DWLBC REPORT

Volumetric Conversion in the South East of South Australia: Community Consultation Processes

2006/33

Government of South Australia
Department of Water, Land and Biodiversity Conservation

Volumetric Conversion in the South East of South Australia: Community Consultation Processes

Ross Carruthers

Resource Allocation
Department of Water, Land and Biodiversity Conservation

September 2006

Report DWLBC 2006/33

Government of South Australia
Department of Water, Land and Biodiversity Conservation

Resource Allocation
Department of Water, Land and Biodiversity Conservation
11 Helen Street, Mount Gambier
PO Box 1246, Mount Gambier SA 5290
Telephone National (08) 8735 1134
International +61 8 8735 1134
Fax National (08) 8735 1155
International +61 8 8735 1155
Website www.dwlbc.sa.gov.au

Disclaimer

The Department of Water, Land and Biodiversity Conservation and its employees do not warrant or make any representation regarding the use, or results of the use, of the information contained herein as regards to its correctness, accuracy, reliability, currency or otherwise. The Department of Water, Land and Biodiversity Conservation and its employees expressly disclaims all liability or responsibility to any person using the information or advice. Information contained in this document is correct at the time of writing.

ISBN-13: 978-1-921218-34-7

Preferred way to cite this publication

Carruthers, R 2006, *Volumetric Conversion in the South East of South Australia: Community Consultation Processes,* DWLBC Report 2006/33, Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Mount Gambier.

FOREWORD

South Australia's unique and precious natural resources are fundamental to the economic and social wellbeing of the State. It is critical that these resources are managed in a sustainable manner to safeguard them both for current users and for future generations.

The Department of Water, Land and Biodiversity Conservation (DWLBC) strives to ensure that our natural resources are managed so that they are available for all users, including the environment.

In order for us to best manage these natural resources it is imperative that we have a sound knowledge of their condition and how they are likely to respond to management changes. DWLBC scientific and technical staff continues to improve this knowledge through undertaking investigations, technical reviews and resource modelling.

The Volumetric Conversion Project was a four-year project initiated in 2002 to facilitate the process of converting the existing area based water licences in the South East of South Australia to licences with a volumetric basis for allocation. The conversion approach was developed following a comprehensive community consultation process, using the best available science and extensive field data.

The conversion approach will be implemented through the review of Water Allocation Plans for the Padthaway, Tatiara and Lower Limestone Coast Prescribed Wells Areas that is being conducted by the South East Natural Resource Management Board. The reviewed Water Allocation Plans will define the arrangements for the issue of new volumetric allocations, taking into account the recommendations of this report, the sustainability of the resource and input from the stakeholder community.

Rob Freeman
CHIEF EXECUTIVE
DEPARTMENT OF WATER, LAND AND BIODIVERSITY CONSERVATION

ACKNOWLEDGEMENTS

This report has been prepared as part of the Volumetric Conversion Project, jointly funded by the Department of Water, Land and Biodiversity Conservation, South East Natural Resource Management Board and Primary Industries and Resources, South Australia.

The authors acknowledge the contributions of John Bourne who provided a review of this report and the methodology documented in it, and made helpful comments and suggestions.

The author acknowledges the contributions of all those associated with the community consultation activities described in this report, particularly Mark Skewes from Rural Solutions SA for his involvement in helping to plan and deliver five series of irrigator workshops, Alison Regan for her assistance with the South East Field Days survey, and the Project Advisory Committee for their input, support and encouragement.

ASSOCIATED REPORTS

Carruthers, R, Latcham, B & Pudney, S 2006, *Volumetric Conversion in the South East of South Australia: Summary of the Conversion Model and Associated Conversion Rates,* DWLBC Report 2006/29, Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Mount Gambier.

Carruthers, R, Skewes, M, Latcham, B & Pudney, S 2006, *Volumetric Conversion in the South East of South Australia: Calculation of the Crop Adjustment Factor,* DWLBC Report 2006/32, Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Mount Gambier.

Latcham, B, Pudney, S & Carruthers, R 2006, *Volumetric Conversion in the South East of South Australia: Calculation of the Delivery Component and Bridging Volume,* DWLBC Report 2006/34, Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Mount Gambier.

Pudney, S 2006, *Volumetric Conversion in the South East of South Australia: Validating the allocation model,* DWLBC Report 2006/30, Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Mount Gambier.

Pudney, S, Latcham B & Carruthers, R 2006, *Volumetric Conversion in the South East of South Australia: Calculation of Specialised Production Requirements,* DWLBC Report 2006/31, Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Mount Gambier.

Skewes, M 2006, *Definition of Net Irrigation Requirements in the South East of South Australia,* Report to Department of Water Land and Biodiversity Conservation, Irrigated Crop Management Service, Rural Solutions SA, Primary Industries and Resources South Australia.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The Volumetric Conversion Project was initiated in 2002 to facilitate the process of converting the existing area based water licences in the South East of South Australia to licences with a new volumetric basis for allocation.

The volumetric conversion process will be implemented through the review of Water Allocation Plans, due for finalisation in late 2006. Over the past four years the Project has developed a model that describes the proposed process for conversion using an iterative process of consultation and amendment with input from the stakeholder community.

This report outlines the community consultation processes and activities that have been used in the Project including:

- Project Management Committee.
- Project Advisory Committee.
- Irrigator workshops.
- Partnerships with irrigator and commodity groups.
- Licensee involvement in data collection.
- Other tools to promote broad information transfer to all stakeholders.

An evaluation process, built-in to the communication strategy, has provided a mechanism for continuous review and amendment. The evaluation has shown that the community consultation processes and activities have resulted in:

- Continuous improvement over time in the percentage of licensees who had heard of the conversion project and who thought that volumetric conversion was a good thing.
- Significant change in broad community attitudes to volumetric conversion, irrigation practices and contemporary water management arrangements over the period of the project.
- General support for the volumetric conversion model that has been developed.

Three key learnings are that:

1. The use of extension principles in project planning and implementation can assist the development of solutions to complex water resource management problems.
2. Broad community involvement in data collection and decision making promotes shared ownership of outcomes.
3. Spending time to build relationships and trust with the broader community assists in enabling broad community attitude change.

1. INTRODUCTION

The Volumetric Conversion Project was initiated in 2002 to facilitate the process of converting the existing area based water licences in the South East of South Australia to licences with a new volumetric basis for allocation.

The volumetric conversion process will be implemented through the review of Water Allocation Plans, due for finalisation in late 2006. Over the past four years the Project has developed a model that describes the proposed process for conversion using an iterative process of consultation and amendment with input from the stakeholder community.

There are ~2500 area based water licences across the region, involving about 4000 irrigation bores pumping an estimated volume of over 300 000 ML per annum. The current area-based water allocation system limits the area of crop irrigated, however it does not limit the volume of water that is pumped for irrigation and does not require the volumes pumped to be measured. Under the new volumetric allocation system, licence holders will have volumetric allocations and will need to manage their volume pumped to the new allocation using water meters they have purchased. This will be a significant change for licensees in comparison to the current arrangements.

It was recognised early in the project planning process that the changes associated with volumetric conversion had the potential to create conflict and disharmony between licensees and water managers, and possibly between licensee groups. Consequently involving the community in both policy development and data collection was identified as being critical to the success of the conversion process. It was recognised that by encouraging community involvement and understanding of the processes involved in volumetric conversion, general acceptance of the outcomes would be much more likely.

This report describes the community consultative processes and activities that have contributed to the development of the conversion model. Other reports (listed in 'Associated Reports') detail the specifications and calculation of the various components of the model.

2. AIM AND OBJECTIVES

Aim — To develop and implement a communications and consultation strategy that would result in successful implementation of volumetric conversion in the South East.

This was achieved by implementing a range of consultative programs with the following key objectives.

1. To ensure that the conversion process is clearly understood and transparent to licensees.
2. To encourage participation in data collection processes that result in the conversion being based on real data that is 'owned'.
3. To engage licensees as true partners in the project with ongoing input to the development of the volumetric conversion approach.
4. To gain general acceptance of the final outcomes of the project from at least 95% of all stakeholders.
5. To keep the broader community advised and informed and to continually improve awareness and knowledge.

3. USE OF EXTENSION PRINCIPLES

The planning phase of the project identified the need for a strong extension focus to link the outcomes of the technical research with the need for community input and involvement. The extension principles that have been used align with the technological development model as identified by Coutts et al (2005) where individuals work together to develop specific technologies, management practices or decision support systems that would then be available to the rest of the community. Elements of the project that aligned with the technological development model are described below:

- Issues or concerns are identified by the community.
- Facilitation is provided to assist the process.
- A process is used to inform and involve stakeholders in problem definition and development of solutions.
- Committees and workshops provide local input and feedback.
- The process encourages researchers and community participants to work together.
- There is a strong on-farm/on-site trial, demonstration and assistance element.
- Benchmarking is a key feature of tracking benefits and progress.
- Supporting mechanisms are available such as incentives and training.

The use of these participative development processes was designed to improve the participant's knowledge and understanding of irrigation in the South East, and then use that knowledge to assist the process of developing of the conversion approach.

4. PRINCIPLES FOR CONVERSION

It was recognised that a framework was required to set boundaries and guidelines for the project's operation. The following principles were developed for use as a framework and 'check list' in the development of the conversion model. The principles relate to both the process of developing the conversion model and to the final outcomes achieved through those processes.

4.1 PROCESS

- Use best available information.
- Actively address information gaps.
- Regular 2-way communication.
- Community involvement throughout.
- Transparency.

4.2 OUTCOMES

- Move to best practice (continuous improvement).
- Incentives for efficient water use.
- Time for adjustment.
- No additional risk to the resource (water quality and quantity) – sustainability.
- Protection of water access rights.
- Minimise windfall gains.
- Fairness and equity.

The principles were displayed and highlighted during many of the consultative processes and activities that were undertaken. This provided a consistency of message through the project, with the principles often used to test policy options and to bring discussions 'back on track'.

5. COMMUNICATION STRATEGY

A detailed communication strategy was developed as part of the planning phase of the project. This identified the stakeholders at different levels and the processes used for communicating with and involving them. Community involvement has been encouraged at all levels with different processes used to target different subsections of the community.

As there is no one organisation in the South East that is seen as representing all irrigators, it was important that the strategy recognised links to key stakeholders including individual licensees, commodity/irrigator groups and industry leaders. Figure 1 plots key communications channels and describes linkages and interactions between key project stakeholders.

Communication processes detailed in the communications strategy and documented in this report include:

- Project Management Committee.
- Project Advisory Committee.
- Irrigator workshops.
- Partnerships with irrigator and commodity groups.
- Licensee involvement in data collection.
- Other tools to promote broad information transfer to all stakeholders.

The communications strategy was developed as a living document. A continuous evaluation process was built in to the strategy to provide a review and amendment mechanism for ensuring that the communication was effective. This involved collecting both quantitative and qualitative information in relation to each consultation/communication activity, for example:

- How many nominations were received for the Project Advisory Committee?
- How many people attended each workshop?
- What were people's reactions to the proposed conversion model?

The importance of evaluating the impact of our communication strategy on a holistic basis over time was also recognised. One way to do this was to obtain a benchmark of people's knowledge/perceptions of the project at its commencement, then test against that benchmark data periodically. The following processes were used for benchmarking:

- A short survey at the South East Field Days to obtain information from individuals on their knowledge/perceptions of the project, using a prize as the lure for participation.
- Assess feedback from each workshop series.

The strategy was a permanent agenda item for each meeting of the Project Management Committee. Data from the evaluation processes was discussed at these meetings and the strategy amended to reflect changes in communication directions.

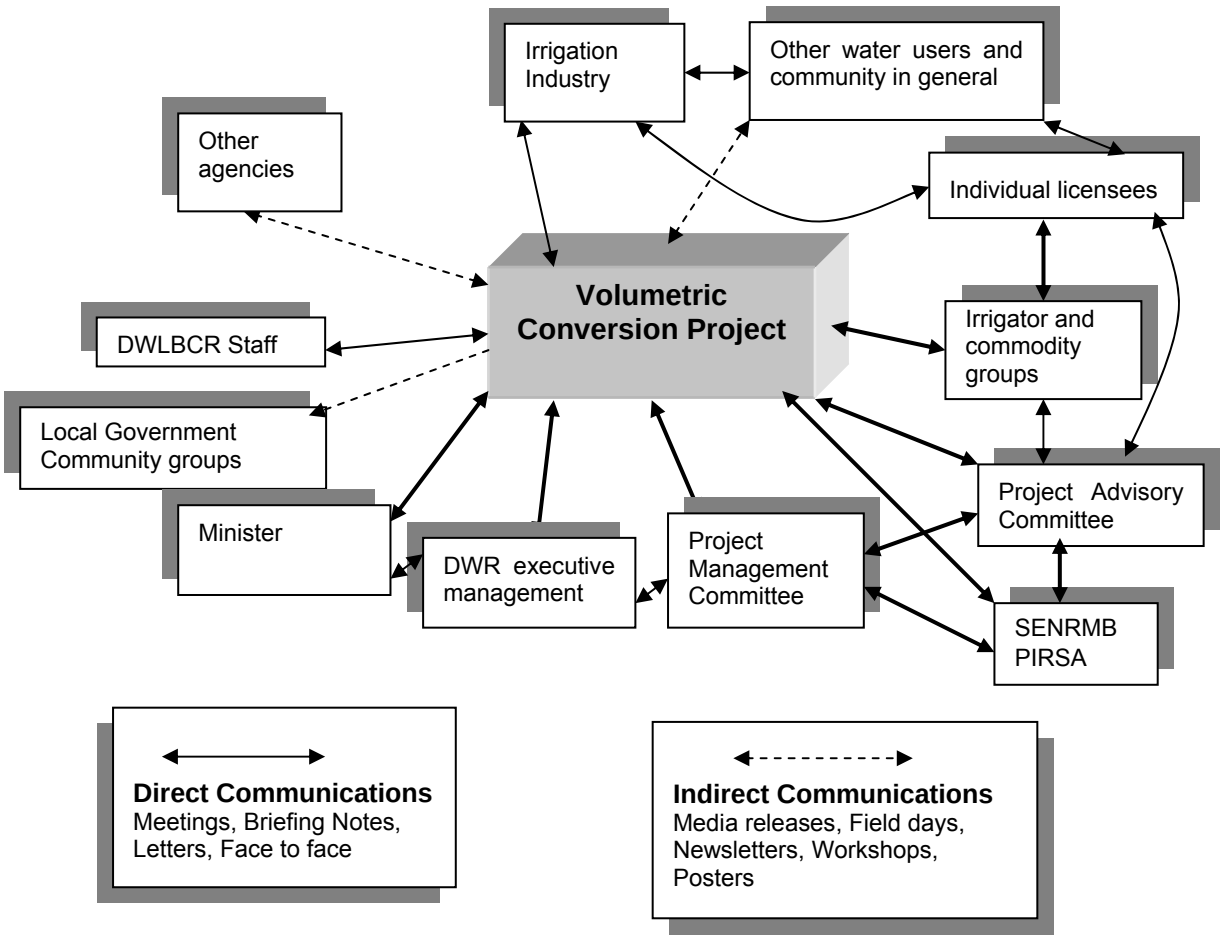

Figure 1. Communication channels and linkages between key project stakeholders

6. PROJECT MANAGEMENT COMMITTEE

The Project Management Committee consisted of representatives from the key water management agencies associated with and responsible for implementing volumetric conversion in the region. The Project Management Committee responsibilities included the setting of strategic project direction, project performance management, and interagency/organisation coordination. The Committee has ensured that the project remains aligned with South Australia's State Water Plan and other strategic policy arrangements.

The Committee has played a key role in ensuring that the project had a strong technical basis with scientific rigour while recognising the importance of community education and participation in the process. Issues associated with the implementation of the communications strategy, including community consultation issues, were addressed as a standing agenda item at each meeting.

7. PROJECT ADVISORY COMMITTEE

The Project Advisory Committee was a community-based committee made up of industry leaders from major commodity groups. The committee consisted of nine representatives from the irrigation community, one representative (also an irrigator) from the South East Natural Resource Management Board (SENRMB) and two representatives from the Project Management Committee. The role of the Committee was to advise the Project Management Committee and provide feedback with regard to:

1. Community views, attitudes and perceptions in relation to the Project.
2. The development and refinement of Volumetric Conversion Project methodology.
3. The assessment of theoretical crop and enterprise water requirements.
4. The collection of irrigation related data including water extraction (metered or unmetered), soil moisture and crop growing information.
5. The implementation of field trials to fill data gaps including methodology, development of incentives for landholder involvement, selection of sites and setting of priorities.
6. The development of a volumetric conversion model taking into account data collected and the range of variables affecting water use in the region.

Community members on the Committee were selected following an open application process by a panel consisting of representatives from the South East Catchment Water Management Board (SECWMB), South Australian Farmers Federation (SAFF) and DWLBC. Selection was based on the provision of representation across a number of key areas including:

- Irrigated crop type.
- Geographic spread.
- Irrigation method.

A total of 13 Project Advisory Committee meetings were held as well a field tour and a joint conversion model workshop with the Project Management Committee. Over the past four years the Project Advisory Committee have played a key role in providing community advice and input on project implementation and outcomes. They have provided a link between licensees and associated irrigator/commodity groups and the project, and applied practical input and feedback in relation to proposed policy directions and project activities.

8. IRRIGATOR WORKSHOPS

As previously stated, the importance of involving the community in both policy development and data collection was identified as being critical to the success of the conversion process. The lack of a single umbrella organisation representing all licensees in the South East has resulted in the development of alternate strategies to enable broad community involvement, including the irrigator workshop concept.

A regular series of irrigator workshops at venues across the region provided everyone in the community with the opportunity to attend and make a real contribution to the development and review of the conversion approach. Licensees received personal invitations to attend whilst the broader community was invited through the media. In all, five workshop series have been held over four years with 1420 irrigators attending a total of 80 workshops. It is estimated that over 40% of active irrigators have participated in at least one workshop. Workshops have been held at Bordertown (7), Keith (7), Padthaway (7), Kybybolite (1), Frances (5), Naracoorte (8), Coonawarra (7), Kalangadoo (4), Mount Gambier (7), Kongorong (5), Mil-lel (3), Millicent (5), Lucindale (4), Robe (6) and Kingston (4).

The workshops were structured, using extension methodologies, to create an atmosphere of joint problem solving rather than confrontation. Ground rules were agreed at the commencement of each workshop to help define the relationships between the facilitator,

The use of small group processes gave workshop participants the opportunity to have their say in a non-threatening environment. Here irrigators discuss a 'possible volumetric conversion model'. All issues raised were collated and then reported back to irrigators via the project's newsletter.

presenters and participants. Small group processes were used to enable all participants to actively contribute to discussions, brainstorming sessions and problem solving activities. An 'issues sheet' was used to record issues not associated with conversion but important to the irrigator to help the workshops stay on track.

The title slide for all presentations 'Working in Partnership with the Community', continually reinforced the joint problem solving message. A summary of the attendance and topics discussed at each workshop series is shown in Table 1. Summarised outcomes from the small group sessions at each of the workshop series are detailed in Appendices A–E.

The concept of a regular workshop series has provided irrigators with the chance to learn and to have real input to the process. As recognised through Roberts work (2004), the more people are engaged in determining their own destiny, the more the outcomes are likely to produce improved situations that last.

Table 1. Irrigator workshops 2002–05

Workshop Series	Number of workshops	Number of locations	Number of participants	Topics for discussion
Aug 2002 1	18	11	300	• Introduction to volumetric conversion including principles for conversion • Workshop – What are your key issues? • Workshop – Crop calendars
Aug 2003 2	18	13	270	• Project update • Check summarised crop calendars • Presentation on irrigation water balance • Workshop – possible conversion model
Aug 2004 3	15	14	260	• Project update – report back on amendments from last workshop • Workshop – climatic bands • Workshop – conversion model/case study
May 2005 4	15	14	330	• Project update – report back on amendments from last workshop • Workshop – gossip, rumours and concerns • Workshop – Developing delivery zones
Nov 2005 5	14	13	260	• Project update – report back on amendments from last workshop • Calculation of draft volumetric allocations • Feedback Session
Total	**80**		**1 420**	

9. PARTNERSHIPS WITH IRRIGATOR AND COMMODITY GROUPS

Whilst there is no one organisation in the South East that is seen as representing all licensees, there are a number of irrigator and commodity groups representing groups of licensees that have significant input to water resource policy in the South East. A concerted effort was made to engage with and to develop trusting relationships with these groups.

Project staff were always been available to attend meetings of these groups as required to listen to issues and to update the groups on the project. In many cases this resulted in the early identification and resolution of issues. It also assisted the project to develop relationships with each group, which now enables full and frank discussions on any issue.

Where specific area based or commodity based issues arose, the project team worked hard to understand the issue, build partnerships and to develop shared solutions. This was particularly important in the development of the Specialised Production Requirements allocation component (see Fig. 5) where detailed information on specific crop management practices was shared and a fair and equitable allocation negotiated and agreed.

Collaborative research partnerships were also formed with the dairy, viticulture and lucerne seed industries to share the cost of additional field trial sites in areas where there were previously knowledge gaps. This resulted in shared outcomes and benefits for all involved.

10. LICENSEE INVOLVEMENT IN DATA COLLECTION

The Project developed and implemented three data collection programs that have involved licensees.

- Metered Extraction Trials (MET) Program – Collection of accurate records of volumes extracted per hectare irrigated from 160 metered trial sites.
- Field Irrigation System Trials (FIST) Program – Collection of detailed information on the on-farm water balance from 36 representative, intensely monitored trial sites (mainly MET program participants).
- Annual Water Use Returns (AWUR) Program – Collection of calculated records of volumes extracted per hectare irrigated from all licensees on their irrigation activities annually.

The involvement of irrigators in the collection and reporting of field data provided multiple benefits. Trial participants were great advocates for the conversion process and helped 'sell' the message. They also have 'ownership' of the data that will be used as the basis for conversion so the data is 'ours' rather than being 'their' (Government) data. Trial participants are using the data collected to assess irrigation system efficiency and amend their systems. An evaluation conducted at the completion of the MET program indicated that the majority of participants intended to continue keeping detailed irrigation records and were keen to be involved in future research programs.

Irrigators generally now have a far greater understanding of the volumes of water they are pumping and this will assist them when the change in allocation systems from area to volume occurs. The requirement for irrigators to calculate their volumes pumped has also brought about a recognition in the irrigation community that volumetric conversion will happen and has helped prepare irrigators for the big change from area based on-farm water management to volumetric management.

11. OTHER TOOLS TO ENABLE BROAD INFORMATION TRANSFER TO ALL STAKEHOLDERS

The project put considerable effort into providing irrigators and other key stakeholders with up to date information on project progress and outcomes, ensuring that the conversion process is transparent to all stakeholders.

Communication tools utilised include:

- A project web site.
- Regular volumetric conversion newsletters.
- Development of an Information Kit.
- Attendance and participation at all field days and other suitable extension activities.
- Active use of all forms of the media to publicise key activities and milestones.
- Papers delivered at major water/irrigation conferences.

By using a range of different tools for information transfer, the project attempted to reach and provide information to as many key stakeholders as possible.

12. DEVELOPMENT OF THE CONVERSION MODEL

Over the past four years the Volumetric Conversion Project has developed a 'possible volumetric conversion model' for use in the formal consultative processes associated with the Water Allocation Plan review.

The model development process commenced in June 2003 with a joint workshop involving members of both the Project Management Committee and Project Advisory Committee. Follow-up meetings of both Committees resulted in the development of a 'possible volumetric conversion model' as a way of commencing community dialog on the conversion process. The possible model (Fig. 2) was introduced to licensees at the August 2003 irrigator workshop series. A small group process was used to ensure that every workshop participant had equal opportunity to provide comment and input.

The model consisted of a base allocation that was the tradeable component of the allocation and provided for net irrigation requirements (NIR), and a delivery component that provided for losses including evaporation, deep drainage and other requirements not related to NIR such as frost control. The licensees appreciated the opportunity to have early input to the policy development process. Issues raised in relation to the proposed model are detailed in Appendix B.

The issues raised at the workshop were considered and the model reviewed and refined. Additional input and feedback was obtained through regular meetings of the Project Management Committee and Project Advisory Committee, and at meetings with key irrigator and commodity groups.

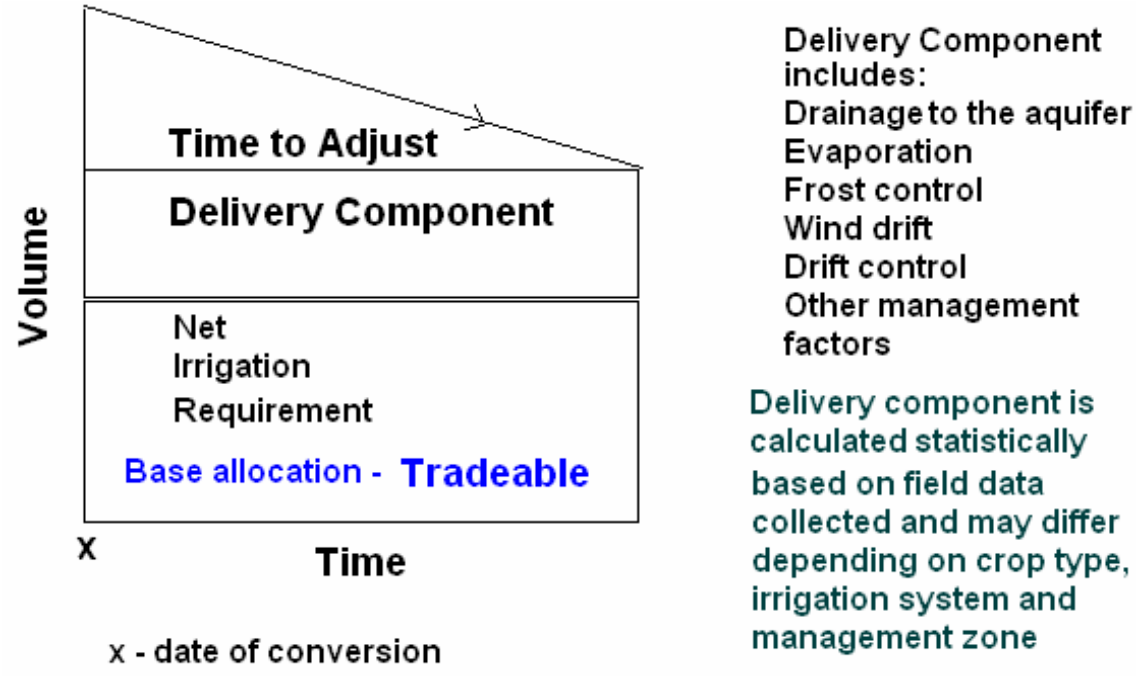

Figure 2. Possible Conversion Model Presented at the 2003 Workshop Series

At the August 2004 workshop series an amended version of the proposed model was presented for discussion (Fig. 3). This version of the model included a Crop Adjustment Factor that was introduced following concerns about whether the Crop Area Ratios (CARs) for certain crops within the existing area-based system provided sufficient water. The use of climatic bands to reflect climatic variation across the South East was discussed and draft climatic bands presented for comment. The concept of using percentiles of the irrigator population to determine what constituted a 'reasonably efficient irrigator' (Latcham 2006) was workshopped. Participants were asked the question 'What do you think is a reasonable percentile (percentage of irrigators) on which to base the delivery component calculation?' Issues raised during this workshop series are summarised in Appendix C.

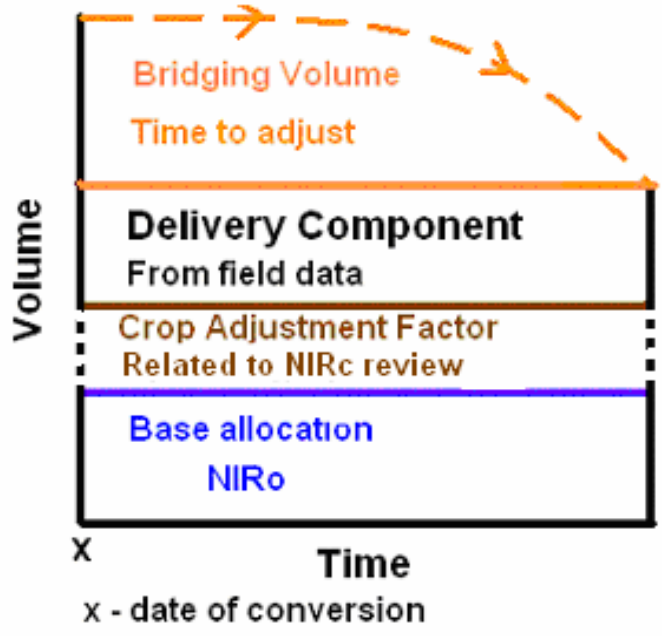

Figure 3. Possible Conversion Model Presented at August 2004 Workshop Series

In February 2005 a two-day stakeholder workshop was held to develop solutions to a number of unresolved issues associated with the model. As a result of this meeting and other consultative activities the model was further refined (Fig. 4), then presented at the May 2005 workshop series. The main change in this model in comparison to the August 2004 model was the introduction of a specific model component relating to Auxiliary Requirements, to provide water for purposes such as frost control, crop cooling etc. that are not part of the water requirements (NIR) for growing the crop. The model also separated out the model components that would be available to all licensees and the model components only available on application under set criteria.

The use of delivery zones to reflect areas of like characteristics in terms of volumes pumped and soil types was also discussed. Workshop participants worked in small groups, drawing lines around areas of like characteristics to commence the process of developing the delivery zones. Issues raised during this workshop series are documented in Appendix D.

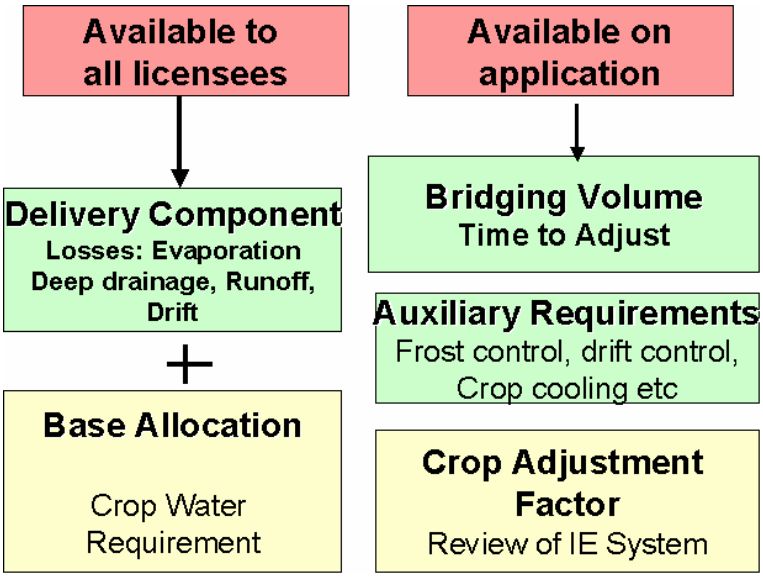

Figure 4. Possible Conversion Model Presented to May 2005 Workshop Series

As a result of the issues raised during the May 2005 workshop series, and following discussions with irrigator and commodity groups, the possible conversion model was again amended (Fig. 5). The main change in this model in comparison to the May 2005 model was the incorporation of the Crop Adjustment Factor into the Base Allocation. A Specialised Production Requirements (SPR) component was introduced, combining the existing allocations associated with Auxiliary Requirements with an allocation for Maximum Production Pasture.

At the November 2005 workshop series, participants were presented with the amended model and given the opportunity to calculate draft volumetric allocations based on the possible conversion model and draft conversion rates. Many participants brought along historical pumping records and were able to compare the draft allocations to their volume pumped calculations. Even though a number of participants observed that they were currently pumping in excess of their draft allocations, there was general support for the model and draft conversion rates. Issues raised during this workshop series are documented in Appendix E.

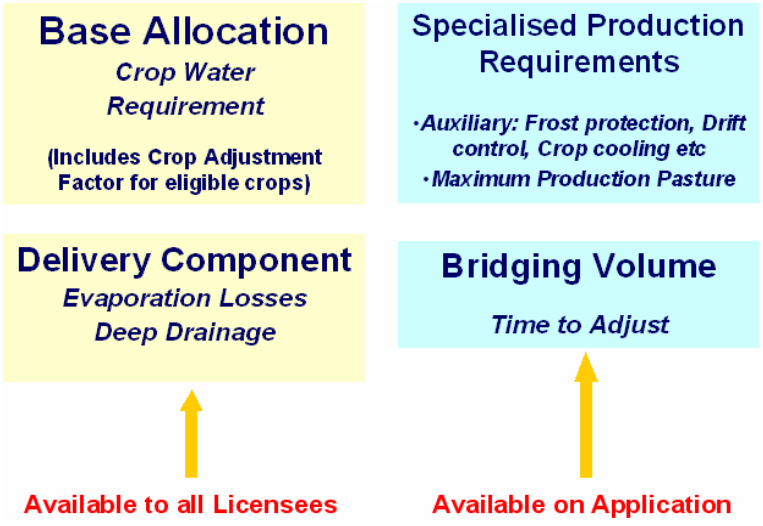

Figure 5. Possible Conversion Model Presented at the November 2005 Workshop Series

The proposed volumetric conversion model was developed through an iterative process of review and amendment. Briefings were provided on a regular basis to the Minister for Environment and Conservation, executive management of Department of Water, Land and Biodiversity Conservation and to the South East Catchment Water Management Board and South East Natural Resource Management Board. It is considered that the model has general support from all stakeholders. The planning and consultative processes associated with the review of Water Allocation Plans will provide opportunities for further review and refinement if necessary.

13. EVALUATING COMMUNITY CONSULTATION PROCESSES AND ACTIVITIES

13.1 SOUTH EAST FIELD DAYS EVALUATION SURVEY

South East Field Days is one of the biggest rural events on the calendar in the South East with over 25 000 people attending over the two days. The Volumetric Conversion Project team has staffed displays at the field days for the last five years from 2002–06. As a means of evaluating the effectiveness of our communications strategy and associated community consultation programs, each year the project has organised a competition as part of the field days display. Contestants are required to complete a survey form to have the opportunity of winning a prize. The survey form has been identical for each of the past five years and asks four questions:

1. Do you have a water licence?
2. Have you heard of the Volumetric Conversion Project?
3. Do you think the conversion of area based water licenses to volumetric water licenses will be a good thing?
4. Why?

Questions 1–3 provide quantitative data that can be used to contribute to an evaluation of the communications strategy, whilst question four provides qualitative information. Table 2 displays collated data in relation to questions 1–3 for the five years of the survey. For those completing the survey who held a current water licence, the data indicates a continuous improvement over time in the percentage of respondents who had heard of the conversion project and a continuous improvement in the percentage of respondents who thought that volumetric conversion was a good thing. For those respondents without a current water licence the trends are not so clear (many attend the Field Days from outside the region), however there appears to be a good awareness of the project and support for its objectives. The qualitative data from question four has been analysed by project staff each year and used in considering variations to communication processes.

Table 2. Comparison of Lucindale Field Days Surveys 2002–06

Year	Hold Current Water Licence		No Current Water Licence	
	% of respondents that had heard of the Volumetric Conversion Project	*% of respondents that thought volumetric conversion was a good thing*	*% of respondents that had heard of the Volumetric Conversion Project*	*% of respondents that thought volumetric conversion was a good thing*
2002	79%	61%	42%	95%
2003	86%	65%	55%	93%
2004	87%	66%	39%	86%
2005	97%	83%	50%	100%
2006	100%	94%	65%	100%

This evaluation process indicates that the communications strategy has been highly effective. The general awareness of the Project within the community has improved over the period of the survey, as has general support for the volumetric conversion process. This is in alignment with the objectives of the communication and consultation programs.

This type of evaluation is a valuable tool for assessing the effectiveness of projects over time. However it should be recognized that there are inherent assumptions made analysing this data, particularly in relation to sample consistency from year to year. These assumptions may or may not be valid and further work may be required to verify outcomes.

13.2 EVALUATING IRRIGATOR WORKSHOPS

Outcomes from the small group processes at each workshop were communicated back to all licensees by newsletter. Changes made to conversion methodologies as a result of input through the workshops were reported back at the following workshop series. Feedback from licensees indicates that this active input – feedback protocol has assisted greatly in the development of a trusting relationship with irrigators based on consistency of experience.

In August 2002 the Project ran the first series of 18 workshops to explain to irrigators the proposed project methodology and to seek irrigator comment and input to the process. Whilst the irrigators actively participated in the workshops, it was obvious that many were apprehensive and mistrustful of the proposed process.

In November 2005, the project held its 5th series of volumetric conversion workshops with irrigators. At this workshop series irrigators were led through the proposed model and conversion factors, and using worksheets were assisted in calculating individual volumetric allocations for their property. Aside from a few boundary related issues, irrigators broadly supported the proposals. This was despite the proposed allocations being less than volumes currently being pumped by some of the irrigators.

By comparing key issues from workshop to workshop (see Apps A–E), changes in irrigator attitudes and areas of concern over time can be evaluated. It is apparent that there has been a significant change in broad community attitude in the period between the first and fifth workshop series (Table 3).

Table 3. Comparison of key issues as identified during the workshop series

1st Workshop Series	2nd Workshop Series	5th Workshop Series
Purchase, installation and maintenance of water meters	Providing time for adjustment	General acceptance of the proposed model and conversion rates
Why is volumetric conversion happening?	Incentives to change	Boundary Issues
Being able to continue irrigating existing enterprises	Education and training	Dealing with Seasonal Variability
Resource condition and land use change	System efficiency	Investigating ways to fit within allocations
	The conversion approach	Resource sustainability
	Irrigator equity	Future change processes
	Administration	

13.3 EVALUATING LICENSEE INVOLVEMENT IN DATA COLLECTION PROGRAMS

The Metered Extraction Trials (MET Program) enabled licensees to receive a 50% subsidy (up to a maximum of $2500) towards the purchase and installation of water meters, in return for collecting detailed records on volumes pumped per irrigation event, over three seasons (2002–03 to 2004–05).

An evaluation process was conducted at the completion of the program to gauge irrigators' feelings towards the program and the volumetric conversion process. 60% of the evaluation forms sent to program participants were returned.

The outcomes from the evaluation and associated comments can be seen in Table 4.

Table 4. Outcomes from the MET Program Evaluation Survey

Question	Yes	No	Unsure
Were you happy with the Trial Program?	96%	2%	2%
Are you comfortable with the proposed volumetric conversion process?	74%	12%	14%
Have you found it useful keeping metered records?	92%	3%	5%
Will you continue keeping metered records?	92%	8%	0%
Would you consider being involved in future irrigation trials?	92%	8%	0%

Comments received in relation to the data collection process included:

- "Could not imagine trying to manage watering without a meter."
- "Meters are useless if no records are kept."
- "A pleasure to be involved, I am sure I have learnt as much from the project as I have contributed."
- "The MET program has been a very good idea. Process has been very open and all subjects have been up for discussion."
- "My meter has been an excellent tool. With diesel approaching $1.30/L, irrigation efficiency is of paramount importance."
- "Happy to have contributed and hope the info gained will help in the future."
- "Metering has increased our awareness of water use. Comparing usage over three years has been very valuable."

Comments received in relation to community consultation activities and the proposed conversion model included:

- "Your intensive consultation process is on track for the best transition to volumetric allocations."
- "Being involved has been excellent and the final result is accepted by all irrigators."
- "Some irrigators will miss out and some will receive bonus volumes in delivery zones that differ greatly in soil drainage and crop growth ability."
- "This is just the start. Implementation will need more funding."

An objective evaluation of communication and consultative strategies is difficult. The evaluation processes described above indicate that the strategies used in the project have been highly effective. Whilst the results of the evaluation appear to be encouraging, it is acknowledged that there will be some licensees who still unaware of the proposed changes associated with volumetric conversion and have not been involved in the development of proposed conversion approach. This could become an issue as the project reaches its implementation phase.

14. PERFORMANCE AGAINST KEY OBJECTIVES

An assessment of the project's performance against the five key objectives is discussed below.

Objective 1. To ensure that the conversion process is clearly understood and transparent to licensees.

Considerable effort has been made to communicate the conversion process through a range of methods. The South East Field Days evaluation and other feedback from licensees indicates that this has been successful with licensees generally appreciative of the efforts that have been made to inform them.

Objective 2. To encourage participation in data collection processes that result in the conversion being based on real data that is 'owned'.

The data collection programmes have enabled all licensees to participate in data collection processes that have contributed to the final outcomes. The MET program evaluation process indicates the success of the program. There is a real feeling of ownership amongst trial participants. At workshops trial participants have often been the project's greatest advocates.

Objective 3. To engage licensees as true partners in the project with ongoing input to the development of the volumetric conversion approach.

Again considerable effort has been made to develop partnerships and to provide all stakeholders with the opportunity to have input to the process. Consistent attendances at the 5 series of irrigator workshops over 4 years indicates that the workshops were valued and considered to be a useful activity for the landholder. The comment 'best water meeting I've attended' was heard many times. The relationships that have been built with irrigator and commodity groups will provide a platform for successful project implementation and for partnerships into the future.

Objective 4. To gain general acceptance of the final outcomes of the project from at least 95% of all stakeholders.

Those who attended the 5th workshop series and calculated draft volumetric allocation were generally supportive of the final outcomes. However it is acknowledged that there will be some licensees who will not accept the final outcomes, particularly those who have not participated in workshops or data collection activities or those who are pumping well in excess of proposed allocations. Evaluations conducted indicate that at least 74% of licensees are comfortable with the conversion process and 94% of licensees think that volumetric conversion is a good thing. The number of appeals received following the issue of volumetric licences will be a key performance indicator for this objective.

Objective 5. To keep the broader community advised and informed and to continually improve awareness and knowledge.

This has been achieved through the use of the media, website, newsletters, conference papers and attendance at field days etc. The South East Field Days evaluation survey indicated that over 50% of respondents without a water licence were aware of the project with the trend improving upwards. The survey also indicated that the broader community thought that volumetric conversion was a good thing, which may correspond with a greater awareness within the community in general of water related issues.

15. CONCLUSIONS AND LEARNINGS

The community consultation processes and activities associated with the Volumetric Conversion Project have been successful. Licensees are generally supportive of the proposed volumetric conversion process, despite the considerable change and costs associated with its implementation. This can largely be attributed to the forming of effective partnerships with licensees and irrigator/commodity groups, and to the considerable efforts made to involve licensees in data collection and in the development of the conversion model.

Three key learnings from this work are that:

1. The use of extension principles in project planning and implementation can assist the development of solutions to complex water resource management problems.
2. Broad community involvement in data collection and decision making promotes shared ownership of outcomes.
3. Spending time to build relationships and trust with the broader community assists in enabling broad community attitude change.

APPENDICES

A. SUMMARY OF KEY ISSUES FROM AUGUST 2002 IRRIGATOR WORKSHOP SERIES

Workshop Question

- What do you think are the key issues for irrigations with respect to volumetric conversion?

1. Purchase, Installation and Maintenance of Water Meters (112 Comments)

- Finding suitable Meters – What are appropriate meters for various systems?
- Dealing with high water velocities when metering.
- Are there going to be further Government subsidies for meters?
- The cost associated with meters – particularly multiple bores/pumps.
- Ways meters can be used for multiple bore/pump requirements.
- Fitting of meters, installation problems for existing irrigators, no room to place meters into system – physical setups not conducive to meter installation.
- Will metering meet sustainability needs of the resource and how?

2. The Conversion Approach (80 Comments)

- Will conversion be comparable with allocations in other areas in the state?
- How the confined aquifer users are treated – can't we use the same principle?
- Is pre-existing usage being accounted for?
- Will new volumetric licenses change once the findings from the VCP field trials are determined?
- How will holding allocations and unused % of a water licence be converted?
- What about irrigation bores with stock water – how will this be taken into account?
- How much extra water will be given for frost control?
- The unavoidable return flows from flood irrigation to aquifer have to be allowed for.
- How will it be linked to the sustainability of the resource?

3. Being able to continue irrigating existing enterprises (54 Comments)

- Allocated amount of water we have been using in previous years (i.e. based on historic use).
- Want to be able to maintain the same level productivity.
- Maintain integrity of entitlement (to grow current crops), honour existing rights.
- Uncertainty of future viability, is it worth continuing to maintain infrastructure?
- Maintain the same flexibility in water use to meet consumer demands – as consumer trends change so does the water consumption.

4. Resource Condition and Land Change (49 Comments)

- What about forestry – Is the forestry development being taken into account in the VCP?
- Ribbon development – concentrate water to where it can be best utilised sustainability.
- Zonal vertical recharge should be reviewed – since we are reviewing and updating the Crop Water Use and IE data.
- Roll overs in drought will cause extra stress on the groundwater resource in Hd of Stirling.
- Should people with poorer water quality be charge the same levy as those with good water?
- Will help prove whether hundreds are over allocated or not!

B. SUMMARY OF KEY ISSUES FROM AUGUST 2003 IRRIGATOR WORKSHOP SERIES

Workshop Questions

- What are the good things about the model?
- What are the problems do you see with the model?

1. Delivery Component and System Efficiency

- Hardest thing will be to decide where the benchmark cut off is for calculation of delivery component.
- Will the volumetric conversion trials be broad enough to cover all delivery requirements?
- Soil type – not so much an issue with drip and sprinkler, big issue with flood.
- Is it fair equitable to have a variable delivery component, wont it reward inefficiency.
- How do you determine efficiency?

2. Time to Adjust, Incentives to Change, Education and Training

- There must be assistance with costs to adjust, help for adjustment could include tax/education/learning period and technical advice to help in adjusting, including field trial help.
- Need time to ID problem and collect site data once a water meter is installed.
- Time to adjust will enable irrigators to get a handle on volumes required and the area you will be able to irrigate with a given volume.
- Model creates issues regarding efficiency, education and training. How do you reward more efficient use, what incentives to be more efficient?
- Flood irrigation – how do you expect us to adjust?

3. The Conversion Approach and Irrigator Equity

- Model must ensure that equivalent volumes to existing area licences are applied.
- Need more data for a fair water allocation (more MET sites, more soil information).
- Too complicated, too hard to fine tune, must be kept simple and manageable.
- Has to be complicated to be fair and equitable across the catchment, so long as the lines are set right it should be OK.
- Our industry (viticulture) has reduced water requirements, our water requirement is well below prescription irrigation requirement figures, it will be unfair if we get converted on this basis, the water saved should be kept up our sleeve for extreme years.

4. Base Allocation and Administration

- Crop type should not be used in calculating base allocation to difficult and unequitable.
- All base allocations should relate to crop type grown.
- Holding allocations should only be given base allocation component and no delivery components.

- Data the model is based on must provide correct values for Base Allocation and Delivery Component.
- How do you manage the model, cost, time and other resource implications?

5. Other

- Extra water given out for delivery components and time to adjust could be unsustainable.

C. SUMMARY OF KEY ISSUES FROM AUGUST 2004 IRRIGATOR WORKSHOP SERIES

Workshop Questions

- What do you think about the proposed climatic bands?
- What do you think is a reasonable percentile (percentage of irrigators) on which to base the delivery component calculation?
- What are the good things about the model?
- What problems do you see with the model?

1. New Climatic Zones/Bands (200 comments)

- More relevant to crop needs, very important, keep trying to improve.
- How accurate are the numbers and can they be verified with other info sources?
- Find the new zones hard to believe – coast Vs inland.
- Climate variation is little compared to soil variation.
- What flexibility is there for people near the boundaries?

2. Benchmarking the Delivery Component (145 comments)

- Happy with setting the benchmark at the 70–80th percentile, but need more field data.
- Need to know what % of irrigators are doing it properly.
- Can you ID 'best practice' to determine percentile, then plus 10–20%.
- 60th–70th percentile with exemption process for those above.
- Might pay to set the Delivery Component high then reduce over time.
- Need different Delivery Component for different irrigation systems and soil types.
- Need to set a cut-off point somewhere.

3. Dealing with different Industries and Crop Types (85 comments)

- Some of the best irrigators are the high water users and should not be penalised.
- Low water users are ineffective producers and dragging the average down.
- Viticulture industry needs allowance for future maximum production.
- Need to know how frost control is going to be incorporated.
- Savings from current drip practices should be used for frost control.
- Big differences in pasture production and the better producers are being disadvantaged.
- The level of effort, labour and management dictates how efficient a system is.

4. Adjusting to the New System (164 comments)

- Need to provide help for those out side the benchmark.
- Need seasonal carryovers (3–5 yr rolling average or unders and overs).
- Need an appeals process if unhappy with allocation or above cut-off benchmark.
- No educational process to follow – just compliance.

- Unique opportunity to share data and knowledge for benefit of SE irrigation.
- What controls will be in place to ensure the new system is not rorted?
- What about irrigators who have not attended, won't be able to understand new system.

5. Latest Conversion Model (157 comments)

- Hard to develop one system that deals with all the possible scenarios.
- Honest attempt of fair water allocation system, good in principle, appears flexible.
- Very good consultation around the region – getting everybody's views.
- Covers most issues, will be much more comfortable once it incorporates soil types.
- No incentive to upgrade system type if the Delivery Component is reduced.
- Got to have a multiple system to begin with, then simplify over time.
- Very complicated to administer – irrigator ends up paying.

6. Other Issues (31 comments)

- What happens to unused allocations – should get credit, not be penalised.
- Extra cost of levy with the Delivery Component – needs sliding scale.
- Fears meters will be used for taxing – what process will be used to read meters?
- Will we be charged for what we use or what we are allocated?
- Need to be able to removes trees to become more efficient.
- What impacts are the high water users having on the environment?

D. SUMMARY OF COMMUNITY RESPONSES FROM MAY 2005 WORKSHOP SERIES

WORKSHOP QUESTIONS

- What are the latest rumours or the latest gossip going around about volumetric conversion?
- What are your particular concerns that you don't think are being addressed?

1. Unanswered Questions

- Are existing volumetric allocations going to be made equitable with new converted volumetric allocations?
- How will delivery components be determined for unused allocations and those without infrastructure in place?
- Will the expert panel assessing application include local growers?
- What about salt leeching, is it being taken into account?
- How will allocations be determined for licences that have recently changed hands or a in the process of changing practices?
- Will there be any 'on-ground' verification for additional components requiring applications?
- Where do you draw the line between system upgrades and changing irrigation system type in regards to changing the delivery component?
- How are you going to convert unused allocations?
- Will there be an appeals process – or individual review?
- Will there be a carryover system for Auxiliary requirements?
- Will the results be embedded in Legislation or Regulation?
- What happens if we install frost protection sprinklers in the future – can we get the additional volume?
- What if you haven't been in full production over the last 3 years?
- Are return flows being accounted for in the PAV's?

2. Concerns addressed during the workshop – FAQ's

- Seasonal variation is our biggest concern – will there be carryovers?
- If you don't use your whole allocation you'll lose it.
- How are return flows to the aquifer being accounted for?
- Will we still need to notify the Department of crop types grown and irrigation systems used in the future?
- Is the influence of soil types being taken into account?
- Trying to get rid of flood irrigation.
- Volumetric licences and water meters are a means for charging more for water.

- Are meters helping irrigators change their practices?
- What will happen to the delivery component if you change irrigation system type?

3. Related Issues

- Where is the incentive to change irrigation system types if the DC is reduced?
- Administration costs will increase under a volumetric allocation system.
- Addition charges for application processes.
- Application process for bridging volume and late season trades must be quick.
- Many irrigators don't have the knowledge required to irrigate to the crops demands.
- Under-utilised areas should be able to apply for frost protection water post-conversion.
- Seasonal carryovers are the same for crop water use and auxiliary requirement as it is a climatic effect.
- Can see big problems with the application process for the CAF.
- Should auxiliary requirements stand alone when it's integral part of the crop production system – maybe it can be incorporated into the delivery component?

4. Water Allocation Planning Issues

- Seasonal variation is our biggest concern – will there be carryovers?
- Need to know the rules for seasonal carryovers and what will happen during consecutive dry years.
- Will irrigators be fined for 'over-use' in the first season of volumetric allocations?
- How will we be charged – should only pay a levy for the base allocation because that's all we pay for now?
- Need to free trading and transfers across imaginary boundaries.
- Need to be able to lease additional water post-season to avoid over-use.
- How will gypsy licences be dealt with in regards to moving across boundaries with different volumetric allocations?
- Need greater flexibility for individual licences – where water is applied and how it is used.
- Base Allocation needs to be protected – If cut-backs are required it should come from additional components first.
- The effect of unused allocations on the PAV and future cut-backs.
- Unused allocations should not get a DC if they have no infrastructure.
- How will over allocated areas with lots of unused water be treated?
- How are future cut-backs going to be implicated?
- Are return flows being accounted for in the PAV's?
- Will the confined aquifer users be treated the same?
- What Base allocation will properties receive that cross or are close to climatic boundaries?
- Under utilised areas should be able to apply for frost protection water post-conversion.

- How will delivery components be determined for unused allocations and those without infrastructure in place?
- Are existing volumetric allocations going to be made equitable with new converted volumetric allocations?

5. Other

- Never expected this much work to done to ensure a fair outcome.
- Going down the right track by using lots of science.
- What will happen if your meter stops working mid-season?
- Who is going to police and read the meters?
- Irrigators are receiving conflicting information on water meter installations.
- How reliable are water meters?
- Will there be any assistance for those having difficulties installing water meters?

E. SUMMARY OF KEY ISSUES FROM NOVEMBER 2005 IRRIGATOR WORKSHOP SERIES

Workshop Session

- Feedback from the process of calculating draft volumetric allocations.

Bridging Volume

- Persons requiring bridging volumes will need assistance – expert advice and financial support.

Delivery Component

- What happens to surplus Delivery Component water when moving from a flood system to a pivot system?
- How will you deal with Licensees that change their combination of irrigation system types from season to season?

Delivery Zones

- Boundary issues – need to check whether boundary needs to be further altered.
    - Willalooka, Stirling, North Pendleton and Wirrega boundaries.

Holding Allocations

- Will holding allocations be brought in to line with the volumetric conversion (Base + Delivery)?
- How will holding allocations be dealt with in areas with sustainability problems?

Aquaculture

- What are the implications of conversion for aquaculture?

Existing Volumetric Licences

- Will existing volumetric licences be brought into line with volumetric conversion?
- Will converted holding licences be eligible for Crop Adjustment Factor or Specialised Production Requirement model components?
- If licensees were not allocated sufficient water when their licenses were converted, they are now by default not eligible for the full Specialised Production Requirement allocation.

Seasonal Carryovers

- In the 2004–05 season a 25% carryover would not have been sufficient.
- Seasonal carryovers are essential and the most critical issue.
- How will seasonal carryovers work?

Crop Adjustment Factor (CAF) and Specialised Production Requirements (SPR)

- A three year qualification period for CAF/SPR is not long enough for long-term certified crops.
- What about CAF on a newly purchased farm? What if you have already invested in the infrastructure?
- Who receives the SPR allocation if the eligible crop has been grown with leased water?

- Who needs to lodge the application?
- What happens if you start growing an SPR crop in the future?
- What happens if you change you area of SPR crop in the future?
- Some sub-clover is not irrigated throughout the growing season, but a post harvest cover crop is planted, is this production system entitled to a SPR?

Sustainability

- If there is a need for reductions will forestry be treated the same as all other industries?

Base

- The NIRc value for olives is low compared to figures developed by a private consultant.
- Water use figures for fully developed olives are not yet available, can the plan be written so that olive water requirements can be reviewed as information becomes available?

Model

- Include ‘drip’ and ‘spray’ delivery volumes in the Base ‘permanent’ part of the model.
- There appears to be a lack of efficiency incentives.
- New developments with no history – how will the model be applied?
- The model does not appear to account for salt leaching.
- The conversion figures look OK but what about the PAV review?

Other

- How is stock and domestic water going to be accounted for?

UNITS OF MEASUREMENT

Units of measurement commonly used (SI and non-SI Australian legal)

Name of unit	Symbol	Definition in terms of other metric units	Quantity
centimetres	cm	10¬-2m	length
day	d	24 h	time interval
hectare	ha	10^4 m^2	area
hour	h	60 min	time interval
Irrigation rate / requirement	ML/ha	mm depth	Rate
kilolitre	kL	1 m^3	volume
litre	L	10^{-3} m^3	volume
megalitre	ML	10^3 m^3	volume
metre	m	base unit	length
milligram	mg	10^{-3} g	mass
millilitre	mL	10^{-6} m^3	volume
millimetre	mm	10^{-3} m	length
minute	min	60 s	time interval
percent	%	Fractions, decimal	Proportion
percentile	$X_{\%}$	Median (50^{th} percentile)	Frequency distribution

EC electrical conductivity (µS/cm)

TDS total dissolved solids (mg/L)

GLOSSARY

Annual Water Use Returns (AWUR's). End of season reporting process whereby water license holders detail their water use activities for the given season. The details required include areas of crop types grown and assessments of volumes pumped.

Application Losses. Water delivered to the border of the field, which is lost during application to the field and therefore not made available to the crop. Includes evaporation, run-off, deep drainage and drift.

Area-Based Licensing System (haIE). Existing water access entitlements to irrigate a given area of crop per annum, with no restrictions on the volume of water applied to the crop. Measured in terms of hectares of irrigation equivalents (haIE).

Base Allocation (BA). The crop water requirement component of the proposed volumetric licenses. Base Allocation (ML) = haIE x NIRo

Bridging Volume (BV). The bridging volume is an additional temporary allocation that may be granted on application subject to eligibility criteria. The bridging volume is designed to give irrigators who are pumping in excess of their new volumetric allocation time to adjust to the new system.

Climatic Bands. 10 Climatic Bands across the South East that were developed to better represent the range of evapotranspiration and rainfall rates across the SE of SA. It is proposed that these Climatic Bands form the basis for determination of each irrigator's volumetric allocation.

Crop Adjustment Factor (CAF). The Crop Adjustment Factor provides additional base allocation for licensees where, due to initial calculations problems, the existing area-based licensing system does not provide adequate allocation.

Crop Area Ratio (CAR). Used in the existing area-based licensing system to determine area of crops that may be grown in relation to the theoretical irrigation requirement.

Crop Calendar. Representation of the critical periods of crop growth and development for a crop in a particular geographical location, under certain management practices. Used to assign crop coefficients to months of the year to represent the crop water requirements of the crop at that location under those management practices.

Crop Water Requirement. Depth of water required by a crop for evapotranspiration (ET_C) during a given period (Doorenbos and Pruitt, 1977).

Deep Drainage. Water that percolates past the crop root zone and is no longer available to the crop for transpiration.

Delivery Component (DC). The volume of water that a reasonably efficient irrigator needs to extract in excess of the crop water requirement to irrigate and grow the crop to account for application and distribution losses.

Delivery Zones (DZ). Areas of like characteristics within the SE. They were used to calculate delivery components and have been developed using soil mapping data, volume pumped data and other hydrogeological information sources (i.e. depth to water table, salinity).

Distribution Losses. Water pumped from the aquifer or from storage, which is lost during the delivery of water to the border of the field. May include evaporation and seepage from channel delivery systems, and leakage from piped delivery systems.

Drip Irrigation. High precision irrigation where water is delivered via emitters (drip, trickle, micro-spray) spaced evenly along a supply line, usually located along each crop row.

Evapotranspiration (ET). Rate of water loss through transpiration from vegetation plus evaporation from the soil (Doorenbos and Pruitt, 1977).

FAO 56. Food and Agriculture Organization of the United Nations. FAO Irrigation and Drainage Paper, 56 (1998) - *Crop Evapotranspiration; Guidelines for Computing Crop Water Requirements.*

Field Irrigation System Trials (FIST Program). Field trial sites equipped with monitoring equipment to collect detailed information on the on-farm irrigation water balance.

Flood/Surface Irrigation. Non-pressurised gravity feed irrigation, whereby water is delivered from the pump via channels to fields constructed to form rectangular bays using parallel check banks. Water flows down the bay's slope as a sheet guided by the check banks.

Frost Protection. Water applied to the crop canopy using fixed overhead sprinklers to prevent frost damage to the crop.

haIE. The number of hectares of irrigation equivalents endorsed on an existing area-based water licence.

Irrigation Equivalents (IE's). The current area-based water licensing system shown in hectares, where 1 haIE is equivalent to the evapotranspiration minus contribution by effective precipitation from one hectare of reference crop under the average climatic conditions for that region.

Irrigation Rate (ML/ha). The annual volume pumped for irrigation expressed in Megalitres (ML) divided by the area irrigated in hectares (ha).

Leaching. The application of irrigation water to minimise the built up of salts from the crop root zone.

Management Area (unconfined). Part of a Prescribed Wells Area used for groundwater management.

Maximum Production Pasture (MPP). A category of pasture that has been recognised as having increased NIRc due to significant changes in pasture management systems.

Megalitre (ML). One ML equal one million litres or one thousand Kilolitres.

Metered Extraction Trials (MET Program). A field trial program aimed at generating accurate 'real-life' volume pumped data representative of irrigation practices in the region.

Net Irrigation Requirement – Crop (NIR_C). Net irrigation requirement for a specific crop, grown according to a defined crop calendar, calculated according to the FAO 56 method (Allen et al., 1998).

Net Irrigation Requirement – Reference Crop (NIR_0). Net irrigation requirement for the reference crop, reflecting the evapotranspiration demand at a certain location, according to climatic conditions in that location, calculated according to the FAO 56 method (Allen et al., 1998).

Net Irrigation Requirement (NIR). Depth of water required for meeting evapotranspiration minus contribution by effective precipitation, ground water, stored soil water; does not include operational losses and leaching requirements (Doorenbos and Pruitt, 1977).

Percentile. Increments of 1% that divides a distribution into 100 groups of equal frequency. For example the 50^{th} percentile is a point where 50% of the data below this point and 50% is above.

Post-Harvest Cover Crop. A crop sown after the harvest of annual crops to stabilise and retain the bare soil.

Prescribed Wells Area (PWA). A water resource declared by the Governor to be prescribed under the Water Resources Act 1997, and includes underground water to which access is obtained by prescribed wells.

Project Advisory Committee (PAC). A community-based committee made up of industry representatives from major commodity groups to provide advice to the PMC on the implementation of the Volumetric Conversion Project.

Project Management Committee (PMC). Representatives from the key water management agencies associated with and responsible for implementing volumetric conversion in the region.

Reference Crop Evapotranspiration (ET_0). Rate of evapotranspiration from an extended surface of 8 to 15 cm tall, green grass cover of uniform height, actively growing, completely shading the ground and not short of water (Doorenbos and Pruitt, 1977).

Soil Drift Control. The application of irrigation water to a bare field or emergent crop for the purpose of preventing soil from being lost or causing crop damage due wind drift.

South East Natural Resource Management Board (SENRMB). Responsible for natural resources planning, public consultation and education and in advising the Minister for Environment and Conservation on various natural resource management issues and policies.

Specialised Production Requirements (SPR). (1) Water that is necessarily applied as a part of the crop production process that does not contribute to crop water use and is not included in the delivery component (e.g. to prevent soil drift or to protect against frost damage). (2) Water that is required in addition to base allocation due to significant changes in the crop production system (as recognised by FAO 56). For example Maximum Production Pasture.

Spray Irrigation. Pressurised irrigation systems with water applied through some form of sprinkler/s. Water is delivered from the pump to the sprinkler through pipe works. Includes centre pivots, fixed sprinklers and travelling irrigators.

Transpiration. Rate of water loss through the plant which is regulated by physical and physiological processes (Doorenbos and Pruitt, 1977).

Volumetric Conversion Model. Describes the components and methodologies for the conversion of existing area-based allocations to volumetric allocations.

Volumetric Licensing System. Licensees are entitled to pump a certain volume of water per annum, but are not restricted by the area of crop/s grown.

Water Allocation Plan (WAP). A plan prepared by a Natural Resource Management Board or water resource planning committee and adopted by the Minister in accordance with Division 3 Part 7 of the Water Resources Act 1997.

REFERENCES

Coutts, J, Roberts, K, Frost, F & Coutts, A 2005, *The Role of Extension in Capacity Building – What works, and why,* Rural Industries Research and Development Corporation, Canberra.

Latcham, B, Pudney, S & Carruthers, R 2006, *Volumetric Conversion in the South East of South Australia: Calculation of the Delivery Component and Bridging Volume,* DWLBC Report 2006/34, Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Mount Gambier.

Roberts, G 2004, *Six Principles of Good Extension. National Extension Policy Forum,* www.extensionpolicy.com.au Accessed (15/11/05).