Irrigation Futures

of the Goulburn Broken Catchment

Final Report 7 – Project plans

State Government Victoria
Departments of Sustainability and Environment Primary Industries
National Program for Sustainable Irrigation
Goulburn Broken Catchment Management Authority
Goulburn-Murray Water
Cooperative Research Centre for Irrigation Futures
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Documents in this series.

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

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

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Provides a manual of project methodology for next-users.

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Irrigation Futures of the Goulburn Broken Catchment

Final Report 7 – Project plans

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Cooperative Research Centre for Irrigation Futures

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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 (Michael Young & Associates, 2001). 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 Land and Water Australia. 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.

Document overview

This Attachment to the Final Report provides a compilation of all the project plans developed within the Irrigation Futures project. The plans are intended to provide a suite of resources or models, which others can modify to suit their particular requirements. The document includes:

- The initial project bid to LWA
- Participation Plan
- Reviewers comments on the Participation Plan and the project team response
- Communication Plan
- Evaluation Plan
- Scenario Assessment Plan
- Reviewers comments on the Scenario Assessment Plan and the project team response
- Adoption Plan

Evolution and adaptation of project plans

The initial project bid to LWA

This provides a detailed model of bid development including objectives, method, review processes, outcomes, communication, milestones, risk, staff and funding requirements.

An important feature of the project plan was its broad structure. This allowed the project team the freedom to explore and adapt processes within that structure, in order to achieve the target outcomes.

Participation Plan

This was developed during Stage 1 of the project. It outlines:

- The principles used in developing the Participation Plan,
- How those principles were translated into inclusive processes and subsequently implemented,
- The processes used to identify and invite key stakeholders, and

- The stakeholder oversight arrangements put in-place to ensure that a high degree of participation was maintained.

The process of calling and inviting stakeholders to participate in the process involved a considerable amount of time of the phone (300+ phone calls for about 120 participants), and a considerable effort to attend industry association meetings (often after-hours). The work needed to be done by a team member so that questions could be answered as required. One of the greatest challenges was overcoming the lack of trust in the engagement process. 'They have already made up their mind anyway" was a common response. This highlights the importance of being honest (we can do this, but not that), and maintaining stakeholder trust during the engagement process, because it impacts on the community's willingness to engage in the next project.

A key participation aspiration that was not achieved was that of engaging with the indigenous community. The problem was a lack of knowledge of engagement protocol. There appear to be at least 3 indigenous nations in the project area. We came to understand that only the elders could speak (with authority) for that nation. Also, the engagement that was achieved produced high-level aspirations (we want to be able to see the bottom of the river again), but there appeared to be a limited capacity to explore ways of achieving that goal. Departmental leaders were advised that if effective engagement was to occur with indigenous communities, an investment in building their capacity to engage would have to be made. So, despite a genuine desire, the project did not have the knowledge or the time to work with that group of stakeholders effectively.

Reviewers comments on the Participation Plan

The Participation Plan was externally reviewed. This provides the reviewers comments, and indicates how the project team took the feedback on-board.

Communication Plan

This was developed during Stage 1 of the project. It provides an overview of the communication aims and target audiences. It then provides detail on the messages to each target audience group and how they would be communicated.

The satisfying element of the communication plan was that it worked. The project team worked hard at delivering the appropriate communication to the key stakeholders. This resulted in Forum participants and Technical Working Group members continuing to engage with the project, because their inputs were faithfully recorded and transmitted. It also meant that the Governance Committee supported project evolution because the underlying reasons for change were clearly communicated.

Evaluation Plan

This was developed during Stage 1 of the project. It formally identifies the goals that the project sought to achieve and then indicates how the achievement of those goals would be measured, using Bennett's hierarchy.

The evaluation of stakeholder satisfaction, changes in their knowledge and attitudes, and changes adopted by the next-users (levels 4, 5 and 6 in Bennett's hierarchy) was also particularly satisfying. It demonstrated to the

project team that the process was working, and provided an external validation of process successfulness.

Scenario Assessment Plan

This was developed at the end of Stage 2 of the project. It provides a literature review of the processes available to provide an integrated assessment of scenario impacts, and makes recommendations on the approach which should be used during Stage 3.

Reviewers comments on the Scenario Assessment Plan

The Scenario Assessment Plan was externally reviewed. This provides the reviewers comments, and how the project team modified the Plan in response to the feedback.

Adoption Plan

This was developed at the end of Stage 3 of the project. It outlines how project outputs were to be embedded in the forward plans of next-user agencies, and the plans to transmit outputs to irrigation enterprises, next generation irrigators, policy and decision makers, and the wider community.

The adoption plan highlights the flexibility within the project structure. It allowed the project team to vary the approach to Stage 4, and actually strengthen the deliver of target outcomes for the project.

PROJECT NO:
CALL AREA: office use only

Project Plan

Refer to *Guidelines for Applicants* for assistance before answering each part of this form.

1. Project title *(Maximum 10 words)*

Title	Irrigation Futures of the Goulburn Broken Catchment

2. Keywords *(Maximum 5 words)*

Keywords	Community involvement; Irrigation; Catchments; Agriculture

3. Applicant

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4. Project summary *A concise summary (maximum 150 words)*

Irrigation, which is fundamentally important to the regional economy in the Goulburn Valley, is facing enormous challenges. As one of the oldest gravity irrigation systems in Australia, the Goulburn irrigation system needs substantial renewal of its ageing infrastructure assets in the next 20 years. Initiatives to increase environmental flows and potential climate changes will also have major impacts on irrigation. It is critical that there is a shared vision on the future of irrigation in the region, and an agreed plan of actions to take the region forward.

This project is to bring together the regional community and other key stakeholders to develop a shared vision on irrigation for the Goulburn Broken Catchment, to make choices about the future by considering social, economic and environmental consequences, to use the best available knowledge to inform that decision process, and to build consensus on regional response options on irrigation.

The project has three stages. Major investors, including LWA, DPI, DSE and GBCMA, have agreed to fund Stage 1 (six months) – Project Development, with in principal commitment of funds for the full 2003/04 financial year and in principle support to the full project.

At the end of Stage 1, it will be decided whether the project will proceed to later stages. This decision will be made by a Project Governance Committee, comprising of representatives of major investors, based on consideration of funding availability, project progress and technical feasibility.

5. Project objectives *List objectives*

- Facilitate key stakeholders to develop a shared vision on the future of irrigation in the Goulburn Broken catchment, 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 based on an integration of 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.

6. Budget summary *Copy figures from Question 14.*

Funding sources	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Total $
LWA funds						
Other funds						
Project totals						

Notes:

- ***The project has three stages. Major investors, including LWA, DPI, DSE and GBCMA, have agreed to fund Stage 1 (six months) – Project Development, with in principal commitment of funds for the full 2003/04 financial year and in principle support to the full project.***
- ***Funds for Stage 1 are half of Year 1 figures in the table above.***
- ***At the end of Stage 1, it will be decided whether the project will proceed to later stages. This decision will be made by a Project Governance Committee, comprising of representatives of major investors, based on consideration of funding availability, project progress and technical feasibility.***
- ***The figures in the above table are cash costs of the project. In-kind contributions are not included.***

7. Other Contacts

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Other contributors

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8. Nature of problem/issue to be addressed

8.1 Who are the key clients/stakeholders needing new knowledge and what are their questions?

Irrigation is fundamentally important to the regional economy in Goulburn Broken catchment. The regional farm gate gross value of production from irrigated agriculture in 2000 was $1.35 billion. Investment in on-farm and processing infrastructure is about $100 million per annum. However, irrigation is facing enormous challenges. As one of the oldest gravity irrigation systems in Australia, the Goulburn irrigation system needs substantial renewal of its ageing infrastructure assets in the next 20 years. Initiatives to increase environmental flows and potential climate changes will also have major impacts on irrigation. In addition, there is now increasingly more stringent demand on responsible natural resources management to meet the social, economic and environmental triple bottom lines.

What is our vision on sustainable irrigation in the region? What are the likely external constraints and opportunities that will impact on irrigation and on the region? What options are available for the region to respond to these constraints and opportunities? What are the likely social, economic and environmental consequences of various options? How does the region collectively make decisions on difficult issues such as future land use and irrigation infrastructure?

Answering these questions is critically important to a range of stakeholders in their decision making on investment, service delivery and policies. Some of the key stakeholders include

- Primary production industries (eg, United Dairyfarmers Victoria, Northern Victorian Fruitgrowers Association, Victorian Irrigated Cropping Council, Victorian Farmers Federation)
- Processing industries (eg, Bonlac, Murray Goulburn, SPC-Ardmona)
- Community groups (eg, Environment Victoria, Goulburn Valley Environment Group, Landcare Groups)
- Natural resources management agencies (eg, Goulburn Broken Catchment Management Authority, Goulburn Murray Water, Murray Darling Basin Commission)
- Local, State, and Commonwealth governments (eg, Shire and City Councils, Department of Primary Industries, Department of Sustainability and Environment, Environmental Protection Authority Victoria, Department of Agriculture, Fisheries, Forestry, Australia)
- Major investment initiatives, such as National Action Plan and Water Trust

8.2 What other investigations inform this issue, and what are the gaps in knowledge?

Probably the most important investigations are those that will give some clear pictures of the likely future external constraints and opportunities, such as environmental policy, markets, and technological breakthroughs. These external constraints and opportunities will set the scene for investigations on regional response options in this study. A previous fore-sighting exercise on irrigation futures in Shepparton Irrigation Region was a good starting point.

Another issue is the impact of water trading on water movement between the study area (Goulburn Broken Catchment) and other areas. The project will review existing work addressing this issue, such as the CRC for Catchment Hydrology water allocation modelling project.

Social responses to changed operating environment, including policies, is another issue that needs to be considered. This is a very complex issue, and the project will establish contacts with people who have expertise in this area.

9. Approach and methods

9.1 How will this project respond to client/stakeholder needs? (What is the overall approach)

It is recognised that the active participation of stakeholders is fundamentally important to the development and ownership of vision and options on future irrigation in the region. It is also recognised that a systems approach is necessary to deal with the many complex issues related to irrigation. Thus, the overall approach of the project is one of stakeholder engagement and integrated systems analysis.

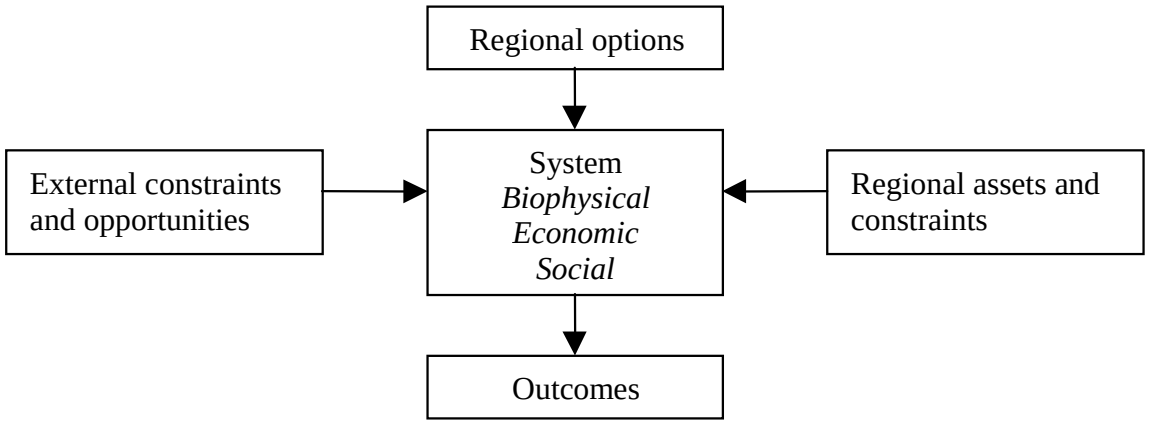
The project will engage key stakeholders to identify scenarios of major constraints and opportunities and of regional response options. It will use specialist and stakeholder expertise to integrate the best available knowledge to assess the social, economic and environmental consequences of various scenarios. The assessment results will then be communicated to stakeholders, forming a basis for building consensus on the preferred regional options for future irrigation in the region.

9.2 R&D Design

The project will facilitate key stakeholders and use the best scientific knowledge to identify and understand the key aspects that affect irrigation outcomes in the region, including

- External constraints and opportunities (eg irrigation water availability, property rights, climate changes, environmental policy, new science breakthroughs, markets).
- Regional assets and constraints (eg soils, hydrogeology, land capability, climate, ecology, infrastructure, skill and expertise, social capability).
- Desired outcomes as measured by indicators of sustainable irrigation (eg industries, economics, social equity, population, water quality and ecology, salinity, soil health).
- Possible regional options (including some radical changes) for future irrigation in the region (eg where, what and how to irrigate in the catchment, infrastructure, commodities and farming systems, regional policy instruments and institutional arrangements).
- Behaviour of the biophysical, economic and social systems that link regional options to outcomes, given the regional assets and scenarios of external constraints.

The diagram below represents how the different aspects link together:



The developed understanding will be used to assess the social, economic and environmental consequences of the various scenarios. The assessment results will then be used to facilitate the key stakeholders to build consensus on preferred regional options for future irrigation.

The project is divided into four major tasks:

Task 1 - Project development

- Form a Project Governance Committee (PGC)
- PGC review and agree on project outcomes, outputs and end uses
- PGC approve final project plan
- PGC agree on funding arrangement
- Form project team
- Form a Technical Advisory Committee
- Develop a detailed project plan, including communication and evaluation plans
- Conduct stakeholder analysis and finalise stakeholder engagement methodology
- Engage key stakeholders to ascertain their commitment to participation in this project
- Form a Stakeholder Reference Committee

*The **Project Governance Committee** will comprise representatives of major investors. It will set and steer broad project directions, review project progress and performance, make decisions on funding for the project and assist in securing funding. At the end of Stage 1 and the end of Stage 2, the Project Governance Committee will decide whether the project will proceed to later stages based on consideration of funding availability, project progress and technical feasibility.*

*The **Technical Advisory Committee** will evolve over time. Its role is to support the project team to employ sound methodologies in project delivery.*

*The **Stakeholder Reference Committee** will comprise representatives of major stakeholders with mixed skills. It will guide the project team in conducting stakeholder engagement, and consolidating stakeholder inputs to the project such as vision development, scenario identification and consensus building.*

Task 2 - Exploring visions and identifying future scenarios

- Engage individual stakeholder groups
- Analyse outputs from stakeholder engagement and consolidate scenarios
- Feedback to stakeholders
- Finalise the scenarios

Methodology on engagement with stakeholders within this task will be designed to achieve: (a) ownership of and commitment to the developed vision by key stakeholders; (b) innovative ideas about regional response options captured. It is recognised that a wide range of stakeholders need to be engaged to achieve the ownership and commitment, and that both local knowledge and external knowledge are important sources of ideas. More detailed consideration of engagement methodology is provided in the preliminary discussion paper (Attachment 4), but further development work is required at Stage 1 of the project. In addition, the project will consider the use of deliberative forums, to complement the more conventional methods of engagement such as workshops and focus groups.

At the end of Task 2, stakeholders will have identified desired irrigation outcomes and indicators, scenarios of major constraints and opportunities and of regional response options. The Stakeholder Reference Committee will make a final decision on what scenarios are to be systematically assessed at the next stage of the project.

Task 3 - Assessing scenarios

- Establish Scenario Assessment Panels (experts and stakeholders)

- Develop assessment tool
- Apply the tool to assess the scenarios
- Finalise assessment

*It is envisaged that there will be a number of **Scenario Assessment Panels** covering different farming and other land use systems and also catchment and regional scale integration. The Panels will guide the project team to develop the assessment tool and review assessment results. The inclusion of stakeholders in the Scenario Assessment Panels is to utilise their expertise and make reality checks, and ensure acceptance of assessment results.*

It is planned that only high level variables and interrelationships of the land use, catchment and regional systems are included in the tool, to the extent that the tool is relatively easy to understand by stakeholders. The project team has considerable experience in using the Bayesian networks technique for high level representation of systems. The technique uses simple diagrams to represent ideas and uses probability tables to represent relationships and uncertainties. The variables can be quantitative or qualitative. It is a very effective tool for communication with stakeholders both in the development of systems representation and during the examination of analysis results. The Bayesian network technique or other similar techniques will be considered for use in the development of the scenario assessment tool.

The project does not intend to use detailed process models because they are data intensive, involve too many assumptions, both implicitly and explicitly, and are often too complex for stakeholders to understand.

The assessment tool will need to be able to consider multiple outcomes (eg, water / salt / nutrient / soil / greenhouse, production, economics, social, and ecological).

Task 4 - Building consensus on future directions on irrigation in the region

- Communicate the scenario assessment results to stakeholder groups
- Facilitate stakeholder groups to identify preferred options
- Finalise preferred regional options and directions
- Recommend regional follow-up actions
- Develop information packages for input to strategic development and other decision processes of stakeholder groups

Building consensus needs to be done with great care and sensitivity. It is envisaged that the project will focus on facilitating the stakeholder groups to narrow down to a few preferred options, rather than one preferred option. This project is to provide a technical basis to inform further decision-makings through political processes.

The project will be staged to:

Stage 1: Project development (Task 1). At the end of Stage 1, a decision will be made on whether to proceed to Stage 2.
Stage 2: Exploring visions and identifying future scenarios (Task 2), and Preliminary investigation on the development of scenario assessment tool (Part of Task 3). At the end of Stage 2, a decision will be made on whether to proceed to Stage 3.
Stage 3: Assessing scenarios (Task 3), and Building consensus on future directions on irrigation in the region (Task 4).

The three stages also shown in Attachment 1 for Activity Chart.

Project management structure is shown in Attachment 2.

9.3 How will this project ensure that it builds on and is informed by other relevant projects?

A brief review will be carried out on past and existing projects on irrigation catchment planning. The project will draw on results from many projects on farming and other land use systems, catchment and regional systems, social, economic and environmental systems. The project will collaborate with the appropriate MDBC Watermark project.

The project will collaborate closely with the Harvey Irrigation District WA project as directed by NPSI.

The project will build on current Regional Catchment Strategies, and on existing links that the research partners have with stakeholder groups in the region.

10. Outputs and outcomes

10.1 Outputs

- Development of a shared vision on sustainable irrigation in the Goulburn Broken catchment, a process for ongoing review of the vision, and a process to support stakeholder groups in linking the vision with their strategic plan development
- Identification of scenarios of future irrigation in the region: major external and regional constraints and opportunities, and regional response options
- Assessment of social, economic and environmental consequences of the identified scenarios based on an integration of the best available knowledge
- Building consensus on preferred regional options for future irrigation, and recommendations on regional follow-up actions.
- Development of a methodology that can be applied elsewhere in Australia for sustainable irrigation planning at a catchment scale

10.2 Outcomes

- Forward thinking leadership in the region with innovative approaches to meeting the challenge of rapid changes
- Catchment and regional planning processes built on a vision shared by key stakeholders and informed by the integration of the best available knowledge
- Debates on environmental policy, eg the Living Murray and environmental flows, being informed by a rigorous assessment of triple bottom line impacts
- A confident community and region built on sustainable irrigation, achieving social, economic and environmental aspirations

10.3 Relevance to policy or management

The outputs from this project are directly related to regional irrigation and other infrastructure planning, catchment and land use planning, and regional social and economic planning. In addition, the assessment of consequences of different environmental policies will inform the formulation of these policies.

11. Consultation

The project idea was initiated by Goulburn Broken Catchment Management Authority, Goulburn-Murray Water, Department of Primary Industries, and Land and Water Australia. Meetings with the above organisations were held in January and April, which confirmed their commitment to the project,

Discussions were held with Department of Sustainability and Environment, Murray Dairy, Dairy Research and Development Corporation, Victorian Irrigated Cropping Council, Greater Shepparton City Council, Shire of Campaspe.

Murray Darling Basin Commission, Environmental Protection Authority Victoria, and Northern Victorian Fruitgrowers Association have been informed of the project.

During Stage 1 (Project Development), the project team will establish contacts with all the above organisations as well as the following: other local governments, United Dairyfarmers Victoria, Victorian Farmers Federation, Bonlac, Murray Goulburn, SPC-Ardmona and other processing factories, Irrigation Surveyors and Designers Group, Environment Victoria, Goulburn Valley Environment Group, Landcare groups, Department of Agriculture, Fisheries, Forestry, Australia. Through this process, the project team will ascertain commitment from these organisation to participation in the project.

12. Knowledge Management, Communication, adoption & potential commercialisation

12.1 Specify the target audiences that have an interest in the knowledge to be generated by the project

The target audiences are the key stakeholder groups, including

- Primary production industries (eg, United Dairyfarmers Victoria, Northern Victorian Fruitgrowers Association, Victorian Irrigated Cropping Council, Victorian Farmers Federation)
- Processing industries (eg, Bonlac, Murray Goulburn, SPC-Ardmona)
- Community groups (eg, Environment Victoria, Goulburn Valley Environment Group, Landcare Groups)
- Natural resources management agencies (eg, Goulburn Broken Catchment Management Authority, Goulburn Murray Water, Murray Darling Basin Commission)
- Local, State, and Commonwealth governments (eg, Shire and City Councils, Department of Primary Industries, Department of Sustainability and Environment, Environmental Protection Authority Victoria, Department of Agriculture, Fisheries, Forestry, Australia)

12.2 How do these target groups prefer to access information from your organisation, and how will you accommodate this?

The target groups access information through direct involvement in projects, presentations and briefings, project reports, newsletters and information bulletins, and web pages.
The project will engage the key stakeholders throughout the project (See 12.3). The people, who are involved in the Stakeholder Reference Committee, workshops, focus groups, and Scenario Assessment Panels, will be encouraged and assisted to communicate the project outputs to their organisations.

The project will use as much as possible existing networks of major stakeholders. For example, the Goulburn-Broken Catchment Management Authority operate a well coordinated network of implementation committees that provide one significant avenue for communicating the project outputs. These networks are well supported and represented by key stakeholder groups in the region. Utilising these existing networks is the most efficient way of promoting the project information within the region. The usual avenue for dissemination of information is through presentation to relevant forums. Flow-on communications to regional communities occur through extension programs and regional press. Other key stakeholder organisations also have well established networks.

Outside the region, the project partners have a wide range of communication networks as well as access to different levels of governments.

It is also proposed that relevant project outputs are made available electronically on suitable web pages, utilising the existing partner organisation home pages.

A detailed communication plan will be developed at the initial stage of the project.

12.3 Will these target groups be engaged by your team during the research period? If yes, how? How will the knowledge and experiences of end-users be captured and used to inform the investigation?

The target groups will be engaged throughout the project period. They will be involved through a series of workshops and focus group discussions to develop visions on irrigation futures, develop scenarios of major constraints and opportunities and of regional response options. These will form the basis for further assessment on social, economic and environmental consequences of different scenarios to identify preferred regional response options.

A selected number of stakeholder representatives with strong technical background will be involved in the Scenario Assessment Panels, to make available their expertise, provide a reality check to the assumptions involved in the analyses, and ensure stakeholder acceptance of the assessment results.

The Stakeholder Reference Committee will comprise representatives of major stakeholder groups. The project will be strongly guided by the Stakeholder Reference Committee in conducting stakeholder engagement and consolidating stakeholder inputs to the project such as vision development, scenario identification and consensus building.

12.4 Will commercialisation facilitate the adoption and update of project outputs?

Unlikely

12.5 If likely, then describe:

a. the commercialisation products and services; and

b. commercialisation strategies, during project progress and post project completion

12.6 Evaluation

Data will be collected throughout the project on the effectiveness of the project processes (workshops, focus group discussions, scenario assessment tool development, communications etc), on the quality and acceptance of the project outputs (vision and scenario development, scenario assessment, building consensus on preferred regional response options), and on the impacts of the project outputs on stakeholder organisations.

A detailed project evaluation plan will be developed at the initial stage of the project.

13 Project management

Project timetable			
commencement:	1 / 7 / 03	completion date:	30 / 6 / 07

13.1 Project activity (Gantt) chart Please attach chart. Link to data dependencies.

See Attachment 1

13.2 Expertise of the project team

The Institute of Sustainable Irrigated Agriculture, has an excellent track record on research and extension, working closely with industry, community and governments, having expertise on horticulture and dairying, irrigation and salinity, and catchment management. The project will be further supported by expertise on irrigation infrastructure and services, catchment management, community engagement from Goulburn-Murray Water and Goulburn Broken Catchment Management Authority.

A full list of funded project staff is given in Attachment 3. Expertise of some of the project members:

- Principal Investigator, Dr QJ Wang, has expertise in hydrology and irrigation, integrated catchment analysis, systems and statistical modelling, science and project management, with a strong publication record.

- Fiona Johnson has expertise on community engagement, policy and market mechanisms, and institutional arrangements. She will provide technical input to the project on community engagement methodology and other areas. A project officer (VPS4) will be appointed to undertake community engagement and communication activities (and take some project management responsibilities). Further in-kind support will come from the DPI Regional Services Tatura team which has extensive experience on community engagement and networks.

- David Robertson will provide systems integration and analysis expertise. He also has irrigation hydrology, modelling, and chemistry expertise. In the last two years, David has been working on a project “Integrated Catchment Analysis”. David will be supported by the Principal Investigator and other project team members to undertake scenario assessment activities.

- Andy McAllister is experienced in resource information including data availability and interpretation, GIS technology and data management. Another part-time resource information officer will be appointed to carry out actual project tasks.

- Strong economics expertise is required by the project. Currently, ISIA does not have sufficient delivery capacity in this area. We will investigate options to overcome this problem, including making new appointments, utilising CRC for Irrigation Futures partners’ expertise, or contracting work out to external consultants.

- ISIA is strong in farming systems expertise, in particular, in dairying and horticulture. The project has budgeted for expert inputs in Years 2 and 3.

- Various other expertise will be required. The project has budgeted for some paid expert inputs, but most inputs will be in-kind.

13.3 Project milestone/criteria (table example shown below)

Generic deliverables to be provided at each milestone:

- All project reports and communications in electronic and hard copy formats as specified by LWA Communications.
- Photographic record depicting project milestones in a digital format suitable for web and powerpoint presentations.
- At least one media release and updates supplied to LWA Communications and copied to Program Coordinator
- what knowledge assets the project has generated in the milestone period (if any).

Date for completion	Description of milestone	Achievement criteria (Outputs against each Milestone)	Funds sought from Sustainable Irrigation Program (% and $)
06/06/03	Agreement Executed Tax Invoice submitted	• Agreement Executed • Tax Invoice submitted	
15/12/03	**Milestone 1 (Stage 1):** Generic deliverables Project development completed Detailed plan of stakeholder engagement completed, including the engagement of the community outside the normal networks and the use of deliberative forums Peer review of the engagement plan Attendance including presentation and poster display by Principal Investigator at annual Sustainable Irrigation Program Forum (October 2003) Communication and evaluation plans completed	• Generic deliverables achieved • Project Governance Committee and Technical Advisory Committee formed • Project outcomes, outputs and adoption pathways reviewed and endorsed by Governance Committee • Final project plan including communication and evaluation plans endorsed by Governance Committee • Agreement on funding arrangement reached by Governance Committee • Core project team appointed • Stakeholder participation in the project formally agreed • Stakeholder analysis documented; engagement methodology developed and peer reviewed • Presentation and poster display at annual forum • Third party cost share achieved • Milestone Report 1 submitted for approval	
Decision Point 1 - Proceed to Stage 2 ? Project Governance Committee decides whether the project proceeds to Stage 2, based on consideration of funding availability, project progress and technical feasibility			

15/12/04	**Milestone 2 (Stage 2)**: Generic deliverables Visions developed and scenarios identified Review of available assessment tools and input information Plan for assessment tool development completed Peer review of the assessment tool development plan	• Generic deliverables achieved • Stakeholder Reference Panel formed • Stakeholder engagement methodology endorsed by the Stakeholder Reference Committee • Key stakeholder groups engaged and outputs documented • Analysis of outputs from stakeholder engagement documented, and consolidated scenarios presented to Stakeholder Reference Committee • Feedback meetings with stakeholders completed • Scenarios agreed by Stakeholder Reference Committee • Scenario Assessment Panels for different land use systems and for catchment and regional scale (consisting of experts and stakeholders) formed • Previous and current assessment approaches reviewed and documented • Endorsement of assessment tool development plan by Stakeholder Reference Committee and Governance Committee after receiving peer review • Milestone Report 2 submitted for approval	
Decision Point 2 - Proceed to Stage 3 ? Project Governance Committee decides whether the project proceeds to Stage 2, based on consideration of funding availability, project progress and technical feasibility			
1/7/05	**Milestone 3 (Stage 3A):** Generic deliverables Assessment tool developed Peer review of assessment tool Attendance including presentation and poster display by Principal Investigator at annual Sustainable Irrigation Forum	• Generic deliverables achieved • Assessment tool developed and documented • Peer review of assessment tool • Endorsement by Stakeholder Reference Committee and Project Governance Committee after receiving peer review • Presentation and poster display at annual forum • Milestone Report 3 submitted for approval	
1/7/06	**Milestone 4 (Stage 3B):** Generic deliverables Scenarios assessed Attendance including presentation and poster display by Principal Investigator at annual Sustainable Irrigation Program Forum	• Generic deliverables achieved • Data required for assessment assembled and documented • Assessment of scenarios completed, and results analysed and documented • Assessment results endorsed by Stakeholder Reference Committee • Milestone Report 4 submitted for approval	

1/7/07	**Milestone 5 (Stage 3C):** Generic deliverables Process for consensus building completed Knowledge products produced to allow national use of the tool and processes Attendance including presentation and poster display by Principal Investigator at annual Sustainable Irrigation Program Forum Final report to be produced as three documents – 1) Final report to peer review standard with all technical reports used in the research project carried as attachments 2) Final report in LWA format (12 pages). This should include a statement on the knowledge assets generated by the project 3) Summary fact sheet of the project and its key findings of relevance to end users	• Generic deliverables achieved • Consensus building methodology endorsed by Stakeholder Reference Committee • Scenario assessment results communicated to stakeholder groups, and preferred options identified – meetings with individual groups held and outputs documented • Results analysed and consolidated, presented to Stakeholder Reference Committee • Consolidated results presented to stakeholder groups together, and preferred options further consolidated, and documented • Preferred options endorsed by Stakeholder Reference Committee • Regional follow-up action plan developed and documented, endorsed by Stakeholder Reference Committee • Information packages developed, endorsed by Stakeholder Reference Committee • Presentation and poster display at annual forum • Project results endorsed by Governance Committee • Final project report submitted and approved by LWA	**Project Total:**

Project Schedule Special Conditions

- All project team presentations/communications to recognize the Sustainable Irrigation Program and use logos and format as agreed with LWA Communications
- Confirm research team membership and time commitment (Note that all team members should have a greater than 10% time allocation, with significant time allocation of principal and core investigators).
- No changes to principal and core investigators time allocation without the written approval of the Program Coordinator
- Participation of Principal Investigator in one science and/or end user panel per annum as required by Program Coordinator
- Participate in one peer review of other Sustainable Irrigation research as coordinated by Program Coordinator
- Participate in Sustainable Irrigation program evaluation as required from time to time.

13.4 Project management system

Project management systems used for this project will include the standard systems used by the Department of Primary Industries. Departmental standard financial, OH&S and human resources systems will be used.
Additional quality systems in place at DPI-Tatura include a project preschedule process to ensure that the project is properly planned, technically sound and adequately resourced, and a publication review process.

13.5 Risk analysis

Please detail the major risks associated with the project and how they will be managed. By accepting this project, Land & Water Australia is not to be taken to be approving your analysis of project risks or proposed management actions in respect of those risks. Your organisation shall remain liable for any failure to adequately manage risks, according to the provisions of the Project Agreement.

	(i) Risks	(ii) Management Actions
1. Inputs	1. Not all funding resources may eventuate	1. Stage 1 (Project development) will establish if required funding can be secured. Project Governance Committee will assist in securing funding
	2. Lack of commitment to participation in the project by some key stakeholders	2. Stage 1 (Project development) will establish if there is sufficient commitment
	3. Stakeholders too diverse in perspective to reach reasonable agreement on visions, outcome indicators, scenarios, and directions	3. Stakeholder Reference Committee will play a critical role in guiding the project team
	4. Socio-economic expertise not available or too expensive	4. Consider using CRC for Irrigation Futures partner expertise
	5. Loss of key research team members	5. Key expertise areas overlap among team members
	6. Systems (social, economic and environmental) too complex to analyse, and data availability insufficient	6. Systems will be represented at a very high (macro) level to simplify analysis and reduce data requirement
	7. Non-mainstream Innovative ideas not captured	7. Will consider use of Deliberative Forums
2. Outputs	1. Validity of project outputs questioned by stakeholders	1. Engage stakeholders throughout the project including scenario assessment
	2. Scenarios identified become outdated within the project period because significant new development (eg policy, technology, economy)	2. New developments will be scanned throughout the project, and new scenarios may be included in consultation with the Stakeholder Reference Committee
3. Outcomes	1. Individual organisations do not act upon the information generated from the project	1. Engagement with stakeholders throughout the project and development of information packages to assist organisation in using the project outputs in their strategic planning
	2. Implementation beyond capability of individual stakeholder groups	2. The vision is needs to be truly owned and shared by different stakeholder groups so that they will move in the same direction
	3. Political processes do not follow through to make hard decisions	3. The project will highlight the need to do so and make recommendations on regional follow-up actions.
	4. Scenarios identified become outdated within planning horizon because significant new development (eg policy, technology, economy)	4. There needs to have on-going review of the vision and analysis of scenarios. The assessment tool will be well documented for use in the future.
	5. Scenarios irrelevant to the younger generation	5. The project will consider how young people are engaged and contribute to this project

13.6 Compliance with Environment Protection and Biodiversity Conservation Act 2000

(a) What will be the level of environmental impact from the proposal?

The project itself will have no direct environmental impact. The outputs from the project may influence future directions of catchment management, but any implementation work is beyond the scope of this project.

(b) What approval have you gained or expect from relevant planning and environmental agencies for this proposal? Please attach to your application a copy of all approvals sought or gained.

N/A

13.7 Data management

The data parameters to be collected by this project include information on

- Regional assets and constraints (eg soils, hydrogeology, land capability, climate, ecology, infrastructure, social capacity)
- Measured indicators of sustainablity (eg economics, water use, water quality, salinity, soil health and demographics)

This data will be stored and managed by the Resource Information Group based at ISIA-Tatura using the Geographic Information System (GIS) software ArcGIS. The GIS at Tatura is part of the statewide regional data net program that provides access to natural resource information by regional and statewide resource managers including Catchment Management Authorities.

The users who will benefit most from using the data will be resource and industry managers from the target audiences outlined previously as well as researchers within organisations such as DPI. It is anticipated that the outputs of the project will be focussed at a regional level and therefore suitable for public use however there will be collection of sensitive datasets (ie. water use, soil salinity) that will need to be managed according to the DPI/DSE privacy guidelines.

13.8 Location of field sites

Please complete the following for each major site. (Please attach details of additional field sites)

Site name: ISIA		Nearest Town: Tatura	State: VIC
Map Name (ID): Tatura Map Sheet (1:25,000)		Grid Ref: E: 341,487.65 N: 5,965,014.17	
Lat: -36º 24' 49"	Long: 145º 13' 53"	GPS coordinates: -36º.446900, 145º.231302	
Site name:		Nearest Town:	State:
Map Name (ID):		Grid Ref:	
Lat:	Long:	GPS coordinates:	
Site name:		Nearest Town:	State:
Map Name (ID):		Grid Ref:	
Lat:	Long:	GPS coordinates:	

14. Budget and intellectual property

14.1 Budget summary

Please state total project funding and distribution of Land & Water Australia funds for personnel, operations, capital, travel and adoption.

Funding sources	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Total $
Land & Water Australia						
Fees						
Operating						
Capital						
Travel						
Adoption						
Total Land & Water Australia funds						
Department of Primary Industries						
Department of Sustainability and Environment						
Goulburn Broken Catchment Management Authority						
TOTAL FUNDING						

Notes:

- ***The project has three stages. Major investors, including LWA, DPI, DSE and GBCMA, have agreed to fund Stage 1 (six months) – Project Development, with in principal commitment of funds for the full 2003/04 financial year and in principle support to the full project.***
- ***Funds for Stage 1 are half of Year 1 figures in the table above.***
- ***At the end of Stage 1, it will be decided whether the project will proceed to later stages. This decision will be made by a Project Governance Committee, comprising of representatives of major investors, based on consideration of funding availability, project progress and technical feasibility.***
- ***The figures in the above table are cash costs of the project. In-kind contributions are not included.***

OFFICE USE ONLY

GST						
Land & Water Australia Total						

14.2 Fees

a) Project Staff (please list ALL staff to be funded, in whole or in part, by Land & Water Australia)

Name and title	Time spent on project %	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $
Name: David Robertson **Title:** Systems Analyst and **Position:** Hydrologist - VPS3	→					
Name: To be appointed **Title:** Communication Officer **Position:** VPS4	→					
Total Fees						

b) Total on-cost (all staff)

Payroll tax					
Workers compensation					
Employer's superannuation					
Holiday leave loading					
Other on costs(Long Service/Maternity Leave)					
Total on costs					
Total Fees + Total On costs					

14.3 Operating, capital, travel and adoption costs

	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $
Operating items					
Capital items					
Travel items					
Adoption items					
Total					

14.4 Host organisation and third party support

Host Organisation:	Department of Primary Industries, Victoria
Nature of support:	Cash (See notes in 14.1)
Method of calculation	DPI Costing Model

Year 1		Year 2		Year 3		Year 4		Year 5	
Cash $	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**

Host Organisation:	Department of Sustainability and Environment, Victoria
Nature of support:	Cash (See notes in 14.1)
Method of calculation	DPI Costing Model

Year 1		Year 2		Year 3		Year 4		Year 5	
Cash $	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**

Organisation:	Goulburn Broken Catchment Authority
Nature of support:	Cash and In-kind (See notes in 14.1)
Method of calculation	Cash - DPI Costing Model; In-kind - Estimation

Year 1		Year 2		Year 3		Year 4		Year 5	
Cash $	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**

Organisation:	Goulburn-Murray Water
Nature of support:	In-kind (See notes in 14.1)
Method of calculation	Estimation

Year 1		Year 2		Year 3		Year 4		Year 5	
Cash $	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**	**Cash $**	**In kind $**

14.5 Intellectual property and project income

a) Intellectual Property

Please give details of prior intellectual property and any restrictions on usage required for the project owned by:

(a) The host organisation
None
(b) Land & Water Australia (from previous Land & Water Australia funding)
None
(c) Third parties (please identify)
None

b) Intellectual Property/Property Income:

Land & Water Australia and the Host Organisation agree that title to all intellectual property and project income arising from the project will be shared between them in the following ratio

Organisation	Property share %
Land & Water Australia	%
Host Organisation – Department of Primary Industries	%
Department of Sustainability and Environment	%
Goulburn Broken Catchment Authority	%
Goulburn Murray Water	%
Note: Final share will be allocated in proportion to the total cash and in-kind contributions to the project	

15. Certifications

15.1 Certification by principal investigator

I understand that:

(a) the Host Organisation agrees to comply with all applicable acts (including environmental legislation), ordinances, rules, regulations and by-laws and with all applicable codes of conduct and guidelines in carrying out the project and to indemnify the Corporation against any claim which may result from the breach of any such requirements;

(b) research which involves animal experimentation must be carried out in accordance with the NH&MRC/CSIRO/AAC Code of Practice for the Care and Use of Animals for Experimental Purposes;

(c) research which involves the use of recombining nucleic acids in vitro from sources which do not ordinarily recombine genetic information must be in accordance with the guidelines laid down by the Genetic Manipulation Advisory Committee or its successor;

(d) research which involves the use of ionising radiation must be carried out in accordance with the guidelines laid down by the Australian Ionising Radiation Advisory Council.

(d) Certification of compliance with the appropriate guidelines must be obtained from my organisation's Ethics, Safety or Bio-Safety Committees and attached to this application before payment of any proposed project can be made.

(e)

Name: Dr Q.J. Wang **Signature:** **Date:** 23 April 2003

15.2 Certification by head of Host Organisation or authorised officer

Department of Primary Industries

I certify for and on behalf of Department of Primary Industries that funds totalling **$52,887** will be provided to undertake the Stage 1 (first six months of 2003/04) of this research project, with in principal commitment of additional **$52,887** for the second six months of 2003/04, and with in principle support to the full project. Final decisions on funding commitment to the project beyond Stage 1 will be based on consideration of funding availability, project progress and technical feasibility.

I certify that this application has my approval.

Name:

Position held:

Signature: Date: / /

15.3 Third parties certification

If there is more than one third party, please duplicate this section so that the information requested is provided for each party. An authorised individual must sign on behalf of the organisation.

Department of Sustainability and Environment

I certify for and on behalf of Department of Sustainability and Environment that funds totalling **$52,887** will be provided to the Host Organisation to undertake the Stage 1 (first six months of 2003/04) of this research project, with in principal commitment of additional **$52,887** for the second six months of 2003/04, and with in principle support to the full project. Final decisions on funding commitment to the project beyond Stage 1 will be based on consideration of funding availability, project progress and technical feasibility.

Name:

Position held:

Signature: Date: / /

If partner(s) is unable to complete above certification, please provide an explanation of the extent of agreement.

Goulburn Broken Catchment Authority

I certify for and on behalf of Goulburn Broken Catchment Authority that funds totalling **$58,425** will be provided to the Host Organisation to undertake the Stage 1 (first six months of 2003/04) of this research project, with in principal commitment of additional **$58,425** for the second six months of 2003/04, and with in principle support to the full project. Final decisions on funding commitment to the project beyond Stage 1 will be based on consideration of funding availability, project progress and technical feasibility.

I also certify for and on behalf of Goulburn Broken Catchment Authority that in-kind services totalling $100,000 per annum will be provided to the Host Organisation to undertake this project for a period of four years.

Name:

Position held:

Signature: Date: / /

If partner(s) is unable to complete above certification, please provide an explanation of the extent of agreement.

Goulburn-Murray Water

I certify for and on behalf of Goulburn-Murray Water that in-kind services totalling $20,000 per annum will be provided to the Host Organisation to undertake this project for a period of four years.

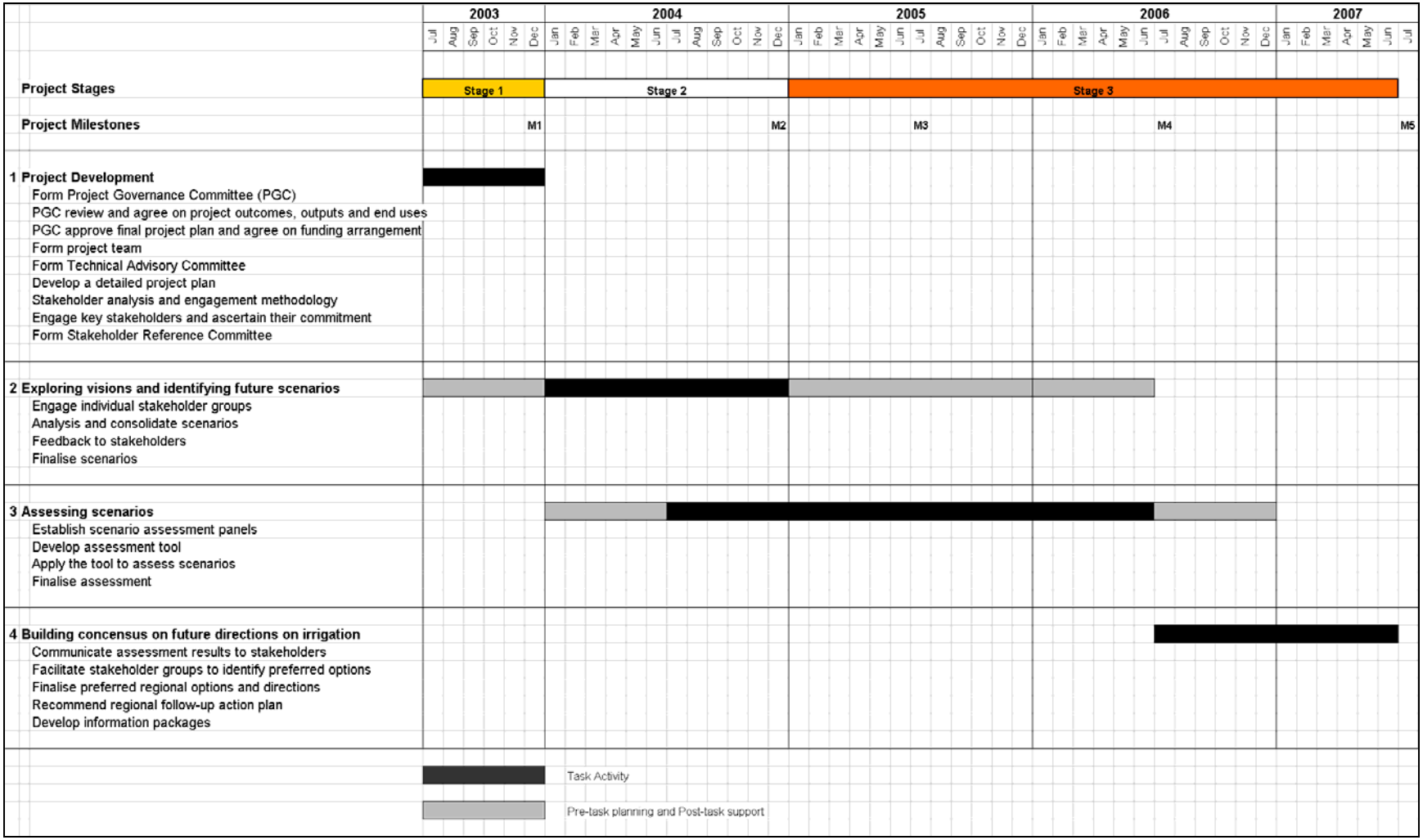
Name:

Position held:

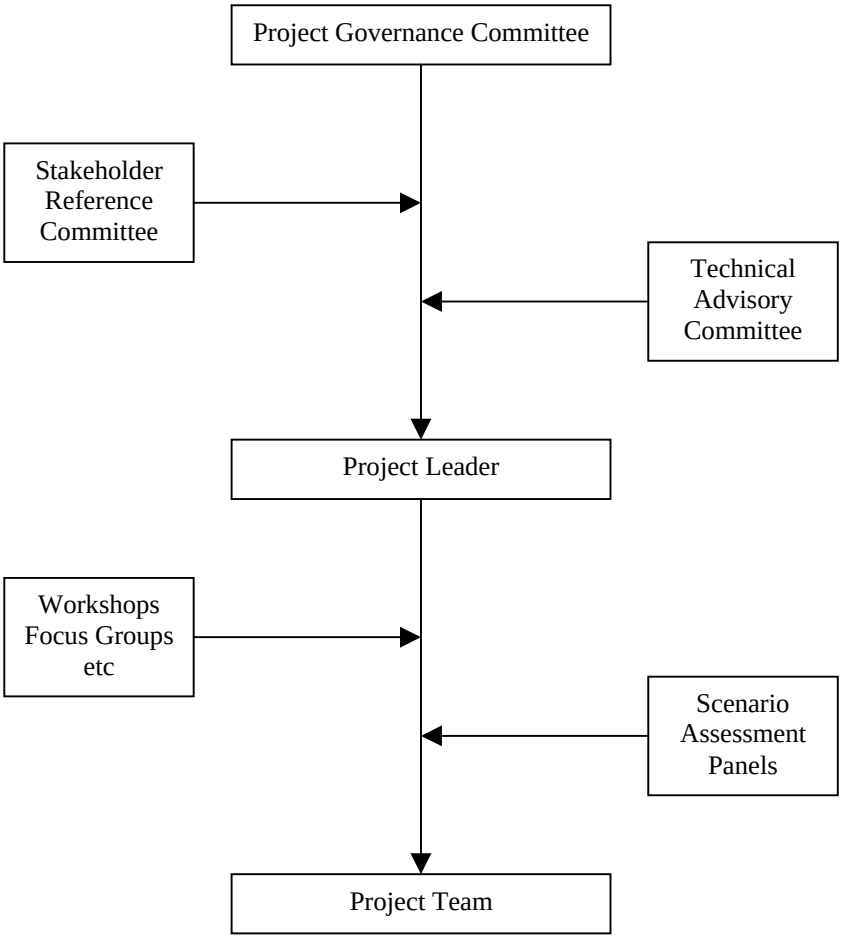
Signature: Date: / /

If partner(s) is unable to complete above certification, please provide an explanation of the extent of agreement.

Attachment 1 – Project Activity (Gantt) Chart



Attachment 2: Project Management Structure



Attachment 3: Funded Project Staff (Excluding In-kind)

	Expertise	Year 1	Year 2	Year 3	Year 4
QJ Wang (PS)	Principal investigator Systems integration Catchment hydrology	0.5	0.5	0.5	0.5
Fiona Johnson (VPS5)	Community engagement Social policy	0.1	0.1	0.1	0.1
VPS4	Community engagement Social policy Project management	1	1	1	1
David Robertson (VPS3)	Systems integration Catchment hydrology	0.2	1	1	1
Andy McAllister (VPS4)	Resource Information	0.1	0.1	0.1	0.1
VPS3	Resource Information	0.3	0.3	0.3	0.3
VPS4	Economist	0.1	0.1	0.1	0.1
VPS3	Economist		0.5	0.5	0.5
VPS4	Farming systems		0.1	0.1	
VPS4	Farming systems		0.1	0.1	
VPS4	Farming systems		0.1	0.1	
VPS4	Other specialists	0.2	0.4	0.4	0.2
Brendan Paterson (VPS2)	Project management	0.3	0.3	0.3	0.3
Total FTE		2.8	4.6	4.6	4.1

Attachment 4: A Preliminary Discussion Paper on Stakeholder Engagement Methodology

Prepared by Rabi Maskey, Bruce Cumming and other members of Regional Services, DPI Tatura

Define the system boundary

The project will identify the issues to be considered to define the boundary.

The project will also help clarify the sub-systems within overall irrigated system (eg. source, delivery, storage, drainage).

Process to develop a shared knowledge and understanding of key words used in communicating ideas, concepts, outputs and visions

The project will go through processes which acknowledge that different groups will have varying perspectives on what should be high priorities (eg., horti may say dairy inefficient and not 'sustainable', major industries don't give importance to mixed farming systems….). These perspectives and opinions will be formulated from previous work in addition to data gathered from stakeholders.

It is important that the 'language' we use is consistent across the modules proposed i.e., when talking about salinity, the same understanding is shared between dairy, horti, mixed farming, dryland, amenity groups. There is a need to set a common definition for words/phrases such as sustainability, salinity, water use efficiency, environment, assets, equity, amenity – It is important to develop glossary of key words and what those words mean in the context of the project. This also includes the definition of the triple bottomline (what do we mean in this projects perspective?)

There will be a process for the project to get to know the full range of stakeholders who need to have input to the project. It is important for the project to consider the vision, mission and VALUES of the individuals that make up a 'group' – these are the drivers for the decision making process that people use on the farm. Another factor is considering the external pressures being applied at any one time eg. drought, low milk prices. Also, it is important to investigate vision, mission and values for organisations. This will put the project in a better position to influence change.

Process for Identification of stakeholders and interest groups

The project will research and review groups that have been involved with future/visioning catchment wide projects or workshops or seeking funding (eg. CMA visioning workshops, development of management/action plans, expressions of interest submissions).

The project will categorise groups into ones that need to know about the project, receive communication about the project, next users (directly involved in the project) and the final users.

This step will also assist in assembling the project Stakeholder Reference Committee.

The next users are critical as these people are the ones that will use the project to support future natural resource management decisions eg. future landscape change, redirecting investment of public dollars/infrastructure.

The project will also use established groups to ensure project development complements existing strategies (i.e. it does not reinvent the wheel or add another layer) .The project will become an integrated part of established strategies supporting existing processes and ideas. These groups are the ones that will have significant influence over what the future of irrigation will look like. The project will identify those who will be impacted upon by the project.

The project will identify the process for representation of urban groups. This ties in with equity issues regarding changes to irrigation systems – i.e, who pays and how is the cost

shared? The project will develop a framework that allows improved implementation of equitable cost-sharing arrangement. Any changes to irrigation systems will be expensive but it shouldn't be just the direct beneficaries that wear most of the cost eg. more water down the Murray benefits a diverse range of groups including environmental, political and recreational users.

Process to ensure consistent communication between project and stakeholders

The project will develop a process to be followed in contacting and communicating with different groups –i.e., it will map stages of engagement with different groups. This will be complemented by a 'brief' that provides framework for language, intent and contact for liasion that the project officer uses (perhaps a generic flyer that can also be sent to groups, some groups may want an in-person presentation)

The project will also set the timeframe for the vision. This needs to consider who set this but the vision needs to include a 5, 10, 20, 50…200 lifespan

Process to ensure project progress and change management

The project will develop a framework around managing any change process - stage dissemination of information regarding implementation of any actions that are derived from the project, evaluate how groups react to outlined change.

The project will develop consistent evaluation across all modules. Evaluation strategy will be a part of initial project brief. This will include important components that warrants its own plan and undertaken at different stages of the project design, development and implementation.

The project will develop a suite of options for change eg. supplementing voluntary adoption/ change practices with market driven strategies

Summary

This project will develop an adaptive engagement and decision making model that ensures the strengthening of partnerships between natural resource organisations and the farming community. The model will deliver sound engagement and communication processes that place high significance on the vision and values of our established community groups and individuals in the Goulburn-Broken Catchment. This will result in the best available decisions being made and committed for better irrigation management at the catchment level, and with associated economic, social and environmental benefits.

While this project seeks to investigate and link the important elements which affect irrigation outcomes, there needs to be a strong emphasis on engagement processes used to bring together key stakeholders and ensure the outcomes complement and add to established strategies and support existing and developing processes. Further, the project needs to ensure sound rigour is applied to every stage to guarantee the credibility and confidence in outcomes that will be used by groups to make future decisions regarding the mechanisms to achieve change and invest in infrastructure while supporting communities in decision making.

END OF APPLICATION FORM

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT

Stakeholder Participation Plan

February 2004

PIRVic (Primary Industries Research Victoria) - Tatura
Department of Primary Industries

Victoria
The Place To Be

NATIONAL PROGRAM FOR
Sustainable Irrigation

GOULBURN
BROKEN
CATCHMENT
MANAGEMENT
AUTHORITY

GOULBURN-MURRAY
WATER

This document was revised after the Governance Committee meeting of 3 February, 2004 and incorporates comments from the external review, Land and Water Australia and the Governance Committee.

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Department of Primary Industries
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Tatura, Victoria, 3616

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Facsimile: (03) 5833 5299

Project Team:

Dr QJ Wang (Project Leader), Leon Soste (Operational Manager), Dr Mohammad Abuzar, Clair Haines, Chris Linehan, Dr Rabi Maskey, Andrew McAllister, David Robertson, Brendan Paterson – Department of Primary Industries

Selina Handley and Nicole Hunter – Department of Sustainability and Environment

Professor Bill Malcolm, Weihua Zhang – University of Melbourne

Technical Advisory Committee:

Jo Haw, Associate Professor Hector Malano, Derek Poulton, Greg Roberts, Ken Sampson

Governance Committee:

John Pettigrew – Goulburn Broken Catchment Management Authority
Kylie Pfeiffer – Department of Sustainability and Environment
Murray Chapman – National Program for Sustainable Irrigation, LWA
Denis Flett – Goulburn-Murray Water
Frank Greenhalgh – Department of Primary Industries
Richard Habgood – Department of Primary Industries

Stakeholder Reference Committee:

Being finalised.

Project Funded By:

Department of Primary Industries

Department of Sustainability and Environment

Goulburn Broken Catchment Management Authority

Goulburn-Murray Water

National Program for Sustainable Irrigation, Land and Water Australia

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EXECUTIVE SUMMARY

Irrigation is a fundamental driver of the regional economy in the Goulburn Broken catchment. The region also makes a significant contribution to the national economy through export earnings. However, the ability to continue to make this contribution requires careful planning to manage the tensions between enhancing productivity growth, and community expectations for building social capacity, and improving the environment.

The Goulburn Broken Irrigation Futures project is a strategic initiative that seeks to work with the regional stakeholder community to:

Define a vision for the future, and options by which that vision can be achieved under a range of possible future scenarios.

Assess the economic, social and environmental consequences of implementing those options, so that the region can make informed choices about its future.

Build consensus on the preferred options, and identify those follow-up actions required to effectively implement them.

It is clear that the achievement of these aims, in a manner that is owned by the community, will only be achieved by the active participation of the key stakeholder groups.

This document outlines the Plan to facilitate effective stakeholder participation in this project. It:
Outlines the principles on which the Plan is built,

Identifies and analyses the needs of the key stakeholders, and

Defines the role and formation of the Stakeholder Reference Committee, which is the key interface between the project team and the stakeholder community (Section 2.1 – 2.3).

Proposes the detailed mechanisms (Workshops, seminars, deliberative forums etc), which will be used for the participation of the key stakeholder and wider community, in various Stages of the project (Sections 4, 5 & 6).

The document is part of a series of reports for managing the project. The accompanying documents are the:

Communication Plan, which deals with the mechanisms proposed to ensure that stakeholders, and the wider audience are appropriately informed of project progress, and the

Evaluation Plan, which deals with how the effectiveness of various elements of the project will be assessed.

1. INTRODUCTION

Irrigation is a fundamental driver of the regional economy in the Goulburn Broken catchment. The regional farm gate gross value of production from irrigated agriculture in 2000 was $1.35 billion. Investment in on-farm and processing infrastructure is about $100 million per annum. It is a big business.

However, irrigation is facing enormous challenges. As one of the oldest gravity irrigation systems in Australia, Goulburn-Murray Water's irrigation system needs substantial renewal of its ageing infrastructure assets in the next 20 years. Initiatives to increase environmental flows and potential climate changes will also have major impacts on irrigation. In addition, there are increasingly stringent demands on responsible natural resources management to meet social, economic, environmental and cultural outcomes.

1.1 The aims of this project

This project has been established to enable the region to successfully meet these challenges. It is a regional initiative, funded by the Goulburn Broken CMA (GBCMA), Goulburn-Murray Water (G-MW), Department of Primary Industry (DPI), Department of Sustainability and Environment (DSE), and Land and Water Australia (LWA).

The aims of the project are to work with the stakeholder community to:

(a) **Facilitate the development** of:

A shared vision for the future of irrigated agriculture in the region.

A range of scenarios covering the major threats and opportunities facing the region.

Regional response options via which the community could position itself to meet those challenges.

(b) Using integrated systems analysis, with the best available knowledge, assess the **social, economic and environmental consequences** of selected response options, under a range of future scenarios. Clearly communicate the results of that assessment to stakeholders, so that they have a **sound basis for making choices** about the preferred regional options for future irrigation.

(c) **Build consensus** within the community on the preferred regional response options, and the associated follow-up actions. (These aims are illustrated in Figure 1). Finally, the project seeks to **develop a generic methodology** that can assist others to define a sustainable future for irrigation in their own region.

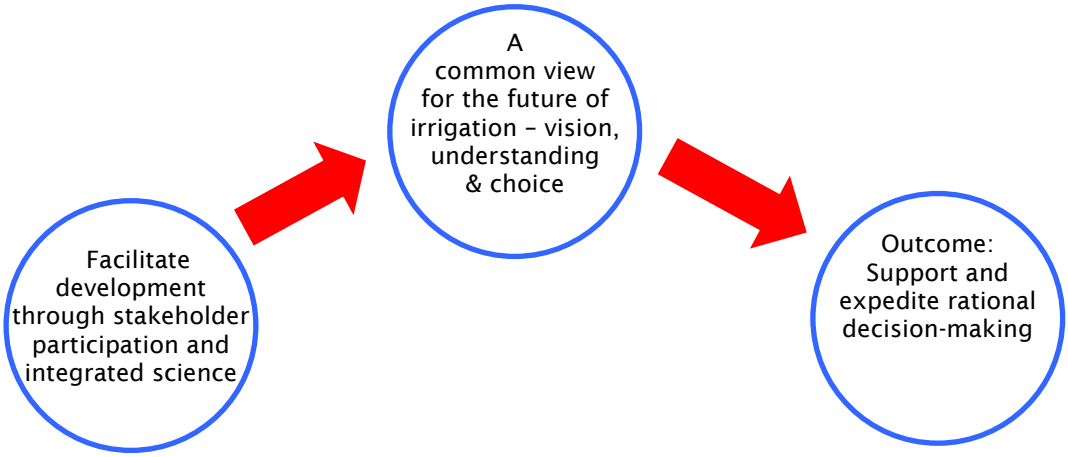

Figure 1: Project aims

The achievement of these aims is expected to deliver the following long-term outcomes:

Development of forward thinking leadership.

Facilitation of strategic business investment decisions.

Co-ordination of stakeholder endeavours.

Regional community making informed choices, and therefore moving forward with confidence.

Other regions throughout Australia benefiting from the implementation of the generic methodology.

1.2 Project organisation and schedule

Project organisation is shown in Figure 2. It was designed to blend management skills with scientific expertise and stakeholder input, so that it would utilise the **best available knowledge** and achieve **community ownership of the output**. Committee roles are given in Table 1.

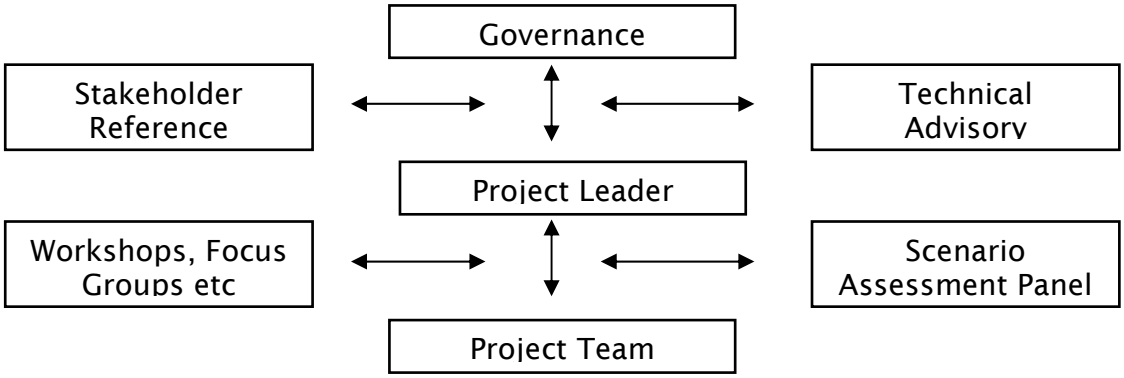

Figure 2: Project organisation

Project Committee	**Key Roles**
Governance Committee (GC)	• Set broad directions • Review project progress and performance • Make investment decisions
Stakeholder Reference Committee (SRC)	• Provide guidance on processes for wider stakeholder participation • Consolidate ideas from wider stakeholders • Generate confidence in the regional community
Technical Advisory Committee	• Provide expert advice as required
Scenario Assessment Panel	• Provide expert assessment of options through the use of systems analysis • Involve selected community members to provide input on assumptions, local knowledge etc

Table 1: Committees and roles

The role of the Project team is to provide background information to assist the stakeholder participation process, and to provide scientific analysis of the scenarios.

The achievement of these aims also requires an adequate time allocation for each Stage, which allows the community to consider the issues. The project timetable is given in Table 2.

Project Stage	Timeframe
Vision, Scenario and Options	Jan 2004 - Dec 2004
Assessment of consequences	June 2004 - June 2006
Building consensus	June 2006 - June 2007

Table 2: Project Timetable

1.3 The importance of participation to this project

The two key adoption pathways utilised by this project are **stakeholder participation** and **communication**. The linkages between project information, the development of vision, understanding and choice within the community (through stakeholder participation and clear communication with the wider audience), leading to strategic institutional and industry outcomes, are illustrated in Figure 3.

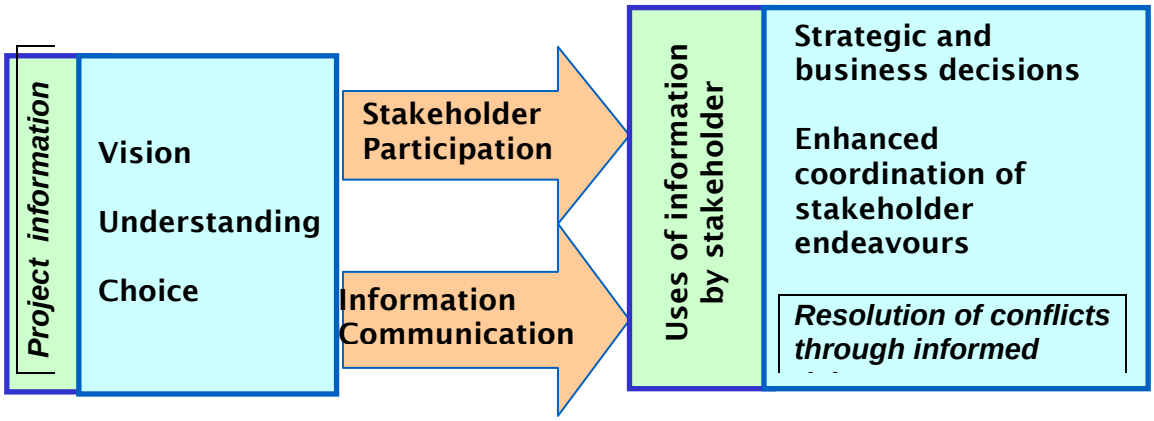

Figure 3: Adoption Pathways and Outcomes

It is obvious that the active participation of the stakeholder community is pivotal to achieving the outcomes of this project. Participation will:

Engender ownership of the options within the stakeholder community. This is vital for subsequent implementation, and leads to maximum utilisation of the information generated.

Enhance the quality and diversity of information. The breadth of local knowledge and innovative ideas within the community are important resources for the project to tap.

Increase community capacity and integrate community effort. Human capital (ie growth in individual and regional understanding of the complexities involved), and social capital (ie the strengthening of community networks within and between groups), will be strengthened through participation in this project. The project also has the potential to align the efforts of different groups, so that they move in a similar direction together. It may also

highlight divergence, but equally assist in understanding why divergent views exist, and perhaps aid acceptance.

It is recognised that a wide range of stakeholders will need to be engaged to achieve ownership and commitment, and that both local knowledge and external knowledge are important sources of ideas. To facilitate the input of local knowledge, the project will consider the use of deliberative forums to complement the more conventional methods of participation such as workshops and focus groups. To ensure the input of the best available knowledge, the participation of invited specialists will be utilised, as required.

1.4 Adoption of project outputs

To ensure that project outputs are incorporated directly into the next-stage planning processes of major institutional stakeholders (both government and private), representation from those institutions will be built into the project at various levels:

Governance Committee,

Stakeholder Reference Committee, and

Stakeholder Workshop groups (called Irrigation Futures Forums, see Section 2.3(a)).

In addition, effective communication is critical to the adoption of project outputs.

The Communication and Evaluation Strategies utilised by the project will be the subject of separate reports. This document presents the rationale and program details of the Participation Plan.

2. DEVELOPMENT OF THE PARTICIPATION PLAN

This Participation Plan has been developed in an iterative fashion, using:

Input from the literature on participation in Australia, and guidelines being developed within DSE/DPI (Victoria).

Consultation, involvement and review by:

- Institutional stakeholders such as Local Shires, G-MW and GBCMA (and their stakeholder sub-committees: Shepparton Irrigation Region Implementation Committee (SIRIC) and the G-MW Water Services Committees (WSC)). This has provided high level feedback on the participation needs of key stakeholders, and on misconceptions (such as links with "Living Murray" etc), which will need to be managed in this project.
- Industry stakeholders (Murray Dairy, horticulturalists).
- DSE/DPI staff who specialise in community engagement.
- Peer review: The Participation Plan has been externally reviewed, and the feedback from the reviewers has been incorporated into the final version of the Plan.

2.1 Participation principles adopted

The project **will seek the active involvement** of key stakeholders in all stages of the project, such that they have ownership of, and commitment to, the project outputs.

The underlying principles that have guided the design of this plan are that the project team will:
Work with stakeholders to develop a common view (as much as that is possible), as the project moves from one stage to the next. It is recognised that, within a diverse community, complete agreement will not be achieved.

Seek to capture innovative ideas. As such, it will seek input from local and external strategic thinkers, and employ a range of deliberative thinking tools.

Be inclusive and equitable. Existing stakeholder networks will be utilised to identify stakeholder participants. However, under-represented groups will also be targeted in the planning stage.

Provide a facilitation role, not an advocacy role. In order to maintain stakeholder confidence, it is essential to emphasise that the responsibility of the project team is to understand, and faithfully represent stakeholder views, not champion a particular cause.

Utilise an approach which is efficient and within resources.

2.2 Stakeholder identification and analysis

The range of stakeholder groups has been identified, and is given in Appendix 1 (Section 9.1). Analysis of those groups has shown that the key stakeholders are the:

Institutional organisations who manage water, land, environment and those who manage community issues in the region (Local Government, Indigenous groups etc),

Industry groups who work with (and whose livelihood depends on) the water and land resources in the region, and

Environmental groups whose focus is protection of natural resources.

An initial assessment of their level of participation was also made by considering the degree of influence that they exercise, the degree to which they are impacted, and their potential to contribute innovative ideas.

The initial development and testing of the plan with these key stakeholder groups brought the strong message that if their needs are not adequately serviced within the participation process, the project will not succeed. That feedback has dictated the direction of this participation plan. It focuses on these key stakeholder groups.

While that focus is appropriate, the literature indicates that care should also be taken to facilitate the **input of classically under-represented groups** such as indigenous groups, women and people from a non-English speaking background (NESB), within the stakeholder participation process (Buchy et al, 2000:15). This also requires that the special needs for effective input of these groups (such as venue, time of meeting etc), be considered (Buchy et al, 2000:11). These issues will be incorporated into the plan.

Finally, while the focus will be on these particular stakeholder groups, opportunity for participation by the wider community will also be facilitated.

2.3 Participation processes

(a) **Input processes**

Utilising the above principles, input from the various stakeholder groups will be facilitated as follows:

Participants from the **key stakeholder groups** will be invited to contribute to regional workshops and focus groups. These will be known as **Irrigation Futures Forums**. It is noted that the invitation to participate will be based on the skills-set that the person brings to the Forum. Participants will not be invited as representatives of a particular interest group.

The use of participants from a **broad cross-section of views** within each Forum (rather than participants who hold the same views), was felt to be the best way forward in the sense that it:

- Will facilitate the clear definition of the range of views which have to be accommodated within the key stakeholder community,
- Will create a broader brainstorming effect, as ideas from one group feed the ideas of others, and
- Has the potential to build inter-stakeholder group trust during the participation process.

Participants from **under-represented groups** will be invited to contribute to the Forums. This will be achieved with the help of specific staff at DPI (Tatura) who are liaison officers for, and therefore who have well developed networks within, the indigenous and NESB communities within the region. The need for special briefings and arrangements outside the normal Forum program will be managed in consultation with these liaison officers. Rural Women's networks will also be identified, and contacted to provide nominations.

Participation in the Forums by young people, through networks such as the Young Irrigators, Young Horticulturalists, students at Dookie Agricultural College etc will be explored. Separate Workshops to cater for the special needs of this group may also be required.

Participation in separate Workshops by invited experts (policy analysts etc) is also anticipated.

The wider community will participate through submissions and deliberative forums. Details are provided in Section 4.4.

(b) **Consolidation of inputs and feedback**

Figure 4 illustrates (in general terms) how stakeholder input will be managed. The process will be managed by the project team, who will:

Conduct stakeholder meetings, and receive submissions.

Consolidate that input (ie collate the input from submissions, focus groups and workshops, and group them into common themes).

Prepare a summary document of that consolidated input, which will go to the Stakeholder Reference Committee (SRC) for subsequent advice as to how the next phase of the project will proceed.

Transmit **feedback** from the SRC to all participants, ie key stakeholder participants, their organisational groups, those who make submissions and the wider community. This aspect of the process will be expanded further in the Communication Strategy.

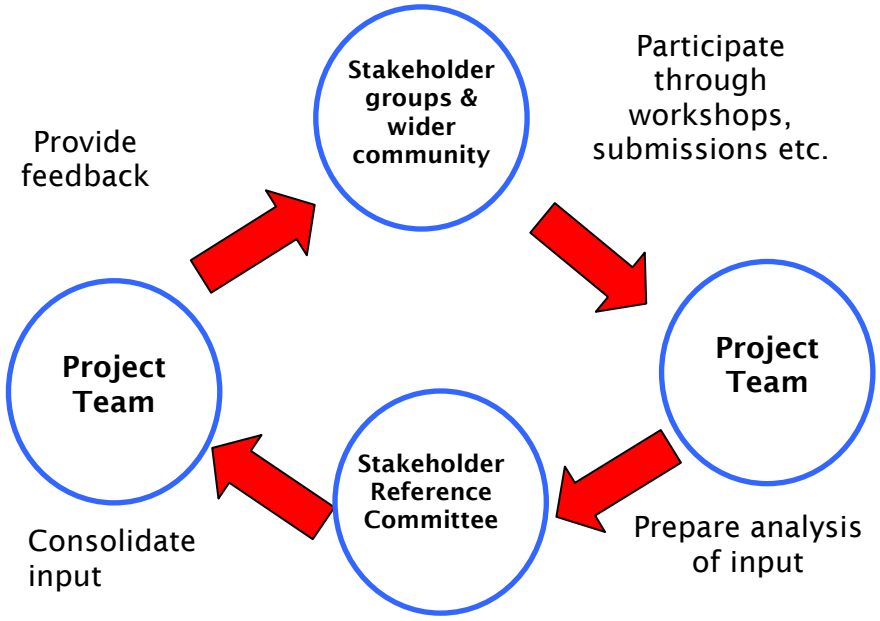

Figure 4: Information movement

In addition to providing feedback **to** stakeholders, the project team will also seek to record our understanding **of** stakeholders (their aspirations, needs, values etc), by group and region. This will assist the team to adapt its participation strategy to better meet the needs of each particular group, and also provide a useful log of experience for others. A number of framework and software tools to assist this process are currently being examined.

(c) **Formation of the Stakeholder Reference Committee**

Section 2.3(b) highlights the important role of the SRC in terms of consolidating input, and providing guidance on how the next stage of the project will proceed. It is therefore worth reiterating the role of the SRC, and identifying how it has been structured to achieve that role. The function of the SRC is to:

Provide guidance on issues of wider stakeholder participation, and advice on the balance of participants in the Forum Workshops.

Consolidate input (ideas, feedback etc) from stakeholders, prioritise and rank the scenarios and options to be examined further by the Scenario Assessment Panel and make recommendations on the preferred regional response options, based on stakeholder views.

Make recommendations on any additional follow-up actions, which may assist agencies and groups in their subsequent implementation of these preferred response options.

Generate confidence in the project (its processes and outputs) within the stakeholder and wider community.

This is a significant and strategic role within the project. Its membership therefore needs to bring a wide range of skills and experience in managing sustainable agri-systems to the table, and yet have the ability to reflect the aspirations of the region. To achieve that blend of skills and experience, the Governance Committee (GC) has recommended the use of the Shepparton Irrigation Region Implementation Committee (SIRIC) as the base for the SRC. (SIRIC is one of the major community interface committees of the GBCMA.) The role has been discussed with SIRIC, and due to its strategic importance, they have committed themselves to make the extra time available.

A gap analysis of SIRIC was subsequently carried out, which indicated that SIRIC should be expanded (to constitute the SRC) with additional:

Business development skills (Regional agribusiness and Investment), to ensure that the needs of current and future investors are considered,

Two senior persons with water policy expertise from DPI and DSE, to ensure that policy developments are fed directly into the project,

Middle and upper catchment representation, to ensure that all interests within the catchment are adequately represented, and

Two senior persons with experience in Local Government planning and process, to ensure that this is built into the project.

Nominations from senior regional managers, Board members etc were used to define people who could provide those skills sets. Those nominations will be considered by the GC, and the persons with the most appropriate skills-sets will be invited by the chair of the GC to join the SRC. It is noted that a

target outcome is the establishment of a greater gender balance within the SRC. The Terms of Reference for the SRC are given in Appendix 2.

2.4 On-going facilitation skills development

The importance of participation to the success of this project has been emphasised. As a result, the project team has established a sub-group (or a reference group) with considerable experience in facilitating community participation. That group will act as a resource (in terms of planning, preparing for and running Workshops). It also assists in achieving a better gender balance on the project team.

In addition, senior staff within DPI/DSE (or other organisations) who are experienced in community participation and foresighting programs, will be approached to see whether they are willing and available to provide an informal mentoring role to project staff.

3. PARTICIPATION PLAN STAGE 1: PLAN DEVELOPMENT

In order to document all elements of the Plan fully, it is noted that Stage 1 has involved:

Formulating the rationale for the plan. As indicated in Section 2.1, this has involved activities such as establishing the project team, conducting a literature review, brainstorming, identifying, consulting with and involving regional stakeholders etc.

Developing the details of the plan. This was an iterative process, which utilised stakeholder input (Section 2).

Forming the Stakeholder Reference Committee. This was detailed in Section 2.3(c).

Recruiting participants for the Forum Workshops in each region. Participants will be nominated after discussion with recognised industry representatives, confirmed (and subsequently invited) by the chair of the SRC.

4. PARTICIPATION PLAN STAGE 2: VISION, SCENARIO & OPTIONS

4.1 Specific objectives

(a) To facilitate wide-ranging discussion and debate of the issues of vision, scenarios and response options within the community.

(b) To facilitate the development of:

- A **shared (high-level) vision** for future irrigation.

  This will include desired outcomes as measured by indicators of sustainable irrigation (eg industries, economics, social equity, population, water quality and ecology, salinity, soil health etc).
- A **spectrum of scenarios** which reflect the major aspirations of, and opportunities for, the region, and the likely constraints to be faced in the future.

  This will consider external constraints and opportunities such as irrigation water availability, property rights, climate changes, environmental policy, new science breakthroughs, markets. It will also incorporate regional assets and constraints such as soils, land capability, hydrogeology, climate, ecology, infrastructure, skill and expertise, social capability.
- A range of innovative and strategic ways (**response options**) in which the region could position itself to deal with, or create, these scenarios.

  This may include some radical changes for future irrigation in the region, such as where, what and how to irrigate in the catchment, infrastructure, commodities and farming systems, regional policy instruments and institutional arrangements.

4.2 Irrigation Futures Forums

Regional Workshops. A series of half-day Planning Workshops will be held throughout the region, for participants in the Irrigation Futures Forums. At this stage, Workshops are planned for:

- Cobram,
- Rochester,
- Kyabram, and
- Shepparton in the lower catchment (SIR), plus
- Benalla (middle catchment on the Broken Ck), and
- Seymour (upper catchment on the Goulburn River) to cater for diversion irrigators outside the SIR.

Workshop coverage. The Workshop series will have the following broad outline:

1. A scene setting/values/current issues and Vision Workshop,
2. Scenario Workshop,
3. Options Workshop,
4. Recommendations of the SRC on what goes to the next stage.

A report-back process will be incorporated within each Workshop to provide feedback to participants on questions raised at the previous

meeting, thoughts of the other Workshop groups, and any comments or recommendations from the SRC.

SRC presence. It is proposed that the SRC have a representative in each of the regional Workshops. This will contribute to the learning of SRC members, ensure the correct transmission of stakeholder views to the SRC, and assist in the development of project credibility within the Forum groups.

Rules of engagement. Each Workshop group will define operating rules which cover issues such as conflict resolution, and deciding when a given issue has been satisfactorily completed etc.

4.3 Forum Workshop timetable

The proposed timetable for the Irrigation Futures Forum Workshops during Stage 2 is given in Table 3. It has been designed to align with the existing meeting schedule for SIRIC, and has allowed time to effectively consolidate input from Forum participants. The schedule has accommodated school holidays, but may also have to accommodate seasonal aspects of farming work, business requirements etc. It is therefore recognised that the schedule may have to be adapted after discussion with participant groups.

The additional Workshops for young people and invited experts, will be scheduled within this broad framework, after discussion with the SRC.

Workshop	**Proposed time**
Workshop 1 Vision	Tues/Wed/Thurs 27 - 29 April and Tues/Wed/Thurs 4 – 6 May. The team would then collate the forum inputs on vision, values etc and feed them into the SIRIC meeting (3) of 14 May as information.
Workshop 2 Scenarios	Tues/Wed/Thurs 1 - 3 June, and Tues/Wed/Thurs 8 - 10 June. Forum inputs on scenarios to SIRIC meeting (4) of 25 June as information.
Workshop 3 Options	Tues/Wed/Thurs 20 - 22 July, and Tues/Wed/Thurs 27 - 29 July. Forum inputs on options to SIRIC meeting (5) of 13 Aug as information.
Note: The SIRIC meeting (6) of 17 Sept then becomes the point where the SRC decides ***which scenarios and options*** are to be investigated in detail in the subsequent modelling stage.	
Workshop 4 Feedback	Tues/Wed/Thurs 12 - 14 Oct, and Tues/Wed/Thurs 19 - 21 Oct. This Workshop will be used to provide feedback to the Forum groups on ***what*** the SRC has decided to investigate in the next stage and ***why.*** It will also provide feedback to the SRC on that decision from the Forum groups.

Table 3: Workshop timetable Stage 2

4.4 The wider community

The mechanism proposed for participation by the wider community is via submissions using e-mail, letters or phone. It is felt that this approach will allow participants to focus on the issues to a greater degree than what could be achieved through a series of open community meetings. The project team will ensure that clear guidelines are issued to the wider community through the media (radio, newspaper), and existing newsletter networks, as to how to obtain information on the project, and how and when to make submissions. This is also dealt with in the Communication Plan.

The input from the wider community will be put through the consolidation process outlined in Section 2.3(b).

5. PARTICIPATION PLAN STAGE 3: ASSESSING CONSEQUENCES

5.1 Specific objectives

To facilitate participation in, and stakeholder acceptance of the outputs from, this Stage through:

(a) The involvement of selected regional stakeholders (who are experts in their field) in the work of the Scenario Assessment Panel.

(b) Wide-ranging discussion of the assumptions, processes and outputs of the Scenario Assessment Panel.

5.2 Irrigation Futures Forums

The role of the Scenario Assessment Panel will be to model the range of consequences (environmental, social, economic and cultural) that are likely to be produced, if each of the options nominated in Stage 2 was implemented. The approach planned is to couple systems analysis (which is quite a specialised mathematical technique), with local (and specialist) expertise, so that model results use the best available knowledge.

That local expertise will be drawn from stakeholders within the Forum groups, who will advise the Scenario Panel on whether the assumptions made, the analyses used etc, are realistic for this region. The shift from the high intensity, widespread stakeholder participation used in the previous Stage is noted. It is critical that the wider stakeholder community accepts the outcomes of this analysis. Hence, the implementation of this Stage will be carefully discussed with the Forum groups, and the SRC, before moving ahead.

During this Stage, participation from the wider stakeholder community will be facilitated by two information seminars for each Forum group. At these seminars, the Scenario Assessment Panel will:

1. Present and discuss the assumptions being made, and the analyses that are being used, and
2. Present and discuss interim results.

This will allow Forum participants to provide feedback to the Panel on their modelling work.

A detailed timetable for these information seminars will be prepared in conjunction with the SRC and the Scenario Assessment Panel.

5.3 The wider community

The wider community will be informed of the work of the Scenario Assessment Panel through regular media releases (as outlined in the Communication Plan), and will have the opportunity to participate through the submission process.

The arrangements for submissions outlined in Section 2.3(b) will again be followed.

6. PARTICIPATION PLAN STAGE 4: BUILDING CONSENSUS

6.1 Specific objectives

After the Scenario Assessment Panel delivers the results of its integrated systems analysis of scenarios, options and consequences, the project team will seek to facilitate:

(a) An **understanding** within the community of the consequences produced, **if** a given option were to be implemented.

(b) Building **consensus** within the wider community for the preferred options for the future of irrigation within the region.

(c) Development of the **regional follow-up actions** required to effectively build leverage towards achieving the preferred options.

6.2 Irrigation Futures Forums

At the completion of the Scenario Assessment Panel work, Forum participants will be invited to a series of 3 further Workshops in their region. The Workshop sequence for each Forum group will be to:

1. Present and discuss the full set of consequences associated with implementing each of the options proposed in Stage 2.
2. Debate and select the preferred regional response options.
3. Formulate any follow-up actions which may assist the region to effectively implement the preferred response options.

(Dates for these Workshops will be developed in consultation with the SRC and the Scenario Assessment Panel.) The preferred regional response options for the future of irrigation within the Goulburn Broken catchment, and the recommended follow-up actions, will be transmitted by the SRC to the relevant State and regional agencies, companies and the wider community. Those agencies and companies will then use this information in their subsequent planning, decision-making and implementation processes.

6.3 The wider community

The wider community will participate in this final stage through the use of a deliberative forum such as the Citizen Jury. It is a strategic time to introduce such a technique, because the Scenario Panel will have reported on the consequences of each option. It is therefore important for the wider community to develop an awareness of the issues being addressed, to consider the options being put forward, and to develop a view on which of the options appear best for the region. Those community views will be put to the SRC through this deliberative forum (and submission) process.

7. RESOURCE REQUIREMENTS

The project will require a considerable breadth of facilitation skills as it deals with issues such as visioning, scenario planning, options development, deliberative forums etc. The project team will examine the specialised needs associated with each stage of the project, and make decisions on whether the requisite in-house experience is available, or whether additional external skills are required. For Stage 2, expertise in facilitation has been brought in from DSE.

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9. APPENDICES

9.1 Stakeholder Groups

Stakeholder Group 1: Institutions who implement changes.

Stakeholders		**Contact person**	**Inform / Consult / Involve / Empower**
Stakeholder Reference Committee	See Terms of Reference for Membership List	To be confirmed	
Goulburn-Murray Water	Policy Level Board Level	Denis Flett (CEO) John Dainton (Chair)	I I
Shire Councils	City of Greater Shepparton Moira Campaspe Rural City of Benalla Mansfield Mitchell Strathbogie Murrindindi	Refer to: J:/…Irrigation Futures/Communication/ Stakeholders for membership and contact details For three Shires in Shepparton Irrigation Region, refer to Melva Ryan (Municipal Catchment Co-ordinator, GBCMA, Shepparton)	I
CMA Board		Bill O'Kane (CEO), Steve Mills (Chair)	E, I
Department of Primary Industries	Policy Level Implementation Level		I E, I
Department of Sustainability and Environment	Policy Level Implementation Level		I E, I
EPA	Water Quality	Elita Humphries, EPA Wangaratta (EPA representative on the SIRIC)	I
MDBC		Scott Keyworth	C,
AFFA		Ross Dalton	C

Stakeholder Group 2: Directly Influenced / impacted by changes.

Stakeholders		**Contact person**	**Inform / Consult / Involve / Empower**
Goulburn-Murray Water	Water Services Committees:		
	Shepparton	Darren Nabbs, Area Manager	I
	Rochester	Graham Clark, Area Manger	I
	Murray Valley	Kevin Preece, Area Manger	I
	Campaspe		I
	Central Goulburn		I
	Groundwater Users	Graham Smith, Area Manager	C
	Diverters		C
GBCMA Implementation Committees	Shepparton Irrigation Region	Ken Sampson (EO)	I
	Mid Goulburn	Phil Stevenson (EO)	I
	Upper Goulburn	Russell Wealands (EO)	I
		See Pam Collins, DPI Tatura for full membership details of these committees.	
Aboriginal Communities		Refer to: J:/…Irrigation Futures/Communication/ Stakeholders for full contact details for all the groups.	I, C
Environmental Groups	Goulburn Valley Environmental Group	Doug Robinson (DPI Benalla) (Chair)	I,C
	Seymour Environment Group	Leslie Dalziel	I,C
	Benalla Environment Group	Charles Jones (also Board member of GBCMA)	I,C
	Tatura Environment Group	Chelsea Nicholson (DPI Tatura)	I,C
	Echuca Village Environment Group		I,C
	Environment Victoria		C
	Barmah/Millewa National Park Group	Paul Sinclair	C
	Australian Conservation Foundation	Nick Roberts (DPI Tatura – also on SIRIC)	C
	Vic. National Parks Association		C
		Nick Roberts (DPI Tatura – also on SIRIC)	
Landcare Groups	SIR Goulburn Murray Landcare Network	Refer to Lyndall Ash, DPI Tatura	I,C
	Granite Creeks		I,C
	3 other mid catchment groups	Refer to Heather Holder, CMA Benalla	
	Upper Goulburn Catchment Group		I,C
	Dabyminga Catchment Collective	Refer to Matt Crawley, CMA Yea	C
	Sunday Creek/Sugarloaf sub-catchment		C
	Hughes Creek Collaborative		C
Goulburn Valley Water	Supplies water for the whole GB catchment	Laurie Gleeson (CEO) or Alan Gale (operation); Mijo Darveniza (Chair of	I

Stakeholders		Contact person	Inform / Consult / Involve / Empower
		Board)	
Industry Groups	Dairy	Maurice Incerti – Kyabram Dairy Centre	I,C
	Horticulture	(consult Bill Ashcroft, DPI Tatura)	I,C
	Viticulture	(consult John Whiting, DPI Tatura/Bendigo)	I,C
	Beef		I,C
	Sheep	(consult Howard Pascoe, DPI Echuca)	I,C
	Forestry	(consult Howard Pascoe)	I,C
	Horses	(consult Rhodey Bowman, DPI Tatura)	C
	Aquaculture	(consult Strathbogie Shire)	C
	Dryland cropping		Inf
	Irrigated cropping	Dale Grey, DPI Cobram	I,C
	Tourism	Dale Grey, DPI Cobram	C
		(BRAIN STORM OR WORK SHOP FOR DETAIL) use Tourism Victoria and council's websites.	
Secondary Industries	Abattoirs (livestock)	(Refer to industry group contact persons)	C
	Horticulture processing		C
	Wine making		C
	Dairy processing		C
	Timber processing		C
	Fish processing		C
Industry Organisations	VFF	Paul Weller (Chair)	I,C
	UDV (Tatura/Rochester)		I,C
	Murray Dairy	Maurice Incerti	I,C
	NVFA	Stan Cornish	I,C
	Vic Irrigated Cropping Council	Peter Swartz, Sam Lolicato	I,C
	T10	Penny Shaw, DPI Echuca	I,C
	Agribusiness		I,C
Diversions from Goulburn, not in SIR	Regulated Catchments	GMW	I,C
	Non-regulated catchments	Lucy Finger	I,C
New Irrigation Developments		Ross Wall, DPI Tatura	I,C

Stakeholder Group 3: Concerned groups

Stakeholders		**Contact person**	**Inform / Consult / Involve / Empower**
TAFE and Universities	Goulburn Oven TAFE		Inf,C
	LaTrobe University		Inf,C
	Melbourne University		Inf,C
Urban fringe / part time farmers			Inf,C
General Public			Inf,C
Others	CFA		Inf,C
	Field & Game	Kanyapella Basin quite active	Inf,C
	Lower Goulburn Flood Plain		Inf,C
	Town groups (Progressive Association)		Inf,C
			Inf,C
	Fishing associations	Tatong Angling Club – Paul O'Connor	Inf,C
		Undera Angling Club – Richard Maxwell	Inf,C
	Banks		Inf,C
	Insurance companies		Inf
	Service Clubs	Refer: J:/…Irrigation Futures/Communication/ Stakeholders for more details	Inf
	Other states		Inf
	Melbourne Water		Inf,C
	Rural finance		Inf,C
	Tertiary industries (transport, engineering companies, solicitors, real estate agencies)		Inf,C
	People outside the Catchment		Inf
	Politicians		Inf,C

9.2 Terms of Reference, Stakeholder Reference Committee

1. Title

The committee will be known as the Stakeholder Reference Committee

2. Life of the Committee

The committee will operate until the 30 June 2007.

3. Authority of the Committee

The Stakeholder Reference Committee is commissioned by the Governance Committee of the "Irrigation Futures in the Goulburn Broken Catchment" project. It can make recommendations to the Governance Committee.

4. Role of Committee

The role of the Stakeholder Reference Committee is to:

Provide endorsement of the processes for wider stakeholder participation,

With input from the wider stakeholder community, develop a shared vision for the Goulburn Broken Catchment for the future of irrigation,

Consolidate scenario ideas from wider stakeholders and identify which are to be analysed,

Discuss the results of the scenario testing in consultation with the Scenario Assessment Panels,

Create awareness of the project within their regions/organisations.

5. Membership

The Stakeholder Reference Group will be made up of voting members of the Shepparton Irrigation Region Implementation Committee, with additions (to be decided).

6. Chairperson

The Chairperson is to be a member of the committee, nominated by the committee and is in the position for a period of 12 months. Elections will be held annually, with the current chair able to renominate.

7. Meeting Frequency

The committee will meet on an "as needs" basis. Frequency will be discussed at the inaugural Stakeholder Reference Committee meeting,

8. Convening and co-ordination

The Project Operational Manager and Chairperson in consultation with the Project Team and Committee will prepare meeting papers and agenda.

Meetings will be convened and coordinated by the Project Operational Manager.

9. Remuneration (to be finalised)

Cost of participation by farmers and self employed members will be met in line with the GBCMA policy on Remuneration for IC Members. Budget to be finalised.

10. Current Membership (October 2003)

Name	Position	Organisation
Russell Pell	IC Chairperson	Wyuna Dairy Farmer
Peter Gibson	IC Deputy Chairperson	Nanneella Dairy Farmer
Alan Canobie	IC Member	Numurkah Dairy Farmer
Nick Roberts	IC Member	GV Environment Group
Ann Roberts	IC Member	Landcare Network Representative
Peter McCamish	IC Member	Ardmona Horticulturalist
Steve Farrell	IC Member	Echuca Dairy Farmer
Athol McDonald	IC Member	Tongala Dairy Farmer
Melva Ryan	Municipal Catchment Co-ordinator	GBCMA

9.3 Acronyms

ANCID	Australian National Committee on Irrigation and Drainage
AFFA	Agriculture, Fisheries and Forestry - Australia
CFA	Country Fire Authority
CRCIF	Co-operative Research Centre for Irrigation Futures
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
EO	Executive Officer
EPA	Environment Protection Authority
GBCMA	Goulburn Broken Catchment Management Authority
GC	Governance Committee
G-MW	Goulburn-Murray water
GV	Goulburn Valley
IC	Implementation Committee
LWA	Land and Water Australia
MDBC	Murray Darling Basin Commission
NPSI	National Program for Sustainable Irrigation
NVFA	Northern Victorian Fruitgrowers Association
PIRVic	Primary Industries Research Victoria
SIR	Shepparton Irrigation Region
SIRIC	Shepparton Irrigation Region Implementation Committee
SPC	Shepparton Preserving Company
SRC	Stakeholder Reference Committee
UDV	United Dairyfarmers Victoria
VFF	Victorian Farmers Federation
WSC	Water Services Committee

Review of Participation Plan

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Directorate / Unit Regional NRM Taskforce
Phone 07 3227 6587
17 December 2003

Project Leader (Dr QJ Wang) or Operational Manager (Leon Soste)
Primary Industries Research Victoria
Department of Primary Industries
Ferguson Road
Tatura, Victoria, 3616

Dear QJ

Project Review: Goulburn-Broken Stakeholder Participation Plan

Many thanks for the opportunity to review the Draft Stakeholder Participation Plan of the NPSI project: Irrigation Futures of the Goulburn Broken Catchment. The project is an ambitious one, and your team has clearly placed considerable emphasis on locating the participation and knowledge/ consensus building arrangements at the core of the project.

Overall Approach

From the outset, I would like to congratulate your team on developing a cohesive and clear overall approach to public participation components of the project.
The Stakeholder Participation Plan is easy to read and clearly articulates your research intent. There has been a focus on identifying the right stakeholders at both sectoral and geographic levels. The participation principles to be applied are clearly articulated, as is the purpose of participation at various levels and stages within the project. The flow of information from participation processes and both in and out of the Stakeholder Reference Committee is clear.
In effect, Stage I has been a critical buy-in step to enable stakeholders to chew over the concept and formally support its progression into Stage II. The following drops down into more specific comments related to the Stakeholder Participation Plan and its influence on the overall project.

Clarity of the Project Concept

One thing that struck me as having been critical in garnering the current level of support for the project within the region is the relative simplicity with which the fairly complex underpinnings of the project have been conceptualised and promoted. I think the presentational material established to work this through with stakeholders is excellent, as well as your straight-foreword explanation of the concepts. I would encourage the team to continue to focus on this approach, and to apply this principle throughout the life of the project. Even as the most complex catchment models emerge

during the project, the team should not only always strive to extract and present the key messages in a very visual way, but to also encourage and promote opportunities for people to get into the detail behind the scenes if they want to.

Diversity of Knowledge Building Approaches

The Stakeholder Participation Plan clearly defines the breadth of stakeholders that may benefit from the knowledge building products emerging from the project (eg from formal planning groups to catchment citizens). The Plan specifically designs a range of strategies to assist knowledge building in each of these contexts.
The strategy also identifies groups that may be less connected to formal decision making processes. Identification of youth as a critical sectors of society requiring particular attention is critically important. In some cases, however, I don't yet see the detail of how strategies will be devised to engage these and other less-engaged sectors (particularly indigenous communities). Lack of gender balance within your team could in itself mean particular care and attention needs to be placed on gender issues.
In addition to the proposed participation reporting arrangements, there are some simple tools that can be used for you to continually build an evolving picture for your own understanding of various sector groups, geographic communities and organisations as the project unfolds. I would suggest that you seek to formally record and continuously improve your understanding of such sectors, communities and groups throughout the life of the project. Doing so would allow you to continuously review and improve the participation and knowledge building techniques that you are applying throughout the life of the project. One research framework of value in this instance maybe "Strategic Perspectives Analysis". Strategic Perspectives Analysis is a simple tool for formalising/ organising qualitative information of this kind. I have attached a copy of a paper regarding Strategic Perspectives Analysis for your information. Software tools to assist qualitative analysis of information required within Strategic Perspective Analysis might assist you in this regard, as well as providing a rigorous reporting framework for your Project Facilitator.

Knowledge Delivery Versus Institutional Reform

In our discussions in Sydney, I was particularly impressed by the very clear distinction that you made regarding the role of the project and the project team being about knowledge development and underpinning consensus building, but *not* stepping into facilitating an actual decision making process. As a technology and knowledge development and delivery focussed team (ie. with neither the specific institutional analysis skills or the organisational mandate to lead and structure critical regional negotiations) its is critical that you have made this distinction clear from the start. This point needs to be reinforced throughout the life of the project. I know that this can be a particularly hard divide to articulate and maintain, but it is essential. If the project team, for example, slipped into using terms like "representative" or "decision making", then it would have started to cross the line into actual decision facilitation; a massive undertaking beyond the scope and mandate of the project.

It should be noted that in your promotional brochure, you do state that "the project aims to bring together regional community and other key stakeholders to ….. make informed decisions on investment, services and policies". This language is problematic, and inconsistent with the language of "supporting decisions" for the future as articulated in your Stakeholder Participation Plan.

While I stress the needs to keep the distinction clear, projects of this nature, however, are most successful when they are able to deliver their knowledge products and consensus building processes into actual formal decision making processes. This leads me into what I perceive to be the most significant "influence risk" facing the project. As I understand it, while there is a linkage between the knowledge building efforts of the project, there is currently no parallel process driven by either the State government or the Goulburn Broken Catchment Management Association to structure up improved engagement systems and decision processes (perhaps leading to refinement or further development of an accredited Regional NRM Plan).
If the project is to maximise its impact, I would suggest that some parallel discussion proceed between the State/ Federal governments and GBCMA about continuously improving planning and decision making processes to be undertaken over the next few years. This means that, while the project is developing knowledge and consensus building activities, parallel institutional reforms to assist decision making should be occurring (eg building a regional decision making mandate among the catchment's Local governments). This would type of parallel process would better define the entry points of your project's knowledge products, as well as better utilise the project's community and group knowledge building efforts.
This is a critical point if the project is to have real influence, and I would suggest that DPI Victoria and LWA could play a catalytic role in establishing such dialogue. As CRC Program Leader, I would be happy to offer support in such discussions. My primary interest here is to maximise the impact of the CRC/NPSI investment.

Formal Public Participation Skills

I remain concerned that the project team lacks formal public participation skills. This is a risk that could be managed, rather than a suggestion that your team does not have the inherent skills to foster successful participation. In fact, from my interactions with you in the context of the CRC Senior Management Team, I would suggest your own honest and no-nonsense approach is a key quality underpinning successful public participation. Additionally, taking a too-academic approach to participation design could itself undermine stakeholder confidence in the process.
The main risk I feel is the lack of opportunity for team members (particularly yourself and Leon) to operate within a peer-based environment; one that would allow your intuitive approach to be tested and challenged in a positive way. As you know, with any scientific activity, this type of open dialogue is critical for innovative thinking, and testing the rigour of the approaches that you take. One way to secure some peer review of this kind may be to find a suitable mentor with formal experience in this field to have a regular dialogue with about the project approach.
Another approach may be to gather a small reference group that you may bring together either six monthly or once a year to thrash out the details of

your engagement systems. Regular email contact could be maintained in the interim. You may want to use your proposed Technical Advisory Committee to do this, but I don't have a clear view of its membership or purpose. There would also be a risk in loosing the richness of discussion on participation issues, if the TAC is predominantly technology based. skill. The reference groups approach has been successfully applied in a number of large projects I have been involved in, but fundamentally rests on the willingness of the project team to commit to genuine adaptive management of the project.

Evaluation Plan

I was very pleased to see a formal Evaluation Plan mentioned within the Stakeholder Participation Plan, but would suggest the team work quite rapidly to establish this during the detailed participation design steps early in the development of Stage II. I am not sure that Bennett's Hierarchy on its own might assist you to set clear performance criteria to evaluate the influence of your knowledge and concensus building activities within the general community, particular geographical communities, sectors or organisations and within the Shepparton Irrigation Region Implementation Group. I would suggest more specific thought be given to determining what you are seeking to achieve in regard to each of these stakeholders/ clients, and the mechanisms needed to assess your impact with each. Distinguishing between the impact of your particular knowledge building interventions and other background factors will be important within the Evaluation Plan.
Once again, I hope my review comments are of assistance in progression of the project to Stage II. I am very happy to continue to offer the services of the Policy and Planning Program Team to support the project to fruition.

Yours sincerely
Dr Allan Dale
Joint Program Leader
Policy and Planning for Change Program
CRC for Irrigation Futures

Project Response to the Review of the Participation Plan

A summary of both the key issues raised by the external reviewer, and the changes made to the Participation Plan (or the running of the project), in response to those comments, is given below.

Reviewer's comments	**Response of the project team**
The team is to be congratulated on developing a clear and cohesive approach to the public participation component of the project.	Reviewer's comments passed on to the project team.
Suggestions: Continue to keep it simple. Continue to use diagrams to represent key messages. Allow participants to get to the next level of complexity if they wish	Will use this suggestion in the Forums.
More detail on engagement methodology for under-represented groups, particularly indigenous groups and young people. The lack of gender balance in the project team needs to be kept in mind.	The DPI office at Tatura has a number of staff who work as liaison officers with the NESB and indigenous communities in the region. (They have also established women's networks within these communities). These liaison officers will be used to identify and work with participants from those communities in the Forums. Women in agriculture networks will also be identified and used. (Section 2.3(a) of the Participation Plan). In regard to young people, contact with Young Irrigators etc has been commenced to identify the best way of facilitating input from this sector.
Record the evolving understanding of stakeholder groups and geographic communities. Make use of: Strategic Perspectives Analysis, & Software tools (Envivo & Nudist)	This suggestion will be taken on-board (Section 2.3(b)). Background information on Strategic Perspectives Analysis has been obtained, and utilisation of the technique is being investigated. The software is also being pursued.
	The suggested changes to the wording of the flyer have been made.
Confirms our focus on information provision rather than decision-making. Watch language. Suggest: Change a small amount of wording in the flyer.	Discussions with key stakeholders are continuing, to ensure that the project outputs feed directly into their planning processes.
Seek to initiate the parallel development of planning and	The project team has established a

decision-making strategies within the CMA and the Shires. Lack of formal public participation skills amongst key staff is a manageable problem. Suggestions: Continue the straight, no-nonsense approach, and take opportunities to operate in a peer environment (either mentor or small reference group). Pleased to see formal Evaluation Plan in the project. Key issues: (a) Clearly identify what we want to measure, (b) how we plan to measure it, & (c) how we can distinguish between the impact of the project and other factors.	reference group, with considerable experience in facilitating community participation. That reference group will act as a resource (in terms of planning, preparing for and running Forum Workshops). (Section 2.4). The issue of mentors for project staff is also being pursued. These suggestions have been incorporated in the development of the Evaluation Plan.

Project response to the LWA comments on the Milestone 1a Report

A summary of both the key issues raised by LWA, and the changes made to the project in response to those comments, is given below.

LWA comments	Response of the project team
Consider whether the Technical Advisory Committee needs further skills in: waterway heath, dryland catchment management, community and industry engagement in both the lower and upper catchment.	Comments noted. The need for additional skills in waterway health will be taken up during Stage 3, Assessment of consequences. The additional skills in dryland catchment management, community and industry engagement in both the upper and lower catchment are considered to have been provided for in the expanded membership of the SRC (see Section 2.3(c) of the Participation Plan).
Develop a list of acronyms and glossary, and make it available to all relevant parties.	A list of Acronyms has been included as an Appendix in each of the Participation, Communication and Evaluation Plans. A glossary of terms has not been developed at this stage because it was considered that: the readership will be mostly NRM managers who are familiar with the terms and concepts, and the prediction of what terms and concepts a non-NRM readership will require, is quite subjective, and therefore difficult to service effectively.
Stakeholders outside the irrigation area appear to be missing. Some of these stakeholders are very important as they have some influence on the quality and quantity of water and the conveyance system to the irrigation area.	Comments noted. It is considered that utilisation of middle and upper catchment representation on the SRC has been strengthened, and an additional Leadership Forum at Benalla will provide a greater level of stakeholder input from outside the irrigation area.
Consideration also needs to be given for tourism to be included, particularly water users at Lake Eildon, Lake Nagambie and Lake Mokoan.	Comments noted. The issue of engagement with tourism groups will be raised in discussions with the appropriate Local Government bodies, and their input to Leadership Forums will be sought. The use of a Leadership Forum at Seymour for the upper Goulburn irrigators is considered adequate. An

	additional Forum is now planned at Benalla to cater for the Broken River/Ck irrigators.
Consider whether there is a need to strengthen forums for the upper Goulburn and Broken River/Creek irrigators. Refine how the community will be informed of the process. This will be important if we are to receive good submissions from the broader community.	Comments noted. Detail on how the broader community will be informed so that it can provide good submissions, has been strengthened in both the Participation Plan (Section 4.3) and the Communication Plan. Preliminary discussions have also been held with the local media to ensure their support, when the need for informing the broader community arrives.
Suggest further development on how the Stakeholder Reference Committee will be expanded, and a selection process to ensure that it gains the diversity of representation needed and the right people to provide the feedback and direction.	Comments noted. The definition of how the SRC will be expanded, and how the selection process will occur has been strengthened in Section 2.3(c) of the Participation Plan. This has been expanded in Section 2.3(a) of the Participation Plan. The issue of whether a different process will be required when dealing with indigenous groups has been raised with the relevant DPI liaison officers, and their advice will be followed in this regard.
Specific comments on the peer review: The development of a detailed strategy for engagement of minority (eg youth and indigenous people and less engaged sectors (and a general comment on the need to consider a different process to engage the indigenous community).	Comments noted. The project team will record its evolving understanding of Stakeholder groups as outlined in Section 2.3(b) of the Participation Plan.
Formally record our evolving understanding of stakeholder groups during the life of the project. The role of the project team in knowledge development and consensus building. In reality the project will be assisting in the facilitation of decision-making, which is to some degree a compromise.	The external review confirmed that the project focus is correctly "about knowledge development and under-pinning consensus building, but *not* stepping into facilitating an actual decision-making process." The LWA comment on compromise is noted. The decisions which will be taken by the project are limited to those required for the effective carriage of the project (eg, how many scenarios and options can we investigate in detail etc). Without such decisions, it would be impossible to move forward.

The use of Strategic Perspectives Analysis, & software tools may offer new insights. If software is used, please advise of the program and why it was selected. Addressing the lack of formal public participation skills within the project team mix. Has it been successful? Establishing a mentor network for Project Investigators. Earlier development of the Evaluation Plan. Reviewer may not be aware of the level of strategic development by the catchment and partnerships with the State and Commonwealth.	The use of techniques (such as Strategic Perspectives Analysis) and associated software, which assist the project team to understand stakeholder groups, will be investigated. Milestone Reports will document choices made and why they were taken. The project team has established a reference group, with considerable experience in facilitating community participation (Section 2.4 of the Participation Plan). That appears to have been an excellent decision. The issue of mentors for project staff is also being pursued. The Evaluation Plan has to be developed after the Participation and Communication Plans. It could be part of a separate review. Comment noted. The effective incorporation of project outputs into the planning cycles of stakeholder agencies is critical. Section 1.4 of the Participation Plan outlines the strategies taken to ensure that this is facilitated by the project.

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT

Communication Plan

February 2004

PIRVic (Primary Industries Research Victoria) - Tatura
Department of Primary Industries

Victoria
The Place To Be

NATIONAL PROGRAM FOR
Sustainable Irrigation

GOULBURN
BROKEN
CATCHMENT
MANAGEMENT
AUTHORITY

GOULBURN-MURRAY
WATER

This document was revised after the Governance Committee meeting of 3 February, 2004 and incorporates comments from the external review, Land and Water Australia and the Governance Committee.

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Selina Handley and Nicole Hunter – Department of Sustainability and Environment

Professor Bill Malcolm, Weihua Zhang – University of Melbourne

Technical Advisory Committee:

Jo Haw, Associate Professor Hector Malano, Derek Poulton, Greg Roberts, Ken Sampson

Governance Committee:

John Pettigrew – Goulburn Broken Catchment Management Authority
Kylie Pfeiffer – Department of Sustainability and Environment
Murray Chapman – National Program for Sustainable Irrigation, LWA
Denis Flett – Goulburn-Murray Water
Frank Greenhalgh – Department of Primary Industries
Richard Habgood – Department of Primary Industries

Stakeholder Reference Committee:

Being finalised.

Project Funded By:

Department of Primary Industries
Department of Sustainability and Environment
Goulburn Broken Catchment Management Authority
Goulburn-Murray Water
National Program for Sustainable Irrigation, Land and Water Australia

TABLE OF CONTENTS

1. Introduction

This project aims to bring together key stakeholders and the wider regional community to develop a shared vision for, and to make informed choices about, the future of irrigation in the Goulburn Broken catchment.

The two key adoption pathways utilised by this project are **stakeholder participation** and **communication**. The linkages between project information, the development of vision, understanding and choice within the community through stakeholder participation and clear communication with the wider audience, leading to strategic institutional and industry outcomes, are illustrated in Figure 1.

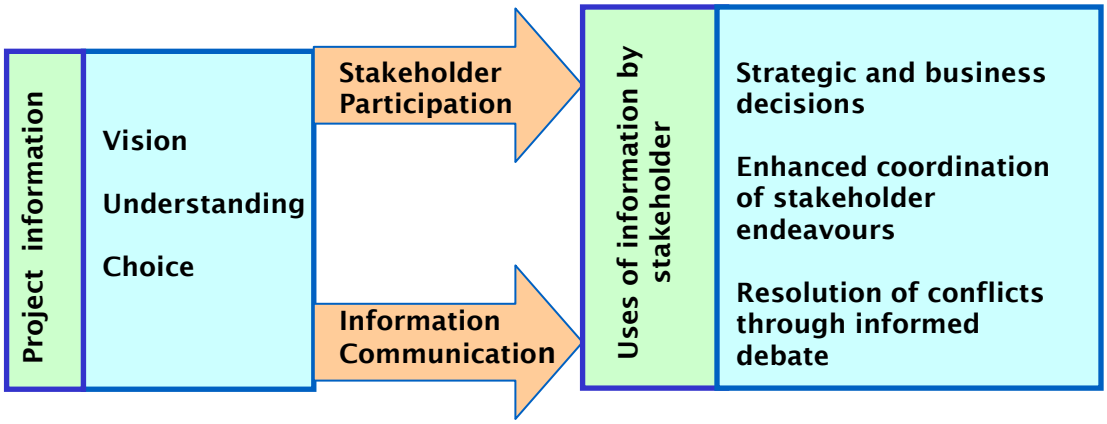

Figure 1: Adoption Pathways and Outcomes

An effective Communication Plan is a key requirement for the success of this project. It is essential to:

Engendering ownership and subsequent implementation of the options, within the stakeholder community, and the

Effective running of the project.

The Participation and Evaluation Strategies utilised by the project are the subject of separate reports. This document presents the rationale and program details of the Communication Plan proposed for each identified stakeholder group and wider audience.

2. Communication aims

In regard to stakeholders, this communication strategy aims to:

Develop and maintain a high level of awareness of project aims, processes and outcomes within the stakeholder community.

Provide stakeholders with the strong sense that their concerns are being heard, and that the project is attempting to deal responsibly with their irrigation related concerns and options.

Develop within stakeholders a strong commitment to the project, in terms of:

- Seeing it through over the next 4 years,
- Enhancing the adoption rate of research findings, and
- Implementing the preferred regional response options.

In regard to effective project management, this communication strategy aims to:

Secure the continued support and on-going commitment of investors and key stakeholders.

Maintain enthusiasm and commitment within the project team and the various project Committees.

3. Communication audience

The following groups of communication audiences have been identified:

Governance Committee and Investor Institutions

Stakeholder Reference Committee

Irrigation Futures Forum participants

Stakeholder community (2 Levels:

- Senior managers of Government agencies, Local Government, business
- Farmers plus farming, industry and environmental groups)

Politicians (At Federal, State and Local Government level)

Wider regional community and community groups

Wider general audience (such as the scientific community etc)

Project Team members.

For each audience group: The project needs, desired response from, key messages to, communication mechanisms and outcomes, have been identified, and are presented in Section 4.

4. Plan Details

Who	Project Needs	Response We Want	Messages	How or Actions	Outcome or Impact
Governance Committee (GC) & Investor Institutions	Advocate for the project at senior levels of Govt and investor meetings. Provide strategic input to, and oversight of, project direction, progress and quality of output. Continue to invest in the project.	Feel high degree of ownership. Confident that the project is well run, and that the results will facilitate strategic planning within the region. High level of commitment to ongoing funding.	The project facilitates the effective participation of all key stakeholder groups. The project takes the input from those stakeholders seriously. The science is rigorous, and the effective input of stakeholders will result in the best available knowledge being used. The outcomes will be of strategic importance to the region. The project is well managed. It delivers outputs on time and within budget.	Governance Committee meetings (2 per year). Project reports as required. Brief project updates (pdf) quarterly. E-mail and phone contact as required. Attendance at Annual NPSI Investor Forum.	Confidence in delivery by the Project Team. Confidence in project methodology. Continuing investment. Advocacy, both during the life of the project and during the subsequent implementation of its preferred options.

Who	Project Needs	Response We Want	Messages	How or Actions	Outcome or Impact
Stakeholder Reference Committee (SRC)	Advocate for the project within the stakeholder community. Advise on the comprehensiveness of the participation process. Consolidate inputs from the Irrigation Futures Forums and wider community. Provide leadership to Irrigation Futures Forums.	Understand the importance of their role. Feel high degree of ownership. Confident that the project is well run, and that the results will facilitate strategic planning within the region. Confident that stakeholder input is being faithfully delivered to them for decision. Commitment to on-going leadership role within the project. Generate confidence and on-going participation within the stakeholder community.	Your role is critical to the success of the project, and your inputs are valued. We will present you with the summarised input of all stakeholders, so that you can take the necessary decisions on how we move forward. We will provide you with adequate support to facilitate your role. The project will make a difference to the region.	Meetings discussing project plans, seeking inputs, providing project updates (3 monthly). Formal briefing notes before each meeting. E-mail and phone contact as required.	SRC champions the project, both during the life of the project and during the subsequent implementation of its preferred options. SRC is enthusiastic in fulfilling its role. SRC has ownership of project results.

Who	Project Needs	Response We Want	Messages	How or Actions	Outcome or Impact
Irrigation Futures Forum participants	Advocate for the project within the stakeholder community. Input their own experience and creative ideas, represent the input from their stakeholder community.	Feel high degree of ownership. Confident that their input, and that of their stakeholder community, is being heard and valued. Confident that the project is well run, and that the results will facilitate strategic planning within the region. Commitment to on-going participation.	Your role is critical to the success of the project. Your inputs, and the inputs of your stakeholder community, are valued. The project will make a difference to the region.	Forum Workshops and seminars: **Stage 2**: Series of 4 Workshops. **Stage 3**: Series of 2 seminars. **Stage 4**: Series of 3 Workshops. Brief project updates (pdf) quarterly. E-mail and phone contact as required.	Innovative ideas generated and captured. Experience of discovery and learning by participants. Ownership of project results.

Who	Project Needs	Response We Want	Messages	How or Actions	Outcome or Impact
Stakeholder community	On-going pro-active participation in the project, so that they will ultimately be prepared to implement the outcomes.	Feel high degree of ownership. Confident that their input is being heard and valued. Confident that the project is well run, and that the results will facilitate strategic planning in the region. Commitment to on-going participation. Prepared to implement the outcomes with appropriate investment of resources.	Your continued input is critical to the success of the project. The project will make a difference to the region.	Awareness presentations initially. Regular presentations of project progress and results. One page project updates (pdf) quarterly. Updates distributed via the GMW, GBCMA and Landcare networks as an insert in their newsletter. Quarterly project technical reports made available. Website for information. Letter response to written submissions.	Informed of project intention, progress and results. Confident in the project outputs. Make use of project information.

Who	Project Needs	Response We Want	Messages	How or Actions	Outcome or Impact
Politicians (Federal, State and Local Government)	Advocate for the project at senior levels of Govt and investor meetings.	Confident that the project is well run, and that the results will facilitate strategic planning within the region.	The project facilitates the effective participation of all key stakeholder groups. The science is rigorous, and the effective input of stakeholders will result in the best available knowledge being used. The outcomes will be of strategic importance to the region. The project is well managed. It delivers outputs on time and within budget.	Media-free briefings (2 per year). Brief project updates (pdf) quarterly.	Confident in project outputs. Confident in the basis for regional decision-making and investment. Advocacy, both during the life of the project and during the subsequent implementation in meetings with investors.

Who	Project Needs	Response We Want	Messages	How or Actions	Outcome or Impact
Wider regional community	Have some sense of ownership of the solution, so that they are prepared to be involved in the implementation of the solution.	Feel some degree of ownership. Confident that their input is heard and valued. Commitment to on-going participation. Prepared to be involved in the implementation of the outcomes.	Your continued input is valuable to the project. The project will make a difference to the region.	Project information and updates through the newspapers and radio (quarterly). Clear guidelines on how to have input through written (e-mail or letter) or phone submissions. Letter response to written submissions. Website for information. **Stage 4**: Deliberative Forum such as a Citizen Jury to: (a) Highlight the information on consequences produced by the Scenario Assessment Panel, and (b) Facilitate the debate on, and selection of, the preferred regional response options.	Aware of the project. Contributin g ideas. Some ownership of project results.

Who	Project Needs	Response We Want	Messages	How or Actions	Outcome or Impact
Wider general audience	Awareness of what has been done here, so that they can take advantage of the process (in their own region), and they can assist us.	They utilise this process in their region. We are interested in linkages.	We are keen to share experiences and ideas. We are open to new ideas.	Conference and journal publications. Public forums. Joint workshops and linkages (CRCIF etc). Web site.	Synergies. Reputation for research group.
Project team (& Scenario Assessment Panel)	Continued enthusiasm, strategic thinking, commitment to participation and excellence.	We work as a team, share information to promote efficiency, and enjoy our role.	Team work: We share the work and the reward. Your skill is valued and put to good use.	**Weekly meetings** with clear goals for the team at Tatura. **Monthly meetings** with clear goals for the wider team. **Agenda and background papers** for monthly meetings to team members one week before the meetings, so that they can adequately prepare. **Brief minutes** of team meetings, with **key resolutions** and **actions required** being highlighted. Significant **document updates** to non-Tatura members by e-mail on a monthly basis.	Team working productively and harmoniously.

5. APPENDIX

5.1 Acronyms

ANCID	Australian National Committee on Irrigation and Drainage
AFFA	Agriculture, Fisheries and Forestry - Australia
CFA	Country Fire Authority
CRCIF	Co-operative Research Centre for Irrigation Futures
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
EO	Executive Officer
EPA	Environment Protection Authority
GBCMA	Goulburn Broken Catchment Management Authority
GC	Governance Committee
G-MW	Goulburn-Murray water
GV	Goulburn Valley
IC	Implementation Committee
LWA	Land and Water Australia
MDBC	Murray Darling Basin Commission
NPSI	National Program for Sustainable Irrigation
NVFA	Northern Victorian Fruitgrowers Association
PIRVic	Primary Industries Research Victoria
SIR	Shepparton Irrigation Region
SIRIC	Shepparton Irrigation Region Implementation Committee
SPC	Shepparton Preserving Company
SRC	Stakeholder Reference Committee
UDV	United Dairyfarmers Victoria
VFF	Victorian Farmers Federation
WSC	Water Services Committee

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT

Evaluation Plan
February 2004

PIRVic (Primary Industries Research Victoria) – Tatura
Department of Primary Industries

Victoria
The Place To Be

NATIONAL PROGRAM FOR
Sustainable Irrigation

GOULBURN
BROKEN
CATCHMENT
MANAGEMENT
AUTHORITY

GOULBURN-MURRAY
WATER

This document was revised after the Governance Committee meeting of 3 February, 2004 and incorporates comments from the external review, Land and Water Australia and the Governance Committee.

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Governance Committee:

John Pettigrew – Goulburn Broken Catchment Management Authority
Kylie Pfeiffer – Department of Sustainability and Environment
Murray Chapman – National Program for Sustainable Irrigation, LWA
Denis Flett – Goulburn-Murray Water
Frank Greenhalgh – Department of Primary Industries
Richard Habgood – Department of Primary Industries

Stakeholder Reference Committee:

Being finalised.

Project Funded By:
Department of Primary Industries
Department of Sustainability and Environment
Goulburn Broken Catchment Management Authority
Goulburn-Murray Water
National Program for Sustainable Irrigation, Land and Water Australia

TABLE OF CONTENTS

INTRODUCTION

This project aims to bring together key stakeholders and the wider regional community to develop a shared vision for, and to make informed choices about, the future of irrigation in the Goulburn Broken catchment.

The Participation and Communication Plans utilised by this project are the subject of separate reports. This document presents the underlying rationale, and program details, of the Evaluation Plan.

Project goals

(a) Facilitate the development of:

A shared vision for the future of irrigated agriculture in the region.

A range of scenarios covering the major threats and opportunities facing the region.

Regional response options via which the community could position itself to meet those challenges.

(b) Using integrated systems analysis, with the best available knowledge, assess the **social, economic and environmental consequences** of selected response options, under a range of future scenarios.

(c) Clearly communicate the results of that assessment to stakeholders, so that they have a **sound basis for making choices** about the preferred regional options for future irrigation.

(d) **Build consensus** within the community on the preferred regional response options, and the associated follow-up actions..

(e) **Develop a generic methodology** that can assist others to define a sustainable future for irrigation in their own region.

Identification of key stakeholders

Analysis has shown that the key stakeholder groups are the:

Government water-policy and Investor groups.

Institutional organisations who manage water, land and environment in the region.

Institutional organisations who manage community issues in the region.

Industry groups who work with (and whose livelihood depends on) the water and land resources in the region.

Environmental groups whose focus is protection of natural resources.

The wider regional community.

What success would look like

Success for the project needs to be considered in a number of arenas:

Investors and policy makers: Success would be the timely delivery of agreed project milestones and input to Govt policy.

Stakeholders: Success within the stakeholder community would be:

- The on-going active participation of the stakeholder community.

- Ownership of the options generated, plus full utilisation and implementation of the information generated.
- Increased community capacity and integrated community effort.

Project team: Success would be:

- Adoption of the project processes and models within the wider NRM community.
- The project team is invited to have input to similar projects elsewhere in Australia.
- Maintaining an enthusiastic input to the project throughout its life.

PROGRAM LOGIC & EVALUATION MEASURES

Bennett's hierarchy of objectives, and the parallel Evaluation Strategy are presented in Section 2.1. The key evaluation questions are embedded in the "Evaluation measures and methods" section of the Table.

Bennett's Hierarchy and Evaluation Strategy

Hierarchy	Result Areas	Evaluation measures and methods
7b Social, Economic and Environmental Conditions	This project will contribute to • Economic change: Greater return from irrigation water and strong regional economic growth • Environmental change: Healthier rivers and land, and sustainable use of natural resources • Social justice: Economic and environmental goals are achieved in a just way (ie. in which costs are shared equitably in society)	• While these changes can be measured, it is not possible to measure them within the lifetime of the project
7a Results of Next Users' Work	• Forward thinking leadership in the region with innovative and robust approaches to meeting the challenge of rapid changes and minimising risks of future uncertainties • Catchment and regional planning processes built on a vision shared by key stakeholders, adopting regional options which have been rigorously assessed of social, economic and environmental implications and of robustness against a range of future scenarios • Key stakeholder groups are more aligned with each other in directions and implementations of sustainable irrigation development • A confident community and region built on sustainable irrigation, achieving social, economic and environmental aspirations	Survey of stakeholder groups to assess: • The degree to which the project outputs continue to guide future decision-making within the organisation • The degree to which agency business plans are more effectively aligned, and regional responsibilities are more clearly defined (Measurement to take place 1 – 2 years after the project, and organised by others)
6 Changes Adopted by Next Users	• Key stakeholder groups use the project information in their strategic policy development and business planning, eg., GBCMA considers the information in the development of its next generation of Regional Catchment Strategies; GMW considers the information in its investment decisions; Industry groups use the information in formulating their strategic plans. • Key stakeholder groups use the project information in debates when differences are being resolved.	Survey of stakeholder groups to assess: • The degree to which project outputs were used in the formulation of their next stage business plan • The degree to which changes in business investment can be linked to the certainty produced by the project. (Note: It will be difficult to accurately attribute cause and effect here) (Measured at the end of the project. Reported in the final Milestone Report)

Hierarchy	Result Areas	Evaluation measures and methods
5 Knowledge, Attitudes, Skills and Aspirations	• Knowledge: Next users understand the key issues facing irrigation and implications of various scenarios and regional options • Attitude: Next users embrace sustainable development concepts and innovative approaches • Skills: Next users are strategic in planning, monitoring, and reviewing regional actions • Aspirations: Next users developed a shared vision for future irrigation in the region	Survey of Forum participants and stakeholder groups to assess: • Degree to which their understanding of the complexity of the problem has increased • Degree to which their attitude to the issues of sustainability and the future have changed • Degree to which their trust of/confidence in other community members (who hold a different view of the critical needs for the future) has increased or decreased (Measurement to take place at the end of Stage 2 and the end of Stage 4. Reported in the Stage 2 and 4 Milestone Reports)
4 Reactions	• Next user groups react positively to the project concepts and participate enthusiastically in the project • Next user groups find the research methodology credible • Next user groups recognise the professionalism of the project team in their facilitation role of the project and the quality of research findings • Next user groups feel they have ownership of the project results	Survey of Forum participants to assess: • Satisfaction with the process at each stage • Sense of ownership of the output from each stage (Measured at major Workshops, and reported in each Milestone Report) Survey of stakeholder groups (and those who made submissions) to assess: • Satisfaction with the process at each stage • Sense of ownership of the output from each stage • Level of confidence produced by the process and the outputs in relation to future investment (Measured at the end of each Stage, and reported in Milestone Reports)
3 Next Users	• Primary production industries (eg, United Dairyfarmers Victoria, Northern Victorian Fruitgrowers Association, Victorian Irrigated Cropping Council, Victorian Farmers Federation) • Processing industries (eg, Bonlac, Murray Goulburn, SPC-Ardmona) • Community groups (eg, Environment Victoria, Goulburn Valley Environment Group, Landcare Groups) • Natural resources management agencies (eg, Goulburn Broken Catchment Management Authority, Goulburn Murray Water, Murray Darling Basin Commission) – Boards and Committees, Senior policy and implementation staff • Local, State, and Commonwealth governments (eg, Shire and City Councils, Department of Primary Industries, Department of Sustainability and Environment, Environmental Protection Authority Victoria, Department of Agriculture, Fisheries, Forestry, Australia) – Senior policy and implementation staff • Scientific and professional communities	Measure the number of participants, institutions and submissions, ie: • Numbers participating in workshops and other meetings • Range of institutional, industry and environmental groups represented at these meetings • Submissions received by region. (Records kept during the project. Results reported in each Milestone Report.)

Hierarchy	Result Areas	Evaluation measures and methods
2b Dissemination Activities	• Stakeholder participation – Series of stakeholder workshops – Special interviews and focus groups – Public comments and submissions – Project committees and panels • Information communication – Regular update presentations to key stakeholder groups – Project update newsletters (Quarterly) – Project update through existing networks of project partners and major stakeholders – Press, radio, web pages • Project reports	Measure the number of dissemination meetings, documents etc including: • Number of presentations to stakeholder and linkage groups • Number of project reports including updates • Media releases and radio interviews • Number and type of Papers produced (ie conference, peer reviewed etc) (Records kept during the project. Results reported in each Milestone Report.)
1b Research Findings	• What do stakeholders collectively see as the important outcomes of sustainable irrigation? What performance indicators should be used to measure the outcomes of sustainable irrigation? • What are the key issues facing irrigation in the region? What are the drivers for changes? What future uncertainties are there? • What are the regional response options available? • What are the social, economic and environmental implications of various regional response options under different scenarios? • How do the various regional response options measure up against the performance indicators of sustainable irrigation and stakeholders' vision? • Do some of the regional response options emerge as the preferred options by stakeholders? What are the follow-up actions for the region? • Is the methodology developed in the project applicable elsewhere in Australia for sustainable irrigation planning at a catchment scale	Research measures of formal project outputs are that they are delivered (on time) to, and endorsed by the Governance Committee, ie: • The Project Plans, Milestone Reports and Technical Reports will be reviewed and endorsed by the Governance Committee • The Participation and Communication Plans and the Technical Reports will be reviewed by the Stakeholder Reference Committee • The Participation Plan has been peer reviewed (Reported in Milestone Reports) Research findings going to scientific Journals (and conferences) will be peer reviewed. (Records kept during the project. Results reported in each Milestone Report.)

Hierarchy	Result Areas	Evaluation measures and methods
2a Project Activities	• Facilitate key stakeholders to develop a shared vision for the future of irrigation in the Goulburn Broken catchment, identify scenarios of major constraints and opportunities, and develop regional response options. • Understand the social, economic and environmental consequences of various scenarios and regional options through impact assessment based on an integration of 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. • Specific activities: Project planning, stakeholder workshops, committee meetings, analysis, modelling, communications etc.	Routine project management measures include: • Number of Forum participants contacted and invited in each region • Number of workshops, seminars, information days for each Stage (vision, assessment and consensus) of the project held in each region • Number and scope of calls for submissions at each Stage • Number and type of reports produced (Milestone, Technical, briefing papers etc) (Records kept during the project. Results reported in each Milestone Report.) Technical reports will be issued after the approval of the Milestone Reports: • Key project plans, ie: Participation Plan, Communication Plan and Evaluation Plan. (27/03/04) • Community values, vision, foreseeable scenarios and response options for irrigation within the Goulburn Broken region. (15/01/05) • Scenario Assessment Tool: Development, assumptions and testing. (01/08/05) • Consequences of implementing various response options for irrigation in the Goulburn Broken, under a range of future scenarios. (01/08/06) • The preferred response option for Irrigation Futures in the Goulburn Broken catchment, and a Regional Follow-up Action Plan. (01/08/07) • Final technical report, including a generic project methodology (01/08/07)
1 Resources	• Budget $$ • Time (4 years) • Project Team • Stakeholder participants (Irrigation Futures Forum) • Governance Committee • Technical Advisory Committee • Stakeholder Reference Committee • Scenario Assessment Panel • Linkage groups • Internal review. Guidance from DPI/DSE working groups • External review • Literature	Bid development phase will be reported in Milestone 2: • Number of planning meetings during bid formulation and development • Number of preliminary presentations to stakeholder groups to gain their support Project management measures have been reported in Milestone 1: • Expenditure tracking during the life of the project • Continued investment as per the project plan • Project Milestones sent to Governance Committee on time • Governance Committee, Stakeholder Reference Committee, Scenario Assessment Panel and Technical Advisory Committee formed and meeting as per respective ToRs • Project Team formed and meeting • Number and type of participants in each of these groups • Internal and external reviews of key documents • Amount and type of contact with linkage groups • Extent of literature review

Data required, design and method

Standard project management data on measures such as: Number of meetings, attendees, reports etc will be routinely collected throughout the project by the project team. It will be consistently stored in the project directory and retrieved for routine reporting to both the Stakeholder Reference Committee and the Governance Committee.

The surveys will be designed and administered by the project team as follows: Forum participants:

At the end of each Forum, participants will fill out a survey questionnaire containing questions selected from 2.1 above.

Stakeholder groups:

At the end of each Stage of the project, survey questionnaires (containing questions from 2.1 above) will be mailed out to Stakeholder groups.

MANAGEMENT & UTILISATION STRATEGY

How evaluation will be managed and utilised

The feedback from the surveys will be used adaptively by the project team to either revisit issues raised, and/or to modify project processes, so that the aims (in terms of success) identified in Section 1.3 are achieved.

Audience and reporting

Summaries of the participant feedback collected from the surveys, and the adaptive project actions taken as a result, will be reported to the Stakeholder Reference Committee for information and comment.

An Evaluation segment will be included in each of the Milestone Reports to the Governance Committee, to illustrate that the project aims are being delivered.

4. APPENDIX

4.1 Acronyms

ANCID	Australian National Committee on Irrigation and Drainage
AFFA	Agriculture, Fisheries and Forestry - Australia
CFA	Country Fire Authority
CRCIF	Co-operative Research Centre for Irrigation Futures
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
EO	Executive Officer
EPA	Environment Protection Authority
GBCMA	Goulburn Broken Catchment Management Authority
GC	Governance Committee
G-MW	Goulburn-Murray water
GV	Goulburn Valley
IC	Implementation Committee
LWA	Land and Water Australia
MDBC	Murray Darling Basin Commission
NPSI	National Program for Sustainable Irrigation
NVFA	Northern Victorian Fruitgrowers Association
PIRVic	Primary Industries Research Victoria
SIR	Shepparton Irrigation Region
SIRIC	Shepparton Irrigation Region Implementation Committee
SPC	Shepparton Preserving Company
SRC	Stakeholder Reference Committee
UDV	United Dairyfarmers Victoria
VFF	Victorian Farmers Federation
WSC	Water Services Committee

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT

Scenario Assessment Plan

Primary Industries Research Victoria (PIRVIC) - Tatura
Department of Primary Industries

in collaboration with

Community Engagement Network
Department of Sustainability and Environment

Victoria The Place To Be

National Program for Sustainable Irrigation

Goulburn Broken Catchment Management Authority

Goulburn-Murray Water

Cooperative Research Centre for Irrigation Futures

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Robert Chaffe – Community Engagement Network, Department of Sustainability and Environment

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Jo Haw, Associate Professor Hector Malano, Associate Professor Bill Malcolm, Derek Poulton, Greg Roberts, Ken Sampson, Dr John Wolfenden, Neil Barr

Governance Committee:

Murray Chapman – National Program for Sustainable Irrigation, LWA
Denis Flett – Goulburn-Murray Water
Brigette Keeble – Department of Sustainability and Environment
John Pettigrew (Chair) – Goulburn Broken Catchment Management Authority (GBCMA)
Sonja Tymms – Department of Primary Industries

Stakeholder Reference Committee:

Mark Allaway – Department of Primary Industries
Alan Canobie – Numurkah Beef Farmer
Bruce Cumming – Department of Primary Industries
Steve Farrell – Echuca Dairy Farmer
Peter Gibson – Nanneella Dairy Farmer
Peter McCamish – Ardmona Horticulturalist
Ian Moorhouse – Goulburn-Murray Water
Chris Norman – Department of Primary Industries
Russell Pell (Chair) – Wyuna Dairy Farmer
Kylie Pfeiffer – Department of Sustainability and Environment
Derek Poulton – Goulburn-Murray Water
Ann Roberts – Goulburn Murray Landcare Network
Nick Roberts – GV Environment Group
Melva Ryan – Municipal Catchment Co-ordinator - GBCMA
Nick Ryan – Lancaster Dairy Farmer
Ken Sampson – Shepparton Irrigation Region Implementation Committee - GBCMA
Justin Sheed – GBCMA
Alan Sutherland – Mid Goulburn Implementation Committee - GBCMA
David Taylor – Former CEO – Ardmona Foods Limited
John Thompson – Upper Goulburn Implementation Committee - GBCMA

Project Funded By:

Department of Primary Industries
Department of Sustainability and Environment
Goulburn Broken Catchment Management Authority
Goulburn-Murray Water
National Program for Sustainable Irrigation, Land and Water Australia

Introduction

Irrigation is a fundamental driver of the regional economy in the Goulburn Broken catchment. The regional farm-gate gross value of production from irrigated agriculture in 2000 was $1.35 billion. Investment in on-farm and processing infrastructure is about $100 million per annum.

However, irrigation is facing enormous challenges. As one of the oldest gravity irrigation systems in Australia, Goulburn-Murray Water's irrigation system needs substantial renewal of its ageing infrastructure assets in the next 20 years. Initiatives to increase environmental flows and potential climate changes will also have major impacts on irrigation. In addition, there are increasingly stringent demands on responsible natural resources management to meet social, economic, environmental and cultural outcomes.

Project Objectives

This project has been established to enable the region to successfully meet these challenges. It is a regional initiative, funded by the Goulburn Broken CMA (GBCMA), Goulburn-Murray Water (G-MW), Department of Primary Industries (DPI), Department of Sustainability and Environment (DSE), and Land and Water Australia (LWA).

The objectives of the project are to:

Facilitate key stakeholders to develop a shared vision on the future of irrigation in the Goulburn Broken catchment 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 based on an integration of the best available knowledge.

Facilitate key stakeholders to build consensus on preferred regional options for future irrigation, and recommend regional follow-up actions.

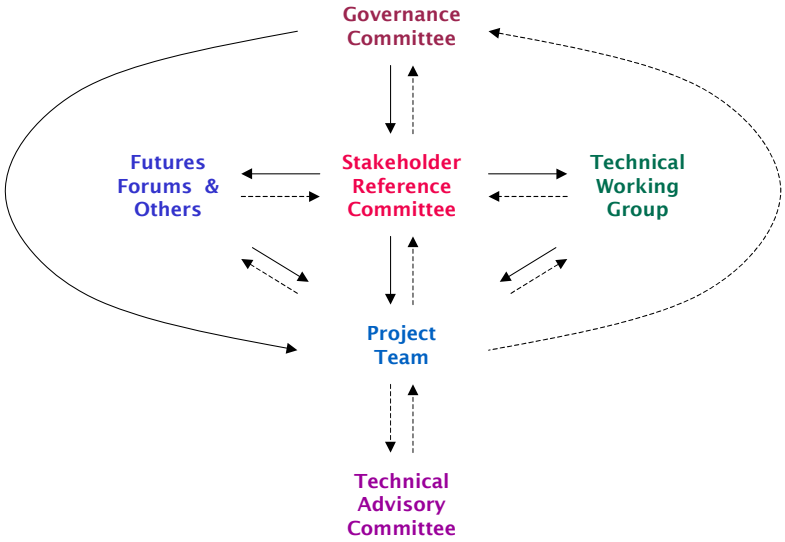
Develop a methodology that can be applied elsewhere in Australia for sustainable irrigation planning at a catchment scale.

Project timetable

Project Stage	Timeframe
Stage 1: Project development	Jun 2003 – Dec 2003
Stage 2: Vision, scenario and options	Jan 2004 – Dec 2004
Stage 3: Assessment of consequences, and effectiveness of regional strategies	Jan 2005 – Jun 2006
Stage 4: Building consensus	July 2006 – Jun 2007

Project Organisation

Project organisation, and the roles of each of the project organisational groups, are given below.



Project organisation

Roles of project organisational groups

Organisational Group	Key Roles
Governance Committee (GC)	Set broad directions Review project progress and performance Make investment decisions
Stakeholder Reference Committee (SRC)	Provide guidance on processes for wider stakeholder participation Consolidate ideas from wider stakeholders Generate confidence in the regional community
Futures Forums and Others	Provide input from the community and other key stakeholders, including contributing ideas on values and aspirations, future scenarios and regional response options.
Technical Working Group	Further develop details of ideas generated by Futures Forums Contribute knowledge and expertise to the assessment process.
Project Team	Facilitate the stakeholder participation process Provide scientific input.
Technical Advisory Committee	Provide expert advice as required

Output from of Stage 2

Stage 2 of the project used an extensive program of stakeholder engagement to identify vision, external scenarios and response options. Stakeholders from irrigated agriculture, major processors, business & community groups, local government, and agencies responsible for land & water management were invited to participate in a series of 4 full-day Workshops during 2004. Representation from women and young people was specifically targeted.

Workshops were held at major centres throughout the region (Echuca, Kyabram, Shepparton, Cobram, Benalla and Seymour). In total, stakeholder input has involved over 500 person-days. The output from Stage 2 was:

A set of Aspirations for the future of irrigated agriculture in the region,

Four plausible, External Scenarios within which the region may have to operate over the next 30 years,

A suite of Regional Strategies by which the region might respond to those external scenarios,

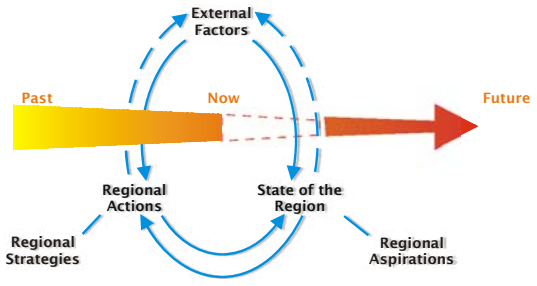
A collation of all the Response Options from the Workshop series, and

A list of the region's competitive Assets.

Introduction to Stage 3

Context

Stage 3 of the project is focused on the further development of the material produced during Stage 2 and the assessment of the effectiveness and robustness of the Regional Strategies. A systems framework will underpin the further development and assessment process. The framework represents the temporal evolution of the interplay between External Factors, Regional Actions and State of the Region (Figure 5).



Regional Aspirations are the community goals and desires for the next 30 years in relation to business, family, the Goulburn Broken Catchment and irrigated agriculture.

Regional Actions are those actions taken by individuals (individual actions) and actions that require some degree of coordination by groups and organisations (coordinated actions). Regional actions can be taken in respond to challenges and opportunities presented by external scenarios and/or the State of the Region. They can also be taken as an initiative to create opportunities.

Regional Strategies – Underlying approach and plan to guide regional coordinated actions both now and in the future.

External Factors – are factors that influence but are beyond the control of the region. The external scenarios describe the temporal evolution of the external factors over the next 30 years.

State of the Region – is the condition of the region as a result of past regional actions and external factors as well as the regional assets at the start point. One may regard the state of the region at a given time as the starting regional assets for the next time period.

Figure 5 A systems framework for the assessment

Stage 3 Objectives
The objectives of Stage 3 of the project are to:

Revise and further develop the material generated by the Irrigation Futures Forums during Stage 2 of the project.

Draw together the material generated during Stage 2 in a systems framework to assess the consequences of the Regional Strategies and Actions, under a range of Scenarios.

Discuss and debate of the concepts and assumptions underpinning the understanding of the consequences of the Regional Strategies and Actions.

- Assess the effectiveness and robustness of the suite of Regional Strategies.

Development of the approach to Stage 3
The approach to the further development and assessment of regional strategies has been developed drawing on a wide range of material including:

A review of the international literature on methods of assessing the consequences of management interventions as a part of both scientific and policy analyses.

A review of the current tools available for undertaking systems analysis within the Goulburn Broken Catchment.

Consultation, involvement and review by:

- Current practitioners within Australia undertaking planning and visioning analysis.
- The project's Stakeholder Reference Committee

Peer review: The approach to the further development and assessment of Regional Strategies has been externally reviewed and the feedback from the reviewers considered and incorporated into this version of the approach. The reviewer's comments and project team's responses are contained in Attachment C of this report.

This document presents a review of the integrated assessment literature and uses the findings of the review to identify and describe the approach to Stage 3 of the project.

Literature Review

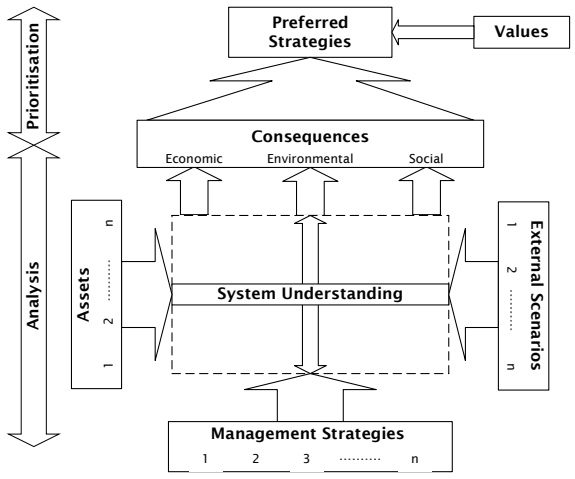
What is Assessment?

Many definitions of assessment exist within the literature in the context of assessing strategies and actions. Most definitions can be placed into one of two broad categories:

(f) identifying and understanding the consequences of the management strategies, and

(g) identifying preferred strategies given the consequences of those strategies.

These two activities can be considered as two sequential phases of assessment (Figure 6). The first phase, analysis, involves identifying, and assessing, the impact of the strategies on a series of consequence measures, for a given set of scenarios and assets. The second phase, prioritisation, is concerned with examining the priorities and trade-offs between the consequence measures to identify preferred strategies.



EXTERNAL SCENARIOS are descriptions of plausible future positions of factors that influence but are beyond the control of the region.

MANAGEMENT STRATEGIES (Regional Strategies) are those strategies addressing areas that are under the control of the region.

ASSETS describe the available resources of the region and their condition.

CONSEQUENCES are measures used to describe the impacts of a particular Scenario and set of Options. With current Triple bottom line thinking, measures are commonly categorised as Economic, Environmental and Social measures.

SYSTEM UNDERSTANDING describes the knowledge relating elements of the Scenarios, Assets and Options to the Consequences. The level of detail and complexity represented in the system understanding can vary from a qualitative mental model through to detailed quantitative simulations of processes.

VALUES are the moral principles and beliefs that underpin the behaviour of the community.

PREFERRED STRATEGIES are those management options that achieve the balance of Consequences that represent the values.

Figure 6 Framework for Assessment

Stage 4 of the Project is concerned with building consensus among stakeholders on the future directions of irrigation in the region. This stage is primarily concerned with the prioritisation phase of the assessment process. A brief review of approaches to prioritisation is included in Appendix 1.

Stage 3 of the Project is focused on the analysis phase of assessment. The analysis phase is concerned with identifying and understanding the consequence of management strategies. Such a task is the concern of the emerging 'meta-discipline' of *Integrated Assessment*.

Integrated Assessment involves integrating knowledge about a problem domain, for learning and assisting decision making. Integrated assessment emerged because it was realised that a single change in policy could no longer be considered in isolation due to the complexity of societal issues

(Rotmans 1998). The discipline has continually evolved since its emergence during the early 1970's. The evolution of the discipline has been influenced by the development of computational resources and changing attitudes toward computer-based modelling.

The following sections review methods used by the field of Integrated Assessment, describing the important concepts and the implications of these concepts for Stage 3 of the Project.

Paradigms of Integrated Assessment

Early integrated assessments typically examined a single issue and evaluated the consequences of solutions to the issue, for example desertification. More recently integrated assessments have examined more complex and less well defined issues, particularly the consequences of urbanisation (Robinson *et al.* 2001) and climate change (Lorenzoni *et al.* 2000a; Lorenzoni *et al.* 2000b).

Initial applications of Integrated Assessment used a "normal" or "mainstream" scientific paradigm (Ravetz 2004). These applications typically use, and link, a suite of discipline specific models that are derived from established scientific principles.

Assessments using the normal science paradigm generally use detailed biophysical and economic models. Experts typically develop these models, allowing minimal interaction with the affected public. In some cases the limited interaction with the affected public has resulted in model output having little credibility (van der Sluijs 2002). There is also a perception, from the modelling community, that modelling using the normal science approach has had very little use for policy making (Engelen *et al.* 2000).

More recently, Integrated Assessments have used a "post-normal" or "Mode II" scientific paradigm (Harris 2002; Ravetz 2004). The post-normal scientific paradigm is used to resolve issues where the facts are uncertain, values are in dispute and the problems are typically complex (Funtowicz and Ravetz 2004). In general, these assessments are undertaken to inform policy decisions, when the stakes are high and decisions are urgent (Ravetz 2004). Typically, assessments using this paradigm aim to compile all available relevant knowledge, and use this knowledge to assess the consequences of management strategies. Experts and the affected public are involved because both groups can contribute knowledge of different forms to the assessment process.

Post-normal science embodies the precautionary principle, and is typically reacting to the unintended harmful effects of progress (Ravetz 2004). Extended peer review is fundamental to integrated assessment. It involves people with a desire to participate in the resolution of the issue, as well as those with some form of institutional accreditation (Funtowicz and Ravetz 2004). This approach more closely follows many of the traditional participatory methods of policy assessment, such as focus groups.

There is no one unifying approach to integrated assessment. Many factors govern the selection of approach for a particular application. These factors include the nature of the problem, purpose of the analysis, the availability of knowledge and information, available resources (including skills and budget) and the dimension of the problem domain.

Examples of Integrated Assessments

Normal Science Approach

There are many examples of integrated assessments using a normal science paradigm. The following section describes a few integrated assessments that have had an agricultural focus.

Fordham and Malafant (1997) developed the Murray Darling Irrigation Futures Framework during the late 1990's. The Framework combines a one-dimensional unsaturated soil-water flow model, a two-dimensional groundwater model, a lumped-conceptual surface hydrology and salinity model, crop production models (considering production losses due to water logging and soil salinity), a farm enterprise economic model and a regional economic input-output model. The model was used to simulate 20 year scenarios for two study areas, a 3,000 hectare catchment in the Cohuna area and a 7,000 hectare catchment in the Harston area (within the Shepparton Irrigation Region).

On a much larger scale, Engelen et al (2000) developed a decision support system to assist regional level environmental policy making. They combined climate models, catchment and hillslope hydrology and groundwater models, crop growth and natural vegetation growth models, crop and irrigation management models and a land use change model. The decision support system was applied to two pilot catchments in Europe, both of which were approximately 160,000 hectares in size. These models ran at resolutions from 1 hectare to 25 hectares and at time steps from half a day to one year. Each of the models was run independently with software facilitating the transfer of data between models. This decision support system was constructed without understanding who would use the system or information produced by the system.

Bell and Heaney (2000) describe a simpler, more purpose driven model, used to evaluate salinity management options within the Murray Darling Basin. They constructed a single model combining economic optimisation with surface and subsurface water movement and crop production functions. The model operates at a catchment scale and runs at an annual time step.

There are many other examples of these types of models that combine hydrology, crop growth and economic optimisation or impact assessment. In general these models are used to assess the impacts of particular management options including water allocation (Giupponi *et al.* 2004), salinity management (Greiner 1999), and production capability (Zuo *et al.* 2003).

"Post-normal" Science Approach

There are fewer examples of applications of a post-normal science approach to integrated assessments.

The Adaptive Environmental Assessment and Management (AEAM) process has been widely used in Victoria to assist with the development of Water Quality Strategies. The AEAM process was implemented where there was little documented information about the important processes, or the documented information was scattered among many different institutions. The principal purposes of the AEAM process for the Ovens Basin were:

to involve all stakeholders and the wider community so as to encourage a common understanding of the issues, and ownership of the process and its outcomes;

to develop a computer model to simulate the complexities of the environmental system being investigated;

to achieve adaptive management, where modelling is used to make 'best bet' decision on management actions, actions that are implemented and their effectiveness tested, and modelling and management actions are continually refined based on experience gained (Felton and Martin 1996).

The models constructed are intended to give qualitative indications of likely relationships and intend to be used as exploratory tools, rather than providing exact answers. The systems are represented both algebraically and verbally, with relationships encoded as functional and lookup tables. All assumptions made during the development of the models were described in the model documentation.

A wide group of stakeholders was involved in defining the issues, possible management options and appropriate performance measures. A smaller group was then involved in developing a simulation model, which was used by the wider stakeholder group to test and evaluate possible management actions.

Wolfenden (2003) used a similar approach to assist with developing a vision for irrigation in northern New South Wales. They used a stakeholder workshop to develop an understanding of the factors contributing to their vision of a "sustainable water landscape". To assist with developing this understanding they used an influence diagram to examine the interconnections between parts of the system. Subsequently part of the influence diagram was quantified to demonstrate the potential for the approach to be used in developing a quantitative simulation model (Wolfenden 2003). The development of the simulation model was supported by a stakeholder working group. Wolfenden (2003) suggests that the approach is as much for the development of community understanding as it is about developing a detailed model of the system.

The Murray Flow Assessment Tool was developed to assess the ecological impacts of three different flow scenarios in the Murray and lower Darling Rivers (Scientific Reference Panel for the Murray-Darling Basin Commission Living Murray Initiative 2003). The tool was developed to combine the best available information on relationships between flow and ecological indicators. All evidence used in the assessment was documented within system, however there was minimal involvement of non-experts in the development of the tool. The tool was developed to inform specific policy decisions and displays many of the traits of the post-normal science approach, particularly with respect to making uncertainties and assumptions explicit and with respect the ability for users to interact with the tool. The minimal involvement with non-experts in the development of the tool has led to community mistrust of the output of the process (Paxinos 2004).

The Georgia Basin Futures project was a major regional integrated assessment project primarily concerned with issue of urbanisation in the areas surrounding the cities of Vancouver and Victoria in Canada (Tansey *et al.* 2002; Robinson *et al.* 2001; Envision Sustainability Tools and Sustainable Development Research Institute 1999). The project engaged the community

to identify the issues, develop a simulation model, develop future scenarios and express preferences in the final analysis of policies. The analysis undertaken uses a model to assess the quantitative impacts of policy decisions and does not examine the non-quantitative impacts. Modelling is undertaken at 10 year time steps using high level relationships. Uncertainty in the model is described in terms of a world view, which describes the rate of technological innovation, ecological resilience and social adaptability (Carmichael *et al.* 2004). The model is 'driven' by projections of population, economic activity and land use goals and policies influencing transportation, housing, lifestyle, agriculture, government, industry, water and labour. Policies can be implemented using incentives and subsidies ("carrots"), regulations ("sticks") or education and social marketing ("information"). Each of these implementation methods, along with a worldview, influences the rate at which the policies are adopted.

Assessment of social consequences

The distinction between the normal and post-normal science paradigms is less clear within social analysis. Social analysis has been undertaken of two broad fields, understanding social change processes and understanding social impacts.

Social impact assessment is directed toward forecasting the consequences of a particular proposal, on people as individuals, groups or society as a whole (Burge and Vanclay 1995; Brouwer and van Ek 2004). The social impacts include changes to people's way of life, culture, community, environment, health, wellbeing and, fears and aspirations (Saddler *et al.* 2000).

Social impact assessments rely on stakeholders' perspectives to understand the potential impacts of a proposal. There are many methods available to undertake social impact assessments that rely on both primary and secondary data sources. Analytical methods used for social impact assessment are typically qualitative, often relying on descriptive techniques. Many environmental impacts assessments conducted in Victoria have also undertaken social impact assessments. Strategic perspectives analysis (Dale and Lane 1994) is a tool to undertake social impact assessment using a post-normal scientific paradigm.

Social impact assessment does not attempt to understand social change processes. Social change processes include both induced and passive changes in demographic, economic, geographical, institutional, political, socio-cultural and other processes (Saddler *et al.* 2000). These processes are typically more easily quantified than social impacts but are more diverse. The analysis of social change processes is typically, but not exclusively, undertaken using scientific methods using a normal scientific paradigm. Examples of social process analysis include agent-based modelling, where the purpose is typically to understand and reproduce human behaviour (Berger 2001), and demographic modelling.

Appraisal of Integrated Assessment paradigms

There are many issues common to all integrated assessments that need careful consideration. The following discussion briefly covers the concepts related to several of these issues and the interconnections between them.

Complexity

An important feature of all integrated assessments is the complexity of the systems involved. Complexity extends beyond the mere complication of processes. Complicated systems can be considered as those systems that require many variables to explain system behaviour (Funtowicz and Ravetz 2004). Complex systems, on the other hand, contain significant and irreducible uncertainties of various sorts in any analysis of the systems and multiple legitimate perspectives on any problem (Funtowicz and Ravetz 2004). Complex systems may also have detailed interrelations between different components (Rotmans 1999; Kemp-Benedict 2004).

The complexity of systems is handled using many different approaches within integrated assessments. One school of thought believes that complexity can be handled adequately by computer models (Rotmans 1999), while others believe that the current state of computer modelling is inadequate, particularly in the description of social systems (Kemp-Benedict 2004).

When modelling complex systems there is a spectrum of approaches in existence. At one extreme, existing disciplinary models are linked on an input-output basis. This often leads to a complicated tangle of models and processes in which keeping track of the components hampers insight into the dynamic behaviour of the overall system (Rotmans 1999). At the other extreme, a suite of directly linked metamodels, or simplified models, may be used. These models often use simplified representation of individual processes, but display complex behaviour because they link many interacting components (Rotmans 1999).

As an alternative to computer-based modelling, intuitive scenario exercises have been used to capture the complexity of systems, using narrative processes to describe mental models (Kemp-Benedict 2004). Narrative approaches allow people to handle the complexity that is not explicitly understood, or cannot be handled by numerical modelling methods (Kemp-Benedict 2004; Swart *et al.* 2004).

The management of complexity within an integrated assessment is at the conjunction of a number of important concepts, particularly the approach to assessment, the scale and resolution of the assessment and the management of uncertainty. A further discussion of these concepts follows.

Qualitative and Quantitative Assessment

A wide range of analytical techniques have been used in integrated assessments. The analytical techniques can be loosely classified as quantitative and qualitative methods of analysis. The classification is not strict because some modellers undertaking quantitative analysis using numerical methods believe their analysis is only indicative or qualitative (Grayson and Doolan 1995; Felton and Martin 1996).

Quantitative analysis methods are most commonly reported. These techniques typically rely on formal mathematical models to represent the important features of human and environmental systems (Swart *et al.* 2004). These methods can provide structure, discipline and rigour to the analysis of the problem domain (Swart *et al.* 2004). In general, quantitative models perform well when simulating well understood systems over relatively short timeframes. However they are often not appropriate for simulating the long-range future of systems, such as social or ecological systems, where the

understanding of causal interactions is poor and the description of variables is highly uncertain (Swart *et al.* 2004; Kemp-Benedict 2004).

Often quantitative analyses are viewed as truth machines by stakeholders not involved in the development process (Rotmans *et al.* 1997). This can occur even though the analysts believe their analyses are heuristic devices (Rotmans *et al.* 1997). This has resulted in quantitative analysis techniques facing a credibility crisis when quantitative predictions do not match observations or stakeholder expectations. In response to this growing concern about the credibility of quantitative models, van der Sluijs (2002) identified several attributes of models to better enable acceptance of quantitative analyses. These attributes include:

transparent as possible,

explicit uncertainties,

value-laden assumptions are explicit and variable,

interactive,

stakeholder use mediated by experts,

facilitate problem structuring,

fostering creative generation and exploration of rival problem definitions,

allow inclusion of local knowledge.

Qualitative analysis has traditionally been undertaken as a part of social impact assessment, however more recently it has formed an increasing part of integrated assessments. Within integrated assessments, qualitative analysis has typically been undertaken through narrative exploration of scenarios. Scenario exploration enables qualitative factors such as values, behaviours and institutions to be considered in analysis. Two forms of scenario analysis are reported in the literature.

Forward-looking analysis examines the consequences of a range of expected trends or attempts to outline the implications of different assumptions. Such analysis assists with identifying possible future trajectories. Backcasting however examines the feasibility and implications of desirable futures and can assist with identifying long-term risks (Swart *et al.* 2004). Qualitative analysis techniques are dependent on the perceptions and therefore require participatory approaches.

Neither qualitative nor quantitative analysis alone can provide a comprehensive assessment of the consequences of management options. Narrative (or qualitative) analysis facilitates debate about normative aspects of the analysis, while quantitative analysis contributes to adequate knowledge base and structural consistency (Swart *et al.* 2004).

Uncertainty

Integrated assessments are concerned with the future, and therefore the management of uncertainty is very important (Rotmans 1999). Many types of uncertainty need to be considered within an integrated assessment. These uncertainties can be placed into two categories: uncertainty due to lack of knowledge and uncertainty due to variability.

Uncertainty due to lack of knowledge can arise from factors ranging from lack of observations and inexactness of observations through to ignorance

and indeterminacy of processes. Uncertainty due to variability can result from natural randomness and behavioural diversity. Variability poses limits on what can be known and therefore can contribute to uncertainty due to lack of knowledge (Rotmans 1999).

There are many approaches to the management of uncertainty. Lack of knowledge of the system behaviour is often overcome by allowing multiple models to exist. This can be facilitated through explicitly acknowledging that multiple plausible conceptual (mental or mathematical) models of the system exist (Ravetz 2000), or through different parameterisations of a common model structure in the case of mathematical models (Envision Sustainability Tools and Sustainable Development Research Institute 1999; Rotmans and De Vries 1997). A lack of knowledge can be identified or overcome through the involvement of a diverse range of experts and non-experts in the assessment process.

Lack of knowledge about the future position of variables influencing, but beyond the control of, the scope of the analysis is typically handled using scenarios, or plausible alternative futures (Rotmans 1999). Scenarios are coherent and plausible stories of the future that describe co-evolutionary pathways of combined human and environmental systems (Swart *et al.* 2004). There are many methods of developing scenarios, including extrapolation, foresighting, backcasting.

Extrapolation involves identifying current trends in variables influencing the system being analysed and projecting these trends into the future.

Foresighting is a more generalised method of scenario development. Plausible future positions of important variables are examined in terms of trends, discontinuities and critical uncertainties. Trends occur when variables are expected to follow a historical trajectory into the future. Discontinuities are sudden shifts in a variable, and critical uncertainties, where the a variable may take many diverse paths (van der Heijden 1996).

Backcasting involves identifying a desired endpoint some time in the future and describing the evolution of the system back to the current time (Kok and van Delden 2004).

Uncertainty due to variability, whether it be due to natural randomness, biophysical, ecological or human behavioural variability or societal randomness, is typically handled using probabilistic methods such as stochastic modelling. Probabilistic methods can handle only the technical uncertainties and not the epistemological uncertainties.

Model validation or verification can also assist with managing uncertainty. Model validation involves the comparison of model predictions with observed data. These comparisons assess how well the model represents reality, and in doing so assist with identifying uncertainties caused by ignorance, indeterminacy and variability (Rotmans and van Asselt 2001).

Stakeholder participation in assessment fosters discussion and debate, and assists in developing a common understanding of the uncertainties. Stakeholders will have very different perceptions of the uncertainty of information. Shackley and Wynne (1995) related perceived uncertainty to the closeness of a stakeholder to the generation of knowledge. They suggest that those directly involved in knowledge generation and those isolated from knowledge generation will perceive the greatest uncertainty in knowledge,

while those involved in managing the problem will perceive the lowest uncertainty (Figure 7).

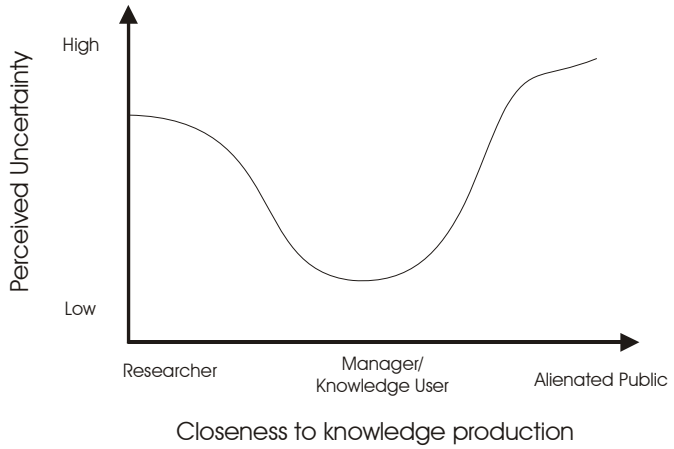


Figure 7: Perceptions of uncertainty (after Shackley and Wynne 1995)

Within an integrated assessment uncertainties exist at many levels. Adequately managing these uncertainties requires a range of techniques to be used. Participatory assessment processes involving a range of experts and non-experts can assist with identifying, reducing and managing the uncertainties.

Scale and Resolution

Integrated assessments deal with a wide range of processes that occur over different spatial, temporal and structural scales. With respect to temporal scales, economic processes and technical change commonly occurs over the relatively short time scale of the invested capital, while demographic processes operate on time scales of generations (Rotmans 1999). Environmental processes occur over a wide range of time scales from sub-day through to hundreds of years. Similarly, these processes operate at different spatial scales, for example, atmospheric processes occur at regional, national and global scales, while land and water processes occur at point through to catchment scales.

Reconciling the temporal and spatial scales of the processes being considered is a major challenge for integrated assessment. Within the Lower Fraser Basin Quest analysis, a time step of a decade was adopted (Envision Sustainability Tools and Sustainable Development Research Institute 1999), because the primary focus of the analysis was driven by demographic processes. Analyses of water-related issues have typically used a much shorter time step such as days (Engelen *et al.* 2000) or months (Felton and Martin 1996). Processes have been resolved spatially in areal units ranging in size from hectares to hundreds of hectares.

Several approaches have been used to integrate processes occurring at different temporal resolutions. Metamodelling uses a summary of the output of a model simulating processes at small time steps to simulate the process at a larger time step (Rotmans 1999). Alternatively, models have been hierarchically linked to allow a model simulating small time steps to run between time steps of a larger time step model (Engelen *et al.* 2000). Hierarchical modelling is typically undertaken in assessments using the normal science paradigm, while metamodelling occurs most commonly using

the post-normal science paradigm. Both approaches can have their disadvantages. Using the hierarchical approach typically uses significant computational resources, while the metamodelling approach may result in inadequate resolution of process.

Understanding the scales at which the 'problems' occur assists with the development of appropriate conceptual (both mental and numerical) models and analysis boundaries of the processes and systems being considered.

Expert and Non-Expert Participation

Participation in integrated assessment typically only occurs when the post-normal scientific paradigm is used. Participation can occur at many stages within the assessment process and can serve many purposes. At the crudest level, participation of stakeholders can serve to legitimise an assessment process. Alternatively, the involvement of experts and non-experts can add considerable value to the assessment process (van der Sluijs 2002). Expert and non-expert involvement in the assessment process can have a number of purposes including the exchange and contribution of knowledge and wisdom, the provision of alternative perspectives and value sets, and the review of the assessment assumptions, logic and robustness.

Involvement of experts and non-experts to contribute knowledge and perspectives to an assessment requires the commitment of considerable resources. However, this form of involvement can result in additional benefits to the participants, including the development of an understanding of alternative views of the world and raising awareness of system behaviour and the limits of knowledge, as well as to the assessment process (Dahinden *et al.* 2000).

Two general approaches to stakeholder involvement are described in the literature for implementing assessments that involve both qualitative and quantitative analysis.

The story and stimulation approach involves expert and non-expert stakeholders in building scenarios. Typically, a narrative team will develop qualitative storylines that describe the evolution of plausible futures, entailing both scenarios and management options and their combined consequences. A modelling team complements the narrative team and, following their lead, simulates the storyline. The modelling team plays four main roles:

1. Forcing a clarification of the terms and mechanisms
2. Exposing contradictions in mental models
3. Providing a feel for the scope of possible outcomes within the narrative framework,
4. Illustrating a particular scenario narrative (Kemp-Benedict 2004).

The simulation will typically use high-level conceptual models that represent the system described by the narrative. Information is passed between the two teams, iteratively, allowing for continual refinement the storyline.

The story and simulation approach allows people to intuitively handle the complexity of systems through the development of storylines. The intuition is then clarified, checked and illustrated through simulation process. Reality checking of the process is also dependent on intuition because there is an

implicit assumption that insufficient data exists to support any model validation.

Participatory modelling, on the other hand, attempts to combine local and expert knowledge into a system model that is used to explore the consequences of management interventions. Participatory processes are used to develop mental models of system behaviour, which form the basis of a model structure. The model structure is tested using available data and knowledge, and results fed back to the participants to allow mental models to evolve. This process allows for the continual refinement of the model structure until it represents the available data. The model is subsequently used to assess the consequences of management interventions (Varis and Lahtela 2002).

The participatory modelling approach allows for the combination of scientific and experiential knowledge and assesses the ability of the combined knowledge to describe available data. However, the approach relies on the data being available to assess the quality of the model.

The credibility of integrated assessments is highly dependent on the participation of stakeholders. Participation in the assessment process can take many forms. However, it is recommended that stakeholders are involved throughout the assessment process to ensure that a range of values, perspectives and knowledge sources are used (van der Sluijs 2002). Assessment approaches such as story and simulation and participatory modelling appear to have the greatest potential to incorporate stakeholder values and perspectives, and allow for both qualitative and quantitative analysis.

Summary

The Irrigation Futures project has been established using a post-normal science paradigm. It is therefore important that this paradigm underpins the assessment of the regional strategies undertaken within Stage 3 of the project.

Stage 3 is concerned with assessing the consequences of strategies in a future environment that is highly uncertain. There are multiple perspectives of the problems, solutions, desired outcomes and the future environment in which the region will operate. Due to the diversity of perspectives, an assessment approach that enables stakeholder participation is essential. The approach needs to allow alternative values and mental models to be considered in the assessment process. Facilitating a debate about the philosophy and assumptions underlying the strategies will be as important as identifying the likely consequences of the strategies.

The systems operating within the region are fundamentally complex, with many interactions between components. While there is some knowledge about many of the biophysical, social and economic processes at work, considerable uncertainty still exists.

The knowledge that exists does so in many forms. Knowledge is stored as scientific understanding, derived from experimentation and modelling, and wisdom, gained through management and experiences within the system. Knowledge exists both quantitatively and qualitatively. All of this knowledge will be required in the assessment to ensure the credibility of the outputs. This will therefore require a flexible approach that can draw upon and

synthesise knowledge that is available, while explicitly acknowledging what is unknown or uncertain. The approach will need to enable a mix of qualitative and quantitative analysis.

Assessments may be required at several scales to reflect the community aspirations and multiple temporal, spatial and structural resolutions at which system processes operate. Metamodelling, both mental and numerical, appears to be a promising approach to handle transitions between assessment resolutions.

Only a limited number of assessment approaches exist that enable the factors described above to be incorporated. The story and simulation approach appears most promising due to its ability to incorporate a variety of knowledge in the development of the storyline. Coupling the story development with participatory analysis and modelling will enable the detailed exploration of alternative mental models and examination of the impact of different value sets. The participatory approach may also assist in raising awareness of the limitations of available knowledge.

Stage 3 Approach

Overview

Stage 3 of the Project involving assessment of the effectiveness and robustness of Regional Strategies will be undertaken using a narrative and analysis approach.

The narrative and analysis approach founded on using two complementary techniques to construct scenario stories. Scenario stories describe the unfolding of a full scenario, comprising the interplay between Regional Actions, External Factors and the State of the Region (see Figure 5). Scenario stories will be constructed for each of the external scenarios developed during Stage 2 of the project.

Narrative exploration will be used to construct broad scenario stories. Subsequent analysis will examine the logic of the scenario story and illustrate some of the detail of the stories, including the likely magnitude of the consequences. The analysis will be based on an understanding of system behaviour as described by qualitative and quantitative models.

Technical Working Group

The Technical Working Group will undertake Stage 3 of the Project using the narrative and analysis approach. The technical working group will be separated into a narrative team and an analysis team, according to their preferred thinking style. Each team will predominantly use one technique to contribute to each scenario story.

Narrative Team

The role of the narrative team will be to scope out a scenario story. They will discuss and describe the evolution and interplay of the external factors, regional actions and state of the region. The narrative team will focus on questions of who, what, where and when. Through the story development process, the narrative team will, implicitly or explicitly, develop concepts and make decisions.

Members of the narrative team will prefer a right brain style of thinking. Right brain thinking tends to be holistic and rely on intuition. Members of the narrative team will like to bring information and ideas together and will not be concerned if there is little detail or information is subjective.

The expected output from the narrative team will be a collection of connected ideas that describe the foundations for the scenario story.

Analysis Team

The role of the analysis team will be to examine and provide a critique of the scenario story. In undertaking the critique, the analysis team will need to clarify the concepts and decisions and examine the logic and rationale of the scenario story. Through this process, the analysis team will be able to illustrate the scenario stories, providing details and examples of the regional actions and consequences. The analysis team will focus on questions of how and why.

Members of the analysis team will prefer to use a left brain thinking style. Left brain thinking tends to be logical and rational. Members of the analysis

team will prefer to understand a problem by looking at it parts and use objective information to identify a solution.

The output from the analysis team will be an embellished and rigorous scenario story.

Scenario story development process

The Narrative and Analysis teams will develop the scenario stories using an iterative process. The Narrative team will commence the story development process, to ensure an holistic perspective of the story. The Analysis team will subsequently review the logic and robustness of the story and add detail. The story will be returned to the Narrative for review and to add richness to the story.

The two teams will provoke and assist each other. Through the iterative process, they will develop and clarify concepts, and request and provide information. The process will allow the teams to stretch each other's thinking, and reduce and handle uncertainty by sharing knowledge and perspectives. The flow of information between the Narrative and Analysis Teams is illustrated in Figure 8.

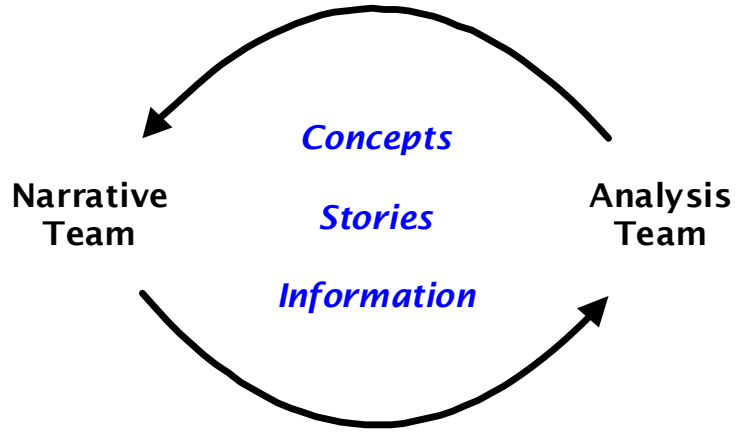


Figure 8 Flow of information between Narrative and Analysis teams

The scenario stories will be developed in workshops with each team. It is anticipated that several workshops will be required to develop a scenario story. Therefore, the scenario stories will be developed in sections describing the unfolding of events over the periods used in the External Scenarios.

The system under consideration is highly complex and has many parts interacting at a range of scales. The narrative and analysis approach will handle this complexity through the scenario stories. These stories will describe the important regional actions and consequences, including individual behaviour and regional responses. The scenario stories will not attempt to describe everything at all times, but will only describe the important features and events occurring at any time.

Implementation of the Approach

There are a number of steps to the implementation of the Narrative and Analysis approach. This section discusses the progress and considerations in the implementation of the approach.

The Technical Working Group

Selection Process

Nominations for the technical working group were sought from the Stakeholder Reference Committee and members of the Irrigation Futures Forums. Nominees were requested to describe their skills in a number of areas considered important for Stage 3 of the Project. Forty-four names were put forward for membership of the Technical Working Group.

The project team prioritised the nominations to ensure that a broad range of skills was covered and the group was a manageable size. The prioritised list of nominees was presented to the Stakeholder Reference Committee for final approval. Twenty-three members were accepted for membership of the technical working group. A list of members and their skills is presented in Appendix 1.

Work Program

Workshop 1 (6th May 2005): Introduction to Stage 3

Workshop 1 was held as an introductory session for the entire Technical Working Group. The workshop covered four main areas: introducing Stage 3 of the Project, forming the two teams, teasing out the Aspirations, and an introduction to the water reform white paper.

The introduction to Stage 3 of the Project covered the purpose and approach to Stage 3. The introduction also discussed the expected output and the experimental nature of the approach.

The narrative and analysis teams were formed by allowing the technical working group members make an informed choice. The project team gave an overview of the role and skills of members of each team. The technical working group members were given a brief test to identify their preferred learning style. The test provided group members with an indication of their preference for rational or intuitive thinking. The group members were then invited to select a team to join, using their test result and the role of each team as a guide.

An introduction to the water reform white paper was provided by Naomi Douglas (DSE Water Policy). This session was held to ensure that the technical working group understood the contents of the White Paper. The white paper provides the basis of water policy for the next 10 years and therefore is important for understanding the future regional actions and consequences.

The final part of Workshop 1 involved further work on the Aspirations developed during Stage 2. The Aspirations described some high level outcomes desired by participants of the Irrigation Futures Forums. The task undertaken was to describe the dimensions of the aspirations. These dimensions describe the broad indications that could be used to understand if the aspirations have or have not been achieved.

Workshops 2 onwards: Developing the Scenario Stories
Subsequent workshops will be held with each team separately, with information being passed between the two teams as described earlier.

Workshops of the Narrative team will involve progressively developing the scenario stories. The process of developing the story will commence by the narrative team internalising the current period of the scenario being considered. The team will then identify the actors important during the period and describe what these actors are doing. In describing what the actors are doing, the team will take on the role of the actor and describe their actions in the first person, for example starting sentences with "I will". This will enable the team to internalise the scenario and perspective of the actor.

The Narrative team will then describe the state of the region. The team will identify important areas that need to be reported on, including social, environmental and economic dimensions. To encourage a critical review of the state of the region, the team will take on the role of investigative journalists reporting on what they see happening in the region during that period.

Workshops of the Analysis team will involve reviewing the scenario story developed by the Narrative team. The review will consider the logic and completeness of the story, and learning that can be drawn from the story to inform future actions. The output from the review will be used to improve and further develop the scenario story.

Both teams will commence with an examination of the past five years (2000 – 2005) to assist in identifying the challenges and opportunities existing at the start of each scenario. This will also allow the teams to practice the skills required for the assessment process.

Dates

The anticipated timetable for meetings of the technical working group presented in Table 4. Each team will meet at approximately four-week intervals, with entire group meetings in August and December.

Table 4 Anticipated meeting dates for 2005

Meeting Number	Narrative Team	Analysis Team
1	6th May	
2	30th May	6th June
3	20th June	4th July
4	19th July	25th July
5	16th August*	
6	12th September	25th September*
7	11th October	25th October*
8	7th November	21st November*
9	6th December	

* To be confirmed

Managing the process
The proposed approach to Stage 3 is innovative and has not been used previously. Therefore, there is a degree of risk in adopting such an approach. To manage this risk, the project team will continually monitor and

evaluate the assessment process and the output of the process. The monitoring and evaluation will be used to adapt the assessment process to accommodate both the needs of the project and participants.

Monitoring will involve a debriefing session at the conclusion of every workshop both with the participants and the project team to identify improvement in the workshop process. Evaluation of the story development process will on completion of the first scenario story, which is anticipated to take up to four workshops.

It is anticipated that the Technical Working Group will have the ability to complete four scenario stories within Stage 3 of the Project. If progress is slower than anticipated, the project team will consider extrapolating the logic and concepts developed in completed scenario stories to those that are incomplete.

Communication to other audiences

During Stage 3 of the project, six monthly meetings of the Irrigation Futures Forums will be held to update members on progress. These meetings will allow the Forum participants to contribute ideas and suggestions to the assessment process and to participate in an extended peer review of the assessment. Regular briefings of the Stakeholder Reference Committee will also be held.

Appendix 1 Methods of Prioritisation

As a part of the literature review on integrated assessment, we identified two parts to assessment; prioritisation and analysis. Approaches to analysis were discussed in the main part of the report. This appendix reviews the different approaches to prioritisation of management strategies.

There are three main formal approaches to assessing priorities to identify preferred management strategies. Each approach on the some sort of judgement of the value, either absolute or relative, of particular outcome measures. The three main approaches are risk assessment, economic assessment and decision analysis or multi-attribute utility assessment.

Risk Assessment

Risk Assessment is a priority setting tool that ranks actions or processes according to the level of risk they pose to people, property, livelihoods and/or the environment. Risk is typically described as the product of the likelihood of the action occurring and the consequence or in some cases the exposure and the effect. Risks are subsequently prioritised using the framework presented in Figure 9.

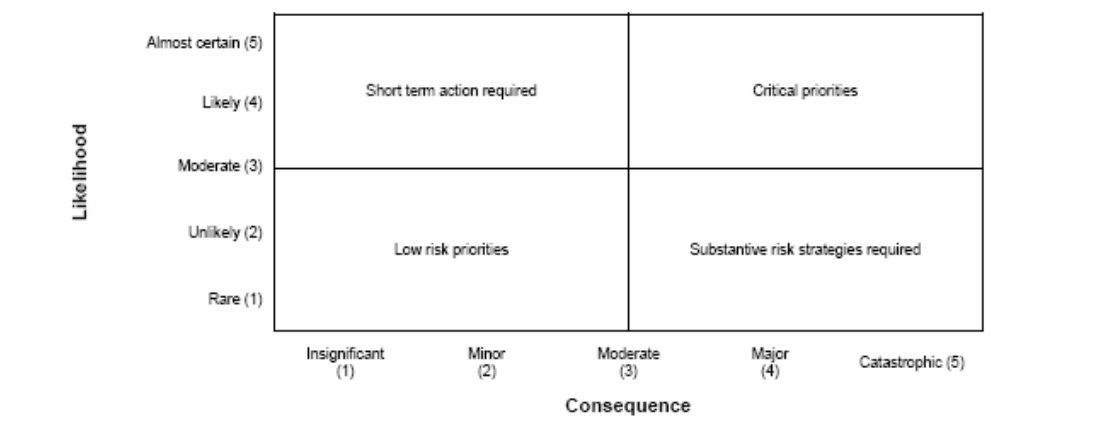


Figure 9 Risk Assessment Proiritisation Framework.

In environmental management, the risk of threats or threatening processes to environmental assets (natural features with some form of economic, social or environmental value) is commonly assessed. This process has been commonly applied in the development of Catchment Strategies in Victoria, following the requirements of the "National Framework for Natural Resource Management Standards and Targets". Formal software (RiVERS) has been developed to assist with prioritising areas for Catchment River Health Strategies within Victoria using a risk assessment approach (NCCMA 2004).

Risk assessment requires the consequences of interventions to be characterised. The Ecological Risk Assessment approach of Hart et al (2002) is an example of this, where both prioritisation and system understanding are brought together into a single framework.

Risk assessment approach prioritises actions and processes according to the risk they pose. This framework can be used prognostically to examine the change in risk when particular management options are implemented. However, there is no explicit consideration of the costs of remedial actions.

Value judgements are introduced when characterising what is actually at risk whether it is people, property, livelihoods or the environment, and its relative importance.

Economic Assessment

Economic assessment is used to assess the relative costs and benefits of proposed management strategies using monetary measures. Cost-benefit analysis is the most commonly used tool for economic assessments. Cost-benefit analysis compares management strategies using measures such as Net Present Value and Benefit Cost Ratio. Economic assessment becomes difficult when costs and benefits are non-priced and therefore non-market based valuation techniques are required. In Victoria, DNRE (2002) required cost-benefit analyses of catchment action plans, preferring contingent valuation of non-priced goods and services.

Decision Analysis

Decision analysis, or multiple criteria evaluation techniques, are used to compare and rank management strategies. Management strategies are evaluated against several quantitative or qualitative measures. A weighted aggregation (eg sum or average) of these measures is used to prioritise management strategies. The weights reflect the relative importance of each of the measures. Several methods are available for the development and analysis of priorities, including the Analytical Hierarchy Process (AHP) and Concordance Analysis. Eigeland and Hooper (2000) demonstrate the use of Multiple Criteria Analysis to rank irrigation farm performance considering social, economic and environmental factors.

Appendix 2 Technical Working Group Members

Narrative team	
Alan Canobie	Beef farmer – Numurkah
Bruce Cumming	Sub-project manager, Sustainable Irrigation Landscapes – Goulburn-Broken, DPI – Tatura
Joe Demase	Viticulturalist - Shepparton
Peter Fitzgerald	Dairy farmer, G-MW Board member - Tongala
John Laing	GV Environment Group - Toolamba
David Lawler	Senior Irrigation Advisor, DPI – Echuca
Oliver Moles	Planning Manager, DSE - Benalla
Bev Phelan	Counsellor, GV Agcare - Kyabram
Claire Pinniceard	Export piggery - Euroa
Peter Sargent	Horticulture – Strathmerton
Rien Silverstein	Horticulture – Shepparton
Kate Tehan (vice Sally Dickinson)	Municipal Economic Development, Campaspe Shire Echuca
Analysis team	
Bruce Anderson	Goulburn Valley Water – Shepparton
David Bourke	Dairy farmer – Tatura
John Dainton	Chair, Northern Water Forum - Shepparton
Lyn Gunter	Municipal councillor - Alexandra
Shane Hall	Orchardist – Mooroopna
Peter Langley	Horse breeding - Benalla
Derek Poulton	Goulburn-Murray Water – Tatura
Kevin Preece	Goulburn-Murray Water – Cobram
Durham Prewett	Milk supply manager, Nestle – Tongala
Ross Wall	Executive officer, Northern Victorian Fruit Growers Association - Mooroopna
Gordon Weller	Dairy farmer - Rochester

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IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT

Milestone 3 Report - Attachment C

Response to Reviewers Comments

June 2005

Primary Industries Research Victoria (PIRVIC) - Tatura
Department of Primary Industries

in collaboration with

Community Engagement Network
Department of Sustainability and Environment

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Technical Advisory Committee:

Dr Neil Barr, Jo Haw, Associate Professor Hector Malano, Associate Professor Bill Malcolm, Derek Poulton, Greg Roberts, Ken Sampson, Dr John Wolfenden.

Project Funded By:

Department of Primary Industries
Department of Sustainability and Environment
Goulburn Broken Catchment Management Authority
Goulburn-Murray Water
National Program for Sustainable Irrigation, Land and Water Australia

Review by Dr. Nick Abel

Irrigation Futures of the Goulburn Broken Catchment

Comments on the Approach to the Further Development and Assessment of Regional Options proposed for Stage 3

Introduction

I was asked to:

- comment on the approach to the further development and assessment of regional options proposed for Stage 3 of this project;
- provide suggestions to help in the development of a detailed program to implement the approach.

To do this I read Milestone Report 2 and its attachments A to H, with a particular focus upon G and H.

Sound Project Structure and Excellent Processes

The project structure, developed for the whole project, was well conceived originally, and has been thoroughly tested in the earlier stages of the project. It provides an excellent platform for the approach to Stage 3 (hereafter 'the Approach'). Similarly, the stakeholder process was well designed, and judging by the running sheets, expertly managed (Attachment C). In establishing the Stakeholder Reference Committee (Attachment B), I did note a relatively weak representation of non-dairy irrigators. It probably is an accurate reflection of current water usage, but predetermines a tendency to 'business-as-usual'. This is a comment rather than a criticism, because you could not run a process like this which is biased against dairying! It does, though, put an extra responsibility on non-dairy participants and project staff to encourage lateral thinking. The Milestone Report shows strong awareness of this, but as the Report itself notes, a tendency to business-as-usual is still apparent in the scenarios.

Project Team's Response: We agree that the Stakeholder Reference Committee contains a strong representation of dairy irrigators. This committee was established using the Shepparton Irrigation Region Implementation Committee (SIRIC) as a base, which already had a strong presence of dairy irrigators. The membership of SIRIC was augmented to bring other expertise. The role of this committee is to provide guidance on processes for wider stakeholder participation, consolidate ideas from wider stakeholders and generate confidence in the regional community. The Irrigation Futures Forums is where the majority of the ideas were generated. These forums had a wide range of participants.

Dealing with Complicated Outputs

The outputs from Stage 2 are community values and aspirations, response options, and five comprehensive scenarios. I agree with the Milestone Report that these outputs are at a fairly high level, and do not always provide sufficient detail for assessment. It is unclear from the project objectives whether the intention is to develop scenarios that are as well informed as possible, or whether the emphasis is on developing a shared vision of the future. If the former, the outputs might have been enhanced by having some discussion papers drafted by experts in particular fields – for example the

factors affecting agricultural exports; population futures; climatic change; the impacts on the regional economy of changes in water allocations, etc. You may still find that useful – but a literature review to inform your Narrative and Analytical teams would do the job.

Project Team's Response: Stage 2 of the project aimed to develop scenarios which are both well informed and owned by the community. One feature of the project is to place great value on local knowledge and on diversity in views and mental models. Early in Stage 2, we made the decision that we would not bring presentations by external experts or discussion papers to our workshops, as we did not want discussions to be influenced by individual experts or papers. We also wanted to demonstrate to our workshop participants that there was no hidden agenda behind the project. At Stage 3, we do bring in expertise from external sources, as suggested by the review.

You write of the 'prodigious amount of material' generated by the project, and the 'somewhat frightening" range and complexity of issues that impact on irrigated agriculture. In retrospect, should you have imposed what Holling calls a 'rule of hand' about the number of drivers allowed (five) (Gunderson and Holling 2002)? Brian Walker tells me (and I do not have a reference yet) that some mathematical modelling of abstract systems suggests that only systems with a small number of controlling variables can persist, larger numbers and the system is too unstable to survive. I don't know if this applies to drivers, but the 'rule of hand' forces participants to synthesise and rank their drivers. Too late for participants to do this, but your narratives and analytical teams still could do it in your Approach.

Project Team's Response: We agree that we need to focus on key variables. We also recognise that drivers can be at many different levels, and the 'rule of hand' concept is difficult to apply in practice. Five high level drivers can mean many drivers at lower levels. In addition, variables may become critical or not critical depending on the state of the system. It was also important to give forum participants the space to identify what they believed were critical drivers.

The outputs do lack internal coherence, and your Approach will have to address this. For example, in the Super Scenario 'Food for Thought', why, given the 'Keen Green' values, do the prices of fuel and water not rise, but the price of chemicals does? Another example, why under the 'Economic Ideals' Super Scenario does the price of water decrease when large volumes are being allocated to the environment? This is probably labouring the obvious, but I suggest the material already gathered, and the incoherence of parts of the output, could be reduced and organised better if in your Approach you could work out the causal relationships behind the scenarios and options. You could use influence diagrams etc., and the 'story-lines' the participants developed may be informative too. You will have to do this intuitively anyway, to make sense of what you have got, so you might as well do it explicitly.

Project Team's Response: The Super Scenarios were raw outputs from a one-day workshop (Stakeholder Reference Committee) in attempt to synthesise Forum workshop outputs. These scenarios have been further developed and presented in Attachment 1 of Milestone Report 3.

Drivers, Threats and Control Variables

The mega drivers listed in the super scenarios did not seem to me to be all drivers. Resource shifts and allocations to me seems to be a regional consequence of changes in what clearly are drivers, such as community values and government policy. Likewise 'sudden change' is offered as a category of driver, whereas it might be better seen as a shock or disturbance to which the system responds. I do think it would help organise the material better if during the application of your Approach it is sorted more clearly into drivers (external), drivers (internal), control variables and shocks.

Project Team's Response: This is a terminology issue. We define "driver" as factors that could impact on the region's catchment, community and industry, either directly or indirectly. We found that the simplicity of defining factors as external and internal drivers suited for our workshops.

Scale

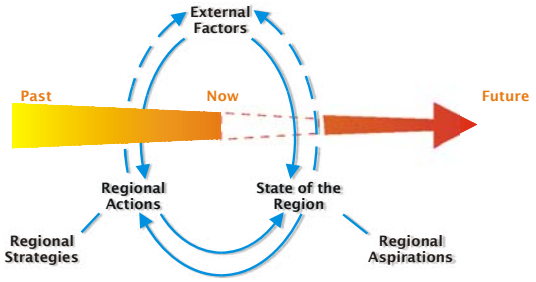
Would it also help organise the information if you distinguished between farm-scale, regional-scale and external changes?

Project Team's Response: We agree that this could be a useful way to organise information. In terms of regional actions, we have used "individual actions" and "coordinated actions".

A Stronger Organising Framework?

All that said, I wonder if the participants' mental models of the system that underlie the outputs are in fact appropriate to what we think we already know of the behaviour of the system? For example, the Summary of Irrigation Futures Forum Aspirations (F, p18) include an equilibrial view of the system's behaviour, which is not appropriate for a system in which we know there are thresholds (in the relationship between tree cover and rate of water table rise in particular). And the Themes within the Regional Response Options reflect in my view some fairly top-down mental models of social change – lots of leadership, planning, governance, coordination, but nothing on market based instruments and local initiatives, which we know can be important in changing the system. I am biased towards a resilience-based conceptualisation of how the system works, with the behaviour of the system controlled for much of the time by slow variables (e.g. perennial vegetation cover, property rights, infrastructure etc), but with a tendency to become increasingly unstable as the quest for efficiency drives the system closer to thresholds (e.g. water table rise; salinity increase). When in this fragile state the system can collapse, release resources, stimulate innovation, and change direction (Gunderson and Holling 2002). I promote this approach because I am trying to apply it in the GB myself. I do think its worth a look. There is stuff in Walker B et al 2002 and in Gunderson and Holling 2002, and I attach a paper (submitted) by Anderies et al. I do realise that applying a resilience (or any other) framework retrospectively may anger the participants, especially as you would have to modify the scenarios and options to fit the theory, but its worth exploring as a way of increasing the value of the outputs.

Project Team's Response: The systems framework we have used is show in the diagram below.



Regional Aspirations are the community goals and desires for the next 30 years in relation to business, family, the Goulburn Broken Catchment and irrigated agriculture.

Regional Actions are those actions taken by individuals (individual actions) and actions that require some degree of coordination by groups and organisations (coordinated actions). Regional actions can be taken in respond to challenges and opportunities presented by external scenarios and/or the State of the Region. They can also be taken as an initiative to create opportunities.

Regional Strategies are Underlying approach and plan to guide regional coordinated actions both now and in the future.

External Factors are factors that influence but are beyond the control of the region. The external scenarios describe the temporal evolution of the external factors over the next 30 years.

State of the Region is the condition of the region as a result of past regional actions and external factors as well as the regional assets at the start point. One may regard the state of the region at a given time as the starting regional assets for the next time period.

The Regional Response Options collected at the Forum workshops have been synthesised to a set of Regional Strategies (See Attachment 1 of Milestone Report 3). Underlying the Strategies is the need for the region to have a system for adaptive management and change and to develop fundamental adaptive capabilities (Social; Land, water and environmental; Industry). We believe that this is very much consistent with the resilience concept.

Integrated Assessment

Unfashionable to say this, but you could do IA using a set of non-integrated models off the shelf. Alternatively you might build a quick and dirty model and perhaps use it in conjunction with off-the-shelf models.

Economic modelling - while cost-benefit analysis is useful to see if an investment is economically efficient, it tells you nothing about impacts on the regional economy and jobs, so to the toolkit you discussed under Economic Assessment, I would add Input-output or General Equilibrium models. We have an IO model for the GB with water included along with monetary flows.

You seem to feel that your post-normal approach is not compatible with more conventional modelling. If so, I don't feel the same. I think that conventional models can inform post-normal science.

An approach that I feel is truly post normal is Bayesian Belief Modelling. It might be fruitful to use this as it links local and scientific knowledge. I think you know this approach.

<u>Project Team's Response:</u> We are of the view that the systems we are dealing with are too complex and uncertain for computer modelling to be

meaningful. Therefore, we have decided to do Narrative exploration of the interplay between external factors, regional actions and the state of the region, supported by Analysis of concepts, qualitative relationships and in some cases quantitative relationships.

Other Comments

The Milestone Report is very clearly written, and a pleasure to read. The project has been carefully designed, and judging by the Report, very well managed. It is also innovative – one example is the innovative idea of offering a prize for innovation by participants!, and another the 'History wall'. A third is the combination of narrative and the analytical approaches, which is brilliant. I would say in its conception and execution so far, the project is a model for scenario development here and abroad.

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Review of the Goulburn Broken Irrigation Futures Project

Stage 3

by

Professor Ron Johnston
Executive Director
Australian Centre for Innovation

January 2005

Summary

On the basis of a detailed reading of the Milestone Report 2 of the 'Irrigation Futures of the Goulburn Broken Catchment' Project I can conclude:

- by international standards, this is an extraordinarily ambitious and well-conceived futures project, and the evidence available suggests it is being executed in a very professional manner, with particular emphasis on evolutionary learning, and effective stakeholder engagement;
- the adoption of an appropriate 'integrated assessment' approach offers sound prospects for further progress;
- the proposed key methodology of distinct Narrative and Analysis teams is relatively novel, but, effectively managed, could be very effective.

Project Overview

The report identifies a four-stage project, extending over four years:

Stage 1	Project development
Stage 2	Vision, scenario and options
Stage 3	Further development and assessment of regional options
Stage 4	Building consensus.

It should be noted that the scale and length of this project will undoubtedly alow for an extremely thorough and rigorous approach. However there may be some disadvantages in attrition of stakeholders, for a wide variety of reasons eg fatigue, new interests, changing personnel, leaving the industry or the region.

Project Team's Response: This has been managed reasonably OK at Stage 2 with a retention rate of over 70% in a period of six months. About a third of the Stage 2 participants have put in nominations for involvement in the Technical Working Group at Stage 3. Strategies for keeping participants involved in the project in the next two years include sending communication material regularly and meeting to provide report on project progress and seek comments every six months.

In addition, a futures project extending over four years must allow for, and adapt to, substantial changes in key parameters, drivers, assumptions, perceived risks, etc, over the lifetime of the project

Project Team's Response: Among such substantial changes is the implementation of the White Paper on water. The project will continually review such changes and incorporate information into the project processes and outputs as necessary.

Four major sets of outputs are identified from the recently completed Stage 2:

- a set of community Values and Aspirations for the future of irrigation in the Goulburn Broken Catchment
- a set of Scenarios describing the plausible positions of factors that influence irrigation in the catchment over which the catchment has no control. These represent opportunities and threats that the catchment may face in the future

- a set of Assets describing the available resources within the catchment and their current condition. These represent the current strengths and weaknesses of the catchment.
- A set of Regional Response Options describing factors within the control of the catchment that will respond to the challenges and opportunities presented by scenarios.

It should be recognised that the distinction between factors that the catchment can and cannot control is inevitably contingent. Changes in external or internal situations can convert a factor from being inside to outside control, and vice versa.

Project Team's Response: We have adopted a simple framework to focus community discussions on regional actions, with the recognition that there is a dynamic interplay among external factors, regional actions and regional consequences. Stage 3 will explore this interplay in much greater depth than Stage 2.

More significantly, the translation of futures concepts into the language of strategic planning provides the initial basis for developing an effective interface between the language and processes of futures studies and that of practical planning and decision-making.

I have argued[1] that the appropriate objective of foresight exercises is not the solution of future problems, but as the transformation and reduction of uncertainties into a form where the tools of strategic planning can be applied.

This goes to the heart of the major weakness of all futures-type exercises – the effective translation into decision-making and action.[2] This project has quite clearly recognised this challenge, and the processes and methods being used would appear to be most appropriate for ensuring effective, implementable (and implemented) outcomes.

Project Team's Response: We are very much in agreement with the reviewer. The focus of developing future scenarios in this project is about developing regional strategies and testing their effectiveness and robustness.

There are two further features of the project which I regard as representative of best practice. The first of these is the strong commitment to a participatory approach and effective stakeholder engagement. I quote at some length to justify my support for this approach[3]:

An Alternative Framework for Foresight

> *As a management tool, foresight, particularly in the forms of model-based projections and scenario planning, is being rapidly adopted in the private sector, and to address specific technological or sectoral issues in government Departments and agencies. However, significant challenges to the further progress of foresight have been*

[1] Johnston, R.,and Tegart, G., 'Some Advances in the Practice of Foresight', *Proceedings of the Workshop on the Role of Foresight in the Selection of Research Policy Priorities,* Seville, 2002; forthcoming in the *International Journal for Foresight and Innovation Policy*

[2] This argument is elaborated in Johnston, R., 'The State and Contribution of International Foresight: New Challenges' delivered to the Spanish Presidency Foresight Conference, *The Role of Foresight in Policy Prioritisation and Planning,* Seville, May 2001

[3] Johnston, R., 'Foresight; Revising the Process', *International Journal of Technology Management*, Vol 21 Nos 7/8, 1999.

identified in this paper. They include the gap between general theoretical models and current practice, the need to develop a comprehensive inventory of foresight tools, and the fact that evaluative empirical research lags far behind the fast-growing practice of foresight.

But perhaps the greatest limitation is in the lack of effective engagement with political and administrative decision-making processes. Research and technology foresight has developed largely outside the world of bureaucratic politics, marked by the 'contested terrain' for ideas and advantage.

A possible alternative framework for foresight, which might provide the basis for addressing these issues, is provided by the approach labelled as ' participatory policy analysis'. This is defined, perhaps clumsily, as:

> *an applied social science discipline which uses multiple methods of inquiry, argument and process facilitation to assist a pluriform set of stakeholders in a policy network to explore and exchange in a direct interaction with each other their different mental maps regarding values, definitions, causes and solutions of problems and to develop and test as effective as needed a shared and robust policy theory on an issue. The ultimate goal is to improve the problem solving capacity of the individual stakeholders and the policy network as a whole. [27]*

This is seen as a response to the increasing complexity of human and social problems:

> *New cross-disciplinary techniques to assist decision-makers are rapidly emerging worldwide. Scientists around the globe have been experimenting with new methods of perceiving, understanding and communicating complexity. Many techniques and technologies have been employed with varying results. The more successful have attempted to capture problems in a systematic way, to facilitate group participation in the articulation of alternatives for action, and to enable a group to evaluate various alternatives. Inevitably, these efforts employ a method for communication that is less sequential than written language and more ' right brain' in encouraging spontaneity, but nonetheless disciplined in use to ensure reasonable results. [28]*

The benefits of stakeholder participation during a process of policy analysis are described as:

> *more creativity, improve production and diffusion of knowledge, integration of different sources of information/knowledge, better mutual understanding between opposing groups, early political coordination, improved legitimacy or enhancement of democracy, no separation between diagnosis and action, improved decision quality, commitment of participants, and more effective communication of results between analysts and users [29]*

A review of participatory policy analysis applications has identified their focus on ill-structured or complex policy problems. Their objectives include exploring and explaining conflicts of interest or values, collecting information from stakeholders to reduce complexity and uncertainty, creating or stimulating the development of a network, establishing a legitimate base for further action, or motivating change.

These passages have been quoted at length to emphasise the commonality between this approach, and that of foresight, particularly in the form of scenario planning. 'Stakeholder exchange of their different mental models', the 'communication of complexity through right brain processes', 'more creativity', ' commitment of participants' and 'better mutual understanding between opposing groups' are all features of the process-based techniques like scenario planning.

But 'no separation between diagnosis and action' and 'more effective communication of results between analysts and users' are not evidently strong characteristics of foresight. An important step in the further development in foresight, particularly as applied to research and technology, may well be to recognise that the different techniques also carry with them implications for the extent of engagement with the decision-making process.

Expert-based approaches may generate technical confidence, but fail in terms of interfacing with decision-makers. Participatory techniques offer the potential of a much higher level of engagement with the decision-making structures, but may be less conducive to accessing the insights of the technical experts. Furthermore, the 'point of balance' will differ in different cultures and economic structures.

The second feature of significance is the adoption of the "post-normal science" paradigm. While the conceptual developments underpinning this perspective have at least a twenty year history in the sociology of science, leading to arguments that the very nature of reliable knowledge is being transformed (from Mode 1 to Mode 2 knowledge)[4], it is only in the past few years that the acknowledgement of fundamental uncertainty in knowledge has begun to be accepted and directly built into analytical and decision-making processes addressing the future.

This project represents one of the fairly early adopters of this approach. The advantages are that there are many opportunities for learning. The disadvantages are that there is only limited experience to build on.

Project Team's Response: The Stage 3 approach is very much experimental in the future. Therefore, the project team will need to constantly review the project methodology and be adaptive.

Stage Three – Further Development and Assessment of Regional Options

Stage 3 of the project involves three main tasks:

- Development of a detailed assessment process
- Further development of the material from the Irrigation Futures Forums
- Assessment of the options (ie "assessment of the consequences of policy options in a future environment that is highly uncertain")..

This is to be underpinned by a systems framework: "the impact of the combination of options and scenarios on outcome indicators will be assessed by understanding how each component of the options and scenarios influences the system behaviour and how the outcome indicators respond to changes within the system."

In this context, "assessment is about understanding the combined impact of options and scenarios on outcome indicators."

This raises two issues. First, quite what is the nature of options, and what do they include. Thus, on page 8 they are described as ways to realise our aspirations that may be described at two levels: "Broad Direction of what we

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[4] Gibbons, M., et al, *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies*, Sage Publications, London, 1994.

want to achieve", and "Course of Action describing how the broad direction is implemented".

However, on page 5 of Attachment H, options are described as "describing factors within the control of the catchment that will respond to the challenges and opportunities presented by scenarios."

Each of these three aspects appears to represent somewhat different components viz a preferred future, mechanisms of implementation, and internal capabilities, or strengths. I would suggest there is a need to make a very clear distinction between these three, and ensure that thinking and analysis does not confuse one with the other.

Project Team's Response: The confusion has resulted from our inconsistent use of words. The underlying concepts have also evolved over time. We believe we have now reached a better set of terms:

Future options for regional actions - Regional actions include those actions taken by individuals (individual actions) as well as actions that require some degree of coordination by groups and organisations (coordinated actions).

Regional strategies – Underlying approach and plan to guide regional coordinated actions both now and in the future.

Regional assets – internal capabilities (strengths and weaknesses).

State of the Region – is the condition of the region as a result of past regional actions and external factors as well as the regional assets at the start point. One may regard the state of the region at a given time as the starting regional assets for the next time period.

Regional actions can be taken in respond to challenges and opportunities presented by external scenarios and/or regional consequences. They can also be taken as an initiative to create opportunities.

The second issue is just how the task set out above under the systems framework is actually to be pursued and completed, given the uncertainty not only of many of the underlying data, but also of the nature of the inter-relationships between the various factors, before we add the special uncertainty associated with addressing the future. This brings us the proposed approach.

Proposed Stage Three Methodology

The decision has been made that the originally proposed approach for Stage 3 based on the development and use of a 'Scenario Assessment Tool' to assess the consequences of the various management options is not appropriate. Scenario assessment is a reasonably well-developed process, but it is usually focussed on issues of internal consistency, rather than on assessment of consequences.

The rationale that is offered is essentially based on the complexity of the issues to be addressed, the limitations of relevant knowledge, and the variety of viewpoints that different actors and stakeholders would bring to such an assessment. All of these criticisms are well-founded.

Hence drawing on an excellent review of the literature on the emerging field of 'Integrated Assessment', a participatory approach is proposed based on what might be called a dialectical interplay between a Narrative Team and an Analysis Team. The former have the role of constructing a suite of stories of

plausible futures. The latter will bring the rigour of systems modelling to testing the plausibility of the stories and illustrating the magnitude of the impacts.

In simple terms, this separation mirrors the distinction between right-brain creative activity and left-brain critical activity. The importance of this distinction, and the need to separate the activities is well recognised in the futures field. But I am not aware of a project where the two functions have been embodied in distinct groups.[5] More commonly they are separated as successive stages carried out by a single group.

In my view this is a very interesting approach, well-worth pursuing. However, its effectiveness, and success, will depend crucially on a combination of detailed planning and, even more importantly, active monitoring, learning and development and introduction of adaptive strategies, tools and information throughout the life of this Stage.

It will be a major, experimental learning exercise. It will take the form of action research, engaging the members of the Technical Working Group. And in the language of futures, this project/Stage will itself be a classical exercise in 'inventing the future rather than predicting it'.

Some practical considerations with regard to membership of the two teams: it may be best to appoint members according to their right brain/left brain preferences (simple non-threatening diagnostic tools are readily available. There may also be value in allowing for some swapping of roles at an appropriate time eg a workshop where roles are reversed.

The proposed assessment process is to rely heavily on structured workshops. While such workshops are undoubtedly an important component, I would se the need also for each team to have significant time to work with their own members, and to respond individually to various tasks. The whole process could be supported by an effective electronic 'bulletin board' type information and idea exchange mechanism.

It is evident that a high level of support would be required from the project team.

Project Team's Response: The project team has adopted a monitoring and evaluation strategy for Stage 3 of the Project. This includes monitoring and evaluation of the participatory processes and the output from the workshops This will allow the process to continually evolve to meet the participants and project requirements.

In forming the two teams, a simple test was used to inform participants of their preferred learning style. Participants were then allowed to make an informed choice of the team they joined.

Methods of communication within and between the teams were discussed with participants during the first workshop. The majority of participants preferred to receive written material in hard copy, and to use electronic communication only for short messages.

[5] I have been unable to access the Kemp-Benedict reference

IRRIGATION FUTURES
OF THE GOULBURN BROKEN CATCHMENT

Communication and Adoption Plan

Primary Industries Research Victoria (PIRVic) - Tatura
Department of Primary Industries

in collaboration with

Community Engagement Network
Department of Sustainability and Environment

Victoria The Place To Be

National Program for Sustainable Irrigation

Goulburn Broken Catchment Management Authority

Goulburn-Murray Water

Cooperative Research Centre for Irrigation Futures

action Salinity & Water Australia

Australian Governments and local communities working together to prevent, repair and manage rising salinity and declining water quality across Australia.

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Deborah Courtney	Department of Primary Industries
Denis Flett	Murray Darling Basin Commission
Ian Moorhouse	Goulburn-Murray Water
John Pettigrew (Chair)	Goulburn Broken Catchment Management Authority
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Stakeholder Reference Committee:

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Technical Working Group:

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National Action Plan for Salinity and Water Quality
Goulburn-Murray Water
National Program for Sustainable Irrigation, Land and Water Australia

Objectives

Facilitate the adoption of Irrigation Futures outputs by agencies and irrigation enterprises,

Provide key decision-makers with an awareness of project progress and outputs.

Relevant outputs

The outputs and tools provided during Workshops and Information Sessions will include:

A Scenario kit - a Workbook which

summarises the key elements of each scenario, the likely changes in water-use, impacts on agricultural production etc,

provides an opportunity for users to formulate their own unique response plans to the scenarios.

A Scenario Book - an Information Book which

summarises each scenario, and provides details, graphs and an explanation of the underlying rationale for 2 of the scenario elements,

provides a set of regional response strategies, suggesting ways in which the current strengths (or competencies) of the region, ie land, water, agribusiness, communities, environment and institutions, can be better prepared for future uncertainty.

Summary of audiences and plans

Audience	Adoption plans
Agencies - G-MW completed, GBCMA currently underway. Local Government (CoGS, Moira, Campaspe) AND GBCMA, G-MW, GVW, DSE, RDV	Engage agency staff in the assessment of scenario implications and development of appropriate response strategies for their agency. Because agency staff have developed the response strategies, they are likely to implement them. The scenario assessment process will also have some embedment in the planning processes of the agency, so there is a likelihood of it being used in an ongoing fashion after the project is completed.
Irrigation Futures Forums WSC and IC members Business leaders Next generation irrigators	The Irrigation Futures team will provide Workshops (with scenario kits) to Irrigation Futures Forum members at 6 locations throughout the region. All WSC and IC members invited to attend the nearest Workshop. Businesses will be invited to send a representative. Because irrigators will develop response plans for their particular enterprise, they are likely to be implemented. Provide a Workshop (with scenario kits) to interested Dookie students and YIN members. Aimed at awareness.
Wider irrigation community and community interest groups (LandCare, environment etc)	DPI extension staff, field officers and service providers will be provided with scenario kits and training guidelines. They will then be able to run Workshops (with scenario kits) for their irrigation clients over the coming years. Again, because irrigators will develop their own response plans, they are likely to be implemented.
Politicians Policy makers	Provide information sessions on project objectives, processes, outputs, adoption and broad implications as required.

Next steps and evaluation

At the conclusion of each Workshop and Information Session, participants will be asked - In the light of these scenarios and learnings:

What next steps should the region take?

If those changes were implemented, what benefits would they bring?

Planned Communication / Adoption Workshops & Information Sessions (06/07)

Target audience	Presentation type	Target date	Notes
CAS extension staff, field officers and service providers (Farmanco etc)	Information session on Irrigation Futures outputs.	Feb 07	Outline their possible role in the communication and adoption of outputs. Get guidance on the development of scenario kits.
Local Government and agencies involved with land development	2 Workshops	March & May 07	Explore scenario implications for land-use and economic development
Irrigation Futures Forums, WSC and IC members	One Workshop to each Forum group (6)	Feb/March 07	
Next generation farmers (Dookie, TAFE, YIN, VFF)	One Workshop	Mar 07	
Politicians	One Information Session	March/April 07	
Policy makers	Information Sessions (as opportunity arises)	Sept 06 April/May 07	
TOTAL	9+ Workshops 3+ Information Sessions	Regional Action Plan to be developed after Workshops (April/May 07) Submitted to SRC (May 07).	