Plan, Evaluation Plan, Scenario Assessment Plan, and the Adoption Plan.

Final Report 8 - Project evaluation

The results of an evaluation of stakeholder satisfaction with the Irrigation Futures Forums and Technical Working Group processes and a review of the project processes identifying those that were essential, identifying where there were alternatives and identifying those that were unique.

Final Report 9 - Scenario implications for land use planning

A summary of the implications of land-use change for zoning, services, economic development and communities.

Final Report 10 - Business futures

An outline of how the region can create an environment which fosters innovation for product differentiation.

Final Report 11 - Water and food: futures thinking

Project findings translated into school curriculum material.

Final Report 12 - Fact sheet

A one page overview of project aims, processes and outputs.

Conference Papers

Soste L, Wang QJ, Robertson D and Chaffe R Scenario planning with regional communities (2007). *Proceedings of the Sustainable Economic Growth for Regional Australia Conference 2007*, Wollongong.

Soste L, O'Keefe S, Wang QJ, Robertson D and Poulton D (2007) Flexible technologies for irrigation delivery infrastructure. *Proceedings of the Australian National Committee on Irrigation and Drainage 2007 Conference*, Bundaberg.

Wang QJ, Robertson D, Soste L and Chaffe R (2007) Embracing change and developing strategies through scenario planning to ensure the future of the irrigation community in the Goulburn Broken Region. *Proceedings of the Water07 Conference*, Melbourne.

Wang QJ, Robertson DE, Soste L, Chaffe R (2006) Scenarios of the future: Irrigation in the Goulburn Broken Region. *Proceedings of the Australian National Committee on Irrigation and Drainage 2006 Conference*, Darwin.

Wang QJ, Soste L, Robertson DE, Handley S, Chaffe R (2006) Scenario planning for future irrigation in the Goulburn Broken Region. *Proceedings of the ABARE Outlook Conference 2006*, Canberra.

Wang QJ, Soste L, Robertson DE, Handley S, Chaffe R (2005) Developing Strategies for Irrigation Futures of the Goulburn Broken Region. *Proceedings of the Australian National Committee on Irrigation and Drainage 2005 Conference*, Mildura.

Wang QJ, Soste L, Robertson DE, Handley S, Chaffe R (2005) Scenario planning for irrigation futures of the Goulburn Broken Region. (Petheram RJ Johnson RC eds) *Practice change for sustainable communities: Exploring footprints, pathways and possibilities: APEN 2006 International Conference*, Beechworth. Published online at www.regional.org.au/au/apen/2006.

Wang QJ, Soste L, Robertson D, Handley S and Chaffe R (2005) Scenario planning for irrigation futures of the Goulburn Broken Region, Australia, *International Symposium on Sustainable Water Resources Management and Oasis-Hydrosphere-Hesert Interaction in Arid Regions*, 27-29 October 2005, Beijing.

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

Michael Young and Associates (2001) 'An economic profile of the Goulburn Broken Catchment (including all of the Shepparton Irrigation Region) 2000: Executive summary'. Goulburn Broken Catchment Management Authority, Shepparton.