

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 December 2004

**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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Mark Allaway – Department of Primary Industries
Alan Canobie – Numurkah Dairy Farmer
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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

Project objectives	5
Context for Milestone Report 2	5
Progress against Milestone 2	6

Attachments

- A Formation of the Stakeholder Reference Committee (SRC)
- B Engagement with stakeholders
- C Irrigation Futures Forum Workshops – processes
- D Irrigation Futures Forum Workshops – outputs
- E Engagement with young people and business leaders
- F Scenario & options synthesis by the SRC
- G Planning for Stage 3
- H Review of integrated assessment literature
- I List of Communication Activities

Milestone Report 2

Project:	Irrigation Futures of the Goulburn Broken Catchment (VPI3)
Principal investigator:	Dr QJ Wang
Project duration:	1 July 2003 – 30 June 2007
Report due date:	15 Dec 2004

Project objectives

The objectives of the Irrigation Futures project are to:

- *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.*

Context for Milestone Report 2

The background, underlying philosophy and methodology for this project are outlined in Milestone Report 1b. In particular, that Report included the:

- Stakeholder Participation Plan (and its external review),
- Communication Plan,
- Evaluation Plan.

This Milestone Report 2 builds on that work. It focuses on project progress in relation to each requirement of Milestone 2.

For each of those requirements, it provides:

- The state of progress (ie **complete** OR **commenced** etc),
- A brief discussion of the key activities and outputs, and
- If an activity is incomplete, it identifies the remaining actions which need to be undertaken, and the anticipated time for completion.

This Report has a number of Attachments (A – I). These provide:

- The details of how each requirement was satisfied, and
- A preamble, which identifies the objectives and methodology used.

The Attachments are intended to be largely self-contained. This means that they can be used as a resource by other groups undertaking a similar community-based exercise.

Progress against Milestone 2

The work completed against each of the specific requirements of Milestone 2 is as follows:

(a) Stakeholder Reference Committee formed

Status: Completed

The SRC has been formed and is fully operational. Details on how it was formed are provided in Attachment A to this Report.

As directed by the Governance Committee, its membership is centred around the Shepparton Irrigation Region Implementation Committee, with additional members co-opted to provide a broader geographic and skills-based representation. Members are listed at the front of this Report.

As a committee, the SRC has met on 7 occasions during 2004 to receive reports from the project team on the level of stakeholder engagement, Workshop outputs etc. Individually, a number of SRC members have attended the Forum Workshop series in their area. This ensured that they had first hand knowledge of the level of participant satisfaction with Workshop directions and processes. In addition, SRC members have also engaged in a 2-day exercise to synthesise the outputs from those Forum Workshops.

(b) Stakeholder engagement methodology endorsed by the SRC

Status: Completed

The stakeholder engagement methodology was endorsed by the SRC at its first meeting in 2004.

(c) Key stakeholder groups engaged and outputs documented

As outlined in the Participation Plan, the project strategy was to engage key stakeholders through a series of Workshops known as the Irrigation Futures Forum. These Workshops invited participants from a range of stakeholder groups (primary producers, processors, environment groups, Landcare,

business people etc). Participant invitation was targeted so that the diversity of views within the stakeholder community were heard.

To cater for input from groups which were classically not well-represented in the above Forum Workshop processes, the project team also planned special engagement activities. These were targeted at women and ethnic communities, the Indigenous community, and young people. Finally, the project sought to engage with the wider community through newspaper articles and community network newsletters.

Details of how each of those stakeholder groups were engaged are provided in Attachment B to this Report. The status of engagement with each group is discussed below. All outputs from that engagement have been documented in the Attachments to this Report.

- **Irrigation Futures Forums** **Status: Completed**

In accordance with the Participation Plan, a series of one-day Forum Workshops were conducted at 6 locations throughout the Goulburn-Broken region during 2004. This series comprised:

- 4 Workshops at each of Cobram and Shepparton (in the lower catchment), Benalla (middle catchment) and Seymour (upper catchment), plus
- 5 Workshops at Kyabram and Echuca. (The Kyabram and Echuca groups felt that they needed more time on Workshop 3.)

Around 120 people participated regularly in the Forum Workshop series, with retention rates of 70% - 90% at each location. To acknowledge the significant time contribution involved, non-Govt participants were offered a nominal sitting fee.

The Forum Workshop series produced the following outputs:

- Participant values and aspirations Workshop 1
- Plausible future scenarios for irrigated agriculture Workshop 2
- Regional Response Options Workshops 3 & 4

An outline of the facilitation processes used, plus an indication of the outputs from, each Forum Workshop (using Kyabram as an example), are documented in Attachments C and D (respectively) to this Report.

- **Young people** **Status: Completed**

In order to capture the views of next-generation farmers, a half-day Workshop was conducted with 2nd and 3rd year undergraduate students in the Bachelor of Agriculture program at Melbourne University's Dookie Agricultural College. The Workshop explored the aspirations of young people for irrigated agriculture, the challenges which they saw as needing

to be addressed, and the means by which the community could respond to those challenges. A total of 15-20 students participated. The facilitation processes used, and the outputs from this Workshop are documented in Attachment E to this Report.

- **Ethnic women** **Status: Commenced**

Discussions have commenced with a regional umbrella organisation for ethnic communities and women in horticulture in the Shepparton region. An evening Workshop which seeks to define the aspirations, challenges for the future, and response options as seen by this group, is proposed. The Workshop will be conducted at a venue chosen by the umbrella organisation in consultation with its group. A suitable (post-harvest) time is still being negotiated.

- **Indigenous community** **Status: On-going**

Discussions with representatives of the regional Indigenous community have commenced. While there is a willingness to be involved the planning and management of land and water resources in the region, there are some significant challenges to be overcome. There are protocols to be established in terms of who can speak for each of the several groups in the region on behalf of country. There is also a lack of capacity within the Indigenous community to contribute to other than the definition of high-level, aspirational goals for land and water management (clean water, more fish etc). That capacity needs to be developed if effective participation is to be achieved. Unfortunately, such capacity building lies outside the scope and the resources of this project. As a result, the project team has initiated calls to a number of authorities to address this issue.

The project will continue to communicate with the leaders within regional Indigenous community by way of regular project updates.

- **Business leaders** **Status: Completed**

Interviews have been held with 9 business leaders (company CEO's and leading edge farmers) within the region. The object was to incorporate the strategic perspectives of major regional industries into the project. The outputs are documented in Attachment E to this Report.

(d) Scenarios (and Options) agreed by SRC

- **Synthesis of Scenarios** **Status: Largely complete**

The Forum Workshops produced a total of 28 scenarios for the future. These needed to be consolidated / synthesised to a more manageable number for further investigation. A policy decision was also taken that this synthesis should be done, as much as possible, by the SRC. In effect, the SRC is taking decisions on behalf of the wider community, so that the potential for regional ownership is enhanced. The project team developed a one-day Workshop process whereby the SRC could synthesise these 28 scenarios, down to 5 super-scenarios. A parallel objective of the synthesis process was that the final outputs were still recognisable to the Forum Workshop participants.

A summary of the major external drivers for change, identified in the Forum Workshops, and used for this SRC process, is given in Attachment F to this Report. That Attachment also contains the program for, and the outputs from, this SRC Workshop.

Analysis has shown that, of the 5 super-scenarios produced, 3 have sufficiently diverse skeletons (or frameworks) upon which further development can be carried out. The remaining 2 super-scenarios had considerable overlap with the others, and will need to be rebuilt. Discussions with the SRC indicate that this rebuild should be centred around the threats and opportunities created by sudden change at both the national and international level.

The SRC has directed the project team to carry out this further development, and to report back to it for review and comment, at the 4 March meeting next year. Allowing for some changes, it is expected that this process will be completed by mid-March 2005.

- **Synthesis of Options Status: Commenced**

The Forum Workshops also developed a large number of response options. These likewise needed to be consolidated / synthesised into a more manageable document. The project team therefore developed a second one-day Workshop for the SRC to synthesise these response options. While some progress was made toward achieving that outcome, the amount and complexity of the work was too great to be completed within one day.

As a result, the SRC:

- Indicated that the process had made them familiar with the range and intent of the Forum Workshop options,
- Gave the project team the imprimatur to complete the synthesis of options and report back to them,
- Indicated that they would check the project team's synthesis against the outputs from the Forum Workshops, and direct the team to make changes as required.

As with the synthesis of scenarios, that process is expected to be completed by mid-March 2005.

The outputs from the SRC exercise are documented in Attachment F to this Report.

(e) Feedback meetings with stakeholders complete

Status **Pending completion of (d)**

The feedback meeting with Forum Workshop groups, to report on the final selection of scenarios and options by the SRC, will be held shortly after the SRC reviews and agrees to the project team's work as outlined in (d) above. That meeting is expected to be held in late March 2005.

(f) Scenario Assessment Panels (now Technical Working Group) formed

Status **Nominations received**

The Scenario Assessment Panels have been renamed the Technical Working Group in light of the recognition that the role of the group is to further develop the material from Stage 2, and assist with the assessment of options. This revision was previously discussed with the Governance Committee (meeting Aug 2004).

A list of skills required by the Technical Working Group was developed from an analysis of the output from Stage 2. Nominations to fulfil the skill requirements have been sought from members of the Irrigation Futures Forums and other organisations. More than 30 nominations have been received and the selection of the Technical Working Group members will be finalised at the next meeting of the Stakeholder Reference Committee (28th January 2005). Details of the role of the Technical Working Group are presented in Attachment G to this Report.

(g) Previous & current assessment approaches reviewed & documented

Status **Completed**

A review of over 40 papers on national and international approaches to the assessment of regional development options has been undertaken. The review considered the philosophy and techniques associated with assessment. It also examined studies that evaluated the consequences of management options, using a range of indicators describing social, environmental and economic outcomes.

The review suggests that the current "state of the art" approaches to the assessment of options are participatory, involve both quantitative and qualitative analyses, and draw together both scientific and local knowledge. As a result of the issues raised by the review, Stage 3 of the project has been revised to reflect the current state of the art in options assessment. The review is contained in Attachment H to this report.

(h) Endorsement of assessment tool development plan by SRC and Governance Committee after receiving peer review

Status	Peer review	Pending
	Endorsement	Incomplete

A revised approach to Stage 3 of the project has been developed and is described in Attachment G to this Report. There have been two substantial changes to the original project proposal.

The first change arises because the stakeholder outputs generated during Stage 2 of the project are at a higher level than originally anticipated. In order to adapt, the project team has included the additional task of further developing the outputs from Stage 2, in preparation for the Stage 3 assessment.

The second change involves a revised approach to the assessment of the options. At the start of the project, it was anticipated that assessments would be undertaken using a single assessment tool. As a result of the literature review in (g) above, the approach now proposes the use of a participatory narrative and analysis approach to assessment. As a part of this revision, Stage 3A will now focus on the development and testing of this narrative and analysis process, rather than the development of an assessment tool, with Stage 3B focussing on the whole-of-catchment application of the assessment process.

The approach to Stage 3 has yet to be peer reviewed, however reviewers have been identified, contacted and have indicated their willingness to be involved in what is a new paradigm for assessment.

(i) Milestone Report 2 submitted for approval

This Milestone Report 2 is submitted for approval.

It is submitted with the proposition that:

- the substantive work of Stage 2 (ie the engagement of key stakeholder groups, and the collection of their views in relation to the future of irrigated agriculture through 27 Workshops, 9 interviews and numerous meetings), has been completed.
- The processing of those views has commenced, a target date for their completion has been set (mid-March 2005), a quality control process has been put in place (approval by the SRC), and a meeting to report back to stakeholders is planned (late March 2005).
- A plan for the next stage of the project has been produced. That plan is based on a review of the evolving processes for assessment used worldwide. It will be submitted for external review in the coming weeks.
- The formation of the Technical Working Group to assist in the next stage of the project has been commenced. That Group is expected to be confirmed by the SRC and operational early in the new year.
- The outstanding items will be reported to the Governance Committee by 1 April 2005.

In summary, the project is delivering its expected outputs very successfully, is essentially on-track, and the small amount of outstanding work is due for completion by late March 2005.

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment A

Formation of the Stakeholder Reference Committee December 2004

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Table of Contents

Formation of the Stakeholder Reference Committee.....	5
Role of the SRC	5
Formation of the Stakeholder Reference Committee	5
Operation of the SRC	6
Nominations for the Expanded SRC.....	7
Letter of Invitation to the Expanded SRC.....	8
Irrigation Futures Briefing Notes: Stakeholder Reference Committee	9
Background.....	9
The aims of this project.....	9
Project organisation and schedule.....	10
Stakeholder participation	11
Time commitment for 2004	13
Stakeholder Reference Committee Terms of Reference.....	15
Irrigation Futures Forums Workshop Schedule.....	17

Formation of the Stakeholder Reference Committee

The role and importance of the Stakeholder Reference Committee (SRC) was outlined in Sections 2.3(b) & (c) of the Participation Plan in Milestone Report 1b. This Attachment deals with:

- How the SRC was established, and
- How it is operating.

It also provides examples of the:

- Letter of invitation to SRC members, and
- Briefing notes for prospective members.

Role of the SRC

To context how the SRC was formed, it is useful to briefly review its role. Under the Terms of Reference for the SRC (Section 9.2 Participation Plan, Milestone Report 1b), the role of the SRC 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 the scenario & options from wider stakeholders and identify which are to be analysed,
- Discuss the results of the options testing in consultation with the Technical Working Group,
- Create awareness of the project within their regions/organisations.

Formation of the Stakeholder Reference Committee

From the ToR above, it can be seen that the SRC plays an important role in ensuring that adequate levels of stakeholder engagement are carried out, and in determining which stakeholder ideas are taken forward. Its membership therefore needs to bring a wide range of skills and experience to this task. Those specialist skills centre around the management of sustainable agri-systems, plus the ability to reflect the aspirations of the region.

To achieve that blend of skills and experience, the Governance Committee (GC) 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 Goulburn Broken CMA.) That role was 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, 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.

Guidance on individuals who could provide those skills was received from the SRC, and senior managers within the region. Nominated individuals were contacted, sent an information pack which outlined the expectations of the role, and invited to register an interest. It is noted that a target outcome was the establishment of a greater gender balance within the SRC. Unfortunately, the majority of women contacted indicated that they were unavailable, due to other commitments.

The list of nominees available was forwarded to the GC for consideration. All nominees were subsequently invited to join the SRC by the chair of the GC.

Operation of the SRC

The SRC has now been formed and is fully operational. Meetings are usually held within the context of a normal SIRIC meeting, to minimise the additional time demands on members.

The SRC has met on 7 occasions during 2004 to receive reports from the project team on the level of stakeholder engagement, particularly in Forum Workshops. Such report sessions are usually of one hour duration. Examples of the SRC reports are provided in Attachment B.

A number of SRC members attended the Forum Workshop series in their area. This ensured that they had first hand knowledge of the sentiments being expressed by stakeholders. It also proved valuable during project reporting sessions, in that they were able to convey the enthusiasm within the Forum Workshops to the wider SRC. That intimate association has also provided useful guidance and feedback to the project team.

In addition, SRC members have been involved in a 2-day exercise to synthesise the outputs from the Forum Workshop series, and other engagement activities. That synthesis is reported in Attachment F.

To acknowledge the considerable time commitment involved, non-Govt SRC members are paid a nominal daily sitting fee.

In summary, the SRC has shown a significant commitment to the project, is providing excellent support and guidance to the project team, and is felt to be working very effectively.

Nominations for the Expanded SRC

Dear colleagues,

Nominations for the expansion of the Shepparton Irrigation Region Implementation Committee (SIRIC) to constitute the Stakeholder Reference Committee (SRC) for the Irrigation Futures project are listed below. The nominees have been contacted and have agreed to participate. A brief description of each person's background (rather than their full CV) has been supplied for ease of analysis.

Unfortunately, we have not been able to attract female nominees to the Committee.

Skills-base required	Nominee	Brief background
Investment and agri-business		Ex-CEO of Ardmona
Water policy (DPI)		Principal Policy Analyst - Sustainable Agriculture
Water policy (DSE)		Project Leader, Salinity Infrastructure
Middle catchment (including Local Govt)		Ex-Shire Councillor, Mid Goulburn Broken IC
Upper catchment		Upper Goulburn IC, Pres of Central Victorian High Country Winegrowers Association

Procedurally, these nominations need to be confirmed by the project Governance Committee, and then formally invited to join the SRC by the Chair of the GC.

To expedite the process, could the Committee provide that confirmation by Friday week (ie 21 May) please. We will draft the invitation letter and briefing notes to new members for the Chair's signature.

In regard to project progress - we completed the first round of Workshops in the SIR last week. Participant feedback is that they went very well, with people looking forward to the next round of Workshops. A briefing paper on the first round of Workshops will be sent to GC members shortly.

Appreciate your support of the project.

kind regards,

Leon Soste
Operational Manager
Irrigation Futures Project
Department of Primary Industries, Ferguson Rd, Tatura 3616

Letter of Invitation to the Expanded SRC

28 May 2004

Dear ###

Stakeholder Reference Committee, Irrigation Futures Project

On behalf of the Governance Committee of the Irrigation Futures Project, I take great pleasure in inviting you to join the project's Stakeholder Reference Committee.

A set of briefing notes which provide:

- a) Some background to the project and its goals,
- b) Information on how the project will be run, and
- c) An overview of the role of the Stakeholder Reference Committee (including the time commitments likely to be involved), are attached.

If you have any questions, please feel free to contact either myself or the Chair of the Governance Committee (Mr John Pettigrew (0428 367 791)) to discuss any concerns. If you are available to take on the role, would you please confirm that with me, and I will forward information on the current status of the project to you.

Look forward to hearing from you.

Kind regards

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Irrigation Futures Briefing Notes: Stakeholder Reference Committee

Background

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 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.

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 plausible scenarios** facing the region over the next 10-30 years.
 - **Regional response options** via which the community could position itself to meet those challenges.
- (b) Using integrated systems analysis, plus the best available local 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.

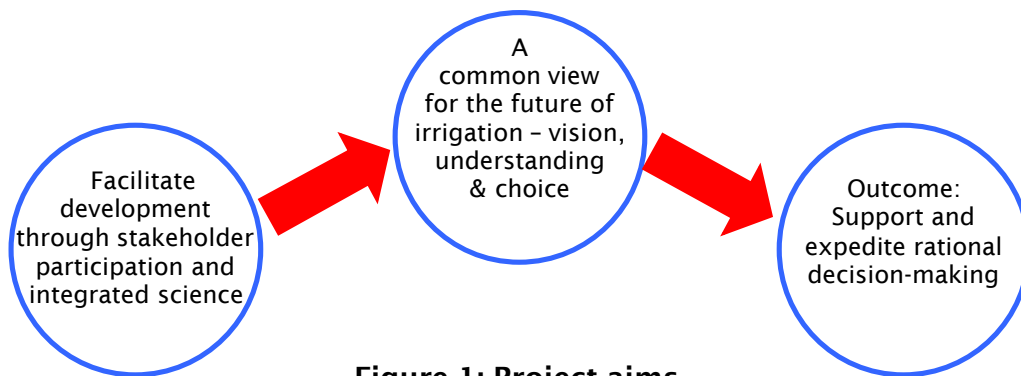


Figure 1: Project aims

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.

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.

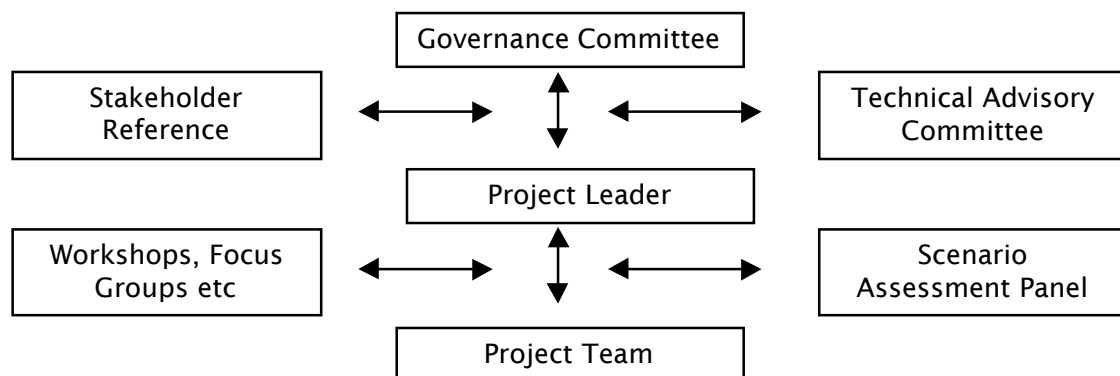


Figure 2: Project organisation

Project Committee	Key Roles
Governance Committee (GC)	<ul style="list-style-type: none"> • Set broad directions • Review project progress and performance • Make investment decisions
Stakeholder Reference Committee (SRC)	<ul style="list-style-type: none"> • Provide guidance on processes for wider stakeholder participation • Consolidate ideas from wider stakeholders • Generate confidence in the regional community
Technical Advisory Committee	<ul style="list-style-type: none"> • Provide expert advice as required
Scenario Assessment Panel	<ul style="list-style-type: none"> • 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 project is broken up into a number of stages as outlined in Table 2.

Project Stage	Timeframe
Stage 2: Vision, Scenario and Options	Jan 2004 - Dec 2004
Stage 3: Assessment of consequences	June 2004 - June 2006
Stage 4: Building consensus	June 2006 - June 2007

Table 2: Project Timetable

Stakeholder participation

Analysis has shown that the key stakeholders are the:

- Primary producers, industry groups and processors who work with, and invest in, the water and land resources of the region,
- Institutional organisations who manage water, land and environmental issues (GBCMA, G-MW, DPI etc), and those who manage community issues (Local Government, Indigenous groups etc),
- Environmental groups whose focus is protection of natural resources.

Input from key 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 Forum schedule for 2004 is attached.

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 specialists** (policy analysts etc) is also anticipated.

The **wider community** will participate through submissions and deliberative forums.

Formation of the Stakeholder Reference Committee (SRC)

The SRC plays an important role in the project. Its function 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. Its membership therefore needs to bring a wide range of skills and experience in managing agricultural systems in a sustainable manner, and also 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. Procedurally, SIRIC will make time within its normal meeting schedule to function as the SRC for the project. Those meeting dates are dealt with in Table 3.

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 1.

Time commitment for 2004

The project team will collate the inputs from each of the four Workshops held in 2004 and report them to the SRC as detailed in Table 3. The SRC will assess the level of participation, and the extent of issues canvassed, to ensure that key community concerns are being heard. It may give guidance to the project team as required. It may also comment on Workshop outputs, and that feedback will be provided to participants as information.

New SRC members will be sent Workshop reports, and may join these reporting/discussion sessions in person. Alternatively, they may participate via tele-conference, with their comments coming to the meeting via e-mail, fax or surface mail. All members should plan to attend the special meeting, dealing with the selection of scenarios and options.

SIRIC meetings are held in the G-MW Water Training Centre in Edgar St, Tatura between 10am and 3pm.

Topic of SRC discussion	Date of SRC meeting
Workshop 1: Vision, values and aspirations	SIRIC meeting (3) 14 May 2004
Workshop 2: Plausible future scenarios	SIRIC meeting (4) 25 June 2004
Workshop 3: Regional response options	SIRIC meeting (5) 13 Aug 2004
Workshop 4: Outcomes	SIRIC meeting (7) 29 Oct 2004
Selection of scenarios and options	Special SRC meeting (date TBA)

Table 3: SRC issues and meeting dates for 2004

As indicated, a special full-day meeting of the SRC (date TBA) will be convened to consolidate all Workshop inputs, and to recommend those

scenarios and *options* to be investigated in detail during Stage 3 of the project. **Members should note that this may require a 2 day meeting.**

Detailed time commitments for the SRC during 2005, 6 and 7 are unknown at this stage, but are expected to be in the order of 2 half-day meetings per year.

Stakeholder Reference Committee Terms of Reference

Irrigation Futures in the Goulburn Broken Catchment

October 2003

Title

The committee will be known as the Stakeholder Reference Committee

Life of the Committee

The committee will operate until the 30 June 2007.

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.

Role of the 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.

Membership

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

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.

Meeting Frequency

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

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.

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.

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

Irrigation Futures Forums Workshop Schedule

Each Forum will meet and participate in four one-day Workshops. Workshops begin at 9.30am for a 10am start and will conclude at 3.30pm.

Lunch and refreshments will be provided. A sitting fee will be available.

	Workshop 1 Values & aspirations	Workshop 2 Scenarios	Workshop 3 Regional Response Options	Workshop 4 Outcomes
Kyabram Forum	Tues 27 th April	Wed 9 th June	Wed 14 th July	Wed 13 th October
Echuca Forum	Wed 28 th April	Tues 8 th June	Tues 13 th July	Tues 12 th October
Seymour Forum	TBA	TBA	TBA	TBA
Cobram Forum	Tues 4 th May	Fri 11 th June	Wed 21 st July	Tues 19 th October
Shepparton Forum	Wed 5 th May	Tues 15 th June	Thur 22 nd July	Mon 18 th October
Benalla Forum	TBA	TBA	TBA	TBA

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment B

Engagement with Stakeholders December 2004

**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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Andrew McAllister – Department of Primary Industries and Cooperative
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Selina Handley, Nicole Hunter and Robert Chaffe – Community
Engagement Network, Department of Sustainability and Environment

Technical Advisory Committee:

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

Governance Committee:

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
John Pettigrew (Chair) – Goulburn Broken Catchment Management
Authority (GBCMA)
Kylie Pfeiffer – Department of Sustainability and Environment

Stakeholder Reference Committee:

Mark Allaway – Department of Primary Industries
Alan Canobie – Numurkah Dairy Farmer
Bruce Cumming – Department of Primary Industries
Steve Farrell – Echuca Dairy Farmer
Peter Gibson – Nanneella Dairy Farmer
Brigitte Keeble – Department of Sustainability and Environment
Peter McCamish – Ardmona Horticulturalist
Ian Moorhouse – Goulburn-Murray Water
Chris Norman – Department of Primary Industries
Russell Pell (Chair) – Wyuna Dairy Farmer
Derek Poulton – Goulburn-Murray Water
Ann Roberts – Goulburn Murray Landcare Network
Nick Roberts – Goulburn Valley 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

Table of Contents

<i>Engagement with stakeholders</i>	5
Participation principles	5
Recruiting people to the Irrigation Futures Forums.....	6
Managing Forum participants.....	6
Under-represented groups.....	7
Report to Stakeholder Reference Committee, May 2004	9
Irrigation Futures Forum - Workshop 1	9
Communication	11
Report to Stakeholder Reference Committee, June 2004	12
Irrigation Futures Forum - Workshop 2	12
Communication	14
The next stage.....	15
Report to Stakeholder Reference Committee, Aug 2004	16
Irrigation Futures Forum - Workshop 3	16
Communication	19
The next stage.....	19
Report to Stakeholder Reference Committee, Oct 2004	20
Workshop 4 & SRC Workshop	20

Engagement with stakeholders

Recruiting stakeholders to participate in the project was a major focus of the early part of Stage 2. This Attachment deals with how individuals from a range of stakeholder groups were:

- Identified, and
- Recruited to participate in this project.

It provides:

- Learnings on the amount of time and effort taken, and (through the SRC reports)
- An indication of the level of participation achieved, and
- An indication of the level of satisfaction with the engagement process.

Details of the engagement processes and outputs are provided in Attachments C and D (respectively) to this Report.

Participation principles

Participation principles and key stakeholder groups are given in Sections 2.1 – 2.3 and 9.1 of the Participation Plan, Milestone Report 1b. Those principles, plus the particular stakeholder groups engaged, and the methods used to engage them, are briefly reviewed below:

- Participants from key stakeholder groups (major primary producers, processors, Govt agencies, environmental and business groups) were invited to contribute to a series of Workshops within their region. These were known as the Irrigation Futures Forums. The invitation to participate was based on the skills-set that the person brought to the Forum.
- The Forum invitation process sought to identify participants from a mix of views, rather than participants who held the same views. This was intended to facilitate:
 - The definition of the range of views to be accommodated within the key stakeholder community,
 - Creativity, as groups stimulated each other, and
 - The building up of inter-stakeholder group trust during the participation process.
- Women and young people were specifically targeted for invitation to these Forums.
- In addition to these Forums, engagement with classically under-represented groups (specifically women, ethnic and Indigenous groups, next generation farmers), was arranged in consultation with appropriate liaison officers.
- Participation by business leaders and visionaries was catered for through an interview process.
- The wider community was encouraged to participate through submissions called for in the local press.

Recruiting people to the Irrigation Futures Forums

Initial guidance on individuals from within key stakeholder groups, who should be invited to participate in the Irrigation Futures Forum Workshops, was provided by the SRC. As those people were contacted, they also recommended other capable and experienced people within their region, who were subsequently invited.

That recruitment process involved around 300 cold-contact phone calls. In terms of project learnings which may be useful for others, the following points are noted:

- Recruiting that number of people to be involved in the project through cold-contact phone calls was found to require a considerable amount of emotional energy.
- Only about 10% of contacts had “signed-up” within the timeframe required. This meant that a second round of phone calls was needed.
- The final percentage of invitees actually participating in Forum Workshops was around 40% of those contacted.

In addition to phone calls, the project team also conducted around 20 presentations to stakeholder groups (Water Service Committees, Implementation Committees, Peach and Apricot Association, United Dairy Farmers discussion groups etc), as a part of that recruitment process.

The other method used to invite people was through the newspaper. A press release to launch the project contained an invitation for people to register their interest in the Forums. This led to a small number (less than 10) of good quality people being added.

The time and the effort required to invite people to participate (ie identify umbrella groups, contact officers, identify individuals, find phone numbers, contact them, write to them, record their details etc), was considerable. It is suggested that groups attempting a similar-sized exercise should allow at least 2 – 3 months for this section of the work.

Managing Forum participants

Forum participants were asked to commit to a series of 4 full-day Workshops during 2004. Those Workshops were held at a number of regional centres to minimise travel for participants. Centres were Kyabram, Echuca, Cobram and Shepparton (in the lower catchment), Benalla (in the middle catchment) and Seymour (in the upper catchment). Workshops were usually conducted at about 6-8 week intervals to give people time to think between sessions. To give some idea of the level of commitment that the project team was able to achieve, the Kyabram and Echuca groups actually requested an extra Workshop so that they could achieve a better output for Workshop 3!

The Workshops at Benalla and Seymour were run on a different schedule to the other locations. This was done specifically to cater for particular local requirements. It is felt that this contributed to the success of the engagement process at those locations.

In terms of post-Workshop communication, participants were sent the outputs (text, photographs, drawings etc) from each Workshop, within about 2 weeks of involvement. That correspondence also contained a reminder letter of the next Workshop (date, time, location).

The project team also took the view that relationship building was an important element of effective stakeholder engagement. As a result, once the above mailout had been done, each participant received a follow-up phone call between Workshops 1-2 and Workshops 2-3. That call allowed people to express their thoughts in regard to Workshop directions, processes, outputs etc privately. It also kept the initial contact “warm”, rather than simply dropping contact at the end of a given Workshop. As indicated, it was felt to be an important part of relationship-building.

The point being made here is that post-recruitment stakeholder management also requires considerable time and resources.

In terms of levels of participation: Participant numbers in the Workshops generally ranged from 15-25 people. Continuation rates were around 70-90% for the series across all Workshops (see the SRC reports below). This was very pleasing to the project team, and is felt to be linked to both the quality of the Workshop program, and the effort put into relationship building.

Participation rates by women and young people (ie under 35 years of age) averaged around 20% for all Workshops. That diversity contributed positively to the Workshop program and the quality of the output.

Under-represented groups

Workshops (such as those above) do not necessarily lend themselves well to participation by certain stakeholder groups. Ethnic communities may suffer from language difficulties, women have to look after families etc. In order to cater for input from some of the classically under-represented groups within the stakeholder community, the project team undertook a number of special programs.

Liaison Officers within DPI identified one growing, but under-represented group within the region as the ethnic community involved in horticulture. During the recruitment process for the Forum Workshops, the project team came in contact with officers of the umbrella organisation for this group. Discussions were initiated in regard to running a half-day Workshop, which gathered the perspectives of people in this community. The interest in being involved is certainly there, and a suitable time is being sought. The plan is to run a Workshop on their time, and their turf.

It was also considered vital that next-generation farmers contribute to the planning for the future of irrigated agriculture in the region. Unfortunately, when young farmers were contacted to participate in the Forums, they were often too busy establishing their farming enterprise to be involved. Another vehicle for obtaining this input was to engage with undergraduate students involved in agricultural programs within the region. Through contacts with the Young Irrigators network, contact was made with students and staff at Melbourne University’s Dookie Agricultural College. As a result, a half-day Workshop which engaged with 2nd and 3rd year students in the Bachelor of Agriculture program at Dookie, was conducted. This attracted 15-20 students, and details are provided in Attachment E.

In regard to engagement with the regional Indigenous community, the project team was fortunate to have access to Indigenous Liaison Officers. They provided the necessary contacts and helped set up meetings with representatives of the Indigenous community. Discussions have commenced, and while there is a willingness to contribute to the planning and management of land and water resources, there are some significant

challenges to be overcome. There are protocols to be established in terms of who can speak for each of the several groups in the region in relation to country. There is also a lack of capacity within the Indigenous community to contribute to more than the definition of high-level aspirations (clean water, more birds and fish etc).

Those issues need to be addressed if effective participation is to be achieved. Unfortunately, the fulfilment of those needs is outside the scope, resources and timeframe of this project. As a result they have been referred to other agencies.

The project will continue to communicate with the regional Indigenous community.

Finally, in order to ensure that the project incorporated the strategic directions of major industries within the region, the project team has conducted interviews with a number of company CEO's and leading edge farmers. Guidance on the selection of those leaders was provided by the SRC. Their input is provided in Attachment E.

Report to Stakeholder Reference Committee, May 2004

Irrigation Futures Forum - Workshop 1

Attendance at Workshops

Location	No. attendees	No. registrations	% attendance	% women	% under 35 years old
Kyabram	21	23	91%	24%	19%
Echuca	19	23	83%	26%	26%
Cobram	16	31	52%	20%	25%
Shepparton	30	37	81%	20%	17%
Total	86	114	75% overall	22%	21%

- Attendance at Workshops was generally high (80% +). The exception was Cobram where we had 14 apologies, mostly work-related (last minute calls to budget meetings, audit meetings etc). These are things that we cannot control, but we will give participants a reminder call a few days before their next Workshop.
- The % of women is reasonably high (20% +), but could be higher.
- Likewise, we have achieved about 20% participation from people under (about) 35 years old (taken as a next generation person). We will try to increase this level of involvement.
- A reasonable balance of participants was achieved as is summarised below. Note that an irrigator could also wear a Landcare and a L&W manager hat.

Industry sector	Dairy including proc'g	Horti incl'g vegetable & viticulture	Mixed farming incl'g crop & grazing	Environ't incl'g Landcare & LAP	Business & investm't	L&W Mgrs G-MW, CMA & DPI/DSE	Comm'ty Mgrs incl Local Gov & Counsel
% attend	50%	20%	13%	27%	13%	27%	12%

- The attendance from Local Govt is limited to the SIR at this stage. While Local Govt in the middle and upper catchment have been contacted a number of times, they have declined to be involved at this stage (with the late exception of Murrindindi).

Participant feedback

Attendees received a follow-up phone call to keep the contact "warm" and to allow them to air their post-Workshop thoughts. A number of quotes are given below:

- "... the history wall was good....process OK first up...."
- "...I was surprised at how green everyone was (with respect to) the damaging impact of the unsustainable price of water.. need more focus on solutions and how it will happen.."
- "...really happy with the day....brought home the importance of the future....".
- "...facilitators excellent....spent a lot of time on values...productive?...can see where it was going....looking forward to a wonderful opportunity...."
- "...good warm-up session.... at the end of the second day, we should be answering the basic questions....will speak up if I feel that we are missing things..."

Key messages and outcomes

The detailed notes from each of the Workshops are attached. That input has been consolidated to produce the following key messages from the past for the future:

- Participants overwhelmingly want to achieve an accountable balance between social, economic and environmental aspects of development. That will require a thorough scenario assessment to minimise the risk exposure associated with change.
- The management of social impacts is important. As a community, we have generally been able to manage change. The future is likely to see bigger holdings, with an increase in corporate involvement.
- Farmers must be innovative (understanding that they operate in an international market), expect to move to greater diversity of production and farm types (from agricultural to hobby), and produce higher yields with less water.
- The community needs to value its farmers and its food production processes.
- Water managers need to work toward an integrated supply system from source – plant.
- Irrigation practise needs to be better linked to land-use capability.

The top four personal/community **values** held by participants were:

Value	Prosperity incl'g profitability	Relationships incl'g co-op'n	Justice incl'g fairness	Integrity	Security
%	15%	11%	11%	9%	7%

Participant aspirations for the future centred around:

- Achieving prosperity with balance.
- Enhancing productivity through innovation and diversity.
- Valuing and improving our environment.
- Maintaining vibrant communities.
- Creating opportunities for young people and new farmers.
- Community leadership and the ability to manage change.
- New & improved water management systems. Associated R & D.
- Valuing food production practices and farmers as stewards of the resource.

Arrangements for non-attendees

A number of registrants could not attend the first Workshop for a variety of reasons. To ensure that they are able (and motivated) to continue, the following steps have been taken:

- They have been sent a project folder and Workshop notes, and
- Received a phone call to examine whether they can attend an alternate Workshop, and/or encouraged to join the next Workshop.

Communication

Workshop participants will receive Workshop notes from their own group (to confirm what was discussed), and also notes from all other groups (to learn from each other).

The wider community will be kept informed through a post-Workshop update sheet which will be mailed out via existing newsletter networks, and a press release.

Preparation for the next round of Workshops

- Seymour and Benalla Workshops have been postponed for “about a month” due to a late grape harvest, and the lack of a water-users network respectively. At this stage it seems likely that sufficient numbers for Seymour are achievable. Separate arrangements for the small number of irrigators on the Broken may have to be made.
- Workshop #2: Planning for the Scenarios Workshop is currently underway.

Report to Stakeholder Reference Committee, June 2004

Irrigation Futures Forum - Workshop 2

Introduction

The object of this Workshop was to identify plausible future scenarios for irrigation (and land-use) in the Goulburn Broken catchment over the next 30 years.

The process used by the facilitators required participants to:

- Identify the range of external drivers (ie issues over which we have limited control), which were operative in the past. This was done using the history wall that they had developed in Workshop 1.
- Chose the 4 - 5 external drivers likely to be most relevant to the future.
- Work in small groups of 4 - 6, and use those drivers (with a credible story-line) to develop a plausible scenario for the next 30 years.
- Represent those scenarios graphically, similar to the history wall that they had created in the first Workshop.
- Present their small group scenario to their Workshop group.
- Analyse their Workshop outputs to identify the similarities and differences between the scenarios developed so far.
- Identify "gaps" in the list of drivers considered and the scenarios developed, which needed further attention.
- Provide an evaluation of the Workshop, to be used in subsequent planning.

During the review of Workshop 1, the project team noticed that history wall had worked particularly well. The process allowed participants to revisit the last 30 years of history using dot points on a time-line, without being encumbered by the need for correct sentence structure, punctuation, grammar etc. People had participated very actively. In planning for Workshop 2, the project team felt that the continuation of such a graphical process would allow participants to focus their energies on the creative elements of scenario development. We think that it was a good decision. An example from the Shepparton Workshop is attached.

An on-going concern for participants (and others) is that the project must deal with issues which are relevant to the region, particularly in relation to water. It is noted that the project is structured so that participants always have the opportunity to define those issues. In the context of this Workshop (Scenario building), participants identified the drivers which they saw as being relevant to the future, and then used those to build plausible future scenarios.

The object of this report is to provide SRC members with a brief overview of:

- The levels of participation in the second round of Workshops within the Shepparton Irrigation Region (SIR),
- The key outcomes generated by those Workshops, and
- The direction of future work.

Levels of participation within the SIR

Location	No. actual attendees	No. possible attendees	% attendance	% women	% under 35 years old
Kyabram	22	24 (not incl 5 apol)	92%	18%	9%
Echuca	14	16 (not incl 3 apol)	88%	29%	21%
Cobram	23	24 (not incl 3 apol)	96%	26%	26%
Shepparton	28	32 (not incl 6 apol)	88%	36%	29%
Total	87	96 (not incl 17 apol)	91%	28%	22%

TABLE 1

Note that the Workshops are limited to the SIR at this stage. Arrangements for Seymour and Benalla are covered in Section 6 of this report. From Table 1 it can be seen that:

- Repeat attendance at Workshops has been excellent (80% - 90%). Very few people appear to have dropped out of the Workshop process (ie not registered an apology for non-attendance).
- The % of women varies (18% – 36%), but reflects the fact that we have specifically sought to incorporate women in the participation process.
- Likewise, participation from “young” people varies from 9% - 29% with an average of 22%. This again reflects the fact that we have attempted to incorporate their views in the Workshop process. (In this context, a “young” person is taken as under (about) 35 years old, and therefore considered a next generation person). It is noted that a separate process for young people is also being planned.

The balance of participants at Workshop 2 is shown in Table 2. It is noted that:

- Over 70% of participants are primary producers (ie either dairy or horti or mixed), which reflects the project’s commitment to engaging stakeholders who are “on the ground”.
- Environmental groups such as the Goulburn Valley Environmental Group (GVEG) are represented, along with those involved in Landcare.
- Business interests are represented either directly by financial consultants or by those who hold a company directorship.
- Cultural and heritage interests, centred around consultation with both the Indigenous community and the ethnic community involved in horticulture, will be handled by a separate process.
- Finally, it is noted that a person may wear a number of “hats”, ie primary producer and Landcare and Water Services Committee. Hence, the sum of the percentages shown in Table 2 is greater than 100%.

Industry sector	Dairy including proc'g	Horti incl'g vegetable & viticulture	Mixed farming incl'g crop & grazing	Environ't incl'g Landcare & LAP	Business & investm't	L&W Mgrs ie G-MW, CMA & DPI/DSE	Comm'ty Mgrs incl Local Gov & Counsel
% attend	48%	20%	10%	21%	14%	28%	14%

TABLE 2

Key outputs

- A (first draft) range of scenarios has been defined by each Workshop group.
- All Workshop groups reviewed their scenario outputs to see whether they were sufficiently comprehensive to go to the next stage. Satisfaction was mixed. Participants at Kyabram felt that they would like to revisit their work to expand the range of scenarios. Other groups were reasonably satisfied (or were too tired to take on a further challenge).
- Taking these concerns on-board, the project team decided to encourage participants to continue their scenario development efforts between Workshops, and to allow an extra half-day at the next Workshop to ensure that participants were satisfied with their efforts.

The project team will also analyse the scenarios developed so far, to attempt to define gaps which have not been well covered. The team will also consult a range of experts to attempt to make the range of scenarios as comprehensive as possible. Finally, SRC members will examine the scenarios developed in order to make a final selection of those which go forward for more detailed investigation.

At this stage, the project team is confident that we will have a sufficient basis to generate good ideas for the next stage.

Participant satisfaction and feedback

Participant satisfaction with the Workshop process was mixed, ranging from medium to high. The main concerns were that people could not yet see the outcome (which produced some uncertainty about the process), and the strong concern over whether “anyone was listening”.

Communication

Workshop participants will receive Workshop notes from their own group within 2 weeks of their Workshop. This will comprise:

- The list of external drivers developed (without any sorting at this stage).
- A print of the scenarios developed.
- The list of similarities, differences and insights from the scenario comparison process.
- An invitation to continue their thoughts on scenario development, for discussion at the next Workshop, and
- Homework to be done in terms of thinking about possible response options.

Participants (including those who did not attend this round) will also receive a follow-up phone call to allow them to air their thoughts on the process so far.

Participants may also receive the scenarios from other groups. An assessment has to be made about information “over-kill”.

wider community will be kept informed through:

- A brief media release to the regional newspapers, and
- A new project update sheet which will be mailed out via existing newsletter networks.

The next stage

- The next round of Workshops in the SIR are currently being planned. They will finalise scenarios (as discussed) and start to consider response options.
- The first round of Workshops at Seymour (for Goulburn diverters) will commence on 23 June. At this stage about 15 participants have registered from a range of industry sectors.
- Advice from locals at Benalla has been to hold the commencement of Workshops in that region. This advice has been taken, and a start around early August is anticipated. This throws the process out somewhat, but it is still our intention to engage as widely as possible within the region.
- The work with Indigenous and ethnic communities, plus young people is planned for the period August – September 2004.

Report to Stakeholder Reference Committee, Aug 2004

Irrigation Futures Forum - Workshop 3

Introduction

Under the Terms of Reference for the Stakeholder Reference Committee (SRC), the role of the SRC 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.

The object of this report is to provide SRC members with a brief overview of:

- The levels of participation in:
 - The third round of Workshops within the Shepparton Irrigation Region (SIR), and
 - The second round of Workshops at Seymour.
- The key outcomes generated by those Workshops, and
- The direction of future work.

Objectives and program for Workshop 3

The object of this Workshop was to identify the options by which we can respond to plausible future scenarios for irrigation (and land-use) in the Goulburn Broken catchment over the next 30 years.

The process used by the facilitators was quite structured. It required participants to identify the:

- **Internal drivers** (ie issues over which we have control), which were operative in the past. This was done using the history wall that they had developed in Workshop 1.
- **Strengths and weaknesses** of the catchment at the moment.
- **Threats and opportunities** presented by one of the Scenarios from Workshop 2, that they wished to pursue further.

Options generation: Then, working in small groups of 4 - 6, the task was to develop a range of options by which we (as a catchment community) could respond to the chosen scenario, taking into account the strengths and weaknesses, threats and opportunities identified above.

Formulation of Response Packages: Finally, participants were asked to put some structure into their list of response options, by grouping them into "packages" of related actions. An example from one of the Workshops is attached as Appendix 1.

The Workshop concluded with an evaluation of the day to be used in subsequent planning.

As a measure of the level of stakeholder commitment being achieved, two of the four groups within the SIR have asked for an additional half-day Workshop to complete their response packages! This is certainly encouraging to the project team.

The SRC is reminded that the project team took advice from stakeholders, and shifted the Workshop schedule for both Seymour and Benalla to accommodate local needs. As a result, the second and third round of Workshops at Seymour have just been completed. The commencement of the Workshop series at Benalla are currently planned for early September.

Levels of participation

Location	No. actual attendees	No. possible attendees	% attendance	% women	% under 35 years old
Kyabram	20	22 (not incl 4 apol)	91%	20%	15%
Echuca	12	15 (not incl 5 apol)	80%	33%	17%
Cobram	13	16 (not incl 7 apol)	81%	23%	31%
Shepparton	23	27 (not incl 8 apol)	85%	30%	22%
Seymour (Workshop 2)	16	22 (not incl 8 apol)	73%	0%	25%
Total	84	102 (not incl 32 apol)	82%	21%	21%

TABLE 1

From Table 1 it can be seen that:

- Repeat attendance at Workshops is still quite high (70% - 90%), with the average still above 80%.
- Non-attendance appears to be due to work commitments such as pruning at Cobram, meetings and family needs etc. The poor turnout at Seymour may also have been linked to communication problems.
- Unfortunately, the % of women varies markedly (0% – 30%). At this stage, there appears little that we can do except to encourage those women already in the system to keep participating.
- Likewise, participation from “young” people varies from 9% - 29% with an average of 22%. Again, we just have to pursue those young people who are already in the system, and note that a separate process for young people at Dookie is also being planned.

The balance of participants at Workshop 3 is shown in Table 2. It is noted that:

- Around 60% of participants are primary producers (ie either dairy or horti or mixed farmers), so the project has maintained its focus of engaging people “on the ground”. The percentage of primary producers has dropped slightly from Workshop 2. This is perhaps due to farmers taking holidays.
- Again, it is noted that a person may wear a number of “hats”, ie they may be a primary producer and a Landcare person, and function on a Water

Services Committee. Hence, the sum of the percentages shown in Table 2 is greater than 100%.

Industry sector	Dairy including proc'g	Horti incl'g vegetable & viticulture	Mixed farming incl'g crop & grazing	Environ't incl'g Landcare & LAP	Business & investm't	L&W Mgrs ie G-MW, CMA & DPI/DSE	Comm'ty Mgrs incl Local Gov & Counsel
% attend	26%	24%	8%	19%	7%	32%	6%

TABLE 2

In conclusion, the attendance data indicates that:

- Stakeholders, particularly at the primary producer level, are continuing to participate.
- Efforts to continue the participation of women and young people need to be made.

Key outputs

- A (first draft) range of options by which the region might respond to a particular scenario has been defined by each Workshop group.
- All groups have been encouraged to continue their options development efforts between Workshops. Some groups (Echuca and Kyabram) have asked for an extra half-day Workshop to complete their efforts.
- All Workshop groups will review their response options against a second scenario, to see whether they are reasonably robust.

Analysis of the Workshop scenarios developed so far has shown that most of them cluster around a small number of plausible futures:

- The Greens gain more power in Government,
- There is less water for agriculture and more for the environment, and
- More arable land being taken up by lifestyle farming.
- Growth in Asian markets through either GM products or “clean green” produce, provide an opportunity for short – medium term growth of agricultural exports.

These may be coupled with disasters of various types (dam failure, animal disease, droughts fire and flood).

An interesting innovation was the possible increase in geo-political and trade blocks based on religious belief systems, which could have an impact on trade volumes, product quality and product preparation requirements.

Scenario analysis is continuing. To supplement these Workshop scenarios, the project team will also consult a range of experts and key industry thinkers to attempt to make the range of scenarios as comprehensive as possible. A shortened list of scenarios will be provided to the SRC for final selection of those which go forward for more detailed investigation.

The target date for this activity is the middle of November (either 11 - 12 Nov OR 18 - 19 Nov), and may require two days. A date will be set at this SRC meeting.

At this stage, significant analysis of the response options has not commenced.

Participant satisfaction and feedback

Participant satisfaction with the Workshop process is still cautiously optimistic. Participants are finding the work more complex than they may have considered, and frustration with the difficulty in producing the “answer” may cause some frustration.

Communication

Workshop participants receive Workshop notes from their own group within approx 2 weeks of their Workshop. This comprises:

- Workshop notes, an example of which is attached as Appendix 1, and
- Homework to be done for the next Workshop.

We are still attempting to phone all participants (including those who did not attend this round) between Workshops, to allow them to air their thoughts on the process so far.

The wider community is kept informed through:

- A brief media release to the regional newspapers (see this week’s Country News), and
- A new project update sheet, which will be mailed out via existing newsletter networks.

The next stage

- Special programs for
 - women and ethnic communities in horti,
 - young people and
 - Indigenous communities to be planned and delivered.
- Expert interviews to be conducted.
- Workshop 4 (Oct) to be planned and delivered. Finish response option packages, consider the consequences of implementing a given package, evaluate those consequences against our original aspirations (Workshop 1), identify indicators which we should use to measure those consequences.
- Handling Benalla – planning and delivery
- Workshop at which the SRC selects scenarios and options for further investigation, to be planned and delivered. Target early – mid Nov.
- Workshop to report SRC selections back to Forum participants to be planned and delivered. Target late Nov.

Report to Stakeholder Reference Committee, Oct 2004

Workshop 4 & SRC Workshop

Introduction

This report presents

- A brief overview of Workshop 4,
- Plans for the upcoming SRC Workshop on the 12th and 19th of November.

Objectives and program for Workshop 4

The object of this Workshop was to develop further detail within specific themes (such as education, land-use planning, water security etc) of the options packages.

The process used was to allow participants to

- Identify the themes within the options packages, and then to
- Work in small groups to develop greater detail on the actions required to achieve target outcomes within that theme.

Participants also checked their options against their original values and aspirations to ensure that they were consistent, and to identify any gaps (plus actions as required).

A short presentation then covered where their information was going, and how the next Stage of the project was structured, plus how they could have on-going involvement with the project through the Technical Working Group.

The Irrigation Futures Prize was also outlined, and was well received by participants.

The Workshop concluded with an evaluation of both the day, and the series as a whole.

That concludes the Workshop series at all 6 locations – Echuca, Kyabram, Shepparton, Cobram, Seymour and Benalla.

Levels of participation

Location	No. actual attendees	No. possible attendees	% attendance	% women	% under 35 years old
Kyabram	15	16 (not incl 7 apol)	94%	27%	7%
Echuca	10	12 (not incl 7 apol)	83%	30%	20%
Cobram	9	12 (not incl 10 apol)	75%	33%	33%
Shepparton	22	26 (not incl 5 apol)	85%	36%	23%
Seymour	15	18 (not incl 4 apol)	83%	13%	20%
Benalla	13	14 (not incl 7 apol)	93%	23%	23%
Total	84	98 (not incl 40 apol)	86%	27%	19%

TABLE 1

From Table 1 it can be seen that:

- Attendance at all locations is still quite high (75%+), with the average still above 80%.
- A large number of apologies were received due to farmers cutting hay.
- The % of women is around 25 – 30%.
- Participation from “young” people is around 20%.

The balance of participants at Workshop 4 is shown in Table 2. It is noted that:

- Around 50% of participants are primary producers (ie either dairy or horti or mixed farmers), so the project has maintained its focus of engaging people “on the ground”.

Industry sector	Dairy including proc'g	Horti incl'g vegetable & viticulture	Mixed farming incl'g crop & grazing	Environ't incl'g Landcare & LAP	Business & investm't	L&W Mgrs ie G-MW, CMA & DPI/DSE	Comm'ty Mgrs incl Local Gov & Counsel
% attend	20%	15%	14%	7%	12%	15%	15%

TABLE 2

In conclusion, the project team can claim that:

- It has delivered the 4 Workshop program at 6 regional locations as outlined in the Participation Plan for the project.
- Participation from the key stakeholder groups (particularly primary producers), has remained high throughout the Workshop series.
- Participants from a broad cross-section of views have been involved.
- Participation from under-represented groups (women and young people), has been facilitated.

This means that the goals outlined in sections 2.1 – 2.3(a) and 4.1 – 4.3 of the Participation Plan have been delivered. This is certainly pleasing to the project team.

Analysis of outputs from Workshop 4

Analysis of outputs from Workshop 4 has not been completed at this stage. Some feedback will be provided at the SRC meeting.

Preparation for the SRC Workshop

The project team plans to distribute notes from all 4 Workshops to SRC members at the October SRC meeting. This is intended to allow members to become familiar with Workshop outputs before the 2 day Workshop on the 12th & 19th of Nov.

An indication of the Workshop method and schedule will be presented.

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment C Irrigation Futures Forum Workshops - Processes December 2004

**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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Professor Bill Malcolm, Derek Poulton, Greg Roberts, Ken Sampson,
Dr John Wolfenden

Governance Committee:

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
John Pettigrew (Chair) – Goulburn Broken Catchment Management
Authority (GBCMA)
Kylie Pfeiffer – Department of Sustainability and Environment

Stakeholder Reference Committee:

Mark Allaway – Department of Primary Industries
Alan Canobie – Numurkah Dairy Farmer
Bruce Cumming – Department of Primary Industries
Steve Farrell – Echuca Dairy Farmer
Peter Gibson – Nanneella Dairy Farmer
Brigitte Keeble – Department of Sustainability and Environment
Peter McCamish – Ardmona Horticulturalist
Ian Moorhouse – Goulburn-Murray Water
Chris Norman – Department of Primary Industries
Russell Pell (Chair) – Wyuna Dairy Farmer
Derek Poulton – Goulburn-Murray Water
Ann Roberts – Goulburn Murray Landcare Network
Nick Roberts – Goulburn Valley 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

Table of Contents

Irrigation Futures Forum Workshops – processes.....	5
Workshop planning	5
Workshop 1	6
Workshop 2	6
Workshop 3	7
Workshop 4	8
Example Workshop Running Sheet.....	11
Irrigation Futures Prize	22

Irrigation Futures Forum Workshops – processes

The major stakeholder engagement activity for Stage 2 of this project was the Irrigation Futures Forum Workshop series. This Attachment deals with the:

- Planning, design and processes for running those Forum Workshops.

It provides examples of the:

- Overall Forum Workshop series “Roadmap”,
- Aims for each of the 4 Forum Workshops, and an indication of how those aims were achieved. (The Running Sheets for Workshop 1 are included in this Attachment. They provide an indication of the level of planning involved.)
- Irrigation Futures Prize launched by the project team, in order to value and encourage the development of innovative ideas within the region.

Examples of Workshop outputs for one of the Workshop groups (Kyabram) are presented in Attachment D.

Workshop planning

Workshop Planning for the series as a whole was carried out during Stage 1. This section deals with the planning for each of the 4 Forum Workshops.

In preparation for Stage 2, the project team invited facilitators from within the Community Engagement Network of the Department of Sustainability and Environment (DSE), to join the project. The project team also decided to include these facilitators in the planning for each of the Workshops. This was felt to be a good decision. It allowed the facilitators to:

- understand exactly what the project team was trying to achieve within a given Workshop, and then to
- bring their experience to the design of the processes to achieve those target outcomes.

The planning for a given Workshop often involved 4 - 6 iterations through a team of 4-5 people, over a period of 2-3 weeks. This allowed the team to refine the achievable goals, and to define / test the Workshop methodology. The team also held a debrief meeting after the first Workshop in each round. This allowed program weaknesses to be identified, and further refinements to be made.

A brief overview of the objectives and methodology for each Workshop is given below:

Workshop 1

In terms of rational aims, Workshop 1 sought to:

- Set the scene for the project, so that participants understood the purpose, boundaries, structure & processes of the project & the Forum Series. The “Roadmap” for the series is provided in this Attachment.
- Allow participants to identify what is important to them (issues, values and aspirations) in this catchment.

In terms of experiential aims, the project sought to:

- Develop a growing sense of trust amongst participants,
- Develop enthusiasm for the project, so that people would continue to participate, and
- Provide participants with an opportunity to get things off their chest, in relation to the future of water and irrigated agriculture in the region.

To achieve these aims the project used:

- a well structured ice-breaker to get people used to working closely with each other,
- the development of an illustrated history wall. This required participants to revisit the past in order to glean key messages for tackling the future, and to further develop their working relationships,
- exercises which required people to elucidate their values, and the aspirations which they had for the region.

Participant feedback was that the history wall was very valuable in achieving perspective, and also in terms of capturing local history. As a result, the outputs will be passed on to the local historical society. As a matter of course, participants found the session on values challenging, and hard to integrate with the project. The project team therefore resolved to make sure that we closed the loop in regard to the assessment of response options (Workshop 4), to ensure that they were consistent with values.

Workshop 2

In terms of rational aims, Workshop 2 sought to:

- Assist participants to understand the concept of external drivers (ie issues outside the control of the region, which had an impact on the region, such as FTA's etc)
- Identify the external drivers relevant to irrigated agriculture in this region, and, from those external drivers
- Create 6-10 plausible, different scenarios for 2035.

In terms of experiential aims, the project sought to:

- Develop within participants an awareness of, and respect for, others right to divergent views,
- Stretch their minds, to consider futures which were not necessarily wished for, but plausible,
- Develop a sense of confidence that the relevant issues were being raised and incorporated, and
- To further develop a sense of team, with encouragement to correspond outside the Workshops Series.

The approach used here was to:

- Identify, as a whole group, the external drivers for change, and then
- In small groups, to develop a plausible storyline for the positions that the external drivers (which they saw as being most important), could take in the future.
- That scenario development was illustrative, rather than sentence-driven, which continued the idea used in the development of the history wall.

Participant feedback was that the building of scenarios was particularly difficult because the drivers could go anywhere, and the exercise seemed to be somewhat futile. They were also inclined to create their preferred future, rather than creating a range of plausible (but not necessarily palatable) scenarios for the future. The challenges they experienced were reasonable given the complexity of the task, and their inexperience in this field.

As a result, the project team spent some time in Workshop 3 to assure participants that:

- One aim of the exercise was for people to realise that we cannot predict the future – it is governed by too many variables, but
- We can generate a range of plausible future scenarios using the drivers that we have chosen. These can then be used to test the robustness of our response options under a range of future operating environments.

Workshop 3

In terms of rational aims, the project team sought to:

- Assist participants to understand the concept of internal drivers (ie things over which the regional community had control),
- Identify the internal drivers which had been used successfully by the region in the past,
- Identify strengths and weaknesses of the region at the moment, plus threats and opportunities created by a given scenario,
- Develop Regional Response Option Packages (RROP) for that scenario,

- Check that RROP against second scenario (time permitting).

In terms of experiential aims, the project sought to:

- Ensure that participants felt confident that their scenarios were 'good enough',
- Stretch participants in relation to how we could respond as a region/catchment,
- Develop within participants the sense that their packages were robust and useful.

The process used by the facilitators was quite structured. It required participants to identify:

- The internal drivers which were operative in the past, plus the strengths and weaknesses of the catchment at the moment. This was done as a whole group.
- Then, in small groups, identify the threats and opportunities presented by one of the Scenarios from Workshop 2, that they wished to pursue further.
- Continuing in small groups, the task was to develop a range of options by which we (as a catchment community) could respond to the chosen scenario, taking into account the strengths and weaknesses, threats and opportunities identified above.

Participant feedback (and our analysis) showed that generating substantial response options was a very difficult process. This is understandable because the issues are extremely difficult to resolve. As a result, the Kyabram and Echuca groups asked for an extra session to deal with this issue. This also led the project team to restructure what was planned for Workshop 4, to allow participants more time to develop a greater level of substance in their response options.

Workshop 4

The rational aims for Workshop 4 were to:

- Generate further detail within specific themes of their options packages (such as education, land-use planning, water security etc).
- Identify any conflict or gaps between their values & aspirations, and their suggested options (and if so, how we might deal with them),
- Understand the next steps in Stage 2, the plan for Stages 3 and 4, and how they could be further involved if they wished,
- Carry out a formal evaluation of the overall workshop series.

The experiential aims were that participants felt:

- confident they had produced robust and worthwhile outputs,
- a sense of 'finality' to their formal commitment to the intensive part of Stage 2 (but not necessarily to the project if they wished to continue their formal commitment),
- comfortable and confident that Technical Working Group will put more rigour into their options during Stage 3, with both transparency and integrity.

The process used was to allow participants to:

- Identify the themes within the options packages, and then to
- Work in small groups to develop greater detail on the actions required to achieve target outcomes within that theme.

As a whole group, participants then checked their options against their original values and aspirations to ensure that they were consistent, and to identify any gaps (plus actions as required).

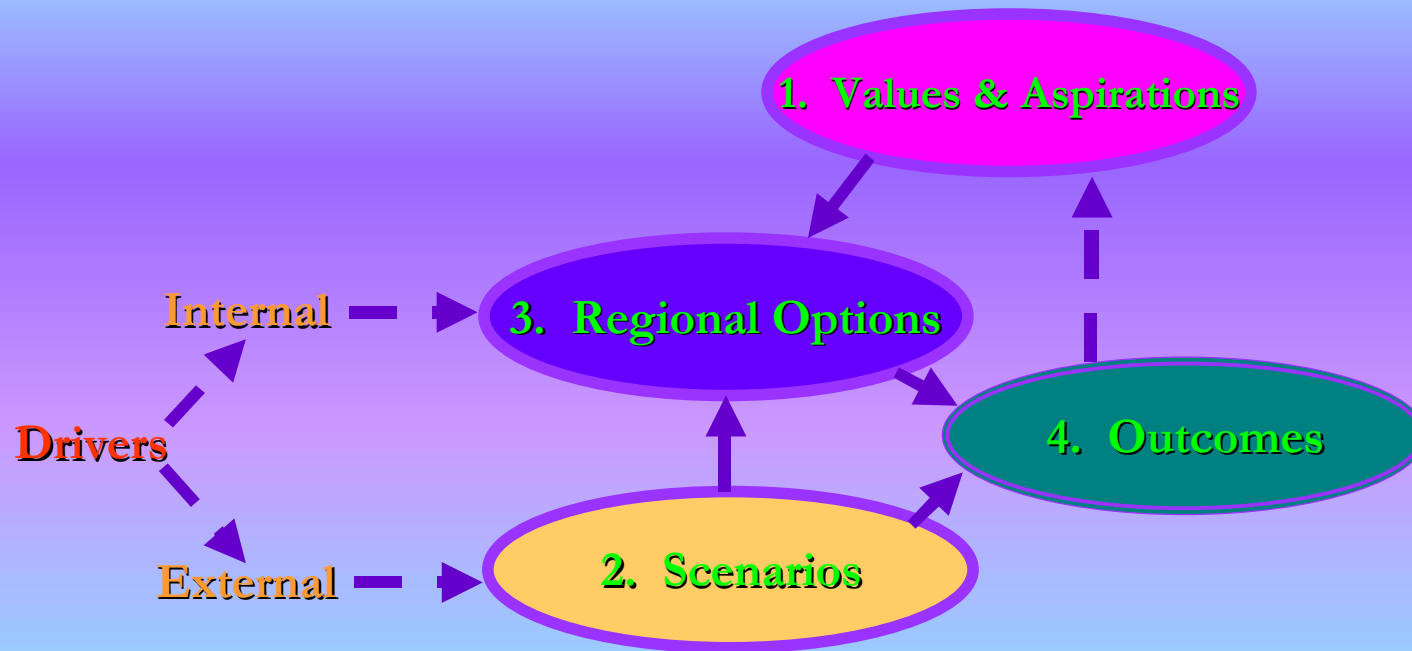
An interactive discussion was then held to clarify where their information was going, how the next Stage of the project was structured, and how they could be involved through the Technical Working Group.

To recognise and value innovation, the project team announced details of an Irrigation Futures Prize. This was well received by participants. Details are provided in this Attachment.

The Workshop concluded with participants completing a written evaluation of the series as a whole.

Participants were then presented with a commemorative mug to acknowledge their contribution to the project. The project team has also sent each participant a signed Christmas card with thanks and well-wishes.

Irrigation Futures - Stage 2 Roadmap



Example Workshop Running Sheet

Workshop 1: Values and Aspirations

Rational Aims:

- Understand the purpose and boundaries of the Irrigation Futures Project, the structure & process of the project & Forum Series
- Identify what is important to people (issues, values and aspirations) in this catchment
- Begin to develop a meaningful vision statement for this group that they 'own', developed with recognition of the many existing visions (GMW, CMA, LAP, etc.), that may alter as the workshop series progresses ie. dynamic process
- Introduce foresighting skills

Experiential Aims:

- Growing sense of trust amongst participants
- Warmed up and enthusiastic about the project, that leads to participants wanting to come back to Workshop 2
- Opportunity to get things off their chest, and we listen

Outline for the session

9.30am	Arrival and Tea/Coffee
10.00am	Welcome, The project, & Where we are heading
11.00am	Who's here
11.30am	Session 1: Learning from the past
12.30pm	Lunch
1.30pm	Energiser
1.45pm	Session 2: What's important for the future
3.00pm	Preparation for next workshop and Evaluation
3.30pm	Close

Equipment required:

Whiteboard & Markers	Blue and pink highlighters	Digital
Camera		
Aims & outline on BP	Parking Bay on BP	Folders
Laminated roadmap	Values activity sheet	cd player
Blu tac	Letter to self paper	Cd
Roll of BP	Envelopes	
$\frac{1}{2}$ A4 paper	Copy of The Australian article	
textas	Laminated glossary poster	

To do before people start arriving:

Masking tape line on floor

BP with aims, outline, PB, role/commitment , DRB, expectations heading on pages

Stick up posters

Prepare History wall BP

Folders on tables

Nametags out

Textas and highlighters on tables

Put values exercise in folders

Test camera

TIME	WHO	SESSION	Equipment
10.00am	Leon	Welcome	
DETAIL: Thankyou for attending. Looking forward to some innovative ideas and active participation. I am Leon Soste..... There are a few key people here that I would like to introduce: QJ, John/Stephen, Selina & Nicole/Fiona. Folders are yours - put name on them. We'll pull things out as we go. And add literature as the Forums go on. Toilets are If you need to go outside/stand up and stretch etc at any time please do so. Hand over to Selina.....			
10.05am	Selina	Context	<ul style="list-style-type: none"> • Aims & Outline on bp • Parking bay on bp
DETAIL: <ul style="list-style-type: none"> • Introduce myself and Nic/Fiona, and how we will interact and be flexible • Run through aims for the day • Run through outline for the day We will be mixing things up & use different approaches you may not have seen before. This is for two reasons - to keep us awake, and to get us thinking differently, outside square Parking Bay - if you think of something really important to you but not totally relevant at the time please put it in the parking bay for addressing later or elsewhere			

Data Requirements Board - if throughout the workshop you identify the need for some specific data so as to move forward, put it up on DRB and we will work out at the end of the day who, how and when we can source that data, and in what format you would like to receive it
Now, I'd like to hand over to Russell/John/Stephen to introduce the project and give us a bit of background

10.15am	John/Stephen	Overview of IF Project	•
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DETAIL:

Prompts for their intro:

- This is a regional project, conceived here with no other agenda
- Emphasis on R&D - not implementation, that is role for combination of agencies
- Not reinventing the wheel - this is about recognising and building on what's been done in the past by NRE, GMW and CMA
- Project aims
- Building capacity of individuals and inspiring innovative thinking and planning
- Context of White paper
- Clear about the fact that the info produced by the workshops may impact on how policy is interpreted and implemented, but can't change broad policy (ie. may feed into implementation policies of groups such as CMA, GMW, etc. but won't alter State Gov policy)

10.30am	Selina	Who's here	<ul style="list-style-type: none"> • Space • Masking tape line on floor • BP for expectations
---------	--------	------------	--

DETAIL:

Team building activity - sociometry questions -

Just so we get to know each other, or even better for those of you who do know each other, we are going to begin with a session on who's here. This is for your benefit in terms of working together as a group, as well as ours so we get a feel for who and what we have got to work with.

I'm going to ask a series of questions, and some may be slightly challenging or probing so are you up for it?

1. Line up in order of how long you've been an irrigator in this catchment.
Now tell us your name, where you are from, how long you've been an irrigator in this catchment, and what you would like to be called

2. Find someone else in the room who has the same hobby as you. Share.
3. Rate yourself on a scale of 1-10 of how innovative you are (work or life). Give us an example of why you put yourself there.
4. Put a green dot on the chart to show how you are feeling re possibilities and opportunities for the future
5. Rate yourself on a scale of 1-10 of how smooth you are on the dancefloor. What's your best style? Move to where your dance partner would rate you!
6. Move to this side of the room/line if you have a strategic plan for your life. Stay here if it is written down, move to the other side if not. How do you measure how life is going?
7. On a scale of 1-10 how tough is life for irrigators in the GB catchment at the moment? Why? Move one step lower, what would have to happen?
8. Return to their seats. What are your expectations from this Forum. Discuss in groups of three for about 5 minutes and then let us know your top one. Co-facilitator to jot on BP as each group tells you their top one. Then ask for any others. Stick on wall and say we will revisit at end of day and/or end of fourth workshop.

10.45am	Selina	Overview of Forum Series	<ul style="list-style-type: none"> • Laminated road map • Blu tac • Project obj on wall • DRB on bp on wall
---------	--------	--------------------------	---

DETAIL:

- Purpose of Forum - not debate validity, been there. Now moving forward, explore future for our region
- Not Big Brother or Talkfest - regional initiative which genuinely want you guys to identify the scenarios and develop the regional options that the project will analyse over the next year or so
- However, we need to spend a fair bit of time doing the groundwork to set the scene for the nitty gritty exciting bit of the workshops, so bear with us today?!
- Appreciate that things are pretty tough at the moment, and have been for some time. So there is no right time to plan for the future, it needs to be constant
- We are up to Stage 2 of the Irrigation Futures project, and about 10 months into the four year project. As you know there are four

workshops in this series, and they are happening in six forums across the catchment. The overall aim of the Forums are to facilitate the development of a vision, scenarios and regional response options for our catchment for the year 2035 (30 years). This will be achieved through providing the opportunity for wide-ranging discussion/debate and capturing innovative and bold thinking, whilst also building capacity.

- Explain structure of SIRIC, Stakeholder Reference Committee, Project Team, and overall aims of project if not already done so by speaker. Use Update in folder.

ROADMAP

- Project Objectives in folders and on wall.
- We've got a roadmap on the wall (and in your folders) to illustrate how we might get to this point. It may look a bit tricky to follow, but that is indicative of the task we are pursuing - it isn't clear cut and straightforward. There will be turns and obstacles. This isn't easy territory. But we have to try. Having said that, the roadmap is flexible to a degree in that it must respond to workshop outcomes, participant needs and perhaps the White paper along the way.
- So, we begin at workshop 1 Aspirations and Values. This is a crucial starting point because what is important to us will form the foundation for the rest of the workshops and ultimately the project. Each workshop then builds upon the previous one.
- Workshop 2 will identify the scenarios we may find ourselves in in 30 years time. These are possible operating environments, decided by external drivers or factors, things that are out of our control and will impact on irrigation outcomes in this region.
- Workshop 3 will see you develop some regional response options to the possible scenarios. This is about deciding what we as a region do have control over.
- Workshop 4 then looks at our responses to the options that have been put forward, and allows us to check them against what we identified as important to us in workshop 1. How do we feel about the possible economic, environmental and social consequences of employing a particular option.

- In between the workshops the Project Team will work to refine the data, summarise the workshop outputs and provide notes across all forums, and be on-the-end of the phone if you want to talk/reflect. They will report to the Stakeholder Reference Committee on progress. See folders.
- After workshop 4 the SRC plays a much greater role in terms of working through and deciding on the number of and which options go onto Stage 3. The Project team will do further analysis and provide the technical work and make detailed assessment of the consequences of the chosen options.
- Stage 4 is about the providing the technical assessment and consequences of the various scenarios and options back to the community. Building consensus.

Roles & Commitment

- Our role is to provide a process for this group to decide what they want to put forward
- Expected that all four dates are in their diaries
- Active participation:
 - Either sit back and react to change or create your own future
 - Create a 'can do' culture rather than a reliant culture who expect government to do everything
- Respect for divergent views, eg. "professional friends - you don't have to like them but must understand them"

11.30am	Nicole/Fiona	History Wall of Irrigation	<ul style="list-style-type: none"> • roll of bp • textas • blu tac • wall or floor space • 1 red and 1 green texta for facilitator • digital camera
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DETAIL:

Purpose: In order to put the next 30 years into context and consider what environment we might be operating in, we must recount the past 30 years.

Look at what happened, what was achieved or not, and what we've learnt from the experience. So we are going to spend about an hour looking at the last 30 years and the lessons through a history wall, that we as group construct.

The lessons are only as good as the info that goes in so please think thoroughly. Also, we will be taking a photo of this for posterity and use as a prompt for you to use in between workshops, so let's make it good!

Identify the irrigation changes in this region over the past 30 years (consider key milestones to get started eg. drought, white paper, war, flood, etc.). Think about what was happening;

- in the world
- in Australia
- this catchment and
- with you.

Anything significant or an event you remember about irrigation jot onto the (chronological) wall with a month or year if you know it. Sprinkle personal experiences throughout the wall to make it relevant to you.

As you fill in this wall chart, consider how we as a region responded (critical things we've done or haven't done).

Now let's recap. I'll quickly run through some of the chunks. As we go if you think there is anything missing or you have just thought of that should be up there please add it.

Now as a group let's stand back and see what this tells us about irrigation in the past, that can then inform us of irrigation in the future (for the afternoon session). Grab a chair if needs be.

Have we considered the people? Barometer along the bottom?

So, as you glance across:

R: What is really concerning? Facilitator puts a red sad face on that bit

What bits are really encouraging? Put a green smile on that bit

I: So where are the major turning points? Put a line down and asked what changed? What stopped and what started? Major shifts?

What is still unknown? Are there significant gaps in our experience or knowledge as a result of what you see up here?

D: What are the important messages from the last 30 years we need to take forward?

Hopefully this will bring out the external and internal drivers, trends, discontinuities and uncertainties and so provide the opportunity to identify the three areas we want to focus on later at next workshop...use these terms to debrief if possible.

12.45pm

Lunch

1.15pm

Selina

Energiser

•

DETAIL:

We need to get our right brain working this afternoon, and exercise after lunch, so let's do a couple of exercises.

Let's get in a circle.

(a) Lift and tap your knees.

Rub your tummy in circles and pat your head. Swap hands.

(b) Who's been a waiter/res in their past life? Well now's your chance.....

1.25pm

Selina

What is important to us as an irrigation region?

DETAIL:

Context the afternoon sessions:

Refer to the roadmap again. We are getting into the detail of identifying your values and aspirations. Why do you think we might do this?

We believe the reason we are spending time clarifying our values and aspirations is two-fold;

- these things form the foundation of any other decisions we make or they way we behave. Any actions we take in relation to the future operating environment are based on our values and the future we desire
- this project is about identifying some regional response options to the future scenarios. In order for us to choose and assess the options we need some sort of criteria. This will help us keep checking if the options and outcomes we come up with are what we really want as a region

Therefore we need to consolidate our values and aspirations to a degree, so

that we can identify the core values that the community would want or expect us to measure our options against for the well-being of the entire catchment (people, eco and environ).
And their glossary of terms may come in handy.

1.35pm	Fiona	What is important to us as an irrigation region? Pt 1 Values	<ul style="list-style-type: none"> • Values Activity sheet
--------	-------	---	---

DETAIL:
We will begin at a personal level and build up to a group list. Let's begin with the Values Clarifyer activity.

2.30pm	Selina	What is important to us as an irrigation region? Pt 2 Aspirations	<ul style="list-style-type: none"> • paper with first line on it • envelopes • bp • blue highlighters • project team example • cd player and cd
--------	--------	--	---

DETAIL:
What we are about to do may seem a little odd. However it is a simple yet very powerful exercise. It has been used by the Dept of Defence and.....to clarify one's aspirations.

Ask everyone to spend 10 minutes writing a letter to their future self in the year 2035, from wherever you might be (eg. elsewhere, retired, even looking down on the region from up above!). Begin with Dear self, here I am in February 2035 and the Goulburn Broken catchment is absolutely thriving.....(describe what you see, hear, smell and feel, etc.)

Draw from the key messages from the history wall whilst writing your

letter.

Play creative music.

Does anyone want to share their letter?

Now from that letter we want to pull out the things that are most important to you. Or your future **aspirations** for the region.

Re-read your letter, and use a blue or pink highlighter to clearly identify the most important parts of what the future looks like for you (aspirations).

Ask people to share their no. 1 aspiration (in 2-3 words) on butcher paper. Any more?

Any saying the same thing? Are there any conflicts?

Are they relevant to the whole group and therefore the community you represent?

Here's an envelope please put your name on the front, place your letter inside and seal it. I will come around and collect them and return them to you in Workshop 4 when we revisit our foundation stones of values and aspirations. **Collect envelopes!!**

Are we happy with our group's lists of aspirations and values accurately reflect our group, and happy for them to go forward to the next workshop and into the mix of forum outputs? This will go on all further correspondence from the project to you.

3.15pm

Fiona

Preparation for next workshop

•

- Refer back to Roadmap. Let people know that the next workshop we intend to stretch their minds regarding the opportunities and threats for this catchment. Please start thinking scenario building, and read article from The Australian
- Prompt re drivers and positions - glossary.
- Take photo of irrigation history wall out to friends, colleagues, family, etc and use it as a prompt to gather their thoughts on what the future operating environment might be
- Refer to Data Requirements Board.....what do we need, by when, how/who will collect it, how do you want to receive it (eg. quick verbal report at next workshop, written material posted out to you between workshops, information session, guest speaker, etc.??)

<ul style="list-style-type: none"> Reiterate date and venue of next workshop <p>Kyabram wed 9th June at Fauna Park?</p> <p>Echuca Tues 8th June, same place</p> <p>Cobram fri 11th June, same place</p> <p>Shep tues 15th June, same place</p> <p>Seymour 20th July same place</p> <p>NB: may need to alter dates of October workshops now</p> <ul style="list-style-type: none"> Put your name tags in your folder and bring back next time You will receive the summary package of info by the 19th May. If you wish to discuss anything, or have had a reflection or questions please don't hesitate to contact us 			
3.20pm	Selina	Evaluation & Wrap up	•
<p>DETAIL:</p> <p>Sociometry questions:</p> <ol style="list-style-type: none"> On a scale on 1-5 how well did today meet your expectations? (Refer to list) <p>What would need to happen to move you up one? (co-facilitator to take notes)</p> <ol style="list-style-type: none"> Put your hand on the shoulder of a person who you knew before today. Then a person you've just met. On a scale of 1-5 how confident are you that your views are being heard? and will play an important role in this project? Dots on the wall. Stand in this corner if you've experienced full on foresighting or scenario building activity before. This corner if you've done some type of visioning. This corner if you've done very little in the way of formally imagining what the future might be like. On a scale of 1-5 how much are you looking forward to the next workshop? <p>Thanks and see you next time.</p>			
3.30pm		Close	

Irrigation Futures Prize

THE MOST INNOVATIVE REGIONAL RESPONSE OPTION FOR THE FUTURE OF IRRIGATION WITHIN THE GOULBURN BROKEN

To acknowledge the efforts of participants in the Irrigation Futures Workshop series, the project team wishes to award a prize to the individual judged to have generated the most innovative regional response option for the future of irrigation within the Goulburn Broken catchment.

WHAT WE ARE LOOKING FOR

Your submission should provide 1 – 2 pages on the following:

- A brief background to the problem that you are seeking to solve.
- A clear statement of your idea, with enough detail to enable the region to implement it.
- What outcomes the idea is likely to produce, and how it will help to solve the above problem.
- Practical consideration such as: Who should be responsible for implementing the idea? What time-frame it should be implemented in? What resources are likely to be required etc?

ELIGIBILITY

Eligible submissions will be limited to those who have attended at least 3 Irrigation Futures Workshops.

HOW IT WILL BE JUDGED

Proposals will be anonymously put to a small panel selected from the Stakeholder Reference Committee for decision. That decision will be final.

SUBMISSION DATE

Submissions should be sent to:

Brendan Paterson
Primary Industries Research Victoria (PIRVic)
Department of Primary Industries, Tatura
Private Bag 1, Ferguson Rd
TATURA VIC 3616
Tel: (03) 5833 5301
Fax: (03) 5833 5299
Email: Brendan.Paterson@dpi.vic.gov.au

By 4pm Wed 10 November 2004

PRIZES

Suitable prizes will be discussed with Workshop participants

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment D Irrigation Futures Forum Workshops – Outputs December 2004

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

in collaboration with

**Community Engagement Network
Department of Sustainability and Environment**



For more information contact:

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Selina Handley, Nicole Hunter and Robert Chaffe – Community
Engagement Network, Department of Sustainability and Environment

Technical Advisory Committee:

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

Governance Committee:

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
John Pettigrew (Chair) – Goulburn Broken Catchment Management
Authority (GBCMA)
Kylie Pfeiffer – Department of Sustainability and Environment

Stakeholder Reference Committee:

Mark Allaway – Department of Primary Industries
Alan Canobie – Numurkah Dairy Farmer
Bruce Cumming – Department of Primary Industries
Steve Farrell – Echuca Dairy Farmer
Peter Gibson – Nanneella Dairy Farmer
Brigitte Keeble – Department of Sustainability and Environment
Peter McCamish – Ardmona Horticulturalist
Ian Moorhouse – Goulburn-Murray Water
Chris Norman – Department of Primary Industries
Russell Pell (Chair) – Wyuna Dairy Farmer
Derek Poulton – Goulburn-Murray Water
Ann Roberts – Goulburn Murray Landcare Network
Nick Roberts – Goulburn Valley 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

Table of Contents

Irrigation Futures Forum Workshops – outputs.....	5
Kyabram Workshop 1 Notes.....	6
Kyabram Historywall.....	8
Kyabram Workshop 2 – Scenario notes	9
Kyabram Workshop 2 – Scenario Manuscripts	12
Scenario - No name scenario (“no irrigation water 2035”).....	12
Scenario: Super – Vision	14
Scenario: Utopia	16
Scenario: Best Guess.....	18
Scenario: Almost Revolution - but in reality a very difficult period of evolution	20
Scenario: There is a future for irrigated agriculture	22
Kyabram Workshops 3A & 3B – Development of Regional Response Options	24
Regional Response Option – Super-vision	26
Regional Response Option – There is a future for irrigated agriculture	29
Regional Response Option– Best guess	33
Regional Response Option - Utopia	35
Best Ideas for the Day.....	37
Kyabram Workshop 4– Further Development of Themes Within Options	38
Element – Adjustment and Re-Configuration.....	38
Element - Viable Communities.....	40
Element: Community	42

Irrigation Futures Forum Workshops – outputs

The major stakeholder engagement activity for Stage 2 of this project was the Irrigation Futures Forum Workshop series.

This Attachment deals with the outputs produced by those Workshops.

It provides an example of the output from each Workshop in the series, ie:

Workshop 1 Values, aspirations and history wall,

Workshop 2 Scenario development,

Workshops 3 & 4 Response Options.

The examples are taken from the Kyabram group, which had an average attendance of around 20 participants.

Kyabram Workshop 1 Notes

(a) Key Messages from the history wall

We need to achieve a balance between economic, environmental and social benefits.

We are likely to have fewer farming enterprises in the future.

Agriculture is still here – we have been able to manage/handle change.

We have a greater diversity of production now than we had in the past.

Maybe we should be attempting to look at 15 rather than 30 years ahead. However, some people can see further than others.

Economists need to value social and environmental benefits and costs in their assessment of proposals.

There is likely to be less water available for consumptive use in the future.

Society seems to place a lower value on food production now than it did in the past.

We need stronger intervention on issues such as cross-border reform (ie more microeconomic as well as macroeconomic reform).

We need to plan for the future, building on positives from the past (ie what worked well and why).

We need to be very aware of global warming and what is happening environmentally.

As a generic statement: We need to be careful that the decisions we take are based upon good, sound information rather than our perception of reality.

Knowledge, wisdom and science must be treated evenly/equally.

People's perceptions of where food comes from, and food quality, are important.

(b) Personal/community values

Co-operation	7 votes
Environment	6
Justice, Innovation	5
Security, Fairness, Profitability, Courage	4
Trust, Prosperity, Efficiency, Ownership	3
Community support, Wisdom, Stewardship	2
Truth, Love, Relationships	1

Freedom, flexibility, honour, success, fun, happiness, initiative, responsiveness, conservation, persistence, friendship, spirituality

(c) Personal/community aspirations

Less irrigated land which is better managed.

Environment has a healthy, clean and green image. Lots of trees and wetlands, and as a result biodiversity is enhanced. We leave the place better than when we found it. We celebrate what was here before. We are building the mosaic of vegetation classes back into our area/catchment. Building viability into our biodiversity, including grassy plains. We have legitimate and passionate aspirations for healthy rivers. We have vibrant eco/agro tourism in the catchment.

Vibrant community. Farmers and their products are valued. Farms are going well (with respect to their productivity). People enjoying farming. There is still opportunity for family farms. Greater cultural mix and social choices. People are proud to be an irrigator and to live in the GV.

We show community leadership with respect to entrepreneurship, ethical investment, value-based not politicised decision-making, strong, and exists at all levels. We have achieved a balance between environmental, social and economic demands.

Strong, thriving economy, with high efficiency, profitable, sustainable irrigated agriculture. Net returns are adequate, and we make a comfortable living. There is a shortage of dairy products worldwide.

Young people return to the land. The average age of farmers is 50 and coming down.

World markets are paying a premium for clean, green agriculture. We have diversified niche-market products including native plants and animals, ie we are using the resources around us. GV is still the food bowl of Victoria. We have world-renowned vineyards.

Change is not suppressed. Through technology and understanding, we have changed adversity into opportunity. We have become the managers of change.

We have good social support networks, and real prosperity, which is measured in human values. We have a sense of equality and peace. We have quality amenity and services.

Timeline of Water Management in Goulbourn (1990-2008):

- 1990:** Pink lady apples planted. Sheep shoots Eura + Shan. Water watch NO compensation.
- 1992:** GVEE FORMED. 6 Oct 92. Head Elder.
- 1994:** Local govt amalgamation (right across state). GMIN FORMED. Waterwatch program. Drought. GBCMA created. Increase in cultural diversity of production - olive, almond, etc. No more sales allocations. Increase in land values. SPC / Almond MARGE. Record low allocation. 2003. Small average farms for sale -> big farms. Dry Farm 85. ag land -> 1/2 style uses. Sell cows + water. Stop M. K. W. L.
- 1996:** Drought. Last year water (left field). Trelis Grown TOMATO VARIETIES introduced from Israel. Beginning of L. B. G. Drought. Heartlands Honeyville CK project started. Change of State govt.
- 1998:** Drought. Waterwatch. Goulbourn Water. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation.
- 2000:** Drought. Goulbourn Water. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation.
- 2002:** Drought. Goulbourn Water. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation.
- 2004:** Drought. Goulbourn Water. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation.
- 2006:** Drought. Goulbourn Water. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation.
- 2008:** Drought. Goulbourn Water. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation. Goulbourn Water Act. Goulbourn Water Corporation.

Kyabram Workshop 2 – Scenario notes

(a) DRIVERS

External drivers (with my first-pass attempt at grouping)

Cost-price squeeze (staying ahead), supply & demand (expectations), availability of labour and capital, workplace reform, availability of fuels,

Global competition, economic climate,

Devaluing of agriculture and farmers, change in Govt support for irrigation, short-term thinking leading to uncertainty, agriculture is not growing as fast as other industries,

Change in community values, rise in green politics, ideology, consumer affluence, consumer values, consumer and community expectations, wealth is concentrating, propaganda,

Biological and technological risk, war, health,

Environmental change, climate variability and change,

Water policy & trading,

Population expansion, changing demographics, development and the impact of man on environment,

Govt policy, regulation-deregulation, economic rationalism, global governance & centralisation, decentralisation,

Internal drivers (no sorting)

Lifestyle, prosperity, ease, education

Both external and internal (my attempt at grouping)

Change in irrigation-use (requirements, competing uses), land-use change,

Govt policy, institutional reform,

Knowledge of finite resources, recognition of altered natural systems (biodiversity and loss of natural species), scientific research, technological progress, efficiency (R & D),

Expansion of world markets, income, debt (wealth creation, development and growth, delaying change, maintenance),

Increased urbanisation, less people working on farm, ageing population,

Survival, fear, conservatism, power, water,

(b) SCENARIO DEVELOPMENT (see Scenario Creation Manuscripts following)

(c) SCENARIO ANALYSIS - similarities, differences and insights

Similarities

Less irrigation, dairy will be different, agriculture is still here,
Optimism, community (socioeconomic) adjustment will be involved,
Better for the environment, driven by major water policy, Greens move to power (based on community values),
Top quality products (what the consumer wants), organic clean-green food, market-driven, change will happen,
Cost of water increases, large shifts in water tenure.

Differences

Some had young people entering dairy (others didn't), some saw a future in dairy (others didn't),
Water entering back in industry versus water stayed out?
Positives and negatives in people's perceptions,
Only one scenario showed an extreme event, 2 scenarios mentioned GMO's, no scenarios mentioned an environmental catastrophe,
Peter Garrett,

Insights

Dairy centric,
Optimism (no disasters), more public money back in the system,
A lot of commonality, we can't predict the future but we have all predicted the same future, haven't picked up historical trends, picked up our "pet" topics – possibly need to overlay other drivers, too simplistic & too narrow...doubts about validity, quite boring (heard it all before).
Acknowledge that change will happen, strong emphasis that it is imposed change, high number of casualties, very few (farmers left?) as a result,

(d) Changes – Things we need to do

Explore all external drivers, test if we have included all drivers, look more at contrived drivers rather than group choices so that we get outside our comfort zone, give people choice as to which we follow-up,

Anyone with a passion for the following scenarios

- #1 (no irrigation in 2035) or
- #2 (less gravity in 2035), and/or
- #3 (keep all our water), to write-up and get to Leon before the next Workshop.

Come back and have another go.

Time with visionaries (5 mins?)

Kyabram Workshop 2 – Scenario Manuscripts

Scenario - No name scenario (“no irrigation water 2035”)

Authors - Chris Brooks, Laurie Bolitho, Peter Beyer, Brian Sullivan, Bev Phelan

(a) Key Drivers included

water policy

water

(b) The story (2004 – 2035)

Based on inefficient water use by agriculture and environment lobby, government introduces water policy that decreases water right by 30%.

Water right for irrigators decreases from present allocation of 340 ML to 250 ML in 2035.

Individual farm

adopt farm system(s)

change management practices

adopt technology for WUE

capital needs ex govt. “innovation” grants

may diversify

value added products

Neighbourhood

declining irrigation farm numbers/farmers retiring

diversification – agriculture/Eco/tourism

Community (rural towns)

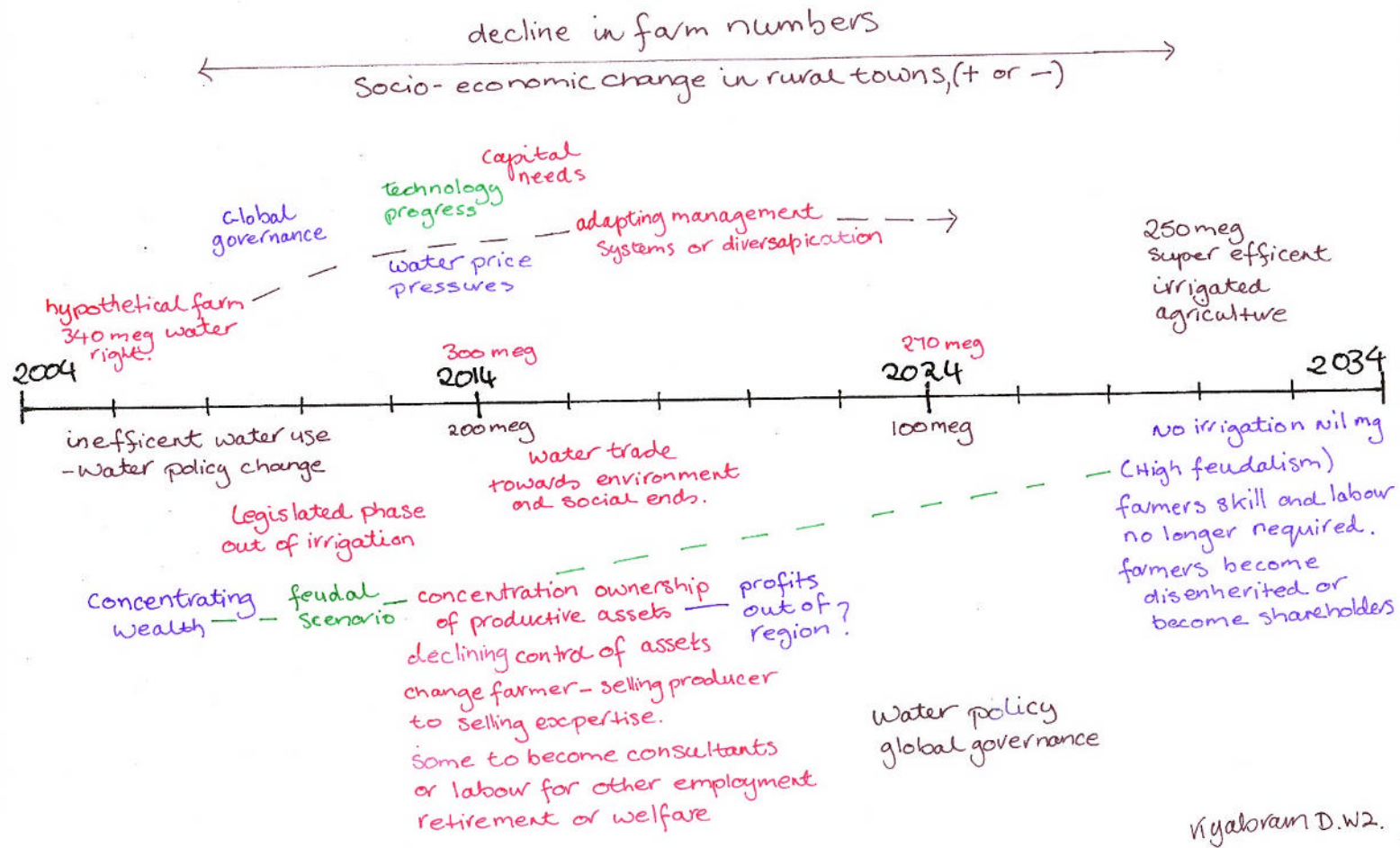
socio/economic changes

positive or negative

eg positive Undera reinvents itself as “bowls retirement village” for city people

capital , jobs, \$\$ to town no longer dependant on agriculture.

Merrigum – no footy club, no post office or store, loss of community, people relocate to Kyabram.



Scenario: Super – Vision

Authors - Peter, David, QJ, Ross, Ian

(a) Key Drivers included

water availability

community health/affluence

community values

(b) The story (2004 – 2035)

2004 – 2020

After the White Paper – 20% reduction in water right, less irrigated land by 2010.

We have more affluent consumers at home and in Asia who are demanding high quality health food, both organic and fresh.

At the same time there is an emerging market in neutraceuticals and pharmaceutical food products.

Change to a 'Green' dominated Government with environmental emphasis. Water trading sees water moving across basin. By 2014 water prices have doubled. Government enters the market to buy Water Right.

2020

Irrigation area reduced by 25-50% 2004 area. More dryland farms.

Huge community shock following changes - results in public willing to invest in integrated irrigation infrastructure from storage areas all way through to on-farm delivery.

GM foods are acceptable to consumers and produced in large quantities (for the less affluent) on retired irrigation land. This provides green house credits for irrigation land-owners, and also allows greater flexibility in growing GM crops in dryer areas.

High demand from affluent for indigenous foods (eg macadamia nuts, kangaroo).

Designated high-value specialty irrigation areas producing niche crops, food and fibre.

China suffers economic collapse - world-wide Depression follows.

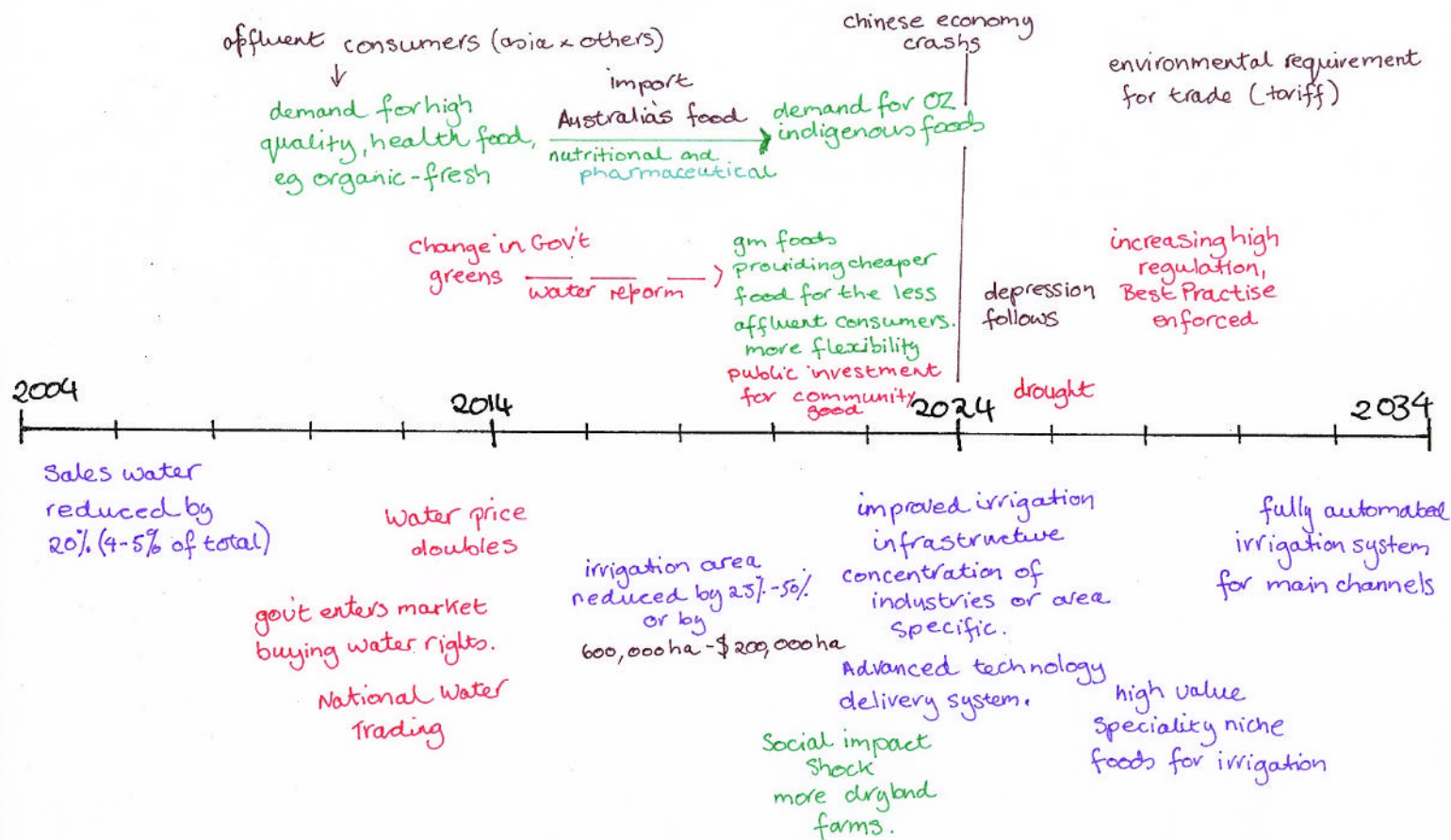
2025

Severe drought

"Environmentally friendly" requirements high in international markets. Domestic markets much more heavily regulated - regulations and 'best practice' requirements strictly enforced.

Specialty high-value niche markets catered for in irrigation areas.

Fully automated irrigation systems from storage to on-crop delivery. Small outlying farms/channels no longer exist.



Kyabram B.W2

Scenario: Utopia

Authors - Michael Lea-Whyte, Jenny Reuther, Ann Bell, Doug Small

(a) Key Drivers included

Health

Environment

(b) The story (2004 – 2035)

Concern for health and environment will lead to

Increased revegetation of farmland

Protection of remnant vegetation on farm

All major wetlands linked to Goulburn River

2035 most fish species are native

Eco-tourism becoming a major industry

GB CMA becoming 80% organic known as the “healthy food bowl of the world”

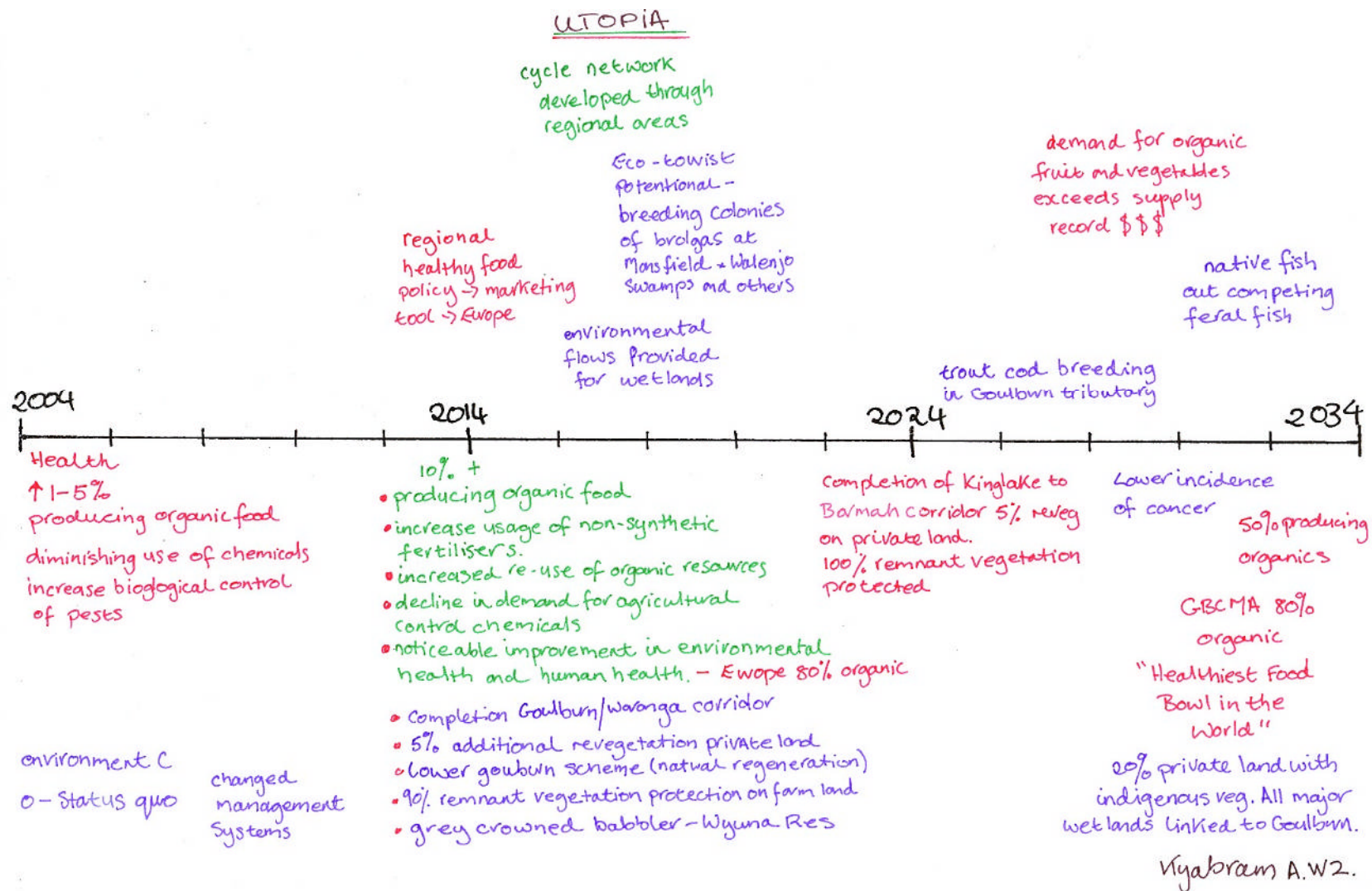
Demand for organic food exceeds supply

Record profits

Less need for medical services

Increased well being

Lowest incidence of cancer since records kept



Scenario: Best Guess

Authors - Lyle, Smith, McDonald, Brown

(a) Key Drivers included

Climate change

Economic climate

Water policy

(b) The story (2004 – 2035)

White Paper adopted – 20% sales loss, but more reliable water for irrigators/less water. Water moves out of region for 10 years as adjustment occurs, then moves back as global economy demands more clean and green food. Dry farmers for fodder and lifestyle farms.

Dairy and fruit industries go through rapid adjustment as a result of lower water access. Dairies move to fodder-based low-cost systems (larger and fewer farms). Fruit moves to fresh fruit export and less reliance on low-return processed product.

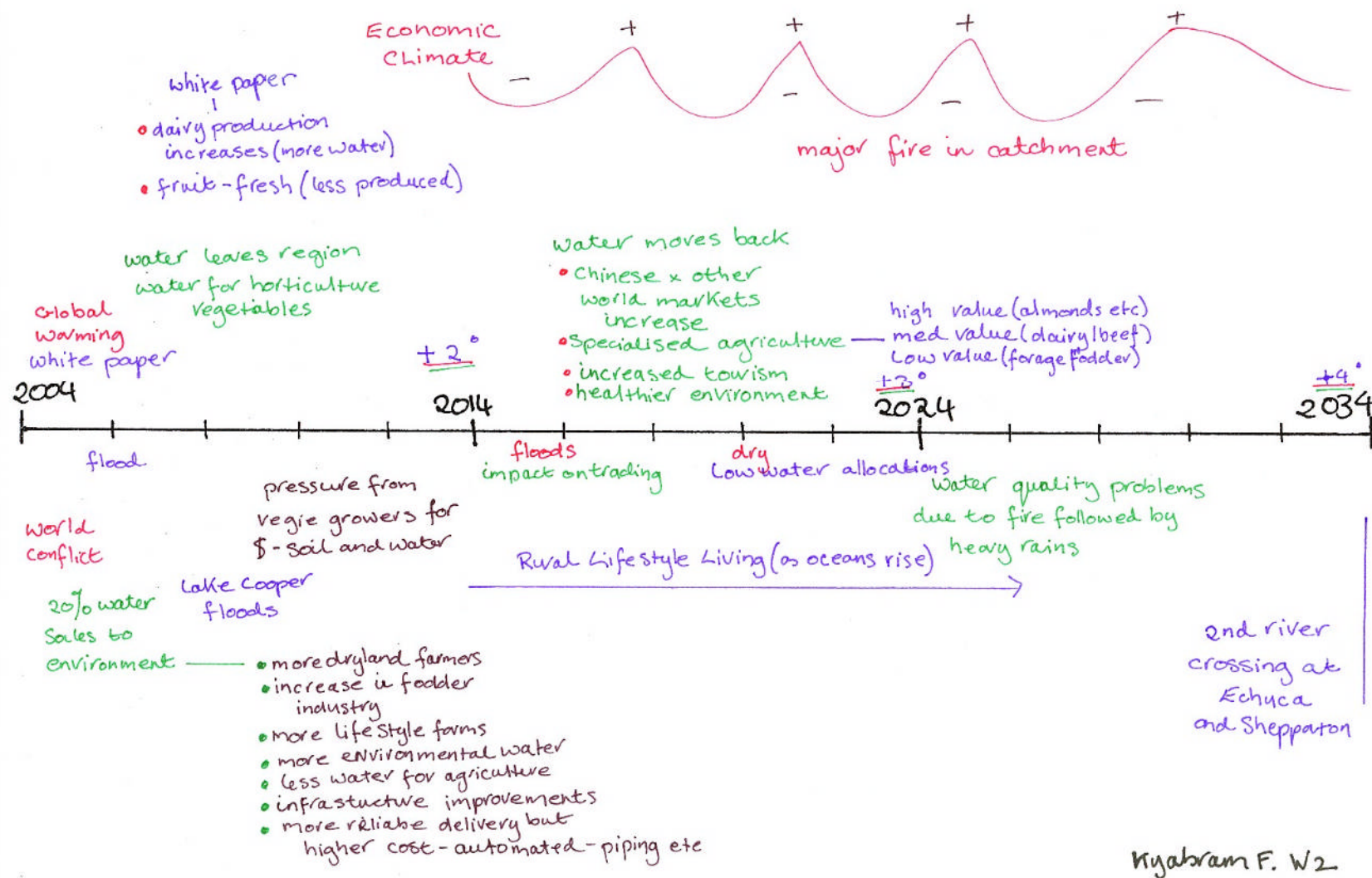
Climate and weather become more variable, floods and dry periods are more common. Increased water reliability helps irrigators manage through drought. Variability in water quality after fires is more common.

Irrigation infrastructure moves to automated systems and piping, extra out of season demand etc. This move is in response to drought and water savings.

Environmental flows increase and tourism market increases as healthier environments are marketed.

Global markets will ebb and flow as they do now. Irrigation industries need to manage this risk.

Communities will adjust through the period (as they always do). Need to manage this process.



Scenario: Almost Revolution - but in reality a very difficult period of evolution

Authors - Sally Dickinson, Toby Accocks, Russell Jones, Mark Lawlor

(a) Key drivers used

Rise in green politics
water policy
changes in irrigation use

(b) Overview

Changes in mix between consumptive use and environmental reserve.
Difficulty in change - consequences at individual, industry and community levels.
Need to prove benefits over time - through adaptive management and better science.
Period of change sustained through changes in community values and underlying value systems and power base of political parties.

(c) The story (2004 – 2035)

Early stages of period

Recovery of 500 gigalitres - will be difficult to prove environmental benefits.
Looming infrastructure crisis in gravity-fed systems.
Changes in land use. Dairy industry will change from pasture-based production.
Government will enter water market after initial 500 gigalitre recovery.
Community value of water and environmental issues will rise as a 'personal value'.

2014 to 2035

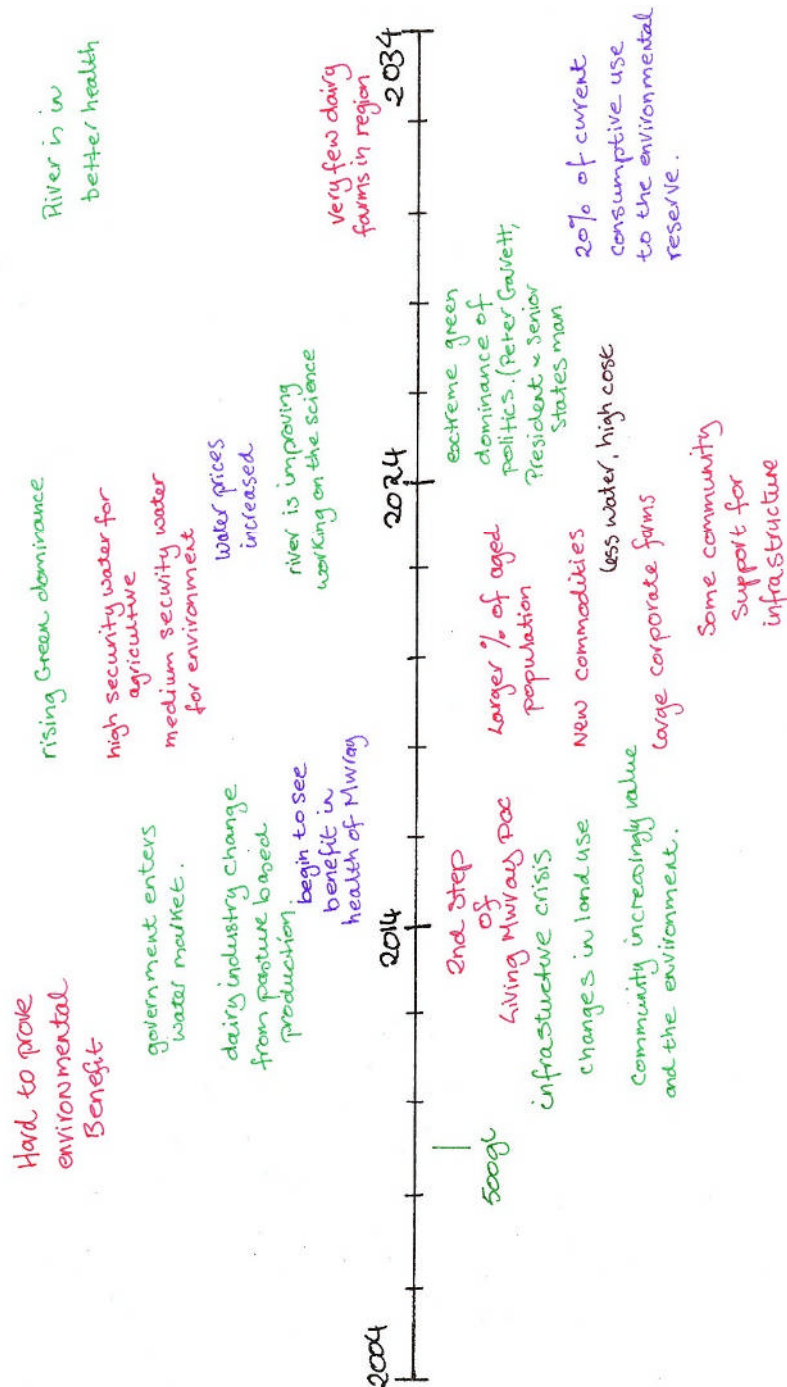
2nd stage of Living Murray process. Begin to see benefits of water recovery.
River quality improving.
Rising 'Green' dominance.
High security water will be held by agriculture - medium security allocated to environmental concerns as a consequence of market forces.
Larger and aged population.
New commodity demands and larger corporate farms.
Water prices continue to rise.
Politics dominated by extreme views - Peter Garrett becomes President.

2035

Very few dairy farms - but perhaps more production and just as many cows.

Murray River much healthier.

50% of 2004 consumptive water use dedicated to the environment.



Murray E. W2

Scenario: There is a future for irrigated agriculture

Authors - Sally Dickinson, Toby Accocks, Russell Jones, Mark Lawlor

(a) Key Drivers included

Government policy

Survival

Efficient R&D

(b) The story (2004 – 2035)

500 gigalitres for environmental flows.

All water stays in the region.

Government commits to long-term investment in infrastructure and research and development, extension and promotion of best management practices and water use efficiency. Results: dairy industry stabilises, water price stabilises (CPI increases only), new agricultural and horticultural industries which are sustainable, water efficient and productive.

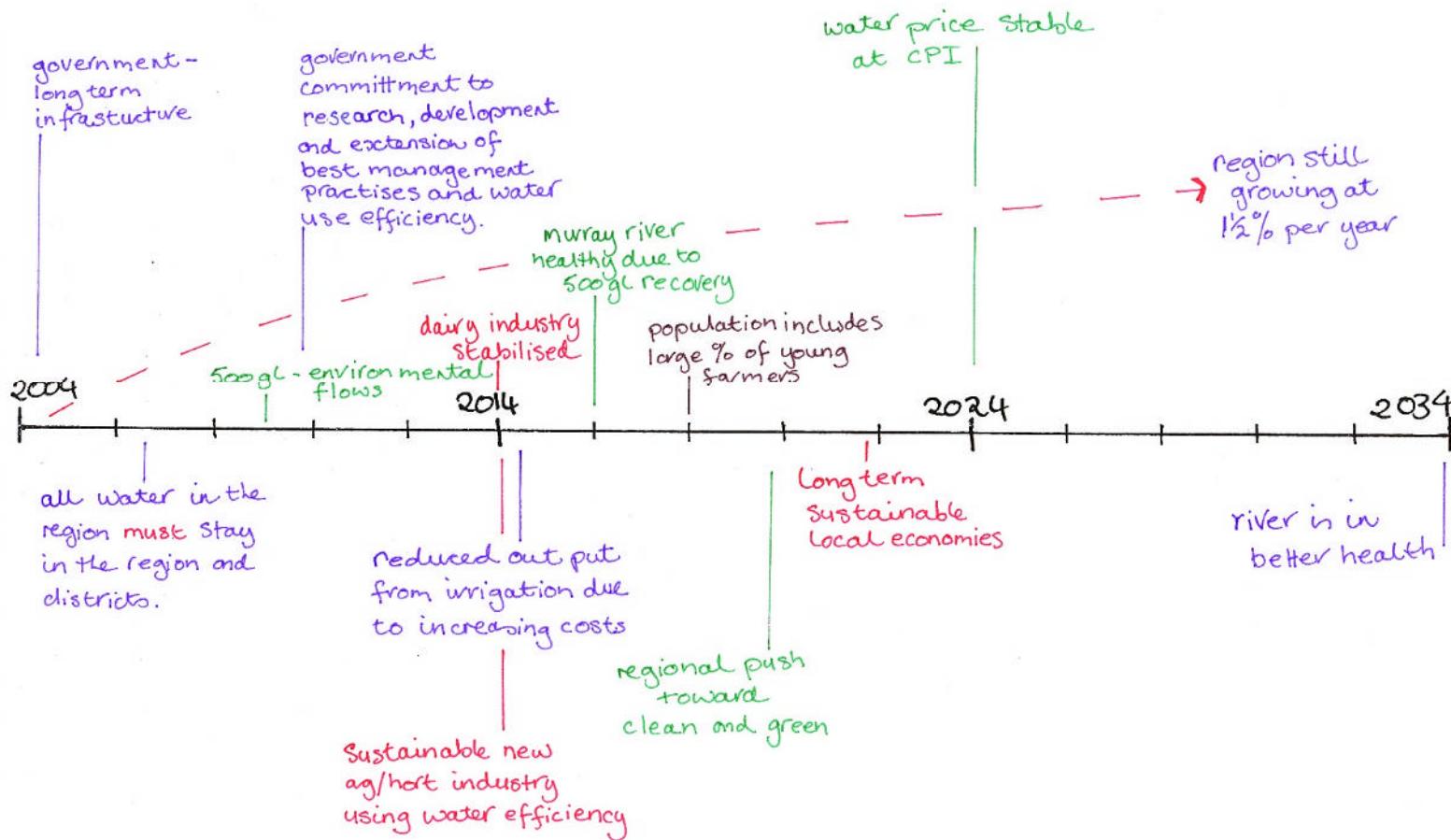
All Murray River healthy following 500 gigalitre release - science proves it.

Population - a large percentage of young farmers.

Continued regional push to promote its 'clean and green' image.

Health rural community - sustainable communities based on the above.

2035 - increased population in region and improved river health.



Kyabram C. W2

Kyabram Workshops 3A & 3B – Development of Regional Response Options

Key Messages So Far

Economic drivers will drive this region - if we don't get this right, other stuff (ie what we want regarding the environment, for example) won't happen.

Can't stick to 'old draught horses' - we need new options, ways, choices, tools for diversification and new technologies / money spent on them.

Grass roots people need to be involved:

- - ownership of the process and effective consultation
- - destiny in our own hands
- combined stakeholders (community, government, irrigators, shires)

Environment / ecological services are a key part of all our option packages - a key driver. An aspiration perhaps beyond economics?

Strengths (ungrouped) – catchment as a whole

energy

strong institutions

location (ports/sea terminals)

understanding of the environment

industry in area

community involvement

strong base for tourism

infrastructure

reliable water (history)

strong scientific community

climate

land availability

the organization/structure of the catchment

social critical mass and diversity

reasonable equity – profitable businesses

increased diversity of production

expertise and experience and adaptability

soils

Weaknesses (ungrouped) – catchment as a whole

land use planning

services declining

low base for tourism

land use intensity

salinity
young people leaving the area
condition of infrastructure (water)
communication
resistance to change
lack of recognition as worthwhile area – food production
community disharmony
fragility of current produce (vulnerability to disease)
propaganda
lack of promotion
farms going out of business
profitability of farms
soils
post drought situation
sensitivity to commodity markets
degraded river systems
drought prone
water leaving the area
concentrating wealth trends

Implications of the White Paper for this project

government will make tough water policy decisions
diversification, mosaic
different types of agriculture
land use change
disbelief – challenge to do it
driving better river health
preserving irrigation region
community actively involved
people are still unclear about white paper and implications – education and communication plan – wider community too
salinity impacts die to change water use/location
reconfiguration and where its likely to occur (include infrastructure component)
technology will drive efficiencies
urban use increase
the importance of tourism

Regional Response Option – Super-vision

Group members – David Mulcahy, Peter Fitzgerald, Durham Prewett, Ian Moorhouse, QJ Wang, Carl Russell

Internal drivers – relevant to this scenario

Location

Communication

Skills – education

Water – availability, high quality, high reliability

Land Use

Adoption of technologies

Local manufacturers

Confidence

Leadership – strong institutions

Strengths - GB Catchment at the moment

community engagement

location

climate

established industries

diversity of production

established infrastructure

soils

Weaknesses - GB Catchment at the moment

water pricing

soils

old irrigation infrastructure

fear of change

profitability (lack of)

agricultural debt load

lack of confidence

Biosecurity

Degraded catchment

Lack of political influence

Lack of skilled personnel coming through

Key Opportunities of this scenario

emerging markets –synergies

more flexibility with water products

GM foods could be low cost/high profit and lower environmental impact
Advanced technologies – on/off farm
Use government will to re-invest in communities
Mosaic effect – re-structure land-use

Key Threats of this scenario

Less water - = high cost
Speed of change – down the line
Urbanisation of voters
Biosecurity/economics – disruption others

Option Package 1 - Land Use planning = water planning

1. research and communicate costs and benefits of mosaic agriculture with triple bottom line accountability.
2. educate farmers and community on how to use the new flexible water products.
3. promote the catchment area as a food producing area, to attract new industry
4. promote irrigation agriculture to politicians.
5. re-configuration plans to determine our mosaic land use eg – what we keep and what we discard.
6. a regional vision and plan for long term effect eg – land and water use.
7. research and extension into how the family farming unit can diversify within the mosaic model.
8. education and research into novel ways of obtaining access to land for new agricultural pursuits.

Option Package 2 - Community involvement and leadership

1. invest in leadership training.
2. a combined regional groups involving stakeholders to develop a vision and plan to take to the community.
3. a mechanism direct to government to inform of vision and strategy.
4. to develop a multi-layered model of communication process and engagement process.
5. rural reconstruction options for people to adjust out of the region if they foresee that they do not fit the mosaic model. For example, Albury-Wodonga Regional Development Corporation assistance for farmers who may be displaced.
6. Process to help young farmers into business.
7. Develop skill level of people identified as having a future in a part of the mosaic (education).

8. Council zoning with a clear vision of the future of each area.
9. Over-arching co-ordination and communication group to help each current authority and agency (eg G-MW, CMA, councils, industry bodies) work within the model.
10. Identify critically-lacking service areas not related to irrigation and address these.

Option Package 3 - R&D and marketing research

1. market research on existing agricultural products, emerging markets and region self promotion.
2. Biosecurity and image aspects. Promotion of the benefits of clean/green and seeking and protecting market opportunities.
3. priorities for research with CRC's eg – new instruments for farm production.
4. economic analysis of options for diversification within the mosaic model - marketing, structure (eg Co-operative vs Pty Ltd etc), process, fundamentals (eg technology, farming systems).
5. options for possible emerging markets - organics, GMO, nutraceuticals, indigenous foods etc: all need research and seed funding.
6. Ecological services - people exiting farming, tourism (eg custodians of land for ecological benefits).

Miscellaneous Ideas that don't fit Into our Options Packages (but we want them recorded)

1. Prime Development Zones (Reconfigured existing zones) - areas with access to high reliability water, soil suitable for high value culture, services (roads, power, sewerage). With these zones there might be different sorts of culture.
2. In between development zones other lower-value parts of the mosaic will develop. Specific options at localised areas will need technical groups to look at specific areas - for example, how to re-configure water infrastructure, on-farm systems, training and education, how overall stakeholder forum would exist (eg councils, G-MW, GBCMA).

Regional Response Option – There is a future for irrigated agriculture

Group members – Toby Acocks, Russell Jones, Chris Brooks, Katrina Tehan, Bev Phelan

Internal drivers – relevant to this scenario

Water use efficiencies – leadership, land use, technology and environment

Learning/education – skills

\$\$ price for water – solidarity, will to survive, political influence, how we value us

Infrastructure

Water Quality (healthy rivers)

Marketing and promotion

Strengths - GB Catchment at the moment

Infrastructure.

Reliable water (historical)

Location (supply chain and resources)

Natural resources (soil and climate)

Social critical mass

Expertise, experience and adaptability

Weaknesses - GB Catchment at the moment

Condition of infrastructure

Farms going out of business (short term)

Young people in/into industry

Water leaving the area

Post drought situation

Key Opportunities of this scenario

Through technology, science and learning will lead to increased profitability, increase WUE and increase sustainable land management

These lead to value adding farms then communities and then regions

To get the balance between environment (rivers) and good/agriculture – farming

Future for young people in agriculture and region

Key Threats of this scenario

White paper (govt. policy)

- Eg. no cap on water out of region, price, inequitable (80/20), compensation

Cost/price squeeze

Salinity

Political eg environment lobby

Climate change

Vulnerabilities – climate, market overseas, disease

Option Package 1 - Environment – looking at salt affected areas

Salt water use –

- pump groundwater
- use water for aquaculture/salt
- use water for forestry
- energy generation

existing farmers need to look at

- irrigation techniques
- soil type selection
- alternative uses

need to improve water qualities so as to not loose more water to the environment

- continue with LandCare activities
- control of runoff

Improvement of cooperatives

- Rationalisation
- Research into existing infrastructure

Option Package 2 Key objectives – profitable agriculture which is viable.

Intro and retraining of young and educated into the ag industry

How -

innovation

succession planning (skills, capital, ownership, control and management)

value ourselves, industry and promotion

education and extension

improving working conditions on the job – flexibility (dependant on adequate returns)

inspiring motivation and passion for farming

involvement in decision making on farm /in business

skills in risk management and business skills will assist with certainty (where possible)

appropriate and affordable training pre and on farm
 encouragement of banks to value and back young people
 VFF and banks involved in training
 How schools and the community value agriculture
 Promote and provide a range of options and entry levels for young people in ag.
 Educate farmers as to how to recruit and mentor young people
 Better returns = better profits = income = adequate distribution of profits to industry

Option Package 3 Profitable, sustainable agricultural enterprises

research and development - irrigation techniques, systems, diversity (irrigated vs non-irrigated), value adding (eg pharmaceuticals, nutraceuticals), enterprise structure (status quo, corporate, lifestyle)
 extension
 capital - human, social, financial
 effective chain from farm gate to end consumer
 'clean, green' production, farms, regions - promote to decision makers and markets
 value ourselves (farmers, rural communities), our production and our environment
 encourage and reward environmental stewardship
 attract and keep young people in agriculture (see Option 2)
 improve effectiveness of industry groups
 develop political will at grassroots
 improve efficiencies of institutions and factories

A sustainable region, leading to a balance between agriculture and the environment.

How?

1. Develop 'pilot project' - salt-affected/marginal land returned to natural revegetated state.
2. Interested parties develop a vision, get support.
3. Engage community at grassroots level to explore vision (community could be a district etc)
 - listening, inclusive
 - provide information (range of 'know how')
 - explore options / outcomes at individual, district and regional level

- swot (strengths, weaknesses, opportunities, threats) analysis
- 4. Form stakeholder group consisting of government (state and local), CMA, G-MW, conservation groups and community representatives (nominated)
- 5. Stakeholder group responsible for co-ordination - need to:
 - draft map, guidelines
 - plan 'how'
 - range of management options (eg outsider and / or stewardship by farmers, hobby farms, local and conservation groups)
 - identify threats and how to respond (eg kangaroos)
 - consider impact on people, districts and work with decision makers / community on response – adjustment
 - develop and promote 'rewards' (eg compensation, leases, eco-tourism, recognition, incentives etc)
 - attract capital from government, corporate, greenies, carbon credits.
- 6. Action
- 7. Refer to Russell Jones' paper.

Option Package 4 Communities Managing Change

Active involvement in process (eg water policy, reconfiguration, diversity).

Support for leaders and training for emerging leaders.

Resource communities to build capacity and move forward using - capital (human, social and dollars), infrastructure and the environment.

Encourage local and regional responsibility for managing change (not imposed).

Other ideas that don't fit into option packages but we want recorded
 Integrity – the design of our systems and policies must have at their foundation an integrity that measures all decisions against physical realities and decentralized purpose which brings the financial (abstract) under it's command.

Regional Response Option– Best guess

Group members – John Lyle, Laurie Bolitho, Graham Smith, Russell Pell, Brian Sullivan

Internal drivers relevant to this scenario

Leadership

Infrastructure and land use planning

Confidence/will to survive

Skills/community

Tech-knowledge

Resource/water/energy

R&D

Political influence

Strengths - GB Catchment at the moment

Location

Infrastructure

Climate

Community

Soils

Weaknesses - GB Catchment at the moment

Salinity

Land Use planning in early days

Drought prone

Water leaving area

Profitability

Key Opportunities of this scenario

20% flow to environment (increased river flows)

specialised agriculture

increased tourism

increased productivity (better use of technology)

population increase

Key Threats of this scenario

climate change

salinity

threats from urban population (water use)

Option Package 1 - Privatization of water industry

This will be achieved by improving the infrastructure that we have and necessary at the time. This would not be up to 100% standard however, all channels, bridges, etc will meet irrigation requirements in servicing delivery and will be priced accordingly.

Before this happens infrastructure would need to go through the reconfiguring of pipelining, closure of some systems, improved measurement and accountability efficient on farm practices with technology.

There would need to be a communication program established with established boards. Rural would need to be established in total management of area with regard to who's eligible.

Allowing farming communities to manage their own destiny, less government interference, owned by stakeholders with options to sell.

Use NSW system as an example.

Option Package 2 - Sustainability of irrigation areas

Farmers need to be viable to maintain all ages of farmers for the future. Education programs that are targeted to the needs of country life on farming enterprises, this package involves all aspects of farming – best practice.

Regional Response Option - Utopia

Group members – Mark Lawler, Jenny Reuther, Doug Small, Ann Bell, Michael Lee-Whyte

GB Catchment in the past (internal drivers)

Education, knowledge and community

Local environment actions

Community expectations

Research

Rescue availability

confidence

Strengths - GB Catchment at the moment

research

diversity

infrastructure – conditions

location

climate

water availability

relatively clean environment

Weaknesses - GB Catchment at the moment

conservation

dairy dominance

defensiveness

land Use intensiveness

environmental knowledge

community disharmony

fragility of system

Key Opportunities of this scenario

Embrace change

Produce local vision – integrate with state and federal initiatives

Improved health

Local economic stability through diversity

Revegetation

Stable environment = stable future

Warm water aquaculture

Water quality

Improved international reputation

Key Threats of this scenario

Community disharmony
Disconnection from national agendas
GMO's
Lost confidence
Environmental disaster/decline
Long term permanent water \$\$

Option Package 1

create regional forums
set targets and vision for stream improvement
shift focus from imposed agenda to local agenda
diverse regional mix (representation)
show leadership in celebration of value local streams
local research on new and diverse production systems
lobby government to do land use planning and irrigation system planning
develop relationships with school councils
supply all schools with curriculum material of local environment
enable every school student to have a rural experience
help to facilitate change management - creative workshops, counselling, education, research, community discussion groups
promote the 'cleanest, greenest' diversity of the catchment
benchmark QA system to prove 'clean and green' at individual and regional level - promote overseas with backup data, develop a regional logo
environmental level - 1% of GST - everybody pays

Option Package 2

innovative technology
develop relationships - banking, corporate, vendors
marketing agriculture as a career
lobby government to ensure all water stays in the region.

Best Ideas for the Day

A 'well-being' industry integrating environment, farming systems and healthy foods for spiritual, mind and body rejuvenation.

Environment levy 1% of GST.

That farmers can consciously challenge and change the power / concentration policy of monopoly.

15% plains grassy woodland across the irrigation landscape

Co-operative farms and landholders – 16 per square mile?

Pool land, assets, water, labour, equipment etc

Re-allocate land-use – match enterprise to soil suitability

Allocate water to highest returns

Collect all drainage for re-use and aquaculture

Pump groundwater for conjunctive use and aquaculture

Share profits

Paid holidays

Labour rostered

Weekend off per month

A factory the size of SPC processing Asian fruits and vegetables to export to Asia.

Region supports a fish-feed industry in response to aquaculture using saline water

Loss of dairy farming on the northern plains to other more viable industries.

Kyabram Workshop 4– Further Development of Themes Within Options

Element – Adjustment and Re-Configuration

Michael, Mark, Graham, Laurie, Durham

Sub-elements:

- (a) Community engagement and education
- (b) Creation of implementation authority
- (c) Planning/funding
- (d) Water reform/Land reform
- (e) Land use change/consolidation of current land use

(a) Community engagement and education

Steps involved	Who	When
<ul style="list-style-type: none"> Precursor to set up of Government authority. Better if driven from ground up 		

Values - Co-operation, justice, truth

Aspirations - Vibrant community

(b) Creation of implementation authority

Government re-configuration appropriation board

Steps involved	Who	When
<ul style="list-style-type: none"> Creation of authority to implement the community's hard decisions (resistance will be felt from minorities) 		

Values - Courage, justice, wisdom, stewardship, success, persistence

Aspirations - Less irrigated land better managed

(c) Planning/Funding

Steps involved	Who	When
<ul style="list-style-type: none"> Funding research & development Community consultation Technology for channels and on-farm education 		

Values - Fairness, community support, prosperity, wisdom, ownership

Aspirations - Less irrigated land better managed, community leadership, strong social network, change is not suppressed

(d) Water reform/land reform

Steps involved	Who	When
Land reform <ul style="list-style-type: none"> Change in ownership Compulsory and voluntary acquisition supported by Govt 		

funding <ul style="list-style-type: none"> • Allows for landscape mosaic re-configuration. Water Reform <ul style="list-style-type: none"> • Compulsory acquisition to shut down systems and concentrate resources in better areas. - Return of water to environment - Technology - Head works change – supported by govt funding. 		
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Values - Environment, courage, innovation, stewardship, trust, flexibility

Aspirations - Less irrigated land better managed, environment has a healthy clean image. Change not suppressed.

(e) Land change/Consolidation of current land use

Steps involved	Who	When
<ul style="list-style-type: none"> • Revegetation • Support of farming systems with high economic efficiency on appropriate soil types where water infrastructure is efficient 		

Values - Environment, security, courage, stewardship, ownership, conservation

Aspirations - Less irrigated land better managed, healthy green, vibrant community, change not suppressed.

Element - Viable Communities

Russell, Brian, David, John, Stuart

Sub-elements

- (a) Managed Water price changes
- (b) Managing and paying for irrigation infrastructure
- (c) Establishing a basis for water pricing
- (d) Recognise industry diversity
- (e) Promote irrigation industry to larger community
- (f) Sustainable farming systems

(a) Managed Water price changes

Steps involved	Who	When
<ul style="list-style-type: none">Industries need to meet dollars/water charges with productivity between price movement needs to recognise this.Need to have a staged system for water price charges<ul style="list-style-type: none">- 5 year - 10 yr plans (herald the change and provide time for adjustment)- to provide certainty and confidence to invest	GMW WSC/Board, Industry	

Values - Security, fairness profitability

Aspirations - Viable communities

(b) Managing and paying for irrigation infrastructure

Steps involved	Who	When
<ul style="list-style-type: none">Recognise the state of asset - infrastructure/inventoryWho should pay for this upgrade (who profits from it)<ul style="list-style-type: none">- regional/state- National - environment- IndividualWhat will we replace infrastructure with - existing, TCC, otherUndertake detailed study of new industry developments - generally outside ??? districts (because of infrastructure costs)	Regional Community	Before water dollars get too high and reduce critical mass

Values - Fairness, profitability, security, justice

Aspirations - Vibrant community

(c) Establishing a basis for water pricing

Steps involved	Who	When
<ul style="list-style-type: none">60% water price vs infrastructure20% Head water20% Delivery (GMW)	GMW provide data Local and state Govt Regional community	Yesterday

Beneficiary pays <ul style="list-style-type: none"> - not just agriculture - regional economics) community benefit - national economics) - tourism etc (maintenance of community/regional infrastructure) <ul style="list-style-type: none"> • level of service between industries • Water savings to environment – can this be funding the required infrastructure. 		
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Values - Farmers, profitability, sustainability, security

Aspirations - Viable community

(d) Recognise Irrigation Industry Diversity

Steps involved	Who	When
<ul style="list-style-type: none"> • Establish the critical linkages between the irrigation industries ie dairy, hort, cropping, livestock Each contributes to maintain viable communities ie dollars, employment, water trading, resource sharing 	DPI	

Values - Security, initiative, persistence, profitability

Aspirations - Strong thriving economy, vibrant community – change not suppressed.

(e) Promotion of Irrigation Industry to larger community

Steps involved	Who	When
<ul style="list-style-type: none"> • Identify contributions that irrigation make to Australian economy – impact on food prices. • Promote the need for total community investment in infrastructure (education program to promote irrigation and the productivity gains which have been achieved) 	ANCID, interest group	

Values - Co-operation, fairness, profitability, community support

Aspirations - Strong thriving economy

(f) Sustainable farming systems

Steps involved	Who	When
<ul style="list-style-type: none"> • Match irrigation method to soil type • Match forage to irrigation method and soil type • Decide whether the enterprise is sustainable (economic/environmentally) 	R&D Planning	

Values - Environment, profitability, initiative, prosperity

Aspirations - less land better managed.

Element: Community

Ann, Jenny, Katrina, Doug, Bev

Sub-elements

- (a) Community Engagement
- (b) Creating Vision/Goals
- (c) Community ownership
- (d) Leadership training
- (e) Community/Regional Action plan
- (f) Community Celebration

(a) Community Engagement

Steps involved	Who	When
<ul style="list-style-type: none">• Recognition of commonality (issue, need, interest, shared ideas)• Responsibility for community engagement (co-ordinated holistic approach)• Coming together – model that suits<ul style="list-style-type: none">- Communicate – everyone- environment eg youth/school- marketing (what's in it for me or my community)- will need dollars, change of thinking, new partnerships/relationships, consensus	Community/stakeholders/service providers/govt ie LC, CMA, GMW, VFF Stakeholder/community	Now (at start) Now at start

Values - Co-operation trust, fairness, relationship, ownership

Aspirations - Vibrant communities

(b) Creating Vision

Steps involved	Who	When
<ul style="list-style-type: none">• Define rules• Reflect on history of community (story telling, photos)• Identifying whose there• Identifying where the community wants to be (vision, goals) –may need sub groups• Define process – what happens next, communications	Facilitator Recorder Group	Start of meeting

Values - Co-operation, innovation, courage, ownership, prosperity, freedom

Aspirations - Change is not suppressed – own managers of change

(c) Community Ownership

Steps involved	Who	When
<ul style="list-style-type: none">• Community nominate people to lead process• - existing or emerging leaders• if earlier steps have been done well community	Training/support Facilitator/group	1 st /2 nd meeting

ownership evolves group		
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Values - persistence, ownership, trust, co-operation, flexibility, community support

Aspirations - vibrant communities, change is not suppressed, managers of change

(d) Leadership Training and Support

Steps involved	Who	When
<ul style="list-style-type: none"> • Training and support if not available, develop and have ready to deliver • Identifying emerging leaders of existing leaders who may need training/support • Identify what's available <ul style="list-style-type: none"> - Who pays - outcomes - back to community 	facilitators Self, group or facilitator Group/Facilitator	Prior to plan 1 st /2 nd meeting “ “

Values - community support, stewardship, truth, trust, initiative

Aspirations - community leadership, strong and exists at all levels.

(e) Action Plan

Steps involved	Who	When
<ul style="list-style-type: none"> • Whip around – introduce • Recap on first meeting • Affirmation what has happened since • Prioritise vision/gals • Steps for how to achieve goals <ul style="list-style-type: none"> - ie action plan (include access to expertise, gathering information etc • Modify vision/goals • Action steps at community/regional level group, sub group, stakeholders • Timeframe, ??? • Report back to community throughout actions 	Leaders Group Group Group Group sub group, stakeholders	2 nd meeting

Values - Courage, co-operation innovation, ownership, prosperity, responsiveness

Aspirations - Could relate to all.

(f) Community celebration

Steps Involved	Who	When
<ul style="list-style-type: none"> • Value community and people <ul style="list-style-type: none"> - history, skills, achievements, environment • Recognise action plan successes and celebrate • Promoting community 	Group Group	Ongoing Ongoing

Values - Fun, success, friendship, happiness, prosperity

Aspirations - Good social support and real prosperity, measured in human values.

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment E Engagement with Young People & Business Leaders December 2004

**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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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

Table of Contents

Engagement with young people & business leaders.....	5
Engagement with young people	5
Business leaders	6
Dookie Workshop Notes	7
Interviews with Industry Leaders	9

Engagement with young people & business leaders

This Attachment deals with the objectives, methods and outputs of engagement with young people and business leaders.

It provides examples of the:

- Aims and methodology of the half-day Workshop program for students at Melbourne University's Dookie Agricultural College,
- Outputs from the Dookie Workshop,
- Results of the interviews with regional business leaders and visionaries.

Engagement with young people

The Participation Plan (Section 2.3(a), Participation Plan, Milestone Report 1 b) specifically targeted engagement with young people. Given a planning horizon of 30 years being used by the project, it was considered essential that the project incorporate the views of next-generation farmers.

While the Forum Workshops specifically targeted people under 35, it was found that they were often too busy establishing their farming enterprise to give a substantial amount of time to regional planning exercises. Hence, additional efforts to engage this group had to be made. One of those efforts was a half-day Workshop with 2nd and 3rd year students at Melbourne University's Dookie Agricultural College.

Planning for the Workshop was done in conjunction with students and staff at Dookie. A key student contact was established through the Young Irrigators group, and that person was then able to nominate particular staff who would support such an initiative. They were very enthusiastic about students being involved, and were therefore keen to assist. Staff helped to identify target student groups who were at the right level to be involved in such a planning exercise. They also provided useful feedback on objectives and methodology. The major challenge was to find a suitable half-day timeslot in an already crowded academic year.

The rational aims for the session were to capture:

- Aspirations of next generation farmers,
- The challenges which they saw as needing to be addressed, if we were to achieve those aspirations, and
- Their ideas for overcoming those challenges.

The experiential aims were that participants felt that:

- They had the opportunity to have their say, and
- That the door is open for further discussion.

The focus on aspirations, challenges and ideas was designed to mesh loosely with the aspirations, scenarios and response options used within the Forum Workshops. This was done so that outputs from all engagement activities could be combined fairly readily in the SRC synthesis process.

The Workshop started with a free lunch (some motivation was considered useful), and then introduced:

- A brief ice-breaker which was designed to get people talking. That conversation was then directed to
- The challenges which they saw as relevant to the future of irrigated agriculture in this region. (Participants were asked to identify their top 3 challenges).
- Aspirations were defined using the “letter to self” approach used in the Forum Workshops.
- Finally, a small group, brainstorming exercise was used to define response options which could overcome those challenges and achieve their aspirations.

While time did not allow a formal evaluation to be conducted (students had to go to their next class), they did seem to enjoy the process and participated actively. The outputs from the Workshop are provided in this Attachment.

Business leaders

The project team considered it essential that the perspectives of major industry groups within the region were captured, so that the project was in-step with their strategic directions. CEO’s of these key industry groups and other leading edge farmers within the region were identified (and contacted) with the help of the SRC. In the context of an informal interview, they were asked to put forward what they saw as:

- The strategic issues for the future of irrigated agriculture in this region, and
- The strategic decisions that we (as a region) need to take in order to move forward.

A summary of those discussions is provided in this Attachment.

Dookie Workshop Notes

(a) Personal / community aspirations (my grouping)

Community

Thriving rural communities, unity within farming communities, community fun days

Viability

Fair, reliable and competitive prices, diverse regional produce,

Recognition

Increased urban awareness of agriculture,

Enhanced environmental consciousness in production

Recycling, reclaimed water, water quality, water-powered machinery, solar energy, native species, environmental focus by Govt and land owners, salinity under control, weeds under control, increased farm efficiency – no channels, water resources – reliable, efficient irrigation delivery systems, dairy industry sustainable with regard to water-use,

Changed management systems

Young people involved in decision-making, local decision-making, less bureaucracy

Technology

Product feedback

Young people in agriculture

Assistance in establishment for young farmers, satisfaction

(b) Challenges

Priority defined by the (number of votes)

Climate Variation	(10)
Labour Efficiency	(5)
Environmental Impacts	(5)
Prices/Margins	(4)
Investment costs and establishment	(4)
R&D (new technology / GM)	(3)
Water Quality	(3)
Uncertainty	(3)
Competitive advantage	(1)
Role Models	
Price Subsidies	
Feedback (production system)	

(c) Response options – things we can do

Community discussion groups with direct links to Government, which comprise of industry leaders in their field who represent the beliefs and values of their constituents.

Education – an appreciation of what we have in terms of people and resources, that can aid in the development of young people's education. Rural scholarships, and program content covering issues such as environmental education, integrated PPA management in public and private land etc. Also, improve the image of country life in metropolitan areas thru' education and role models.

R&D which demonstrates sustainability for all to benefit and understand. Benchmarking for farms. Investigate the productive use of native pastures and bushland reserves in properties.

Govt assistance during drought plus commercial funding, for efficiency improvements such as tape irrigation, solar energy use, plus an incentive / vision for young people to enter agriculture.

Improved succession planning to attract youth into agriculture.

As a community, work to deliver a fair price for food, so that primary producers can remain viable.

Interviews with Industry Leaders

INDUSTRY	CONCERNS	RESPONSE OPTIONS
DAIRY		
Company A	The critical area of concern for dairy is: the price of water .	The price which producers pay for water should not adversely affect their ability to stay in what is an important developing market. It is argued that water price should reflect the depreciation rate over the life of the (supply system) asset, and not force additional costs of (historically) poor management in the past, onto producers now.
Company B	The key issues at Company B are also, the price of water , and the uncertainty regarding the future.	In relation to water, it is argued that the time over which price adjustments are made should be sufficient to allow farmers to make the necessary transition without being financially crippled, and G-MW needs to send a clear picture of the price of water in the future so that farmers can plan accordingly. Perhaps the 2% cap on water trading out of the region needs to remain until some of these unknowns are resolved, otherwise farmers may be making decisions on a poor information base.
Farmers A & B Directors A & B	Why is it more attractive to develop at Sunraysia at the moment, and will that change in the future? What risks are there for this region if NSW can provide a higher security of supply? What happens to this region if we have another bad season(s), and we loose a large number of dairy farmers in a short period of time? Succession planning in the dairy industry is limited.	Note: Some work on the impact of water (and other?) pricing on dairy viability has been done by Dairy Aust, ABARE, & DPI. In relation to uncertainty, there is a mood/perception in the dairy community that the future is bleak, which needs to be addressed by counselling/information seminars etc. Cost the long-term infrastructure requirements of some of these greenfield site moves. Consider the social impacts of TWE's. Consider how to manage the issue of large-scale movement out of the dairy industry, and the associated impacts on land (retirement?) and water availability.

		Provide for down-sizing in a planned and supported fashion for the good of the whole community.
HORTICULTURE Company A	Labour and infrastructure costs will be important to the future. It appears that quantity, quality and reliability? of water are not an issue at the moment.	
VITICULTURE Company A	Restoring the Goulburn River to pristine eco-health It appears that quantity, quality and reliability? of water are not an issue at the moment.	Whatever it takes.
VEGETABLES Company A (local) Company B (just returned from China)	Water trading out of the region is seen as a key concern. The view that we will be the foodbowl of Asia is a myth – nothing could be further from the truth. They will be our opposition. The other myth is that we are short of water, and that water is dear.	Maintain the cap on trading out of the region. Protects infrastructure and cost regimes for the remaining players Industry will move to a greater emphasis on machine picking. Exciting future for lettuce, cabbage etc. We have just gotten thru’ the last 8 years and survived, so we are not short of water. What we need to do is manage what we have more effectively, eg reduce losses thru’ piping etc.
LOCAL GOVERNMENT Shire A	Movement of lifestyle farming on to good agricultural land.	Lifestyle farming brings in new money, so it makes a contribution. Its location needs to be managed so that valuable agricultural land is not lost to intensive production enterprise. The recognition of tourism (thru’ environmental flows) provides a key opportunity

		for Local Government.
FINANCE Company A	<p>Water movement out of the region has flow on effects, both in terms of channel isolation and broader social impacts.</p> <p>“New” / inexperienced players buying farms without an adequate knowledge of the water requirements.</p> <p>Separation of land and water is causing some headaches for lenders.</p>	
YOUNG PEOPLE 3 rd year students at Dookie	<p>Concerns, in order of priority, with # of votes in brackets</p> <p>Climate Variation (10)</p> <p>Labour Efficiency (5)</p> <p>Environmental Impacts (5)</p> <p>Prices/Margins (4)</p> <p>Investment costs & establishment (4)</p> <p>R&D (new technology / GM) (3)</p> <p>Water Quality (3)</p> <p>Uncertainty (3)</p> <p>Competitive advantage (1)</p>	<p>Community discussion groups <u>with direct links to Government</u>, which comprise of industry leaders in their field who represent the beliefs and values of their constituents.</p> <p>Education – an appreciation of what we have in terms of people and resources, that can aid in the development of young people’s education. Rural scholarships, and program content covering issues such as environmental education, integrated PPA management in public and private land etc Also, improve the image of country life in metropolitan areas thru’ education and role models.</p> <p>R&D which demonstrates sustainability for all to benefit and understand.</p> <p>Benchmarking for farms. Investigate the productive use of native pastures and bushland reserves in properties.</p> <p>Govt assistance during drought plus commercial funding, for efficiency improvements such as tape irrigation, solar energy use, plus an incentive / vision for young people to enter agriculture.</p> <p>Improved succession planning to attract youth into agriculture.</p> <p>Work as a community to deliver a fair price for food, so that primary producers can remain viable.</p>

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment F Scenario & Options Synthesis by the SRC December 2004

**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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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

Scenario & Options synthesis by the SRC.....	5
SRC Workshop planning	5
Scenario synthesis (Day 1).....	6
Response Option synthesis (Day 2).....	7
Outputs from SRC Workshop 1	10
Revised mega-external drivers	10
Super Scenario 1: Food for Thought	11
Super Scenario 2: Policy For People.....	12
Super Scenario 3: Economic Ideals	13
Super Scenario 4: People & Production	14
Super Scenario 5: Climatic Clamps.....	15
Outputs from SRC Workshop 2	16
Themes within the Regional Response Options	16
Summary of Irrigation Futures Forum Aspirations	18

Scenario & Options synthesis by the SRC

Having generated a prodigious amount of material through the stakeholder engagement process, the challenge was now to synthesise (or consolidate) that material to a manageable size, without losing the intent and richness of participant input.

This Attachment deals with the:

- Planning and running of a 2-day Workshop for the SRC, aimed at synthesising that material,
- Outputs which were generated by that process, and
- Additional work required.

It provides examples of:

- The pre-processing of information carried out by the project team in order to facilitate the target outcome,
- The Workshop program for the 2 days,
- The outputs from the process, and
- An evaluation of the success of the process, with an identification of what is required for completion.

SRC Workshop planning

The Forum Workshops generated 28 scenarios and over 100 pages of Response Options. In addition, information was captured from young people and business leaders within the region. That material needed to be synthesised into something more manageable, for further detailed investigation in Stage 3. A policy decision taken by the project team was that this synthesis should be done, as much as possible, by the SRC. The rationale was that the SRC were stakeholders (primary producers, processors, Landcare reps etc), and their decision-making processes would better represent stakeholder views than those of the project team.

Due to the complexity of managing such a large volume of material without overwhelming SRC members, the planning process again involved a large number of iterations (5 significant drafts) over a 2-3 week period. “Dummy runs” were conducted to make sure that the instructions were clear, and tasks were achievable.

Also, to context these SRC Workshops, it is noted that:

- The group size was about 20 people,
- All SRC members had been provided with outputs from the Forum Workshops and other engagement activities, plus telephone briefings if they had not been able to attend the actual SRC meeting,
- Not all SRC members had actually attended the Forum Workshop series, and
- Not all SRC members were regionally-based, or knew one another very well.

As a result, some time was lost as the whole group came “up to speed” on various aspects of the project. “Bedding-in” of people into a team takes time.

Scenario synthesis (Day 1)

It was found necessary for the project team to carry out some pre-processing of the information, so that the SRC Workshop task was achievable. This involved:

- Harvesting and then grouping all the external drivers identified within the Forum Workshops. Those driver groupings are provided within this Attachment as the “Revised mega-external drivers”. It demonstrates the (somewhat frightening) range and complexity of issues which impact on irrigated agriculture. Scenario creation was subsequently carried out in terms of those mega-driver groupings.
- Collating scenario storylines from all Forum Workshops.

In terms of Workshop planning, the rational aims for Day 1 were for SRC members to:

- Understand where these 2 days fit in the context of overall project process,
- Understand concepts of internal and external drivers, and
- Identify 5 (synthesised) scenarios to go to the next stage.

The experiential aims were for participants to feel:

- That they have a good grasp on the content of the scenarios and options,
- That they have a considerable responsibility to the project, and that we are taking that very seriously,
- Confident with the synthesising process and their final ‘product’,
- That they aren’t just doing ‘hack work’, and
- That they are developing a sense of ‘team’.

The approach used was to:

- Working in groups of two, examine 2 to 3 scenarios from the Forum Workshops. Identify and list the storylines within each mega-driver of those scenarios.
- The storylines for each individual mega-driver were then collated.
- From the collated storylines for a given mega-driver, create 2 or 3 distinct and plausible storylines for that particular mega-driver, which encapsulate the range of storylines within the collated set. (This was done in small groups, and created up to 21 distinct storylines for the 7 mega-drivers.)
- Create 5 distinct super-scenarios. This was done by each group choosing a “seed” storyline from within their 2 – 3 mega-driver storylines, to commence one of the five scenarios. Groups then rotated, read the “seed” storyline, considered how their own mega-driver storylines would complement that scenario, added (or did not add) something from their portfolio, and moved on etc. Mega-driver storylines could be used more than once, as considered appropriate to the scenario being built. This led to the considered development of 5 super-scenarios, which contained a range of mega-driver storylines. The results are presented in this Attachment (Super-scenarios 1-5).

It was quite a challenging day, and to their credit, SRC members completed the task.

Analysis of the 5 super-scenarios showed that:

- Most of the key ideas from the Forum Workshops were captured,
- Scenarios 4 & 5 overlap considerably with scenarios 1-3. In hindsight, this was bound to happen, given the method of development.
- There is some degree of connectedness between the mega-drivers, but this needs to be strengthened,
- The scenarios provide a range of plausible futures.

In regard to analysis of the storylines within the 7 mega-driver themes:

- Resource Shifts and Allocations - Land well covered, but not water,
- Climate - The two storylines are two aspects, not alternatives,
- New and Emerging Technology - Good ranges, but implications need to be explored,
- Community Values and Gov't Policy - Could include 15 year review of water allocation,
- Sudden Change - Consistency with other drivers needs to be checked. There could be a Sudden Change driven scenario,
- Input Costs of Production - Could include labour availability and work expectation,
- Consumer Demand - Could include demand on eco-agro-tourism & well-being products. Could include influence of big purchasers. Rephrase "market convergence".

To address these issues, it was felt that that the project should:

- Develop up Scenarios 1, 2 and 3 - Incorporate missing ideas; Check consistency; Connect storylines and enrich the story,
- Rework Scenarios 4 & 5 - Use 2 Sudden Change storylines (one involving sudden change at a national level, the other at an international level) to drive and develop two brand new scenarios,
- This would be done by the project team, and resubmitted to the SRC for approval.

Response Option synthesis (Day 2)

In terms of pre-processing for this Workshop, the project team:

- Identified the major themes within the Forum Workshop response options. This provided a starting point for the SRC process.
- The next task was to sift through the Forum Workshop response options and group them into these Themes for use within the SRC Workshop.

In terms of rational aims for Day 2, the object was for the SRC to:

- Synthesise the regional response options,
- Input their own ideas for response options (ie value-add),
- Prioritise/give direction on areas to further develop options,
- Reach consensus on a list of final values and aspirations,
- Work on a shared vision, and
- Identify some high-level outcome measures (to feed into the TWG)

The experiential aims were unchanged from Day 1.

The options were addressed as follows:

- Members were encouraged to choose a response option Theme that they wished to pursue,
- Working in those theme-based groups (about 5-7 people), members then refamiliarised themselves with the Forum Workshop options within that particular theme,
- The major sub-themes within the theme were then identified. These are given in this Attachment, and
- For a given sub-theme, a package of synthesised response options was generated.

Most groups were able to process 2-3 sub-themes, albeit not very comprehensively. Unfortunately, information overload, and the complexity of developing workable solutions appeared to set in.

However, even though the process did not go to completion, it was felt to be valuable in the sense that it had forced the SRC to become familiar with the range and intent of the Forum Workshop options. The majority of SRC members were very pleased with the outcome, as it identified the complex nature of the task and the seriousness with which the project team was managing it. As a result, the SRC:

- Directed the project team to complete the synthesis of both the scenarios and the options, and report back to them.
- They would check that the project team's work reflected the inputs from the stakeholder engagement processes, and direct the project team to make changes as required.
- The final output would then go forward to Stage 3 for further detailed investigation.

The other issue addressed was that of Aspirations. The Aspirations from all the Forum Workshops were integrated, and presented to the SRC for discussion. The final list of regional aspirations endorsed by the SRC is given in this Attachment.

Report back to stakeholders

To complete Stage 2, it is planned to report back to Forum Workshop participants on the SRC decisions, and the reasons why those decisions were taken. This is seen as important in terms of keeping faith with stakeholders. It means that the process for handling their contributions remains clear and transparent, and it also allows them to provide feedback on those decisions.

Outputs from SRC Workshop 1

Revised mega-external drivers

1. **Resource shifts and allocations** (eg between environment, urban, lifestyle, commercial agriculture, water trading, tourism, plantation forestry etc.)
2. **Consumer demand** (eg. price, quantity, quality, variety, environmental impact, globalisation, currency, free trade etc.)
3. **Input costs of production** (eg. energy, labour, technology, water, capital, infrastructure, processing, transport, etc.)
4. **Community values and government policy** (eg. environment, biodiversity, equity, community well-being, diversity, migration, structural change, religion, subsidy etc.)
5. **Climate** including change and variability (eg. water availability, farming conditions, droughts, bushfires, floods, chill hours etc.)
6. **Dramatic change** (eg. international conflict, terrorism, disease, earthquake, dam failure, salinity, acidity etc.)
7. **New and emerging technology** (eg genetic modification, desalination, weather manipulation, communication, energy, new varieties, irrigation, etc.)

Super Scenario 1: Food for Thought

Resource shifts and allocations	Climate	New & Emerging Technology	Community Values & Gov't Policy - Keen Green	Sudden change	Input Costs of Production	Consumer Demand
<p>Storyline based on international grain shortage for extended period.</p> <p>Farming leads to development of larger corporate farms providing high productivity. Outcome: less farmers.</p> <p>This implies more technology and thus more skills required ⇒ smaller population but more skilled.</p> <p>Prospects of importing contract services and specialised equipment.</p> <p>These “corporate” farms will concentrate on quality agricultural land and or land appropriate for production (eg near transport services). Mangalore airport develops. Hobby or lifestyle farms (sea change and green change) will concentrate in environmentally more attractive areas and nearer urban services.</p> <p>Irrigation and other production infrastructure will be substantially improved in “production” areas.</p> <p>The region will develop in a “western suburbs / eastern suburbs” manner with high productivity / relatively low living standards in one area and low productivity / high standards in the other.</p>	<p>Climate change</p> <p>Move to warm / dry winters</p> <p>Hot / wet summers</p> <p>Too hot for existing pastures</p> <p>Overall reduction of rainfall</p> <p>Increases in crop water requirements</p> <p>Reduction of chill factor.</p> <p>Leads to different crops plus different watering seasons & methods.</p> <p>Increased wildfire in upper catchment, impacting on water quality and quantity.</p> <p>Increased fire risk on plains due to reduced irrigation.</p>	<p>Technology continues to underpin the development of agriculture (business as usual)</p> <p>Broad acre agriculture still exists.</p> <p>Irrigation technology developments have increased water use efficiency and productivity, while energy use has gone up.</p> <p>Genetic Modification of plants and animals is widely accepted, which has resulted in no chemical use, and enabled permanent row crops.</p> <p>Robotics look after agricultural production</p> <p>Silage pipelines from Queensland to Victoria.</p>	<p>Politicians and communities are focused on natural resource stewardship. Sustainability and protection of the environment becomes core business.</p> <p>More QA requirements on-farm. Farmers more accountable.</p> <p>Concern for health leads to clean green, organic production for local consumption. Food safety is very important.</p> <p>Large volume food production is GMO based and exported to poorer countries.</p> <p>Community goes through a sea change with people moving to rural living over the catchment as a whole. Particularly significant in the Upper Catchment. Facilitated by Local Gov't planning wrt land use management.</p> <p>Formation of regional government structures</p>	<p>Fire blight outbreak in Goulburn Valley.</p> <p>Genetically modified pears resistant to fire blight are developed.</p> <p>Life goes on.</p>	<p>Price structures for fuel and water have <u>not</u> been changed from their current basis.</p> <p>Price increases for chemicals have occurred.</p> <p>Additional internalisation of environmental costs.</p> <p>Cost of living increase.</p>	<p>Export and domestic markets converge.</p> <p>Increased competition at the high value end from low cost producers in our traditional markets (both overseas and home).</p>

Super Scenario 2: Policy For People

Resource shifts and allocations	Climate	New & Emerging Technology	Community Values & Gov't Policy - Keen Green	Sudden change	Input Costs of Production	Consumer Demand
<p>Based on higher level of Government regulation to address NRM, recreation and tourism issues.</p> <p>Conduct land capability studies to identify "good" agricultural land to protect it, dedicated to best practice production and meeting minimum Government standards.</p> <p>Government purchases or manages considerably more public land, particularly for tourism, recreation, aesthetic and cultural reasons.</p> <p>Water supply provided at a higher reliability level to ensure environmental and other non-agricultural demands are met.</p> <p>Government encourages and supports a diversity of agricultural industries rather than "all eggs in one basket".</p> <p>This gives rise to a more diverse work force in terms of age, occupation, education levels etc. More international visitors etc.</p>	<p>Adelaide swings over to desalination and reduces demand on the Murray and enables barrages to be scrapped.</p> <p>Changes Salt Disposal Entitlement and water entitlement.</p>	<p>Alternative food technology developed. Most food constructed in a Laboratory.</p> <p>In some areas, agriculture becomes the producer of basic components only (eg starch etc).</p> <p>Competition for the production of basic components with aquaculture.</p> <p>Urban supply is primarily sourced from recycled sewage.</p>	<p>Politicians and communities are focused on natural resource stewardship. Sustainability and protection of the environment becomes core business.</p> <p>More QA requirements on-farm. Farmers more accountable.</p> <p>Concern for health leads to clean green, organic production for local consumption. Food safety is very important.</p> <p>Large volume food production is GMO based and exported to poorer countries.</p> <p>Community goes through a sea change with people moving to rural living over the catchment as a whole. Particularly significant in the Upper Catchment. Facilitated by Local Gov't planning wrt land use management.</p> <p>Formation of regional government structures</p>	<p>Fire blight outbreak in Goulburn Valley.</p> <p>Genetically modified pears resistant to fire blight are developed.</p> <p>Life goes on.</p>	<p>Price structures for fuel and water have <u>not</u> been changed from their current basis.</p> <p>Price increases for chemicals have occurred.</p> <p>Additional internalisation of environmental costs.</p> <p>Cost of living increase.</p>	<p>Export and domestic markets converge.</p> <p>More affluent market consume more</p> <p>require more variety / higher value.</p> <p>Only small increase in population, ie negligible increase.</p> <p>Opening of niche markets</p> <p>Still high demand for basic foods.</p> <p>Shift in urban sprawl from Melbourne increased opportunity for Goulburn Broken region.</p>

Super Scenario 3: Economic Ideals

Resource shifts and allocations	Climate	New & Emerging Technology	Community Values & Gov't Policy - Extreme Green	Sudden change	Input Costs of Production	Consumer Demand
<p>Based on higher level of technology in agricultural production systems.</p> <p>Corporate production systems introduce new management arrangements (eg. ownership of assets, contractual arrangements, etc).</p> <p>Goulburn Valley operation is part of an international operation (eg. car manufacturing).</p> <p>Value-adding is more important - the whole product cycle is part of the operation,</p> <p>Support industries are much more important in the region.</p> <p>This all leads to high skill levels across technology, management, finance etc.</p> <p>A younger population results and requirements for local education, cultural activities, continuous education prevail.</p> <p>Water supply will require sophisticated management arrangements and security of supply to provide confidence for investment.</p>	<p>Adelaide swings over to desalination and reduces demand on the Murray and enables barrages to be scrapped.</p> <p>Changes Salt Disposal Entitlement and water entitlement.</p>	<p>Alternative food technology developed. Most food constructed in a Laboratory.</p> <p>In some areas, agriculture becomes the producer of basic components only (eg starch etc).</p> <p>Competition for the production of basic components with aquaculture.</p> <p>Urban supply is primarily sourced from recycled sewage.</p>	<p>Concern for the environment within the community leads to the rise of Green power in politics.</p> <p>Large volumes of water allocated to the environment (3500gl) over the next 10 years.</p> <p>Outcome - agricultural production is compromised, regional communities negatively impacted.</p> <p>The wider community recognises that the pendulum has swung too far and after 15-20 years; there is swing back to more conservative Government values. Sharman Stone is President.</p> <p>Loss of confidence in Government process and policy in regional Victoria, a result of poor decisions in regard to bio-security and food safety.</p> <p>Regional producers and community feel a lack of control due to over-regulation.</p> <p>Government policy moves further toward commercialisation and water is privatised. Monsanto owns the water which allows it to control farms and subsequently labour, to the detriment of the region.</p> <p>Leads to a shift from state to regional Government.</p>	<p>No sudden change submitted.</p> <p>Options felt to be inconsistent with other megadrivers.</p>	<p>Price decrease in water due to restructure of G-MW</p> <p>G-MW water supply and delivery arm separated from other non - supply and delivery roles.</p> <p>Fuel price increase - agriculture relies on bio-fuels to reduce input costs.</p> <p>Agriculture becomes energy producer to replace fossil fuel industries.</p> <p>Cost of living increase.</p>	<p>Export and domestic markets converge.</p> <p>Increased competition at the high value end from low cost producers in our traditional markets (both overseas and home).</p>

Super Scenario 4: People & Production

Resource shifts and allocations	Climate	New & Emerging Technology	Community Values & Gov't Policy - Keen Green	Sudden change	Input Costs of Production	Consumer Demand
<p>Storyline based on international grain shortage for extended period.</p> <p>Farming leads to development of larger corporate farms providing high productivity. Outcome: less farmers.</p> <p>This implies more technology and thus more skills required ⇒ smaller population but more skilled.</p> <p>Prospects of importing contract services and specialised equipment.</p> <p>These “corporate” farms will concentrate on quality agricultural land and or land appropriate for production (eg near transport services). Mangalore airport develops. Hobby or lifestyle farms (sea change and green change) will concentrate in environmentally more attractive areas and nearer urban services.</p> <p>Irrigation and other production infrastructure will be substantially improved in “production” areas.</p> <p>The region will develop in a “western suburbs / eastern suburbs” manner with high productivity / relatively low living standards in one area and low productivity / high standards in the other.</p>	<p>Climate change</p> <p>Move to warm / dry winters</p> <p>Hot / wet summers</p> <p>Too hot for existing pastures</p> <p>Overall reduction of rainfall</p> <p>Increases in crop water requirements</p> <p>Reduction of chill factor.</p> <p>Leads to different crops plus different watering seasons & methods.</p> <p>Increased wildfire in upper catchment, impacting on water quality and quantity.</p> <p>Increased fire risk on plains due to reduced irrigation.</p>	<p>Technology continues to underpin the development of agriculture (business as usual)</p> <p>Broad acre agriculture still exists.</p> <p>Irrigation technology developments have increased water use efficiency and productivity, while energy use has gone up.</p> <p>Genetic Modification of plants and animals is widely accepted, which has resulted in no chemical use, and enabled permanent row crops.</p> <p>Robotics look after agricultural production</p> <p>Silage pipelines from Queensland to Victoria.</p>	<p>Politicians and communities are focused on natural resource stewardship. Sustainability and protection of the environment becomes core business.</p> <p>More QA requirements on-farm. Farmers more accountable.</p> <p>Concern for health leads to clean green, organic production for local consumption. Food safety is very important.</p> <p>Large volume food production is GMO based and exported to poorer countries.</p> <p>Community goes through a sea change with people moving to rural living over the catchment as a whole. Particularly significant in the Upper Catchment. Facilitated by Local Gov't planning wrt land use management.</p> <p>Formation of regional government structures</p>	<p>Foot and mouth disease in China.</p> <p>Massive demand for Goulburn Valley products</p> <p>Food prices rise</p> <p>Farmers and farming is buoyant and debt is low</p>	<p>Price structures for fuel and water have <u>not</u> been changed from their current basis.</p> <p>Price increases for chemicals have occurred.</p> <p>Additional internalisation of environmental costs</p> <p>Cost of living increase</p>	<p>Increased power to regional communities - reverse of centralisation.</p> <p>Export and domestic markets converge.</p> <p>More affluent market consume more</p> <p>require more variety / higher value.</p> <p>Only small increase in population, ie negligible increase.</p> <p>Opening of niche markets</p> <p>Still high demand for basic foods.</p> <p>Shift in urban sprawl from Melbourne increased opportunity for Goulburn Broken region.</p>

Super Scenario 5: Climatic Clamps

Resource shifts and allocations	Climate	New & Emerging Technology	Community Values & Gov't Policy - Keen Green	Sudden change	Input Costs of Production	Consumer Demand
<p>No driver for resource shifts submitted.</p> <p>Options felt to be inconsistent with other megadrivers.</p>	<p>Climate change</p> <p>Move to warm / dry winters</p> <p>Hot / wet summers</p> <p>Too hot for existing pastures</p> <p>Overall reduction of rainfall</p> <p>Increases in crop water requirements</p> <p>Reduction of chill factor.</p> <p>Leads to different crops plus different watering seasons & methods.</p> <p>Increased wildfire in upper catchment, impacting on water quality and quantity.</p> <p>Increased fire risk on plains due to reduced irrigation.</p>	<p>Alternative food technology developed. Most food constructed in a Laboratory.</p> <p>In some areas, agriculture becomes the producer of basic components only (eg starch etc).</p> <p>Competition for the production of basic components with aquaculture.</p> <p>Urban supply is primarily sourced from recycled sewage.</p>	<p>Politicians and communities are focused on natural resource stewardship. Sustainability and protection of the environment becomes core business.</p> <p>More QA requirements on-farm. Farmers more accountable.</p> <p>Concern for health leads to clean green, organic production for local consumption. Food safety is very important.</p> <p>Large volume food production is GMO based and exported to poorer countries.</p> <p>Community goes through a sea change with people moving to rural living over the catchment as a whole. Particularly significant in the Upper Catchment. Facilitated by Local Gov't planning wrt land use management.</p> <p>Formation of regional government structures</p>	<p>Terrorist attack in Australia - poisoned water supply</p> <p>Irrigation becomes impossible</p> <p>Significant pain continues</p> <p>Industry collapse, rural depression</p> <p>Government rebuilds and accelerates adjustment</p> <p>Long term outcome - smaller irrigation sector</p>	<p>Price increases in water resulting from full cost recovery systems (ie price restructure), and increasing operating costs</p> <p>Genetically modified products allow reduction in chemical costs</p> <p>Environmental costs shared between landowner and government</p> <p>Cost of living increase</p>	<p>Export and domestic markets converge.</p> <p>Increased competition at the high value end from low cost producers in our traditional markets (both overseas and home).</p>

Outputs from SRC Workshop 2

Themes within the Regional Response Options

Community Capacity and Influence

Sub-themes

- Leadership
- Whole community engagement (including communication)
- Enabling young people in agriculture
- Research and development (R&D)
- Governance
- Co ordination and planning

Planning of Land & Water Resources

Sub-themes

- Land Use
- Natural assets and Protection (sustainability)
- Water
- Infrastructure
- Adjustment
- Community engagement and social development

Use of Land and Water Resources

Sub-themes

- Sustainable irrigated agriculture - use of land and water resources:
 - Based on industry areas with priorities based on their importance to the region eg. dairy and horticulture.
- Industry development
 - Across industry support mechanisms such as:
 - marketing / promotional mechanisms
 - infrastructure
 - capacity building e.g. training / leadership development
 - R&D (research and development)
- Environmental use of land and water resources
 - Ecosystem services
 - Retirement of land for environmental purposes

- Urban / development – urban / lifestyle use of land and water resources
 - Lifestyle farming
 - Pressures from urban development
 - Subdivision of existing farms
- Eco-Tourism use of land and water resources
 - Eco-tourism / agricultural and farm tourism

Summary of Irrigation Futures Forum Aspirations

In 2035 we want the Goulburn Broken Catchment to be:

- Embracing new and existing technology
- Managing change (preparedness, adaptability, innovation, learning culture)
- Achieving a balance between environment, social and economic demands (catchment is in equilibrium, industry exists in harmony with environment and community)
- Investing in the environment (biodiversity, healthy rivers, native vegetation, etc.)
- Efficient users of water, and appropriate water distribution systems
- Recognised as valued stewards of the land (proud to be farmers/irrigators, recognised for contribution to economy/community)
- Seen as a world leader in food production (clean and green, export markets, growth)
- Happy people who have time for leisure
- A vibrant, prosperous (businesses, region, employment, eco/ag tourism, service industries) and diverse community
- Creating all kinds of opportunities for all (in particular young people and new farmers)
- A great place to live (community well-being, social networks, well-serviced, appropriate/maintained infrastructure, amenities)
- Planning strategically and making collaborative decisions (displaying community leadership, co-operation, working together as a wider community)

All achieved through engaging the entire community

IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment G Stage 3: Further Development and Assessment of Regional Options – The Approach December 2004

**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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Denis Flett – Goulburn-Murray Water
Frank Greenhalgh – Department of Primary Industries
Richard Habgood – Department of Primary Industries
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Bruce Cumming – Department of Primary Industries
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Brigitte Keeble – Department of Sustainability and Environment
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Derek Poulton – Goulburn-Murray Water
Ann Roberts – Goulburn Murray Landcare Network
Nick Roberts – Goulburn Valley Environment Group
Melva Ryan – Municipal Catchment Co-ordinator - GBCMA
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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

Table of Contents

Project Overview	4
The objectives of this project	4
Project organisation and schedule	5
Output from of Stage 2	6
Stage 3 Further Development and Assessment of Regional Options.....	7
Purpose and Objectives	7
Development of the approach to Stage 3	7
Approach to Stage 3	8
Context.....	8
Approach	8
Rationale.....	10
Issues still to be resolved with approach	11
Stage 3 Tasks	11
Stakeholder Involvement.....	14
References	15

Project Overview

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.

The objectives 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 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, 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.

The achievement of these objectives is expected to deliver the following long-term 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
- Other regions throughout Australia benefiting from the implementation of the generic methodology.

Project organisation and schedule

Project organisation is shown in Figure 1. Roles of each of the project organisational groups are given in Table 1. The overall project timelines are given in Table 2.

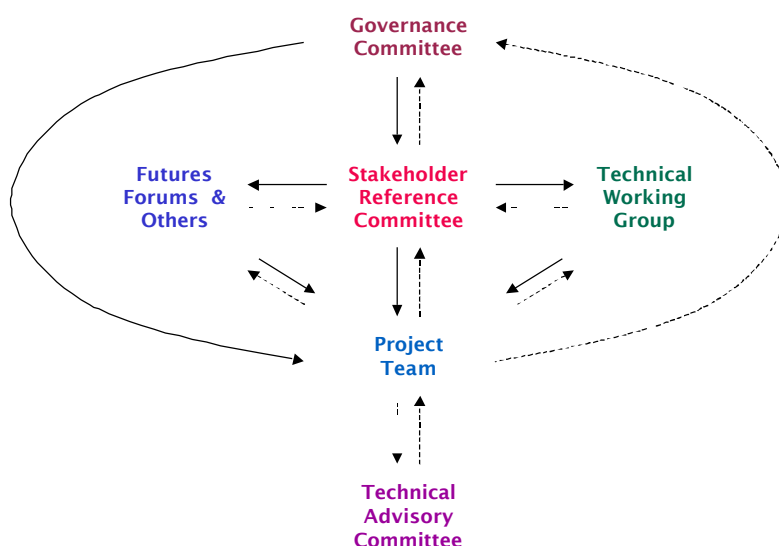


Figure 1: Project organisation

Table 1: Roles of project organisational groups

Organisational Group	Key Roles
Governance Committee (GC)	<ul style="list-style-type: none"> • Set broad directions • Review project progress and performance • Make investment decisions
Stakeholder Reference Committee (SRC)	<ul style="list-style-type: none"> • Provide guidance on processes for wider stakeholder participation • Consolidate ideas from wider stakeholders • Generate confidence in the regional community
Futures Forums and Others	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Further develop details of ideas generated by Futures Forums • Contribute knowledge and expertise to the assessment process.
Project Team	<ul style="list-style-type: none"> • Facilitate the stakeholder participation process • Provide scientific input.
Technical Advisory Committee	<ul style="list-style-type: none"> • Provide expert advice as required

Table 2: Project Timetable

Project Stage	Timeframe
Stage 1: Project development	Jun 2003 – Dec 2004
Stage 2: Vision, scenario and options	Jan 2004 – Dec 2004
Stage 3: Further development and assessment of regional options	Jun 2004 – Jun 2006
Stage 4: Building consensus	Jun 2006 – Jun 2007

Output from of Stage 2

Stage 2 of the project has engaged the community of the Goulburn Broken Catchment in a discussion of the future of irrigation in the region. A series of four Irrigation Futures Forums were held in six locations throughout the catchment. Special programs were held to encourage the participation of traditionally under represented groups, including the ethnic community and young people, and regional business leaders. The community participation process has generated four major sets of outputs:

- 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

The Stakeholder Reference Committee has undertaken a first pass at synthesising the output from the community participation process. The synthesis, expected to be completed in March 2005, will result in an agreed set of community Values and Aspirations, a structured set of Regional Response Options and a set of 5 comprehensive Scenarios.

The ideas within the outputs developed by the Irrigation Futures Forums and Stakeholder Reference Committee are at a relatively high level and in some instances provide insufficient detail for assessment. In addition, the Values and Aspirations are often abstract concepts that require translation into Outcome Indicators. Therefore before assessment can be implemented, further development of the material developed by the Irrigation Futures Forums is required.

Stage 3 Further Development and Assessment of Regional Options

Purpose and Objectives

The objectives of Stage 3 of the project are to:

- 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 an analytical framework to assess the consequences of the Regional Response Options, under a range of Scenarios, in terms of Outcome Indicators that describe the community Values and Aspirations.
- Facilitate discussion and debate of the concepts and assumptions underpinning the understanding of the consequences of the Regional Response Options.

Development of the approach to Stage 3

The approach to the further development and assessment of regional options 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 (See Attachment H: Review of Integrated Assessment Literature).
- 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 Options will be externally reviewed and the feedback from the reviewers will be incorporated into the final version of the approach.

This document describes the broad approach that will be used to further develop and assess the Regional Response Options. It outlines the activities to be undertaken at Stage 3A to develop details of the assessment approach for the implementation at Stage 3B.

Approach to Stage 3

Context

The further development and assessment process will 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 the changes within the system (Figure 2). The changes in outcome indicators can then be compared using the values and aspirations to identify preferred and non-preferred options. The identification of preferred options through a consensus building process is the focus of Stage 4 of this project and is not considered within this document.

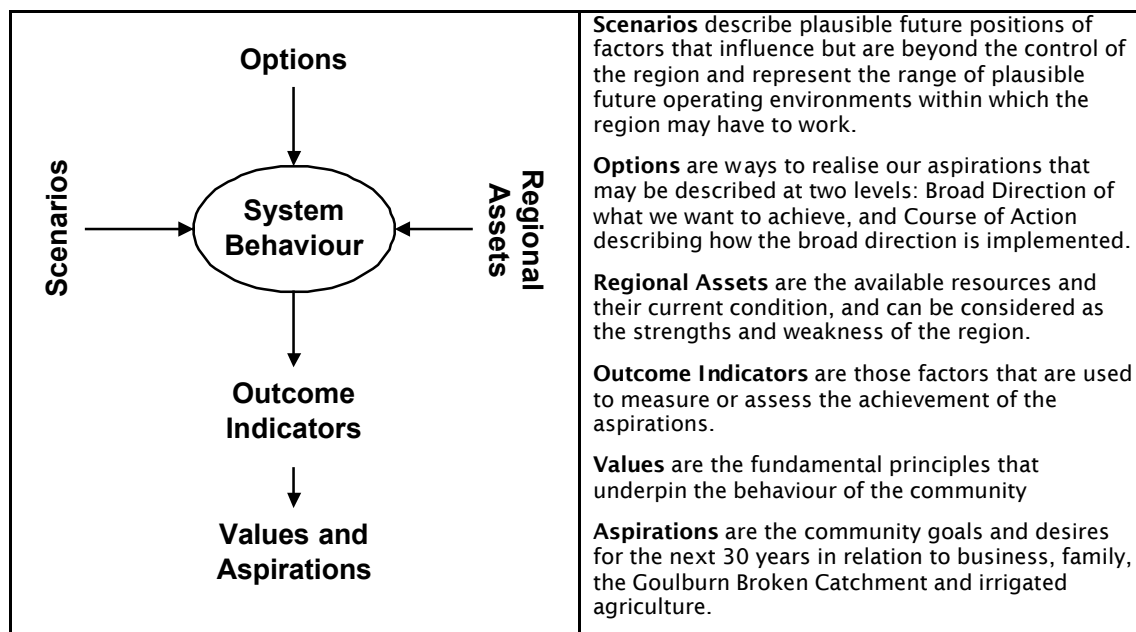


Figure 2 A systems framework for the assessment

Approach

In the context of this project, assessment is about understanding the combined impact of options and scenarios on outcome indicators. Assessment will be undertaken qualitatively and, where appropriate, quantitatively. Assessment and further development of regional options will be undertaken using a narrative and analysis approach.

Narrative exploration of a combination of scenarios and options will construct a suite of stories of the plausible futures. Analysis will illustrate some of the detail of the stories including the likely magnitude of the impacts of the combination of scenarios and options based on an understanding of system behaviour as described by qualitative and quantitative models.

At the highest level, a story will consist of an overview of the evolution of a scenario, the broad direction of the options and a perspective of the

consequences of the options including a high level rationale. A more detailed exploration of parts of each story will be undertaken to assist with understanding of the consequences and to assess alternative courses of action for the options. Within the detailed exploration, linkages between different parts of the high level story will be considered. A detailed story will subsequently be constructed by integrating the detailed exploration with the high level story.

The assessment will be undertaken by a skills-based Technical Working Group, actively supported by the project team. The Technical Working Group will be divided into two teams, a Narrative Team and an Analysis Team. The roles of the two teams are presented in Table 3.

Table 3 Roles of the Narrative and Analysis Teams

Narrative Team	Analysis Team
<ul style="list-style-type: none"> • Concept development • Story telling • Asking for additional information 	<ul style="list-style-type: none"> • Concept clarification • Story illustration • Provide additional information

The Narrative Team will develop the concepts that link the options, scenarios, assets and outcome indicators and using these concepts to build a story of the consequences. In developing the concepts and stories, the Narrative Team may ask for additional information to assist with defining the concepts or consequences.

The Analysis Team will critically review the story written by the Narrative Team to ensure the concepts are clear and are not contradictory, and illustrate the story. This will involve analysis of the concepts described in the story and illustration of these concepts using simple models and the results of existing studies to provide a feel for the scope of the possible consequences. The Analysis Team will also be responsible for the provision of additional information requested by the Narrative Team. This additional information may be sourced from existing studies or require some analysis by the Analysis Team. Both qualitative and quantitative approaches to analysis will be used.

The flow of information between the Narrative and Analysis Teams is illustrated in Figure 3. The two teams will provoke and assist each other, and through an iterative process, develop and clarify concepts, stretch the teams' thinking, reduce and handle uncertainty by integrating knowledge and perspectives.

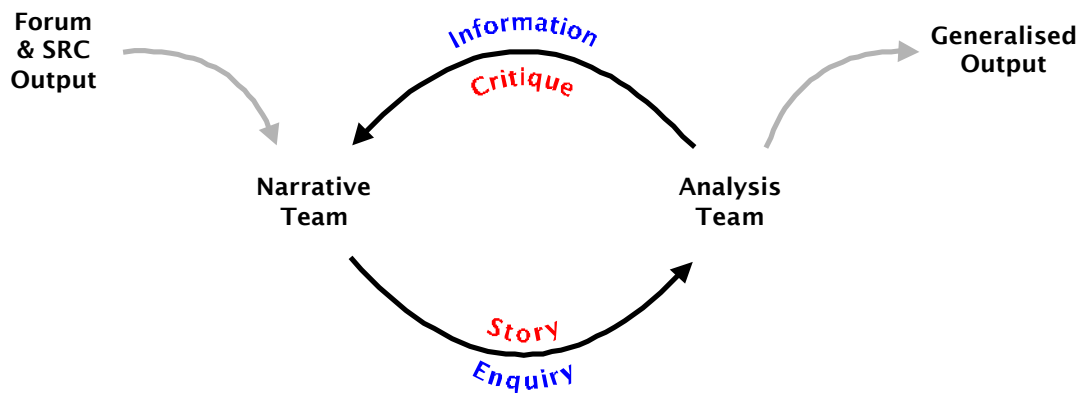


Figure 3 Information flow between the Narrative and Analysis Teams

Rationale

An understanding of system behaviour can be drawn from many sources. Traditionally, integrated assessment has attempted to use scientific knowledge to describe system behaviours, including the use of experimental results and other data and the application of established scientific principles to scales of interest (van der Sluijs 2002). However, recent experiences have shown that scientific knowledge forms an insufficient base when undertaking assessment of complex systems (Ravetz 2003). This commonly occurs in situations where the facts are uncertain, multiple plausible perspectives of system behaviour exist and assumptions made in assessments are value laden. In these circumstances participatory approaches enabling qualitative and quantitative analysis of management options, using a combination of scientific and experiential knowledge, have been suggested to enable the assessments to explicitly consider divergent values and perspectives (Swart *et al.* 2004).

Individuals have different perspectives on the behaviour of systems. An individual's understanding of system behaviour can be described in terms of a mental model. This mental model represents the linkages between variables according to the perception, or world view, of the individual. An individual's mental model is constructed from a range of sources including practical experience in system management and from indirect learning.

Several methods are available to develop a description of an individual's mental model, including narrative exploration and, qualitative and quantitative conceptual modelling. Methods should ideally be selected according to the preferred learning style of the individuals involved in the assessment process. Work undertaken in Stage 2 of the project suggests that narrative exploration may be the most appropriate for Stage 3.

While there is merit in striving for commonality in mental models among the individuals involved in the assessment process, it is understood that this commonality may not be possible in all cases and multiple, equally plausible, mental models may be required.

The detail of the stories will be developed using a number of methods, dependent on the nature of the concepts involved. In some instances it will be appropriate to develop the details from process simulations, utilising information from analysis and understanding of detailed system responses. While in other cases, such as some social analyses, details will need to be generated from the collective understanding of experts and stakeholders. In all cases the source and certainty of the derived understanding should be documented to ensure transparency of the assumptions underlying the assessment.

Issues still to be resolved with approach

Throughout the assessment, careful consideration of the spatial, temporal and structural resolution of concepts and processes will be required. The Regional Response Options proposed by the Irrigation Futures Forums include interventions at spatial scales ranging from the farm through to the catchment scale. The Aspirations are similarly concerned with outcomes at the farm and catchment scales. Therefore the assessment process will need to consider the outcomes indicators at both farm and catchment scales and the interactions between these scales.

The community has generated a large number of regional response options addressing multiple aspects of the system. Within the collection of regional response options, many of the options are complementary, while some are alternatives. This means that there are a considerable number of possible combinations of regional response options. The large number of possible combinations presents a challenge for the assessment of regional response options.

The large number of possible combinations suggests a manageable approach would entail assessing each aspect of the regional response options independently, constructing a series of part stories that can be patched together to create in a complete story. However because many aspects of the regional response options are complementary, patching together a series of part stories has the potential to miss some of the interactions and synergies between regional response options. Therefore, there is a tension between constructing complete stories, for all combinations of regional response options, that capture the interactions between response options and a manageable, but less complete assessment.

These issues will be resolved in the first six months during the development of the detailed assessment approach.

Stage 3 Tasks

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 and assessment of the options. There have been two substantial changes to the original project proposal. The first change arises because the material generated during Stage 2 of the project is at a higher level than originally anticipated. Therefore, an additional task has been included to undertake further development of the products of Stage 2 in

preparation for the assessment. The second change is somewhat more subtle. At the start of the project, it was anticipated that assessments would be undertaken using a single assessment tool. The narrative and analysis approach to assessment proposed uses a participatory process rather than an assessment tool. Therefore, Stage 3A will focus on development and testing of the process rather than the development of an assessment tool, with Stage 3B focussing on the implementation of the assessment process.

Task 1: Development of detailed assessment approach (completed by June 2005)

The development of the detailed assessment approach will involve a number of activities. Many of these activities are dependent on the finalisation of the output from Stage 2.

Further development of a number of concepts is required. In particular, development of the detailed approach to handling the different scales of assessment required and the interactions between the scales. The detailed approach to the development of stories also needs to be resolved, which will include further defining the form of the story and the level of detail it contains.

The assessment process will rely heavily on structured workshops. The approach to and format of the workshops will be developed in consultation with the Community Engagement Network, Department of Sustainability and Environment. The assessment approach will also be tested with the Technical Working Group. As a part of the development of the detailed assessment approach, the Technical Working Group will be formed.

Task 2: Further Development of Forum material (completed by June 2005)

The second task will involve taking the material generated by the Irrigation Futures Forums and preparing it for use in the assessment process. This will involve

- the development of detailed descriptions of the regional response options,
- the adaptation of the future scenarios generated from Stage 2 into a detailed sequences of events, and
- the development of outcome indicators that describe the values and aspirations.

The Stakeholder Reference Committee has been involved in undertaking a first pass at this further development in the final stages of Stage 2 of the Project. The Technical Working Group, in conjunction with the project team, will subsequently undertake the development of further detail based on the work of the Stakeholder Reference Committee and Futures Forums. Some additional development and refinement of the Forum material is likely to occur during the assessment phase as the initial ideas are explored in more detail.

Task 3: Assessment (Completed by June 2006)

The assessment will be undertaken using the approach described earlier by the Technical Working Group, actively supported by the project team. It is anticipated that the Technical Working Group, through the Narrative and Analysis Teams, will provide directions, debate concepts and provide critical review, while the project team will fill in much of the detail and undertake the 'legwork'. The project team will also act as the intermediary between the Narrative and Analysis Teams.

Stakeholder Involvement

Implementation of the Assessment process will be overseen by the Stakeholder Reference Committee. The Stakeholder Reference Committee will commission the skills-based Technical Working Group to assist the project team with developing the details of the Scenarios, Options and Outcome Indicators and describing the current knowledge of the systems under consideration. The Technical Working Group will draw skills from both within and outside the catchment. Nominations have been sought from the members of the Irrigation Futures Forums and people with specific discipline expertise. Information provided to members of the Irrigation Futures Forums explaining the role of the Technical Working Group is contained in Appendix 1. The Technical Working Group will draw on outside experts as required to provide additional skills and expertise. Updates on progress of the assessment will be provided to the Stakeholder Reference committee at their regular meetings.

In addition, meetings of the Irrigation Futures Forums will be held on a six monthly basis to update members on the progress of the assessment phase. These meetings will allow for the Forum participants to contribute ideas and suggestions to the assessment process and to participate in an extended peer review of the assessment.

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Appendix 1 Irrigation Futures of the Goulburn Broken Catchment Technical Working Group

Background

The Irrigation Futures of the Goulburn Broken Catchment Project seeks to bring together the regional community and other key stakeholders to:

- develop a shared vision on irrigation for the Goulburn Broken Catchment,
- make choices about the future by considering social, economic and environmental consequences,
- use the best available knowledge to inform that decision process, and
- build consensus on regional response options on irrigation.

Stage 2 of the project involved the community describing their values and aspirations for the future, developing plausible scenarios of the future and identifying regional response options to achieve their aspirations under the future scenarios. Stage 3 of the project involves drawing together the material generated by the Irrigation Futures Forums during Stage 2 of the project. Stage 3 will involve the assessment of the generated Regional Response Options using the described Values and Aspirations under the range of Scenarios developed, using systems analysis. The assessment process will be guided by the project Technical Working Group.

Role of the Technical Working Group

The material developed by the Irrigation Futures Forums has been at a relatively high level, that is ideas and concepts without many details. The Technical Working Group will assist the Project Team to develop the detail around the material generated by the Irrigation Futures Forums and assist with systems analysis. The specific activities of the Technical Working Group will include:

- the development of detailed descriptions of the regional response options produced by the Irrigation Futures Forums,
- the adaptation of the written of plausible future scenarios into a form suitable for systems analysis,
- the development of detailed outcome indicators that describe the values and aspirations expressed by the Irrigation Futures Forums, and
- assist with describing knowledge of the economic, social and environmental systems under consideration for the purpose of assessing the regional response options, through the development and analysis of stories.

Technical Working Group Membership

The membership of the Technical Working Group will be skills based. The skills required by the group need to encompass the entire range of regional response options proposed by the Irrigation Futures Forums. A preliminary scan of the regional response options suggests that the skills in the following areas are required.

1. Regional Community Development
 - Community capacity building
 - Communication within region
 - Attraction of residents/students/migrants
2. Regional Business Development
 - Establishment of local industry/businesses/cooperatives
 - Succession planning

3. Education and Training
 - Primary, Secondary, Tertiary, Farmer training
 - Curriculum development
 - Educational institution establishment
4. Land-use Planning
 - Regional planning tools eg. Planning scheme development
 - Planning principles eg. best areas for irrigation etc.
5. Agricultural production
 - Irrigation technology
 - Farm product development
 - Farming systems including natural farming systems
 - Standards (environmental, QA etc.) development
6. Agricultural industry development
 - New industry establishment
 - Marketing of existing products
7. Water
 - Irrigation Infrastructure planning
 - Water market development/investment
8. Tourism
 - Water based
 - Eco-tourism
9. Working with Government
 - Infrastructure Investment
 - Structural Adjustment

The actual skills required for the Technical Working Group will be finalised following the Stakeholder Reference Committee workshop in November.

Recruitment of the Technical Working Group

The Technical Working Group will be commissioned by the Stakeholder Reference Committee to guide the systems analysis. Members of the Irrigation Futures Forums are invited to nominate and the Stakeholder Reference Committee will also suggest potential members.

Time Commitment

Members of the Technical Working Group will be expected to make a substantial time commitment to the project. The extent of this commitment will vary during the life of the project but is initially anticipated to be:

January 2005 – June 2005	up to 6 days
July 2005 – June 2006	up to 6 days

The time contributed by members of the Technical Working Group will be resourced by the project. The resourcing arrangements will be negotiated with the project team, however it is anticipated the cost of participation by farmers and self employed members will be met in line with the GBCMA policy on Remuneration for IC Members

Further Information

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IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment H Review of Integrated Assessment Literature December 2004

**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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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	5
Assessment.....	6
Prioritisation	7
Risk Assessment.....	7
Economic Assessment	8
Analysis	8
Examples of Integrated Assessments	10
Issues in Integrated Assessment	13
Complexity	13
Qualitative and Quantitative Assessment	14
Uncertainty	15
Scale and Resolution	17
Expert And Non-Expert Participation	18
Implications for Stage 3	19
References	21

Introduction

The Irrigation Futures of the Goulburn Broken Catchment project seeks to develop a vision for the future of irrigation in the catchment. The project is being undertaken in four stages:

1. project development,
2. exploring visions, scenarios and options,
3. further developing and assessing the options, and
4. building consensus.

Stage 2 of the project has engaged the community of the Goulburn Broken Catchment in a discussion of the future of irrigation in the region. The community engagement process has generated four major sets of outputs:

- 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.

The main purpose of Stage 3 of the project is to draw together the material generated during Stage 2 in an analytical framework, to assess the consequences of the Regional Response Options under a range of Scenarios. The consequences are to be assessed using a series of measures describing the Values and Aspirations elicited from the community participation process.

The initial concept was to develop and implement a “Scenario Assessment Tool” that would be able to assess the consequences of the various management options. It was envisaged that the “Scenario Assessment Tool” would provide an analytical framework capable of representing the important components of the systems relevant to the regional response options.

This paper reviews approaches used internationally to assess regional development options and strategies. We introduce the concept of assessment and describe several of the approaches used. We subsequently identify the important concepts underlying many assessments and discuss the implications of these concepts for assessment undertaken as a part of the Irrigation Futures Project.

Assessment

In the context of assessment of options, there are many definitions of assessment, within the literature. Most definitions can be placed into one of two broad categories:

- (a) identifying and understanding the consequences of the options, and
- (b) identifying preferred or non-preferred options given the consequences of those options.

These two activities can be considered as two sequential phases in assessment (Figure 1). The first phase, analysis, involves identifying, and assessing, the impact of the options on a series of intermediate outcomes, or measures, for a given set of scenarios and assets. The second phase, prioritisation, is concerned with examining the priorities and trade-offs between the outcome measures to identify preferred options.

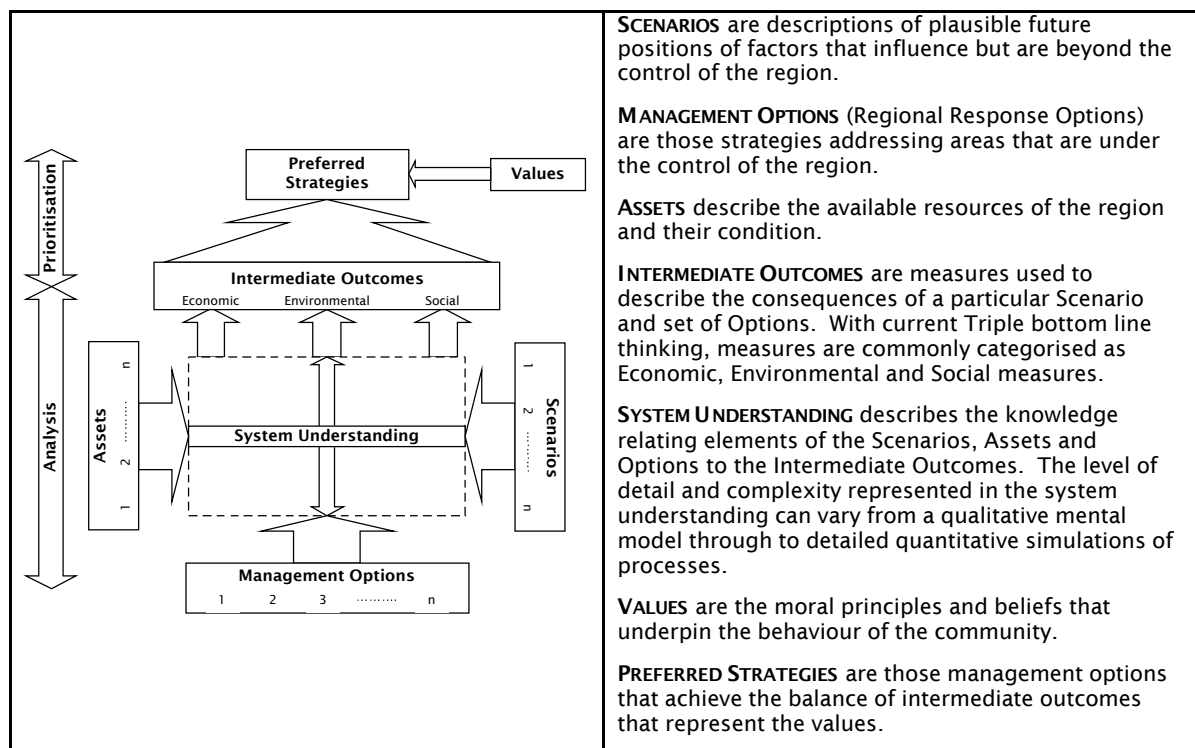


Figure 1 Framework for Assessment

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.

This review briefly discusses approaches used to assist the prioritisation phase of an assessment. We then examine methods of understanding the consequences of options, describing the important concepts and the implications of these concepts for systems analysis undertaken as a part of the Irrigation Futures Project.

Prioritisation

There are three main formal paradigms of identifying preferred and non-preferred management options. All are methods of assessing priorities and each relies on the some sort of judgement of the value, either absolute or relative, of particular outcome measures. The three main paradigms 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 (hazard and vulnerability). Risks are subsequently prioritised using the framework presented in Figure 2.

Likelihood	Almost certain (5)				
	Likely (4)	Short term action required		Critical priorities	
	Moderate (3)				
	Unlikely (2)	Low risk priorities		Substantive risk strategies required	
	Rare (1)				
		Insignificant (1)	Minor (2)	Moderate (3)	Major (4)
		Catastrophic (5)			
		Consequence			

Figure 2 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).

The risk assessment approach to prioritising actions requires some form of method to characterise the consequences of interventions. 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.

The 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 the 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 options using monetary measures. Cost-benefit analysis is the most commonly used tool for economic assessments where management options are compared (prioritised) 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 action plans within catchment strategies, 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 options. Management options are evaluated against several quantitative or qualitative measures. A weighted aggregation (eg sum or average) of these measures is used to prioritise the management options. 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.

Analysis

All prioritisation approaches require the consequences of management options to be understood. Understanding the consequences in turn requires the drawing together of scenarios (boundary conditions), assets (initial conditions) and options to examine their impact on outcome measures. There is a spectrum of approaches to understanding the consequences of options, extending from intuition based tables (NCCMA and Sinclair Knight Merz 2000) through to models simulating detailed processes (Engelen *et al.* 2000). All of these approaches are different methods of structuring and representing knowledge of the system.

Understanding the consequences of management options is the concern of the emerging 'meta-discipline' of *Integrated Assessment*. Integrated Assessment is concerned with integrating knowledge about a problem domain for the purpose of learning and to assist decision making processes. Integrated assessment has emerged as a result of the realisation that complexity of societal issues means that a single change in policy can no longer be considered in isolation (Rotmans 1998). The discipline has continually evolved since its emergence during the early 1970's, influenced particularly by the development of computational resources and changing attitudes toward computer-based modelling.

Early integrated assessments typically examined a single issue and evaluated the consequences of solutions to the issue, for example desertification. The consequences were evaluated with respect to multiple indicators, in general economic and environmental indicators at a individual and regional scales (Engelen *et al.* 2000). 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, building up a collection of hard facts established from reductionist science (Ravetz 2004). These applications typically use, and link, a suite of discipline specific models that are derived from established scientific principles.

The normal science approach has generally used detailed biophysical and economic models to assess the consequences of management options, using bottom-up modelling techniques. These models are typically developed by experts and interaction with the affected public is minimal. In some cases the limited interaction with the affected public has resulted in model output having limited 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, applications of Integrated Assessment have used a “post-normal” or “Mode II” scientific paradigm (Harris 2002; Ravetz 2004). The post-normal scientific paradigm is issue driven, 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, this approach aims to pool together all available information, both scientific and perceived, relevant to the policy issue and use this information to investigate the consequences of alternative management options. It is common that experts and the affected public are involved because both groups can contribute knowledge of different forms to the assessment process.

Post-normal science is driven by implementation of 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.

The distinction between the normal and post-normal science paradigms is much 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 focussed on assessing the consequences of a particular proposal, or set of proposals, on people as individuals, groups or society as a whole (Burge and Vanday 1995; Brouwer and van Ek 2004). The social impacts include changes to people's way of life, their culture, their community, their environment, their health and wellbeing and their fears and aspirations (Saddler *et al.* 2000). Social impact assessments rely on understanding the stakeholders affected by the proposal and understand the perspectives of these stakeholders on the potential impacts of the 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 undertaken social impact assessments. Strategic perspectives analysis (Dale and Lane 1994) is another example of social impact assessment using a post-normal scientific paradigm.

Social impact assessment does not attempt to examine 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 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.

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 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 occurred in two parts, firstly developing a qualitative model and then quantifying the model. 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 value-laden assumptions explicit and with respect the ability to 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 of 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.

Issues in Integrated Assessment

There are many issues common to all integrated assessment approaches 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 to be 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 all 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, narratively describing mental models have been used to capture the complexity of systems (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 loose because those undertaking quantitative analysis using numerical methods believe that 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 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 the 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 used for integrated assessment, van der Sluijs (2002) identified several features of models to better enable acceptance of quantitative analyses. These features 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 the development and 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 not chosen on the basis of likelihood (Swart *et al.* 2004). Backcasting however examines the feasibility and implications of desirable futures (or risks of undesirable ones) (Swart *et al.* 2004). Forward looking analysis assists with identifying possible future trajectories, while backcasting 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 or 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 the future is always highly uncertain. Rotmans (1999) suggests that the central focus of integrated assessment is the management of uncertainty. 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 contributes 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 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 where plausible futures positions of important variables are examined in terms of trends, where the current trend could be expected to follow a historical trajectory into the future, discontinuities, where a sudden shift in a variable may occur, and critical uncertainties, where 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).

The participation of stakeholders in the assessment process builds a dialogue between stakeholders and assists in the development of a common understanding of the uncertainties of the assessment. Stakeholders will have very different perceptions of the uncertainty of information. Shackley and Wynne (1995) describe a model of perceived uncertainty according to the closeness of a stakeholder to the generation of knowledge of a problem. They suggest that those directly involved with knowledge generation and those alienated from knowledge generation will perceive the greatest uncertainty in knowledge of the problem, while those involved in managing the problem will perceive the lowest uncertainty (Figure 3).

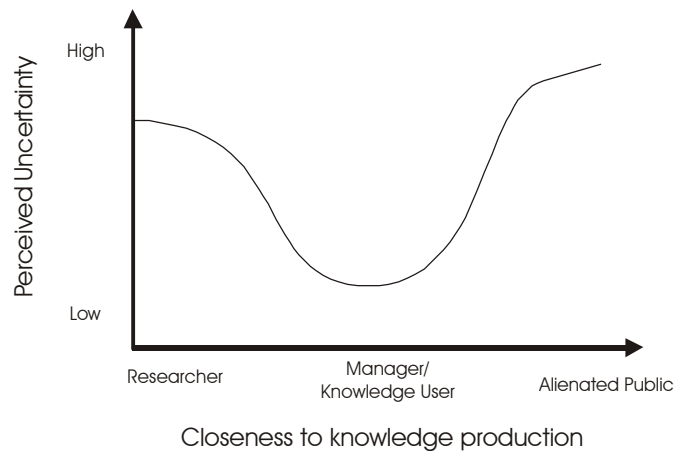


Figure 3: Perceptions of uncertainty (after Shackley and Wynne 1995)

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.

One of the challenges of integrated assessment is reconciling the temporal and spatial scales of the processes being considered. 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. Analysis examining water-related issues have typically used a much shorter time step in some instances 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 metamodeling approach may result in inadequate resolution of the 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. As with the overall assessment process, participation 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). Experts and non-experts involvement in the assessment process can have a number of purposes including the exchange and contribute of knowledge and wisdom, the provision 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.

Implications for Stage 3

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 options undertaken within Stage 3 of the project.

Stage 3 is concerned with assessing the consequences of policy options 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 results. Facilitating a debate about the philosophy and assumptions underlying the options will be as important as identifying the likely consequences of the options.

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. Utilisation of this knowledge will be required in the assessment of the Options to ensure the credibility of the outputs. This will therefore require a flexible approach that can draw upon and synthesise all of 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 multiple 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 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.

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IRRIGATION FUTURES OF THE GOULBURN BROKEN CATCHMENT



Milestone Report 2 - Attachment I List of Communication Activities for Stage 2 January - December 2004

**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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Professor Bill Malcolm, Derek Poulton, Greg Roberts, Ken Sampson,
Dr John Wolfenden

Governance Committee:

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
John Pettigrew (Chair) – Goulburn Broken Catchment Management
Authority (GBCMA)
Kylie Pfeiffer – Department of Sustainability and Environment

Stakeholder Reference Committee:

Mark Allaway – Department of Primary Industries
Alan Canobie – Numurkah Dairy Farmer
Bruce Cumming – Department of Primary Industries
Steve Farrell – Echuca Dairy Farmer
Peter Gibson – Nanneella Dairy Farmer
Brigitte Keeble – Department of Sustainability and Environment
Peter McCamish – Ardmona Horticulturalist
Ian Moorhouse – Goulburn-Murray Water
Chris Norman – Department of Primary Industries
Russell Pell (Chair) – Wyuna Dairy Farmer
Derek Poulton – Goulburn-Murray Water
Ann Roberts – Goulburn Murray Landcare Network
Nick Roberts – Goulburn Valley 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

List of Communication Activities

Stage 2

Jan – Dec 2004

(a) Reports

- Irrigation Futures of the Goulburn Broken Catchment: Milestone Report 1b, DPI Tatura, February 2004.

(b) Conferences

- Poster Presentation to ANCID Conference on the 'Irrigation Futures for the Goulburn Broken Catchment Project', OCTOBER 2004

(c) Irrigation Futures Forum Workshops

- Kyabram - 27 April, 9 June, 14 July, 11 August and 13 October 2004
- Echuca - 28 April, 8 June, 13 July, 28 September and 12 October 2004
- Cobram - 4 May, 11 June, 21 July and 19 October 2004
- Shepparton - 5 May, 15 June, 22 July and 18 October 2004
- Seymour - 23 June, 20 July, 10 August and 14 October 2004
- Benalla - 7 September, 21 September, 5 October and 20 October 2004
- Dookie - Young Farmers Workshop, 26 October 2004 Dookie Campus, University of Melbourne
- Stakeholder Reference Committee Workshops - 12 & 19 Nov 2004.

(d) Articles / Newsletters

- 'Irrigation Futures for the Goulburn Broken Catchment Project', DPI Project Summary Leaflet, July 2003
- 'Irrigation Futures for the Goulburn Broken Catchment Project', DPI Project Update No. 1, February 2004
- 'Irrigation Futures', Channels (DPI/DSE Tatura, Cobram and Kyabram Staff Newsletter), May 2004.
- 'Irrigation Futures', Channels (DPI/DSE Tatura, Cobram and Kyabram Staff Newsletter), August 2004.

(e) Newspaper / Television / Radio

- 'Water forum plans', Country News, 5 April 2004.
- 'Planning ahead', Country News, 24 May 2004.
- 'Demand for worthy workshops', Country News, 9 August 2004.
- 'Water planning', Country News, 27 September 2004.

(f) Presentations

- Hosted visit by Mike Ginnivan, Managing Director, Dairy Australia, 30 January 2004.
- Presentation to representatives of Catchment and Water Division, Department of Sustainability and Environment, Melbourne, 2 February 2004.
- Presentation to Executive Officer of Murray Dairy, Kyabram 11 February 2004.
- Presentation to Shepparton Water Services Committee, 12 February 2004.
- Presentation to Russell Wealands, Executive Officer, GBCMA Upper Catchment Implementation Committee, 23 February 2004.
- Presentation to representatives of DPI Strategic Policy Division, DPI Tatura, 25 February 2004.
- Presentation to Phil Stevenson, Executive Officer, GBCMA Middle Catchment Implementation Committee, 25 February 2004.
- Presentation at DPI Tatura to members of the Andhra Pradesh (India) Water Conservation Mission, 27 February 2004.
- Presentation to DPI Hydrology SubPlatform staff, Kyabram Fauna Park, 1 March 2004.
- Presentation to Goulburn-Murray Water Water Services Committee, 3 March 2004.
- Presentation to Dairy Industry Guidance Group, Kyabram Dairy Centre, 5 March 2004.
- Presentation to City of Greater Shepparton Councillors, 9 March 2004.
- Presentation to Mitchell Shire Councillors, 9 March 2004.
- Presentation to Shepparton Water Services Committee, 11 March 2004.
- Presentation to Moira Shire Chief Executive Officer and senior staff, 11 March 2004.
- Presentation to Kyabram United Dairy Farmers of Victoria (UDV), 15 March 2004.
- Presentation to Numurkah United Dairy Farmers of Victoria (UDV), 15 March 2004.
- Presentation to CSIRO Ecosystem Services Team, 16 March 2004.
- Presentation to Goulburn Broken Catchment Management Authority Middle Management Implementation Committee, 17 March 2004.
- Presentation to University of Melbourne Faculty of Civil and Environmental Engineering students, 22 March 2004.
- Presentation to Shepparton Irrigation Region Implementation Committee, 26 March 2004.
- Presentation to Shire of Campaspe Councillors, 13 April 2004.
- Presentation to Victorian Peach and Apricot Growers' Association Executive, Cobram, 20 April 2004.

- Presentation to SIRIC Research Reporting Day participants, DPI Tatura, 19 May 2004.
- Presentation to Irrigation Futures Stakeholder Reference Committee, Goulburn-Murray Water, Tatura, 25 June 2004.
- Presentation to Chris Norman, DPI Tatura Portfolio Manager, Community Relationships, 15 July 2004.
- Briefing with Rien Silverstein, Shepparton East 'Women in Horticulture' Group to prepare information activities for horticultural workers from non-English speaking backgrounds, 16 July 2004.
- Presentation to River Health and Water Quality Committee, GBCMA, 3 August 2004.
- Discussions with John Thompson, GBCMA Upper Catchment Implementation Committee, regarding possible collaboration, 3 August 2004.
- Presentation to Irrigation Futures Stakeholder Reference Committee, 13 August 2004.
- Presentation to Irrigation Futures Governance Committee, 17 August 2004.
- Presentation to Rod Carter, Indigenous Partnership Facilitator, Department of Sustainability and Environment, Kerang, 9 Sept 2004.
- Presentation to Indigenous community leaders in relation to effective engagement, Shepparton, 4 Oct 2004.
- Presentation on 'Irrigation and Dairy Farms Into the Future' at DPI Kyabram Centre Seminar Series, 13 October 2004.
- Update on Project progress to Bob Cameron, Minister for Agriculture, DPI Tatura, 28 October 2004.
- Update on Project progress to Peter Harris, Secretary, DPI at DPI Tatura, 17 November 2004.
- Presentation to Sonja Scudds KPM, Program 5 within DPI, Shepparton, 18 Nov 2004.
- Presentation to SIALM State-wide leaders, Shepparton, 26 Nov 2004.
-