



Government of South Australia **Milestone 7 Report** 

# Regional WUE Reporting & Implementation of the FLWMM

April 2004

Murray-Darling Basin Commission Strategic Investigations and Education Program I2003



**Milestone 7 Report** 

# Regional WUE Reporting & Implementation of the FLWMM

Sarah Rhodes

Environmental Analysis and Research Unit, Department for Environment and Heritage

April 2004

Thanks to: Tony Adams, Irrigated Crop Management Service, Primary Industries and Resources SA Sung Liang and Renee Fielke, Central Irrigation Trust, Barmera



Department for Environment and Heritage







### CONTENTS

1. INTRODUCTION
2. PRESENTED THE WUE PACKAGE IN SOUTHERN MDB
3. REGIONAL WUE REPORTING
3.1. Trial Irrigation Districts
3.2. Water Use Efficiency Defined6
3.3. Crop Types
3.4. On-farm Irrigation Systems83.4.1. Irrigation System Types83.4.2. Irrigation Systems and Water Use Index93.4.3. Irrigation Systems, Water Volume and WUI10
3.5. Property Size Profile11
3.6. Irrigation Water Use11
3.7. Irrigation Management Training13
3.8. Soil Water Monitoring
3.9. Water use index 14
3.10. Conclusion
4. SUPPORTED IMPLEMENTATION OF THE FLWMM IN 6 TRIAL AREAS
4.1. Bookpurnong Lock 4 Pilot Group16
5. REFERENCES
6. APPENDIX 1

### LIST OF FIGURES

Figure 1: Location of WUE trial areas	5
Figure 2: Major Crop Types - Chaffey Irrigation Area	7
Figure 3: Crop Type by WUI - Chaffey Irrigation District	8
Figure 4: On-farm Irrigation System - Kingston Irrigation Area	9
Figure 5: Irrigation Systems by Water Use Index - Kingston Irrigation Area	10
Figure 6: Property Size by WUE - Kingston Irrigation Area	11
Figure 7: Water Use by WUI - Coomealla Irrigation District	12
Figure 8: Water Use (ML/ha) by Crop Type and WUI - Chaffey Irrigation Area	13
Figure 9: Irrigation Management Training - Kingston Irrigation Area	13
Figure 10: Soil Water Monitoring Devices	14
Figure 11: Property WUI - Kingston Irrigation Area	15

### LIST OF TABLES

Table1: Water Use Efficiency Package Presentation Summary	2
Table 2: Irrigation System by WUI- Chaffey Irrigation Area	10

### 1. INTRODUCTION

Activities describe under Milestone 7 include:

- Trialed regional WUE reporting in Kingston, Ral-Ral, Cooltong and Coomealla.
- Presented the WUE-M&R package to the irrigation industry and agencies in horticultural regions of the southern MDB.
- Supported implementation of FLWMM in 6 trial areas.
- Specified the functional requirements for a professionally written version of the FLWMM software, with specification approved by PSC.

This report documents the results from the WUE reporting trial in Kingston, Ral-Ral, Cooltong and Coomealla. Water use characteristics within each district are discussed in relation to crop composition and irrigation techniques. Many presentations of the WUE Monitoring and Reporting package have been made to irrigation industries and agencies in horticultural regions of the southern Murray-Darling Basin. These presentations and the groups who were presented to are documented in this report. This report also documents the implementation of the FLWMM in the five trial areas. The functional requirement for the FLWMM software has been prepared as a separate document.

### 2. PRESENTED THE WUE PACKAGE IN SOUTHERN MDB

Regular presentations on the project Water Use Efficiency package have been delivered to the irrigation industry and agencies in South Australia throughout the project life (see Table 1). These presentations have been delivered to irrigation industry groups and agencies in the horticultural sector of the southern Murray-Darling Basin. The project team has completed two information tours through the Southern Murray Darling Basin regions of NSW and Victoria (2001, 2003). The *Delivering Improved Water Use Efficiency: Communication Strategy* (2003) documents the presentations and publications completed as a part of this project. A summary of the groups and locations where the project team presented the I2003 tools is listed below in Table 1.

Presentation Audience	Toois Presented
2001	
Information Session, Mildura	• FLWMM, IIM
Working Group, Mildura	• FLWMM, IIM
Information sharing and gathering session, Tatura	FLWMM, IIM
Information Session, Griffith	• FLWMM, IIT
ANCID Conference, Bunbury	• FLWMM, IIM
Riverland Field Days, Monash	• FLWMM, IIM
2002	
Industry Development Board - Horticulture, Adelaide	• FLWMM, IIM
MDBC Partnership Workshop, Hepburn Springs	• FLWMM, IIM
River Murray Catchment Water Management Board, Adelaide	• FLWMM, IIT
River Murray Catchment Water Management Board, Murray Bridge	• FLWMM, IIT
Irrigation Association Australia conference, Sydney	• FLWMM, IIT
"National workshop to initiate establishment of national standards for irrigated	FLWMM
crop water balance and ETc field methodologies"	
ESRI User Group Meeting	• IIT
Riverland Citrus Group	• FLWMM
OZRI 2002 Conference on IIT, Brisbane	• IIT
Information Session, Berri	FLWMM
Water Allocation Plan launch, Coldridge vineyard, Loxton	• FLWMM, IIT
ANCID Conference	• FLWMM, IIT
Riverlink forum	• FLWMM, IIT
Grower Information Day, Loxton Centre	• FLWMM

#### Table1: Water Use Efficiency Package Presentation Summary

MDBC Irrigation Forum, McLaren Vale	FLWMM, IIT, WUEM
Sunraysia Rural Water Board	FLWMM, IIT, WUEM
Bookpurnong Irrigators group	• FLWMM
Information Session, Mildura	• FLWMM, IIM
2003	
Onkaparinga Catchment Water Management Board	• FLWMM, IIT
Interstate Information Exchange tour, Griffith, Leeton, Deniliquin, Tatura, Mildura     and Dareton	• FLWMM, IIT
South East Benchmarking project management committee	• FLWMM, IIT
Renmark CITT Groups of Citrus Growers SA	• FLWMM, IIT
Waikerie CITT Groups of Citrus Growers SA	• FLWMM, IIT
Loxton CITT Groups of Citrus Growers SA	• FLWMM, IIT
Barossa Valley Viticulture Technical Committee including representatives from the Northern Adelaide Plains Catchment Water Management Board	• FLWMM, IIT
DWLBC Seminar Series, Adelaide	• FLWMM
Central Irrigation Trust Irrigation Efficiency Expo	• FLWMM
WUE workshop, Dubbo	• FLWMM, IIT, WUEM
Irrigation Association Australia conference, Dubbo	• FLWMM, IIT, WUEM
NSW, SA and Vic Gov lower MDB irrigation officers communication meeting	• FLWMM, IIT, WUEM
Riverlink stand, Mildura Field Days	• FLWMM, IIT, WUEM
Onkaparinga Catchment Water Management Board	• FLWMM
Kingston Estate Wines, Riverland	• FLWMM
Barossa Valley Viticulture Technical Working Group and Northern Adelaide Plains     and Barossa Catchment Water Management Board	• FLWMM
Irrigation officers at NSW Agriculture, Dareton	• FLWMM
Riverland Field days	•
Rural Solutions SA Land and Water Technical Conference, Loxton	• FLWMM
<ul> <li>Integrated natural resource management committee regarding the Bookpurnong Lock4 irrigators case study group</li> </ul>	FLWMM, IIT
Information Session, Mildura	• FLWMM, IIM
2004	
National Action Plan combined State and Commonwealth committee	• FLWMM
Beringer Blass, Loxton	• FLWMM
McGuigen Simeon Wines, Riverland	• FLWMM
Irrigation Association Australia, Adelaide National Conference, (paper).	Collaborating with case     study groups

.

For more detailed information on these presentations see the Crop Standard in Appendix 1.

The project team has planned a final series of meetings in Griffith during late May 2004. The aim is to inform the irrigation industry and agencies in the Southern Murray Darling Basin of the Water Use Efficiency package developed by the project. Contact has been made with the Water Use Efficiency team of NSW Department of Agriculture, MIA Horticulture Council, Murrumbidgee Irrigation and Pratt Water. Presentations have been arranged with the Riverina Citrus grower groups, Leeton Citrus Growers and the Wine Grapes Marketing Board liaison officers. It is hoped the team will also be able to arrange a presentation to the Prune Growers Association and representatives from the cotton industry. Although presentations have already been provided to the following, invitations will also be extended to Coleambally Irrigation and CSIRO Land and Water.

### 3. REGIONAL WUE REPORTING

Analyses were undertaken for the trial districts of Kingston and Chaffey (comprised of Ral Ral and Cooltong) in South Australia and Coomealla in New South Wales. The location of these trial areas can be seen in Figure 1. Baseline crop and irrigation system information was collected using the Irrigation Inventory Tool (IIT) within Kingston and Chaffey. SunRise21 collected the crop and irrigation system information within Coomealla using their existing survey methodology and stored the information in ESRI's ArcView 3. This information was converted into the IIT format after the survey was complete.



Figure 1: Location of WUE trial areas

The information for these trial districts, stored in the District Irrigation Database (DIDb), was then used to generate water use index statistics using the Water Use Efficiency Module (WUE Module).

The output table generated by the WUEM was linked back to the original data recorded in the DIDb using the outlet number as the common field. This information was then queried using ESRI's ARC/INFO software. Microsoft Excel was used to create charts and tables to illustrate the potential use of the District Irrigation Database. These examples are described in detail in the following sections.

### 3.1. Trial Irrigation Districts

The Water Use Efficiency Module was trialed within three irrigation districts; Kingston, Chaffey and Coomealla. These three districts are spatially isolated from each other and have very different crop and irrigation system characteristics.

Kingston is a small district comprising some 181 hectares. This district was surveyed for the 2002/2003 irrigation season and the data was entered into the Irrigation Inventory Tool (IIT) District Irrigation Database (DIDb) by Central Irrigation Trust. This data was used to calculate a water use index using the prototype WUE Module.

Ral Ral and Cooltong Irrigation Districts collectively form the District of Chaffey. As a whole it is larger than Kingston, comprising over 1000 hectares of irrigated land. Central Irrigation Trust collected the crop and irrigation system information for this district and entered the data into the IIT DIDb. The Department for Environment and Heritage (DEH) then used this information to calculate the district's water use index.

Coomealla Irrigation Area is located in New South Wales (see Figure 1). SunRise21 collected the crop and irrigation system information in this area for the 2002/2003 irrigation season. This information was collected using an existing survey methodology employed by SunRise21. This survey methodology differs from that used within the IIT as the information is stored in ESRI's ArcView 3.2 software. As a result, the data was converted from the ArcView 3.2 format into the IIT ArcMap 8 format. This process was done using a series of lookup tables designed to convert the SunRise21 crop lists into the IIT standard crop lists. The Water Use Efficiency Module could then be used to generate water use index statistics for the Coomealla Irrigation Area.

### 3.2. Water Use Efficiency Defined

The South Australian *Water Allocation Plan for the River Murray Prescribed Watercourse* (RMCWMB, 2002) defines water use efficiency (expressed as a percentage) as:

"the amount of water required by the particular crop or crops multiplied by 100 and divided by the amount of water applied to the particular crop or crops in a water-use year".

For the purposes of this report, the Water Use Efficiency percentage is referred to as the Water Use Index (WUI). The WUI is only suitable for change detection and grouping, or

benchmarking, irrigators within a district. This information is not suitable for calculating absolute values for drainage calculations and associated salinity credits.

The water use index figures calculated for the Kingston and Chaffey Irrigation Areas incorporated long-term annual average climatic conditions and crop and age factors. This information was taken directly from the *Water Allocation Plan for the River Murray Prescribed Watercourse (WAP)*. The water use index figures calculated for Coomealla used actual measured monthly climatic information recorded at the Dareton weather station in NSW. This included ETo and crop coefficients. This information differs to the method applied in Kingston and Chaffey as alternate information was available for the Coomealla area. As a result, water use index values are not comparable between Coomealla and the other districts.

All of the crop and irrigation system information in these three districts represents the irrigation season 2002/2003.

#### 3.3. Crop Types

An analysis of the crop composition within each irrigation area can be undertaken using the data stored in the District Irrigation Database (DIDb). The major crop types in the Chaffey Irrigation Area are displayed in the pie chart in Figure 2. Vine crops occupy the majority of the area (72%), with citrus as the next most prominent crop type (18%).



#### Figure 2: Major Crop Types - Chaffey Irrigation Area

Incorporating the results from the Water Use Efficiency Module (WUE Module), it is possible to examine the water use index of these crop types. As the water use index uses the simulated water use for all crops in relation to the water use for an outlet, the water use index

represents an average for all crop types within this outlet. These water use index figures have been compiled to represent the properties where these crop types represent more than 80% of the property.

Figure 3 is an example of the water use index of the major crop types in the Chaffey Irrigation Area. Figure 3 is an example of the type of output that can be produced using the data stored in the District Irrigation Database (DIDb). This example shows that three of the five citrus growers have a water use index between 61% and 80%. Of the irrigators that have vines on more than 80% of their property, the majority is between 41% and 60% with a significant number in the 61% to 80% index range. Stonefruit growers are evenly distributed between 41% and 100% water use index. These results indicate that the water use index is highly variable within each commodity.



Figure 3: Crop Type by WUI - Chaffey Irrigation District

The sample set used in this example is quite small, hence Figure 3 is presented as an example of the type of queries that can be performed using the data stored in the DIDb.

#### 3.4. On-farm Irrigation Systems

#### 3.4.1. Irrigation System Types

The DIDb can be queried to provide information on the composition of on-farm irrigation system types within an irrigation district. Figure 4 provides an example, showing the system types used within the Kingston Irrigation Area during 2002/2003. In this example, the

majority of irrigators use under canopy sprinklers (about 70%). The remaining irrigators use either drip or overhead sprinklers with one irrigator using a furrow system.





#### 3.4.2. Irrigation Systems and Water Use Index

An analysis of the water use index in relation to irrigation system type can be performed using the data stored within the DIDb. The graph in Figure 5 illustrates the water use index of each outlet based on the type of irrigation system used within the Kingston Irrigation Area.

As indicated by the previous graph, the majority of irrigators within the Kingston Irrigation Area irrigate using under canopy systems. Of these irrigators, most generated an WUI between 61% and 80%.

Only six drip irrigators and six overhead irrigators were recorded within the Kingston Irrigation Area, and one flood/furrow irrigator. The majority of drip and under canopy properties performs between 61% and 80% water use efficiency. At least 30% of drip properties, 20% of under canopy properties and 15% of overhead properties were greater than 80% water use efficient. No drip properties were less than 60% water use efficient. Approximately 30% of under canopy were less than 60% water use efficient, compared to 65% for overheads. Due to the limited number of flood/furrow irrigators it is inappropriate to report their WUE statistics publicly, as they are easily identifiable to their peers. Figure 5 indicates that there are many factors affecting the water use index beside irrigation system type. Generally, the highest water use efficiencies were achieved with drip and under canopy systems.



Figure 5: Irrigation Systems by Water Use Index - Kingston Irrigation Area

#### 3.4.3. Irrigation Systems, Water Volume and WUI

The data stored in the DIDb can be used to examine the water use index in relation to irrigation systems and volumes of water used. Table 2 is an example of this type of analysis. This table shows the percentage of irrigators within each system type that have a water use index below (WUI <80%) or above 80% (WUI >80%). This table also shows the volume of water irrigated by these systems below and above the 80% water use index. Over 85% of flood/furrow irrigators returned a water use index below 80%. This represents a volume of water of approximately 8500 kilolitres. Even though only 46% of drip irrigators have a water use index of below 80%, this equates to 12270 kilolitres of water.

Table 2	2: Irrigation	System by	WUI- Chaffey	Irrigation Area
---------	---------------	-----------	--------------	-----------------

System Type	WUI <80%	Water Use KL	WUI >80%	Water Use KL
Drip	46 %	12270	54 %	9782
Flood/Furrow	86 %	8460	14 %	1180
Overhead	68 %	2315	32 %	250
Under Canopy	72 %	68123	28 %	14771

This example illustrates the potential use of the DIDb to assist with identifying users of large volumes of water with a low water use index.

### 3.5. Property Size Profile

The size of properties in relation to the water use index can also be examined using the information stored within the DIDb. Figure 6 is an example of how the DIDb information can be displayed. The Kingston Irrigation Area has been used for this example. The general trend within the Kingston Irrigation Area is for the water use index to increase as property size increases.



Figure 6: Property Size by WUE - Kingston Irrigation Area

### 3.6. Irrigation Water Use

An example of a comparison between the water use index and total irrigation water consumption in the Coomealla Irrigation District is shown in Figure 7. The y-axis represents the WUI, while the total water consumption is displayed along the x-axis. Representing the results of the water use index calculation in this way enables us to determine the water use index for most of the water consumed in the district.

The information analysed in this example can be used to allocate resources to irrigators who need the greatest assistance in improving their water use index with either appropriate training packages, on farm assistance or upgrading delivery systems.



Figure 7: Water Use by WUI - Coomealla Irrigation District

The information displayed in Figure 7 can be presented in many different ways. Figure 8 is an example of how this data can be used to represent water use, in mega litres per hectare, in relation to the water use index. Each point in the scatter plot represents a property, with the major crop type on the property indicated by the symbols. Using the Chaffey Irrigation Area as an example, Figure 8 shows that a general trend exists between water use and the water use index. This trend indicates that as water use per hectare increases, the water use index decreases. While this general trend exists, it is also evident from this chart that the trend is highly variable within each crop type. For example, some vine properties that have a higher water use per hectare than other vine properties also have a higher water use index.

- 12 -



Figure 8: Water Use (ML/ha) by Crop Type and WUI - Chaffey Irrigation Area

### 3.7. Irrigation Management Training

The DIDb can be used to examine the number of irrigators who participated in irrigation management training. The type of training undertaken was not specified as a part of the survey. Of all irrigators who responded to the question regarding irrigation management training in the Kingston Irrigation Area, approximately 60% had participated in some form of irrigation management training. Figure 9 illustrates the number of irrigators who did and did not participate in some irrigation management training.



Figure 9: Irrigation Management Training - Kingston Irrigation Area

### 3.8. Soil Water Monitoring

The data stored in the DIDb can also be used to examine how many irrigators use soil water monitoring devices. The chart in Figure 10 represents the number of irrigators with and without soil water monitoring devices within Kingston and Chaffey Irrigation Areas. This information shows that within both districts, there are fewer properties without devices installed on their property than those properties that do have devices.



Figure 10: Soil Water Monitoring Devices

### 3.9. Water use index

Using the method outlined in the Water Allocation Plan for the River Murray Prescribed Watercourse (RMCWMB, 2002), the water use index of the Kingston Irrigation Area was 65% during the 2002/2003 irrigation season. This figure does not quantify drainage as long term annual average climatic information is used within the calculation. When comparing this information to net irrigation requirement ((ETO x Kc)-P) the 15 year average for citrus was 15% greater and 6% higher for winegrapes. Hence, actual seasonal consumption will be higher relative to long term average data. The long-term information is designed for use as a change detection index or as a method of benchmarking irrigators within an area, rather than focussing on absolute values. Figure 11 demonstrates how this data can be displayed to show where irrigators sit in relation to the efficiency of other irrigators within the same area.



Figure 11: Property WUI - Kingston Irrigation Area

#### 3.10. Conclusion

These analyses have illustrated the types of queries and information that can be extracted from the District Irrigation Database. Potential correlations between water use index and various crop and irrigation practise attributes can be developed. The results have shown that these relationships are highly variable. The individual characteristics of properties within a particular district influence the results. The WUI is only suitable for change detection and grouping, or benchmarking, irrigators within a district. This information is not suitable for calculating absolute values for drainage calculations and associated salinity credits.

#### 4. SUPPORTED IMPLEMENTATION OF THE FLWMM IN FIVE TRIAL AREAS

Project 12003 Milestone 7 specifies supported implementation of the FLWMM in five trial areas. The initial intention of the milestone was for the Irrigated Crop Management Service (ICMS) to provide technical support to irrigation officers of NSW Department of Agriculture and Victoria Natural Resources and Environment to establish trial sites in their respective areas. Irrigation Officers from NSW Department of Agriculture established six sites in Coomealla during 2002/03, with technical support from the ICMS. Victoria was unfortunately unable to participate due to lack of resources in the Victorian Department of Primary Industries.

However, during the life of the project, the FLWMM has been applied in five trial areas including Bookpurnong Lock 4 (26 properties), Cobdogla (20 properties), Loxton (2 properties), Pike River (2 properties), and Coomealla (6 properties). The change in Milestone 7 to implement the FLWMM in Bookpurnong Lock 4 instead of six trial areas was approved by the Project Steering Committee.

### 4.1. Bookpurnong Lock 4 Pilot Group

The IIT and WUEM prototype software development has been very successful with extensive trial application through the Local Action Planning Groups in South Australia and SunRise21 in Victoria. Preliminary indications from FLWMM presentations are enthusiastic with support for the irrigation record keeping methodology, particularly from large or corporate vineyards and wineries. Extensive promotion created a broad awareness and interest in the project.

During the project, funding was approved for a ground water salt interception scheme involving the Bookpurnong Lock 4 (BL4) irrigators group. The Salinity Response Team within the Department for Water, Land and Biodiversity Conservation (SA) identified the group as a very good pilot group to develop a salinity impact assessment and accountably framework. As a result of I2003 project presentations, the BL4 group commenced implementing the IIM methodology and showed strong interest in adopting the FLWMM to assist on farm irrigation record keeping and drainage assessment. The BL4 group provided an opportunity to trial the implementation of the FLWMM with a broader group of irrigators (28) outside of the Central Irrigation Trust (CIT). It was an opportunity to identify issues associated with broader implementation and interaction between the IIT/WUEM and FLWMM. Particularly with irrigators not included within CIT districts. In particular it will clarify the role played by key community representatives and the Local Action Planning groups. The FLWMM project team has focused on supporting the BL4 pilot group rather than repeat the establishment of a small number of additional sites to achieve six trial areas. The BL4 pilot group covers approximately 1,540 hectares. Crops are mainly citrus and vines, but also include stonefruit and nut crops.

### 5. REFERENCES

River Murray Catchment Water Management Board 2002, *Water Allocation Plan for the River Murray Prescribed Watercourse*, River Murray Catchment Water Management Board, Berri.

### 6. APPENDIX 1

· . .

### Communication Strategy

- 1<del>9</del> -



# Delivering Improved Water Use Efficiency Across the Murray-Darling Basin

# **Communication Strategy**

Prepared by **Project Management Team** GPO Box 1671 Adelaide 5001 Phone: 08 8303 9334 Fax: 08 8303 9555 Email: schrale.gerrit@saugov.sa.gov.au

April 2003

# Contents

Key partners (stakeholders/audiences)       page 3         Key messages       page 6         Objectives       page 7         Communication strategies       page 8         Communication tactics       page 9         Appendix 1 Action Plan       page 11         Appendix 2 Total Communication Budget       page 14	Introduction	page 1
Key messages       page 6         Objectives       page 7         Communication strategies       page 8         Communication tactics       page 9         Appendix 1 Action Plan       page 11         Appendix 2 Total Communication Budget       page 14	Key partners (stakeholders/audiences)	page 3
Objectives	Key messages	page 6
Communication strategies	Objectives	page 7
Communication tactics	Communication strategies	page 8
Appendix 1 Action Planpage 11 Appendix 2 Total Communication Budgetpage 14	Communication tactics	page 9
Appendix 2 Total Communication Budgetpage 14	Appendix 1 Action Plan	page 11
	Appendix 2 Total Communication Budget	page 14



# Introduction

The project 'Delivering Improved Water Use Efficiency Across the Murray-Darling Basin' was initiated and partly funded by the River Murray Catchment Water Management Board (RMCWMB) and Primary Industries and Resources South Australia (PIRSA) with considerable in-kind support from Department for Environment and Heritage, SunRISE 21 Inc., Central Irrigation Trust, Sunraysia Rural Water Authority, Western Murray Irrigation and the Department of Water, Land and Biodiversity Conservation.

This initiative is endorsed by the Irrigation Issues Working Group of the Murray-Darling Basin Commission and co-funded under the Strategic Investigations and Education program.

Its aim is to develop tools for monitoring and reporting water use efficiency (WUE) for irrigated horticulture in districts with pressurised water delivery systems in South Australia, and the Sunraysia region of New South Wales and Victoria. This will enable repeatable and affordable WUE reporting at different and integrating scales: from irrigated field to property, district and ultimately region.

The project has two major components, a Farm Level Water Management Module (FLWMM) and an Irrigation Inventory Module (IIM). The IIM will provide the framework for collecting base information required for WUE measurement at property, district and regional scales, and provide information to the FLWMM.

The project brief and proposal for Delivering Improved Water Use Efficiency Across the Murray-Darling Basin have been developed over a long period of time and propose an integrated framework and set of tools for WUE reporting and monitoring. The IIM component of the proposal draws on experience gained from previous work highlighting changes in landuse and land management practices resulting from the rehabilitation of highland irrigation delivery systems from open channels to pressurised pipe networks (Kirk, Miles and Ralph, 1999). The report from this project ('Monitoring and Assessment of Change in Irrigation Districts') used a GIS platform to store and evaluate this information.

The FLWMM component of the project involves developing a practical method for irrigators to measure and record planned irrigation activities, intermittent rainfall events and resulting soil moisture levels leading to improved scheduling of their irrigation operations. In essence, the FLWMM component is 'packaging' and testing modern irrigation management practices based on using electronic devices for monitoring of soil moisture and water table fluctuations developed mainly in South Australia during the past 10 years.

'If you can't measure it, you can't manage it' is now a well-known saying in the irrigation sector. As the accountability for the use of irrigation water and its impact increases at all levels, the



collection and reporting of WUE information becomes important. The rationale for developing these tools is recognition of factors including:

- the need to report on WUE, whether as an integral part of a proactive approach to improve water resource management or as a response to perceived future legislative requirements.
- the need for reporting to be approached in a consistent and repeatable manner wherever possible.
- the need for flexibility to be built into reporting tools to allow interactive information exchange between agencies, organisations and the individual landholder.
- the need to provide irrigators with a toolkit for assessing water use efficiency.

The main objectives of this communication strategy are to:

- Better communicate the objectives of this project, resulting in knowledge, products, trials and outcomes of the WUE project to key organisations in SA, NSW, VIC, QLD and Murray-Darling Basin wide.
- Increase understanding and support for the WUE project among industry and project partners.
- Provide tools for and support Rural Water Authorities in meeting water use efficiency monitoring and assessment targets.
- Initiate irrigator awareness of appropriate methods for assessing and reporting on water use efficiency.

These objectives recognise that effective communication is essential to setting up the WUE project and helping to deliver successful outcomes that are likely to be accepted by stakeholders.

This communication strategy addresses specific needs of the WUE project and complements the broader Watermark Strategy. The Watermark Projects Communication Strategy has been developed to provide an umbrella approach for a group of projects funded by the Murray-Darling Basin Commission's Landscapes and Industries Program, through its Irrigated Regions component.

This strategy is supported by an action plan (Appendix 1), further defining tactics, responsibilities, timing, budget and evaluation processes.



# Key partners (stakeholders/audiences)

The Communication Strategy for 'Delivering Improved Water Use Efficiency Across the Murray-Darling Basin' is designed to facilitate communication with the project partners and other stakeholders.

The other stakeholders are divided into the following categories. The majority of these partners have been contacted, however those not yet informed about the project will be targeted by this strategy in the future.

### **1. Rural Community**

- Individual irrigators/growers
- General Public

## 2. State Agencies

- Department for Water, Land and Biodiversity Conservation (SA)
- Department for Environment and Heritage (SA)
- Primary Industries and Resources South Australia
- Department of Natural Resources and Environment (VIC)
- NSW Agriculture
- Department of Land and Water Conservation (NSW)
- Department of Primary Industries (QLD)

## **3. Rural Water Authorities**

- Central Irrigation Trust (SA)
- Sunraysia Rural Water Authority (VIC)
- Western Murray Irrigation (NSW)
- Murrumbidgee Irrigation (NSW)
- Renmark Irrigation Trust (SA)
- Colleambally Irrigation Limited (NSW)
- Goulburn-Murray Water (VIC)
- Jemalong Irrigation Limited (NSW)

## **4. Catchment Boards & Authorities**

- River Murray Catchment Water Management Board (SA)
- Mallee Catchment Management Authority (VIC)
- Lower Murray-Darling Catchment Water Management Board (NSW)



## 5. Industry Groups

- South Australian Citrus Board
- Murray Valley Citrus Marketing Board
- Australian Citrus Growers Incorporated
- Australian Dried Fruit Association
- Australian Table Grape Growers Association
- Australian Vintage Pty Ltd
- Australian Wine and Brandy Association
- South Australian Wine and Brandy Association
- MIA Council of Horticultural Associations Inc.
- Murray Valley Table Grape Growers Council
- Murray Valley Wine Grape Growers Council
- Murray Valley Wine Grape Industry Development Committee
- Phylloxera and Grape Industry Board of South Australia
- The Irrigation Association of Australia

## **6. Federal Agencies**

- Murray-Darling Basin Commission
- Bureau of Resource Sciences
- Environment Australia
- Land and Water Resources Research and Development Corporation
- Australian Bureau of Agricultural and Resource Economics
- Rural Industries Research and Development Corporation
- Australian Bureau of Statistics
- Department of Agriculture, Fisheries and Forestry Australia

### 7. Research and Development

- CSIRO Land and Water
- IRO Plant Industry
- CRC for Viticulture
- Horticulture Australia Ltd
- South Australian Research and Development Institute (PIRSA)
- Grape and Wine Research and Development Corporation
- Australian Wine Research Institute
- TAFE and University Students

### 8. Community Groups

- Renmark to the Border Local Action Planning Group
- Loxton to Bookpurnong Local Action Planning Group



- Berri to Barmera Local Action Planning Group
- Riverland West Local Action Planning Group
- Mid Murray Local Action Planning Group
- Mannum to Wellington Local Action Planning Group
- SunRISE 21 Inc.
- Angas Bremer Irrigators
- Wetland Care Australia
- Waterwatch
- Conservation Groups



# **Key messages**

The following key messages relate specifically to the WUE project.

- Delivering Improved Water Use Efficiency Across the Murray-Darling Basin is a tri-state project for developing tools for affordable and useful monitoring and reporting of water use efficiency (WUE) for irrigated horticulture in districts with pressurised water delivery systems.
- The WUE project aims to deliver a series of tools facilitating WUE assessment and reporting at an on-farm, property, district and regional scale.
- The WUE project will lead to useful and credible crop, drainage and irrigation system information to assist irrigators and help policy makers, resource managers and key irrigated commodity groups make sound decisions about irrigation management in the Murray-Darling Basin.
- The proposal for the WUE reporting framework draws on experience gained from previous work associated with the monitoring and assessment of landuse change in four South Australian irrigation districts (Kirk, Miles and Ralph, 1999).
- The on-farm WUE reporting involves 'packaging' and testing principles of modern irrigation management practices, using specially developed software and electronic devices for monitoring of soil moisture and water table fluctuations developed mainly in South Australia during the past 10 years.
- The WUE project is part of the Murray-Darling Basin Commission's effort to work with governments, irrigation industries and the research community to address natural resource management issues resulting from irrigation impacts.
- The Murray-Darling Basin Commission, Industry and State Government partners have a vital role to play in helping to communicate outcomes from the WUE project to irrigators, including the latest information, research outcomes and best management practices. This will help improve viability and sustainability.



# **Objectives**

The following objectives have been developed to complement and enhance the Irrigated Regions Program Communication Strategy objectives.

- To provide technical assistance and guidance with information collection and support in establishing WUE measurement and reporting mechanisms.
- To provide methods and support for coordinating crop and irrigation information collection necessary for WUE calculation across pressurised horticultural districts in the Murray-Darling Basin.
- To support development of various modules of the WUE project and to facilitate calculation of WUE indicators within the scope of the project.
- To provide information on and technical assistance with the use of the IIM and FLWMM.
- To establish linkages with key Basin-wide and National horticultural organisations and land and water managers.
- To ensure integration of information between WUE and other related projects through regular communication and project updates.
- To ensure strong relationships are established and maintained with key Basin-wide and Federal organisation strategies and associated projects.



# **Communication Strategies**

The following strategies have been developed after taking on board direct input from the Project Management Team, Steering Committee and Irrigated Regions Program Manager.

See Appendix 1 for a detailed list of Communication Strategies.

### 1. Brand the project

Create a unique identity for the WUE project by establishing a distinctive visual style for all communication material. This will not only facilitate communication efforts to establish the context, scale and vision of the research effort, but encourage a more cohesive approach to communication activities carried out by the project.

### 2. Communication Network

It is important to establish integrated partnerships and a clearly defined communication network within the project. The roles and responsibilities of the project partners within these communication networks must be clarified to develop effective communication strategies and tactics.

### 3. Presentations and Publications

This strategy will be important to ensure the milestones achieved with the WUE project are communicated to various project partners and industry groups through conference presentations and publications.

### 4. Media Program

A media program will be developed to publicise outcomes of the WUE project and to gain support of the media.

### 5. Promotional Kit

A promotional kit will be developed to increase public awareness of the WUE project objectives, progress and outcomes. It will involve developing brochures, posters and PowerPoint displays relating to irrigator case studies and project background and results.



# **Communication Tactics**

The following communication tactics are recommended to complement tactics being undertaken as part of the broader Irrigated Regions Communication Strategy. The tactics outlined here are common to all projects under the Watermark umbrella.

See Appendix 1 for a detailed list of Communication Tactics.

### 1. Brand the project

- a) Create a logo for the WUE project and a distinctive visual style for communication materials, which complements the new Watermark and MDBC SI&E style guide.
- b) Create a template for PowerPoint presentations, reports and emails.

### 2. Communication Network

- a) Develop a master contact list and internal/external email networks.
- b) Send letter to irrigators informing them of the WUE project and how they can be involved, CIT, November 2001.
- c) Target existing email list servers (e.g. MDBC, LAWNinfo) to report on project progress and trial outcomes.
- d) Send letter to irrigators informing them of the survey and requesting their cooperation and time.
- e) Send follow-up letter to irrigators thanking them for their cooperation, report on results of the survey and provide CIT growers with a property plan.

### 3. Presentations and Publications

- a) Information Session, Mildura, May 2001, July 2002, late 2002\*, late 2003/early 2004\*.
- b) Communication Strategy Meeting, Mildura, May 2001.
- c) Working Group, Mildura, May 2001.
- d) Information Session, Tatura, 1 June 2001, late 2002\*, late 2003/early 2004\*.
- e) Presented a paper outlining the project at the ANCID conference, Bunbury, WA, July 2001.
- f) Information Session, Griffith, 8-9 August 2001, late 2002\*, late 2003/early 2004\*.
- g) Participated in the Riverland Field Days, Monash, 12-13 September 2001.
- h) Presentation to Industry Development Board Horticulture, Adelaide, February 2002.
- i) Presentation to the MDBC Partnership workshop, Hepburn Springs, March 2002.
- j) Presentation to the River Murray Catchment Water Management Board, Adelaide, April 2002.
- k) Presentation to the River Murray Catchment Water Management Board, Murray Bridge, May 2002.
- I) Display a poster at the Irrigation Association Australia conference, Sydney, 21-23 May 2002.



- m) "National workshop to initiate establishment of national standards for irrigated crop water balance and ETc field methodologies", 27 June 2002.
- n) Information Session, Berri, July 2002, late 2002\*, late 2003/early 2004\*.
- o) ESRI User Group Meeting, 3 July 2002.
- p) Presentation to Riverland Citrus Group, 4 July 2002.
- q) Publish the Crop Standard, August 2002.
- r) Present at OZRI 2002 Conference on IIT, 27-28 August 2002.
- s) Present a paper on the project progress at the ANCID Conference, September 2002.
- t) Presentation at Riverlink forum, 28 October 2002.
- u) Grower Information Day, Loxton Centre, 8 November 2002.
- v) Present at MDBC Irrigation Forum, McLaren Vale, 13-15 November 2002.
- w) Present at Sunraysia Rural Water Board, 14 November 2002.
- x) Present the FLWMM to Jim Hallion, Loxton Centre, 25 November 2002.
- y) Present the FLWMM to the Bookpurnong Irrigators group, 6 December 2002.
- Present the FLWMM and IIT to representatives of the Onkaparinga Catchment Water Managment Board, 22 January 2003.
- aa) Present the IIT and FLWMM and obtain feedback through Interstate Information Exchange tour, Griffith, Leeton, Deniliquin, Tatura, Mildura and Dareton, 27-31 January 2003.
- bb) Present the FLWMM and IIT to South East Benchmarking project management committee, 10 March 2003.
- cc) Present the FLWMM and IIT to Renmark CITT Groups of Citrus Growers SA, 11 March 2003.
- dd) Present the FLWMM and IIT to Waikerie CITT Groups of Citrus Growers SA, 12 March 2003.
- ee) Present the FLWMM and IIT to Loxton CITT Groups of Citrus Growers SA, 12 March 2003.
- ff) Present the FLWMM and IIT to Barossa Valley Viticulture Technical Committee including representatives from the Northern Adelaide Plains Catchment Water Management Board, 18 March 2003.
- gg) Present the FLWMM at the DWLBC Seminar Series, Adelaide, 19 March 2003.
- hh) Participate in the Central Irrigation Trust Irrigation Efficiency Expo, May 2003.
- ii) Participate in the WUE workshop, Dubbo, 6 May 2003.
- jj) Present at the Irrigation Association Australia conference, Dubbo, 7 May 2003.
- kk) Presentation as part of the Riverlink stand, Mildura Field Days, 28 May 2003.
- II) Presentation to Onkaparinga Catchment Water Management Board, 4 June 2003.
- mm) Presentation to grower liason officer and manager of Kingston Estate Wines, Riverland 11 June 2003
- nn) Presentation to Barossa Valley Viticulture Technical Working Group and Northern Adelaide Plains and Barossa Catchment Water Management Board, 30 June 2003.
- oo) Presentation to representatives from the Riverland Almond Industry, 1 August 2003.
- pp) Presentation of FLWMM to irrigation officers at NSW Agriculture, Dareton, 22 August 2003
- qq) Presentation of FLWMM to Rural Solutions SA Land and Water Technical Conference, Loxton, 27 November 2003.



- rr) Presentation of FLWMM to the National Action Plan combined State and Commonwealth committee during their tour of irrigation districts in SA, 24 March 2004.
- ss) Presentation of FLWMM to manager and technical officers at Beringer Blass vineyards, Loxton, 10 March 2004.
- tt) Presentation to the technical officer and grower liason officers of McGuigen Simeon Wines, Riverland, 15 April 2004
- uu) Publish a paper in an irrigation/horticulture journal/magazine.

vv) Target existing newsletters to report on project progress and trial outcomes.

\*Date is unconfirmed

### 4. Media Program

- a) Select a media spokesperson and review their media skills, and potential launch of the IIM tool in the Riverland.
- b) Prepare press releases for local media regarding project trials and outcomes.

### 5. Promotional Kit

- a) Create a WUE fact sheet.
- b) Create a brochure for the WUE project.
- c) Create posters of irrigator case studies.
- d) Establish a WUE project website and look at including an overview and context of the project, a project fact sheet, contact information, a summary of the project outcomes, updates on progress of the project, and a feedback mechanism.
- e) Develop a standard Microsoft PowerPoint presentation of the Irrigation Inventory Tool to demonstrate the tools application and use.

Partner categories targeted Strategy									Tactics/Evaluation	Besponsibility	Timing
1	2	3	4	5	6	7	8	ollalogy	ractics/Evaluation	nesponsibility	rinning
~	~	~	~	~	~	~	~	Brand the Project	Create a logo for the WUE project and a distinctive visual style for communication materials, which complements the new Watermark and MDBC SI&E style guide.	Project Management Team, IIM and FLWMM Working Groups	August 2002
~	~	~	~	~	~	~	~		Create a template for PowerPoint presentations, reports and emails.	Project Management Team, DEH	August 2002
	~	~	~		~		~	Communication Network	Develop and review a master contact list and internal/external email networks.	DEH	Established & Ongoing
~									Send letter to irrigators informing them of the WUE project and how they can be involved.	CIT, PIRSA	November 2001 & November 2002
~	~	~	~	~	~	~	~		Target existing email list servers (e.g. MDBC Watermark Projects, LAWNinfo) to report on project progress and trial outcomes.	Project Management Team	Ongoing
~									Send letter to irrigators informing them of the survey and requesting their cooperation and time.	CIT, SunRISE 21 Inc.	Pre 01-02 survey & pre 02-03 survey
~									Send follow-up letter to irrigators thanking them for their cooperation, report on the results of the survey and provide CIT growers with a property plan.	CIT, SunRISE 21 Inc.	
~								Presentations and Publications	Information Session, Mildura.	Project Management Team	May 2001, July 2002, late 2002*, late 2003/early 2004*
	~	~	~		~		~		Communication Strategy Meeting, Mildura.	Project Management Team	May 2001
	~	~	~		~		~		Working Group, Mildura.	Project Management Team	May 2001
~									Information Session, Tatura.	Project Management Team	1 June 2001, late 2002*, late 2003/early 2004*
~						~			Present at the ANCID conference, Bunbury, WA.	Project Management Team (Gerrit Schrale)	July 2001



Par	tner	cate	gori	es ta	rget	ed		Strategy	Tactics/Evaluation	Responsibility	Timing	
1	2	3	4	5	6	7	8					
~								Presentations and Publications	Information Session, Griffith.	Project Management Team	8-9 August 2001, late 2002*, late 2003/early 2004*	
~									Participate in the Riverland Field Days, Monash.	DEH, PIRSA	12-13 September 2001	
	~								Presentation to Industry Development Board – Horticulture, Adelaide.	Project Management Team	February 2002	
	~	~	~		~		~		Presentation to the MDBC Partnership workshop, Hepburn Springs.	Project Management Team	March 2002	
			~						Presentation to the River Murray Catchment Water Management Board, Adelaide.	Project Management Team	April 2002	
		÷	~						Presentation to the River Murray Catchment Water Management Board, Murray Bridge.	Project Management Team	May 2002	
~	~	~	~	~		~			Display posters at the Irrigation Association Australia conference, Sydney.	PIRSA - ICMS	May 2002	
~									Information Session, Berri.	Project Management Team	July 2002, late 2002*, late 2003/early 2004*	
	~					~			ESRI User Group Meeting, Adelaide.	DEH	3 July 2002	
				~					Presentation to Riverland Citrus Group.	Project Management Team	4 July 2002	
	~	~	~	~	~	~	~		Publish the Crop Standard.	DEH	August 2002	
	~					~			OZRI 2002 Conference, Brisbane.	Project Management Team	27-28 August 2002	
~						~			Present a paper on the project progress at the ANCID Conference.	Project Management Team	September 2002	
~									Grower Information Day, Loxton Centre	PIRSA	8 November 2002	
	~	~	~	~		~			Present at and participate in Irrigation Forum, McLaren Vale, SA.	DEH, PIRSA	13-15 November 2002	
		~							Present at Sunraysia Rural Water Board.	SunRise21, PIRSA	14 November 2002	
~									Presentation of the FLWMM to Jim Hallion, Loxton Centre.	PIRSA	25 November 2002	



Partner categories targeted						arae	hat	Christianus,	Tactics/Evaluation	Responsibility	Timing
1 2 3 4 5 6 7 8							8	Strategy			
~	-	~	-			~		Presentations and Publications	Publish a paper in an irrigation or horticulture journal/magazine.	Project Management Team	December 2002
~									Presentation of the FLWMM to Bookpurnong irrigators Group.	PIRSA	6 December 2002
	~	~		~		~			Present the FLWMM and IIT to representatives of the Onkaparinga Catchment Water Managment Board.	DEH, PIRSA	22 January 2003
	~	~		~		~	~		Present the IIT and FLWMM and obtain feedback through Interstate Information Exchange tour.	DEH, PIRSA	27-31 January 2003
							~		Present the FLWMM and IIT to South East Benchmarking project management committee.	DEH, PIRSA	10 Matvh 2003
				~					Present the FLWMM and IIT to Renmark Citrus Growers group.	DEH, PIRSA	11 March 2003
				~					Present the FLWMM and IIT to Waikerie Citrus Growers group.	DEH, PIRSA	12 March 2003
				~					Present the FLWMM and IIT to Loxton Citrus Growers group.	DEH, PIRSA	12 March 2003
			~	~					Present the FLWMM and IIT to Barossa Viticulture Technical Committee including representatives from the Northern Adelaide Planis Catchment Water Management Board.	DEH, PIRSA	18 March 2003
		~							Present the FLWMM to DWLBC Seminar Series, Adelaide.	PIRSA	19 March 2003
~			~						Participate in the Central Irrigation Trust Irrigation Efficiency Expo.	DEH, PIRSA	May 2003
		~	~	~			~		Participate in the WUE Workshop, Dubbo.	PIRSA	6 May 2003
~		~	~	~	~		~		Present at the Irrigation Association Australia conference.	Project Management Team	21-23 May 2003
~							~		"National workshop to initiate establishment of national standards for irrigated crop water balance and ETc field methodologies".	Project Management Team	27 June 2002



Partner categories targeted							eted	Strategy	Tactics/Evaluation	Responsibility	Timing
1	2	3	4	5	6	7	8	-			
~						~		Presentations and Publications	Present at the ANCID conference.	Project Management Team	July 2003
~							~		Target existing newsletters to report on project progress and trial outcomes.	Project Management Team	Ongoing
~	~	~	~	~	~	~	~	Media Program	Select a media spokesperson and review their media skills, and launch the IIM tool in the Riverland.	Project Management Team, Murray-Darling Basin Commission	December 2002
~	~	~	~	~	~	~	~		Prepare press releases for local media regarding project trials and outcomes.	Project Management Team, Murray-Darling Basin Commission	December 2002
~		~		~			~	Promotional Kit	Create a WUE fact sheet and/or brochure.	DEH	Dec 2002 & Jun 2004
~	~	~	~	~	~	~	~		Develop a standard Microsoft PowerPoint presentation of the Irrigation Inventory Tool to demonstrate the tools	DEH	Dec 2002
~							~		Create posters of irrigator case studies.	Project Management Team	Dec 2002, Dec 2003 & June 2004
~	~	~	~	~	~	~	~		Establish a WUE project website and look at including an overview and context of the project, a project fact sheet, contact information, a summary of the project outcomes, updates on progress of the project, and a feedback mechanism.	Project Management Team, RMCWMB, MDBC	





# **Appendix 2 Total Communication Budget**

Stage No.	Task No.	Task	Funding		In-kind	
			SI&E	RMCWMB	DEH	Other
1	3	Website Design			\$ 14 800	\$ 12 000
2	7	Production of Crop Standard	\$ 2 500	\$ 2 500		
		Production of Report	\$ 1 250	\$ 1 250		
		Newsletters and Advertising	\$ 7 500	\$ 7 500		
з	12	Field Days	\$ 2 000	\$ 2 000		
		Fact Sheet	\$ 1 500	\$ 1 500		
4	16	Final Report & Fact Sheet	\$ 4 000	\$ 4 000		
		Web Site	\$ 7 051		\$ 7 897	
Total Funded			\$ 45 551			
Total In-kind					\$ 34 697	
Total Communication Budget			\$ 80 248			