# Davies Livestock Research Centre

## Strategic Plan 2021 - 2025

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make history.

The Davies Livestock Research Centre will deliver solutions for our livestock industries to enable their growth in the areas of wellbeing, genetics, productivity and product quality.

We will achieve this by having a thriving convergence science research environment focused on developing knowledge and outcomes that can be readily implemented in industry.

We aim to grow our research program to $10M turnover by 2025 underpinned by industry partnerships, developing people and targeted infrastructure development.

## Summary

John S Davies was a respected grazier who generously bequeathed properties to the University of Adelaide. The proceeds from the sale of these properties have been invested and an annual disbursement supports the operations of the Davies Livestock Research Centre. It is our responsibility as stewards of the disbursement to maximise the scale of research for the benefit of our livestock industries.

The Centre is based at Roseworthy Campus and encompasses activities from basic and applied research, development, awareness, and adoption of solutions. Our core research programs are Wellbeing and Health, Breeding and Genetics, Sustainable Productivity, Meat and Wool Science, and Capacity and Adoption. Our primary, but not sole, industries are beef and sheep.

*As the child feeds the cow, so the cow feeds the child.*

### Research Program Development

We partner with industry across the value chain to co-invest in projects with the aim of collaboration, co-learning and creativity. We will collect baseline data on traits of interest that span growth, reproduction, productivity, product quality and disease incidence. Measures of pain and wellbeing will be included when available. We will trial interventions, such as management changes, supplements, or therapeutics, with industry partners to optimise their use before broader adoption and implementation efforts.

Alongside applied research programs, we will continue to evolve our understanding of the underlying biology of complex traits. Overall, this approach will enable development of solutions for priority industry issues, whilst undertaking research ranging from basic understanding to quantifying the impact and benefit of adoption. Thus, our approach is to focus on adoption partnerships and strategic use of bequest funds to ensure a pipeline of research outcomes and capacity building of staff and students.

Excellence in research and research training is fundamental to the discovery, development and successful adoption of new approaches to livestock production. Key to this strategy is building convergence science partnerships across all of University of Adelaide's Institutes and Faculties as well as with Primary Industries and Regions SA, interstate and international partners. We prioritise resources toward activities that develop people in teams, conduct high quality research, and deliver solutions to industry.

Where appropriate, we will secure and commercialise IP with delivery for industry being our primary motivator while continuing to publish for maximum impact.

Roseworthy Campus is a key University asset. We will build on recent investments in solar array and battery technology by championing infrastructure for both field deployable technologies and development of facilities for intensive monitoring and that support a One Health approach to Biosecurity.

## 1. Wellbeing and Health

Specifically, by 2025, we aim to have deployable tests for pain and wellbeing that will underpin further research and enable optimal husbandry strategies to be developed and implemented. These tests will allow us to investigate the relationships between immune function and chronic pain, the effects of heat stress, and the impact of chronic pain on appetite, livestock communication and socialisation.

These objective measures can be used in stud breeding programs to optimise immune response in animals and reduce the likelihood of developing chronic pain. These measures will be coupled with solutions to provide continuous improvement in animal wellbeing and health in commercial production systems. In particular, our measures of wellbeing will be used to develop a livestock lifetime wellbeing index akin to the Meat Standards Australia index for beef and lamb eating quality.

In addition, other applied research will include testing and developing field and supply chain measures of pain and wellbeing in sheep and cattle, new pain relief products and strategies, and husbandry strategies to enhance wellbeing and improve productivity.

Biosecurity and infectious disease impact on animal wellbeing and threaten human food security and health. Our approach is to develop antimicrobial management strategies including stock handling, timing of operations, nutritional supplements, and development of vaccines.

## 2. Breeding and Genetics

By 2025 we aim to provide solutions to partner breeding programs to cost effectively increase rates of genetic improvement. We will achieve this through better prediction of genetic merit coupled with more effective assisted reproduction technologies.

To deliver custom breeding programs, we will have an active role in advancing livestock genome science by generating high quality reference genomes to facilitate discovery of economically important traits. Our research focus will include bioinformatics, genomic analysis and selection, and optimisation of artificial breeding techniques. When integrated together with GenoRater (our genetic evaluation system), we will offer our breeding program partners integrated solutions to accelerate genetic improvement by increasing both accuracy and generation turnover.

To deliver improved assisted reproductive technologies, our focus will be to develop tools to predict embryo competence and optimise embryo development. This will facilitate development of improved embryo culturing media, as well as commercial mature and juvenile in vitro embryo production programs.

## 3. Sustainable Productivity

In sheep, our focus is to contribute to improved survival of twin born lambs and their dams, which has both large welfare and productivity benefits. We will also focus on heat stress impacts on maternal productivity and wellbeing.

In cattle, we will continue to lead projects on optimising heifer and cow management for improved maternal productivity. We will also contribute to reducing methane emissions. Thus, we are contributing to both improving emissions intensity and mitigation, so contributing to the national goal of our livestock industries to be carbon neutral by 2030.

Outputs will include critical knowledge for learning packages and novel inputs that can be implemented in commercial livestock production systems to optimise productivity.

### 4. Meat and Wool Science

Our meat research focusses on improvement of lean meat yield and eating quality by utilising objective measures. By 2025, we will deliver probes for measuring intramuscular fat in lamb, carcass value calculators and customised optimisation programs. We will work with processors and retailers to develop pricing systems that provide clear signals to producers, circularity that improves efficiency of the supply chain.

Wool research will include compounds for alternative shearing strategies and understanding the biology of the sheep, wool follicle and fibre. This knowledge will be coupled with engineering strategies for automated fleece harvesting.

### 5. Capacity and Adoption

By 2025, we will have partnered with multiple producer groups to record key performance indicators in a coordinated strategy that will simultaneously:

- provide validation in commercial production systems;
- lead to rapid adoption of technology; and
- provide a foundation for identifying further research and priorities

The recently funded Drought Innovation Hub is a good example of such work.

Leading development of industry adoption training packages including "train the trainer" programs is core to the Centre and will grow with scale.

Training of Honours and PhD students and investing in early career researchers will also remain our core business. We will strive to have training and development projects linked to industry research partners. Our vision is for everyone in the Centre to contribute to the development of others. The Centre will continue to support undergraduate students, who have a passion for livestock, with extracurricular activities, such as industry expos, student club activities and educational tours.

We will work with social scientists and socio-economists to grow our understanding of farm decision making and guide public engagement. In addition, we will be involved in specific external programs on resilience in livestock producers and their supporting professionals.

### Governance and Structure

Our Executive Team is specifically designed to include a range of research disciplines and to develop early and mid-career researchers by giving them opportunity to be involved in governance.

Our Advisory Board is comprised of leaders within our School and Faculty, colleagues from PIRSA, researchers with track record in collaborative vision and leadership, and industry representation with direct links to our State Sheep and Beef Cattle Blueprints that are aligned to national priorities.