Stress Testing Regenerative Agricultural Practices

Building resilience and sustainability in southern Australia's farming systems

Why this project

This project represents the first comprehensive, region-wide evaluation of novel regenerative agriculture practices in Australia's southern grain-growing areas.

Climate change and increasingly variable rainfall demand systems that can thrive under dry conditions. This project will help farmers and researchers understand how regenerative practices can improve soil health, drought resilience, and long-term farm viability.

Principles of Regenerative Agriculture

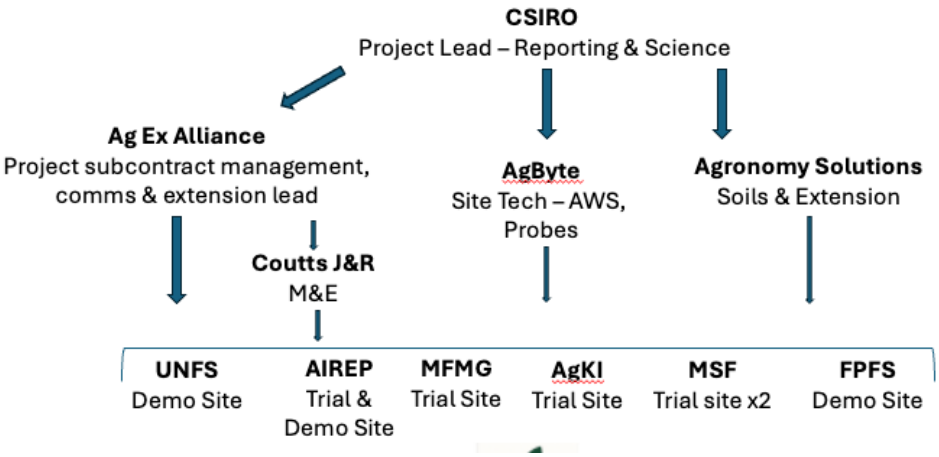
Regenerative agriculture follows five key practices:

1. Not disturbing the soil through reduced tillage
2. Keeping the soil surface covered with cover crops or mulch
3. Maintaining living roots in the soil
4. Diversifying crops through rotation and intercropping
5. Integrating grazing animals into the system.

These practices seek to improve soil health, enhance biodiversity, build ecosystem resilience, and reduce the reliance on synthetic fertilizers and pesticides.

Project Aims & Outcomes

The project aims to rigorously study regenerative cropping and pasture management to boost drought resilience in southern Australia's dryland farming systems. It is farmer-led with scientific support from CSIRO, involving five long-term trials across key eco-climatic zones and four large demonstration trials. The data collected will be modelled to predict outcomes of different management scenarios, helping stakeholders visualize impacts on soil resilience and sustainable productivity. A robust monitoring, evaluation, and communication strategy will ensure transparency, stakeholder engagement, and value delivery throughout the project.



Credible Science Based Research

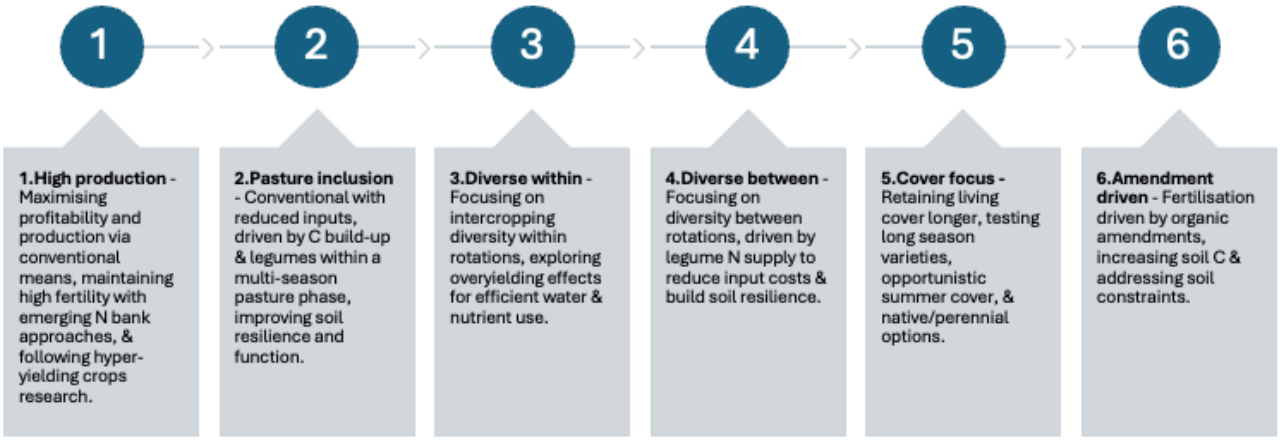
The research in this project is led by an experienced and highly respected team from the CSIRO. Dr. Mark Farrell leads the overall project, with Dr. Roger Lawes specializing in big data and AI to extend observational insights beyond limited data points. Dr. Gupta Vadakattu and Dr Ruth Gomez Exposito focus on soil function and the interactions between soil, microbes, and plants, which are critical for understanding resilience in grains systems. Their combined expertise ensures a strong scientific foundation for the research and its application in dryland farming.

Achieving Success Through Strong Partnerships

The project involves a diverse group of partners, each playing specific roles. CSIRO leads the project, while Ag Excellence Alliance coordinates research trials, demonstrations, extension, and monitoring with regional farming groups that will implement the long-term and demonstration trials, ensuring local relevance and farmer engagement. Technical partners Agbyte and Agronomy Solutions will provide environmental sensing and soil analysis expertise. This collaborative approach integrates scientific research with practical farming knowledge and extension services.

LTT Treatments to Test Drought Resilience

Six core treatments will be tested to improve drought resilience. These varied approaches will help identify the most effective practices for dryland farming systems.



Measurements & Modelling

The trial and demonstration sites will be extensively measured and monitored over the course of the project. Advanced techniques like stable isotope analysis will quantify legume-fixed nitrogen and fertilizer use efficiency. Soil chemical and microbial properties will be monitored to assess health and resilience, greenhouse gas emissions will be evaluated, and drought stress responses will be measured using cutting-edge methods. CSIRO's modelling tools will scale these findings across southern Australia, predicting where regenerative practices can be most effectively deployed and estimating their broader environmental and economic impacts.

Project Contact

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Stress Testing Regenerative Agricultural Practices

Project Lead

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Key Project Partners

AgExcellence Alliance, Fleurieu Farming Systems Inc., MFMG, AGKI Agriculture Kangaroo Island, UNFS, AIR EP, Mallee Sustainable Farming, Agronomy Solutions, agbyte

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