

Project Progress Report – January to July 2021

The first M&E Update Report was submitted by Coutts JR in June 2021 for the February to June 2021 period. The report found the project to be making good progress with all milestones on track.

The project is very rich in the quantity and types of data being collected and then utilised to make better farmer decisions. One of the most consistent 'speed bumps' discovered so far in this extension of this project is the quality of data collected from soil moisture probes and farmer yield maps.

For effective extension to take place there needs to be confidence in the data being presented. Soil moisture probes have been found to need adjusting for warmer temperatures experienced over summer. Yield maps that growers believed they had are often not present or low in quality. These issues are being overcome through algorithmic compensation of the soil moisture outputs for temperature and discussions with farmers about the data they have and then seek other forms of data if yield maps aren't available (i.e. satellite imagery, conduct soil surveying such as EM38).

Ongoing monthly delivery partner meetings were valued by those involved and seen as highly useful by allowing input and discussion and providing updates on project progress.

Sensor network activities are on-track with extensive sampling work being undertaken as well as a soil moisture probe audit to ensure regional probe coverage and accuracy.

Regional Innovators Group (RIG)

The RIG continues to provide critical feedback to the project research partners, ensuring the project provides value to farmer decision making in relation to available soil water and climate impacts. The third RIG workshop held in March 2021 was a critical point in the project where the project objectives and component roles were reaffirmed and mapped out for the remaining term of the project. Planning is currently underway for the fourth RIG workshop to be held on 20 September 2021.



Discussion group at the Cootra validation site

As a result of feedback from RIG members, several adjustments have been made in how project research partners interact with the RIG. These include distribution of regular the RIG Report e-newsletters providing critical updates on project progress. Also inviting RIG members to the monthly online project research partner meetings has proven to be valuable. A change of format for the next RIG workshops with more in-paddock activities is planned. Setting up in-season small group discussion groups involving RIG members and local farmers at the validation sites across the region have also been very well received.



RIG Workshop 3, March 2021

CSIRO - Soil Water Sensor Network Development

The CSIRO team delivered several requested outputs around the regional soil water objectives (e.g. probe location optimisation, regional soil water map) that demonstrated that the 'network' is not currently well suited to regional-scale predictions. A regional map of predicted soil water was shared with the RIG that was developed using machine learning approaches highlighting the level of uncertainty around the spatial representation of soil water. The discussion that ensued decided that the current distribution of probes means that their best use is to extrapolate at the paddock and farm level rather than regionally. A protocol has been developed for field sampling for season 2021 on focus paddocks and farms to allow extrapolation of soil water from probe site.

Significant support has also been provided to project the around decisions on nitrogen requirements in response to soil water knowledge which has received very positive feedback from RIG members and farmer co-operators.

CSIRO team members worked with Square V around data visualisations including making plant available water capacity (PAWC) and PAW visualisations available. They have also developed temperature-corrected predictions of soil water for probes across the network and are collaborating with Square V to provide an example of this corrected data via the soil water app to allow project-wide discussion about next steps.

CSIRO have assisted with the analysis and quality assurance of plant available water characterisations and made them available for project use via Yield Prophet®. APSIM and Yield Prophet have been updated with all available new soil characterisation,

significantly improving the performance of APSIM and Yield Prophet for the project sites. CSIRO are providing ongoing support for characterisation via pressure plate analysis and are setting up an analysis on the best techniques for probe calibration after accessing relevant data from SARDI.

SARDI Minnipa Ag Centre – Soil Characterisation, Soil Moisture Assessment, Yield Prophet

2021 pre-season soil moistures undertaken at all 37 sites soils dried, initial soil moisture calculated, and soil nitrogen and phosphorus levels analysed. 2021 in-crop soil moistures currently being undertaken at all 38 probe sites.

Rain out shelters will be placed at 26 cropped sites (wheat and canola) in September 2021 to determine crop lower limits (CLL). Harvest crop samples from each site (both under the tent and outside) will be processed for dry matter, grain yield and grain quality.

Soil characterisations will be undertaken at 10 sites across the region in 2021. The 2019 and 2020 soil characterisation information has been provided to CSIRO for entering onto APSOIL. Yield Prophet reports for the 2021 season on the eight focus paddock sites have been provided for early June and late July.

Square V – Data Visualisation/Application Development

Development of the site began at the start of this year, and an initial beta version of the site was demonstrated at the RIG Workshop in March at Port Lincoln. This site is currently available on the probes.airep.com.au subdomain. Based on feedback from the March RIG workshop and discussions with CSIRO, a new section was added to the site allowing a user to directly compare the past 4 years of probe data at a specific time of year, which is innovative and has been well received. All AIR EP soil probes have now been added to the site and are working with EPAG Research to fix any bugs relating to the specific devices. Working with the CSIRO team, Square V are looking to incorporate temperature correction into the probe data. More work is required to examine dates when heat and frost will affect crops across the region, and to evaluate their effect on yields.

Paddock Validation Sites

Eight validation paddocks for 2021 have been selected in conjunction with the RIG. In each paddock the following aims were determined:

1. To collect detailed information that will help to calibrate soil moisture probes.
2. To collect information on variation of plant available water holding capacity within a paddock and how that impacts on production.
3. To determine how well APSIM/Yield Prophet correlates with water use/plant growth.
4. To determine if changing management practices can improve yields.

2020 activities provided the foundation data that has informed the field trial/demonstration program in 2021. The validation paddocks are being monitored to provide data to the RIG and the wider agricultural community on Eyre Peninsula. Discussion groups are being used to dissect the information collected in the validation paddocks. These are providing insights into how management decisions are formulated, and where opportunities may lie for where sustainable and less risky production increases can be made.

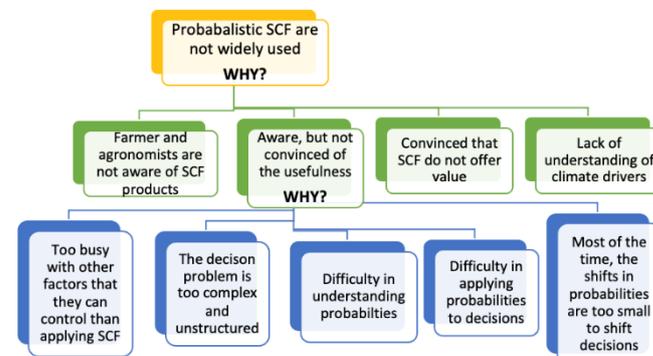
The field experiments are then being used to test the hypothesis developed as part of the discussion groups, with in-field visits being used to evaluate the success of the hypothesis and improve understanding of where gaps of knowledge exist.

SARDI - Climate Risk

Two reports have been produced in the reporting period. Both will be available soon on the AIR EP web site in the Resilient EP blog.

The first uses indices determined in an earlier report to prioritise climate risks and analyse how these risks have changed over recent decades and likely to change in future projections. This report includes statements of confidence (e.g. high confidence that growing season temperatures have increased but lower confidence in changes to rainfall) and reviews appropriate EP climate change projections.

The second report seeks to develop a better understanding of what seasonal climate forecasts are available and improved feedback to BoM from Eyre Peninsula farm advisors and farmers, using a root cause analysis seeks to identify underlying reasons.



This informs how to better communicate with users of climate forecasts:

- Remember that the skill of the forecast increases from a low base through the winter growing season.
- Because dynamic seasonal forecasts are influenced by new developments in the ocean and atmosphere during the season, we need to check the latest update.
- Appreciating that even 80% chance of above median rainfall includes 20% chance of the opposite happening.

EPAG Research- Extension

COVID 19 has limited the way farmers and advisors can meet and interact. However, many late winter field events were still able to take place. Twenty-three extension events have been held this year to date with over 300 growers/advisors participated. Existing networks of farmer groups across Eyre Peninsula are being utilised to extend the information generated by the project. Information gained from R&D within the project in the past year has formed content that has been taken forward to the regional innovators and growers/advisors to educate and apply information gained.

AIR EP - Communications

The project is progressing well with all the communication structures in place (website, twitter, Facebook, YouTube, e-newsletters, RIG meetings and extension events). More consistent communication and extension has been a focus of 2021 so far. The communications team have been practicing with video equipment at discussion group meetings to develop stock footage for videos and photos for communication opportunities.

