AG Production Update - Coomandook Ag Bureau

4.30pm start followed by Ag Bureau Meeting *includes BBQ tea*

Wednesday 3rd March 2021

REGISTRATIONS for catering;
tstrugnell@coorong.sa.gov.au or
text on 0427 750 050
Register by Friday 26th of Feb

What you will see & hear?

- Pulse Check Update and Report
- Where to next with dryland salinity? - including automated monitoring
- Update on results at Simmons & Lucas soil amendment sites
- NEW 4 YEAR PROJECT - MLA Improved Grazing production on Non Wetting Sands
  What soil amendments do you want to try out?

Full program over the page

Australian Government | National Landcare Program

MEAT & LIVESTOCK AUSTRALIA

COORONG DISTRICT COUNCIL

Coorong Tatiara Local Action Plan

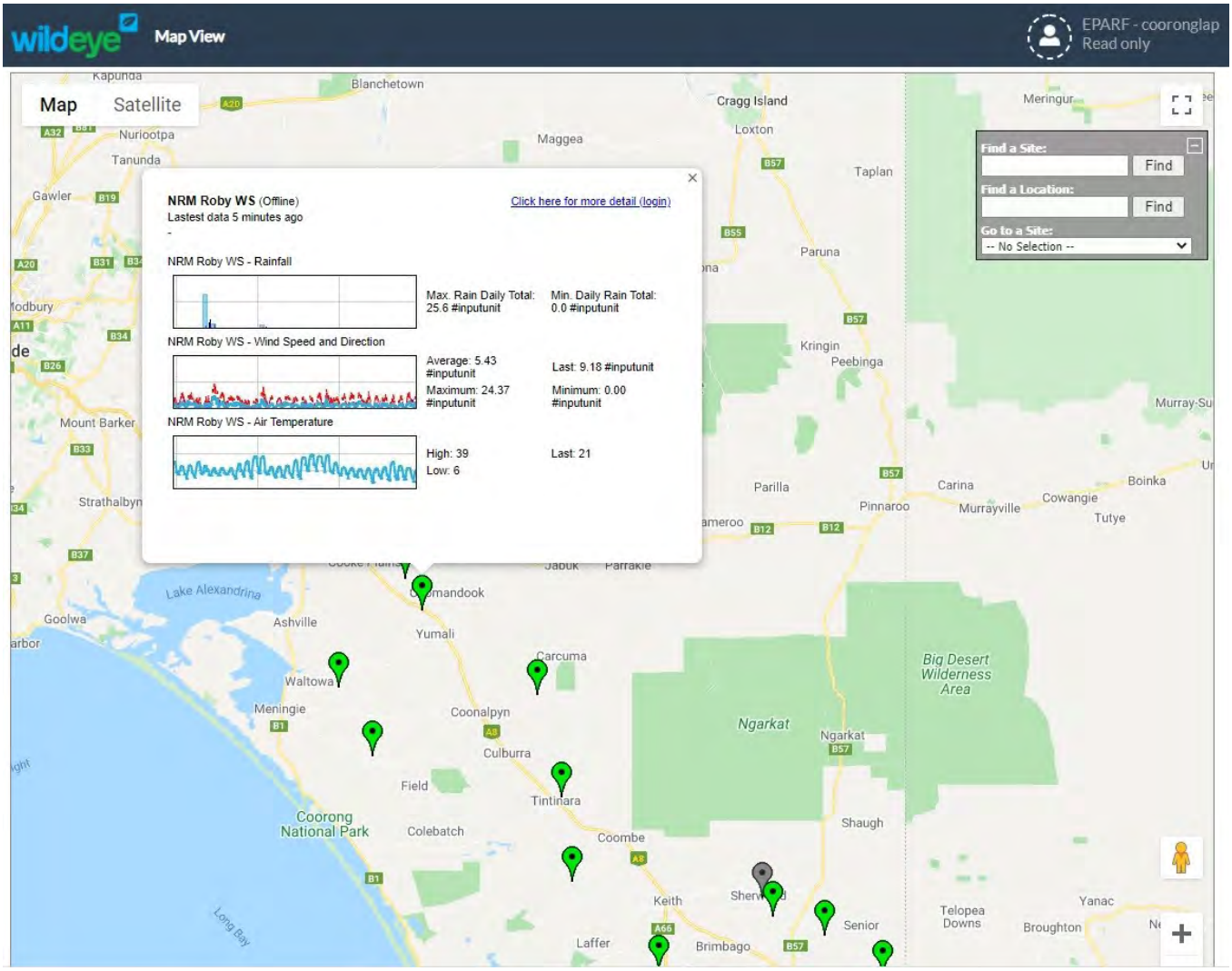
LANDSCAPE SOUTH AUSTRALIA

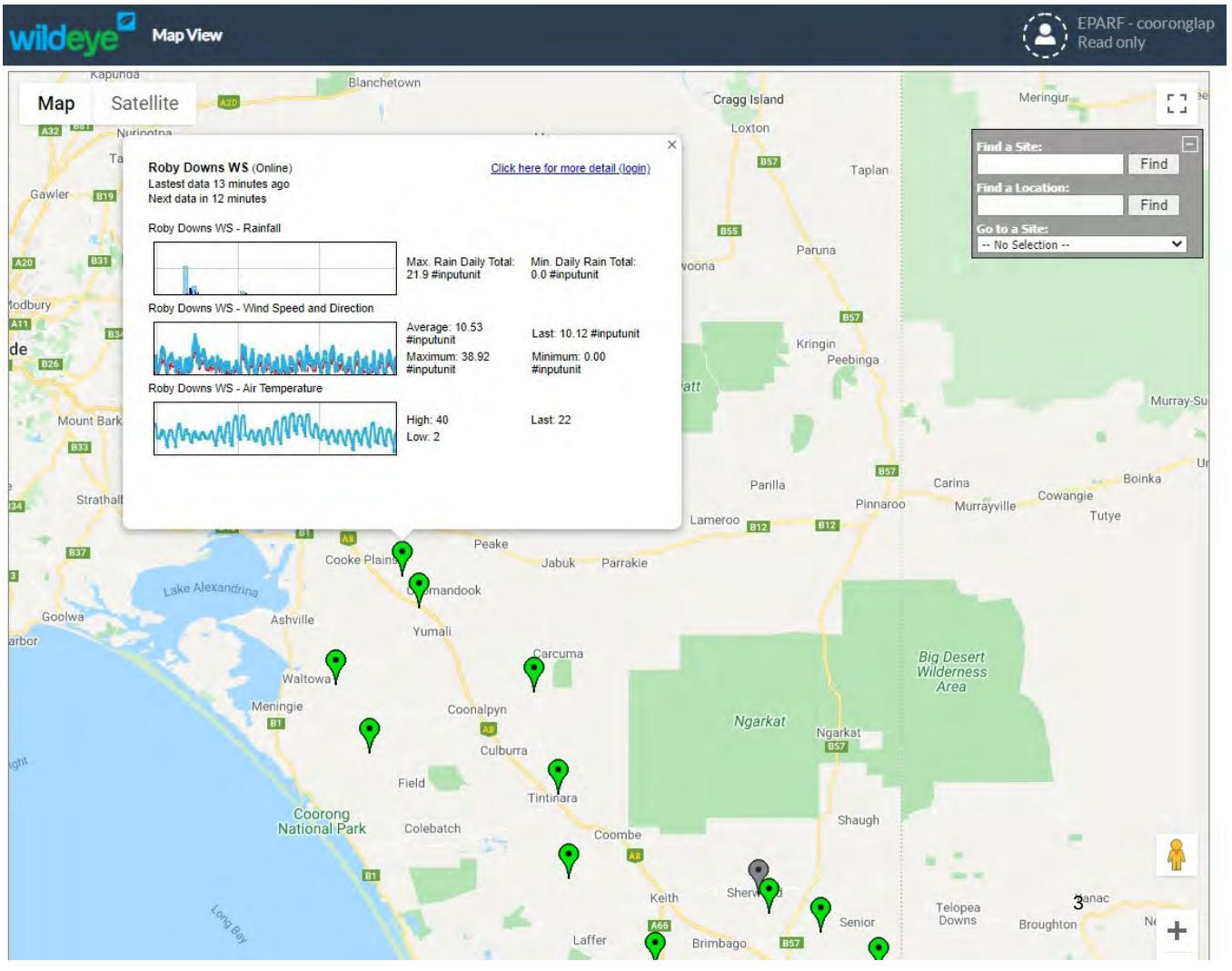
This project is supported through funding from the Australian Government's National Landcare Program & the Murraylands and Riverland Landscape Board

Agricultural Bureau of South Australia Inc. PATHWAY TO IMPROVEMENT

AG PRODUCTION UPDATE - Coomandook Ag Bureau Wednesday 3rd of March 2021				4.30pm – including Meeting & BBQ tea	Handout page
	Item	**Speaker**	**Organisation**	**Time**	
1	**VENUE** Coomandook Uniting Church Hall Supper Room			**4.30pm**	
2	**Pulse Check Update & Report**	Brendan Wallis	Pinion *was Rural Directions*	**4.30pm** – *5.30pm including questions*	-
3	**Salinity Update –** Use of automated monitoring equipment; depth to water table, soil moisture & soil soil salinity levels *What saltland management questions should we be looking at next?*	Felicity Turner Shane Oster	Turner Agri Alpha Group Consulting	**5.30pm** – *6.30pm including questions*	3 - 9
4	BBQ Tea – food and non alcoholic drinks provided *Please BYO Beer etc*	*Provided by* *Coorong Tatiara Local Action Plan* *with the support of funding partners*		**6.30pm** – *7.30pm*	
5	**Coomandook Ag Bureau Meeting**	President: Bryan Peter		**7.30pm** – *8.00pm*	
6	**Results update from Simmons and Lucas soil amendment and salinity sites**	Brian Hughes Mel Fraser	Soils Consultants PIRSA Rural Solutions	**8.00pm** – *8.30pm including questions*	10 - 16
7	**NEW 4 YEAR PROJECT MLA** **Improved Grazing Production on Non Wetting Sands** *What soil amelioration techniques do you want to try out?* **EVALUATION FORM PLEASE**	Mel Fraser	Soils Consultants PIRSA Rural Solutions	**8.30pm** – *9.30pm including questions*	17 - 18 19 - 20

https://www.coorong.sa.gov.au/council-services/coorong-tatiara-local-action-plan/agriculture/weather-stations



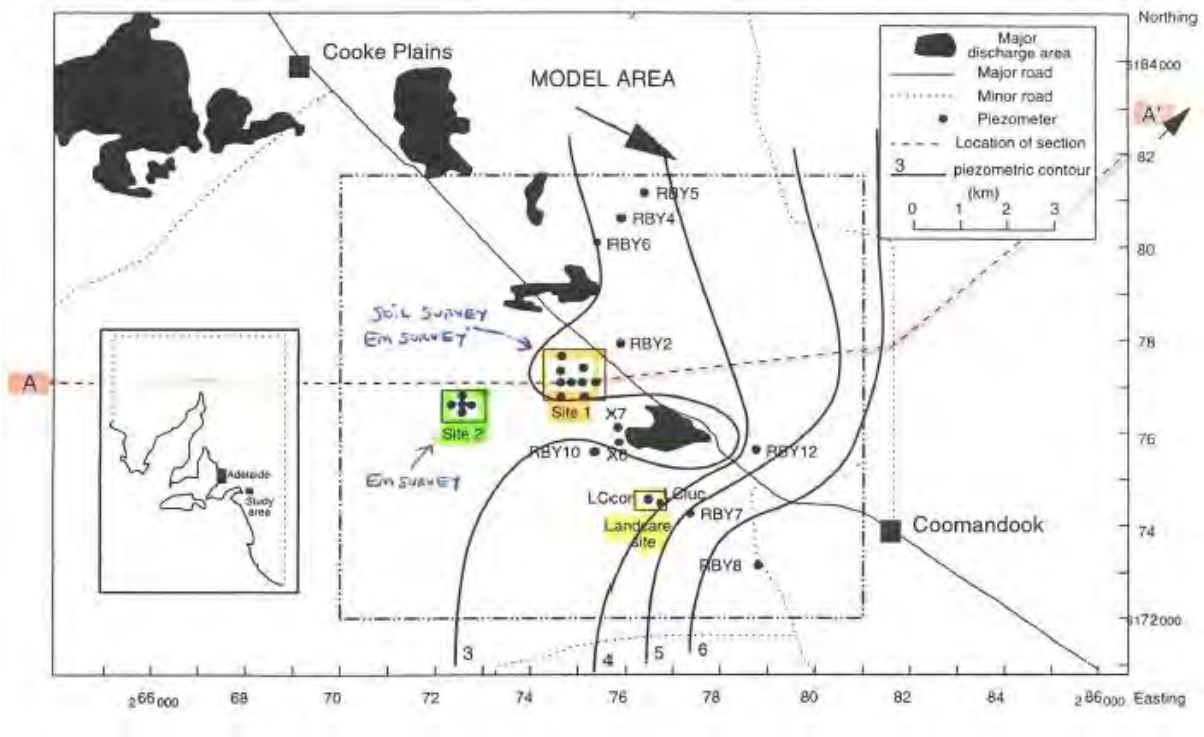


Appendix 4: Groundwater and Rainfall Trends *continued*

Chris Henschke– Senior Consultant Hydrogeology
PIRSA Rural Solutions

4.4 Coomandook Landcare Network

The Coomandook Landcare Network comprises 25 shallow wells up to 5.5m deep that were drilled in April 1994. The Landcare network is not part of the official DEW WaterConnect network. The location of the sites is shown on a map over the page. The map below shows the location of a revegetation Landcare site and the location of two CSIRO experimental sites which were the subject of instrumentation and groundwater flow modelling during the early 1990s.



The wells / 'piezometers' were routinely monitored during the 1990s but are now monitored on an ad-hoc basis. The following table provides some data and current status of the wells.

A Coomandook Landcare Piezometer

Coomandook / Cooke Plains Landcare Monitoring Network

End of winter readings page 1

Coomy landcare netwotk	Unit number	location	Salinity 29/04/1994 (drill date)	Date 17/10/2001	Date 20/10/2007	Date 09/11/2009	Date 21/09/2018	Date 25/10/2019
			ppm (mg/l)	Water level measured to the top of the casing				
CL01	6827-1703	Simmons	*18,200*	1.69	1.57	1.69	1.15m	**1.12**
CL02	6827-1704	Teusner	*2,966*	3.07	3.10	3.12	2.70m	**2.54**
CL03	6827-1705	Ballard	*24,100*	1.80	1.97	1.94	1.72m	**1.65**
CL04	6827-1706	Hansen	*21,300*	3.29	3.25	3.28	2.89m	**2.78**
CL05	6827-1707	Murray	*18,200*	3.78	3.98	4.15	Dry	**Dry**
CL06	6827-1708	Poole	*10,700*		3.50	3.64	3.12	**3.12**
CL07	6827-1709	Freak	*23,200*	2.78	3.39	3.54	3.02	**3.01**
CL08	6827-1710	Freak	*24,000*		3.19	3.33	2.75	**2.80**
CL09	6827-1711	Freak	*26,900*	1.24	2.37	2.43	1.94	**1.95**
CL10	6827-1712	Freak	*32,900*	3.09	3.85	3.94	Could not find	broken off
CL11	6827-1713	Patterson	*23,900*	1.83	1.93	1.95	1.62m	**1.59**
CL12	6827-1714	Crouch	*28,200*	2.93	2.89	2.91	2.73m	**2.35**
CL13	6827-1717	Piggott	*29,500*	2.99	2.89	2.98	2.47m	**2.38**
CL14	6827-1716	Williams	*26,400*	1.75	1.70	1.78	1.58m	**1.45**
CL15	6827-1715	Kleinig	*49,500*	1.66	1.77	1.71	1.72m	**1.62**
CL16	6827-1693	Smyth	*14,600*	1.85		Missing	Missing	Missing
CL17	6827-1694	Smyth	*29,300*	1.70	2.02	1.89	Missing	Missing
CL18	6827-1695	Smyth	*12,800*	1.90		Missing	Missing	Missing
CL19	6827-1696	Smyth	*14,600*	1.67		Missing	Missing	Missing
CL20	6827-1697	Smyth	*12,000*	1.55	1.82	1.77	Missing	Missing
CL21	6827-1698	Smyth	*12,500*	1.68	1.82	1.83	Missing	Missing
CL22	6827-1699	Hansen	*26,800*	1.47	1.66	1.63	1.44m	1.42
CL23	6827-1700	Hansen	*n/a*	Not found	Not found	Not found	0.94m	0.91
CL24	6827-1701	Hansen	*n/a*	0.91	Not found	Not found	1.42m	**1.44**
CL25	6827-1702	Hansen	*n/a*	0.66	Not found	Not found	0.64m	**0.62**

Coomandook / Cooke Plains Landcare Monitoring Network

End of winter readings page 2

Coomy landcare netwotk	Unit number	location	Salinity 29/04/1994 (drill date)	Date 14/10/2020	Date	Date	Date	Date
			ppm (mg/l)	Water level measured to the top of the casing				
CL01	6827-1703	Simmons	*18,200*	0.95				
CL02	6827-1704	Teusner	*2,966*	2.64				
CL03	6827-1705	Ballard	*24,100*	1.45				
CL04	6827-1706	Hansen	*21,300*	2.93				
CL05	6827-1707	Murray	*18,200*	Dry				
CL06	6827-1708	Poole	*10,700*	3.20				
CL07	6827-1709	Freak	*23,200*	3.11				
CL08	6827-1710	Freak	*24,000*	crop				
CL09	6827-1711	Freak	*26,900*	1.85				
CL10	6827-1712	Freak	*32,900*	Broken off				
CL11	6827-1713	Patterson	*23,900*	1.58				
CL12	6827-1714	Crouch	*28,200*	2.33				
CL13	6827-1717	Piggott	*29,500*	Broken off				
CL14	6827-1716	Williams	*26,400*	1.27				
CL15	6827-1715	Kleinig	*49,500*	1.48				
CL16	6827-1693	Smyth	*14,600*	Missing				
CL17	6827-1694	Smyth	*29,300*	Missing				
CL18	6827-1695	Smyth	*12,800*	Missing				
CL19	6827-1696	Smyth	*14,600*	Missing				
CL20	6827-1697	Smyth	*12,000*	Missing				
CL21	6827-1698	Smyth	*12,500*	Missing				
CL22	6827-1699	Hansen	*26,800*	1.24				
CL23	6827-1700	Hansen	*n/a*	0.94				
CL24	6827-1701	Hansen	*n/a*	1.34				
CL25	6827-1702	Hansen	*n/a*	0.56				

Coomandook / Cooke Plains Landcare Monitoring Network

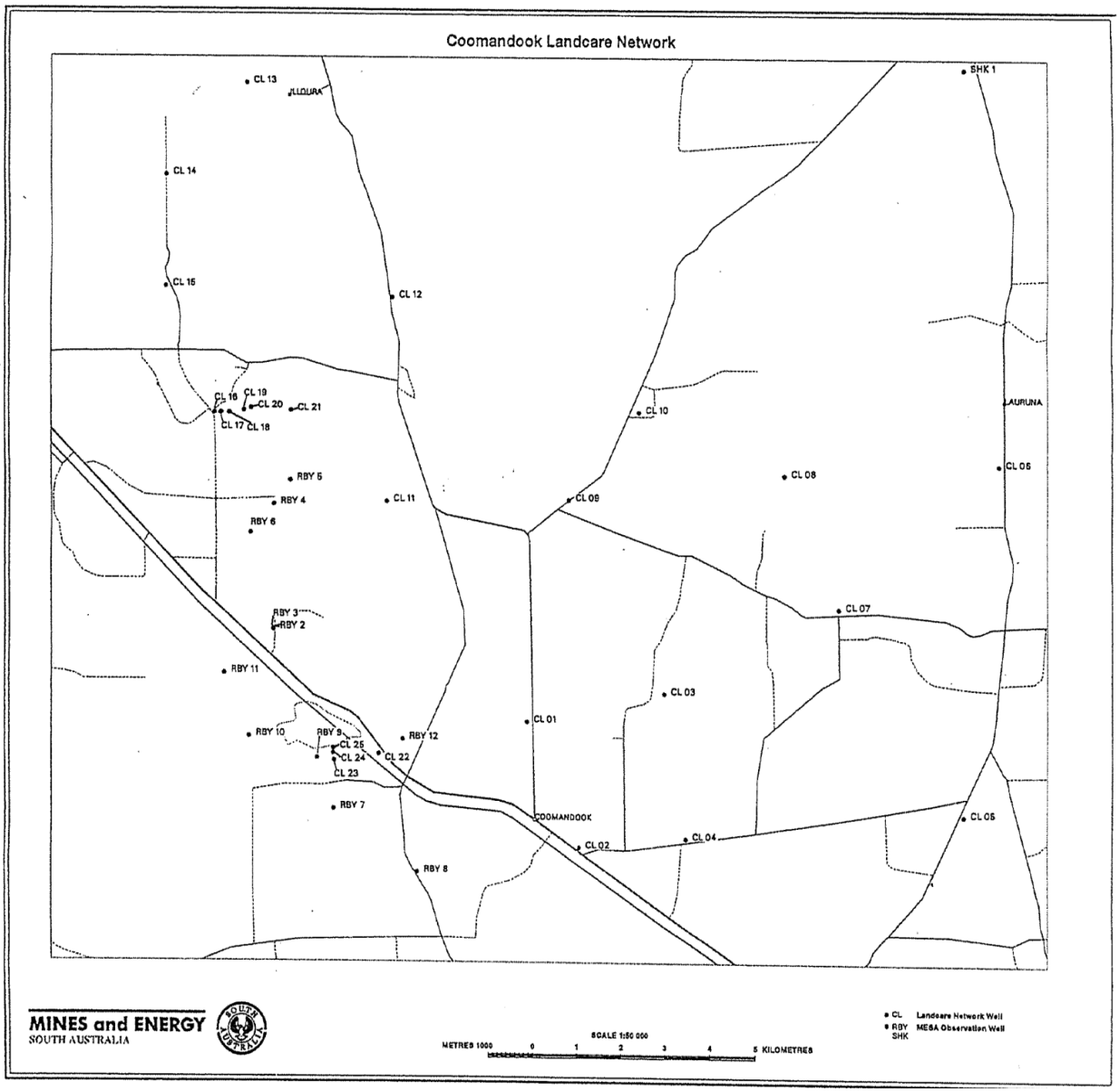
End of summer readings Page 1

Coomy Landcare network	Unit number	location	Salinity 29/04/1994 (drill date)	Date 09/07/2007	Date 17/05/2008	Date 20/05/2009	Date 10/05/2016	Date 21/04/2019
			ppm (mg/l)	Water level measured to the top of the casing				
CL01	6827-1703	Simmons	*18,200*	1.41	1.84	1.75	1.42	1.30
CL02	6827-1704	Teusner	*2,966*	3.21	3.26	3.25	2.96	2.94
CL03	6827-1705	Ballard	*24,100*	1.80	2.02	1.90	1.81	2.02
CL04	6827-1706	Hansen	*21,300*	3.33	3.33	3.30	2.99	2.98
CL05	6827-1707	Murray	*18,200*	4.05	4.1	4.17	3.07	Dry at 3.4m
CL06	6827-1708	Poole	*10,700*	3.54	3.59	3.64	3.26	3.2
CL07	6827-1709	Freak	*23,200*	3.39	3.52	3.53	3.11	3.16
CL08	6827-1710	Freak	*24,000*	3.31	3.39	3.39	2.98	2.95
CL09	6827-1711	Freak	*26,900*	2.28	2.50	2.46	2.09	2.18
CL10	6827-1712	Freak	*32,900*	3.89	3.84	3.84	3.49	broken off
CL11	6827-1713	Patterson	*23,900*	1.78	2.02	1.99	1.70	1.78
CL12	6827-1714	Crouch	*28,200*	2.76	3.00	2.86	1.70	2.51
CL13	6827-1717	Piggott	*29,500*	2.75	3.01	2.99	2.67	2.41
CL14	6827-1716	Williams	*26,400*	1.49	1.79	1.73	1.45	1.72
CL15	6827-1715	Kleinig	*49,500*	1.82	1.72	1.60	1.68	2.05
CL16	6827-1693	Smyth	*14,600*	1.54	1.61	Missing	Missing	Missing
CL17	6827-1694	Smyth	*29,300*	1.64	1.79	1.42	Missing	Missing
CL18	6827-1695	Smyth	*12,800*	1.57	1.88	Missing	Missing	Missing
CL19	6827-1696	Smyth	*14,600*	1.61	1.58	Missing	Missing	Missing
CL20	6827-1697	Smyth	*12,000*	0.86	1.23	1.07	Missing	Missing
CL21	6827-1698	Smyth	*12,500*	1.32	1.53	1.37	Missing	Missing
CL22	6827-1699	Hansen	*26,800*	1.64	2.11	1.98	1.64	1.82
CL23	6827-1700	Hansen	*n/a*	Not found	Not found	Not found	Not found	1.25
CL24	6827-1701	Hansen	*n/a*	1.75	Not found	Not found	Not found	1.76m
CL25	6827-1702	Hansen	*n/a*	1.71	Not found	Not found	Not found	Dry at 0.9m

Coomandook / Cooke Plains Landcare Monitoring Network

End of summer readings Page 2

Coomy Landcare network	Unit number	location	Salinity 29/04/1994 (drill date)	Date 27/04/2020	Date	Date	Date	Date
			ppm (mg/l)	Water level measured to the top of the casing				
CL01	6827-1703	Simmons	*18,200*	1.19				
CL02	6827-1704	Teusner	*2,966*	2.38				
CL03	6827-1705	Ballard	*24,100*	1.91				
CL04	6827-1706	Hansen	*21,300*	2.97				
CL05	6827-1707	Murray	*18,200*	dry				
CL06	6827-1708	Poole	*10,700*	3.18				
CL07	6827-1709	Freak	*23,200*	3.06				
CL08	6827-1710	Freak	*24,000*	2.91				
CL09	6827-1711	Freak	*26,900*	2.10				
CL10	6827-1712	Freak	*32,900*	Broken at ground level				
CL11	6827-1713	Patterson	*23,900*	1.74				
CL12	6827-1714	Crouch	*28,200*	2.444				
CL13	6827-1717	Piggott	*29,500*	2.51				
CL14	6827-1716	Williams	*26,400*	1.51				
CL15	6827-1715	Kleinig	*49,500*	1.82				
CL16	6827-1693	Smyth	*14,600*	Missing				
CL17	6827-1694	Smyth	*29,300*	Missing				
CL18	6827-1695	Smyth	*12,800*	Missing				
CL19	6827-1696	Smyth	*14,600*	Missing				
CL20	6827-1697	Smyth	*12,000*	Missing				
CL21	6827-1698	Smyth	*12,500*	Missing				
CL22	6827-1699	Hansen	*26,800*	1.66				
CL23	6827-1700	Hansen	*n/a*	1.22				
CL24	6827-1701	Hansen	*n/a*	1.81				
CL25	6827-1702	Hansen	*n/a*	Dry at 0.9m				



The depth to water column in the table is the water level recorded from the top of the PVC riser tube. As most of the wells have a shallow watertable (1 to 3m), records of rainfall vs. waterlevel taken during the 1990s indicate a rapid seasonal response to winter rainfall with subsequent falls of the watertable due to summer evaporation. As indicated in the table, some wells have gone dry and others are missing, presumably destroyed. In these cases, the water level is the last available reading.

The Landcare revegetation site comprised of a tagasaste plantation on a sandhill which had been in lucerne for 8 years and was renovated in 2004. Another revegetation site was located at the base of the sandhill, below the tagasaste block. A saltbush and tree shelter belt had been established around the perimeter of a large area of saline land. Despite the high water use strategy on the sandhill immediately upslope of the saline area, the watertable was still very shallow (0.6m from the surface in 2005). This confirms the difficulty of controlling dryland salinity in a regional discharge zone. Hydrographs are presented for three sites (CL 1, 6 and 11), but with large gaps in the record it is difficult to draw any further conclusions from the Landcare trial sites.

GRDC Yumali Lime Trial – Report post 2020 harvest

Brian Hughes, David Woodard, Bonnie Armour (PIRSA)

Nigel Fleming (SARDI), Kevin Lucas (Landholder co-operator), Matt Howell (Plantinum Ag Services)

Introduction

In 2020, a lime trial was established at Yumali as part of the GRDC project '*New knowledge and practices to address topsoil and sub-surface acidity under minimum tillage cropping systems of SA'* (2019-2022) to compare and evaluate lime sources; to assess the impact of broadcasting lime vs incorporation; and investigate deep ripping, biochar and clay impacts on acidity. The site was identified from acid areas identified by Veris® pH mapping in 2020 where paddock pHca was generally in the 4.5-5.0 range.

Method

The lime sources and other treatments included Agricola Lake Hawden lime at various rates, Cawtes Ag Lime, Henschkes Ag Lime, biochar- Cool Terra, local clay, incorporation treatments by a rotary hoe and a deep ripping at 30cms in some treatments. A sulphur treatment (elemental sulphur at 0.75t/ha) was also added and incorporated to determine the effects of increased acidification as well as a cultivated and non-cultivated control. The trial was replicated four times and sown at right angle by the farmer.

The soil is a sand around 30-50cm deep over a yellowish brown sandy light clay.

pHCa were 0-5cm 5.0, 5-10cm 4.6, 10-15 cm 4.8, 15-25cm 4.8, and 25-40 cm 6.6

The trial was sown to barley (var. Compass) in mid- June 2020.

Table 1- Treatments

Tmt	Product and rate	Material
1	sulphur cultivated	0.75 T/ha
2	control	
3	low lime surface	1 T Agricola
4	medium lime surface	3 T Agricola
5	high lime surface	5 T Agricola
6	medium lime cultivated	3 T Agricola
7	high lime cultivated	5 T Agricola
8	deep rip	
9	cultivated control	
10	lime 2 Cawtes surface	3T Cawtes
11	lime 3 Henschke surface	3T Henschke
12	deep rip + cultivate + lime	3 T Agricola

13	clay cultivate	100T/ha
14	biochar + lime + cultivate	3T Kool Terra + 3T Agric
15	spare 1	may use inclusion plates +/- lime 2021
16	spare 2	

Table 2: Lime sources used

Source	NV- Neutralising Value	ENV- Effective Neutralising Value	Calcium (%)	Magnesium (%)
Agricola Robe	85	41 dry, 82 wet	26	5
Cawtes Murray Bridge	73	54	24	3
Henschkes Naracoorte	97	80	36	1

Clay Assessment

pH water	Potassium mg/kg	ESP %	% $CaCO_3$
8.4	680	4	3.8

Table 3- Rainfall – from K Lucas

Month	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Rain 2020 (mm)	24	2	5	40	57	39	13	42	50	75	4	11	360

NDVI assessment was undertaken by a greenseeker in September. Selected plant analysis was undertaken in September at later tillering/ early elongation.

Barley was sown and managed by the landholder. Fertiliser applied was 80kg/ha 19:13 at seeding, 70 kg urea topdressed and liquid spray of Cu/Zn and Mn.

Early season growth showed big differences particularly linked to clay and cultivation impacts.

Harvest was by SARDI harvester. **Results – Dec 2020**

NDVI/Dry Matter Assessment

Greenseeker (NDVI) was carried out in September to determine the plant growth (biomass) of the treatments.

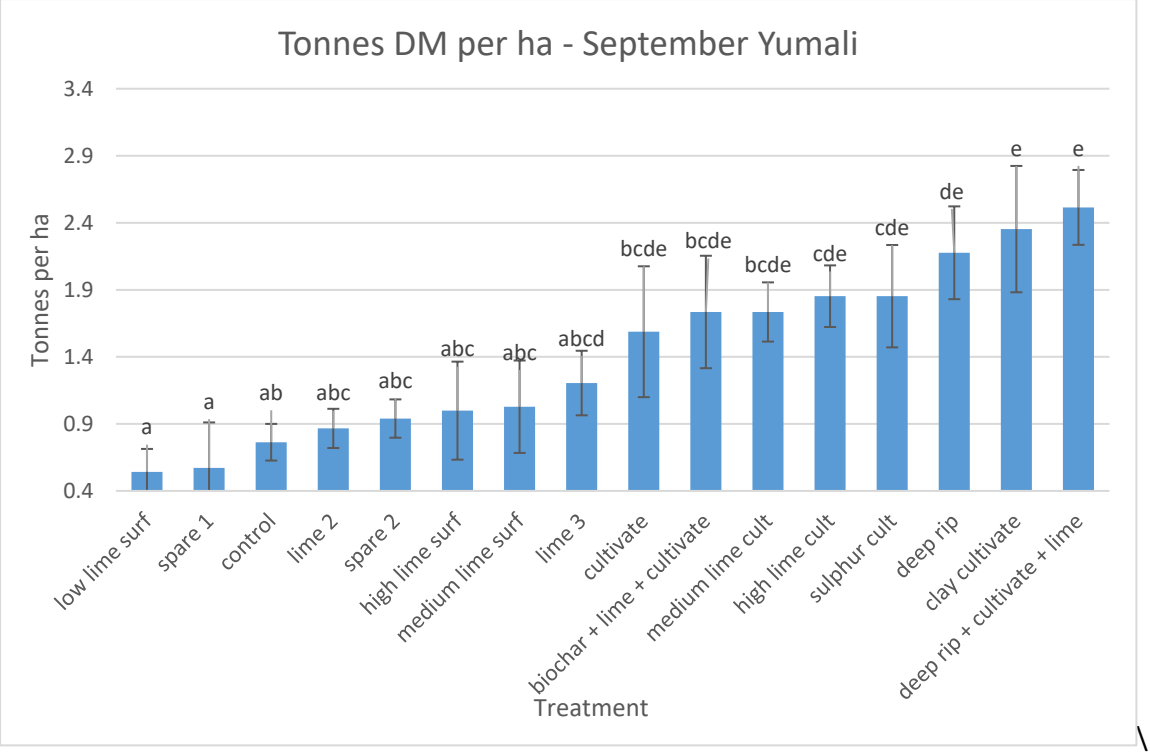


Figure 1: Dry matter from NDVI – September 2020

At September deep ripping, clay, cultivation and combination of ripping, cultivation and lime had significant results**.**

Plant Analysis – September 2020

Table 1- Selected plant analysis (YEB) was undertaken on rep 3 at late tillering.

Treatment	Nitrogen	Phosphorus	Potassium	Calcium	Magnesium	Sodium	Sulfur	Boron	Copper	Zinc	Manganese	Iron	Aluminium	Molybdenum	Chloride
	%	%	%	%	%	%	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
3 Deep rip lime and cult	3.86	0.37	2.78	0.41	0.12	0.089	0.26	6.9	3.7	21	24	82	18	0.267	0.92
4 control	3.82	0.35	2.21	0.46	0.13	0.13	0.24	7.3	4.5	28	39	100	20	0.138	0.9
5 high lime cult	3.84	0.35	2.68	0.46	0.13	0.13	0.26	6.3	4	24	28	110	20	0.312	1.2
9 sulphur cult	3.85	0.37	2.63	0.41	0.12	0.078	0.27	6.2	4.1	23	32	93	16	0.141	0.96
10 med lime surf	3.72	0.3	2.01	0.42	0.12	0.15	0.23	5.4	3.9	24	29	94	22	0.173	1
11 med lime cult	3.68	0.36	2.38	0.33	0.11	0.093	0.22	5.2	3.7	22	22	95	16	0.266	0.83
13 biochar lime cult	3.56	0.35	2.6	0.39	0.12	0.11	0.23	6.3	4.2	23	22	98	22	0.252	0.97
14 control cult	3.59	0.37	2.31	0.35	0.12	0.08	0.23	6.1	3.7	23	29	90	22	0.137	0.86
16 clay cult	3.75	0.35	3.16	0.36	0.12	0.057	0.24	7.2	3.6	24	24	120	16	0.311	0.71
Adequate Barley YEB late tillering	3.5-5.4	0.3-0.5	2.4-4.0	0.21-4	0.13-0.3	<0.5	0.15-0.4	5--10	5--50	15-70	25-300			0.1-0.5	<2
	marginally low														
	slightly higher from products applied														

Plant analysis indicated marginal levels of potassium and magnesium- common on acid soils. Low Copper – common in sand, low manganese where lime was incorporated or clay added and the positive impact of liming on Molybdenum levels.

Yield data 2020

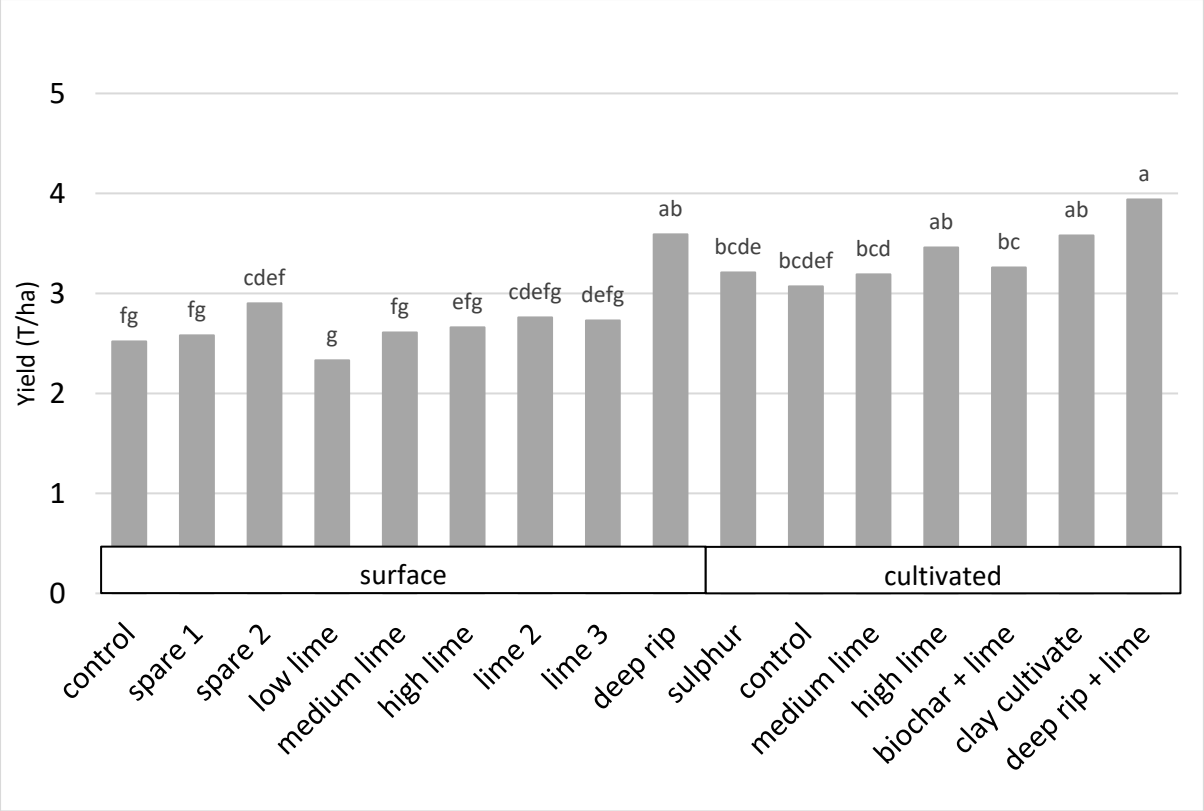


Figure 2- Yield results 2020 (t/ha)

At harvest cultivation, deep ripping and clay gave significant yield responses. Surface lime had no response although incorporated lime may have- generally don't expect a response to lime in year 1.

Year 2- hoping to sow with a wheat cultivar more acid sensitive than Scepter. (Yipti, Scout??)

Acknowledgment of Sponsors and Partners including

GRDC GRAINS RESEARCH & DEVELOPMENT CORPORATION

SOUTH AUSTRALIA Government of South Australia Primary Industries and Regions SA

Government of South Australia Department for Environment and Water

Platinum Ag

Kevin Lucas, Landholder

Lucas Demo Site on shallow sand over clay

Yumali Demo	2020	pHCa 0-5cm 4.9, 5-10cm 4.46, 10-15 cm 5.6, 15-25cm 6.6	15 cm Shallow sand/Clay	famer sown	sown mid- June 2020 Compass barley

Lucas demo trial

North

Strip	Product and rate	Material
0	control (outside pegged area)	
1	till + lime + gypsum	3 T Agricola + gypsum
2	till	
3	till + lime	3 T Agricola
4	control	
5	medium lime	3 T Agricola
6	sulphur	1 T/ha
7	control	
8	high lime	5 T Agricola
9	low lime	1 T Agricola
0	control (outside pegged area)	

strip size 15 x 4m, gypsum 3.67 T/ha
(top of clay dispersed)

No differences between treatments using NDVI or yield

Coomandook Ag Bureau Spader, Mouldboard and Organic Matter Trial Harvest Results 2020 – R Tonkin, B Hughes, B Armour

Background

A trial to improve the productivity of deep sandy water repellent soil in the Coomandook area was set up in May 2013. Treatments included mouldboard ploughing, spading, controls, and various organic matter and fertiliser treatments. Nutrition treatments were Control (nil), Aged Pig Manure (APM) and Composted Pig Manure (CPM) at 10 t/ha, cereal straw, triticale silage and vetch hay at 5 t/ha, composted grape marc (TPR) at 20 t/ha, and DAP fertiliser, applied before sowing and then twice at 3 week intervals afterwards giving a total of ~ 50 units of N and P (Fert 2), 25 units (Fert 1) and 12.5 units (Fert 3). Applying the fertiliser over time allowed the higher rates to be applied without damaging the crop, and more closely resembled the gradual release of the other organic based treatments. The DAP fertiliser rates were selected to give a range of N and P rates from low to high so that the N and P nutritional effects of the organic matter inputs could be related to those from the fertiliser. These treatments were applied only in year 1.

Yields and economic analysis were measured from 2013-2015 (see Coomandook Soil Trial 3-year report 2013-2015). In 2018, measurements of water repellence and soil strength were carried out to see if any the treatments were still affecting the soil five years later.

The measurements of water repellence at the site showed that the spaded and ploughed plots had lower water repellence than the control plots. The water repellence had increased slightly in the spaded and ploughed plots since December 2015.

The measurements of soil strength showed that the spaded and ploughed plots had lower soil strength than the control plots, to a deeper depth. Lower soil strength in this case should allow easier root growth for plants, and hence increased ability to take up water and nutrients.

Harvesting 2020

Trial site was planted with ??? barley and harvested using the SARDI plot harvester with 2 runs per plot. Plot weights were added and a yield converted to t/ha for each plot. Data was analysed using STAR 2-way ANOVA and LSD mean comparison test at the 0.05 significance level.

Yield Results 2020

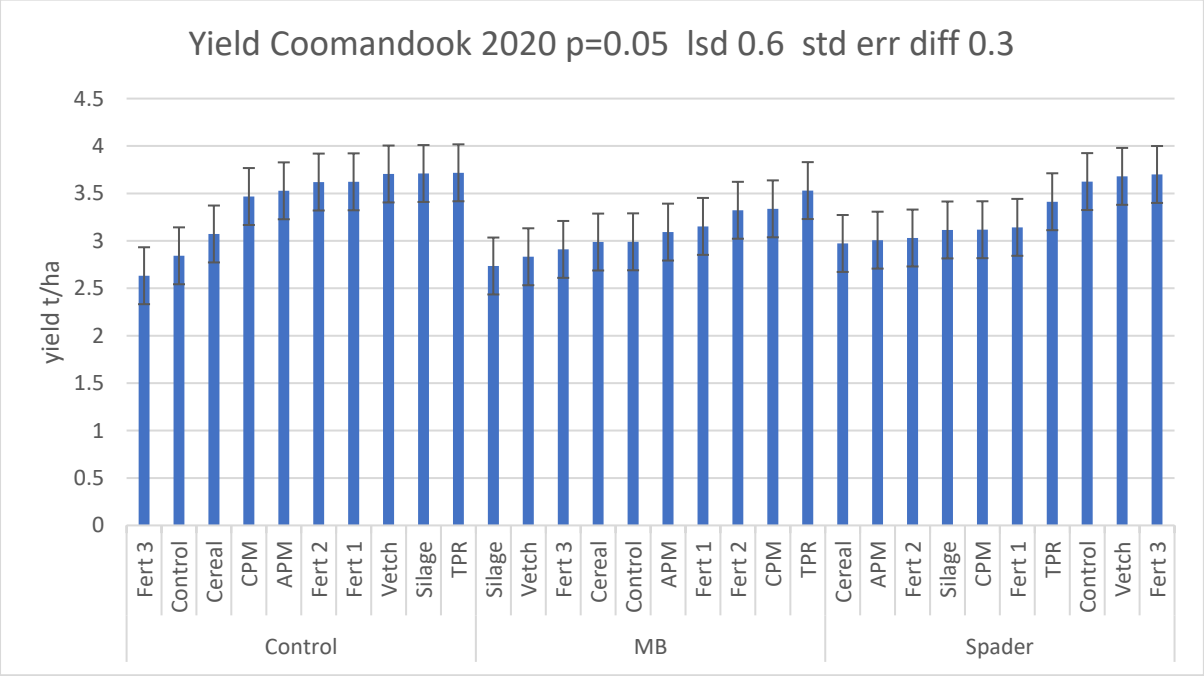


Figure 1- Mean yields of all plots

Figure1 highlights individual plot yields- highest yields differed depending on the soil modification treatment. TPR was high in all 3, while vetch did well on the control and spader but not mouldboard., Cereal straw still

showed negative effects. Mouldboard plough had better effects from flowable treatments such as TPR and compost – straw/silage/hay did not work well with the mouldboard plough used here, even after 7 years.

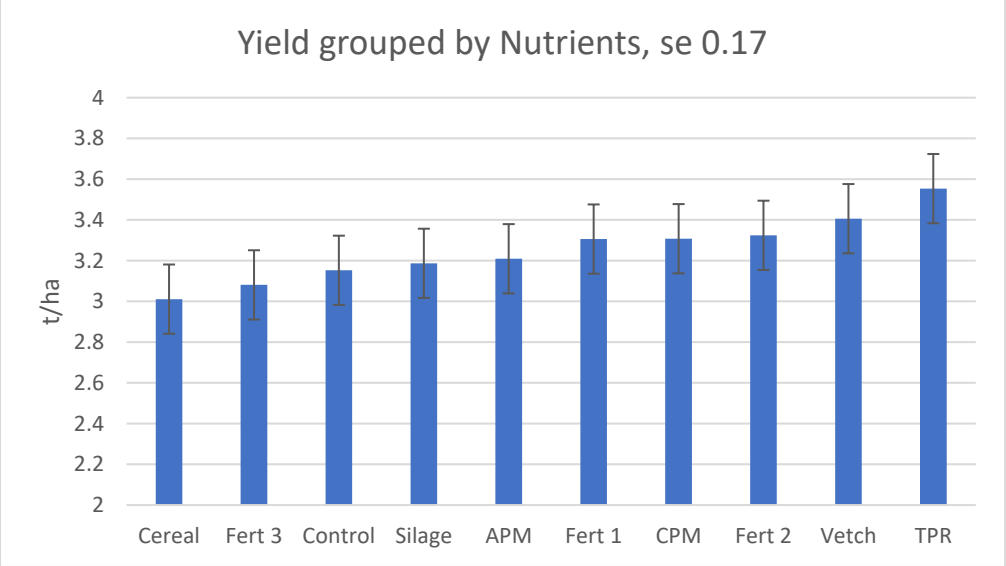


Figure 2 – Mean yield across soil additive

Yield trends indicated better yields from TPR (increased yield by 0.4t/ha), vetch (increase around 0.25t/ha) across all soil treatments.

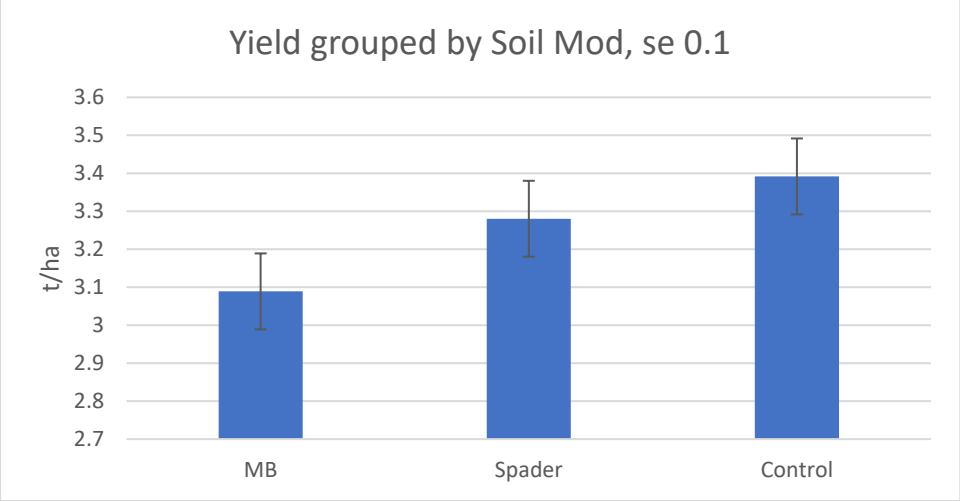


Figure3 – Mean yield by Cultivation method

Using all treatments the surface applied methods was slightly in front of spading (not sig) and significant better than mouldboard plough in 2020 eight years after application.

Future Work 2021

Intention is to sample some treatments and compare soil carbon and major fertility levels later in Autumn 2021. Soil water repellence will be measured independently by Rebecca Tonkin.

Funding acknowledgement

Funding has been provided for this yield and soil assessment through PIRSA while earlier funding was from the NLP and the MDB NRMB.

Government of South Australia
Department of Primary Industries and Regions

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LANDSCAPE SOUTH AUSTRALIA MURRAYLANDS AND RIVERLAND

Project Title	**Improved Grazing Production on Non-Wetting Sands**
Proposed start date	1st November 2020
Proposed end date	15th June 2026
Project Delivery	PIRSA Rural Solutions

Project Background

Sandy dune soils are a common landscape feature in southern South Australia, Victoria and Western Australia. Traits in these sandy soils include low plant available water holding capacity, low organic matter, low nutrient availability, compaction, non-wetting and high risk for wind erosion.

Over the last five years GRDC has demonstrated improved crop biomass at research sites in South Australia by adding clay (spading) or deep ripping and pasture inversion for integration of organic matter and fertilisers to soil profiles. In 2018 Grassgro modelling for Keith-Meningie SA found combined deep ripping with surface applied nutrition (fertiliser, manure or organic matter or chicken litter) delivered increasing organic matter and increased root depth of pastures. Changing soil structure produced an increase in feed production of 1.88T/ha/year (from 3.52T/ha DM/year to 5.4T/ha DM/year) and increase in carrying capacity of 1.8 DSE/ha.

The findings will seek to confirm productivity can be substantially improved on infertile sandy soils when subsoil chemical, physical and biological constraints are treated. This project will test plant growth response, dry matter production, and feed nutrition values using a range of practices and treatments. Results will demonstrate the effectiveness of amelioration techniques in a local context and assess economic return within grazing systems.

Outcomes, Deliverables and Activities

1. Utilise new technologies and techniques being demonstrated to improve productivity in cropping systems on sandy soils and will test them in grazing systems to provide increased feed & livestock production.

2. At Coomandook, Field and Western Flat demonstrate methods of improving the grazing systems feed base to extend the growing season, increase pasture utilisation, optimise fertiliser use, and reduce the overall cost of production per hectare by producing more feed, converting to increased feed, increase carrying capacity & livestock production.

3. Increase producer understanding of opportunities to increase feedbase and red meat production by introducing, and testing the production response and cost effectiveness of the following treatments on sites across the project area.

4. Three demonstration sites will be established with core producers, with a site specific selection of three to five treatments.

EVIDENCE OF PRODUCTION INCREASES

From 2018 Grassgro Modelling for
Keith – Meningie SA in an average rainfall year (Decile 5)
Under a lucerne grass posture – grasses unimproved grasses eg. barley, brome and silver grass

Sandy soil with low Plant Available Water (38mm)	**SOIL AMENDMENT** Increasing organic matter and / or breaking hard pan to increase root depth	Increased Plant Available Water /'bucket size' to 55mm	**RESULT: Increase in feed production of 1.88T/ha/year**
Produced approx 3.52T/ha DM/year		Increased production to 5.4T/ha DM/year	**Increase in carrying capacity of 1.8 DSE/ha**

Assumptions: 70% efficiency in amount consumed = 1316 kg DM/ha/year extra that stock can eat (=3.6kg/day extra). A dry sheep (eg. 65kg) – can eat 3% of its bodyweight = 1.9Kg/day.
Source: Felicity Turner

From 2014 – 2018 GRDC Sandy Soils Project
GRDC Cadgee SA
Under Crop

Unmodified Sandy Soil	**SOIL AMENDMENTS** Clay Spreading	6.4 tonne of grain/ha	**RESULT:** Transferring these techniques to livestock feed production will produce similarly impressive results
Produced 4.77 tonne of grain/hectare	Clay spreading & spading	7.29 tonne of grain/ha	
	Spaded clay & lucerne	9.3 tonne of grain/ha	

Source: Melissa Fraser – Rural Solutions SA, GRDC Sandy Soils Project
See attachment: Clay and hay increases yield on SE Sands

Eckert's clay spread and ripped cropping site 2018
Malinong SA
Under crop, side by side harvesting comparison

Clay Spread Sandy Soil	**SOIL AMENDMENTS** Deep Ripping *to break hard pan and increase rooting depth*	Produced 3.5 tonne of grain/hectare	**RESULT:** Transferring these techniques to livestock feed production will produce similarly impressive results
Produced 1.2 tonne of grain/hectare			

Source: Tim Eckert 2019

Participant evaluation form - agricultural event

Please take a few minutes to fill in **both pages** of this questionnaire. Your input will help us understand the usefulness of this event and how we might improve future events of thistype.

Event name: _____ **Your postcode:** _____

Please tick if you are:

- ❑ Primary Producer
- ❑ Land Manager
- ❑ Farm Worker
- ❑ Researcher
- ❑ Agronomist
- ❑ Agricultural Advisor
- ❑ Agricultural sales
- ❑ Project Officer
- ❑ nrm Professional
- ❑ Government Employee
- ❑ Other:

What is the size of the property you manage? _____

Please indicate:

1) What gender do you identify as? ❑ Male ❑ Female ❑_____

2) With which ethnic group do you identify?
❑ Non-Indigenous Australian ❑ Indigenous Australian or Torres Strait Islander ❑ Other _____

3) Age: _____years

Please mark the response which best represents your agreement with the following statements

	Strongly disagree	Disagree	Undecided	Agree	Strongly Agree
The mix of presentation and participation/exercises was right for me					
The level of information/training was suitable for me					
The amount of information/training was suitable for me					
The materials (e.g. handouts and notes) are useful to me					
The training/workshop/event was well conducted					
I learned something from interacting with the other participants					
I would recommend this training to other people					
Participation in this training workshop has increased my:					
Awareness of the topic					
Knowledge of the topic					
Knowledge to change how I do things					
Skills in the topic					
Skills to change how I do things					
Capacity to make better decisions					
Commitment to change my management and/or adopt new practices					
How many Hectares or Acres will you adopt the practices on?	Ha or Acres				

Would you be willing to be contacted to participate in follow up surveys on how you have been able to apply information from this event on your property and the benefits that have occurred?

❑ Yes ❑ No If yes please provide name and contact details below

Name:_____Phone:_____

Email:_____

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Please provide written responses to the following questions about the training/workshop

What is the most useful thing you gained or learned from attending this workshop?

What future topics for field days, workshops or training events would be beneficial to you and your farm business?

Is there anything that could be added or changed to improve future events or any other comments?

Thank you for taking the time to complete this survey. Your input will help us understand the usefulness of this event to you and how we might improve future events of this type.

This project is supported by the Murraylands and Riverland Landscape Board through funding from the Australian Government's National Landcare Program and the Landscape levies.