

Irrigation in Mackay



Sugar Research
Australia

Irrigation best practice

- Irrigation is one of the key drivers to productivity
- Irrigation responses of 10 tons per ML are common and achievable
- BMP Irrigation is
 - The right amount of water
 - In the right place
 - At the right time



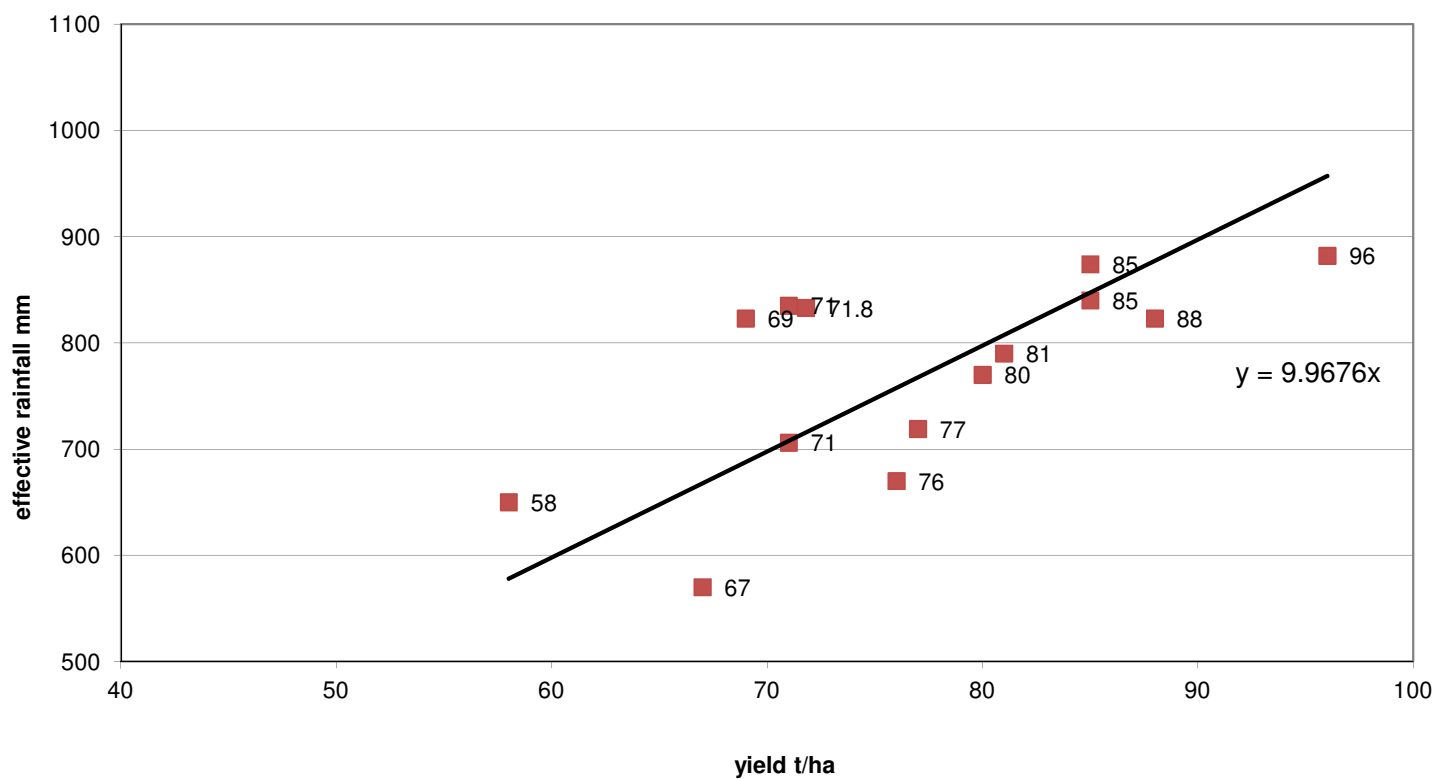
Yield benefits from irrigation

Estimated crop yield under rainfed and unlimited irrigation conditions (from Hardie *et al.*)

Location	Rainfed t/ha	Irrigated yield potential t/ha	Increase from irrigation t/ha
Bundaberg	62	130	68
Childers	60	120	60
Mackay	84	144	60
Mareeba	29	152	123
Proserpine	73	154	81
Sarina	84	144	60



Mackay yields – effective rainfall -1998 to 2013



Level of irrigation required to reach yield potential

Location	Annual crop water use	Rainfall mm	Effective rainfall	Irrigation requirement
Bundaberg	1360	1106	854	500
Mackay	1490	1676	870	620
Burdekin	1520	1058	600	920

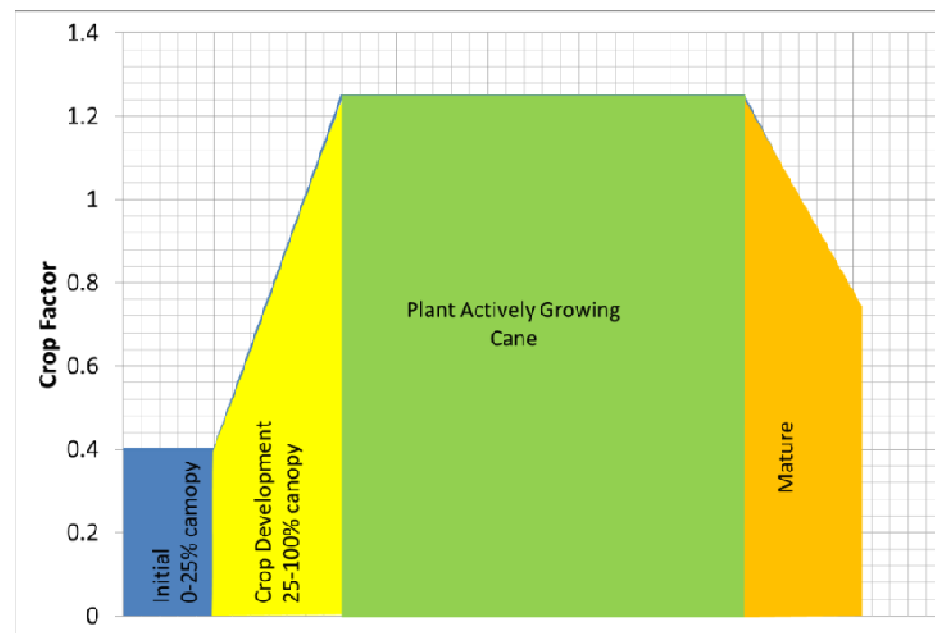
Mackay Aero - December 2014 daily calculations

Date	Evapotranspiration (mm) 0000-2400	Rain (mm) 0900-0900	Pan Evaporation (mm) 0900-0900	Max Temp	Min Temp	Max Rel Hum (%)	Min Rel Hum (%)	Average 10m Wind Speed (m/sec)	Solar Radiation (MJ/sq m)
25/11/2014	5.9	0.0		31.7	20.4	94	59	4.52	26.02
26/11/2014	6.1	0.8		31.3	25.6	87	59	5.58	23.31
27/11/2014	6.0	0.0		31.0	23.5	77	55	4.83	21.82
28/11/2014	6.8	0.0		31.8	19.2	93	50	5.85	27.70
29/11/2014	7.6	0.0		31.5	24.9	80	52	7.72	27.46
30/11/2014	7.7	0.2		31.3	23.2	82	48	7.42	28.59
01/12/2014	6.6	1.2		30.8	22.4	88	54	5.63	27.24
Totals:	46.7	2.2							



Calculating crop evaporation

- Crop coefficients for cane have been determined for use with BoM evapotranspiration rates



Irrigation water used in the Pioneer Valley supply area

Year	Water available	Water used	% used	ML/ha (22000 ha)
2008 / 9	47390	9543	20%	0.44
2009 / 10	47390	18307	39%	0.83
2010 / 11	47390	681	1%	0.03
2011 / 12	47390	5191	11%	0.23
2012 / 13	47390	8456	18%	0.38

- Need 6.2 ML/ha to reach potential yield
- Apply 0.38 ML/ha in Pioneer Valley



Mackay irrigation support project

- RWUE-IF – project funding from the state government – managed by Canegrowers
- Aim of project – assist growers with irrigation scheduling information
- Work program
 - Establish a number of irrigation scheduling sites around the district
 - Information from sites is available on MAPS web site
 - Interested growers can seek funding from MAPS to assist with the cost of scheduling equipment
 - 4 year project

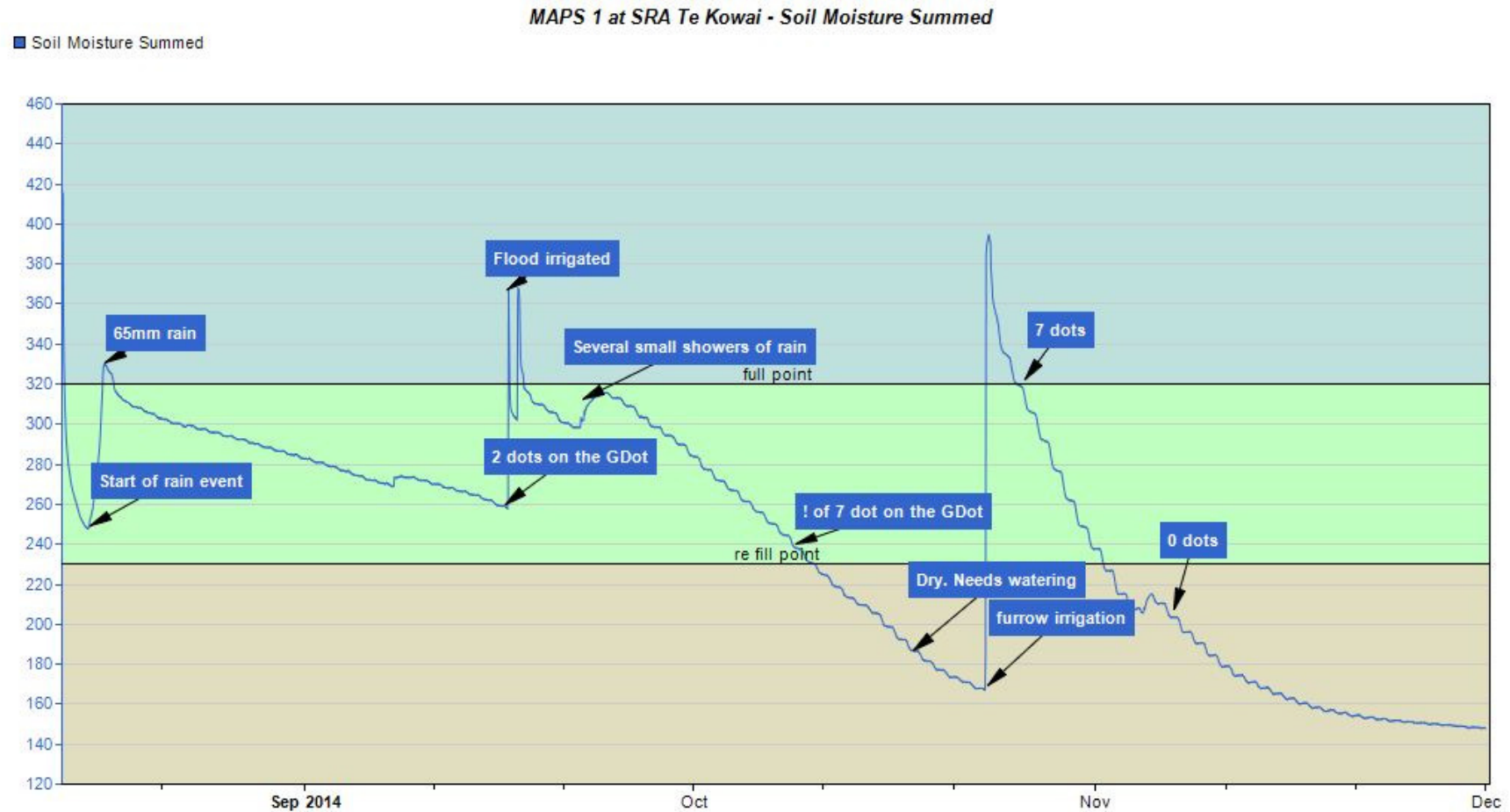


Irrigation scheduling tools

- Direct measurement of soil moisture
 - Capacitance probes such as
 - Enviroscan, Enviropro, John Deere

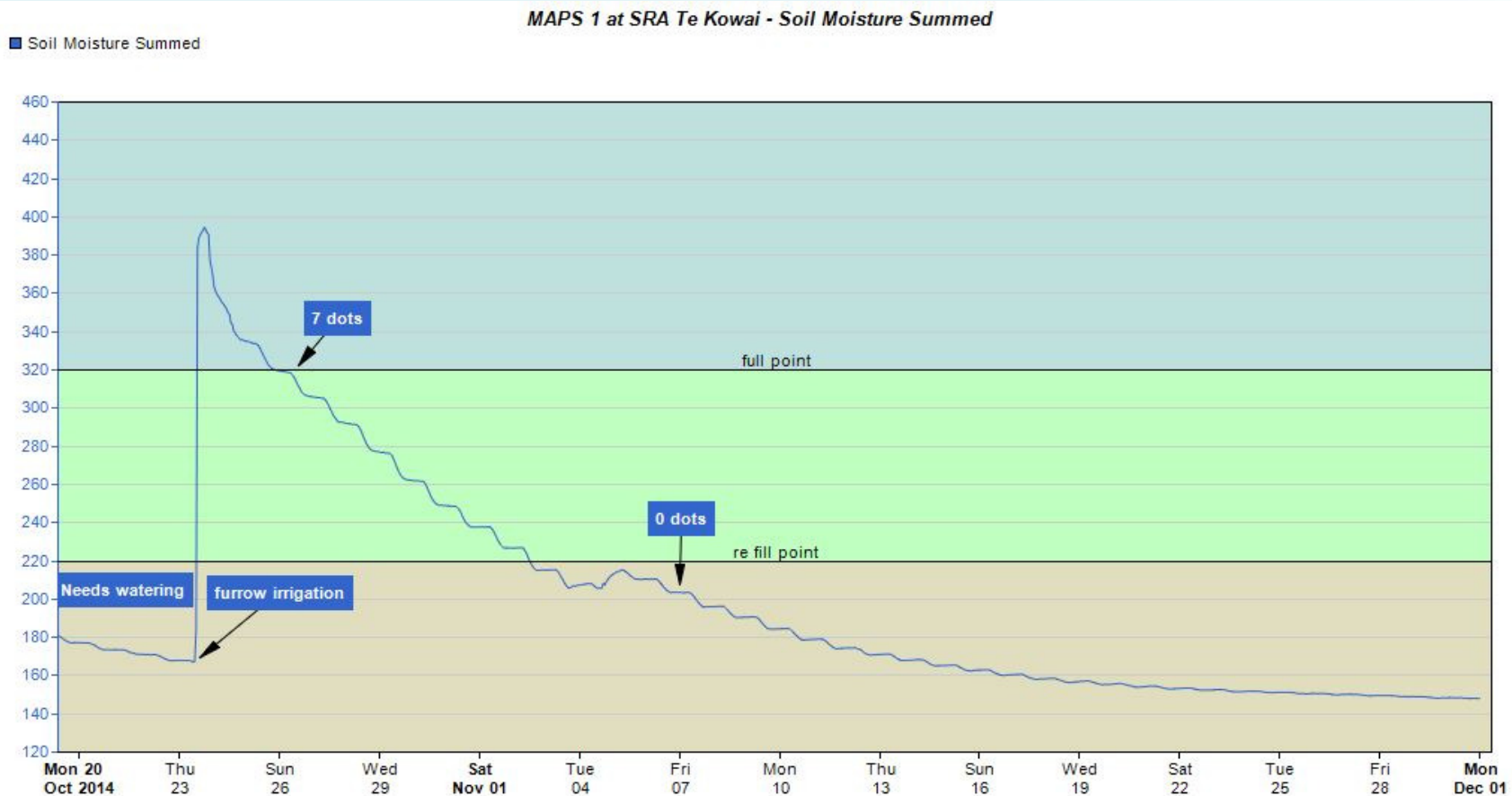


Water use over time



Sugar Research
Australia

From wet to very dry – in 2 weeks



Probes measure soil moisture at 10cm intervals

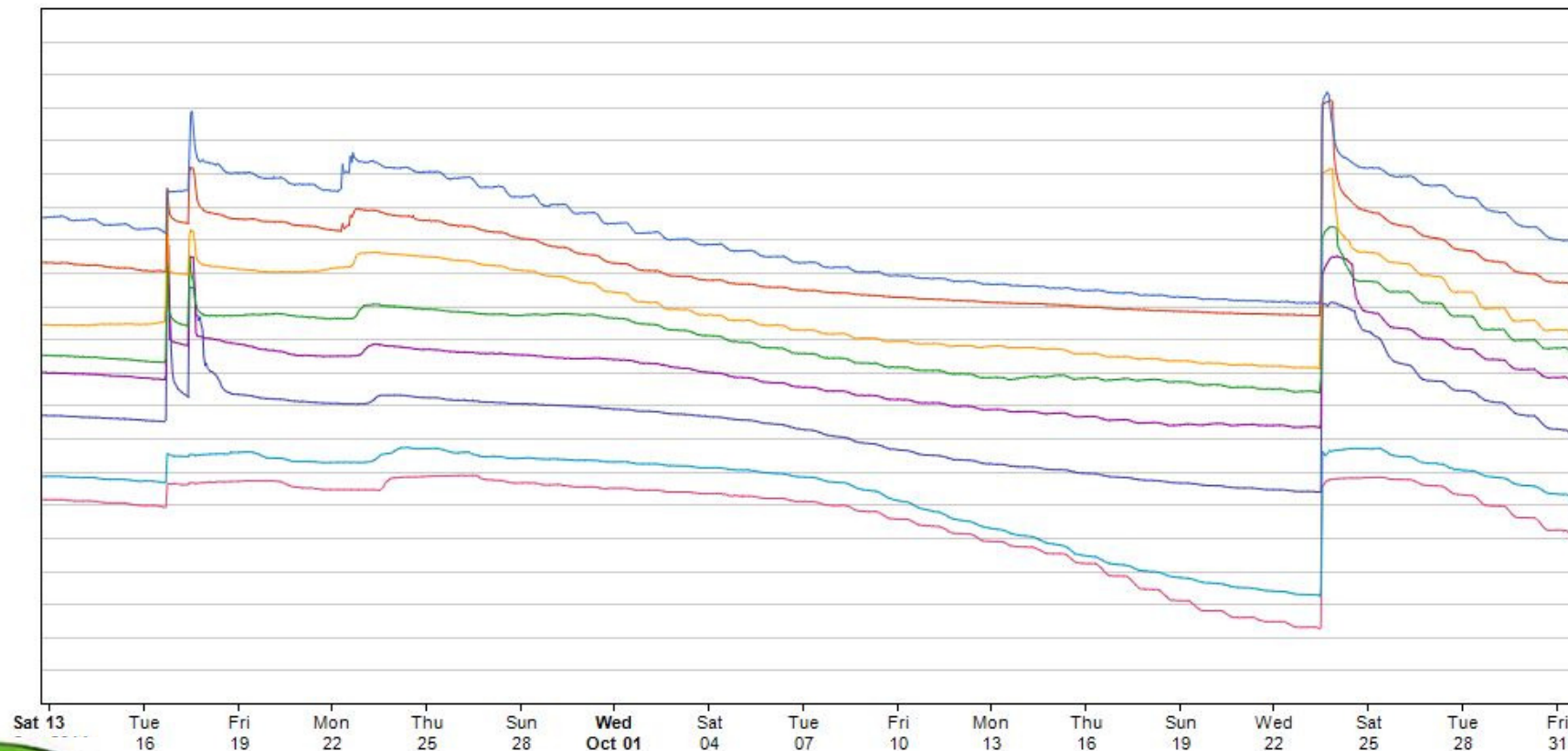
- Valuable to see how deep into the soil a irrigation event went
- Can see where the crop is drawing water from
- Give an idea of level of moisture stress
- Can see if water use is restricted at depth



Individual depth sensors

MAPS 1 at SRA Te Kowai - Soil Moisture Stacked

■ Soil Moisture 10cm ■ Soil Moisture 20cm ■ Soil Moisture 30cm ■ Soil Moisture 40cm ■ Soil Moisture 50cm ■ Soil Moisture 60cm ■ Soil Moisture 70cm
■ Soil Moisture 80cm



Irrigation scheduling tools

- Gdot
 - Gypsum block with large yellow dots to display soil moisture level



Yield potential from full irrigation

