



GRASSROOTS GRANT FINAL REPORT

Part 1 - Summary Details

Please use your TAB key to complete Parts 1 & 2.

CRDC Project Number: CGA2006

CGA: SVCGA

Project Title: Investigation of the impact of last irrigations on profit and quality in the MIA region

Project Commencement Date: 01/01/2020

Project Completion Date: 30/08/2020

Part 2 – Contact Details

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Part 3 – Final Report

(The points below are to be used as a guideline when completing your final report.)

Background

1. Outline the background to the project.

Water prices in 2019 rose to above \$600/ML and many growers were short of water due to the hot, dry summer. Many growers asked whether it was worth buying water and what the 'cost' in yield and quality would be. A similar project was carried out in 2018-19 out by Steve Buster (Summit Ag/RivCott Ltd) on four farms and found no value in the last irrigation being applied mid-March. This project would provide further data for growers to make informed decisions on the marginal utility of the last irrigation.

Objectives

2. List the project objectives (from the application) and the extent to which these have been achieved.

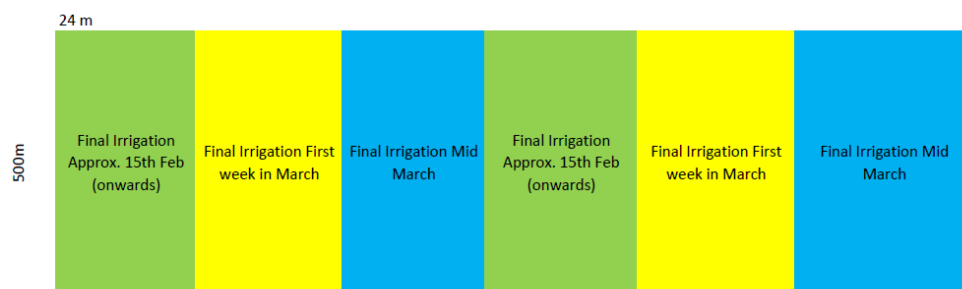
Farmers and consultants will be able to make informed decisions on the value of the last irrigations and thus improve resource allocation and profitability. This includes looking at the implications of buying the water as well

as the follow through effects on fibre quality. The aim will be to produce a short report and financial case study for growers. The work that we have been able to replicate this year has helped to build on the case from last year and although we had significant rain events that compounded the results that were collected, the evidence that was collected helped to reinforce the results that were received last year.

Methods

3. Detail the methodology and justify the methodology used. Include any discoveries in methods that may benefit other related projects.

For the 2019/2020 season the same 4 original farms offered to participate in this trial, along with one additional farm at Darlington Point. The plan was to replicate the similar scenario to the previous season, but with only 3 main timings. 2 replicates where applied this year where possible to try and collect a larger data set for more in-depth analysis. The example layout as shown below:



Plot Siz: 2 ha

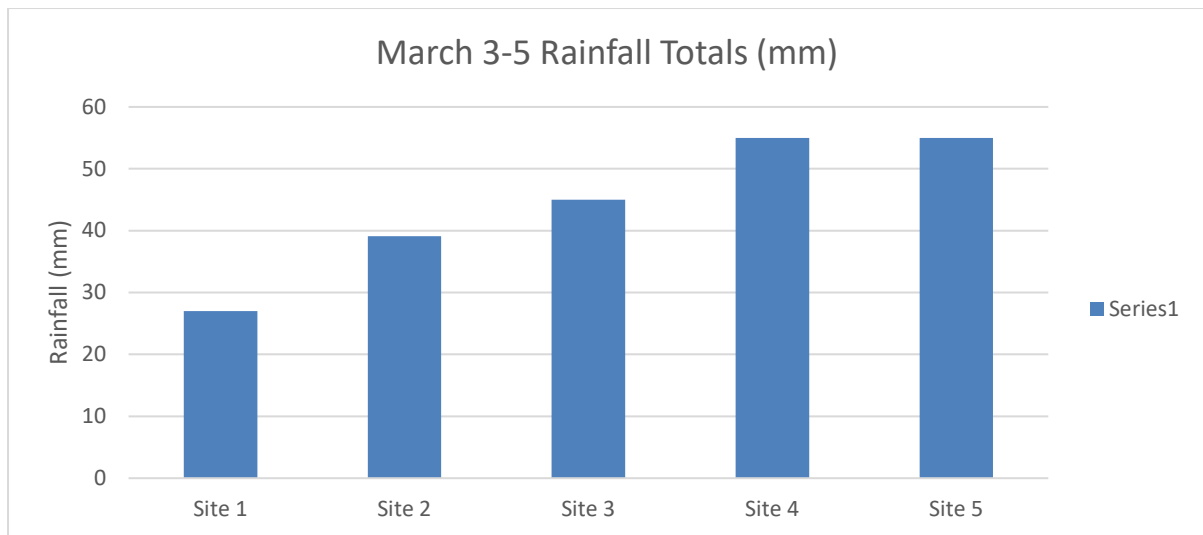
Table 1: Field Details

	Soil Type	Rotation	Variety	Water Up Date
Site 1	Med-Heavy Clay Loam	Fallow	746 B3F	7/10/2019
Site 2	Med-Heavy Clay Loam	Fallow	748 B3F	11/10/2019
Site 3	Med-Heavy Clay	Fallow	746 B3F	7/10/2019
Site 4	Med-Heavy Clay Loam	Fallow	746 B3F	5/10/2019
Site 5	Med-Heavy Clay Loam	Fallow	746 B3F	9/10/2019

Table 2:
Final irrigation timings at each site

	Early Feb	Mid Feb	Early March	Grower Standard
Site 1	8/02/2020	21/02/2020	1/03/2020	13/03/2020
Site 2	-	-	28/02/2020	15/03/2020
Site 3	-	23/02/2020	2/03/2020	13/03/2020
Site 4	-	10/02/2020	20/02/2020	1/03/2020
Site 5	-	10/02/2020	22/02/2020	13/03/2020

Over the end of the season there were some significant rainfall events recorded in March that in some locations offered a “final water” for the final irrigation in February treatments. For the period of the 3rd-5th of March rainfall totals shown below:



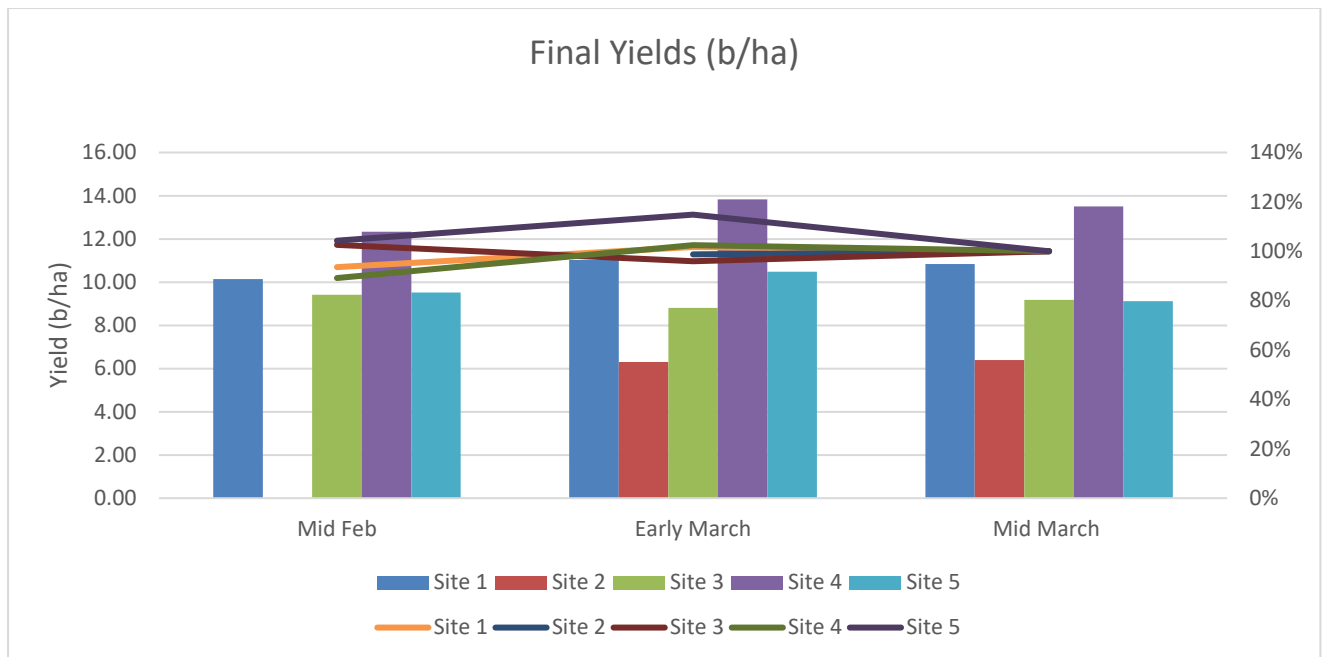
Graph 1: Rainfall from the most significant event that impacted the mid-February final irrigation event. Each of the plots were picked individually with a commercial picker, avoiding areas like tail drains where water backed up where possible. Plant heights, nodes and NAWF were collected at commencement, but as this did not influence the trial were omitted from this report.

The rounds were weighed with a hand sample of lint taken from each round which were then hand ginned by Kieran O’Keeffe (CottonInfo) thanks to the DPI and then classed by ProClass Griffith on a HVI™ (High Volume Instrument) 1000 instrument. The sites in general had similar final irrigation dates, excluding site 4 which was an earlier crop. Due to the cool finish and issues with micronaire the decision was made to take a deeper dive into how this trial effected the quality of the lint produced.

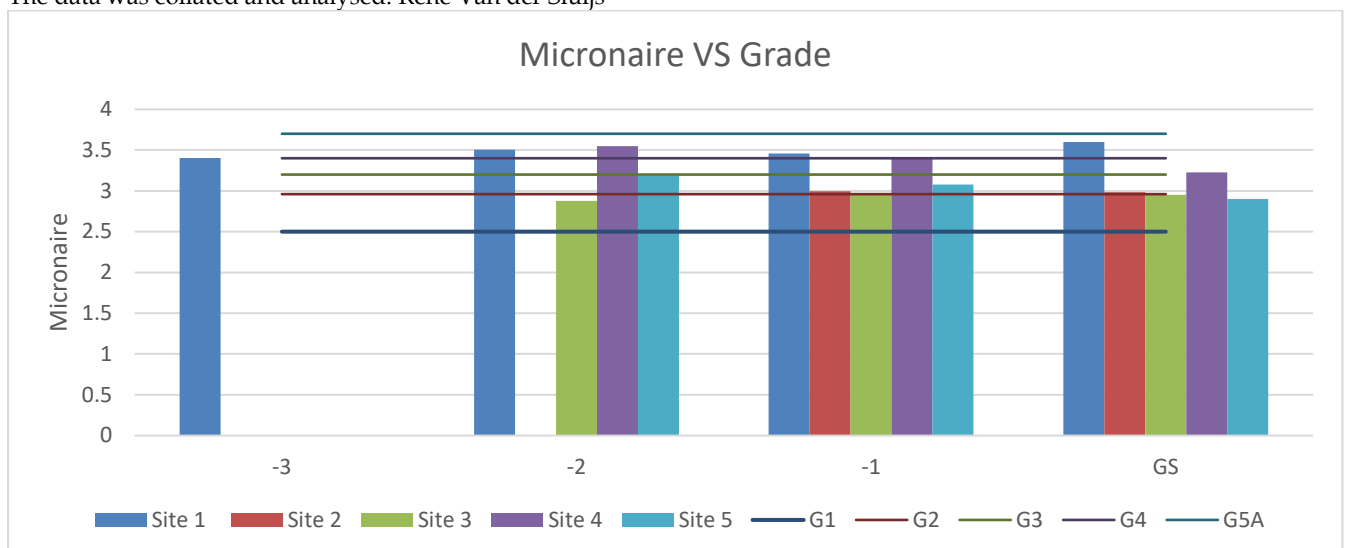
	Treatment	Turnout %	Yield (bales/ha)	Yield % of fully Irrigated	Micronaire	Micronaire Grade	Estimated Discount
Site 1	-3	47.9	8.86	82	3.40	G4	57.14
	-2	47.2	10.15	94	3.51	G5	0.00
	-1	47.9	11.03	102	3.46	G5	0.00
	Grower Standard	46.4	10.84	100	3.60	G5	0.00
Site 2	-1	46.8	6.31	99	2.99	G3	88.00
	Grower Standard	45.9	6.39	100	2.98	G3	88.00
Site 3	-2	45.45	9.42	103	2.88	G3	88.00
	-1	43.7	8.81	96	2.95	G3	88.00
	Grower Standard	44.2	9.18	100	2.95	G3	88.00
Site 4	-2	46.6	12.33	89	3.55	G5	0.00
	-1	46.4	13.83	100	3.41	G4	57.14
	Grower Standard	46.6	13	100	3.23	G3	88.00
Site 5	-2	43.9	9.52	104	3.19	G3	88.00
	-1	44.0	10.48	115	3.08	G3	88.00
	Grower Standard	44.0	9.13	100	2.90	G2	109.42

Table 3: Study Summary

The overall yields of most fields were below average due to lower than average day degrees accumulated for the season. With such a mild finish and some significant rain events the crops were not pushed in terms of their end of season water use which saw only small variations in yield. In some fields there was actually a slightly inverse trend of yield to irrigations.



Graph 2: Site yields overlaid with the percentage of the fully irrigated. It can be seen from the data above that the yields were a bit all over the place likely due to rain events that were large enough to supplement some of the shortfalls in irrigations. The data was collated and analysed. Rene Van der Sluijs



Graph 3: Average micronaire of samples by site and timing with the boundaries of grades shown as horizontal lines. It can be seen from the data above that there is an inverse trend between the number of irrigations and the micronaire at site 4 and 5. This is an interesting trend that could be hypothesised to be related to geographic area, as they are both the more eastern areas, and could indicate that later irrigation encouraged more late fruit set or got waterlogged due to irrigations and then significant rain events. The true cause is difficult to determine exactly but luxurious water coupled with below average day degree accumulation does appear to have a negative impact on crop micronaire.

Season		Day degrees accumulated
19/20	12th Feb DD accumulated	880.2
18/19	13th Feb DD accumulated	1005.15
12.5% less heat from Oct 1st to 12th Feb		
19/20	Day Degrees Accumulated 12th Feb - 30th April	318.65
18/19	Day Degrees Accumulated 12th Feb - 30th April	492.25
35% Less heat from previous year to finish crop		
19/20	Day Degrees Accumulated LEF to 1st pass 12th April	300.2

18/19	Day Degrees Accumulated LEF to 1st pass 15th April	432.3
31% Less heat from LEF to 1st pass defoliation		

Table 4: Day Degree Accumulation

It can be seen from the information above that the biggest factor effecting the lower micronaire was the lower amounts of day degrees accumulated, it is interesting to see that in the more Eastern blocks increased irrigations compounded on this and resulted in even further reduced micronaire.

There were no other trends from the quality results in terms of strength and length.



Photo: Site 1 modules post picking showing variations in lint picked off plots of the same size. Photo Emma Ayliffe, Summit Ag

Outcomes

4. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

The outputs from this project is some further great data for growers in the southern valleys, and beyond, to use to make decisions on the final Irrigation value in their production systems. We have also managed to inadvertently do some work on micronaire as well as the data collected has provided some great resources around that which was a big issue this year.

Economically, it provides growers with even further evidence that in most years there is little to no benefit in a mid-September irrigation with that water likely used for other crops, as well as there being an inverse relationship this year between higher rainfall areas and the quality when watered later.

Environmentally the results reflect above with evidence suggesting most growers in most years can reduce their water Input but 0.8megs/ha.

The social benefits follow the same lines, with further evidence to the wider community that farmers are implementing sciences to make decisions and improve their production systems.

5. Please report on any:-

- a) Feedback forms used and what the results were
Nil
- b) The highlights for participants or key learnings achieved
See conclusions below.
- c) The number of people participating and any comments on level of participation
5 farms participate, contribution pretty similar in regards to time and resource allocation. They need to be commended as some have worn some yield loss in some replicated to assist in getting these findings.

Conclusion

6. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. What are the take home messages?

- The return on investment of the final irrigation in the 2019/2020 season was an interesting study that was ultimately impacted by rain with the more

Eastern sites showing no significant differences in yield. The key take home messages from the second year of this trial are:

- That the cut out of irrigations in early February is yield limiting, even in a cooler wetter finish, with the second year of this result supporting the findings from last year.
- In climatic conditions that are cooler and trending towards damper there is no yield benefit to continuing to irrigate into mid-March, with site 3 and 5 having a slightly inverse trend of more irrigation resulting in a slightly lower yield.
- At the two Eastern sites (4 and 5) there was an inverse relationship between irrigations and micronaire indicating that final irrigations when coupled with significant rain events produced poorer quality. Site 4 went from an estimated \$88/bale discount at grower standard irrigations to no discount when final irrigation was at the end of February.
- At site 1 we saw a 6% yield increase when going from a late Feb to an early March final irrigation so water at \$300/meg, 0.8 megs/ha applied would cost approximately \$240, the yield increase of 6% on a 10 bale/ha crop assuming lint price at \$600 would be \$360/ha, resulting in a positive return on investment.
- Hindsight is a wonderful thing.

Extension Opportunities

7. Detail a plan for the activities or other steps that may be taken:

(a) To tell other CGAs/growers/regions about your project.

Has been reported in the IREC newsletter with the report made available for any other publications. Requested to present at the CCA update.

(b) To keep in touch with participants.

They have been emailed final results.

(c) For future projects.

Growers in the Southern regions would like to see this work continue again this year with some growers already committing to be part if the project is to go ahead.

Please email your completed report to research@crdc.com.au