

# Innovative ways to reduce runoff to the Great Barrier Reef

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# Burdekin Irrigation Area



- ▶ Predominately furrow irrigation for Sugarcane areas
- ▶ Small percentage of overhead and drip irrigation
- ▶ Minority of Irrigation systems are automated

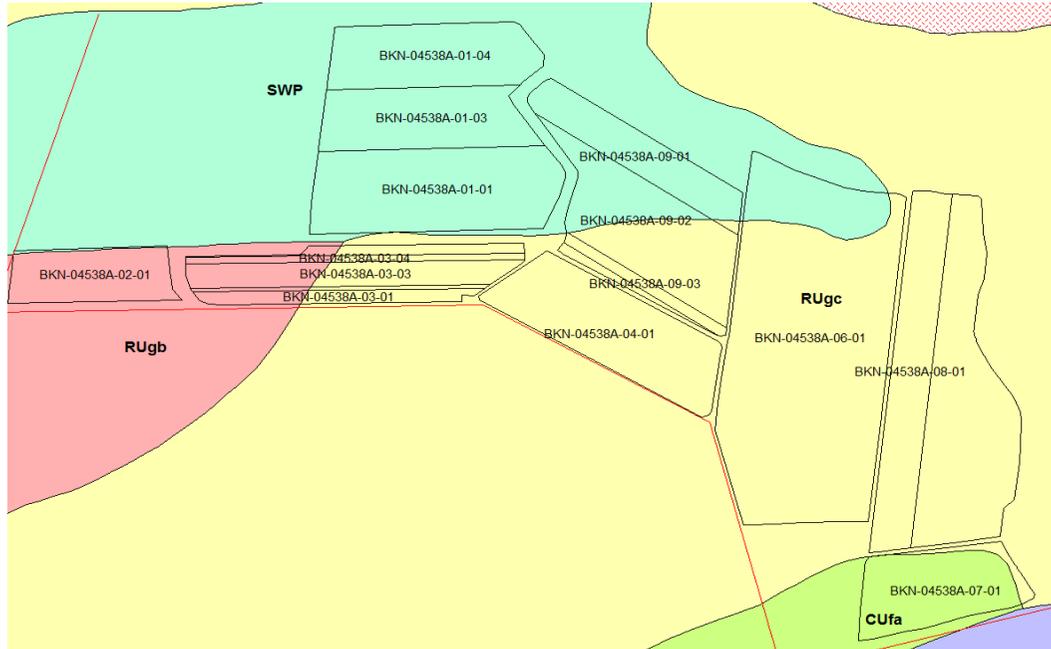


# Achieving Optimum Irrigations

- ▶ **Knowing when to irrigate**
  - When to start the pump. E.g. Sandy Soil may be sooner than Clay soils.
- ▶ **Knowing How long to irrigate for**
  - How many hours between when water hits the end of the paddock until the pump gets turned off.



# Know when to Irrigate



- ▶ Growers irrigating on set schedule somewhere between every 7-10 days during peak crop demand.
- ▶ Many different soil types not only across the farm but also within the paddock.

How can we manage this across a farm?



# G-DOT- Soil moisture Monitoring

- ▶ Simple, cheap and effective monitoring tool that allows growers to visualise what is happening under the plant
- ▶ Bury the gypsum block in the root zone and it will indicate how difficult it is for the plant to extract water from the soil.
- ▶ The harder the plant works to extract water, the less energy it is using for growth and production.



# How Does it Work?

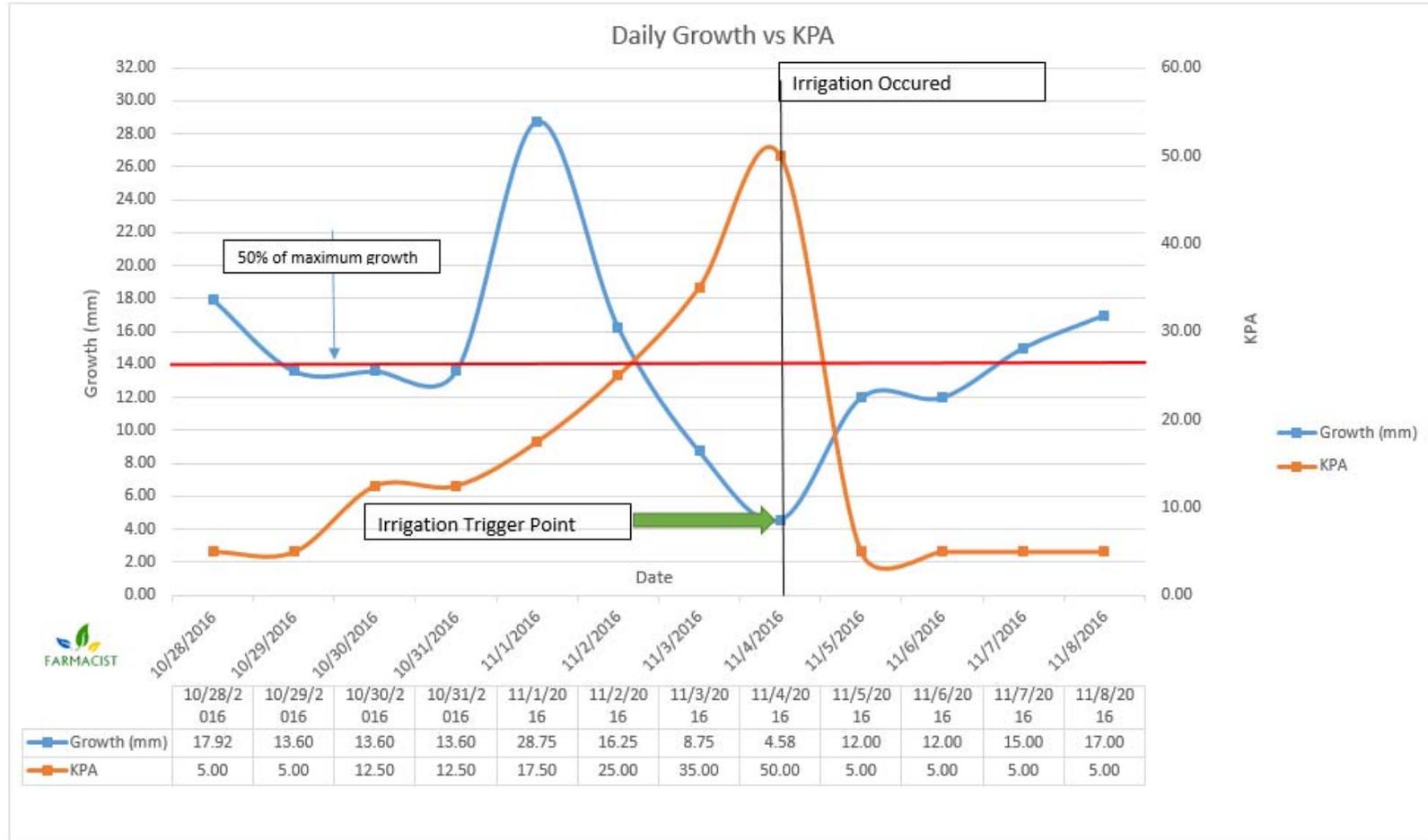


# Calibrate to Plant Growth

- ▶ Mark 24 sticks of cane at location of Gypsum block.
- ▶ Record a baseline height.
- ▶ Measure each stick and record the daily growth
- ▶ When growth is below 50% of peak growth for two days its time to irrigate.



# Calibrate to Plant Growth



# Optimise the Irrigation

- ▶ By irrigating based off the G-DOT, we are providing the crop with water when it needs it. Less wasted water!
- ▶ Sandy soils may need to be watered quicker than heavy soils.
- ▶ Reduces waterlogging, and therefore is minimising losses of Nitrogen to the Environment.



# Now we know when to irrigate...

- ▶ How can we manage the volume of water applied?
- ▶ What can we do to minimise unnecessary run-off leaving farms?
- ▶ What technology is available to growers to help them manage the time spent and volume of water used when they irrigate?



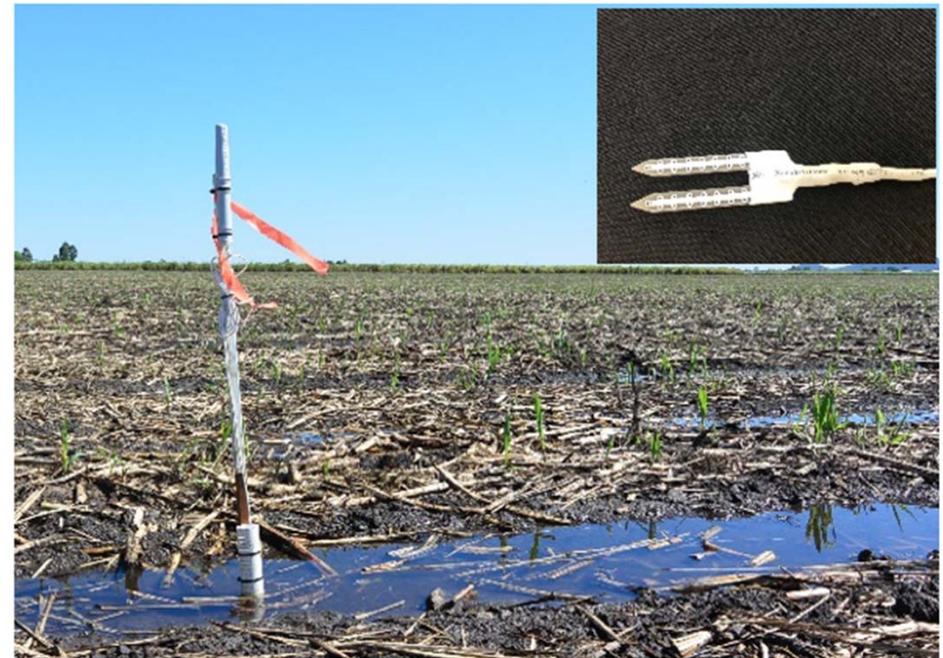
# Some quick run off estimates

- ▶ If we assume that 20% of applied irrigation water is lost to run off and deep drainage:
- ▶ The grower applied 0.6ML/ha during an irrigation
- ▶ If 20% is lost, that is 0.12ML/ha OR 120 000l/ha of run off per irrigation
  
- ▶ If we assume this is over a 12 hour set, what happens if we shorten the irrigation to 10 hours? How can we achieve this?



# End of row sensors

- Simple, low cost sensors
- Connect to a low-power radio network powered by Taggle
- Send a message when the sensor is activated by water
- Available through Farmacist



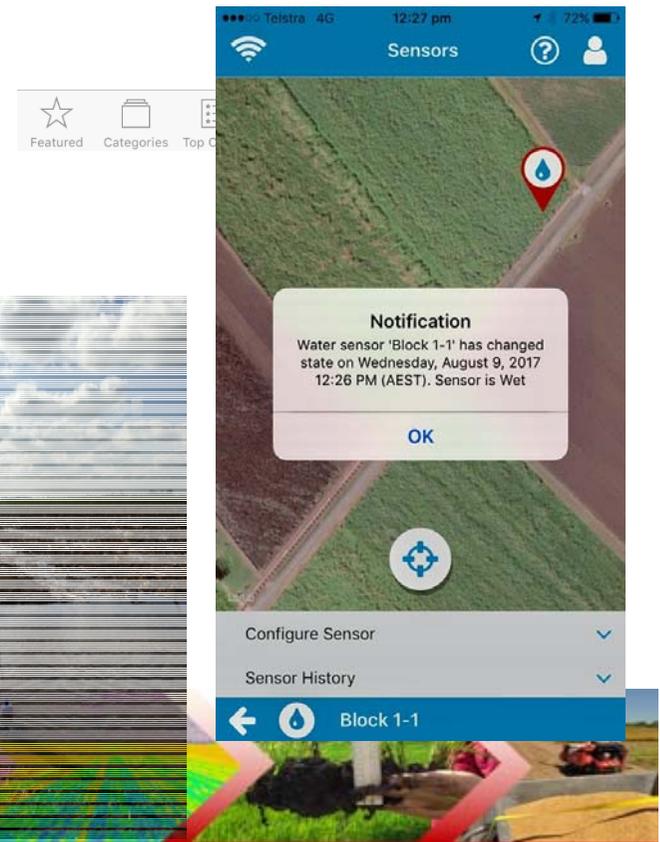
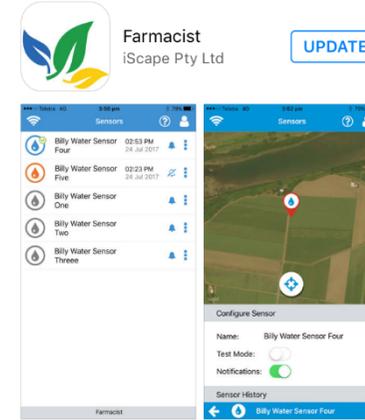
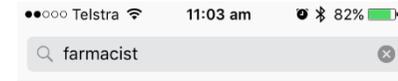
# How can we use these sensors?

- ▶ To alert growers to:
  - ▶ Irrigation sets finishing
  - ▶ Over-flowing cylinders
  - ▶ The height of water in recycle pits
- ▶ To create irrigation records
- ▶ Any other way you can imagine!

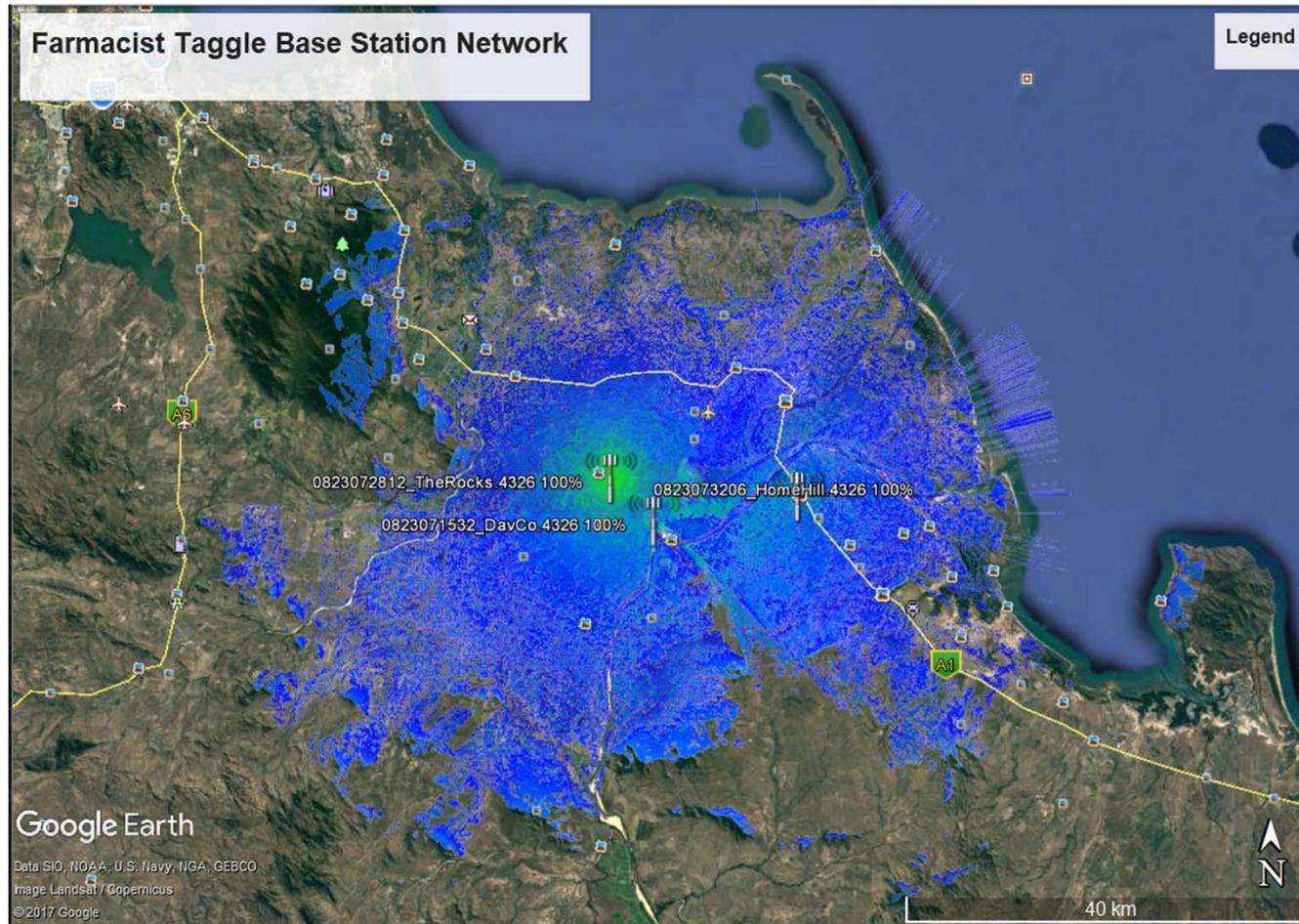




# Technology in Action!



# Who can access the Farmacist network?



# Back to the maths for a second..

- ▶ Irrigation applied 0.6ML/ha over 12 hours. This equals 50 000L/ha/hr.
- ▶ If we shorten the irrigation to 10 hours, this would save 100 000L/ha from being applied.
- ▶ This would prevent approximately 20 000L/ha/irrigation from leaving the paddock as runoff or deep drainage (assuming 20% loss).



# Acknowledgements

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- ▶ Farmacist Staff

