

Irrigated farm businesses

Increasing the resilience

APSRU

Irrigation growers are currently confronted by the challenges of drought, increased climate variability, and poor business profitability driven by lack of irrigation water, decreased yields (drought), changing relative prices, and increased production costs.

Clearly, increase in climatic variability, ongoing structural adjustment, and expected climate change make the preparedness and adaptation to change an urgent and unavoidable task for our irrigation industries.

The key aim of our work is to achieve that irrigation growers are better prepared to:

- cope with the impact of increased climate variability and decreased reliability in water supply;
- benefit or reduce exposure from high market volatility, and minimise the impact of the cost-price squeeze.

This will be achieved by developing a participatory research program to investigate the impact of alternative agronomic practices and whole-of-farm irrigation strategies on the trade offs between whole farm profitability (\$/ML) – economic risk – environmental outcomes, for case study farm businesses in the Riverina, Northern NSW, Southern and Central Queensland.

In the following slides we introduce and provide some help on the use of a new risk management tool the Irrigation Optimiser



Here comes some,..... Help!!

Briefly, we have developed this simple tool to help irrigation answer:...

If I have x ML of water available and x ha of land available, What would be the allocation of those resources that maximises whole farm profitability? Should I put all the water into cotton?,... or should I irrigate something else???

The engine of this tool is a very simple optimiser that crunches the numbers you input, so... the closer your description to reality the more reliable the output will be.

Because it is quite simple there is a bit of a trade-off in terms of how easy it is to use and how well you will be able to describe your particular circumstances. Though, so far, it has been well received by growers from Northern NSW, Darling Downs, to Central Queensland during an initial testing phase of the product.

Installation tips:

- When you click download you might be prompted to install "*Silverlight*". Follow the prompt and click "run". After installing you may need to restart your browser, or simply press 'F5' to refresh.
- Once up and running you might want to "Add to Favourites" in your browser to it will be easier to come back to the tool.
- On the tool the easiest is to open the demo farm description and save it in your hard drive. This will save a text file with your farm settings, you could also e-mail the file to us in case you have a question.
- Next just follow the menus and tabs on the left hand side and try to describe your farm as best as you can
- Lastly go to the Optimiser tab, select whether you want to optimise for dry, average or wet seasons and press Go. The results table will show an optimum strategy that maximises whole farm profits.

If you get into trouble please e-mail to:

daniel.rodriquez@dpi.qld.gov.au or alastair.doherty@dpi.qld.gov.au

To follow our case studies, comment and participate, visit the project blog at

<http://irrigatedcropping.blogspot.com>






The start: *The Farm*

1. To start, open the Demo farm description (the Bottom left side icon)
2. Describe the farm
3. Describe the sources of water
4. Describe the paddocks & allocations
5. Describe your crops
6. Run the optimiser & interpret results

- Farm
- Irrigators
- Paddocks
- Crops
- Optimiser

Farm

Contributors:








Name:


Rainfall Efficiency: ↑ ↓

Select a nearby site for Rainfall: ▼
(or enter below)



Dry Season	Average Season	Wet Season
Estimated Summer Rain (mm): <input type="text" value="241"/>	Estimated Summer Rain (mm): <input type="text" value="296"/>	Estimated Summer Rain (mm): <input type="text" value="412"/>
Estimated Winter Rain (mm): <input type="text" value="155"/>	Estimated Winter Rain (mm): <input type="text" value="222"/>	Estimated Winter Rain (mm): <input type="text" value="280"/>





This creates a new scenario...



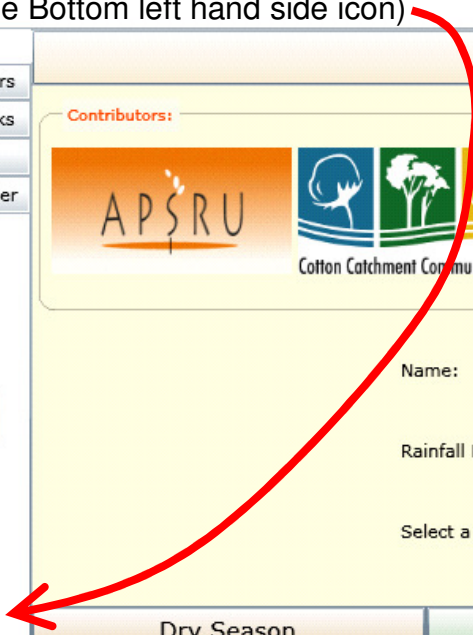
...this opens an existing scenario...

...these ones are Save and Save as...

...here you can find our contact details if you need... **Help!!**






The Sources of Water

Farm
Irrigators
Paddocks
Crops
Optimiser



Irrigators



Manage Irrigators

River   

Bore

Name:

Irrigator Efficiency:  

Cost (\$/MI):  

Dry Season	Average Season	Wet Season
Max. Annual Allocation (MI): <input type="text" value="1000"/>	Max. Annual Allocation (MI): <input type="text" value="3300"/>	Max. Annual Allocation (MI): <input type="text" value="5000"/>

Here you can delete, copy or add new irrigators

... then specify irrigation efficiencies and costs per MI...

... and finally describe expected allocations during different types of seasons.

The Paddocks & water allocations

The screenshot shows a software interface for managing paddocks. The main window is titled "Paddocks" and contains a sidebar on the left with options: Farm, Irrigators, Paddocks, Crops, and Optimise. The "Paddocks" section is active, showing a "Manage Paddocks" button and a "Test Paddock" sub-section. The "Test Paddock" section includes a "Name" field with "Test Paddock" and an "Area" field with "2000 (Ha)". Below this, there are two options for entering soil parameters: "Enter Soil PAWC:" with a "PAWC" field set to "160 (mm)", and "OR Enter Soil type and depth:" with a "Soil Type" dropdown set to "Deep/heavy brigalow or brigalow" and a "Soil Depth" slider set to "100 (cm)".

The bottom section of the interface is divided into three columns representing different seasons: "Dry Season", "Average Season", and "Wet Season". Each column has a percentage slider at the top (50%, 75%, and 100% respectively) and an "Initial Water" field (80 mm, 120 mm, and 160 mm). Below each field is an "Irrigation Mix" pie chart showing the allocation between "River" (blue) and "Bore" (orange). The "Average Cost of Irrigation" is displayed at the bottom of each column: \$67 for Dry Season, \$47 for Average Season, and \$47 for Wet Season.

Five callout boxes provide instructions:

1. Here you can indicate the total area to irrigate
2. Pick a typical soil type in your farm to estimate plant available water capacity (PAWC).
3. Set the maximum depth of your typical soil...
4. Here you can indicate the initial soil water at the start of the summer cropping season,...
5. Input the expected allocations during the different types of seasons by just clicking with your mouse...

...or input the typical PAWC if you know it.

...then water costs are calculated for each season type.

Season	Percentage	Initial Water (mm)	River (%)	Bore (%)	Average Cost of Irrigation (\$)
Dry Season	50%	80	33%	67%	\$67
Average Season	75%	120	62%	38%	\$47
Wet Season	100%	160	71%	29%	\$47

The Crops you could grow

1. Here you can delete, copy or add new crops to test.

2. Indicate variable costs.

3. Expected prices.

4. Set a cap to the maximum amount of water to apply.

5. Here you define a yield response curve to total available water (irrigation + rain)...

...you can either move the blue and red dots with your mouse or change the numbers with the arrows.

	Dry Season	Average Season	Wet Season
Expected Price(\$):	450	450	450
Maximum Water Applied(Ml/Ha):	7	6	4.5

Yield vs Water Use Graph Data:

Total Water Use (ML/ha)	Yield (t or bol/ha)
6.5	5.2
8.0	9.1

The Optimiser

Farm
Optimiser

Irrigators

Expected Summer Outlook: Average

Expected Winter Outlook: Average

Go

Summer Crops:
Winter Crops:

	Irrigated Cotton	Irrigated Maize	Rainfed Wheat	Wheat - 1 Irrigation	Wheat - 2 Irrigations
Price(\$/t)	\$ 450	\$ 200	\$ 200	\$ 200	\$ 200
Yield(b/ha or t/ha)	9.1	4.5	0.0	0.0	0.0
Variable Cost(\$/ha)	\$ 2100	\$ 749	\$ 465	\$ 500	\$ 500
Water Cost(\$/ML)	\$ 47	\$ 47	\$ 47	\$ 47	\$ 47
Water Applied(ML/ha)	5.4	0.0	0.0	0.0	0.0
Irrig Cost(\$/ha)	\$ 252	\$ 0	\$ 0	\$ 0	\$ 0
Gross Margin(\$/ha)	\$ 1733	\$ 146	\$ -465	\$ -465	\$ -465
Gross Margin(\$/ML)	\$ 321	\$ 0	\$ 0	\$ 0	\$ 0
Optimal Area	974	400	0	0	0
Profit(\$)	\$ 168776	\$ 58991	\$ 0	\$ 0	\$ 0

1. Here you need to indicate the type of season that you expected.

2. Press Go

3. Wait a few second to get the outputs..

4. Based on your inputs, this is the amount of water to apply to the selected crops...

...over this area, to maximise the profit over the whole farm.

Keep in mind that gross margins in \$/ha or \$/ML, might not reflect farm profit, as different crops are planted over different areas.

The key objective of tool is to maximise profits over the whole farm not individual gross margins (\$/ha or \$/ML).

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The end

