



BIGG's Soil Moisture and Climate Monitoring Activities: *Survey Report*

June 2020

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Summary

An online survey of Barossa Improved Grazing Group (BIGG) subscribers was conducted in June 2020 to gain feedback on the key activities of BIGG's project, *'Using soil moisture and climate data to improve farm decision making'*. The activities included re-developing the webpages that display the recorded data from BIGG's four weather stations, and delivering communications such as media articles and webinars.

Twenty-five subscribers responded to the survey and of these, 64% viewed BIGG's weather station data at least weekly during the growing season (April-October).

BIGG's redeveloped webpages were well received, with 76% of survey respondents rating the new webpages at least '4 out of 5' for usefulness. Of the communications conducted throughout the project the most useful were:

- Soil moisture/rainfall update articles in the BIGG newsletter
- Monthly reports on the soil moisture status of BIGG's weather station paddocks

The survey verified the projects value as respondents made on average five farm enterprise decisions or actions during the project period (September 2019-June 2020) that had been assisted by either accessing BIGG's weather station data or viewing the projects communications. The 'top 5' decisions/actions were:

- Rainfall check
- Estimating the length of the growing season (for stock feeding decisions)
- Suitability of conditions for spraying
- Stocking rates/timing of destocking
- Timing of nitrogen fertiliser application

Survey respondents also gave suggestions on soil moisture and climate monitoring activities that could be developed as part of any future project. Responses included:

- Predicting pasture production
- Predicting stream flows
- Establishment of new weather stations
- Adding infrastructure to BIGG's existing stations to measure temperature inversions (to reduce the risk of spray drift)

Background

In September 2019, BIGG received a 'Supporting Sustainable Primary Production' grant from the Adelaide and Mount Lofty Ranges Natural Resources Management Board for the project, *'Using soil moisture and climate data to improve farm decision-making'*.

Various activities were undertaken throughout the project, including:

- Re-developing the webpages that display the recorded data from BIGG's four weather stations, located at Flaxman Valley, Keyneton, Koonunga and Moculta. These changes included the addition of panels displaying key weather data and graphs 'laid out' specifically for viewing on a mobile phone (see [here](#) to access the homepage)
- Communications such as media articles and webinars

At the end of the project, a survey was conducted to gain feedback on the projects value. A 10-question survey questionnaire (Appendix 1) was developed using the survey tool SurveyMonkey and emailed to BIGG's subscribers (340) who responded to it online. The survey was open from 9-17 June 2020.

This report presents and discusses the survey results.

Survey results and discussion

Q1. Survey participation and profession of respondents

Twenty-five out of 340 BIGG subscribers responded to the survey, representing seven percent of the survey pool. The vast majority of respondents were producers/land managers (Table 1).

Table 1: Profession of survey respondents.

Profession	Responses	
	(#)	(%)
Producer/land manager	21	84
Landholder/non-commercial	0	0
Consultant/advisor	3	12
Other (please specify)*	1	4

*Other- single response was 'producer and consultant'.

Q2. Enterprises managed by respondents

The majority of survey respondents ran or specialised in more than one farm enterprise, with most managing sheep (72%) and or beef cattle (44%) (Table 2).

Table 2: Enterprises ran or specialised in by survey respondents*.

Enterprise	Responses	
	(#)	(%)
Sheep	18	72
Beef cattle	11	44
Dairy cattle	3	12
Broad-acre crops	7	28
Perennial pasture	8	32
Native pasture	7	28
Grapes	8	32
Land management	3	12
Other (please specify)**	3	12

*Respondents (25) selected as many options as they wanted from the listed choices (producers/land managers selected enterprises they ran and consultant/advisors listed enterprises they specialised in).

**Other- single responses were; 'hay', 'angora goats', 'horticulture'.

Q3. Frequency of data access

During the growing season survey respondents mostly viewed BIGG's weather station data two-three times per week, while 64% viewed the data at least weekly (Table 3). This result is similar to the same question from a survey BIGG conducted in May 2019, where 60% of respondents viewed the data at least weekly¹.

Table 3: Frequency BIGG's weather station data is accessed during the growing season (April-October)*.

Frequency of data access	Responses	
	(#)	(%)
Daily	2	8
Two-three times per week	8	32
Weekly	6	24
Fortnightly	1	4
Monthly	4	16
Once every two months	2	8
Never	2	8

*Respondents (25) selected one option from the listed choices.

¹Nietschke, B. (2019) BIGG survey report: Use and application of BIGG's weather monitoring station data.
<https://biggroup.org.au/wp-content/uploads/2019/07/SMM-Survey-report-Final-July-2019.pdf>

Q4. Usefulness of BIGG's redeveloped weather station webpages

Seventy-six percent of survey respondents rated the new webpages displaying BIGG's recorded weather station data at least '4 out of 5' (Table 4). Of the respondents that rated the redeveloped webpages '1' (i.e. not useful), this was mostly because they lived too far from any of BIGG's weather stations for the data to be relevant.

Table 4: Usefulness of the redeveloped webpages that display BIGG's weather station data*.

Webpage usefulness	Responses	
	(#)	(%)
1 (not useful)	4	16
2	1	4
3	1	4
4	9	36
5 (very useful)	10	40

*Respondents (25) selected one option from the listed choices.

Q5. Further improvement of webpages displaying BIGG's weather station data

Survey respondents gave feedback on how the webpages displaying BIGG's weather station data might be further improved. The individual feedback from respondents were:

- Wind direction displayed as arrows similar to Mid north Mesonet, much easier to comprehend at a glance
- Highlight the depth's at which plants are actively taking up water on a daily basis
- Rather than presenting rainfall data as a chart, perhaps display as numerical tables, the charts can be a little hard to interpret
- Implement secure web connections, i.e. https
- Tend to check out first thing in the morning or at night from my phone. I find the mobile site still fairly clunky. I think the data is solid but just needs a more user friendly interface
- Excellent data currently
- It doesn't matter how flash the site is, if the content to your area is not relevant, you won't use it

Q6. Soil moisture and climate monitoring communications

Various BIGG communications were conducted throughout the project period with all communication types being seen by respondents (Table 5). The main types seen were:

- Soil moisture/rainfall update articles in the BIGG newsletter (96% of respondents)
- Monthly reports on the soil moisture status of BIGG's weather station paddocks (83% of respondents).

Table 5: Soil moisture and climate monitoring communications seen by respondents*.

Communication type	Responses	
	(#)	(%)
Soil moisture/rainfall update articles in the BIGG newsletter	23	96
Monthly reports on the soil moisture status of BIGG's weather station paddocks	20	83
Webinar presentations on the "2020 seasonal outlook" (Darren Ray) or "Interpreting weather station data" (Peter Toome)	13	54
Updates at BIGG's annual conference or other BIGG events	13	54
BIGG Facebook posts	3	13

*Respondents (24) selected as many options as they wanted from the listed choices.

Q7. Most useful soil moisture and climate monitoring communications

The most useful soil moisture and climate monitoring communications delivered throughout the project were:

- Soil moisture/rainfall update articles in the BIGG newsletter
- Monthly reports on the soil moisture status of BIGG's weather station paddocks (Table 6).

Table 6: Most useful soil moisture and climate monitoring communications rated by respondents*.

Communication type	Responses	
	(#)	(%)
Soil moisture/rainfall update articles in the BIGG newsletter	14	58
Monthly reports on the soil moisture status of BIGG's weather station paddocks	13	54
Webinar presentations on the "2020 seasonal outlook" (Darren Ray) or "Interpreting weather station data" (Peter Toome)	9	38
Updates at BIGG's annual conference or other BIGG events	6	25
BIGG Facebook posts	1	4

*From the options selected by each respondent in Question 6, respondents (24) chose their most useful (as many as they wanted).

Q8. Enterprise decisions or actions assisted through project information

Twenty-three survey respondents listed 113 enterprise decisions or actions made during the project period (September 2019-June 2020) that were assisted through either accessing BIGG's weather station data or viewing the projects communications (Table 7). This equates to five farm enterprise decisions or actions per respondent. The 'top 5' were:

- Rainfall check (100% of respondents)
- Estimating the length of the growing season (for stock feeding decisions) (56% of respondents)

- Suitability of conditions for spraying (52% of respondents)
- Stocking rates/timing of destocking (43% of respondents)
- Timing of nitrogen fertiliser application (43% of respondents)

Table 7: Enterprise decision or actions made by respondents during the project period (September 2019-June 2020), which had been assisted through either accessing data from BIGG's weather stations or viewing project communications*.

Enterprise	Responses	
	(#)	(%)
Suitability of conditions for crop harvest	3	13
Suitability of conditions for spraying	12	52
Suitability of conditions for haymaking	6	26
Estimating the length of the growing season (for stock feeding decisions)	13	56
Stocking rates/timing of destocking	10	43
Timing of nitrogen fertiliser application	10	43
Timing of sowing	5	22
Assessment of frost events	9	39
Assessment of sheep chill conditions	8	35
Rainfall check	23	100
Spray record keeping	6	26
Seasonal outlook	5	22
Irrigation scheduling	2	9
Other (please specify)**	1	4

*Respondents (23) selected as many options as they wanted from the listed choices

**Other- single response was; 'Soil moisture and frost data used in reference to timing revegetation'.

The survey BIGG conducted in May 2019² of its subscribers included the open-ended question:

'Please list the enterprise decisions or actions you have made through accessing information from the weather monitoring stations?'

The major responses were:

- *Suitability of conditions for spraying (47% of respondents)*
- *Estimating the length of the growing season for feed availability and associated feed decisions (35% of respondents)*
- *Determining stocking rates (29% of respondents)*
- *Determining nitrogen fertiliser application (29% of respondents)*

The results from Q8 (Table 7) substantiate these responses.

²Nietschke, B. (2019) BIGG survey report: Use and application of BIGG's weather monitoring station data.
<https://biggroup.org.au/wp-content/uploads/2019/07/SMM-Survey-report-Final-July-2019.pdf>

Q9. Future soil moisture and climate monitoring activities

Survey respondents gave suggestions on soil moisture and climate monitoring activities that could be developed as part of any future project. Key responses included: predicting pasture production, predicting stream flow, establishment of new weather stations and adding infrastructure to BIGG's existing stations to measure temperature inversions.

The individual feedback from respondents were:

- Daily growing season plant water use in relation to dry matter growth - production kg/DM/ha/day
- Predictive modelling to show potential pasture yields
- Stream flow probability
- Projected stream flows/runoff or field capacity/saturation so we can make a more educated decision on stock/irrigation water in storage dams
- Given the longitudinal data set BIGG has developed, its an ideal time to work in collaboration with University of Adelaide students/honours projects, state and national collaboration or others with soil moisture probes in pasture (not in cropping and not just the weather stations). Also probably time for a refereed scientific publication
- Focused workshop of the site hosts and advisers of BIGG and Fleurieu Farming Systems in 2020-21 to drive their use of the data harder, record what decisions they make and develop the next level of innovation
- Presentation of back dated data i.e. stats for the last week, month, year
- The Mid North Mesonet project has infrastructure on their weather stations to measure temperature inversions, could similar be added to BIGG's stations?
- Weather station closer to our location (Gumeracha). NRM related stations at Mt Torrens (dryland and irrigated) don't work any more/no data available
- More stations across the lower Barossa

Q10. Other comments on soil moisture and climate monitoring

For the final question of the survey, respondents were asked if they had any other comments about soil moisture and climate monitoring. Several responses highlighted the value of BIGG's weather station data for decision-making. The individual feedback from respondents were:

- I would like to see the Prospect Hill/Kuitpo area included in a future project
- I would like to see another moisture probe installed in the southern part of the Barossa, closer to Birdwood/Mt Pleasant way to be able to gauge a better understanding on the Barossa as a whole, north south east and west.
- Excellent service should continue
- It is important to keep recording this data throughout the district. There maybe value in having some case studies to have some production data linked to the soil moisture data
- Any data is very useful in making management decisions, great job BIGG, keep it going and evolve
- Am surprised how many people still don't know about this resource. But my main concern is still the interface. If there was some funding to improve the usability - particularly for mobile view, that would be great.
- I am time poor, so this information has been valuable in helping make farming decisions

Appendix 1 – Survey Questionnaire

Q1. What is your role or profession?

- ☐ Producer/land manager
- ☐ Landholder/non-commercial
- ☐ Consultant/advisor
- ☐ Other (please specify)

Q2. Which enterprises do you run on your property, or if a consultant/advisor which enterprises do you specialise in? (select as many as applicable)

- ☐ Sheep
- ☐ Beef cattle
- ☐ Dairy cattle
- ☐ Broad-acre crops
- ☐ Perennial pasture
- ☐ Native pasture
- ☐ Grapes
- ☐ Land management
- ☐ Other (please specify)

Q3. During the growing season (April-October), how often do you generally view BIGG's weather station data (the homepage to access each station is [here](#))

- ☐ Daily
- ☐ Two-three times per week
- ☐ Weekly
- ☐ Fortnightly
- ☐ Monthly
- ☐ Once every two months
- ☐ Never

Q4. The webpages have been redeveloped to display the recorded data for each of BIGG's weather stations (e.g. click [here](#) for the Flaxman Valley webpage).

On a scale of 1-5, how useful have you found the new webpages?

- ☐ 1 (not useful)
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 (very useful)

Q5. Can the webpages displaying the weather stations data be further improved, if so how?

Q6. Over the years BIGG has communicated our soil moisture and climate monitoring activities through various channels/events. Which of the following have you seen? (select as many as applicable)

- ☐ Soil moisture/rainfall update articles in the BIGG newsletter
- ☐ Monthly reports on the soil moisture status of BIGG's weather station paddocks
- ☐ Webinar presentations on the "2020 seasonal outlook" (Darren Ray) or "Interpreting weather station data" (Peter Toome)
- ☐ Updates at BIGG's annual conference or other BIGG events
- ☐ BIGG Facebook posts

Q7. From those that you selected in Question 6, which did you find most useful (select as many as applicable)

- ☐ Soil moisture/rainfall update articles in the BIGG newsletter
- ☐ Monthly reports on the soil moisture status of BIGG's weather station paddocks
- ☐ Webinar presentations on "2020 seasonal outlook" (Darren Ray) or "Interpreting weather station data" (Peter Toome)
- ☐ Updates at BIGG's annual conference or other BIGG events
- ☐ BIGG Facebook posts

Q8. Since the projects inception (September 2019), what enterprise decision or actions have you made that has been assisted by either accessing data from BIGG's weather stations or viewing the projects communications? (select as many as applicable)

- ☐ Suitability of conditions for crop harvest
- ☐ Suitability of conditions for spraying
- ☐ Suitability of conditions for hay making
- ☐ Estimating the length of the growing season (for stock feeding decisions)
- ☐ Stocking rates/timing of destocking
- ☐ Timing of nitrogen fertiliser application
- ☐ Timing of sowing
- ☐ Assessment of frost events
- ☐ Assessment of sheep chill conditions
- ☐ Rainfall check
- ☐ Spray record keeping
- ☐ Seasonal outlook
- ☐ Irrigation scheduling
- ☐ Other (please specify)

Q9. What activities relating to soil moisture and climate monitoring would you like to see developed as part of any future project?

Q10. Any other comments or suggestions about soil moisture and climate monitoring that you would like to add?