Project Catalyst Final Report

Using a Smart Phone to Record Irrigations

Grower Information	
Grower Name:	Paul Villis
Entity Name:	PA & FM Villis
Trial Farm No/Name:	
Mill Area:	Kalamia
Total Farm Area ha:	
No. Years Farming:	
Trial Subdistrict:	Airdmillan
Area under Cane ha:	

Trial Status

- Completed

Background Information

Aim: to assist Burdekin growers in recording their irrigation data

Background: (Rationale for why this might work)

At the moment, there are very few Burdekin growers who record their irrigations and know how much water they're using on farm (ML/ha). As a result, there's no hard data concerning what is an appropriate volume of water to apply to sugarcane over the season.

One of the reasons grower's (especially in the Delta) do not keep irrigation records is that their pumps are not metered. This makes calculating irrigation volumes difficult unless the grower knows their pump flow rates or conducts a bucket and stopwatch to calculate the cup flow rate.

A number of growers have expressed interest in keeping irrigation records if it can be conducted with technology or with a smart phone app.

There is also potential for the end of row sensors being trialled with other growers may be able to be used to record irrigations – the sensor is able to time stamp and GPS stamp the location of each change od state (wet/dry) creating an online record of hours irrigated. If growers are aware of their pump flow rate and set areas, they will be able to calculate and record the volume of water applied.

Potential Water Quality Benefit:

By creating irrigation records, growers will be able to see how much water their applying to their paddocks over the season. This will give them the ability to decide whether or not to increase/decrease the volume of water being applied. They will also be able to identify blocks that they may be applying too much water to and be able to change their practices to reduce the volume of water being wasted or lost to runoff/deeo drainage.

Expected Outcome of Trial:

Growers will be able to install sensors at the top of their blocks or use an record keeping app to record their water use. This will inform their future water use, hopefully helping them reduce their wastage.

Service provider contact: Billie White (0409 477 359, billiew@farmacist.com.au)

Where did this idea come from:

Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	**Jan -Dec 2018**	- Develop a smart phone app to assist growers in creating irrigation records. -
Stage 2	**Dec 2018 – Jun 2019**	- Install the app on grower's phone - Test the app for record ability and receive user feedback
Stage 3		
Stage 4		

Project Trial site details

Trial Crop:	Sugarcane
Variety: **Rat/Plt:**	Various
Trial Block No/Name:	Various
Trial Block Size Ha:	Various
Trial Block Position (GPS):	Various
Soil Type:	Various

Block History, Trial Design:

Farmacist has trialled passively recording irrigations using sensors; however, this has not had a great deal of success due to unreliability of the radio coverage of the base station network.

They have also been working on developing an irrigation record app that will help the grower record data such as:

- **Start and stop times and dates**
- **ML applied (ML and ML/ha)**
- **Set area**
- **Water source**

The data collected in the app is spatially allocated to the specific set area (which is adjustable if set sizes change throughout the year.

Treatments:

Using the irrigation record app to record irrigations

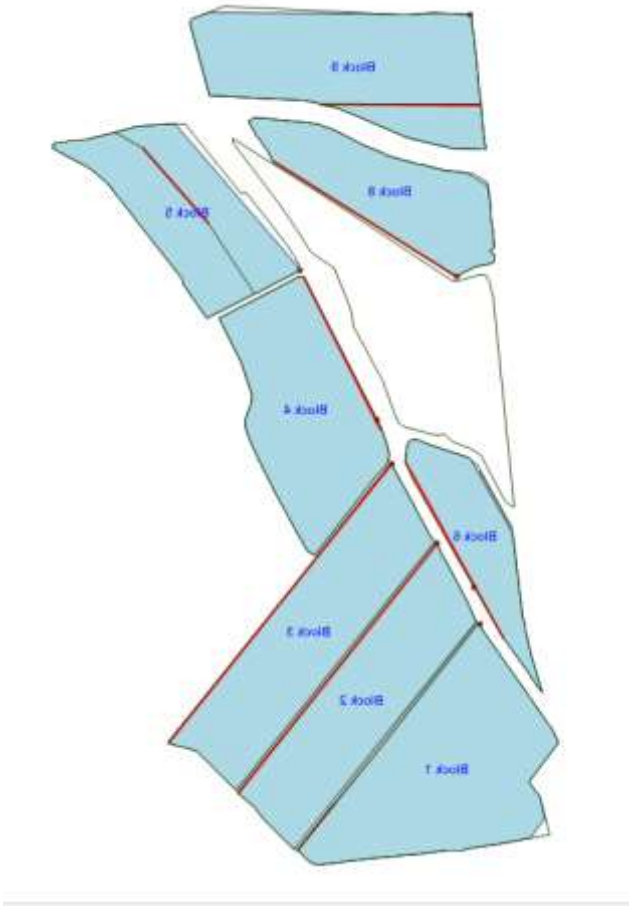
Results:

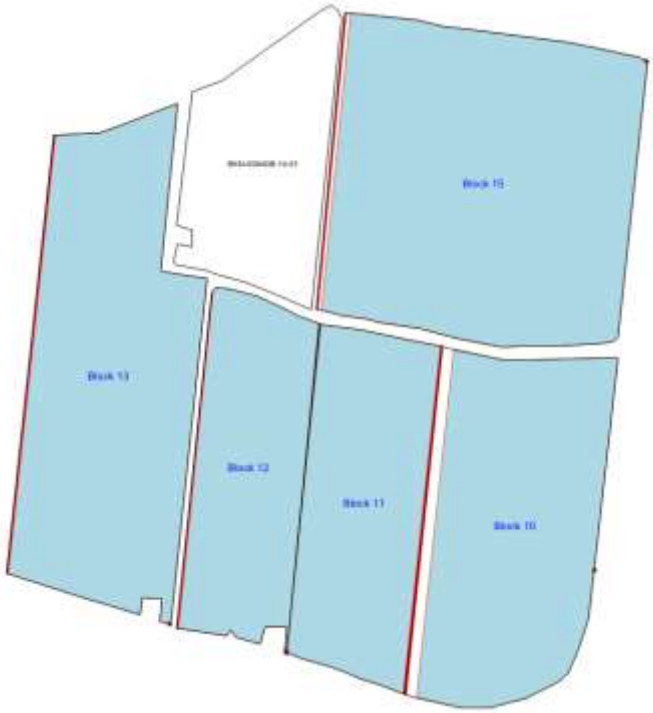
The sensors were shown to be too unreliable to accurately record irrigations for growers. This is primarily due to the locality of the farm and the reach of the base stations.

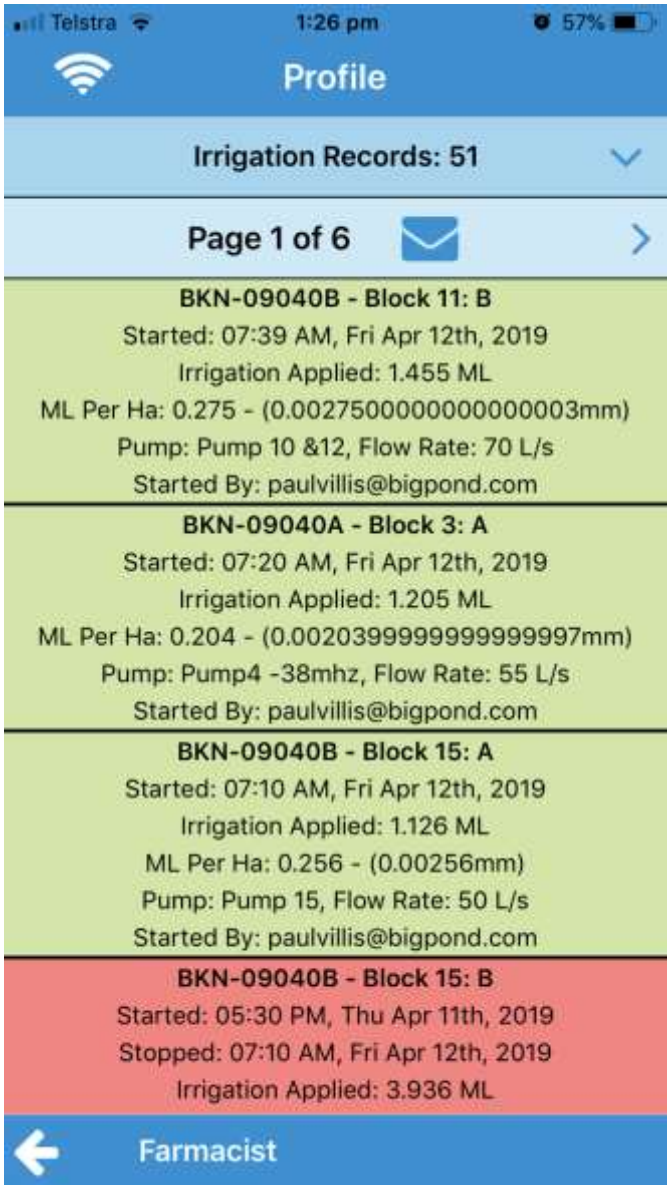
Over the last 12 months, Farmacist has been developing a smart phone app that will allow growers to record their irrigations quickly and easily. The app records data such as start/stop dates and times and volume of water applied (ML and ML/ha). To calculate volume, the app uses either their meter readings (if they have meters) or their pump/cup flow rates. When using the pump/cup flow rates, the app acts as a bucket and stopwatch – it uses the flowrates (input by the agronomist/grower) and the set area to calculate the volume applied. All of this data is also spatially allocated to each set and each block.

In this case, the grower has set the app up on 2 of his 5 farms. These two farms are the easiest to get set up on (only 2 pumps per farm and consistent sets). One of his workers has been using the app to record his irrigations; once he is comfortable with the app, the other farms will be added. One of the hardest parts of getting the correct ML applied data, is having the correct flow rate being applied to the set. On these two farms, the grower is able to use the pump flow rates. He has a VFD on the pump so he has entered different flowrates for the pump, depending on the kW that the pump is set to.

The other farms will be harder to calibrate as they have a number of different pumps, and the blocks aren't square – lots of angle drills. In this case, a cup flow rate will probably be used instead.






Telstra
1:26 pm
57%
Profile
Irrigation Records: 51
Page 1 of 6
BKN-09040B - Block 11: B
Started: 07:39 AM, Fri Apr 12th, 2019
Irrigation Applied: 1.455 ML
ML Per Ha: 0.275 - (0.0027500000000000003mm)
Pump: Pump 10 &12, Flow Rate: 70 L/s
Started By: paulvillis@bigpond.com
BKN-09040A - Block 3: A
Started: 07:20 AM, Fri Apr 12th, 2019
Irrigation Applied: 1.205 ML
ML Per Ha: 0.204 - (0.0020399999999999997mm)
Pump: Pump4 -38mhz, Flow Rate: 55 L/s
Started By: paulvillis@bigpond.com
BKN-09040B - Block 15: A
Started: 07:10 AM, Fri Apr 12th, 2019
Irrigation Applied: 1.126 ML
ML Per Ha: 0.256 - (0.00256mm)
Pump: Pump 15, Flow Rate: 50 L/s
Started By: paulvillis@bigpond.com
BKN-09040B - Block 15: B
Started: 05:30 PM, Thu Apr 11th, 2019
Stopped: 07:10 AM, Fri Apr 12th, 2019
Irrigation Applied: 3.936 ML
Farmacist


Telstra
1:26 pm
57%
Profile
BKN-09040B - Block 15: A
Started: 07:10 AM, Fri Apr 12th, 2019
Irrigation Applied: 1.126 ML
ML Per Ha: 0.256 - (0.00256mm)
Pump: Pump 15, Flow Rate: 50 L/s
Started By: paulvillis@bigpond.com
BKN-09040B - Block 15: B
Started: 05:30 PM, Thu Apr 11th, 2019
Stopped: 07:10 AM, Fri Apr 12th, 2019
Irrigation Applied: 3.936 ML
ML Per Ha: 1.009 - (0.010089999999999998mm)
Pump: 15 & recycle, Flow Rate: 80 L/s
Started By: paulvillis@bigpond.com
BKN-09040B - Block 11: A
Started: 05:22 PM, Thu Apr 11th, 2019
Stopped: 07:39 AM, Fri Apr 12th, 2019
Irrigation Applied: 1.8 ML
ML Per Ha: 2.571 - (0.02571mm)
Pump: Pump 10 , Flow Rate: 35 L/s
Started By: paulvillis@bigpond.com
BKN-09040B - Block 10: C
Started: 05:22 PM, Thu Apr 11th, 2019
Stopped: 07:39 AM, Fri Apr 12th, 2019
Irrigation Applied: 2.315 ML
ML Per Ha: 1.543 - (0.01543mm)
Pump: Pump 10, Flow Rate: 45 L/s
Farmacist

Conclusions and comments

Ideally, growers would be able to passively record their irrigations, due to the sheer number of irrigations that are applied throughout the season. This was what we were trialling by putting the sensors at the top of the block; however, these have been found to be too unreliable to accurately record the irrigation start and stop times.

If growers are to actively record irrigations, the process should be quick and easy – if they have to input too much information, they are unlikely to continue to record their irrigations, especially in peak irrigation times. This is where the Farmacist irrigation app has come into play – from reports from growers, once the app is set up (this takes the most time), actually using the app is a quick and easy process. As the grower only needs to press start and stop to create his irrigation record, he has been using it regularly.

Advantages of this Practice Change:

By recording irrigations, growers are able to get a better understanding of their water use. This helps them identify where they may be applying too much water, or not enough relative to their soil's water holding capacity and the crop yield. By identifying areas where they may be applying too much water, the grower can take steps to reduce this water use or mitigate the issues – by applying appropriate volumes of water, the grower reduces their risk of losses. Water is the primary loss pathway for nutrient and pesticides to leave the paddock (run off or deep drainage).

Disadvantages of this Practice Change:

There are little to no disadvantages to recording irrigations; however, there are disadvantages to the different irrigation record methods.

With the sensors, the advantages to that system is the passive recording – this ensures that the records do not rely on grower's memories. However, this only works if the sensors are working everytime.

With the irrigation record app, the advantages are that it is quick and simple to use and the app does all the calculations for the grower. It also spatially allocates the data. The disadvantage is that it relies on the grower to remember to input the data at all times. This can be an issue when growers are in their peak irrigation period.

Will you be using this practice in the future:
The grower has implemented the app over 2 farm and has plans to add the other farms in the future.

% of farm you would be confident to use this practice :
The app is used on 100% of 2 farms (Approx 40% of the total farming area).