



Improving water quality for the Great Barrier Reef and wetlands by better managing irrigation in the sugarcane farming system

NEWSLETTER

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INTRODUCTION

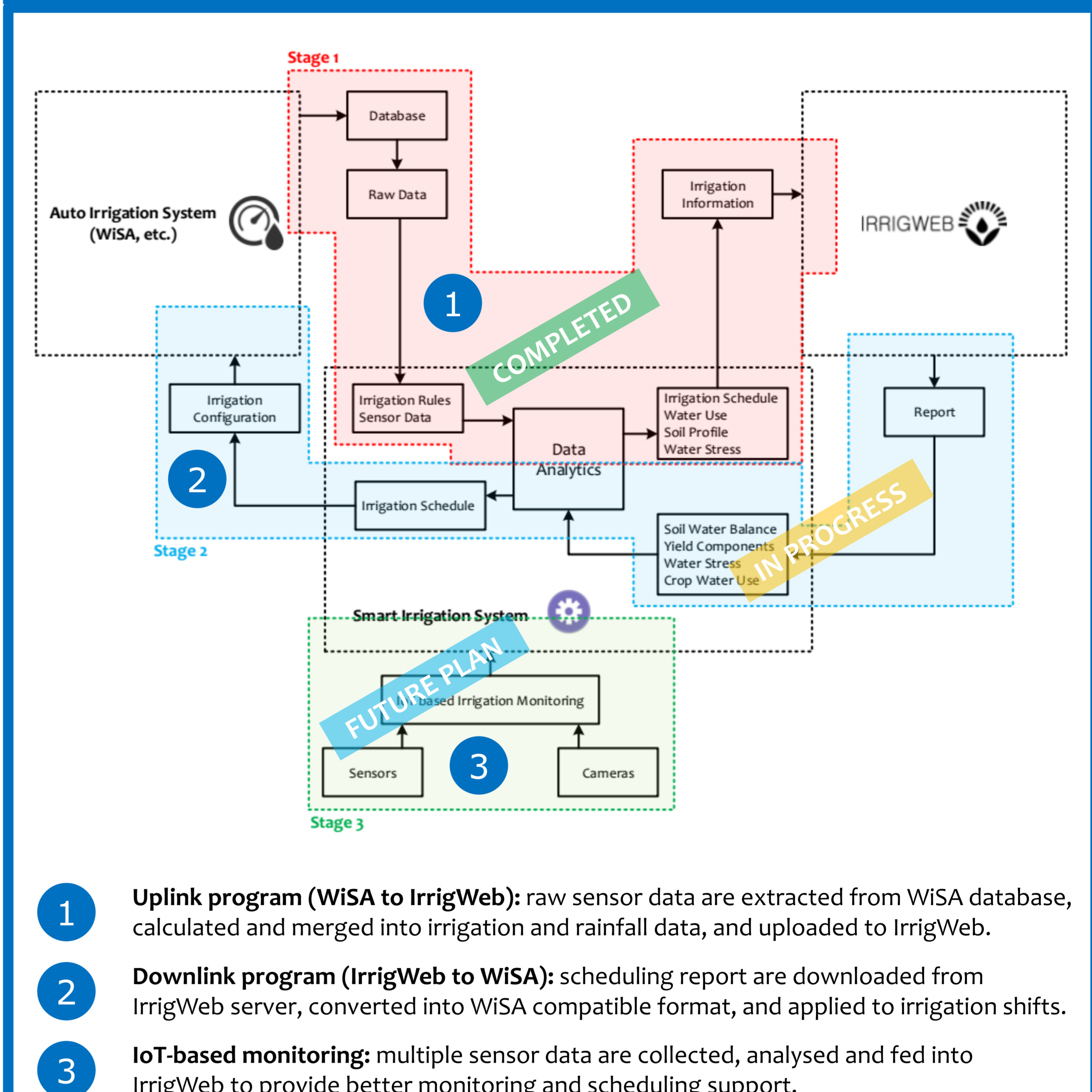
WHAT IS THIS PROJECT ABOUT?

The revised Burdekin water quality improvement plan has aspirations to achieve an 80% reduction in dissolved inorganic nitrogen (DIN). Because of the strong linkage between irrigation management and DIN losses, managing DIN must involve both managing the N rate that is applied, and irrigation subsequent to that. For many sugarcane farmers, irrigation management is a significant time investment due to the need to irrigate almost all year round. Better irrigation practices lead to improved yields through less water stress and waterlogging. Moreover, reduced runoff from excess irrigation can deliver benefits to the environment too.

WHAT DO WE WANT TO ACHIEVE?

This project focuses on improving irrigation management by integrating the WiSA auto-irrigation system and IrrigWeb irrigation scheduling tool to provide a smarter irrigation solution. The system generates a two-way communication channel between these two platforms, and allows them to share data. In the process, sugarcane irrigators will spend less time manually entering irrigation records as it will happen automatically. Many irrigators have indicated that the time taken to keep records up to date was an impediment to using tools like IrrigWeb. The goal is to optimise sugarcane water management by reducing the amount of time irrigators need to invest in obtaining the best irrigation management information, and eventually improve Great Barrier Reef water quality.

SYSTEM DIAGRAM



EXPECTED OUTCOMES

Auto-irrigation management: extracting irrigation information from the auto-irrigation software, uploading to the irrigation scheduling tool and integrating with irrigation records.

Improve irrigation schedule and water use: scheduling the auto-irrigation based on the report extracted from the IrrigWeb report; and

Smart irrigation system based on Internet of Things (IoT): adding extra sensors, cameras and probes to monitor the crop or soil to ensure optimised irrigation and an increased yield.

RECENT SUCCESS

Live Irrigation And Rainfall Data Update To Irrigweb On Aaron Linton's Farm

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1

Name	Date	Block	Water Applied (mm)
Aaron Linton	03/08/2017	D1	0.00
Aaron Linton	03/08/2017	D2	0.00
Aaron Linton	03/08/2017	D3	0.00
Aaron Linton	03/08/2017	D4	0.00
Aaron Linton	03/08/2017	Set 10	0.00
Aaron Linton	03/08/2017	Set 11	0.00
Aaron Linton	03/08/2017	Set 3	0.00
Aaron Linton	03/08/2017	Set 4	0.00
Aaron Linton	03/08/2017	Set 5	0.00
Aaron Linton	03/08/2017	Set 6	0.00
Aaron Linton	03/08/2017	Set 7	0.00
Aaron Linton	03/08/2017	Set 8	0.00
Aaron Linton	03/08/2017	Set 9	0.00
Aaron Linton	03/08/2017	Set 1	0.00
Aaron Linton	03/08/2017	Set 2	0.00
Aaron Linton	02/08/2017	D1	0.00
Aaron Linton	02/08/2017	D2	0.00
Aaron Linton	02/08/2017	D3	0.00
Aaron Linton	02/08/2017	D4	0.00
Aaron Linton	02/08/2017	Set 10	0.00
Aaron Linton	02/08/2017	Set 11	0.00
Aaron Linton	02/08/2017	Set 3	0.00
Aaron Linton	02/08/2017	Set 4	0.00
Aaron Linton	02/08/2017	Set 5	0.00

Irrig/Rain: Set 10, (Aaron's Shed)

Irrigation Details Rainfall Details

2

New Irrigation Record

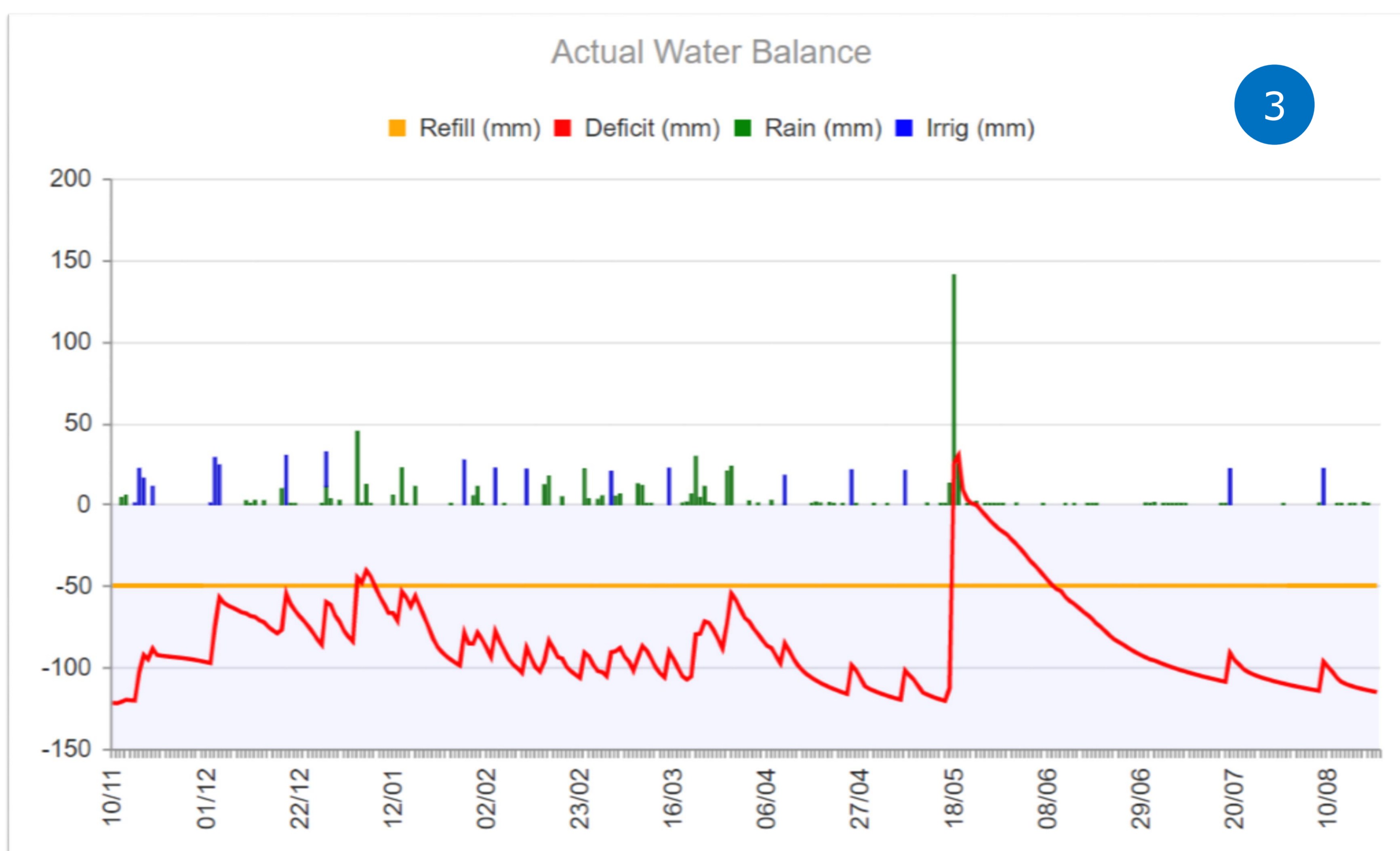
Irrigation Date	Irrigation (mm)	
09/08/2017	21.6	☑ ☒
19/07/2017	21.5	☑ ☒
07/05/2017	20.4	☑ ☒
25/04/2017	20.8	☑ ☒
10/04/2017	17.2	☑ ☒
15/03/2017	21.8	☑ ☒
02/03/2017	19.9	☑ ☒
11/02/2017	21.2	☑ ☒
04/02/2017	21.9	☑ ☒

WHAT HAVE WE

ACHIEVED: The project team has been working on linking Aaron's WiSA automation program to IrrigWeb. The uplink program (WiSA to IrrigWeb) was deployed in Aaron Linton's on-site computer on August 4th, and it connects Aaron's WiSA to IrrigWeb, by uploading irrigation data automatically.

1 Irrigation data extracted from Aqualink.

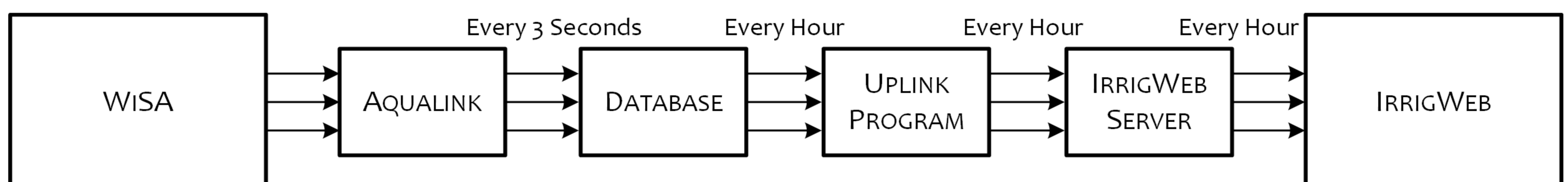
2 IrrigWeb's irrigation records, for Set 10, have been automatically updated.



3 IrrigWeb's Water Balance chart, for Set 10, is automatically populated with irrigation and rainfall records from WiSA.

WHAT'S THE RESULT:

Aaron's irrigation records, that is the date and water amount applied to each irrigation set, are automatically loaded into IrrigWeb. This saves Aaron time and makes the scheduling a more efficient process. Another benefit is that Aaron can now see the exact amount being applied to each field, and make modifications to his irrigation management if they are required.

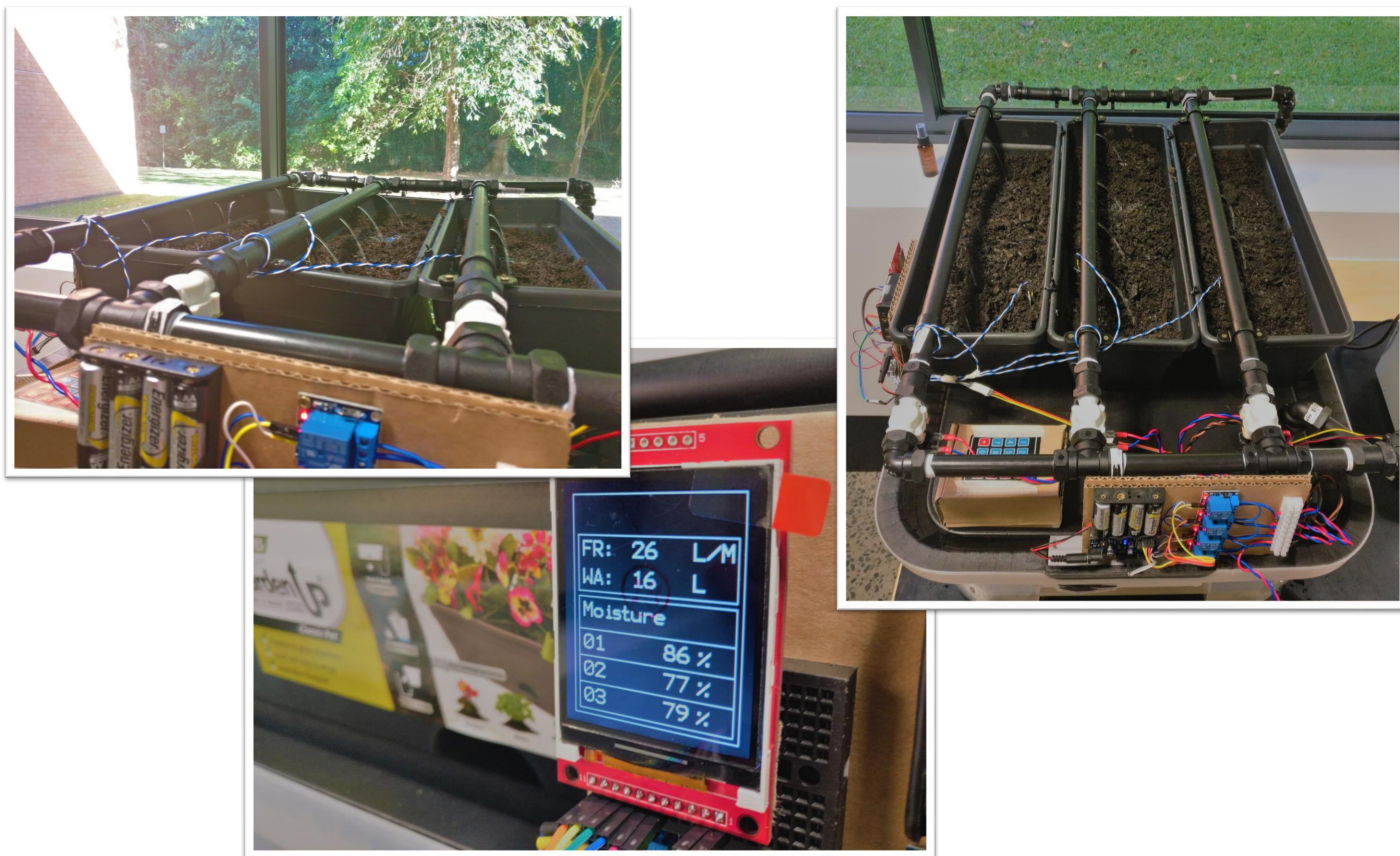


HOW IT WORKS?: This program extracts the irrigation and rainfall data for the past week from Aqualink database every hour, and calculates the daily irrigation data for each irrigation set, i.e., date, water amount applied (litre), water depth applied (mm). The irrigation and rainfall data are then merged and uploaded to IrrigWeb's server on an hourly basis. A job is established at the IrrigWeb server to upload the cumulative irrigation and rainfall data into each user's IrrigWeb.

IN PROGRESS

Auto-irrigation Demonstration Farm at JCU, Cairns

A miniature farm with one 80-litre water tank, one 12v pump, one water meter and three solenoids was set up at JCU, Cairns to demonstrate the auto-irrigation and to test the developed programs. This will be useful to test the linking of the IrrigWeb schedule to the WiSA software, before conducting on-farm trials.



Converting the community garden at JCU to an auto-irrigation farm

The community garden at JCU will be automated using WiSA to replicate a similar set up and attract awareness about the project.

Downlink Program (IrrigWeb to WiSA)

The next stage of the project is to link the IrrigWeb generated irrigation schedule to the WiSA automation software. The team has just started to tackle this, but the likely steps involved will be:

- Export the scheduling report from IrrigWeb to a readable file;
- Obtain the required information for irrigation scheduling from the report, i.e., irrigation set, irrigation date and water applied (mm);
- Calculate the irrigation scheduling information, i.e., water amount (litre) and irrigation duration;
- Suggest an irrigation shift according to the user's preference, e.g., Set 10, Friday, 9:00 PM – 11:30 PM, 450,000 Litre;
- Send the irrigation shift configuration to Aaron for confirmation;
- Automating the irrigation scheduling on Aqualink once Aaron has confirmed.

INCREASED AWARENESS

Project awareness raising has occurred through:

- May 2017, Indigenous Leaders of Tomorrow, JCU, Cairns;
 - May 2017, Cairns Ecofiesta, Cairns;
 - Jun 2017, NQ Dry Tropics;
 - Jun 2017, students and teachers of Home Hill State High School, Home Hill;
- <https://homehillshs.eq.edu.au/Calendarandnews/Newsletters/Newsletters/newsletter-2017-06.pdf>



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