



AIR EP
Ag Innovation & Research
Eyre Peninsula

Resilient & Profitable Farming on EP

A new paradigm for resilient and profitable dryland farming on the Eyre Peninsula using data to improve on-farm decision making.

Project objective

New and emerging technologies will be used to assist farmers make efficient use of soil moisture. The Eyre Peninsula has an extensive soil moisture probe network which is underutilised. A *Regional Innovators* group of farmers and advisers will engage researchers and link with the region's farmers to develop techniques to integrate information generated from the probe network, satellite imagery, climate and yield models. Farmers will be able to make more informed, timely decisions underpinned by innovations in agronomy and livestock management in order to optimise the region's productive potential whilst protecting soil and water resources in a changing climate.

Why this issue is important

Current farming systems on the Eyre Peninsula are under stress from the quest for higher productivity that relies on higher inputs and greater management intensity, resulting in a decline in soil quality and ground cover. Significant gains have been made over the past four decades with no till and residue retention systems, however these systems have also created their own issues which were detailed at a workshop held in June 2018 with leading farmers and their advisers at a joint LEADA / EPARF grower group workshop.

Without investment in this project the region will not have the confidence or reliable tools to decide how best to utilise scarce water resources in the region's dryland farming systems. Farmers need to have the knowledge and confidence to assist them to make better decisions in relation to grazing management, utilising out of season rainfall / soil moisture; address poor water holding ability of soils in the root zone; and better manage input costs with better targeted weed and nutrition management systems.

This proposal will unlock value in existing data to drive innovation in agronomy and livestock management by bringing together data from a range of sources including satellite, soil moisture probe networks, weather stations, proximal sensing and yield models. Farmers readily admit to not knowing what to do with the plethora of digital information being generated from a range of sources. Linking data with decision making will enable farmers and their advisers to make more informed and significantly improved land management decisions. The project will ground truth innovative practices that will be targeted to take a paradigm shift in thinking based on the information being generated for on farm decision making.

Project activities.

1. Support an innovative regional group of trusted influencers who will connect directly with growers and create linkages with key researchers, called the *Regional Innovators*, consisting of 12 representatives from consultants, retailers, farming groups, leading farmers and industry

representatives. They will collaborate with researchers ensuring the project will test decisions with rigour and provide real benefits to farmer decision making and farmer's ability to embrace innovation, and to make significant change in land management across the region.

2. SARDI and CSIRO will use geostatistical techniques to review the existing probe network and soil characterisations for coverage and effectiveness in the ability to provide real time landscape scale data on soil moisture status. Gaps in the landscape will be filled and technology updated to ensure a region wide coverage that can provide quality data for on farm decision making. CSIRO and SARDI will calibrate the soil moisture probes and apply geospatial modelling to interpolate the soil probe information at the 44 locations in combination with other soil property data as a means of generating value from the soil probe data at both paddock and regional scale.

3. CSIRO researchers with the Regional Innovators will discuss which decisions may be enhanced using emerging and available digital tools. The top 3 to 5 decisions will be prioritised and analysed to determine their economic, production and sustainability levers which will lead to identification of suitable approaches for testing with digital data. From this CSIRO will develop 5 studies where data layers are assembled to address the decisions identified. With the Regional Innovators, CSIRO and SARDI will determine if the digital approach to the decision would engender a significant practice change which would include identifying which data layers are most useful and what their potential effects are. The outcomes will contribute to field trial design. The aim is to generate maps of 'production risk' as it relates to available soil water and yield potential, to improve decision making relating to ground cover management, feed on offer, crop management and options to optimise dry matter production and reduce erosion risk.

Post-field trial analysis by CSIRO with the field trial team, the Regional Innovators and the App team (Square V) will evaluate the usefulness of the individual data layers at the end of each year to identify the most useful/ adoptable format for delivery of the data.

4. SARDI Climate Applications group will work with the Regional Innovators to determine the influence of the combination of soil moisture and dynamic weather forecasting on farm decision making. A climate risk analysis will be conducted at key sites on Eyre Peninsula. Further analysis will be based on response from the Regional Innovators and more sophisticated seasonal weather forecasting tools from BOM.

5. EP Ag Research and SARDI will establish a set of 24 field trials over the course of the project to validate and demonstrate practices that will take advantage of the new ability to make informed decisions on the soil /water interface across the region. This will include out of season options for dry matter production, use of permanent pasture options in areas that are no longer profitable for cropping, timing of operations to maximise soil water utilisation.

6. Square V will enhance the use of imagery, linking information to decision making through setting appropriate trigger points will be displayed on a user-friendly mobile application. The application will provide real time information to farmers and advisers of approaching critical decision points.

7. A comprehensive multi channelled communications and extension plan will be developed and delivered. Details provided in other sections of this application.

Communications and Extension

A comprehensive multi channelled communications and extension plan will be developed and implemented. The project will have space on the EPARF and LEADA websites, providing a legacy for the project information. Regular project updates will be posted and distributed. Regular field days will be conducted at the validation trial sites over the course of the project.

The *Regional Innovators* will meet biannually to ensure the project it is connecting with the needs of farmers and that effective collaboration is occurring between project partners.

The project progress will be promoted on social media channels. Instructional fact sheets and YouTube videos will be produced and webinars conducted to provide access to all farmers and their key influencers on how to utilise the applications and decision support tools being implemented. Existing communication products including the annual trial result book and stakeholder newsletters will be utilised to promote the project progress. Radio and television media interviews will be conducted over the life of the project to reach a broader audience. The capacity building achieved by the project through the *Regional Innovators* group, the farming systems group members and the broader farming community will leave a lasting legacy for the project outcomes.

Innovation in the project

Eyre Peninsula has an extensive soil moisture probe network, however accessibility and interpretation of the data being generated is frustrating end users (farmers and their advisers). A recent survey of end users indicated concerns including; the need for a mobile friendly application to view soil probe data in real-time; improved presentation and interpretation of data for easier understanding and use; improved understanding of the soil water bucket size; how to better use soil moisture probe data in spatially variable environments; how to better target yields; fertiliser decision making; land use; feed availability; and ground cover alerts.

This project will use new and emerging technologies and tools to assist farmers to improve ground cover, make efficient use of soil moisture and to use farm inputs more efficiently. The technologies and decision support tools will be validated locally to assist farmers make more informed decisions based on soil moisture and improved weather forecasting. The innovation is both in how the new and emerging technologies can be put to practical use on farms for decision making, and how scientists and farmers in the region will be engaged through the *Regional Innovators*. The App proposed in this project relies heavily on connectivity (mobile, internet, satellite). There are parts of the region that may have issues with access to platforms consequently the App will be designed to work offline.

This project will be ground driven, engaging key farmers and their trusted adviser network, creating linkages and developing trust between the scientists developing the technology and farmers who will be applying it. The project is drawing on scientific expertise (knowledge partners) from CSIRO, SARDI and EP NRM Board, SquareV and regional farm advisers and R&D providers; and extension and communication expertise from the two farming systems groups in the region, LEADA and EPARF.