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:

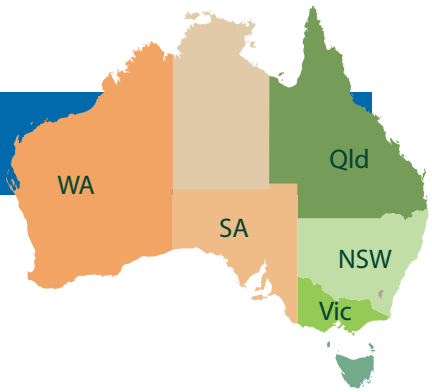
- 10-20% improvement in water productivity, efficiency and farmer profitability, or $20,000 - $40,000/farm/year.
- Adoption of new irrigation technologies and science application by farmers and irrigation professionals to improve farm profits.
- Web based information resources detailing cost benefit 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 972 206 E: 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.



Rural Research and Development for Profit
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SMARTER IRRIGATION FOR PROFIT

South East South Australia Optimised Irrigation Site

Smarter Irrigation for Profit is a national project that aims to 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/skills requirements, maintenance costs and labour and lifestyle implications. It will target irrigators to improve their individual enterprise profit by $20,000 - 40,000 per annum.

The SA Project

The South Australian project is based on three centre pivots located South of Mt Gambier at Mt Schank, Allendale East and Eight Mile Creek, the aims are to:

- Assess the potential performance of VRI technology at each site,
- Identify opportunities to improve irrigation performance on those existing pivot sites,
- Develop a decision support tool for farmers to assess VRI (Variable rate irrigation).

Baseline

Each pivot was EM and Radiometrically surveyed in 2015 at the time soil cores were taken to estimate plant-available water capacity (PAWC). The project will undertake a review of readily available water (RAW) and a catch can test for distribution uniformity (DU%) and coefficient of uniformity (CU%) at each site. Each site also keeps water use and financial records that will be made available to the project.

Eight Mile Creek/Wye: New centre pivot installed in 2014 on relatively flat and consistent soils. This pivot is used to grow Lucerne for a cut and carry system rather than grazed.

Mt Schank: A relatively old centre pivot (installed around 2000) on undulating ground. Pasture at the site was sown between 2010 and 2014. This site shows extreme variability of soil type, from deep clay soils on rises to shallow sand over rock on flats.

Allendale East: Also a relatively old centre pivot, installed in around 2000 used to produce grazed perennial pasture. Only about half of the site has been surveyed by EM38 sensor and radiometrics. The pasture at the site is also relatively old (10 -12 years).

Modelling VRI Performance

The four scenarios to be modelled at each site are:

- Standard centre pivot – where travel speed (and application rate) can only be adjusted manually,
- Variable walk speed – where travel speed can be programmed for sectors determined by the angle of rotation of the pivot, e.g. less water applied over a laneway,
- Variable sprinkler bank – a variable walk pivot with individual control of a number of sprinkler banks. For the purpose of this exercise the number of banks has been set to four,
- Individually variable nozzles – a centre pivot with both variable walk and individual control of all sprinkler nozzles.

Modelling outputs will include

- irrigation water applied,
- drainage,
- plant transpiration (an indication of water stress), and
- soil water evaporation.

Further modelling of the biophysical and economic performance of the irrigation strategies will be used to examine the business case of the four VRI scenarios at each site.

Optimising Irrigation

Over the next two irrigation seasons the project will also monitor the performance and decision making on the existing sites in order to explore the value of improved monitoring and management.

For further information or project progress updates, contact:
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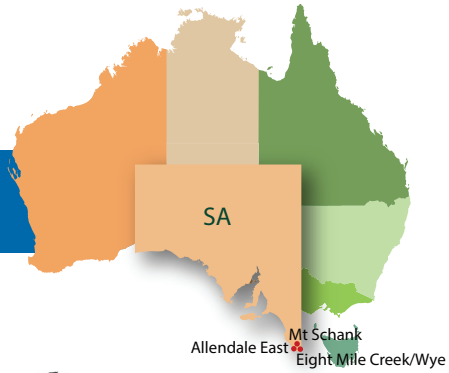

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Government of South Australia
Primary Industries and Regions SA

SADA Fresh

Natural Resources South East

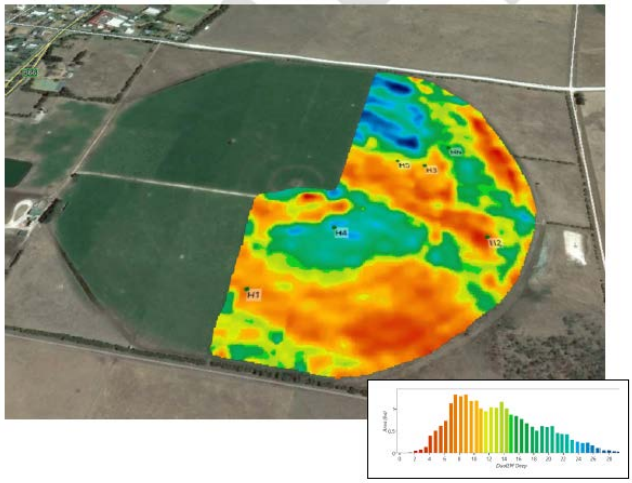
FLINDERS UNIVERSITY ADELAIDE AUSTRALIA

SARDI
SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

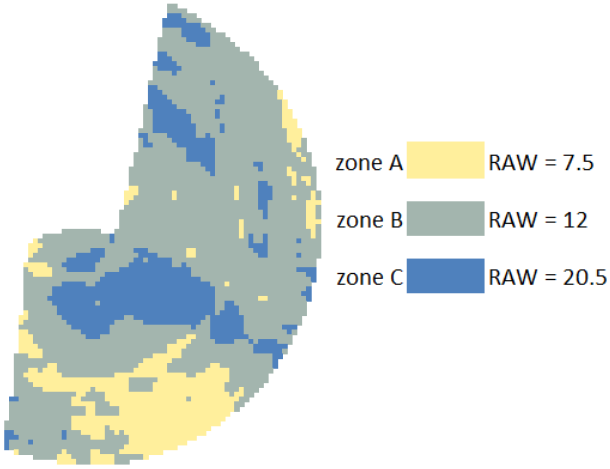
Smarter Irrigation for Profit - Variable Rate Irrigation Nigel Fleming, SARDI

VRI - why use it? To get better control of watering. To do this, you need information, for example how much water the soil can hold. Can use a way to look at soil variability (EM) and relate to soil type, (RAW values). Once you have done this, can optimise irrigation to soil type.

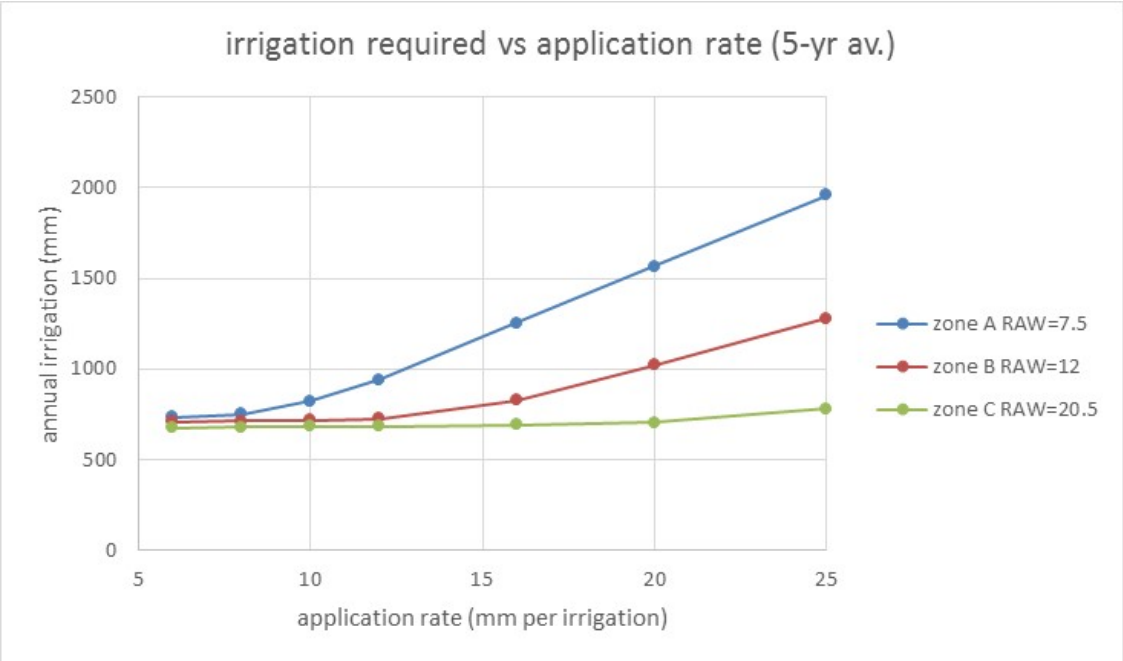
EM map of Allendale East pivot



Assign soil types and RAW values

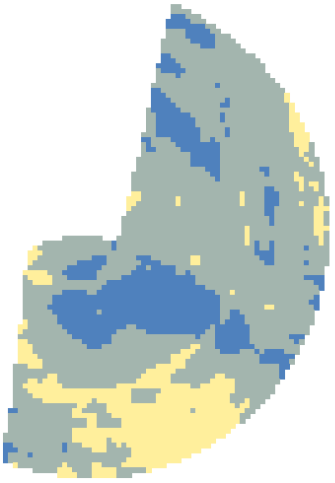


How much water to apply? Since the soil can't hold more than its RAW value, try to keep irrigation rate close to RAW.



Once irrigation is optimised to soil type (most sensitive soil), there is little effect of VRI on water use. This is because the other soil types do not suffer from more frequent watering at lower rates. Know your soil type!

VRI water used at 8mm rate 713 mm



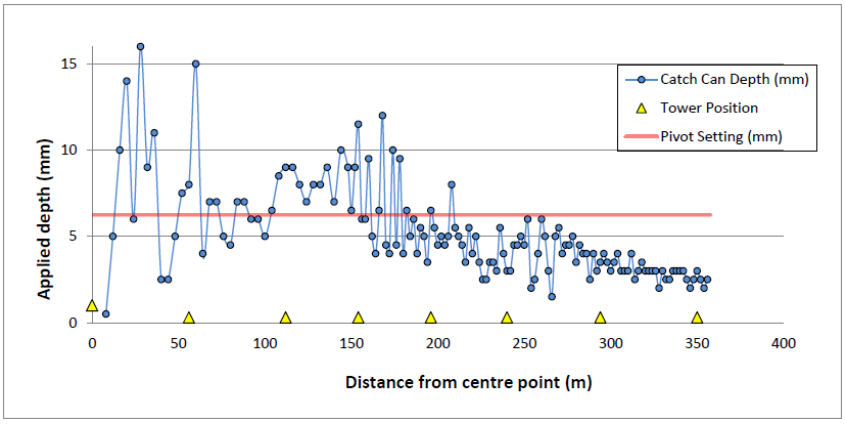
calculated water requirement

zone A	750
zone B	714
zone C	680

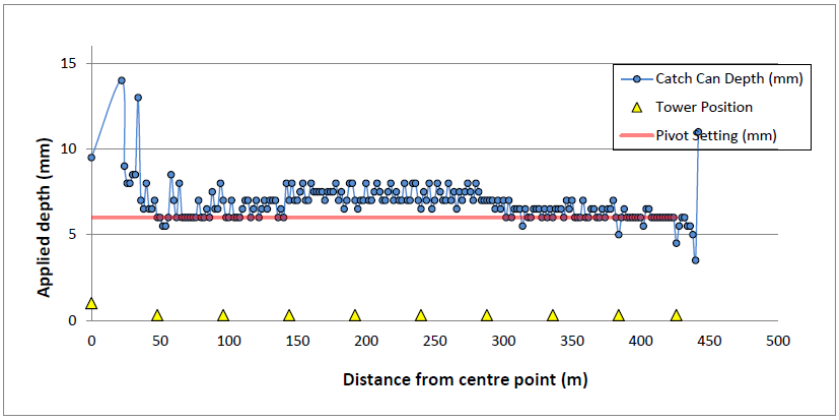
What else?

Check the application uniformity of pivot and update sprinkler packs, regulators as needed

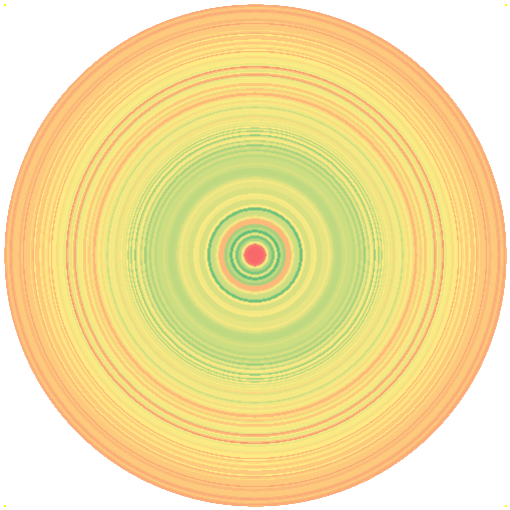
Allendale East



Eight Mile Creek

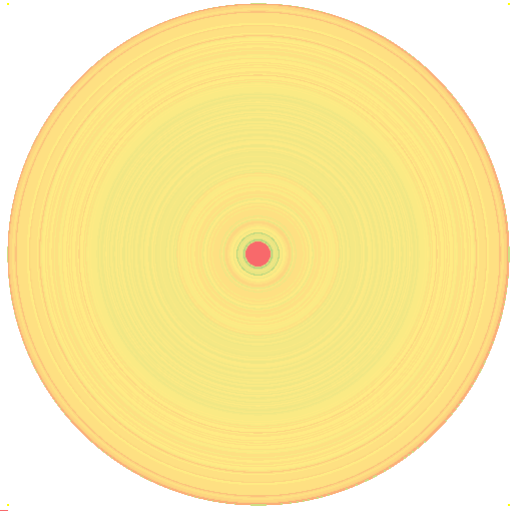


Allendale East



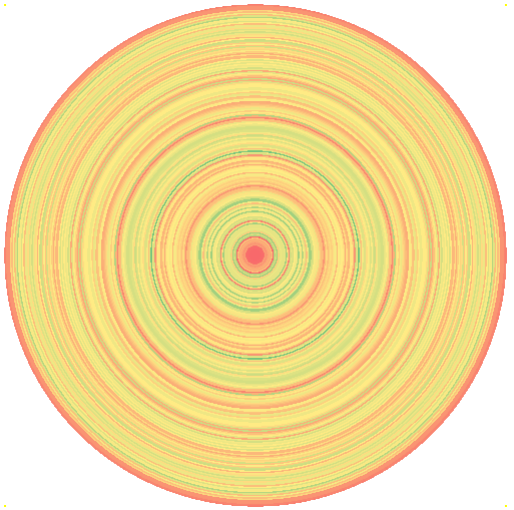
>900mm 10% of water

Eight Mile Creek



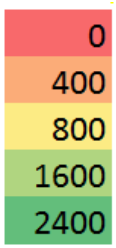
1% of water

Mt Schank



11% of water

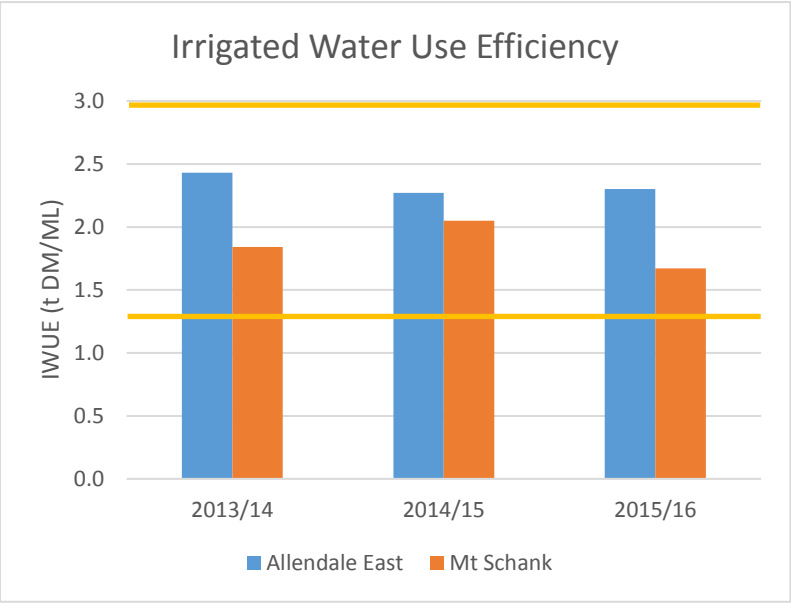
Each pivot has had an average of 800mm water applied.



Red areas are under-watered

Yellow areas are ideal

Green areas are over-watered



water use efficiency for the last three years was within the range found in a survey by Horizon Farming Systems in 2006 (yellow lines on chart)

Where to from here?

With such a wet season, we are looking into using VRI to skip over wet patches, as well as over laneways and other unproductive areas. How long do wet patches persist into the irrigation season? This will affect the water savings. What are the actual areas, and how much buffer is needed around them?

wet areas of Mt Schank pivot (in blue)

As well as

- Cost of applying water at different rates
- Irrigation scheduling tools (Tim Powell)
- Data collection during next irrigation season
- Energy efficiency (Nick Bullock)