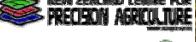
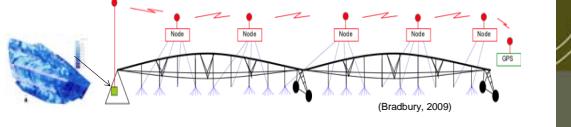
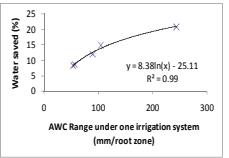


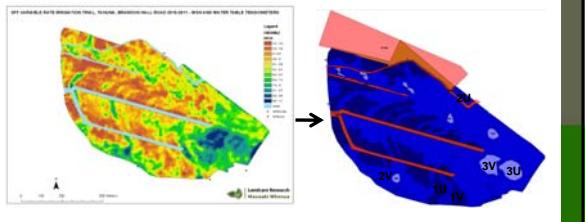

**Landcare Research
Manaaki Whenua**

**PRECISION
irrigation**
**SOIL WATER STATUS AND WATER TABLE
MODELLING USING EM SURVEYS FOR PRECISION
IRRIGATION SCHEDULING**

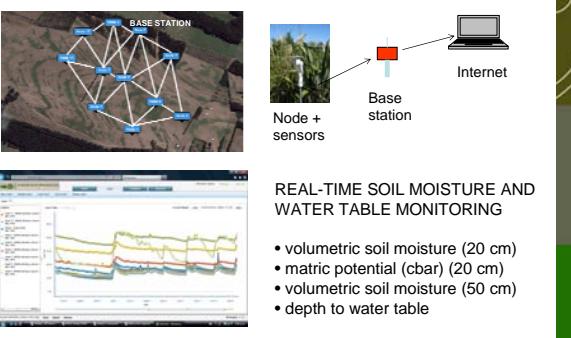

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2nd Proximal Soil Sensing Global Workshop, May 15-18, 2011, Montreal, Canada

Talk content

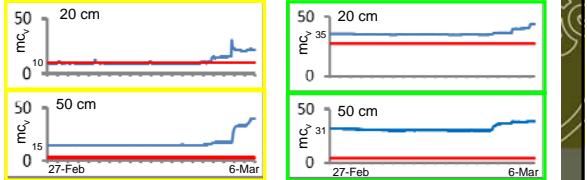
- Precision irrigation defined
- Case study
 - EM map → Irrigation prescription map
- Data analysis
 - Wireless Sensor Network (WSN) - monitoring moisture content (mc) and depth to water table (WT)
 - Measurement: high temporal resolution**
 - Prediction variates: EM31,EM38,DEM,rain
 - Modelling: high spatial resolution**
 - Spatio-temporal model of soil moisture content (mc) and depth to water table (WT)
- Summary

Precision Irrigation
High resolution (~10m) irrigation placement for soil, crop and landscape differences


 $y = 8.38 \ln(x) - 25.11$
 $R^2 = 0.99$
AWC Range under one irrigation system (mm/root zone)

EM38 mapping – irrigation management zones
• 75 ha maize grain field
• Variable rate irrigator
• Undulating sandy soils variably influenced by a high water table (~0.3-2.0m)
• EM38MK2 and EM31 surveys conducted - ground truthing – prescription map
• Wireless mesh sensor network installed for irrigation season
• Irrigation season 16 Dec - 21 March; URL=380mm; VRI=329mm/season


Wireless sensor network (WSN) – real-time soil moisture and water table monitoring

REAL-TIME SOIL MOISTURE AND WATER TABLE MONITORING

- volumetric soil moisture (20 cm)
- matric potential (cbar) (20 cm)
- volumetric soil moisture (50 cm)
- depth to water table

Soil moisture


ZONE	Depth	0	5	10	50	100	1500	AWC	RAW
DRY	cm	-----	-----	-----	-----	-----	-----	-----	-----
	0-20	52	25	16	12	10	4	120	70
	20-40	40	11	8	4	3	2	60	50
WET	40-60	41	12	9	3	2	2	70	60
	0-20	55	42	39	31	27	7	320	120
	20-40	40	16	13	5	4	2	110	90
	40-60	39	18	15	4	3	2	140	120

