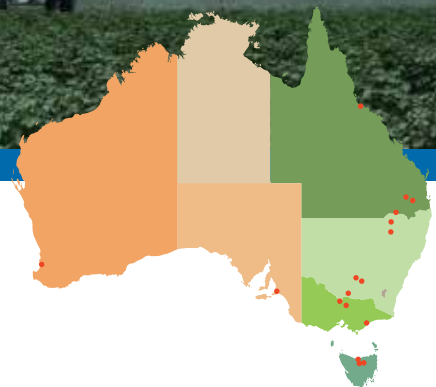


# SMARTER IRRIGATION FOR PROFIT

## Project Overview



# SMARTER IRRIGATION FOR PROFIT

The project aims to improve the profit of 3,000 cotton, dairy, rice and sugar irrigators by \$20,000 - 40,000 per annum, with the support of 16 Research and Development partners and 19 farmer irrigation technology learning sites.

The project consists of three components.

1. Practical, reliable irrigation scheduling technologies,
2. Precise, low cost automated control systems for a range of irrigation systems,
3. A network of farmer managed learning sites located in major regions referred to as "optimised irrigation" farms.

The expected outcomes are:

- 10-20 percent improvement in water productivity, efficiency and farmer profitability,
- Adoption of new irrigation technologies and science application by farmers and irrigation professionals to improve farm profits.

The project is a partnership between the major irrigation industries of cotton, dairy, rice and sugar, led by the Cotton Research and Development Corporation (CRDC) in conjunction with Dairy Australia, the Rural Industries Research and Development Corporation (RIRDC), Sugar Research Australia and research partners including; CSIRO, NSW DPI, USQ, TIA, SARDI, DEDTJR Victoria and other industry organisations.

The project key activities include:



Automated satellite, weather, plant and soil irrigation scheduling research.



Smarter automated surface irrigation.

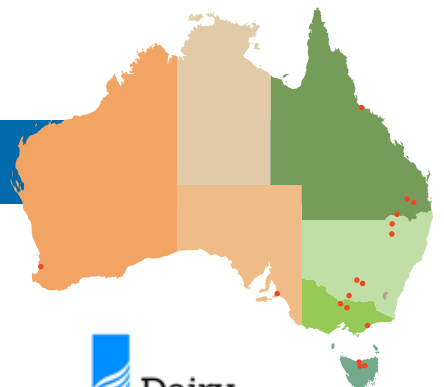
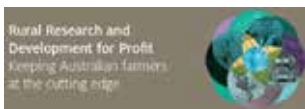


Automated and variable rate irrigation application technologies.

For more information contact:

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The project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural Research and Development for Profit Programme.



# SMARTER IRRIGATION FOR PROFIT

## Irrigation scheduling technologies (plant, soil, weather)

### Background and method

The project will develop and test an automatic irrigation module, based on the satellite/weather-based irrigation information system developed in Victoria, on commercial dairy sites using flood irrigation as a preliminary step towards the whole farm automation of future irrigated farms in SE Australia.

The system combines recent and forecast weather data with satellite imagery to provide local, web based crop and location specific measures of reference evapotranspiration (ETref) and crop coefficients (Kc) for use in irrigation scheduling.

The project will partner with irrigation automation service providers to demonstrate its ability to provide reliable satellite based irrigation demand triggers to support affordable automated irrigation scheduling on dairy farms in Victoria.

### 2015/16 Activities

- Identification and establishment of sites for demonstration of satellite/weather based automation.
- Design and build of the irrigation scheduling system and proposed performance monitoring of the selected pilot farms.



### For more information, contact:

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The project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural Research and Development for Profit Programme, and the Department of Economic Development, Jobs, Transport and Resources and Dairy Australia.

Rural Research and Development for Profit  
Keeping Australian farmers at the cutting edge



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# SMARTER IRRIGATION FOR PROFIT

## Irrigation cotton agronomy for tailored and responsive management with limited water

### Aim

- To improve irrigation agronomy, through identifying the optimum strategies for cotton irrigation.
- To optimise use of limited water.
- Research support and guidance provided for improved research delivery and adoption by growers.
- New irrigation scheduling strategies developed for difficult irrigation decisions.

### Background

Variable climates (e.g. hot and dry springs) and limited water availability has highlighted a need for developing new integrated strategies for difficult irrigation decisions for crop establishment, timing of first irrigation, mid-season irrigation (e.g. integrating canopy temperature approaches and the dynamic deficit approach) and last irrigation.

In addition there is a need for ongoing research into limited water scheduling to understand the physiological response to water stress in partially irrigated conditions grown in different row configurations.

### 2015/16 Activities

A number of cotton field experiments have been established including:

- Investigation of the impact of pre-and post-plant irrigation on plant establishment and health.
- New approaches to utilising canopy temperature sensing technologies for use in skip-row/limited water situations.
- Refinement of canopy temperature sensing technology for use in fully irrigated cotton crops.
- Investigation of an alternative approach to last irrigation management of cotton crops.



Canopy temperature sensors monitor the crop 24/7

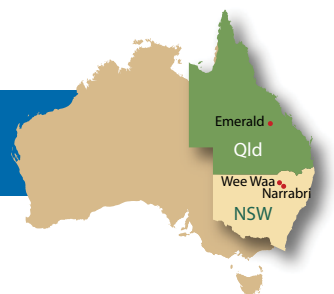


Skip row cotton planting compared to conventional planting strategy

### For further information contact:

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The project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural Research and Development for Profit Programme, the Cotton Research and Development Corporation, and CSIRO.



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Cotton Research and  
Development Corporation



# SMARTER IRRIGATION FOR PROFIT

## Smart Automated Irrigation

### Aim of the Project

The aim of this project is the delivery of smart automated precision irrigation systems for whole of farm scale use. The systems will be tested and validated at the field scale, and demonstrated to growers and potential commercial providers to encourage future industry adoption.

### Methodology

The project involves significant development, evaluation, field testing and engagement of potential commercial partners. Field level testing will be implemented at one centre pivot irrigated pasture site in Tasmania, one furrow irrigated cotton field near Wee Waa, NSW, one lateral move cotton site in Dalby, Queensland and one furrow irrigated sugar site in the Burdekin, Queensland. Sites will be monitored to assess both the volumetric irrigation performance and crop yields as well as technical challenges and economic cost benefit. This will assist growers and commercial providers assess the merits of adopting smart automated irrigation systems. Research partners include the CSIRO and the Tasmanian Institute of Agriculture.

### The expected outcomes are:

- Automated adaptive precision irrigation management systems suitable for Australian Cotton, Dairy and Sugarcane industries.
- 10-20 percent improvement in water productivity, efficiency and farmer profitability.
- Adoption of new irrigation technologies and science application by farmers and irrigation professionals to improve farm profits.
- Improved cross sector industry research collaboration with public and private sectors.



Smart automated irrigation – Dairy



Precision overhead irrigation systems – Cotton



Irrigation research - Sugar

### For further information or project progress updates, contact:

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The project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural Research and Development for Profit Programme, and the Cotton Research and Development Corporation, Sugar Research Australia, Dairy Australia, Tasmanian Institute of Agriculture and The University of Southern Queensland.



# SMARTER IRRIGATION FOR PROFIT

## Smart automated irrigation: Increasing farm profit through efficient use of irrigation for dairy farms



This project, led by the Tasmanian Institute of Agriculture (TIA) will use data and autonomous technology to help farmers make informed decisions and improve their efficiency of irrigated water use in pastures.

### Getting smarter from data

The project will look at the use of irrigation water in pastures by collecting data on water use, energy use and pasture production from five sites across Tasmania. Using this data, the team will work with farmers to make changes to improve water use efficiency and will continue monitoring the sites to measure the success of these changes.

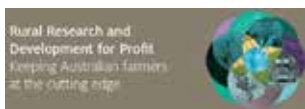
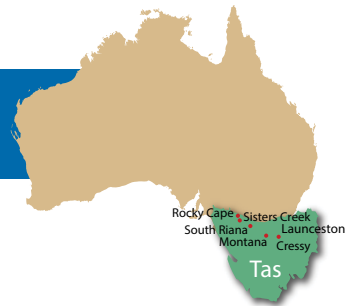
### Automation to save farmers time, water and money

The project will also trial an automation system. Not only will the system automatically irrigate pasture, it will also apply variable volumes of water to the same paddock, which could save farmers time, water and money.

To do this, the team will collaborate with The National Centre for Engineering in Agriculture at the University of Southern Queensland, who have developed a control platform called VARIWise. The VARIWise system has been developed and tested in cotton, but this is the first time it will be applied to a pasture based system.

**For more information, contact:** Dr James Hills, Research Fellow,  
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The project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural Research and Development for Profit Programme, and the Tasmanian Institute of Agriculture, The University of Southern Queensland and Dairy Australia.



# SMARTER IRRIGATION FOR PROFIT

## Improving flow on irrigation bays

### Aim

To demonstrate to border check irrigators the benefits of an improved irrigation bay design that reduces the duration and variation of surface ponding time.

### The problem



### The outcome we are seeking

Irrigation bays with shorter and more uniform ponding durations,

#### leading to:

- more precise irrigation applications
- more precise irrigation scheduling

#### in turn leading to:

- greater production per ML and per ha
- less environmental impact



### 2015 - 16 Activities

- Establishment an experimental site in the Macalister Irrigation District, Victoria.
- Use 2D ANUGA Hyrdo surface flow water model modified for surface irrigation to evaluate designs.
- Field assessment of designs during the winter months of 2016.

### For more information, contact:

Mike Morris, Senior Research Scientist, Irrigation Hydrology | Agriculture Research,  
Department of Economic Development, Jobs, Transport and Resources, Tatura, Victoria.

T: 03 5833 5283 M: 0419 317 454 E: [mike.morris@ecodev.vic.gov.au](mailto:mike.morris@ecodev.vic.gov.au)

The project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural Research and Development for Profit Programme, and the Department of Economic Development, Jobs, Transport and Resources and Dairy Australia.



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# SMARTER IRRIGATION FOR PROFIT



## Maximising Irrigation Profitability

### Aim of the project

To develop sustainable broadacre irrigation systems that increase the profitability and flexibility of farming systems in the southern Murray Darling Basin.

The project will:

1. Assess the ability of precision irrigation to apply defined irrigation depths on time and determine its potential to reduce deep drainage and waterlogging risk, and increase nutrient and water productivity; and
2. Develop irrigation design criteria to allow precision irrigation to occur on basin irrigation layouts.

### The methodology provides three key areas of focus within the project:

**Agronomy;** the influence of irrigation layout and management on input efficiencies, particularly nitrogen and subsequent impact on water productivity and system profitability.

**Hydrology;** to gather information on the impact of factors such as slope, bay surface roughness and soil type on water infiltration, and then validate these factors to develop the irrigation layout design criteria.

**Communication/adoption;** utilisation of grower groups to ensure project activities are meeting grower needs, local demonstration of activities, collection of relevant data.

### 2015/16 Activities

Benchmarking of commercial layout performance

Establishment of key grower learning sites

### Project partners

Murray and Riverina LLS

Rice Extension

CottonInfo



### IREC, Whitton – Back to back cotton:

What is the effect of reduced deficit irrigation on NUE and WUE in southern irrigated cotton?



### SG, Jerilderie – Intensive double cropping in a rice rotation:

Is continuous double cropping a possible alternative to increase productivity and profitability of the rice farming system?

What are soil and nutrient constraints to winter crop production following rice?



### ICC, Numurkah – Automated surface irrigation:

What is the influence of N management and reduced deficit irrigation on NUE and WUE on alternate summer crops?

**For more information, contact:** John Smith, Research Officer, Irrigation,  
NSW Department of Primary Industries, Yanco, NSW T: 02 6951 2503 M: 0427 060 597  
E: [john.smith@dpi.nsw.gov.au](mailto:john.smith@dpi.nsw.gov.au)

The project is supported by the Cotton Research and Development Corporation, through funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit Programme and the Rural Industries Research and Development Corporation.



# SMARTER IRRIGATION FOR PROFIT

## Grower led irrigation system research in the Gwydir Valley 2009-2018

The Gwydir Valley Irrigators Association Inc. (GVIA) is leading an irrigation systems comparisons trial at Moree, NSW.

The trial coordinated by the GVIA in partnership with Sundown Pastoral Company was initiated at Keytah in 2009-2010. The 2015-2016 season will be the fourth year that the Keytah system comparison trial has run. The systems included are; the traditional furrow system, bankless channel, lateral move and subsurface drip irrigation.

It has been designed to compare the yield and water use efficiency of four different irrigation systems commonly in use in the Australian cotton industry. All water on and off each system is measured and comparisons made for bales per hectare and bales per megalitre.

As energy and labour resources are important to the efficient management of irrigation properties the project has also collected information on the relative energy and labour resource requirements of each system.

The grower led irrigation system comparison trial will develop comparative results for the major resource inputs of each of the different irrigation systems. The information will enable cotton growers to make more informed infrastructure investment decisions.



**For more information, contact:** Lou Gall, GVIA Project Officer  
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The project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural Research and Development for Profit Programme, and the Cotton Research and Development Corporation, Sundown Pastoral Company, Auscott Ltd and the Gwydir Valley Irrigators Association.



# SMARTER IRRIGATION FOR PROFIT

**Smarter Irrigation for Profit** is a partnership between the major irrigation industries of cotton, dairy, rice and sugar. It will target 3000 irrigators to improve their individual enterprise profit by \$20,000-40,000 per annum. The project has 10 key activities, four industries, 16 R&D partners, and 19 farmer managed learning sites across five states.

The dairy industry is the second largest user of irrigation water in Australia. Increasing cost and availability of water is a major concern for Australian dairy farmers and there is a pressing need for the industry to find and adopt innovative practises and technologies to utilise water as efficiently as possible.

## Optimised Dairy Irrigation Farms

Managed by Dairy Australia this project will see the establishment of a network of farmer managed learning sites located in major dairy regions referred to as "optimised irrigation" farms.

Dairy Australia will establish "optimised irrigation" demonstration sites on commercial dairy farms in WA, SA, Victoria, NSW and Queensland. Each site has the opportunity to tailor the technologies demonstrated base on local needs but each of the sites will quantify the expected water, energy and labour savings associated with adoption of innovative irrigation technologies over two irrigation seasons, as well as the associated management and skills requirements, maintenance costs and labour and lifestyle implications.

### The expected outcomes are:

- 10-20% improvement in water productivity, efficiency and farmer profitability, or \$20,000 - \$40,000/farm/year.
- Adoption of new irrigation technologies and science application by farmers and irrigation professionals to improve farm profits.
- Web based information resources detailing cost benefit analysis of different precision irrigation technology options for both gravity fed and pressurised dairy irrigation systems across Australia.
- Integrated industry agreed irrigation scheduling design and management guidelines for pressurised and gravity fed irrigation.



*Improved scheduling of surface irrigation.*



*Precision control of irrigation systems.*

### For further information or project progress updates, contact:

Monique White, Program Leader T: 0400 927 276 E: [monique2@internode.on.net](mailto:monique2@internode.on.net)

The project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural Research and Development for Profit Programme, and Dairy Australia.

