

## Rice CRC Water Quality Workshop Report

Workshop convened by Dr E. Humphreys

<sup>1</sup>Cooperative Research Centre for Sustainable Rice Production

C/- Yanco Agricultural Institute

PMB Yanco 2703

Email: [liz.humphreys@grf.clw.csiro.au](mailto:liz.humphreys@grf.clw.csiro.au)

<http://www.ricecrc.org>

<sup>2</sup>CSIRO Land & Water

Private Bag 3

Griffith NSW 2680

email: [liz.humphreys@grf.clw.csiro.au](mailto:liz.humphreys@grf.clw.csiro.au)

Rice CRC Water Quality Workshop

**(14 June, 2000)**

The strategic plan of the Rice CRC includes an objective to *develop systems which minimise pesticide residue levels in soils and waterways in rice based systems*. During the first three years of the CRC there was only a small research effort addressing this objective, and this was identified as a deficiency in the Second Year Review of the CRC.

A workshop was held on 14 June 2000 at CSIRO, Griffith to help the CRC to identify priorities for future water

quality projects.

The program consisted of:

1. stakeholders providing a brief overview of water quality monitoring conducted by their organisations and their major water quality issues, problems and R, D & E needs
2. researchers providing overviews of past/current research and research gaps
3. identification of priorities for the CRC to consider

Stakeholders included representatives of irrigators, land and water management planners, environmentalists, and state and federal government agencies with environmental custodian responsibilities.

Researchers from 6 different organisations in 3 states of Australia participated in the workshop.

This report summarises the major issues, and the identified research needs and their prioritisation. The report was written by Kaye Spark, and drawn directly from the issues, research needs and priorities identified at the workshop.

Dr Liz Humphreys

Workshop Convenor

2 November, 2000

# Water Quality Workshop

9.00 *Refreshments*

9.30 **Welcome and overview of day**

9.45 **Problems as identified by the irrigators and LWM  
Planners**

Robert Cawley  
Lilian Parker  
Arun Tiwari  
Geoff McLeod

DLWC Lower Bidgee  
Murrumbidgee Irrigation  
Coleambally Irrigation  
Murray Irrigation

## Summing up

11.00 *Morning Tea*

## 11.15 **Problems as identified by environmental guardians**

Alistair Buchan	DLWC Murrumbidgee Region
Karina Budd	Bureau of Rural Science/Canberra
Stuart Blanch	Inland Rivers Network/Sydney
Sandy Robinson	MDBC

## Summarizing morning session

12.30 *Lunch*

## 1.00 **Research - past and present and gaps**

Kaye Spark	CSIRO L&W/Griffith	Overview of past research in MIA
Mallavarapu Megharaj	CSIRO L&W/Adelaide	Effects of pesticides on soil biota
Stuart Helliwell	Charles Sturt University/Wagga	Pesticide impacts on aquatic ecosystems
John Oakeshott	CSIRO Entomology	Bioremediation of pesticide residues in irrigation drainage waters
Tapas Biswas	CSIRO L&W/Griffith	FILTER system for removing pesticides from drainage waters
Darren Baldwin	CRC Freshwater Ecology	Research in CRC for Freshwater Ecology, research gaps and opportunities for links with CRC Rice

## Summing up

2.30 *Afternoon Tea*

## 2.45 **Research - Looking at the big picture**

Mark Stevens	NSW Agriculture / Yanco	Biological impacts of rice pesticides
Lorraine Hardwick	DLWC / Wagga	Effect of environmental flows on river health
Rai Kookana	CSIRO L&W / Adelaide	Assessing off-site migration potential of pesticides used in the MIA
Fei Zhou	CSIRO L&W / Griffith	Predicting the risk of chemical contamination of groundwaters
Shahbaz Khan	CSIRO L&W / Griffith	A surface and groundwater hydrologist's perspective

## Summarizing afternoon session Putting it all together

4.45 *Refreshments*

# Rice CRC Water Quality Workshop - Participants

**Stakeholders – affected by the research (users of research findings or affected by their implementation by others)**

## **Producers and their representatives**

Arun Tiwari	Coleambally Irrigation
Robert Cawley	DLWC Lower Bidgee
Geoff McLeod	Murray Irrigation
Lilian Parker	Murrumbidgee Irrigation
Kylie Chenery	Murrumbidgee Irrigation
Mark Neeson	Murrumbidgee Irrigation
Ian Davidge	Rice grower; chairman of Rice CRC
Warwick Clampett	NSW Agriculture / Griffith

## **Environmental guardians**

Karina Budd	Bureau of Rural Science / Canberra
Alistair Buchan	DLWC Murrumbidgee Region
Helen Keenan	DLWC Murrumbidgee Region
Melissa Daniher	EPA Griffith
Stuart Blanch	Inland Rivers Network / Sydney
Sandy Robinson	MDBC

## **Researchers**

Stuart Helliwell	Charles Sturt University / Wagga
Andrea Wilson	Charles Sturt University / Wagga
Darren Baldwin	CRC Freshwater Ecology
John Oakeshott	CSIRO Entomology
Mallavarapu Megharaj	CSIRO L&W / Adelaide
Rai Kookana	CSIRO L&W / Adelaide
Kaye Spark	CSIRO L&W / Griffith
Tapas Biswas	CSIRO L&W / Griffith
Fei Zhou	CSIRO L&W / Griffith
Shahbaz Khan	CSIRO L&W / Griffith
Liz Humphreys	CSIRO L&W / Griffith
Wendy Minato	CSIRO L&W / Griffith
Dr Anu Kumar	University of South Australia
Lorraine Hardwick	DLWC / Wagga
Mark Stevens	NSW Agriculture / Yanco
Laurie Lewin	NSW Agriculture / Yanco - Director Rice CRC

# Workshop summary

The table below is a summary of the research needs identified on the day. This summary shows the relative rating given to each of the needs. The list was compiled from two lists of research needs identified after presentations by: (1) representatives of irrigators (land and water management planners, ricegrowers), and (2) representatives of environmental custodians (DLWC, MDBC, BRS, Inland Rivers Network, EPA). The voting was done at the end of the day after some participants had left, so not all participants were able to express their views in this way. People were asked to assign high, medium or low priority to each research need, and the ratings below are the high priority scores. There is some duplication due to the two general points of view being considered on the day, ie irrigators (I) and environmentalists (E). The fact that this duplication does exist is reassuring as it implies that these two general groups have similar views on the nature of the problems of water quality and the options available for addressing these problems.

Identifying group (E/I)	Rating	Research Need
E	16	Biological significance of contaminant levels – (eg pesticides, salinity)
I	15	Science to underpin strategic targeted approach to monitoring
E	15	Salinity – impact of management on drain salinity (predictive tools and scenarios)
I	14	Amelioration of contaminated waters
I	14	Regional salt management
I	11	Methods – rapid, what, how and when (entities, indicators)
E	11	Strategic monitoring plans
E	11	Understanding pesticide movement including groundwater contamination
I	10	Salinity and chemical tolerances – invertebrates and vegetation, (terrestrial, river)
E	9	Development of tools/models (at a range of levels – valley, irrigation, area, farm) to evaluate the impact of policy decisions and management
E	9	Understanding linkages between management and surface and groundwater contamination
E	8	Role and design and management of wetlands in mitigating contamination
I	6	Field test kits for other pesticides besides molinate – eg thiobencarb
I	4	Interaction between salinity and fate of pesticides
I	4	Effects of cocktails versus single entities
I	4	Rainfall impacts on water quality at monitoring points
E	4	Understanding the implications of changing surface and groundwater quality
I	3	Better understanding of metabolites and their impacts
I	3	Rice varieties – frost tolerant, short season, salinity tolerance at establishment–alternative water management (including weed control strategies)
E	2	Alternative management to limit impact of contaminants
E	2	Significance/management of turbidity loads from farms

I	1	Impact of chemicals on food quality
I	1	Contribution of irrigation Crops/rice to C cycling in our systems
I	1	Mineral data sets for local conditions
I	0	Information on organic C for local soils/sediments/water
I	0	Understanding P in drains
I	0	Potential for using rice fields late season for cleansing waters

The research needs in the above table can be divided into four groups concerning:

## 1. What are the impacts of poor water quality.

In particular, a question that arose regularly at the workshop was what is the significance of the levels of contaminants which have been set as guidelines. A second question relating to this was what do we regard (if any) as an acceptable effect on the “health” of an organism. The other main areas of concern under this heading identified at the workshop were the impacts on the environment of metabolites and mixtures of contaminants.

Identifying group (E/I)	Rating	Research Needs – Impacts
E	16	Biological significance of contaminant levels – (eg pesticides, salinity)
I	10	Salinity and chemical tolerances – invertebrates and vegetation (terrestrial and river)
I	4	Effects of cocktails versus single entities
E	4	Understanding the implications of changing surface and groundwater quality
I	3	Better understanding of metabolites and their impacts
I	1	Impact of chemicals on food quality

## 2. Management options that may address water quality problems.

The two main research needs that concerned management options were managing salt on a regional scale in addition to the farm or local scale, and the need for feasible methods of ameliorating contaminated waters.

Identifying group (E/I)	Rating	Research Needs- Management
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I	14	Regional salt management
I	14	Amelioration of contaminated waters
E	8	Role and design and management of wetlands in mitigating contamination
I	4	Rainfall impacts on water quality at monitoring points
I	3	Rice varieties – frost tolerant, short season, salinity tolerance at establishment– alternative water management (including weed control strategies)
E	2	Significance/management of turbidity loads from farms
E	2	Alternative management to limit impact of contaminants
I	0	Potential for using rice fields late season for cleansing waters

### 3. Monitoring

A clear research need identified was to be able to measure the presence of contaminants in water quickly and accurately (at the low levels associated with the limits allowable). Other questions raised on this topic concerned the frequency with which measurements should be taken and whether other water quality indicators should also be taken into account. It was also concluded that a more strategic approach to monitoring should be taken, with regional coordination, as this will assist in preventing overlap of monitoring schedules and in the collation of data needed to identify problems more quickly and positive management strategies.

Identifying group (E/I)	Rating	Research Needs – Monitoring
I	11	Methods – rapid, - what, how and when (entities, indicators)
E	11	Strategic monitoring plans
I	6	Field test kits for other pesticides besides molinate – eg thiobencarb

### 4. Scientific understanding

The first of two main needs for scientific research was to learn more about the processes giving rise to poor water quality, so that a more strategic approach to water monitoring can be planned – in particular, where and when to monitor . The second area of need for scientific research was the relationship between surface water contamination and ground water contamination and the need for tools/models to evaluate the impact of management strategies and policy decisions affecting the quality of each of these.

Identifying group (E/I)	Rating	Research Needs – Science
I	15	Science to underpin strategic targeted approach to monitoring
E	15	Salinity – impact of management on drain salinity (predictive tools and scenarios)

E	11	Understanding pesticide movement including groundwater contamination
E	9	Understanding linkages between management and surface and groundwater contamination
E	9	Development of tools/models (at a range of levels – valley, irrigation, area, farm) to evaluate the impact of policy decisions and management
I	4	Interaction between salinity and fate of pesticides
I	3	Better understanding of metabolites and their impacts
I	1	Contribution of irrigation crops/rice to C cycling in our systems
I	1	Mineral data sets for local conditions
I	0	Information on organic C for local soils/sediments/water
I	0	Understanding P in drains