



Dairy Smarter Irrigation for Profit



Australian Government
Department of Agriculture

This 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.

5 Regional Sites & 5 Research Sites in Tasmania

Queensland – Warwick, Hoffman property

New South Wales – Loomberah, Tout property

Gippsland – Macalister Demonstration Farm

South Australia, Mt Gambier, Hunt, Telford and Mann properties

Western Australia – Benger, Giumelli property & Harvey Ag School

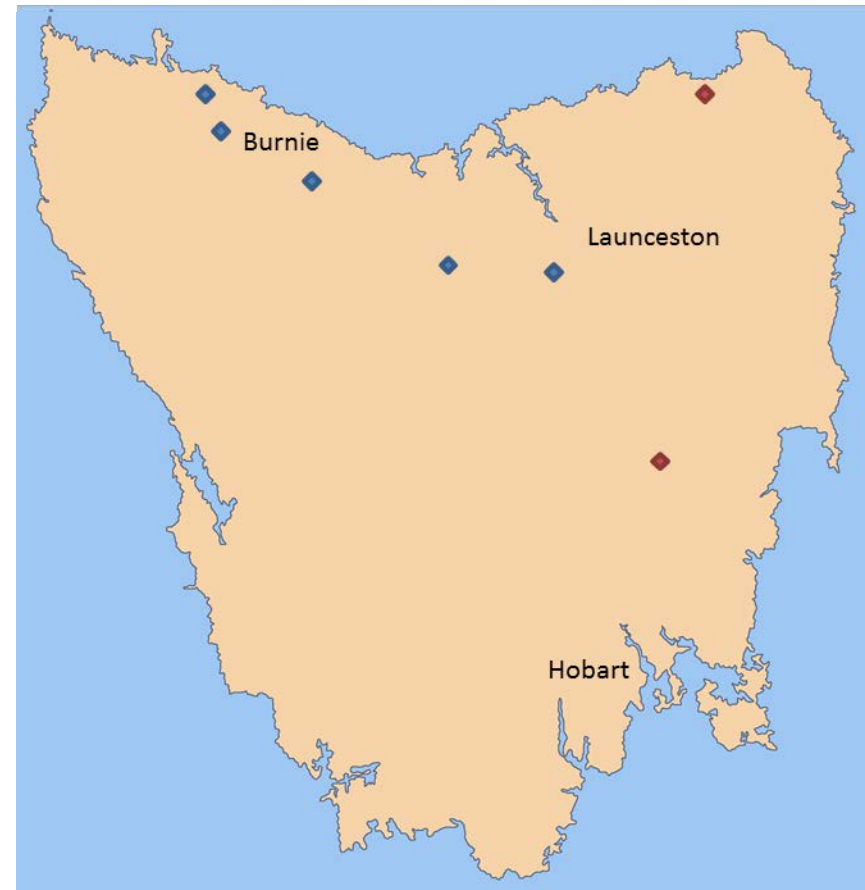




Trial sites

- Cressy (Cressy Clay loam)
- Montana (Alluvial river flat)
- South Riana (Ferrosol)
- Sisters Creek (Ferrosol)
- Rocky Cape (Sandy loam)

Elliott (TIA Dairy Research Facility)



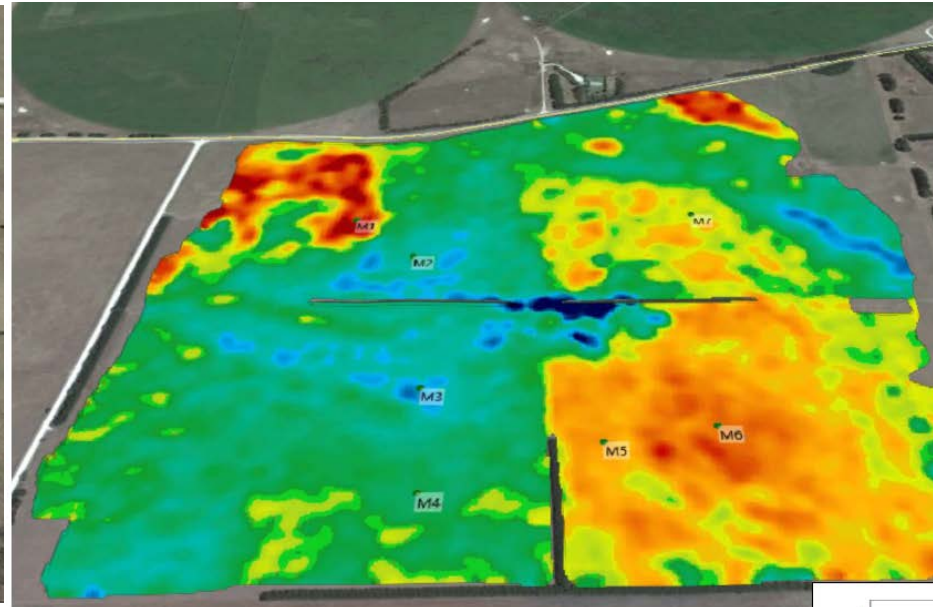
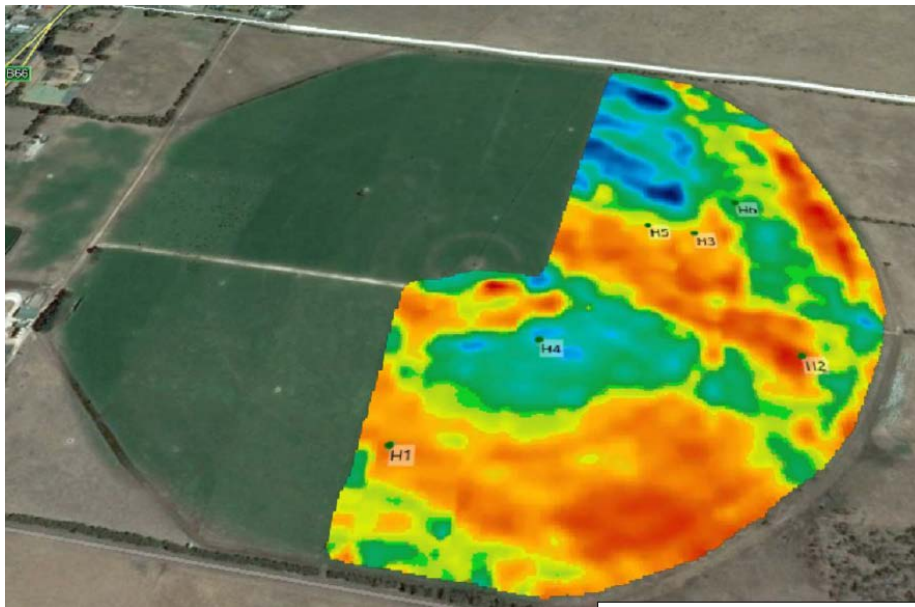
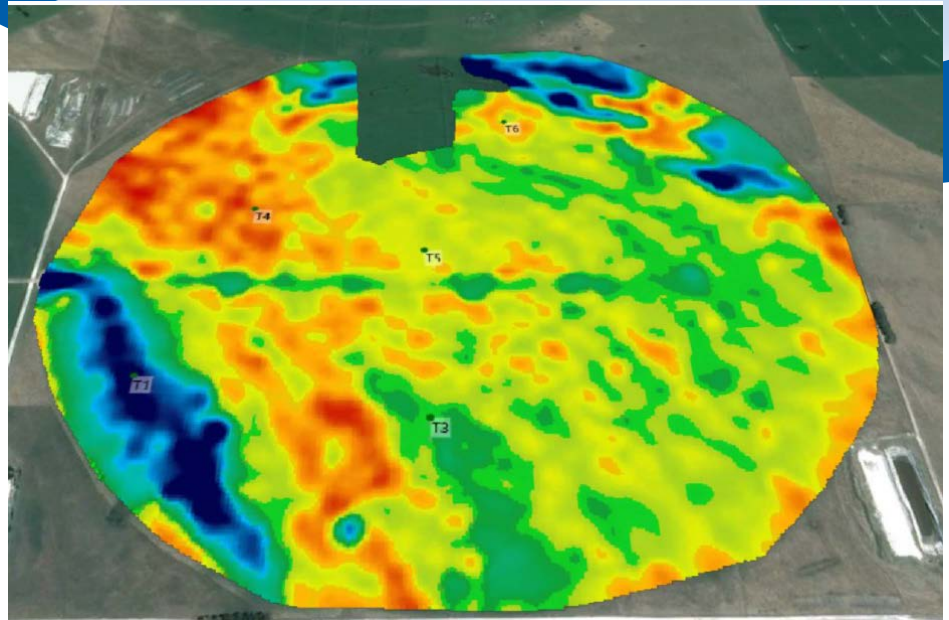
Key Learnings

- System Checks
- Energy use
- Variability and VRI technology
- Irrigation scheduling and pasture productivity

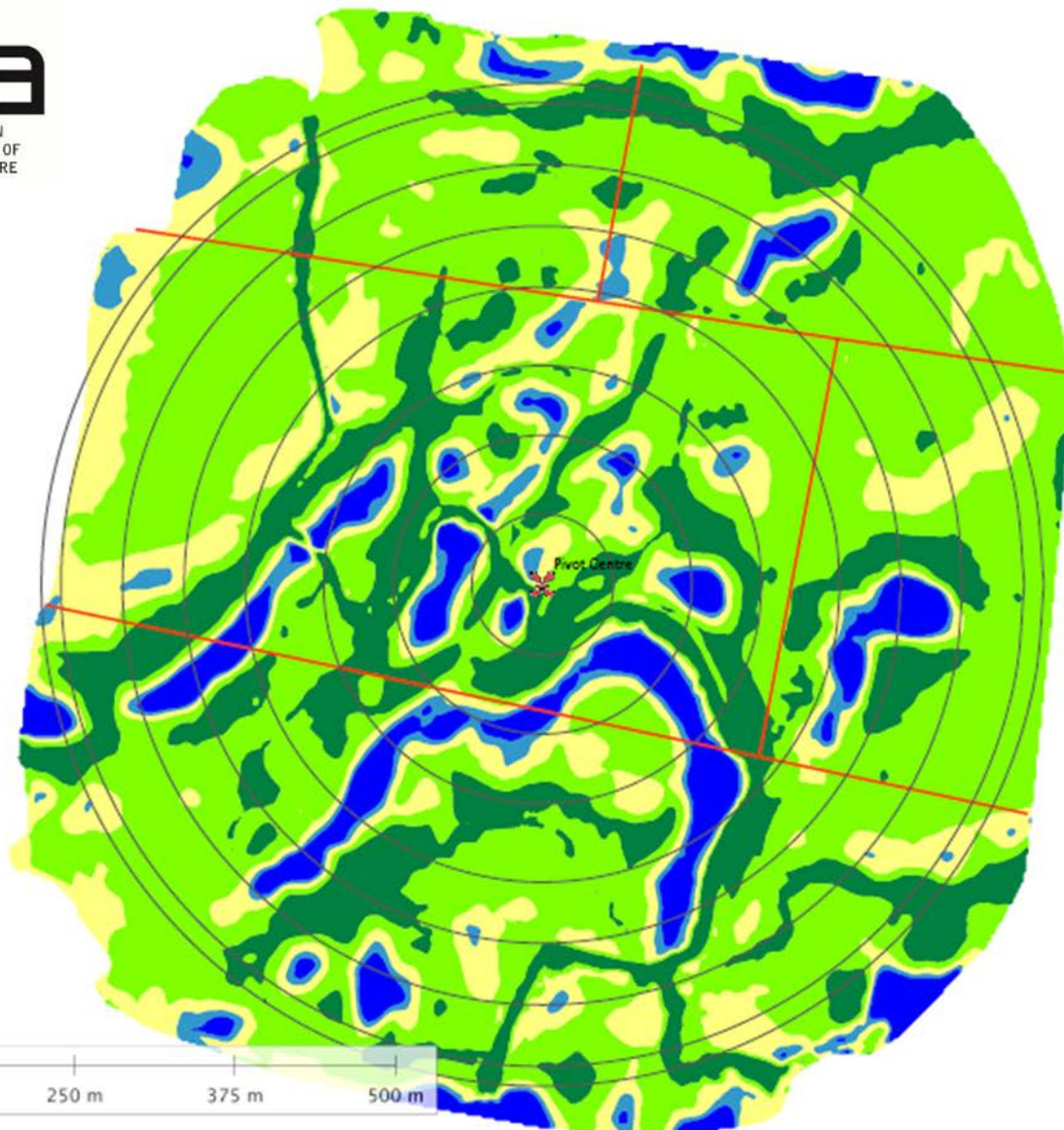
Variability and VRI

- Value of VRI depends on variability
- Due to
 - Management decisions
 - Turning off on roadways and waterways
 - Locking up paddocks for silage
 - Renovation of specific paddocks
 - Different crops under 1 pivot
 - Soils/topography

The SA Sites (EM Maps)



Brock VRI Zones



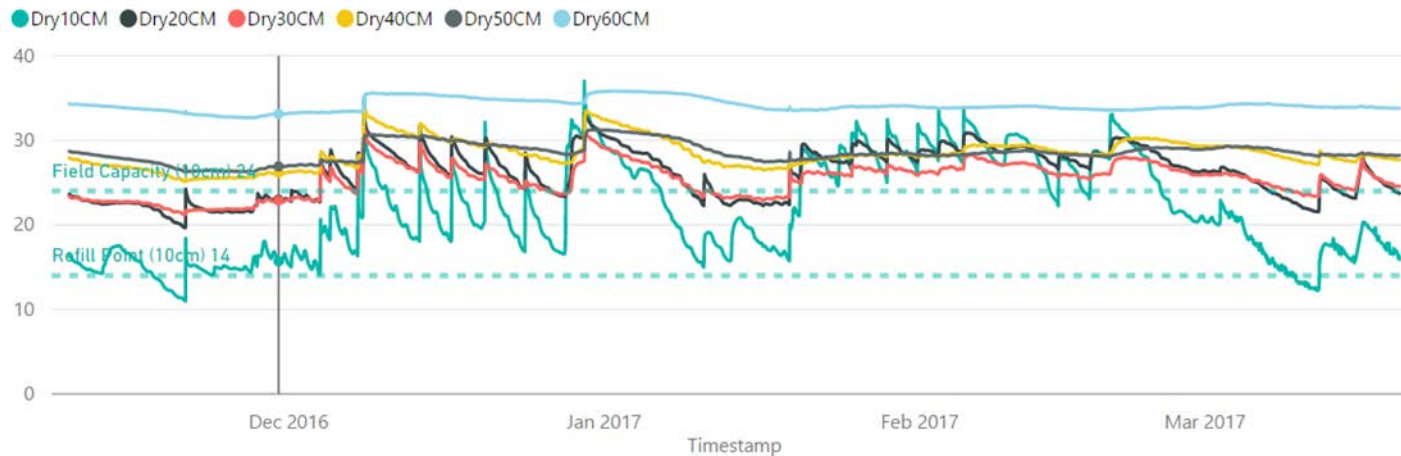
0 m 125 m 250 m 375 m 500 m

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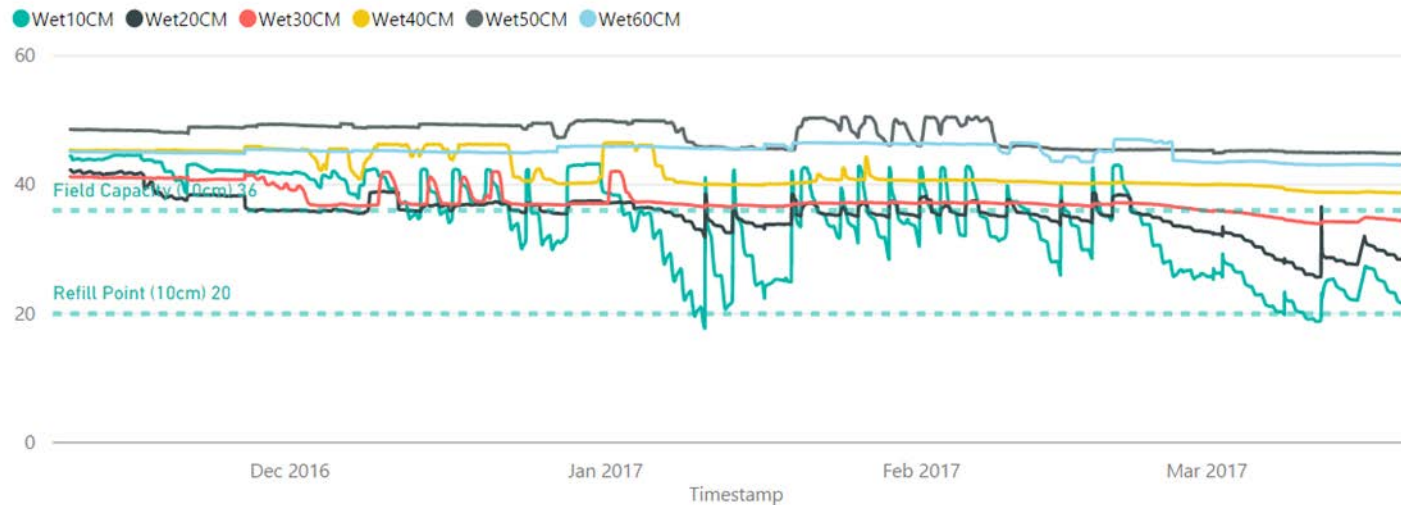
- Drains
- Flats
- Foot of Slope
- Hill Crest
- Hill Sides
- Laneways
- Pivot Wheel Tracks
- X Pivot Centre

Brock Dairy Montana - Soil Moisture (Dry + Wet) + Rainfall

Dry Probe (Median)



Wet Probe (Median)



The Economic Case

	1	1A	1B	1C
	0.5 ML/ha water saved, 1 t DM/ha extra pasture	No water saved, 1 t DM/ha extra pasture	1 ML/ha saved, no extra pasture	2.9 ML/ha saved, no extra pasture
ADDITIONAL CAPITAL COSTS FOR VRI ON A PIVOT				
VRI Hardware (\$/ha)	\$ 1,750	\$ 1,750	\$ 1,750	\$ 1,750
Total VRI hardware cost	\$ 70,000	\$ 70,000	\$ 70,000	\$ 70,000
VRI software cost	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Is the software likely to last 5 or 10 years?	5	5	5	5
EM38 mapping	\$ 1,800	\$ 1,800	\$ 1,800	\$ 1,800
EM map and soil cores	\$ 3,500	\$ 3,500	\$ 3,500	\$ 3,500
Other Capital Costs	\$ -	\$ -	\$ -	\$ -
Total Capital Cost	\$ 80,300	\$ 80,300	\$ 80,300	\$ 80,300
Physicals				
Ha under pivot	40	40	40	40
Extra feed consumed with VRI (t DM/ha/year)	1.0	1.0	-	-
Average value of extra feed consumed (\$/t DM)	\$ 250	\$ 250	\$ 250	\$ 250
Reduction in irrigation water applied with VRI (ML/ha)	0.5	-	1.0	2.9
Value of saved irrigation water (\$/ML)	\$ 100	\$ 100	\$ 100	\$ 100
OTHER COSTS & BENEFITS				
Increase in fuel or electricity costs (\$/ha)	\$ 1.00	\$ 1.00	\$ 1.00	\$ 1.00
Increase in fuel or electricity costs (\$/year)	40	40	40	40
Increase in repairs and maintenance (\$/ha)	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00
Increase in repairs and maintenance (\$/year)	200	200	200	200
Extra labour requirement (hrs/year)	20.00	20.00	20.00	20.00
Labour cost (\$/hr)	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00
Other extra operating costs (\$/year)	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
Other Benefits eg reduced pugging (\$/year)	\$ 400	\$ 400	\$ 400	\$ 400
Interest Rate (%)	6.00%	6.00%	6.00%	6.00%
RESULTS				
Years to pay back (before interest)	7	8	10 or more	7
Years to pay back (after interest)	8	10 or more	10 or more	8
Nominal NPV at 10% discount rate	\$ 2,343	-\$ 13,837	-\$ 62,379	-\$ 893
Nominal Internal Rate of Return	11%	6%	-15%	10%

1. Summary	2. Details	3. Results	4. Comments
1.1. Project details	1.1.1. Project name	1.1.2. Project location	1.1.3. Project start date
1.2. Project objectives	1.2.1. Project objectives	1.2.2. Project objectives	1.2.3. Project objectives
1.3. Project budget	1.3.1. Project budget	1.3.2. Project budget	1.3.3. Project budget
1.4. Project risks	1.4.1. Project risks	1.4.2. Project risks	1.4.3. Project risks
1.5. Project outcomes	1.5.1. Project outcomes	1.5.2. Project outcomes	1.5.3. Project outcomes
1.6. Project evaluation	1.6.1. Project evaluation	1.6.2. Project evaluation	1.6.3. Project evaluation
1.7. Project conclusion	1.7.1. Project conclusion	1.7.2. Project conclusion	1.7.3. Project conclusion
1.8. Project recommendations	1.8.1. Project recommendations	1.8.2. Project recommendations	1.8.3. Project recommendations
1.9. Project references	1.9.1. Project references	1.9.2. Project references	1.9.3. Project references
1.10. Project appendices	1.10.1. Project appendices	1.10.2. Project appendices	1.10.3. Project appendices

Details	Water saving	Improved production	both
Pivot (ha)	55	55	55
Extra production consumed tDM/ha	0	1	1
Value of extra feed \$/tDM	250	250	250
Water saving ML/ha	1.4	0	1.4
Value irrigation water saved \$/ML	100	100	100
Capital costs \$	47225	47225	47225
Years to pay back	9	3	Less than 2

Future Activities – VRI and Pasture Productivity

- Using 15/16 data to identify challenges to optimal irrigation.
- Working with TIA to Model optimal productivity at the SE sites.
- Use 16/17 data from farms to identify the yield gap between optimal productivity and that achieved.
- Could VRI have improved the potential yield

