# Project Catalyst Final Report

# Sam Marano

# Using a Smart Phone App to Record Irrigations

| Grower Information | |
|---|---|
| **Grower Name:** | Sam Marano |
| **Entity Name:** | Myola Farming Co |
| **Trial Farm No/Name:** | BKN-01652A |
| **Mill Area:** | Inkerman |
| **Total Farm Area ha:** | |
| **No. Years Farming:** | |
| **Trial Subdistrict:** | Causeway |
| **Area under Cane ha:** | |

## 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:**

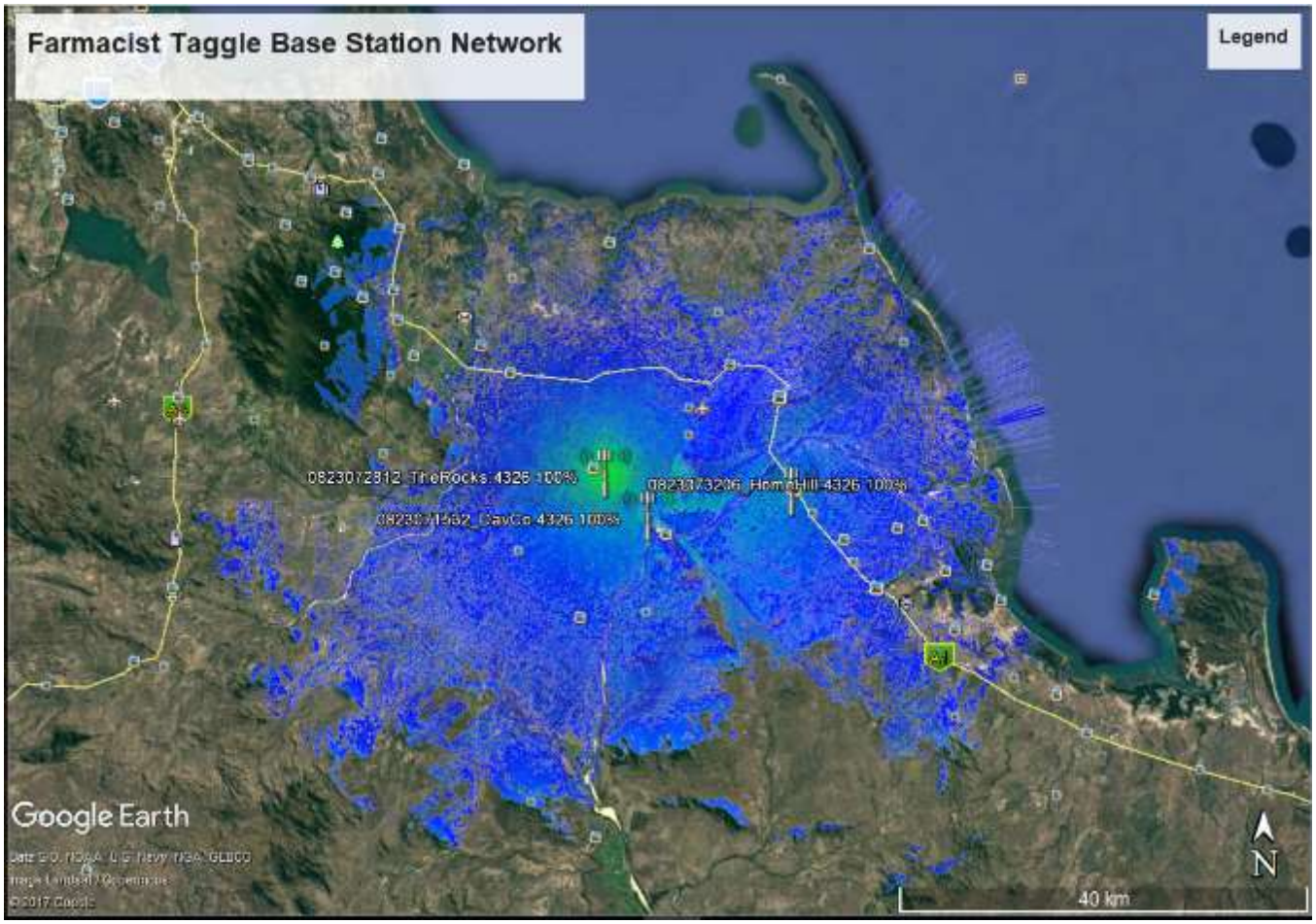
| Plan - Project Activities | Date : (mth/year to be undertaken) | Activities :(breakdown of each activity for each stage) |
|---|---|---|
| **Stage 1** | **Jan-July 2017** | - Design an end of row sensor that will communicate with a low power radio base station network |
| **Stage 2** | **July – Dec 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.<br>- Develop a smart phone app to assist growers in creating irrigation records. |
| **Stage 4** | **Dec 2018 – June 2019** | - Install the irrigation record app on the grower phone and begin collecting irrigation data |
| **Stage 5** | | |
| **Stage 6** | | |

## Project Trial site details

| | |
|---|---|
| **Trial Crop:** | Sugarcane |
| **Variety:**<br>**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:**



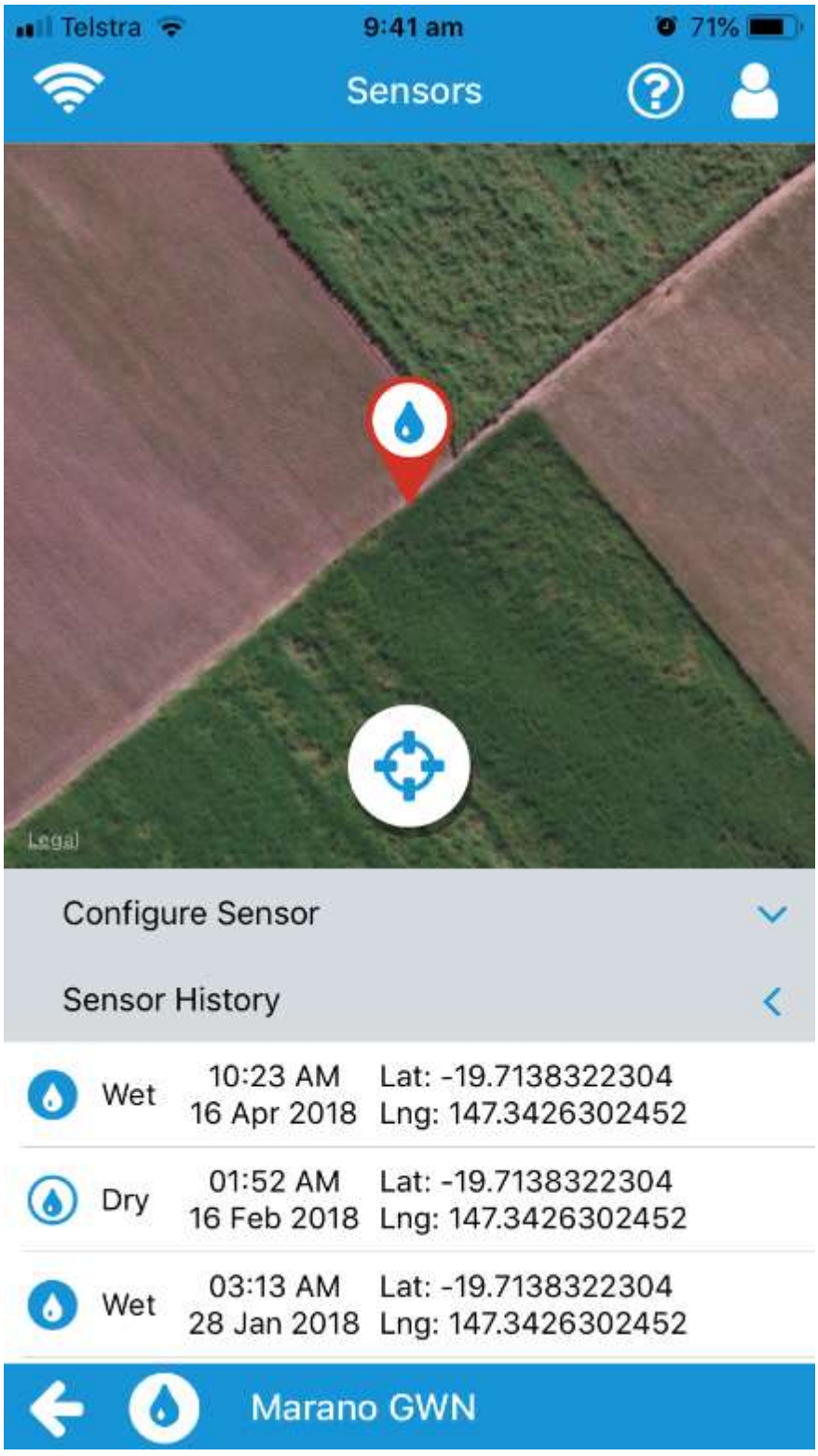

The sensor being used is pictured below:

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

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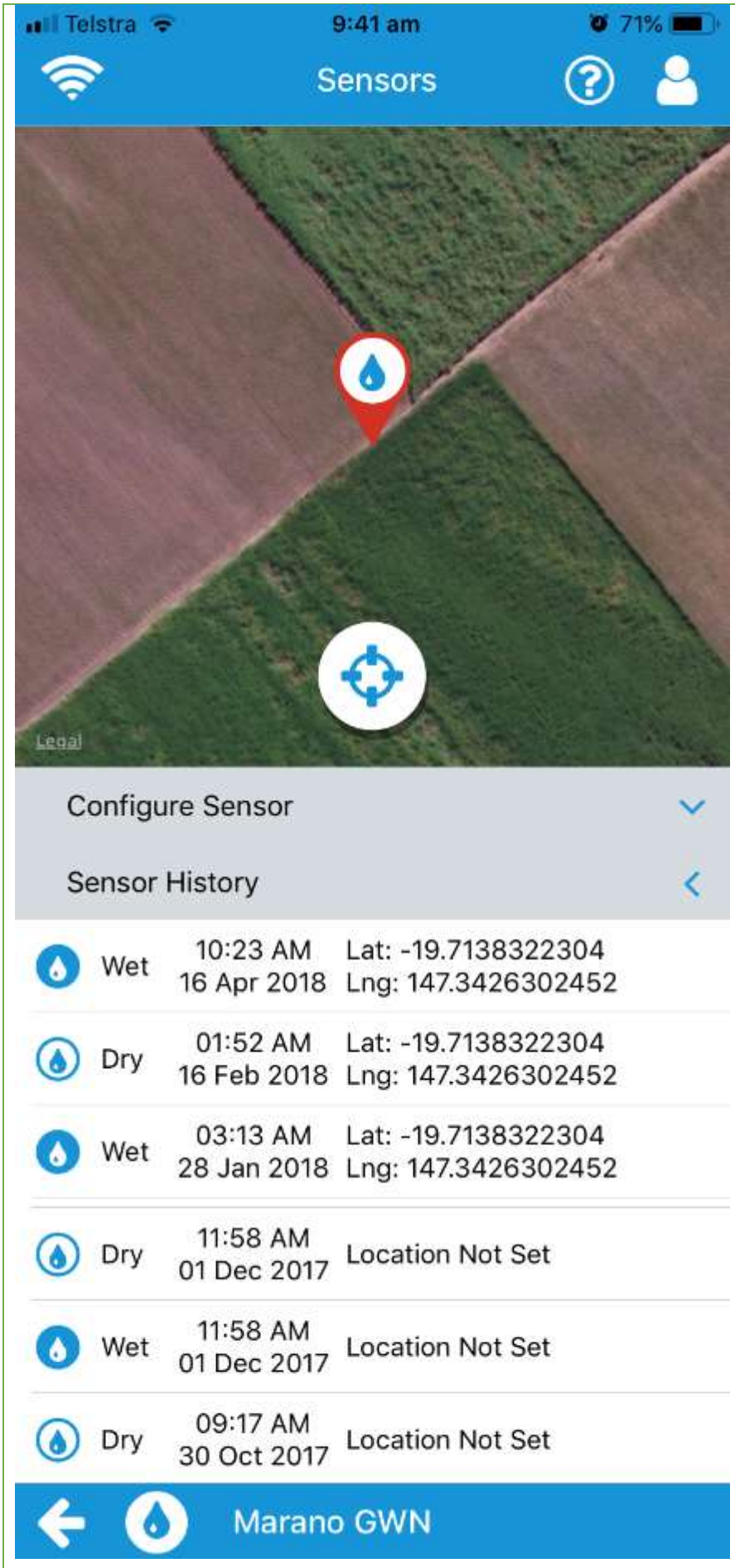
**Below are the records for the grower's sensor. There is quite a bit of variation with the sensor; however, there are also some records that appear to be correct. The records that appear to be accurate have been marked with red boxes.**

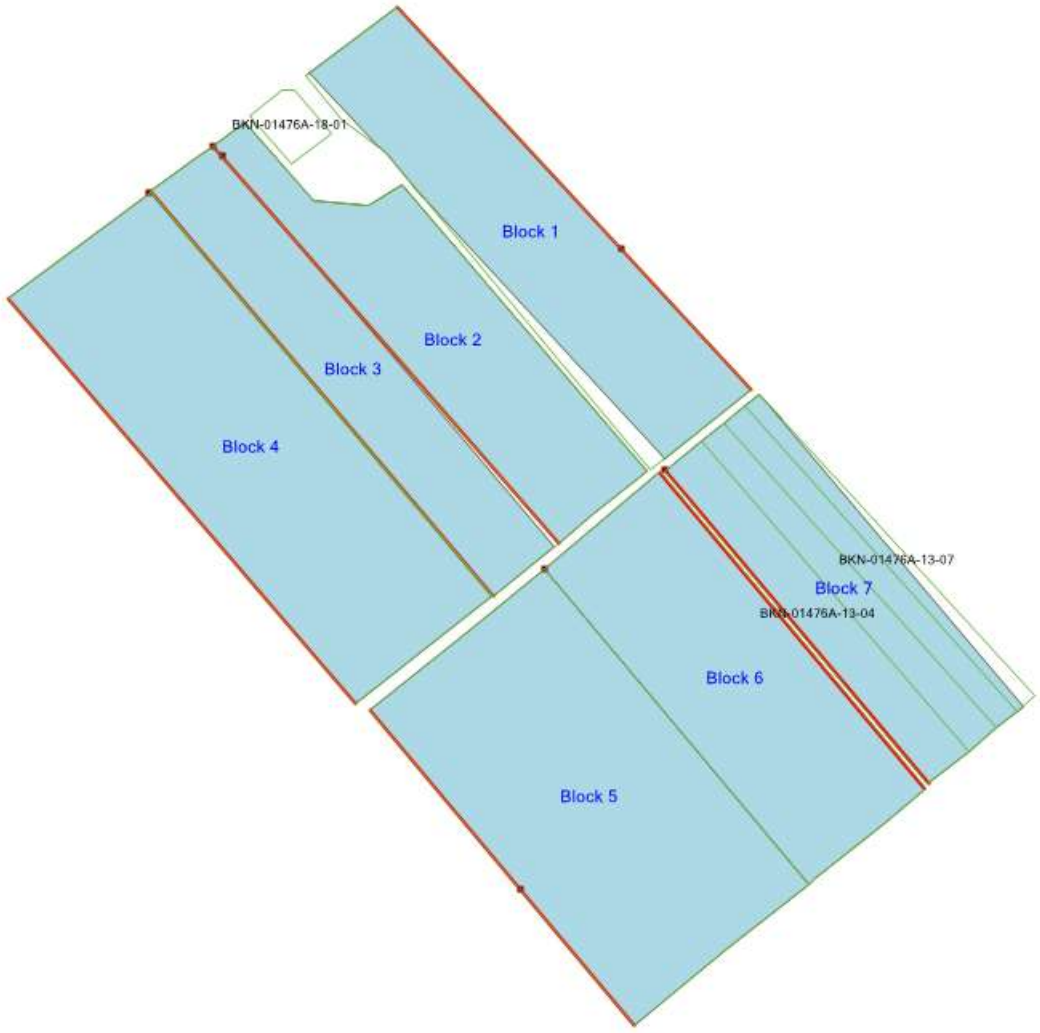
**The unreliability of the data collected can be attributed to the sensor itself. Though the radio on the sensors are working well, the prong sensor that was attached to the end has been found to corrode quickly when in contact with water. As a result, the sensor began to send unreliable notifications.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

Furthermore, it appears that the grower's farm is in a blackspot for the Taggle Network. Though the grower does get coverage on some parts of the farm, the sensor struggled to send notificiations in the areas that are close to the Home Hill Aerodrome. It is unclear whether there is interference from the aerodrome or if it is a network black spot.

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.


Telstra
9:41 am
71%
Sensors
Legal
Configure Sensor
Sensor History
Wet 10:23 AM 16 Apr 2018 Lat: -19.7138322304 Lng: 147.3426302452
Dry 01:52 AM 16 Feb 2018 Lat: -19.7138322304 Lng: 147.3426302452
Wet 03:13 AM 28 Jan 2018 Lat: -19.7138322304 Lng: 147.3426302452
Dry 11:58 AM 01 Dec 2017 Location Not Set
Wet 11:58 AM 01 Dec 2017 Location Not Set
Dry 09:17 AM 30 Oct 2017 Location Not Set
Marano GWN

The grower has been trialling the Farmacist Irrigation Record App to record his irrigation data. One of the grower's farms has been set up as a trial and if the grower becomes comfortable with using the App, the rest of the farms will be added to the Record App. The grower is having more success collecting his irrigation data with the App than the sensors. Because the grower runs multiple pumps, the cup flow rates have been calibrated for the app, to ensure the data is as close to accurate as possible.




Telstra
8:11 am
82%
Irrigation Home
BKN-01476A
Select IMZ/s
Set Details
Pump Details
Irrigation Record
Active Sets
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).**

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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**

**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:**
**Once the technology is more reliable, yes the grower would use the sensors to record irrigation data.**

**When the grower is more confident with the app, he may expand it to cover all of the farms**

**% of farm you would be confident to use this practice :**
**Currently using it on 100% of one farm, 25% of his farming area**