



Department of
Primary Industries and
Regional Development

Protect
Grow
Innovate

Katanning Research Station Showcase

17 August 2023

Projects and initiatives



About us

We are a sheep, pasture and cropping research hub. Our digital agriculture technologies and management systems are designed to lift productivity and lower greenhouse gas emissions. Our research includes the:

- genetics (breeding values) of feed intake efficiency in sheep
- impact of feed supplements and forage combinations on methane production of sheep
- evaluation of novel pasture species to develop livestock systems of green feed year round
- saltland rehabilitation program that aims to halt and reverse salinity (surface water management and groundwater drainage), and provide out-of-season feed (the planting of native trees / shrubs / saltbush / perennial grasses)
- management and monitoring of the National Genetic Resource Sheep Flock, a genetic research resource for difficult to measure traits such as feed intake efficiency
- national sire evaluation program (managed by Australian Merino Sire Evaluation Association for more than 20 years)
- management of the 'Yardstick' flock in partnership with industry.

Located 8km east of Katanning, our Station demonstrates how technology can be integrated into farm businesses.

Onsite facilities

- Animal house that houses up to 80 sheep in individual pens.
- 50 paddocks (ranging from 2 to 50 hectares) including 67 one-hectare lambing plots with water, feed troughs and moveable straw bale windbreak.
- Sheep yards and 2 shearing sheds.
- Silos for grain and pellets.
- One large hay storage shed.
- Mechanical sheep handling devices.
- Trucks with stock crates and feed trailers.
- Meat processing facility and cool room and freezers.
- Standard commercial broadacre cropping farm machinery.
- Fully mobile small research plot gear.
- Our soils range from light deep sand, gravel over clay, and light clay.

Equipment

- 10 soil moisture sensors.
- 3 mobile weather stations.
- A station connected to the Bureau of Meteorology network.
- Silo monitors.
- Gate and water tank sensors.
- A central command centre that monitors the Station.

Project: Achieving carbon neutrality by 2030

Project manager: Mandy Curnow

Team: John Paul Colins, Justin Hardy, Darren de Vos, the Katanning Research Station team, and affiliated research staff in soil assessment, vegetation, grains and livestock.

Project summary

In alignment with the West Australian Government's commitment to reducing emissions, we have set a target of net zero emissions by 2030. We conducted a baseline assessment of our carbon footprint in 2020, which serves as the foundation for the Carbon Neutral Implementation Plan.

Project aim

- Achieve carbon neutrality on the Station by 2030.
- Support and demonstrate tested carbon neutral options for broadacre livestock farmers in WA.

The project involves testing and demonstrating carbon neutral options including:

- improved pasture legume management
- feed optimization
- alternative energy sources
- revegetation
- anti-methanogenic feed additives.

We are working closely with farmers, industry experts, and researchers to assess the viability, efficacy, and scalability of these options.



By equipping farmers with the necessary tools and knowledge, the project strives to support the reduction of emissions within the livestock and cropping sectors and contribute to the government's broader sustainability objectives.

Current projects

- Implement saltland rehabilitation to enhance productivity and improve biodiversity (see our saltland rehabilitation project).
- Acquire 4 greenfeed machines to measure sheep methane emissions in paddock.
- Adopt a strategy to reduce the total stock number through efficient flock management and the purchase of research animals.
- Implement on farm fodder production to decrease purchased feed.
- Evaluate current soil carbon levels and explore methods to enhance carbon content.

Industry impact

The agricultural industry is experiencing growing pressure to improve sustainability and reduce emissions.

This is driven by government and social demands, as well as the necessity to maintain access to export markets.

It is crucial for our industry to proactively develop and adopt technologies that support this transition.

Using research and demonstration, we aim to support the industry in implementing practical and effective strategies at a whole farm scale to achieve its emissions reduction goals.

The project will continue to focus on research and development, exploring emerging technological advancements that have the potential to further assist the industry in achieving emissions reductions.

By staying at the forefront of innovation, we can continuously identify and evaluate new solutions that contribute to a more sustainable agricultural sector.



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Project: SheepLinks – Carcasse feedback for improved on farm productivity

Project manager: Claire Payne

Team: Ashleigh Lydon.

Project summary

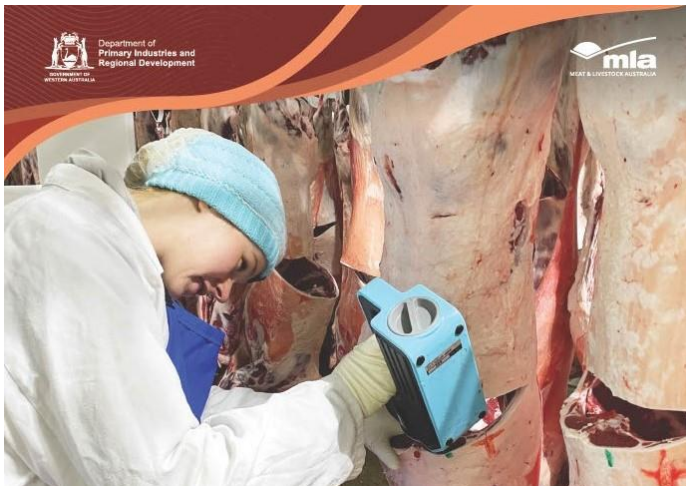
Lean meat yield and eating quality are important profit drivers that create value across the supply chain.

Despite this, the current methods of measuring lean meat yield and eating quality in lamb are inaccurate or non-existent.

This results in poor feedback to consumers and slows improvements in these traits. The development of technologies that objectively measure carcasse quality traits, including the installation of DEXA at WAMMCO, now provide accurate carcasse feedback to producers.

This project includes:

- assisting producers through the Meat the Market Profitable Grazing Systems program
- training consultants to be coaches and facilitators for the profitable grazing systems program
- developing case studies and value propositions around the use of carcasse feedback on farm
- a large-scale economic evaluation of accurate carcasse data and price signals to the WA sheep meat industry.



The Profitable Grazing System increases the capacity of lamb producers to deliver carcasses to specification every time by:

- understanding lean meat yield, eating quality and objective carcasse measurement
- understanding consumer requirements, processor grids and feedback
- developing practical solutions to increase compliance, using genetics, nutrition and management.

Project aim

- Develop and support 40 farm businesses through a customised adoption project involving the Meat the Market Profitable Grazing System Program.
- Producers involved will improve their understanding of:
 - lean meat yield
 - eating quality and objective carcass measurement
 - consumer requirements
 - processor grids and feedback
 - practical on-farm solutions to increase compliance.
- Create supply chain groups and build relationships between producer and processor.
- Develop a value proposition, including a cost benefit analysis for the integration of lean meat yield and eating quality feedback on farm.
- Deliver a detailed economic report of the value of lean meat yield and eating quality data on-farm within WA supply chains.

Industry impact

This project equips sheep meat producers with the tools to:

- implement management techniques that improve lean meat yield, eating quality and compliance to market specifications
- facilitate selection decisions that balance the antagonistic traits of lean meat yield and eating quality.

This enables producers to produce and breed high quality and high value lambs for the future, boosting the value of chilled lamb which is currently worth over \$350 million in exports.

It will reduce the level of non-compliance to market specification, which currently costs the Australian lamb industry excess of \$8.4 million per annum.



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Project: The genetic resource flock project

Project manager: Beth Paganoni

Team: Stacey Egberts, Kirsty Cunningham, Brittany Bolt, Amy Bowden, Tom How.

Project summary

The Resource Flock Project generates data for the genomic prediction of Australian sheep.

This data can be used to increase the accuracy of genomic prediction.

Data is collected for carcass and eating quality traits (rarely measured by breeders).

These traits have a large economic value in the breeding goal and genetic improvement of sheep and will greatly enhance genomic selection.



Project aim

- Develop breeding values for eating quality and meat yield.
- Develop eating quality indexes.
- Develop a single step for meat eating quality breeding values.
- Develop single step analysis for other traits ongoing.
- Improve in accuracy of genomic testing.
- Assess the value of full genomic sequence analysis (Biobank of DNA).
- Provide clues in gene affecting traits in using high density and sequence data.
- Develop technology to measure intramuscular fat content.
- Grade yearling Merinos.
- Improve the accuracies and link data with MERINOSELECT and LAMBPLAN.
- Become a valuable resource for other research projects.



Industry impact

This project is key in the development of a breeding program infrastructure for Australian sheep in the new area of genomic selection.

It will put us in a competitive position globally.

This has already changed the direction of genetic improvement of lamb towards improved eating quality.

Improvement to production efficiency and an increased rate of genetic improvement for reproductive efficiency can be expected in the coming years.



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Project: Adding sustainability traits to the genetic resource flock (phase 1)

Project manager: Beth Paganoni

Team: Brittany Bolt, Amy Bowden, Tom How, Ashleigh Lydon, Stacey Egberts, Kirsty Cunningham.

Project summary

Reducing greenhouse gas emissions from ruminant livestock is a goal for us and Meat and Livestock Australia.

Ruminant livestock produce greenhouse gasses, including enteric methane as a bi-product of natural digestion.

Enteric methane emissions represent lost energy for productivity such as lean meat production. It contributes to production inefficiencies and potentially, climate variability.



We are investigating the relationships between feed intake, body composition and methane emissions and how variable these traits are genetically.

Project aim

- Measure up to 700 genotyped lambs for feed intake, growth, methane production and body composition.
- Collect data to make quantitative estimates of genetic parameters for feed intake in sheep including:
 - heritability estimates
 - genetic correlations
 - Australian sheep breeding values (ASBV).
- Compare feed intake and body composition to determine the differences between sheep that have low or high feed efficiency.
- This data will be available to Sheep Genetics for calculation of genetic parameters. This will then be made available to the sheep industry.

Industry impact

This project will contribute to the development of ASBV.

This will assist producers in selecting animals with better feed-use efficiency for desired products and lower enteric methane production.

This project will assist the Australian red meat industry to meet current and future market expectations regarding sustainability, including our commitment to carbon neutrality across the livestock sector by 2030.

Project: SheepLinks – FEED365

Project Manager: Daniel Real

Team: Clinton Revell, Paul Sanford, Angelo Loi, Justin Hardy, John Collins, Claire Payne, Maddie Mellawage, Andrew Van Burgel, Janet Conte, Perry Dolling, Daniel Cox, Shahab Pathan.

Project Summary

Grazing systems in southern Western Australia are challenged by climate variability with increasingly hotter and drier seasons.

It is likely that:

- the annual pasture growing season will shorten
- more rain will fall outside the growing season
- the frequency of false breaks will increase
- winter pasture production will decline.

To address this, FEED365 aims to redesign livestock forage systems for grazing all year round.



We are collaborating with six grower groups to evaluate animal production from an extensive range of forage species combinations including:

- shrubs
- perennial legumes and grasses
- annual legumes
- winter forages
- grazing crops
- opportunistic summer crops
- crop stubbles.

Project Aims

- Develop productive and resilient pasture / forage systems for the WA Wheatbelt.
- Increase forage availability during critical feed gaps.
- Quantify the livestock production on a range of feed base options.
- Report on the performance (availability and feed quality) of each forage species individually and as part of a multispecies forage production system.
- Provide the newly developed production systems, principles and bioeconomic modelling to growers.

Industry Impact

We will create awareness and provide forage options to growers that will improve their livestock systems operation.

This improved feed base system will increase whole farm profitability by at least 10%.

The implementation of new forage combinations will reduce feed gaps leading to 30% less supplementary feeding costs.



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Name of Project: Land Rehabilitation Works

Project Manager: Justin Hardy and John Paul Collins

Team: John Firth, Darren DeVos, Ron Master and Paul Raper.

Project summary

The opportunity to reduce emissions and supplementary feeding includes:

- alternate legumes
- saltbush
- browse shrubs
- rotational grazing.

The options identified to sequester carbon utilising vegetation include:

- saltbush and fodder shrubs
- windbreaks
- shelterbelts
- alley farming
- remnant vegetation rehabilitation
- permanent eucalypt and Sandalwood plantations.

In April 2021, implementation began following a farm planning workshop involving station staff, experienced industry practitioners and local land care.

We used a multifaceted approach using:

- annual legumes
- perennial pastures
- shrubs for grazing
- revegetation for land restoration and biodiversity
- engineering solutions (surface water control and groundwater systems).

Project aim

- Showcase a multifaceted approach to land rehabilitation on over 24ha of the property.
 - Revegetation techniques to rehabilitate land and maximise local native plant species biodiversity plantings (site preparation, species selection, establishment).
 - Preferred groundwater drainage design and construction techniques.
 - Exploration of installing a solar reverse osmosis desal production bore.
 - Field base tour of the whole site for extension and education purposes.
- Showcase industry practice in establishment and management of saltland pastures on over 90ha of the property.
 - Site assessment, design, preparation, species selection, planting, and grazing management (understory perennial pastures and saltbush fodder).
 - Set and record biomass and sheep grazing targets.
- Investigate measurement methodologies and techniques in environmental indicators for use in natural capital accounting frameworks for the region.
- Investigate measurement methodologies and techniques in soil and above ground carbon capture and sequestration for use in the property emission reduction account.

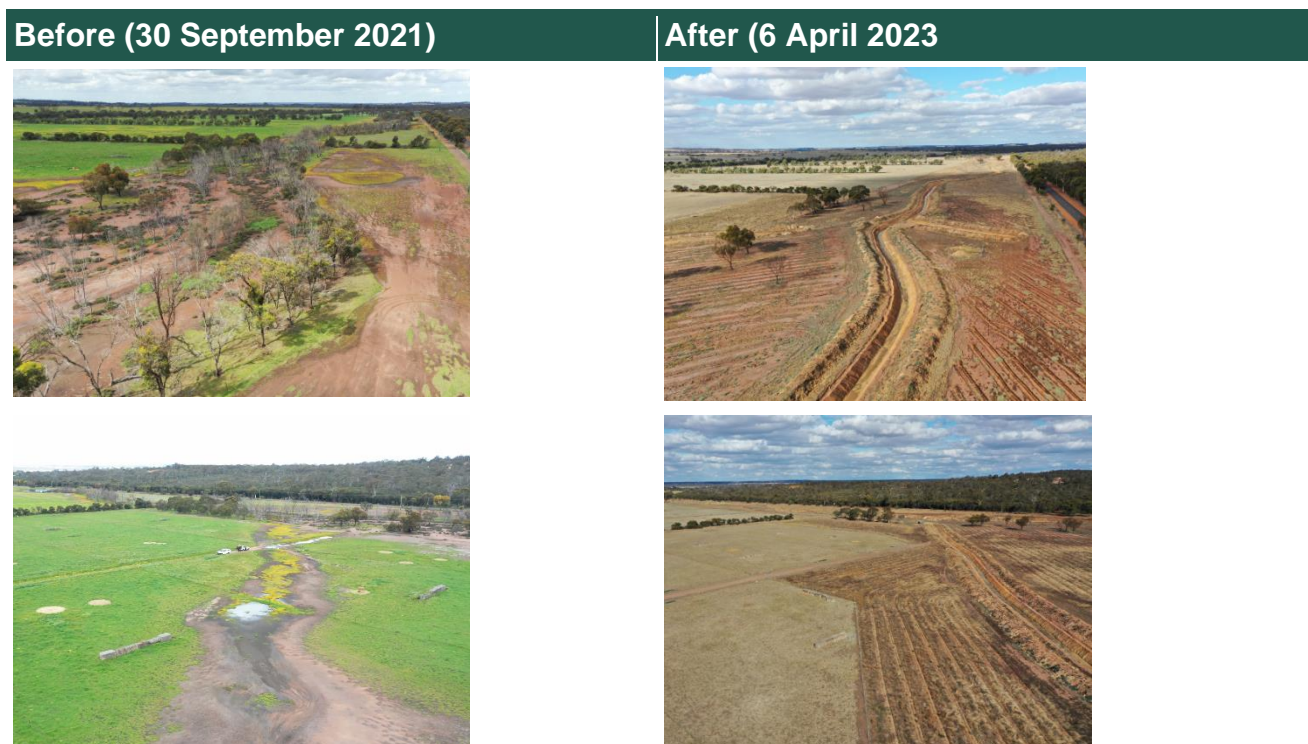
- Establish online information, knowledge, and exchange hub on our website.
 - YouTube [videos](#) specific to engineering techniques in groundwater management.
 - Interactive web tools provide self-guided tours of the field sites and track changes over time on key environmental indices.
 - QR code information nodes specific to key field-based monitoring points highlighting changes over time of key indices.
 - Paddock QR code signage that can be accessed during a field tour and/or from a virtual site map.

Industry impact

Much of the marginal and moderately salt affected land that has previously been cropped is suitable for either grazing production or land rehabilitation. In some cases, land holders aim to return saltland to cropping using engineering structures.

These land rehabilitation activities provide an opportunity to showcase best practice to industry in plant based and engineering solutions.

The land rehabilitation work demonstrates to industry practical strategies in moving to a carbon neutral status in building the natural capital asset of farmland.



Please see link [here](#) to a 30 sec drone video taken on **16 August 2023** of the section of drain and rehabilitation shown in the before and after photos above and that was completed in 2022.

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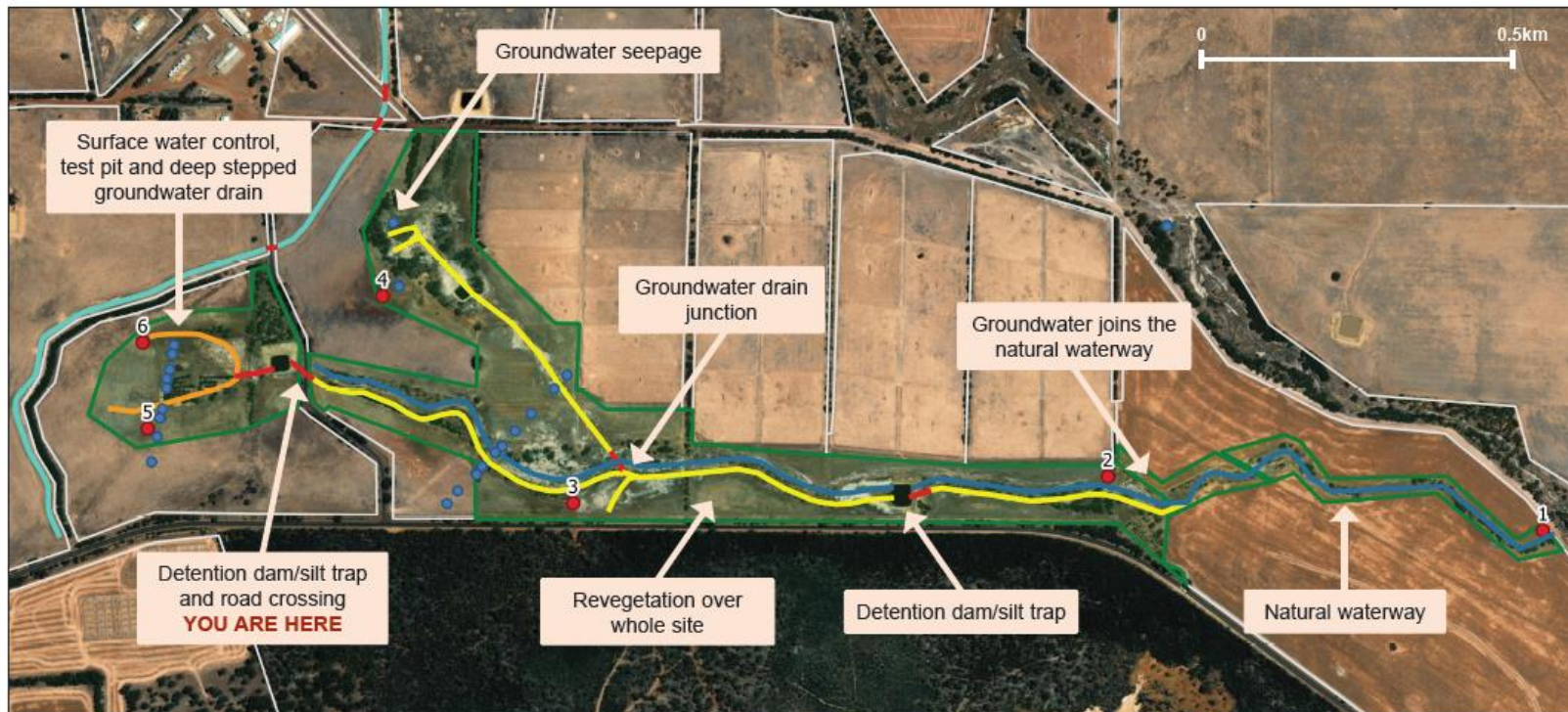
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Revegetation and groundwater drain



Legend

- Reveg-fencing
- Earthworks**
- Deep stepped groundwater drain
- Stepped groundwater drain
- Pipe
- Waterway
- Broadbased bank
- Monitoring bores
- Test-pits
- Paddock boundary

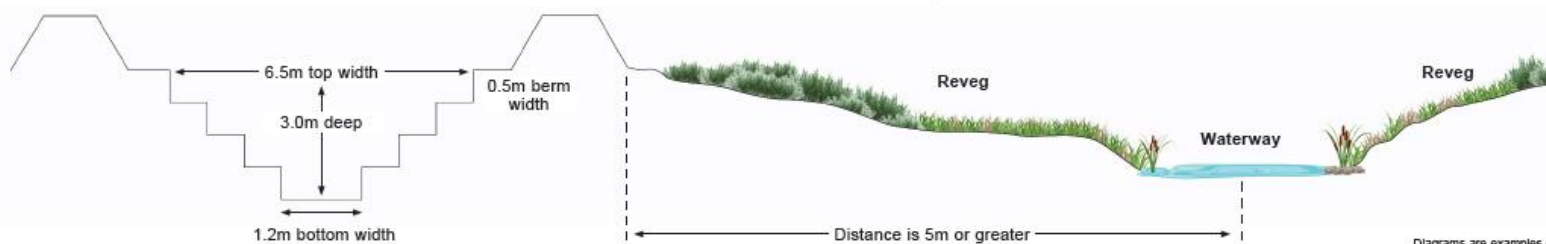
Further information

For the most up-to-date information, contact the Katanning Research Station

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Drain schematic drawing



Diagrams are examples only

Important disclaimer: The Chief Executive Officer of the Department of Primary Industries and Regional Development and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.

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