



Office Use Only

Project Code	
Project Type	

FINAL REPORT 2019

Applicants must read the *SAGIT Project Funding Guidelines 2019* prior to completing this form. These guidelines can be downloaded from www.sagit.com.au

Final reports must be emailed to admin@sagit.com.au as a Microsoft Word document in the format shown **within 2 months** after the completion of the Project Term.

PROJECT CODE : A116

PROJECT TITLE (10 words maximum)
Hi Tech monitoring sites

PROJECT DURATION

*These dates **must** be the same as those stated in the Funding Agreement*

Project Start date	1/3/16					
Project End date	28/02/18					
SAGIT Funding Request	2019/20	\$	2020/21	\$	2021/22	\$

PROJECT SUPERVISOR CONTACT DETAILS

The project supervisor is the person responsible for the overall project

Title:	First Name:	Surname:	
Mr	Leighton	Wilksch	
Organisation:			
Agbyte			
Mailing address:			
Telephone:	Facsimile:	Mobile:	Email:

ADMINISTRATION CONTACT DETAILS

The Administration Contact is the person responsible for all administrative matters relating to the project

Title:	First Name:	Surname:	
Organisation:			
Mailing address:			
Telephone:	Facsimile:	Mobile:	Email:

PROJECT REPORT

Provide clear description of the following:

Executive Summary (200 words maximum)

A few paragraphs covering what was discovered, written in a manner that is easily understood and relevant to SA growers. A number of key dot points should be included which can be used in SAGIT communication programs

3 monitoring sites have been set up at Riverton, Bute & Hart in conjunction with MNHRZ, NSS & Hart FD committee an additional 'Hi Tech' monitoring site was added in 2017 for the Upper North FSG at Booleroo.

The data generated by the sites that growers have found particularly useful has been as the Fire Danger Index information for making decision about paddock operations at harvest time. Observations of data has led to an expansion of the weather station network across the regions to allow for more local & precise FDI information. This has also led to more FDI alerting SMS systems being put into place. This should be noted as a particularly positive outcome from these sites, particularly in the face of current proposed changes to the fire & emergency services bill.

Soil moisture probe information has been utilised by many to assist in making decisions about crop nutrition information with many queries during the past two seasons with dry spring finishes.

The canopy temperature sensors have also led to many questions from growers during frost events. The data generated, whilst not being used to make any management decisions as yet, has been watched with interest to observe just how cold plants are getting during the early hours of the morning.

Project Objectives

A concise statement of the aims of the project in outcome terms should be provided.

The sites have proven to be a very useful resource for community groups to view relevant crop & weather data from. Web site hits for each respective site have reached over 300/day on high FDI risk days during harvest indicating that they are a valuable resource. At these locations, local grain growers & other community organisations have seen the relevance of the data and invested in their own sites to use for making management decisions.

In regards to assisting the respective farming systems groups more 'tuned in' to weather events affecting management decisions, it is thought that these 'Hi Tech' monitoring sites have had a positive impact. The awareness of temperature inversions has also been raised through these weather stations and coupled with the newly installed SA Mesonet, growers now are realising the implications of spraying during inversion conditions and the potential negative impact on other crops & the natural environment.

Frosty conditions during each of the years that the sites have been installed has seen many questions back to the installed about the data generated by the canopy temperature sensors. A greater understanding of the severity of cold conditions and duration of frost events has been garnered by users. This again has led to more thorough investigations of crops in low lying areas after frost events to make robust hay cutting decisions.

The project aimed to bring greater awareness of using weather & crop sensors to making management decisions. Assessments of the web sites hits for each site and the installation of additional stations around each of these original 'Hi Tech' monitoring sites is a sound guide that the objectives of the project have been met.

Overall Performance

A concise statement indicating the extent to which the Project objectives were achieved, a list of personnel who participated in the Research Project including co-operators, and any difficulties encountered and the reasons for these difficulties.

It is believed that the original objectives were met. It was envisaged that there would be increased observation of weather & crop sensors to make better management decisions which overall, has definitely occurred.

Cooperation has occurred with the respective committee's from the following farming systems groups; Hart field day, Mid North high rainfall zone, Northern Sustainable Soils, Upper North in getting feedback from the way data was displayed & what relevance & value was placed on the outputs.

Conversations were had between Leighton Wilksch & dozens of growers & agronomic consultants about the data generated and how it was being utilised to make better management decisions.

Also conversations & feedback was gathered from some of the initial proposed industry specialists including Dr Tim March (frost), Greg Baker (pest Traps), Graeme Tepper (temperature inversions), Dr James Hunt & Allan Rattey (crop growth modeling) as well as CFS representatives (FDI alerting).

The main issues faced were with the ineffectiveness of the Trapview insect traps that saw very poor Etiella catches as well as ongoing maintenance. These in effect have shown to be a reasonable high cost and of low value return.

The other issue was with loading up the respective sites with multiple sensors that saw some short periods when sensors failed. With so many users observing the data on a regular basis, it was readily made known to Agbyte that there was an issue and 'could it please be fixed soon!'. Result of this was that there needed to be prompt response to fix the issue so that data could continue to be utilised by users.

Key Performance Indicators (KPI)

Please indicate whether KPI's were achieved. The KPI's **must** be the same as those stated in the Application for Funding and a brief explanation provided as to how they were achieved or why they were not achieved.

KPI	Achieved (Y/N)	If not achieved, please state reason.
Select locations 2016	Y	
Install sites 2016	Y	
Develop web app 2016	Y	
Meet with stakeholders & review 2016	Y	
Refine web app 2017	Y	
Meet with stakeholders & review 2017	Y	

Technical Information (Not to exceed **three** pages)

Provide sufficient data and short clear statements of outcomes.

Feedback from grower/agronomic consultants discussions as well as observations gathered from the web page hits have allowed for some technical conclusions to be reached regarding the display of the data.

The sensors/outputs that have been highly successful in their value to growers have been the following:

- Canopy temperature for increased awareness of frost duration & severity, although this is still more of an interest tool rather than an output that hard decisions can be made with; the spatial nature of frost (how much has been affected?) is more critical than how severe was it at this site?
- Temperature inversion towers for increased awareness & understanding of events that lead to problematic conditions for spray drift has been a huge success with many users having increased their knowledge about this issue
- Rainfall tallies for a quick check of herbicide residual issues that might present themselves for the following crop (Group B Imi herbicides in particular)
- Soil moisture probes for increased understanding of infiltration & root extractions. Also for quantifying residual moisture that is left after hay of pulse

crops that can be available for the following years crops. Increased adoption of soil moisture probes on grain farms is continuing to assist with in-paddock nutrition decisions as well as potential yield forecasting.

- Fire Danger Index for decision making at harvest time has grown across the state and having these public sites with a broad spread of users has been key. Utilising the grower group network has seen many hundreds of nearby grain growers & other community stakeholders log in on high risk days to see the FDI data. The spread of the SMS alerting systems set up in various regions also resulted in Leighton Wilksch receiving a SA community achievement award in November.
- Spray conditions logging such as leaf wetness, wind speed & direction & delta T has also been popular. With an increase in mobile recording platforms such as Ag World, growers are simply taking a screenshot of their phone when starting/completing a tank of crop protection products and copying to the relevant reco.

The sensors/outputs that have been moderately successful in their value to growers have been the following:

- The Trapview remotely monitored insect traps; in 2016 the traps were set for use with 2G modems which had been phased out and they were largely unsuccessful. They were set for Etiella & Heliothis, it was established by this trial (and others), that Etiella were particularly uninterested in going inside the trap even though they were attracted to the phorenone. Also, the model that the supplier of the Trapview runs with (only through Ag Chem resellers) has seen mixed results as far as adoption. There are other players in this market now with other options for these traps.
- NDVI crop sensors provide interesting information but it really is only showing how NDVI increases during the growing season, then decreases rapidly during senescence. Similar to frost, it is the spatial nature of NDVI that is of interest in making paddock based decisions, so remote sensed imagery is coming into its own here. Possible further work with frost sensors to see how much NDVI is affected by severe frost events could be an avenue of research for these sites.

Conclusions Reached &/or Discoveries Made (Not to exceed one page)

Please provide concise statement of any conclusions reached &/or discoveries made.

In conclusion, these sites have provided many growers & agronomic consultants the experience of using real-time weather & crop data when they had previously had none. There has been excellent engagement with the farming systems groups and feedback about the value & usability of outputs has been forthcoming.

In regards to the critical FDI information, having many users have the *same* information at the *same* time has led to positive practice change for harvesting decisions.

Increasing installations of such weather & crop monitoring sites on farms is a strong indication that this project has left a strong legacy.

Intellectual Property

Please provide concise statement of any intellectual property generated and potential for commercialisation.

None

Application / Communication of Results

A concise statement describing activities undertaken to communicate the results of the project to the grains industry. This should include:

- *Main findings of the project in a dot point form suitable for use in communications to farmers;*
- *A statement of potential industry impact*
- *Publications and extension articles delivered as part of the project; and,*
- *Suggested path to market for the results including barriers to adoption.*

Note that SAGIT may directly extend information from Final reports to growers. If applicable, attach a list of published material.

Main Findings

See Technical Information

Industry Impact

The 'High Tech' monitoring sites have provided many growers & agronomic consultants the experience of using real-time weather & crop data when they had previously had none. The outputs have had direct impact on decision making and coupled with a high adoption of Smart Phone's across the grain growing community, has seen usage that has exceeded the installers expectations.

There has been excellent engagement with the farming systems groups and feedback about the value & usability of outputs has been forthcoming.

Increasing installations of such weather & crop monitoring sites on farms is a strong indication that this project has left a strong legacy.

Publications & extension material

No direct publications were created; rather information was delivered via the web links to the respective weather display sites. These were circulated throughout the respective grower group networks as well as on the Agbyte web site information on how to interpret data is available on the Agbyte web site).

Leighton Wilksch presented multiple times to the grower groups & other community groups (particularly about the soil moisture probes, frost observations & FDI alerting)

over the course of the project.

Path to market

Weather & crop monitoring sites continue to be installed for grain growers & other community organisations which indicated that the market is comfortable with the technology and see value in it.

POSSIBLE FUTURE WORK

Provide possible future directions for the research arising from the project including potential for further work and partnerships.

Possible future work would revolve around improving the temperature inversion monitoring & alerting in line with the great work being done by the SA Mesonet infrastructure.

There could also work to be done with the canopy temperature sensors & NDVI change with frost impact.

Also, further work on combining evapotranspiration, soil moisture usage & NDVI to create crop growth models could be refined

AUTHORISATION
Name: Leighton Wilksch
Position: Director & Ag Technologist
Signature:
Date:17/12/2018

Submit report via email to admin@sagit.com.au as a Microsoft Word document in the format shown ***within 2 months*** after the completion of the Project Term.