Project Catalyst Final Report

Bryan Langdon

Using technology to record irrigation events

Grower Information	
Grower Name:	Bryan Langdon
Entity Name:	Langfarm Pty ltd
Trial Farm No/Name:	BKN-09449A
Mill Area:	Kalamia
Total Farm Area ha:	
No. Years Farming:	
Trial Subdistrict:	Airville
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.

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Where did this idea come from:

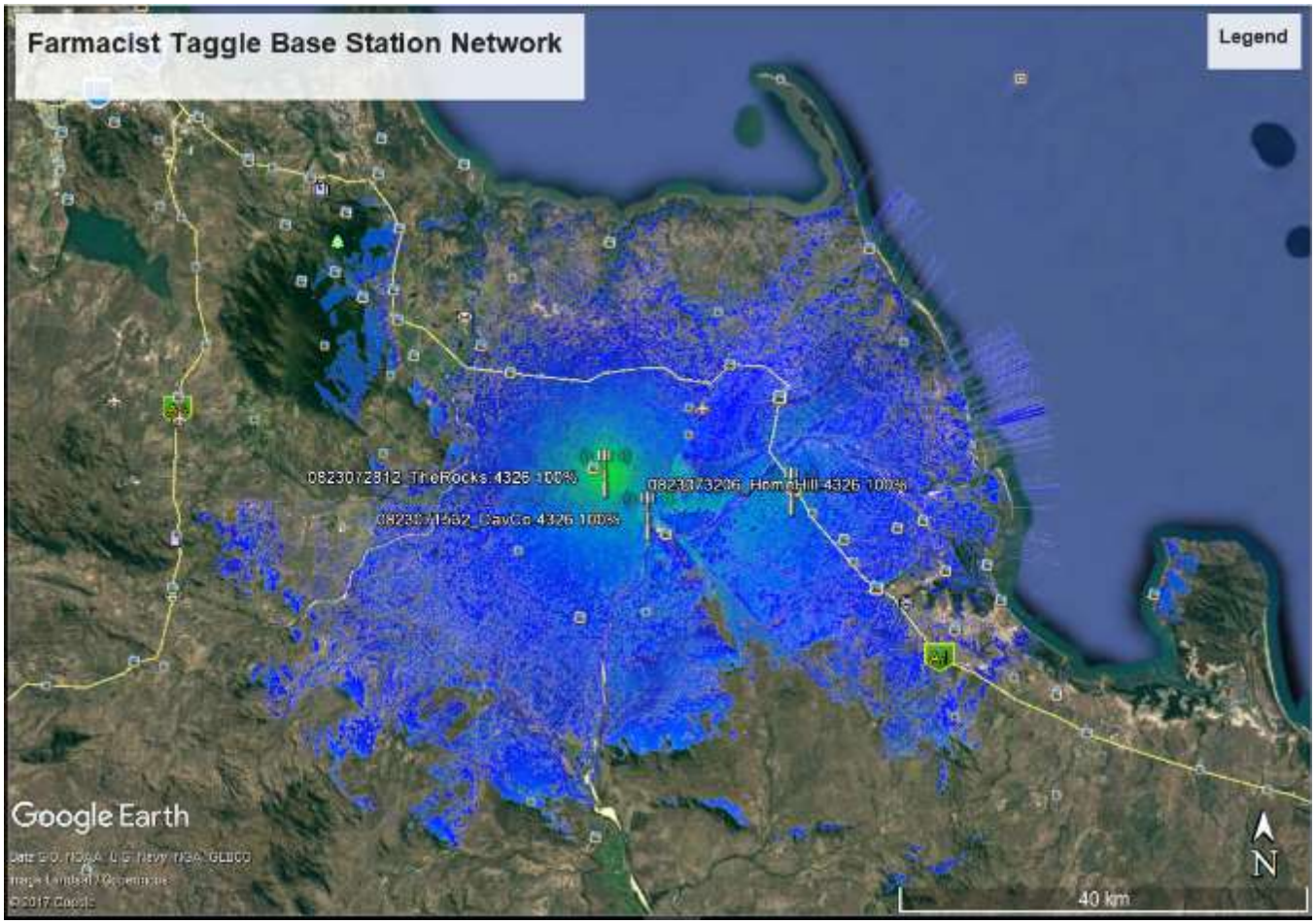
Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	**Jan-July 2017**	- Design an end of row sensor that will communicate with a low power radio base station network
Stage 2	**July – Dec 2017**	- Implement the base station network
Stage 3	**Jan -Dec 2018**	- Install the sensor at the top of a trial block and test the sensor for reliability and robustness. - Develop a smart phone app to assist growers in creating irrigation records.
Stage 4		
Stage 5		
Stage 6		

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:

Once the base station network was set up, the coverage is expected to be similar to the image below:



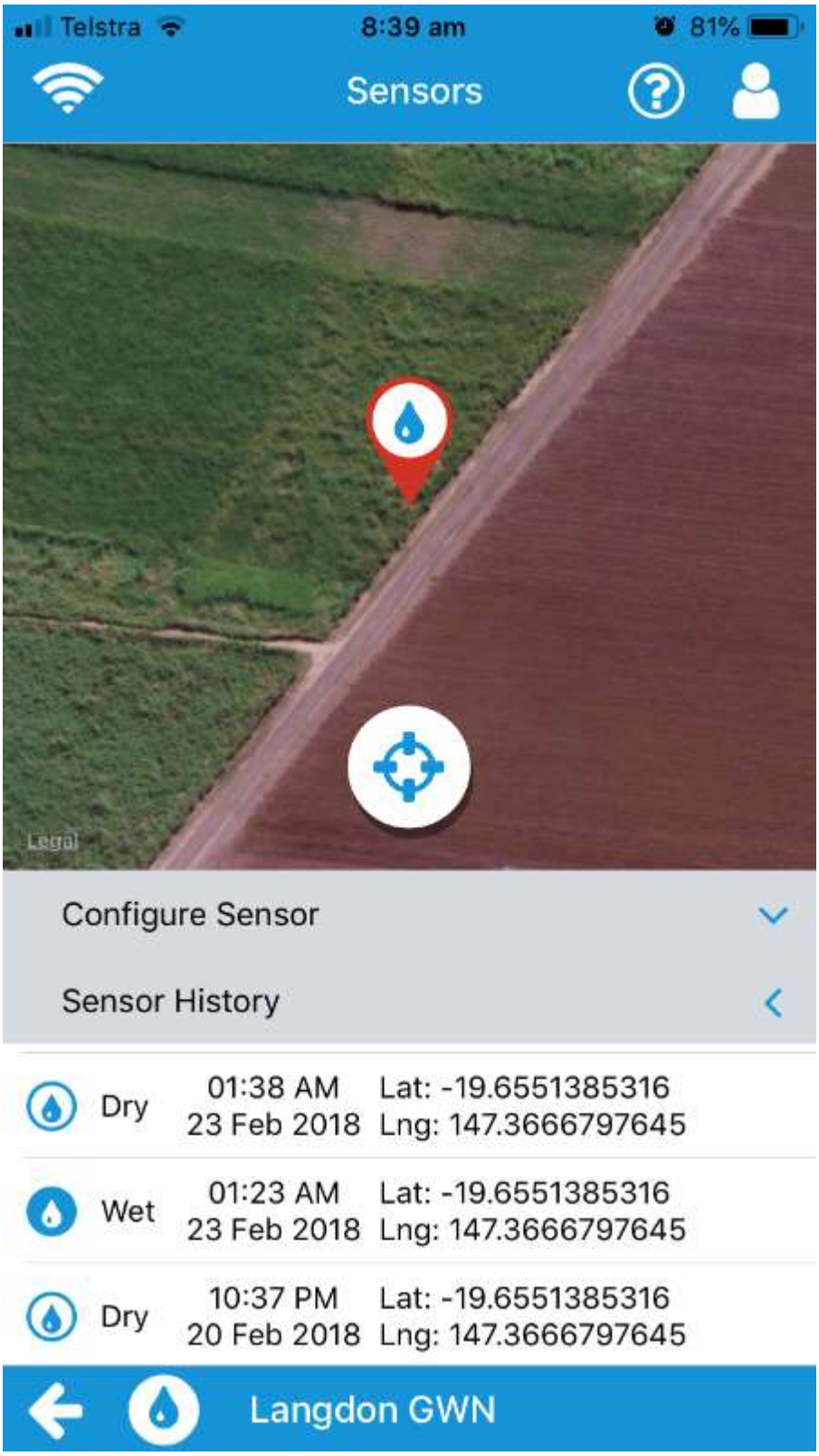
The sensor being used is pictured below:

A sensor has been installed at the top of the block to record irrigations:

Treatments:

Results:

The image below is a screen shot from the Farmacist App, from the grower's sensor. You can view the sensor's history (Wet/Dry changes), inclsuing time, date and a GPS location. The records are listed from most newset to oldest in the app.



Below are the records for the grower's sensor. There is quite a bit of variation with the sensor; however, there are also some records that appear to be correct. The records that appear to be accurate have been marked with red boxes.

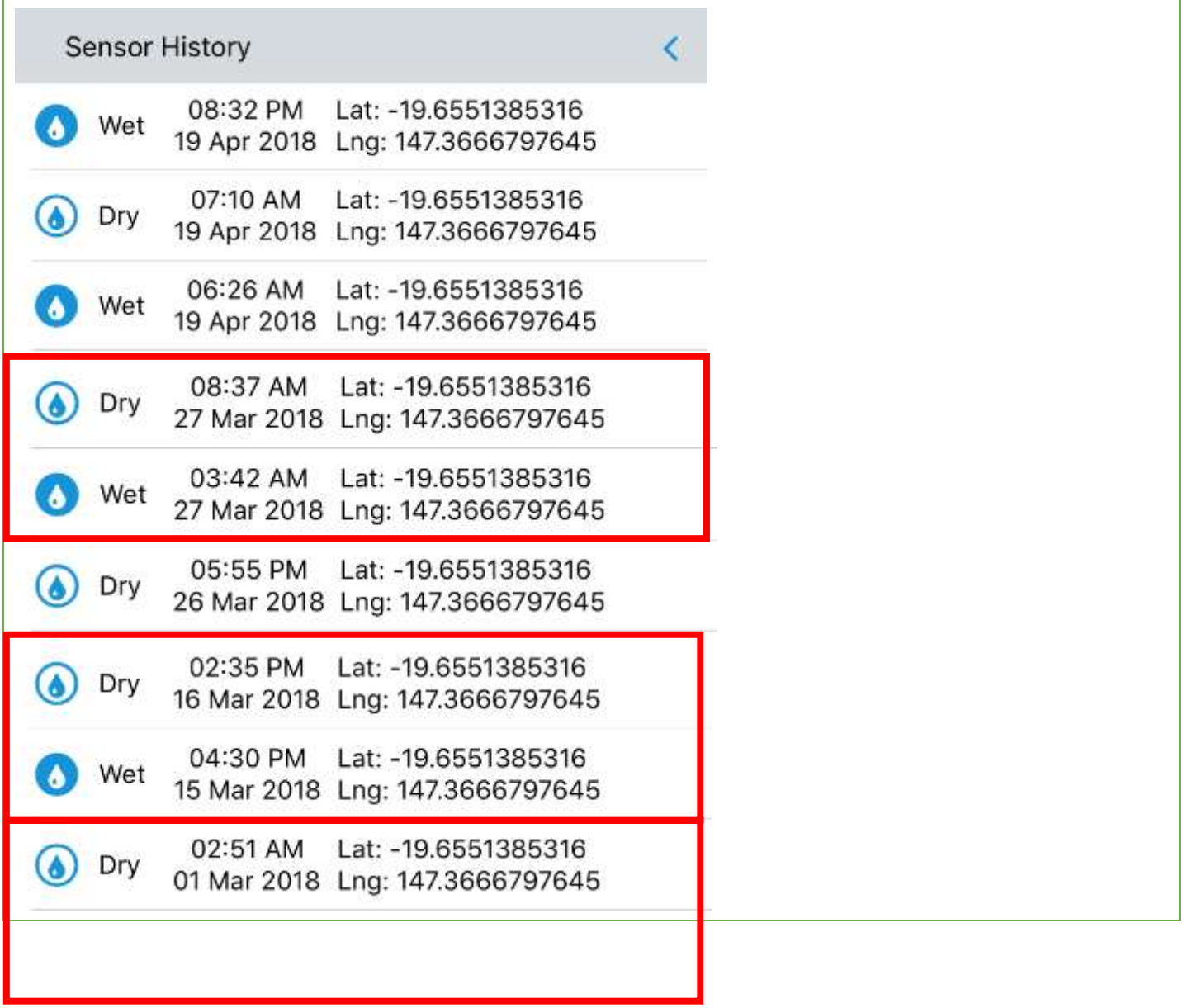
The unreliability of the data collected can be attributed to the sensor itself. Though the radio on the sensors are working well, the prong sensor that was attached to the end has been found to corrode quickly when in contact with water. As a result, the sensor began to send unreliable notifications. The senro was pulled out of the trial site in April due to the notifications becoming more unreliable.

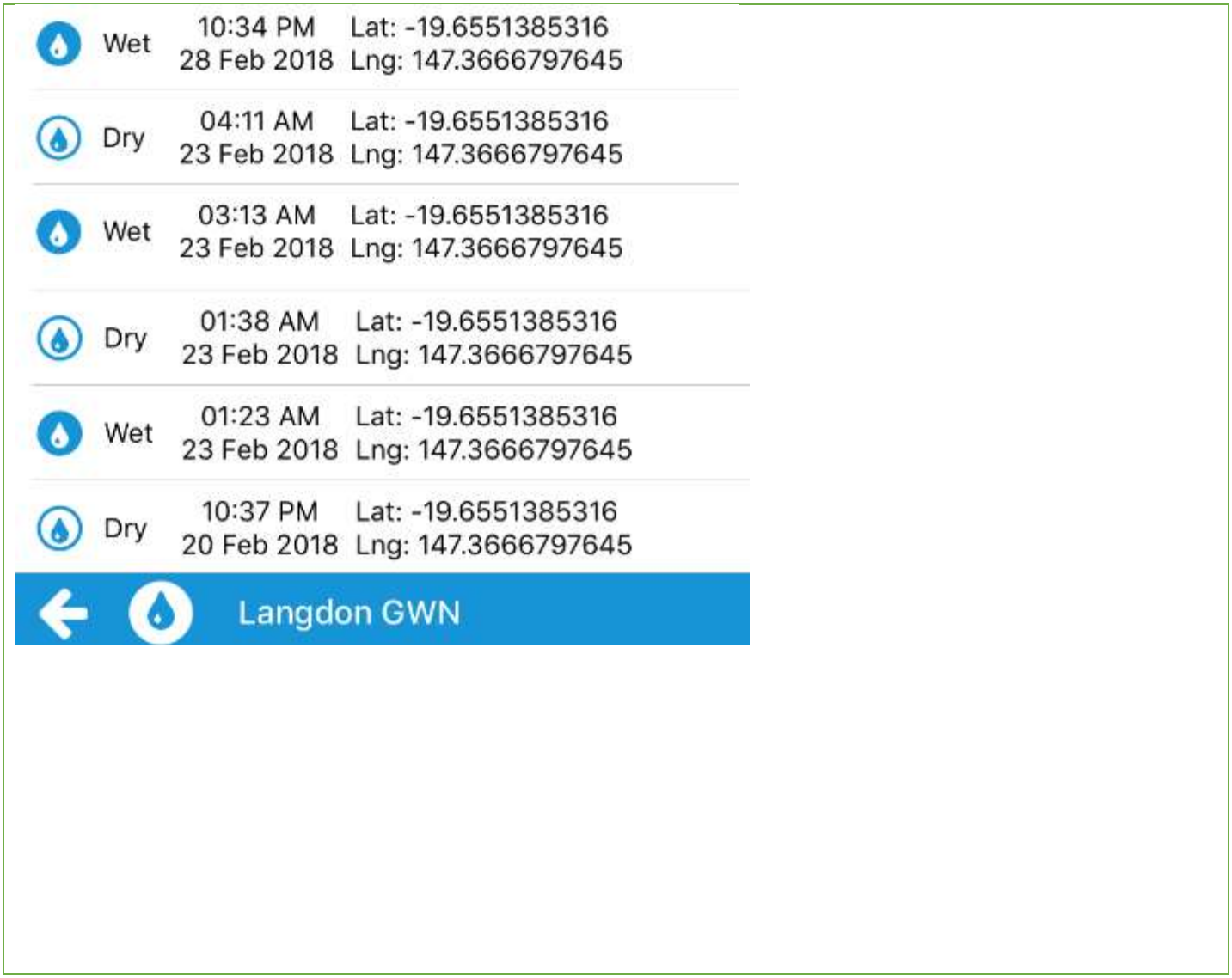
This has been rectified by attaching a float switch to the end of the radio instead of the prongs. The mechanical option has resulted in more reliable notifications. A float switch sensor has been installed at the farm to test the reliability of the new technology. The delay between pulling the old sensor out of the trial site and installing a new sensor is due to a) finding a solution to the corroded sensors (prongs to float switch) and b) the paddock was now in a dry down period so no irrigation was being applied. The float switch has tested well.

It has been discovered that though the new version of the sensor works well, the grower's farm is in an area with poor signal coverage from the Taggle basestation network. This has resulted in poor record keeping from the sensors.

Farmacist has been developing a smart phone app that will allow growers to log their irrigations on their phones in a quick and easy manner. The grower has been keen to trial the app; however, there is an issue with the app and the grower's phone regarding storage. As a result, the grower has not been able to install the app yet.

This trial is finished until either the sensor technology has been improved, or the irrigation app has been developed enough to allow the grower to use the app.


Sensor History
Wet 08:32 PM 19 Apr 2018 Lat: -19.6551385316 Lng: 147.3666797645
Dry 07:10 AM 19 Apr 2018 Lat: -19.6551385316 Lng: 147.3666797645
Wet 06:26 AM 19 Apr 2018 Lat: -19.6551385316 Lng: 147.3666797645
Dry 08:37 AM 27 Mar 2018 Lat: -19.6551385316 Lng: 147.3666797645
Wet 03:42 AM 27 Mar 2018 Lat: -19.6551385316 Lng: 147.3666797645
Dry 05:55 PM 26 Mar 2018 Lat: -19.6551385316 Lng: 147.3666797645
Dry 02:35 PM 16 Mar 2018 Lat: -19.6551385316 Lng: 147.3666797645
Wet 04:30 PM 15 Mar 2018 Lat: -19.6551385316 Lng: 147.3666797645
Dry 02:51 AM 01 Mar 2018 Lat: -19.6551385316 Lng: 147.3666797645


Wet
10:34 PM
28 Feb 2018
Lat: -19.6551385316
Lng: 147.3666797645
Dry
04:11 AM
23 Feb 2018
Lat: -19.6551385316
Lng: 147.3666797645
Wet
03:13 AM
23 Feb 2018
Lat: -19.6551385316
Lng: 147.3666797645
Dry
01:38 AM
23 Feb 2018
Lat: -19.6551385316
Lng: 147.3666797645
Wet
01:23 AM
23 Feb 2018
Lat: -19.6551385316
Lng: 147.3666797645
Dry
10:37 PM
20 Feb 2018
Lat: -19.6551385316
Lng: 147.3666797645
Langdon GWN

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.

Advantages of this Practice Change:

- **Passive irrigation recording – far more likely to actually collect records than manual record keeping**
- **Using this data to calculate annual and per irrigation water use may lead to better water management strategies**
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Disadvantages of this Practice Change:

- **The technology being tested is currently unreliable and needs to be improved in order to ensure that the records are accurate**

Will you be using this practice in the future:

- **Once the technology is more reliable, yes.**

% of farm you would be confident to use this practice :