1. **Nominee Statement of about 1500 Words** (in the following format)

(a) Describe the innovation (essential)

IrriSAT https://irrisat-cloud.appspot.com is a weather based irrigation management and benchmarking technology app that uses remote sensing to provide site specific crop water management information across large spatial scales at fine resolution. IrriSAT calculates crop coefficients (Kc) from relationships with freely available satellite derived Normalized Difference Vegetation Index (NDVI) data. Daily crop water use (ETc) is determined by multiplying Kc and daily reference evapotranspiration (ETo) observations from nearby weather stations or nationally provided gridded ETo data. IrriSAT is moving weather-based scheduling into the future. The free IrriSAT app automates satellite processing from both the Landsat NASA satellite platforms and the Sentinel ESA satellite platforms. IrriSAT has been developed using the Google Earth Engine and deliveries crop water use information to assist in irrigation scheduling and crop productivity benchmarking. IrriSAT provides daily crop water use as well as a seven day crop water use forecast. This allows irrigators and water managers to look at crop water use on individual farms as shown below in Figure 1.

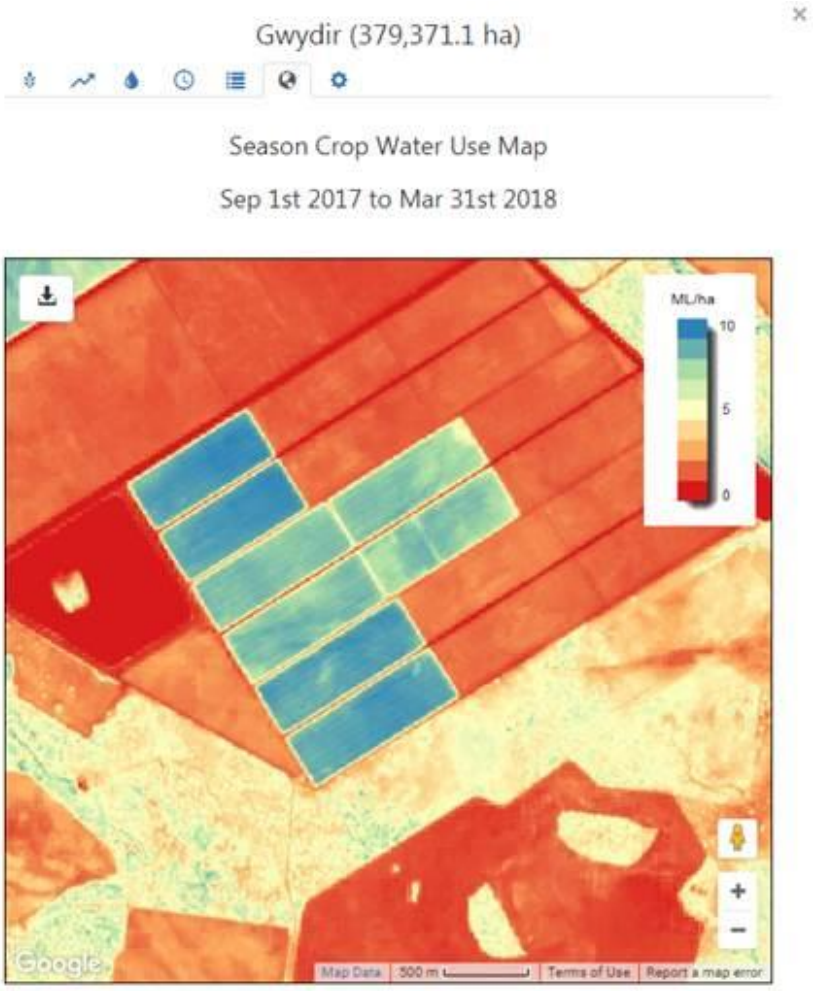


Figure 1. Seasonal crop water map in IrriSAT across an irrigated farm showing cotton crop water use differences within and between irrigated fields.

Or across entire irrigated regions at daily, seasonal or yearly periods as shown in Figure 2. This information can all be freely and easily accessed by users by simply tracing areas of interest with mouse clicks within the app. IrriSAT automates the

satellite remote sensing processing and allows users too quickly and easily access site specific crop water use information.

Previously, what would have taken considerable time and extensive costs in satellite processing can all be done with a few clicks of the mouse button.

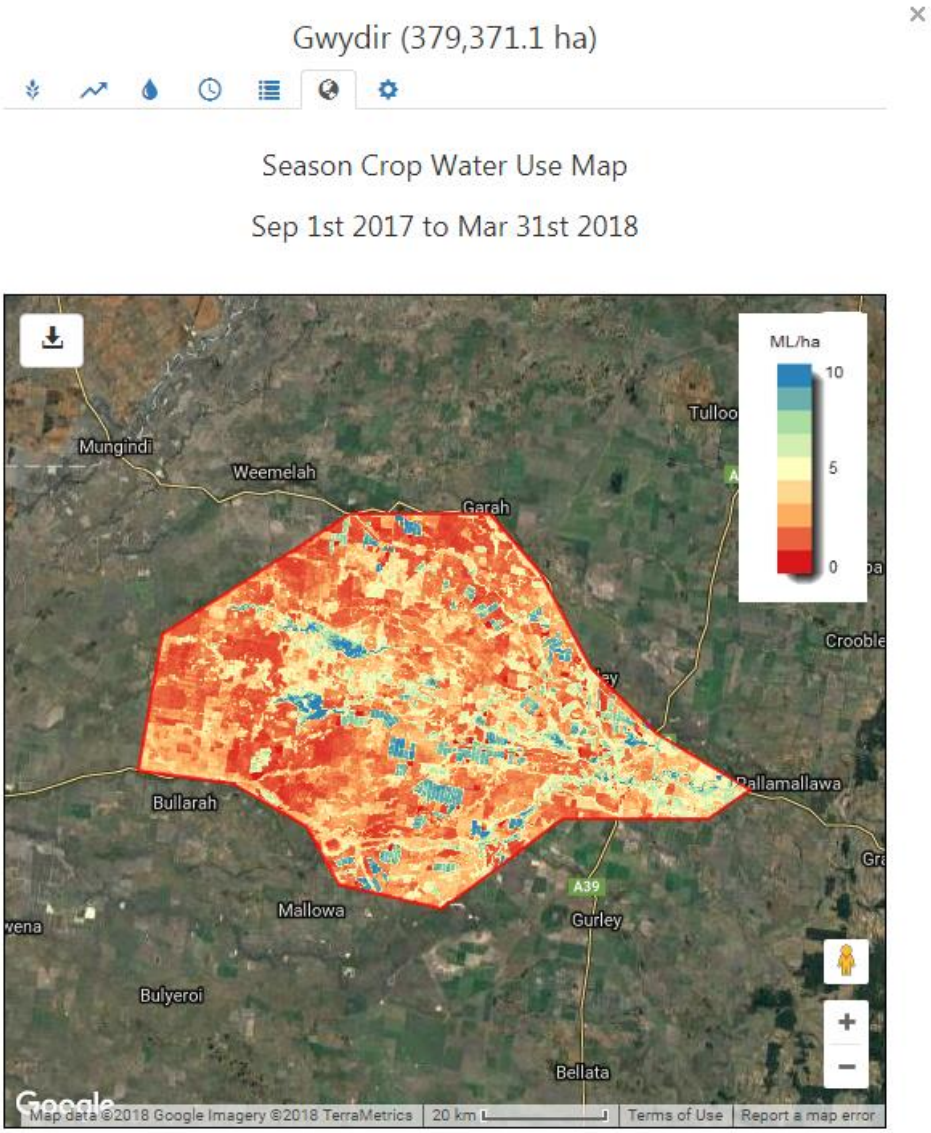
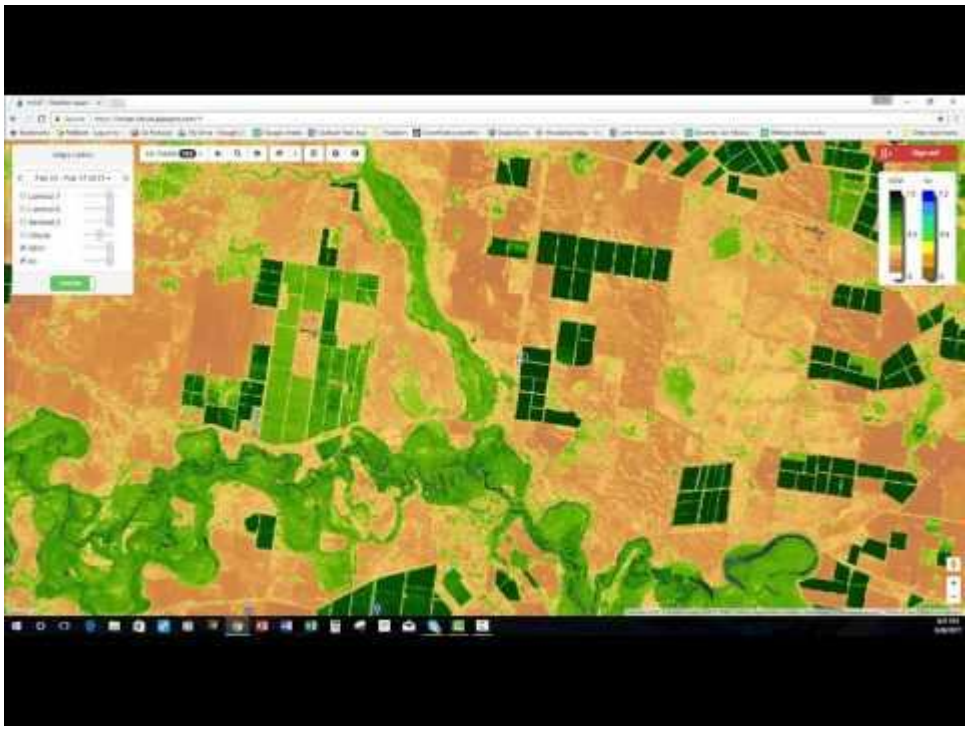


Figure 2. Seasonal crop water use map from the Gwydir Irrigation Area in Australia showing crop water use across the entire irrigated region during the 2017/18 irrigation season.

Irrigators aim to maximize returns per ML and having low cost options which allowing tracking and forecasting of crop water demands is critical in achieving increased water use productivity . IrriSAT helps irrigators apply the right amount of water at the right time, provide benchmarks and examine performance drivers to enable continuous improvement in crop water use productivity.

The YouTube videos embedded below further visually show and describe the system and its application.

https://youtu.be/ccvJizT4Iw0



https://www.youtube.com/watch?v=5qznIkqDsIA&t=323s

(b) Describe how the innovation saves water (essential)

A proper irrigation scheduling method adjusted to the actual crop water requirements is crucial to better use the available water resources. IrriSAT provides users with an

estimate of crop water information that can be used for assisting with irrigation scheduling, ordering water and also benchmarking performance of crops within and between fields and regions.
On a daily basis IrriSAT shows historical and current crop water use for a selected field or region as shown in Figure 3 as well as cumulative crop water from the planting date.

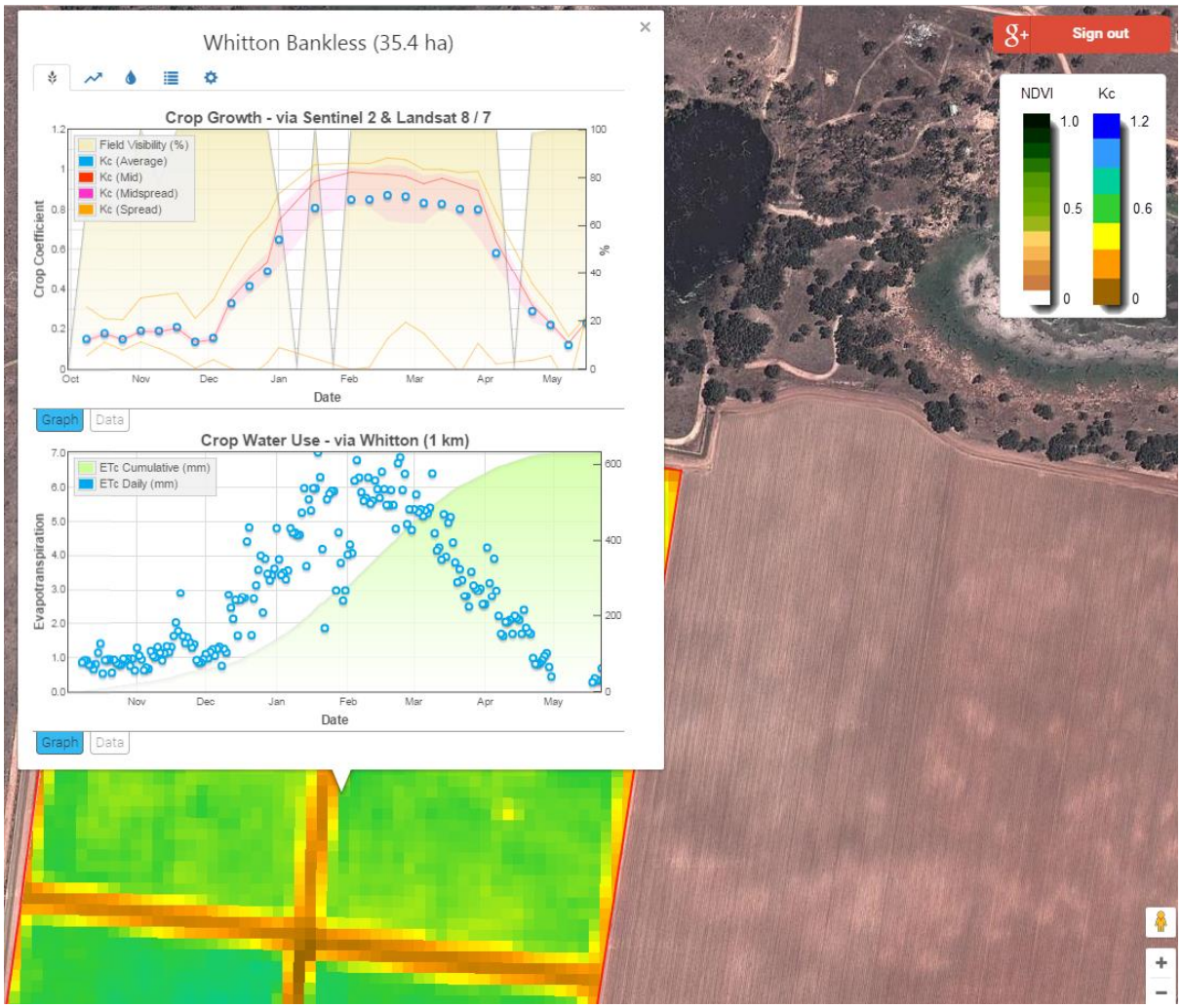


Figure 3. Daily crop water use information displayed in IrriSAT. Satellite and ETo data is automatically ingested into the system as new satellite images and data becomes available.

Users can also enter applied irrigations and the IrriSAT tool undertakes a water balance for the selected field or region showing irrigation deficit information. IrriSAT also undertakes a 7 day crop water use forecast and provides an estimate of the next irrigation time period based on the user selected irrigation deficit. This information can be used for improving irrigation scheduling to better match conditions and also improving water orders/planning to ensure optimal irrigation water is released or available (Figure 4).

IrriSAT users have reported water savings from using the tool in a number of ways. These have included:

- Modifying irrigation timing to better match crop water demands

- Better predicting coming extreme climate events (i.e. high ETc days) and modifying irrigation schedules/deficits to minimize impacts on crops
- Identifying poorer performing areas within irrigated crops and changing management i.e. laser levelling
- Benchmarking performance of irrigated fields across farms and regions and using limited water resources on better performing fields

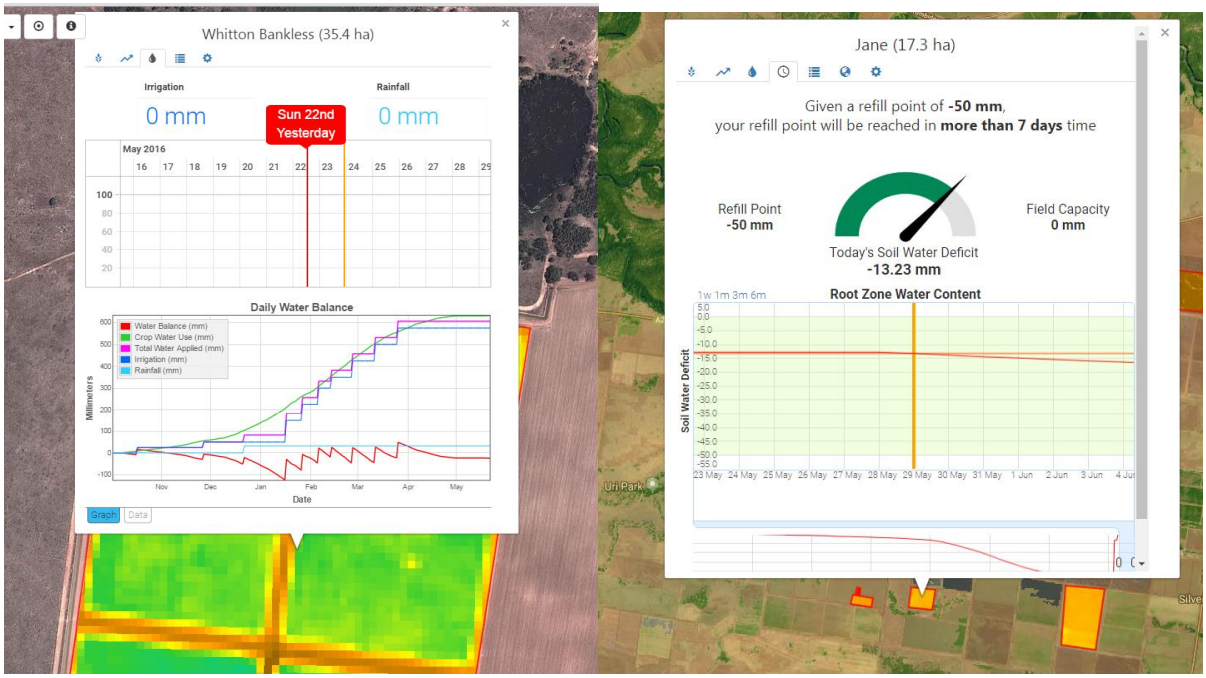


Figure 4. Irrigation scheduling information and forecasted irrigation deficits for the coming 7 days shown in IrriSAT

When collated with yield information collected from the fields/paddocks IrriSAT provides useful information on benchmarking performance and investigating impacts of management practices on water use. Figure 5 shows cropwater use and yield relationships developed using IrriSAT across cotton fields showing the impacts of cotton row configurations, irrigation system types and scheduling approaches on yields. This information is used for benchmarking industry/system performance and also providing benchmarks for irrigators.

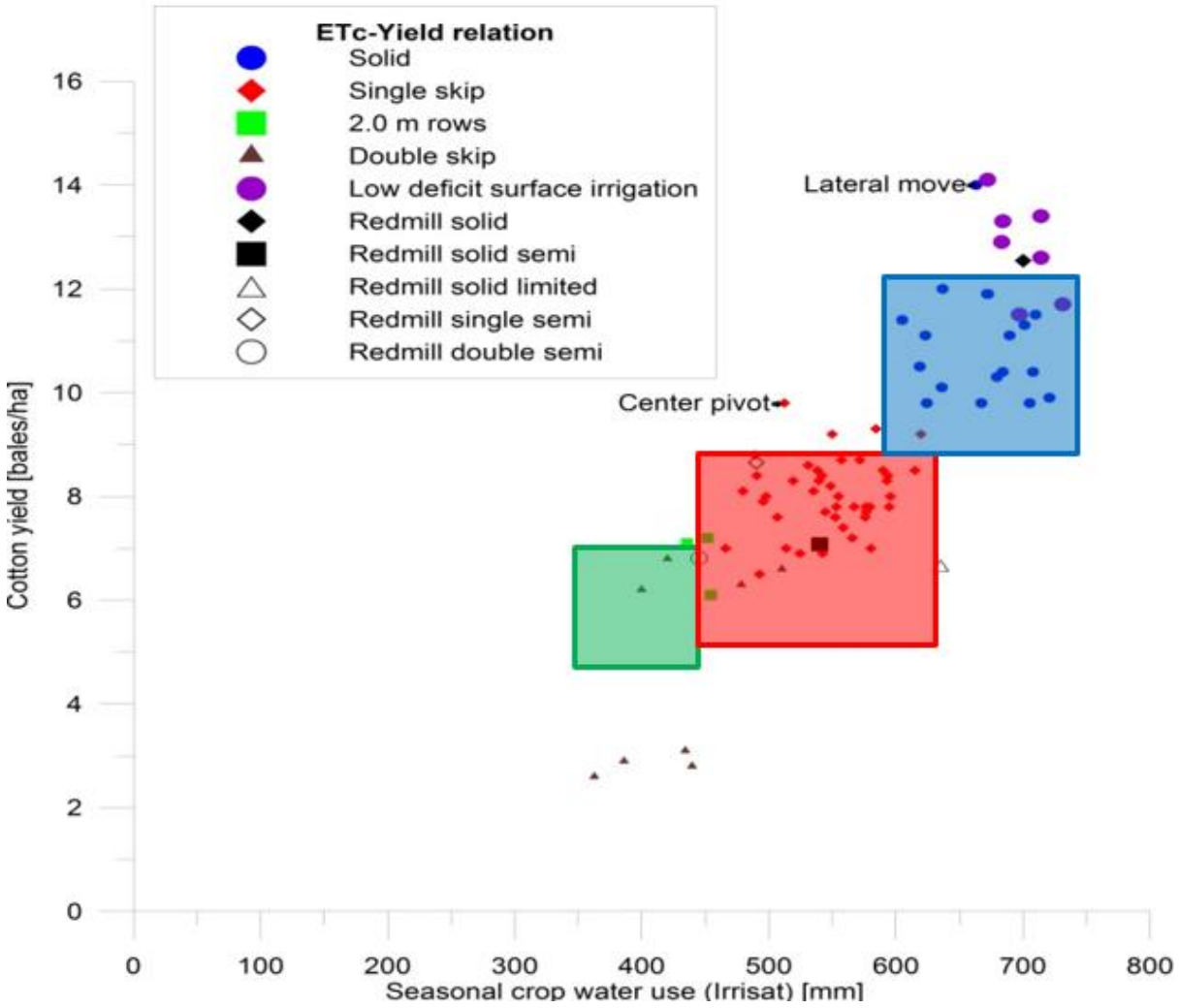


Figure 5. Yield and crop water use relationships developed with IrriSAT showing the impact of irrigation systems, planting configurations and scheduling approaches on crop water use and yield in cotton across the Gwydir Irrigation Area

(c) Describe how the innovation was introduced and spread (for Young Professional award, describe how the innovation will be introduced and spread).(essential)

The IrriSAT app was made available in October 2014 and has seen the current user base grow to over 1500 users as of April 2018. The technology was introduced to irrigators through a range of mediums which included direct meetings and presentations to irrigators and irrigation consultants at farmer field events throughout the Australian cotton and grain growing areas. A series of workshops on using IrriSAT were also held across the Murray Darling Basin to introduce irrigators and also irrigation consultants to the technology.

Traditional coverage of the IrriSAT tool was undertaken in a range of industry magazines and trade events and conferences. A range of social media activities

were also used to showcase and extend the use of IrriSAT and these included YouTube videos, Twitter posts and webinars.
These activities were supported by a range of extension organizations and farmer groups including Cotton Info, NSW Department of Primary Industry, Irrigation Research and Extension Committee and Gwydir Valley Irrigators Association. Figure 6 shows the growth of the IrriSAT user base since its introduction in late 2014.

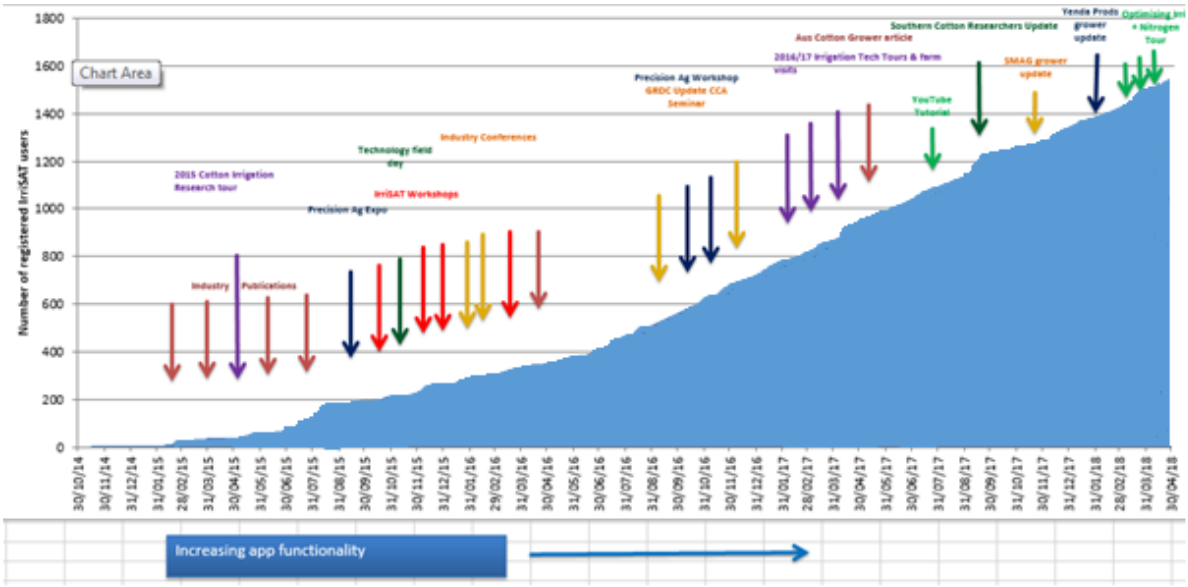


Figure 6. Cumulative increase in IrriSAT users since the technology was introduced and major events associated with the technology.

(d) Describe the scope for further expansion of the innovation (essential)

The IrriSAT app has scope for significant expansion. Currently the IrriSAT app has full functionality across the entire Australian Continent and the entire USA. This allows users in any of these areas to get site specific crop water use information historically and also seven days in advance. Both Australia and the USA have gridded ETo data which can be easily accessed and allows this functionality.

Across the entire globe the IrriSAT app can currently be used to get predicted seven day crop water use forecasts as it currently stands for any point on the globe. Historical, current and seasonal crop water use information could be made available for any area in which gridded ETo data could be supplied for these areas as well. So the technology is easily scalable.

IrriSAT has been applied in a wide range of user environments from irrigators who have never previously used any irrigation scheduling or water management tools to very experienced irrigators who use a range of existing irrigation scheduling technologies. First time irrigation management tool users like the ease of use of the system and its low cost and more experienced tool users see benefits, particularly from the spatial crop water use information provided, which compliments existing traditional technologies such as soil probes. This ability to offer useful information across a wide spectrum of skills and expertise provides great scope for using the IrriSAT app and approach in a range of irrigation environments and systems.

(e) Describe the roles of the individual nominees (optional)

Technical Documents:

https://irrisat-cloud.appspot.com/doc/IrriSAT_QuickGuide_20052016.pdf

http://agronomyaustraliaproceedings.org/images/sampledata/2015_Conference/pdf/agronomy2015final00449.pdf

https://www.cottongrower.com.au/images/articles/c122a3ca300f331ed1a13deeef8e7cc4.pdf

https://link.springer.com/chapter/10.1007/978-3-319-15994-2_18