

# RD&A stocktake

A summary of MLA's research,  
development and adoption (RD&A) projects  
from June 2019 – November 2021



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## Abbreviations

ABSF	Australian Beef Sustainability Framework	MDC	MLA Donor Company
ALMS	automated livestock management system	MEDLI	Model for Effluent Disposal Using Land Irrigation
AMU	Antimicrobial usage	MENA	Middle East and North Africa
APVMA	Australian Pesticides and Veterinary Medicines Authority	MEXA	Multi Energy X-ray Absorptiometry
AR	Augmented Reality	MISP	Meat Industry Strategic Plan
AWI	Australian Wool Innovation	MSA	Meat Standards Australia
BIN	Beef information nucleus (project)	NACP	Northern Australian Climate Project
BRD	Bovine respiratory disease	NFAS	National Feedlot Accreditation Scheme
CISP	Collaborative Innovation Strategies Program	NLIS	National Livestock Identification System
CN30	Carbon Neutral 30	NSW	New South Wales
CRC	Cooperative Research Centres	NSW DPI	New South Wales Department of Primary Industries
CT	Computerized Tomography	OCM	Objective Carcase Measurement
DAFF	Department of Agriculture and Fisheries	Pty Ltd	Proprietary limited
DEXA	Dual Energy X-ray Absorptiometry	R&D	Research and Development
DNA	Deoxyribonucleic acid	RD&A	Research, Development and Adoption
EBV	Estimated Breeding Value	RDE&A	Research, Development, Extension and Adoption
eID	Electronic identification	REDI	Remote early disease identification
eNVD	electronic National Vendor Declaration	RFID	Radio-frequency identification
GHG	Greenhouse gas	RRD4P	Rural Research and Development for Profit
ILSC	Indigenous Land and Sea Corp	SA	South Australia
IMF	Intramuscular fat	SCRC	Sheep Cooperative Research Centre
IoT	Internet of Things	SMDB	Ship Mortality Database
ISC	Integrity Systems Company	STEC	Shiga toxin-producing <i>Escherichia coli</i>
LEP	Livestock Export Program	TGP	Total grazing pressure
LGAP	Livestock Global Assurance Program	WA	Western Australia
LPP	Livestock Productivity Partnership	WAN	Wide Area Network
MAP	Modified atmosphere packaging	WBSF	Warner Bratzler shear force

## Introduction

MLA fosters the long-term prosperity of the Australian red meat and livestock industry by investing in research, development and adoption (RD&A) activities. Investments cover world-class projects to increase the productivity, profitability and sustainability of Australia's cattle, sheep and goat businesses.

In 2020-21, MLA invested \$179.5 million in new RD&A programs across the value chain. Information on investment breakdowns and programs of work can be found in MLA's [Annual Investment Plan](#) and [2025 Strategic Plan](#).

## Purpose

This document summarises MLA-funded projects across the Research, Development & Adoption (RD&A), Integrity Systems Company (ISC) and International Marketing R&D portfolios, from June 2019 through to December 2021. It provides details of completed and in-progress projects during the two-and-a-half-year period.

The document has been compiled to create more visibility of the range of projects that MLA has invested and is investing in on behalf of the red meat industry. It is also intended to help inform MLA's consultation with [stakeholders](#) and [industry bodies](#), which is conducted to identify future investment areas in RD&A. The document provides a comprehensive record of in-progress and existing work, and can be used to identify areas where there are significant gaps in R&D and help avoid duplication of research or resources.

## Structure and use

This document provides basic information on MLA's RD&A projects and provides hyperlinks to full reports and further information when available. The document groups projects into their relevance for different species (grassfed cattle, grainfed cattle, sheep & lamb, goats, all grassfed species and all red meat species). The projects are then grouped by research area (e.g. meat quality, animal production, husbandry and nutrition, genetics, etc.), with completed projects listed before 'projects in progress'.

Please note that at the time of publishing, not all reports are available. However, the information in this document is designed to be used in conjunction with the R&D search function on the [MLA website](#), wherein users can search for specific projects and/or terms of interest (keyword, region, species, etc) for more information.

Each project listed includes a short summary and the following details:

<b>Project code</b>	This can be used to search the MLA website to find further information on the project.
<b>Location</b>	This is the production region the research is relevant to.
<b>Start &amp; end date</b>	This is the planned term of the project. For projects in progress, it helps readers know when research outcomes are expected to be released.
<b>Publication date</b>	Date published on the MLA website.
<b>Funding source</b>	Levy or external partnerships (which are matched with federal government funds). External partnerships are funded by companies and organisations external to MLA.
<b>Initiation of research</b>	Industry, feedlot industry, processing industry or MLA Donor Company
<b>Vendor</b>	The research institution or supplier

To receive this information on a regular basis, please subscribe to MLA's monthly RD&A e-newsletter, [R&D Round-Up](#). For further information on any of the projects included in this document please click the relevant hyperlinks below or use the project code to search the [MLA website](#).



# Grassfed cattle

## Completed R&D projects

### Animal health, welfare and biosecurity

#### ParaBoss for cattle parasites

Project code	B.AHE.0314	Location	National
Start date	31-Jan-17	Vendor	DAFF
End date	30-Sep-21	Funding source	Levy
Publication date	<i>Not yet available</i>	Initiation of research	Investment call

This project will align parasite management resources for grassfed beef producers into the existing sheep framework for integrated parasite management. ParaBoss will consolidate Australia's available cattle parasite management resources into one centralised national database, which will be the key platform for the development and extension of national best practice management for cattle parasite infections.

#### Quantifying neonatal mortality and reproductive performance in southern beef herds

Project code	B.GBP.0048	Location	Southern Australia
Start date	30-Aug-19	Vendor	University of Melbourne
End date	30-Mar-21	Funding source	Levy
Publication date	21-Jun-21	Initiation of research	Industry

This project conducted an extensive survey to quantify the extent, cause and effect of neonatal calf loss in southern Australia, which is estimated to cost the Australian beef industry \$96.2 million each year.

#### Evaluation of anti-tick vaccines for tick immunological control

Project code	B.AHE.2026	Location	National
Start date	20-Jan-20	Vendor	University of Queensland
End date	1-Mar-21	Funding source	Levy
Publication date	15-Sept-21	Initiation of research	Industry

This project compared the protective efficacy of a peptide of tick ribosomal protein P0 with that of a Cuban vaccine using the Bm86 antigen against the Australian cattle tick. Efficacy was assessed on reduced engorged female tick numbers and weights, oviposition and egg hatchability.

#### Area-wide control of buffalo fly and prevention of southward spread using Wolbachia

Project code	B.AHE.0242	Location	National
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Start date	01-Nov-16	Vendor	University of Queensland
End date	01-Jan-21	Funding source	Levy
Publication date	21-Jun-21	Initiation of research	Investment call

This project investigated a novel approach to buffalo fly (BF) control using *Wolbachia*, an insect-infecting bacterium, in area-wide approaches targeting overwintering foci of BF. This was undertaken to reduce the effects of BF in already infested areas and stop its southerly spread.

### Product development of a new cattle tick vaccine

Project code	P.PSH.1076	Location	National
Start date	01-Apr-18	Vendor	University of Queensland
End date	31-Aug-21	Funding source	MLA Donor Company
Publication date	<i>Not yet available</i>	Initiation of research	External partnership

Using antigens identified by reverse vaccinology and screened previously (see projects B.AHE.0024, 0212), this project aimed to identify a cattle tick vaccine candidate with more than 80% efficacy and a demonstrated duration of immunity of six months or more.

### Risk factors, treatment and prevention options for pink eye disease in cattle

Project code	B.AHE.0319	Location	National
Start date	01-Aug-18	Vendor	University of Sydney
End date	30-Dec-21	Funding source	Levy
Publication date	<i>Not yet available</i>	Initiation of research	Industry

Pinkeye can cause permanent blindness, impacting reproduction rates, workplace health and safety, and animal welfare. This project estimated the prevalence, identify risk factors and compare the effectiveness of currently available treatments and vaccines for pinkeye disease for the Australian red meat industry.

### [Vectors and epidemiology of \*Theileria orientalis\* on the Northern Tablelands](#)

Project code	B.AHE.0324	Location	Northern Australia
Start date	01-Apr-18	Vendor	University of New England
End date	01-Apr-21	Funding source	Levy
Date of publication	15-Dec-20	Initiation of research	Industry

This research determined which of the biting flies, ticks and lice affecting cattle in the Northern Tablelands are effective transmitters of *Theileria orientalis*. It also outlines the main types of *Theileria orientalis* present in this region and their relative prevalence to inform future research and management strategies.

### [Prophylaxis and treatment of \*Theileria orientalis\*](#)

Project code	P.PSH.0832	Location	National
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Start date	01-May-17	Vendor	University of Sydney
End date	02-Mar-20	Funding source	MLA Donor Company
Date of publication	24-Nov-20	Initiation of research	External partnership

This project confirmed the vector competence and transmission of the tick-borne parasite, *Theileria orientalis ikeda*, by the three-host tick *Haemaphysalis longicornis*. Therapy with four chemicals did not cure the carrier state in recovered cattle, but BPQ significantly reduced parasitosis in the two weeks after administration. Infection with piroplasms of *T.orientalis buffeli* significantly reduced the peak of parasitosis when challenged with tick nymphs infested with *T.orientalis ikeda*.

### The welfare of bobby calves in the meat supply chain

Project code	P.PSH.0860	Location	National
Start date	31-Oct-17	Vendor	University of Melbourne
End date	31-Oct-20	Funding source	MLA Donor Company
Date of publication	Not yet available	Initiation of research	External partnership

The project measured the health and welfare status of non-replacement (bobby) calves within the supply chain. Improving on-farm colostrum management, calf nutrition and health will likely improve bobby calf welfare during transport and lairage.

### The Probio-TICK Initiative

Project code	B.AHE.0321	Location	National
Start date	15-Dec-17	Vendor	Microbial Screening Technologies
End date	30-Sep-20	Funding source	Levy; Cooperative Research Centre Project (CRC-P)
Date of publication	26-Oct-20	Initiation of research	Industry

This project delivered Probio-TICK, containing up to nine microbes recovered from soil in northern Australia and shown to have in vitro activity against ticks and buffalo fly. When applied to the hair coat of cattle in liquid suspensions, Probio-TICK significantly reduced tick burdens.

### Automating welfare measurements and interventions for northern Australia beef cattle

Project code	P.PSH.1100	Location	Northern Australia
Start date	01-Jul-18	Vendor	Central Queensland University
End date	30-Oct-19	Funding source	MLA Donor Company
Date of publication	23-Dec-19	Initiation of research	External partnership

This project developed a purpose-built automated livestock management system (ALMS) to separate calves from cows in the paddock, to provide producers with access to calves at a younger age. Producers were involved in developing the system to ensure it would be useful in a commercial setting to encourage industry uptake.

### Testing and verification of a single-dose cattle tick vaccine

Project code	B.AHE.0316	Location	Northern Australia
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<b>Start date</b>	01-Dec-16	<b>Vendor</b>	University of Queensland
<b>End date</b>	31-Dec-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	23-Dec-19	<b>Initiation of research</b>	Investment call
<p>This project evaluated a new single-dose vaccine formulation of the Bm86 cattle tick antigen. The vaccine elicited anti-tick antibodies that remained at high levels for one year. Cattle challenged with tick larvae 56 days after a single injection of the vaccine had 76.9% fewer ticks than unvaccinated controls. Injection site reactions necessitate further refinement of the formulation.</p>			

### Quantitative image assessment of embryos to predict pregnancy in embryo transfer programs

<b>Project code</b>	P.PSH.0969	<b>Location</b>	National
<b>Start date</b>	15-Nov-17	<b>Vendor</b>	University of Adelaide
<b>End date</b>	30-Jun-18	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	19-Aug-19	<b>Initiation of research</b>	External partnership
<p>Female-focused reproductive technologies have modest adoption in the Australian cattle industry. This project assessed the predictive capacity for pregnancy establishment from microscopic imaging of routinely selected transferable cattle embryos prior to transfer.</p>			

### Cost-effective testing of beef herds for Johne's disease

<b>Project code</b>	B.AHE.0322	<b>Location</b>	National
<b>Start date</b>	01-May-18	<b>Vendor</b>	University of Sydney
<b>End date</b>	01-Sep-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	17-Jun-19	<b>Initiation of research</b>	Industry
<p>This project was conducted to identify alternative, more cost-effective sample pooling strategies to achieve the same or better confidence of freedom from Johne's disease. Results suggest that increasing the sample size would reduce the costs without impacting the test's accuracy, but these need to be validated in the field.</p>			

## Animal production, husbandry and nutrition

### Scoping the development of high value beef production from dairy bulls using forage based systems

<b>Project code</b>	B.GBP.0050	<b>Location</b>	Southern Australia
<b>Start date</b>	15-Jan-20	<b>Vendor</b>	DAFF
<b>End date</b>	27-Apr-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	23-Aug-21	<b>Initiation of research</b>	Industry
<p>This project aims to define the potential of a dairy-beef supply chain. This will identify further R&amp;D investment opportunities to assess low-cost, high quality forage systems and their potential to achieve target growth rates, and consumer acceptance to dairy beef becoming a mainstream commodity.</p>			



### Optimising supplement use in Australia's northern beef industry

<b>Project code</b>	P.PSH.0857	<b>Location</b>	Northern Australia
<b>Start date</b>	26-Nov-17	<b>Vendor</b>	University of New England
<b>End date</b>	27-Feb-21	<b>Funding source</b>	MLA Donor Company
<b>Publication date</b>	27-Feb-21	<b>Initiation of research</b>	External partnership

Using remote drafting, weighing and block intake recorders, this project monitored nutritional behaviours for two years to provide long term data on breeder liveweight change, reproductive efficiency and supplement intake. This will help identify nutritional requirements in northern cattle.

### Northern Breeding Business: NB2 Strategic Partnership Development

<b>Project code</b>	L.NAB.1903	<b>Location</b>	Northern Australia
<b>Start date</b>	01-Jun-19	<b>Vendor</b>	NABRC
<b>End date</b>	30-Aug-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	08-May-20	<b>Initiation of research</b>	Industry

The North Australia Beef Research Council (NABRC), in association with MLA, has developed NB2 – the Northern Breeding Business strategic RDE&A partnership. The objective of this project was to define the strategic partnership to address the low reproductive performance of breeder herds across northern Australia.

### Supplementation to reduce the impact of mycotoxins and insufficient magnesium

<b>Project code</b>	B.GBP.0012	<b>Location</b>	National
<b>Start date</b>	21-Mar-17	<b>Vendor</b>	University of New England
<b>End date</b>	31-Aug-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Sep-20	<b>Initiation of research</b>	Investment call

This project studied the impacts of varying levels of potassium and crude protein on muscle glycogen, as well as the effect of magnesium and mycotoxin binder supplementation on the prevalence of dark cutting.

## Digital agriculture

### Enhancing the profitability and productivity of livestock farming through virtual herding technology

<b>Project code</b>	B.SBP.1701	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Jul-16	<b>Vendor</b>	Dairy Australia Limited
<b>End date</b>	01-Mar-21	<b>Funding source</b>	Levy
<b>Publication date</b>	15-Jan-21	<b>Initiation of research</b>	Industry

This Rural R&D for Profit Program project was designed to evaluate the application of virtual herding (VH) technology across livestock production systems and examine animal responses to various cues and stimuli to improve productivity and



profitability. The project aimed to demonstrate the application of virtual herding technology on farm to improve environmental and animal welfare outcomes.

### Evaluation of connectivity and digital solutions for vertically integrated beef operations– Stages 1 and 2

<b>Project code</b>	P.PSH.1056	<b>Location</b>	National
<b>Start date</b>	30-Apr-18	<b>Vendor</b>	Australian Country Choice Properties
<b>End date</b>	10-Jan-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	07-Feb-20	<b>Initiation of research</b>	External partnership

The primary objective of this project was to evaluate the feasibility and commercial options of data transfer across a vertically integrated beef company. This involved an independent assessment of connectivity and capability in data movement and an evaluation of solutions through proof of concept demonstrations.

### Options for improving telecommunications across northern Australia for a connected beef industry

<b>Project code</b>	B.GBP.0041	<b>Location</b>	Northern Australia
<b>Start date</b>	30-Apr-19	<b>Vendor</b>	GHD Pty Ltd
<b>End date</b>	07-Oct-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	28-Nov-19	<b>Initiation of research</b>	Industry

The purpose of this review was to assess the suitability of current and emerging technologies that could help improve internet connectivity across the north Australian beef industry.

### Terrestrial based digital connectivity at Calliope

<b>Project code</b>	P.PSH.1077	<b>Location</b>	National
<b>Start date</b>	10-Apr-18	<b>Vendor</b>	Hitachi Australia Pty Ltd
<b>End date</b>	30-Nov-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	22-Oct-19	<b>Initiation of research</b>	External partnership

This project was established on a central Queensland grazing property to evaluate the use and efficiency of the 'internet of Things' (IoT), which relies on a strong internet connection to monitor water levels in dams, weather data and soil moisture.

### Eagles Nest – development and assessment of UAV technologies and data capture for extensive beef production across northern Australia

<b>Project code</b>	P.PSH.0859	<b>Location</b>	National
<b>Start date</b>	03-Nov-17	<b>Vendor</b>	Hitachi Australia Pty Ltd
<b>End date</b>	01-Sep-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	25-Sep-19	<b>Initiation of research</b>	External partnership

This project evaluated the potential for autonomous drones to monitor pasture, livestock and infrastructure for extensive beef properties across northern Australia. Imagery and data collected from the drones were used to demonstrate the viability to support the assessment of land and pasture condition, the location of livestock and condition of fences.



## Eating quality

### MSA beef model expansion: sensory evaluation of entire males

Project code	L.EQT.1909	Location	National
Start date	30-Apr-19	Vendor	Polkinghorne
End date	30-Dec-21	Funding source	Levy
Publication date	<i>Not yet available</i>	Initiation of research	Industry

The project was designed to aid in quantifying the eating quality difference between steers and entire males or bulls based on the current MSA model prediction. The project aimed to conduct a sensory evaluation on 18 young bulls purposefully produced for meat production by collecting 34 primals for each carcass and testing five cooking methods.

## Feedbase and grazing land management

### Dieback: spatio-temporal prediction of pasture dieback using UAVs and remote sensing

Project code	B.PAS.0510	Location	Northern Australia
Start date	03-Aug-20	Vendor	Queensland University of Technology
End date	31-Jan-22	Funding source	Federal grant
Publication date	<i>Not available</i>	Initiation of research	Industry

This project integrated remotely sensed imagery from unmanned aerial vehicles (UAVs) and satellite-based platforms to identify spectral signatures of pasture dieback for easy, cost-effective identification, mapping and monitoring over time. This capability will allow monitoring and mitigation practices to reduce infestations of dieback.

### Dieback: Rapid diagnosis of pasture dieback using SIFT-MS

Project code	B.PAS.0505	Location	Northern Australia
Start date	30-Aug-20	Vendor	Queensland University of Technology
End date	30-Nov-21	Funding source	Federal grant
Publication date	<i>Not yet available</i>	Initiation of research	Industry

Rapid and accurate identification of pasture dieback is essential to correctly identifying outbreaks and the application of suitable management interventions to ensure feed for livestock. This project tested the proof of concept of rapid analysis of volatile organic compounds and chemical markers detected by mass spectrometry for the fast identification of pasture dieback in both the laboratory and on-farm.

### Management options and species evaluation to increase productivity in dieback affected pastures

Project code	B.PAS.0507	Location	Northern Australia
Start date	15-Jul-20	Vendor	Applied Horticulture Research Pty
End date	15-Oct-21	Funding source	Federal grant



<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry
The aim of this project is to develop and evaluate alternative agronomic practices for pasture management and feed options for livestock in pasture dieback-affected areas. Trial sites will form part of a network of collaborative demonstration sites to communicate effective practices to producers.			

### Dieback buffel

<b>Project code</b>	B.PAS.0358	<b>Location</b>	Queensland
<b>Start date</b>	11-Oct-17	<b>Vendor</b>	Multiple
<b>End date</b>	13-May-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	n/a	<b>Initiation of research</b>	Industry
In early 2017, producers across parts of central Queensland reported widespread dieback of pastures including buffel grass and native bluegrass. The dieback was unexplained and raised significant producer concern in affected regions. This project covered a cross-disciplinary team of researchers and technical experts, with six commercial companies and four research organisations, to narrow down the cause(s) and develop suggestions and recommendations on management and non-management interventions to reduce the impact.			

### [Supporting The Leucaena Network: national research and the regional adoption outcomes for a highly productive beef industry](#)

<b>Project code</b>	P.PSH.1015	<b>Location</b>	National
<b>Start date</b>	15-Dec-17	<b>Vendor</b>	Leucaena Network Association Inc
<b>End date</b>	15-Dec-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	07-Jan-20	<b>Initiation of research</b>	External partnership
This project supported The Leucaena Network to increase the awareness of national research and regional adoption activities for potential, new and established leucaena producers.			

### [Assessment of promising pasture legumes and grasses](#)

<b>Project code</b>	B.NBP.0766	<b>Location</b>	Queensland
<b>Start date</b>	01-Jun-13	<b>Vendor</b>	Department of Agriculture & Fisheries
<b>End date</b>	25-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	30-Sep-19	<b>Initiation of research</b>	Industry
Pasture legumes remain the most effective option for long-term improvements in productivity – however, there are few reliable and persistent legume options for many areas in northern Australia. This project evaluated promising pasture legume and grass options and identified persistent grasses and legumes for basalt, red duplex and red earth land types in northern Queensland.			

### [Preparation and revision for second edition of the grazier manual for leucaena](#)

<b>Project code</b>	B.GBP.0028	<b>Location</b>	Northern Australia
<b>Start date</b>	29-Jan-18	<b>Vendor</b>	University of Queensland
<b>End date</b>	21-Jun-19	<b>Funding source</b>	Levy



<b>Date of publication</b>	20-Sep-19	<b>Initiation of research</b>	Industry
<p>The primary aim of this project was to update the first edition of the grazier manual for leucaena with new content, material and relevant producer case studies, to create a second edition for publication that would support the adoption and impact of grazing management for the Australian beef industry.</p>			

## Food safety, traceability and integrity systems

### [Assessing the feasibility of an implantable ID for cattle](#)

<b>Project code</b>	V.RDA.0002	<b>Location</b>	National
<b>Start date</b>	05-May-20	<b>Vendor</b>	Asymmetric innovation
<b>End date</b>	05-Aug-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>This project will validate assumptions related to the technical and adoption challenges for an implantable ID in cattle, as well as testing improvements of the implantable ID concept. The project will ensure that a critical thinking approach is applied to prototype development and testing and will identify changes that need to be made to the prototype to improve the chances of widespread adoption.</p>			

### [Evidence-based digital traceability trials for beef exports to China](#)

<b>Project code</b>	P.PSH.1242	<b>Location</b>	International
<b>Start date</b>	2-Mar-20	<b>Vendor</b>	AgLive
<b>End date</b>	3-Nov-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	28-Apr-21	<b>Initiation of research</b>	External partnership
<p>This project piloted a fully integrated beef supply-chain traceability solution connecting Australian farmers and exporters to retailers and consumers in China and other markets. The Aglive platform is designed to prove the authenticity of beef products and link those goods with evidence of the journey, brand story, and compliance collected and shared as the product moves along the physical supply chain.</p>			

### [Antimicrobial resistance in commensal bacteria in bovine faeces at slaughter](#)

<b>Project code</b>	V.MFS.0432	<b>Location</b>	National
<b>Start date</b>	15-Aug-18	<b>Vendor</b>	CSIRO
<b>End date</b>	29-May-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Oct-20	<b>Initiation of research</b>	Industry
<p>In 2013, a survey demonstrated the low prevalence of antimicrobial resistance (AMR) in bacteria in Australian cattle production systems (including grass fed, grain fed and dairy). This project surveyed cattle faeces again and compared the results to see if there have been changes from the previous survey. Knowing about changes in AMR rates will inform the design of future surveillance.</p>			



### Egypt beef shelf life verification trials

<b>Project code</b>	V.MFS.0438	<b>Location</b>	National
<b>Start date</b>	21-Aug-19	<b>Vendor</b>	CSIRO
<b>End date</b>	23-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	13-Oct-20	<b>Initiation of research</b>	Industry

Australian vacuum-packed chilled beef has a practical storage life of 140 days when stored below 0°C. In Egypt, much shorter limits of 49 days for boneless and 28 days for bone-in beef are prescribed, which restricts market supply of Australian beef. This study was designed to verify that Australian boneless (striploin) and bone-in beef (oven-prepared rib) primals display satisfactory sensory properties throughout extended cold storage in Egypt.

### Cutting room traceability

<b>Project code</b>	V.RMH.0105	<b>Location</b>	National
<b>Start date</b>	01-Dec-19	<b>Vendor</b>	Natasha Anne Wing
<b>End date</b>	01-Aug-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	21-Jan-21	<b>Initiation of research</b>	Industry

Meat leaving processing plants in a carton has detailed product information and the risk of a product description being misapplied is highest when the contents of the carton are prepared for retail sale. This project documents the procedures in place within Australian export licenced plants to mitigate the above risk.

### **Development of new generation livestock tag platform for the beef industry**

<b>Project code</b>	P.PSH.0828	<b>Location</b>	National
<b>Start date</b>	08-Jan-18	<b>Vendor</b>	Ceres Tag Pty Ltd
<b>End date</b>	30-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project aimed to develop a new generation NLIS compatible smart ear tag for remote identification, location, health monitoring and traceability of animals. The tags are designed to have a geo-location function for individual animals or as a herd and quantify them at any time using satellite communication systems.

## Genetic analysis

### An evaluation of new business models for breed societies

<b>Project code</b>	L.GEN.2002	<b>Location</b>	National
<b>Start date</b>	07-Apr-20	<b>Vendor</b>	Australian Venture Consultants
<b>End date</b>	04-Jun-21	<b>Funding source</b>	Levy
<b>Publication date</b>	25-Jan-22	<b>Initiation of research</b>	Industry



The purpose of this project is to develop a set of potential alternative business models that breed societies could use to address constraints to the continued growth of BREEDPLAN. The models will demonstrate merit with respect to increasing the existing market and unregistered sectors.

### Southern Beef Technology Project

<b>Project code</b>	P.PSH.0714	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Jul-16	<b>Vendor</b>	Agricultural Business Research Institute
<b>End date</b>	30-Jul-21	<b>Funding source</b>	MLA Donor Company
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

The Southern Beef Technology Services (SBTS) project provides the southern beef industry with hands-on technical support to improve the understanding and adoption of BREEDPLAN and related genetic improvement technologies. This phase of the SBTS project delivered a strategy for structured coordination of BREEDPLAN related R&D priorities, an industry capacity-building component and a refined, more focused approach on consultation with key influential seedstock herds.

### Phenotypic and genetic relationships between retail beef yield, live animal and carcass traits

<b>Project code</b>	P.PSH.0942	<b>Location</b>	National
<b>Start date</b>	02-Oct-17	<b>Vendor</b>	NSW DPI
<b>End date</b>	02-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

The purpose of this project was to generate retail beef yield (RBY) phenotypes on 1,000 fully pedigreed and genetically described steers. These will be used to re-estimate BREEDPLAN RBY% parameters and to provide more accurate carcass RBY% estimated breeding values to suit the modern beef cattle population.

### Bull fertility update: historical data, new cohort and advanced genomics

<b>Project code</b>	L.GEN.1818	<b>Location</b>	National
<b>Start date</b>	24-Feb-19	<b>Vendor</b>	CSIRO
<b>End date</b>	20-Jan-21	<b>Funding source</b>	Levy
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will update Beef CRC resources to the latest technology and expand them with the inclusion of new samples for bull fertility genomics. Improving the understanding of bull fertility and linking biological knowledge with genomics will help to identify causative mutations, which will lead to better estimated breeding values.

### Genetics R&D: A bull selection decision support tool

<b>Project code</b>	P.PSH.0847	<b>Location</b>	National
<b>Start date</b>	02-Jan-18	<b>Vendor</b>	NSW DPI
<b>End date</b>	18-Dec-20	<b>Funding source</b>	MLA Donor Company
<b>Publication date</b>	1-Feb-21	<b>Initiation of research</b>	External partnership



The purpose of this project was to develop DeSireBull™, a decision support tool to simplify the bull selection process and increase the number of bull buyers effectively using genetic performance measurement information.

### Optimizing temperate cow herd efficiency - a Trans-Tasman collaboration

<b>Project code</b>	P.PSH.0869	<b>Location</b>	National
<b>Start date</b>	01-Jul-16	<b>Vendor</b>	Beef + Lamb NZ Genetics
<b>End date</b>	06-Jan-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	20-Nov-20	<b>Initiation of research</b>	External partnership

This project sought to leverage investment in phenotyping and genotyping undertaken on behalf of New Zealand beef breeders, to enable research which generated and investigated data from Australian temperate beef breeding herds.

### Intensive phenotyping in industry to expand the Brahman reference population

<b>Project code</b>	P.PSH.0921	<b>Location</b>	National
<b>Start date</b>	11-Sep-17	<b>Vendor</b>	FLO Australia Pty Ltd Trading as Kaiuroo
<b>End date</b>	01-May-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	20-Nov-20	<b>Initiation of research</b>	External partnership

This project aimed to contribute genotypes and hard-to-measure phenotypes for male and female reproduction to the Brahman BREEDPLAN analysis from a seedstock herd, which is linked to the current Brahman population and key research herds.

### Proof of Profit from EBV based selection

<b>Project code</b>	L.GEN.1810	<b>Location</b>	National
<b>Start date</b>	01-Nov-18	<b>Vendor</b>	Bush Agribusiness
<b>End date</b>	30-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Sep-20	<b>Initiation of research</b>	Industry

This project aimed to improve breeding in northern beef enterprises by developing a tool for producers to quantify the trend and spread of productivity gains attributable to genetic improvement, making the use of genetics easier.

### **Phase 2 - Hereford information nucleus & young sire progeny test project**

<b>Project code</b>	P.PSH.0503	<b>Location</b>	National
<b>Start date</b>	15-Feb-16	<b>Vendor</b>	Herefords Australia Limited
<b>End date</b>	30-Jul-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project is an extension of the initial Hereford Beef Information Nucleus (BIN) project (P.PSH.0502). Key areas of genetic interest for the breed were investigated and the strengths and weaknesses of currently available selection tools were considered, with a view to maximizing the benefits of existing and emerging technologies.



### Improving the Australian poll gene marker test

<b>Project code</b>	L.GEN.1713	<b>Location</b>	National
<b>Start date</b>	01-Jul-17	<b>Vendor</b>	University of Queensland
<b>End date</b>	25-Mar-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	24-Apr-20	<b>Initiation of research</b>	Industry

This project investigated the tests available for analysing the poll gene across common beef breeds in Australia to develop an optimised poll test (OPT). Research also analysed genetic markers associated with scurs to determine whether there are negative effects of the poll gene on reproductive performance.

### **Investigating and implementing international multi-trait genetic evaluations for beef cattle**

<b>Project code</b>	P.PSH.0787	<b>Location</b>	National
<b>Start date</b>	01-Jun-17	<b>Vendor</b>	Agricultural Business Research Institute
<b>End date</b>	30-Dec-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project was the first in a series of proposals to address issues identified with the current BREEDPLAN genetic evaluation service model. This project addressed the issue of limited access to multi-country, multi-trait evaluations to validly compare Australian genetics to those in the rest of the world.

### Development and implementation of multi-breed genetic evaluation systems for the Australian beef industry

<b>Project code</b>	P.PSH.0837	<b>Location</b>	National
<b>Start date</b>	01-Jun-17	<b>Vendor</b>	Agricultural Business Research Institute
<b>End date</b>	31-Dec-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	25-Feb-20	<b>Initiation of research</b>	External partnership

This project reviewed stud client and industry databases, including the BREEDPLAN software, to investigate which ones link to other breed databases to effectively perform multi-breed genetic evaluations.

### Cost effective DNA pooling strategies to drive genetic gain in the livestock industries

<b>Project code</b>	P.PSH.1154	<b>Location</b>	National
<b>Start date</b>	02-Aug-18	<b>Vendor</b>	CSIRO
<b>End date</b>	26-Jul-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	25-Feb-20	<b>Initiation of research</b>	External partnership

This project aimed to assist commercial farms to identify sires contributing favourably to their breeding objective, by evaluating new DNA pooling strategies and techniques.



### Genetics R&D: characterisation of the Brahman genome

<b>Project code</b>	P.PSH.0868	<b>Location</b>	National
<b>Start date</b>	15-Apr-17	<b>Vendor</b>	University of Queensland
<b>End date</b>	15-Jul-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	03-Dec-19	<b>Initiation of research</b>	External partnership

This project used new genetic technology to develop the full characterisation of the Brahman genome that is more appropriate for use in research on Australian Brahman cattle.

### Beef CRC genomics database annotation

<b>Project code</b>	B.BFG.0061	<b>Location</b>	National
<b>Start date</b>	03-Sep-18	<b>Vendor</b>	University of New England
<b>End date</b>	01-Sep-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	24-Sep-19	<b>Initiation of research</b>	Industry

The key objective of this project was to include DNA sample identifications within the performance database, along with descriptive information of the DNA to enable the pre-existing database to become the Beef CRC Genomics database.

## People and business

### **Western Australian (WA) – Premium Southern Beef Project**

<b>Project code</b>	P.PSH.0881	<b>Location</b>	National
<b>Start date</b>	15-Jun-17	<b>Vendor</b>	Western Australian Agriculture Authority
<b>End date</b>	30-Dec-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	Not yet available	<b>Initiation of research</b>	External partnership

The project developed a suite of tools to enable value chain participants to increase their operating margins by participating in high value premium market segments. The project was focused on building the capability of commercial participants and development of a series of tools to support growth within three premium beef market segments - organic/biodynamic, Wagyu and beef snacks.

### Global veal market: Innovation opportunities for Australia

<b>Project code</b>	V.GVM.0001	<b>Location</b>	National
<b>Start date</b>	20-Jun-19	<b>Vendor</b>	GIRA
<b>End date</b>	28-Jan-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	10-Jun-20	<b>Initiation of research</b>	Industry

This project provides an update on the global veal market and identifies opportunities for the Australian veal sector.



### Harvey Beef retail ready export market development capability building activity

Project code	P.PIP.0553	Location	Western Australia
Start date	13-Feb-17	Vendor	Harvey Industries Group Pty Ltd
End date	12-Mar-20	Funding source	MLA Donor Company
Date of publication	03-Mar-20	Initiation of research	Processing industry

Through a range of market research activities within a number of potential markets, this project supported Harvey Beef to determine the optimal distribution channel, product positioning and marketing strategy for its products.

### Western Australian premium southern beef project

Project code	P.PSH.0881	Location	Western Australia
Start date	15-Jun-17	Vendor	DPIR
End date	31-Dec-19	Funding source	MLA Donor Company
Date of publication	<i>Not yet available</i>	Initiation of research	External partnership

The project was designed to develop a suite of tools to enable value chain participants to increase their operating margins by participating in high value premium market segments.

### Developing a global narrative for beef

Project code	E.ENV.1902	Location	National
Start date	20-May-19	Vendor	Pollinate
End date	30-Jun-19	Funding source	Levy
Date of publication	<i>Not yet available</i>	Initiation of research	Industry

This project explored the potential to develop a global narrative for the beef industry by reframing the sector to be a driver of increased environmental sustainability, innovation, social and economic prosperity.

## Processing productivity

### Validation, AUS-MEAT accreditation and commercial integration of the Frontmatec beef grading camera

Project code	P.PSH.2058	Location	National
Start date	15-Mar-21	Vendor	Australian Country Choice
End date	30-Sep-21	Funding source	MLA Donor Company
Publication date	<i>Not yet available</i>	Initiation of research	External partnership

This project brought a second commercial supplier of an AUS-MEAT accredited beef grading camera to the Australian industry. The physical form and functionality of this camera will provide objective grading options to more businesses as it can be used at a fixed grading station or for within-chiller grading.



### Automated MSA/AUS-MEAT hyperspectral handheld grading for beef

<b>Project code</b>	P.PSH.0776	<b>Location</b>	National
<b>Start date</b>	01-May-16	<b>Vendor</b>	Frontmatec
<b>End date</b>	31-Mar-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	17-Jul-20	<b>Initiation of research</b>	External partnership

The main objective of this project was to develop an automated handheld camera to grade beef rib eye according to MSA/AUS-MEAT standards, consistently and in accordance with visual grading conducted by highly trained graders.

### **DTS Diathermic Syncope controlled trials**

<b>Project code</b>	P.PIP.0528	<b>Location</b>	National
<b>Start date</b>	15-May-16	<b>Vendor</b>	Wagstaff Food Services Pty Ltd
<b>End date</b>	13-Apr-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Processing industry

Previous research has demonstrated, using a small number of animals, that insensibility can be successfully induced in cattle, using DTS Diathermic Syncope. This project validated these outcomes in a larger number of animals, demonstrating repeatability, at a pace more suited to a commercial processing situation.

### **Investigating neural network algorithms for imaging points of interest identification**

<b>Project code</b>	P.PIP.0765	<b>Location</b>	National
<b>Start date</b>	30-Nov-18	<b>Vendor</b>	Scott Automation & Robotics Pty Ltd
<b>End date</b>	22-Jun-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Processing industry

This project contributed to the development of an essential tool for beef boning automation, precise and reliable cutting line determination. It also assessed the performance of a neural network image analysis approach to identify the rib 1 costochondral junction, as a potential improvement to marginal existing imaging algorithms.

## **Product innovation**

### Beef Thyroid capsules - proof of concept development (NextGen)

<b>Project code</b>	V.RMH.0005	<b>Location</b>	National
<b>Start date</b>	20-Feb-20	<b>Vendor</b>	NEXGEN Wholefoods
<b>End date</b>	30-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	11-May-21	<b>Initiation of research</b>	External partnership

This project looked at developing a proof of concept Australian Beef Thyroid capsule using freeze drying and milling technology platforms. The concept, aimed at the Australian Health wellness supplement market, explored the possible value created and captured for the Australian red meat industry through a this new product.



### Farm Gate to Plate – preliminary study of Argyle’s China retail ready solution

<b>Project code</b>	V.RMH.0005	<b>Location</b>	National
<b>Start date</b>	15-Apr-19	<b>Vendor</b>	Argyle Foods Group Pty Ltd
<b>End date</b>	21-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	10-Feb-20	<b>Initiation of research</b>	Industry

The main objective of this project was to develop a preliminary business case for a retail-ready, red meat program in China. This involved a commercial model for frozen-thawed products along the value chain and new innovative concepts.

## Supply chain sustainability

### The design of a production management system for an intensive Northern Australian irrigation grazing operation to determine optimal production approach

<b>Project code</b>	P.PSH.1104	<b>Location</b>	Northern Australia
<b>Start date</b>	15-May-18	<b>Vendor</b>	Pardoo Beef Corporation Pty Ltd
<b>End date</b>	31-Oct-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	9-Oct-19	<b>Initiation of research</b>	External partnership

The project designed a process for a grazing management recording system, which included the development of a prototype animal weight recording system and the collection and analysis of production data across various input and pasture management scenarios.



## R&D projects in progress

### Animal health, welfare and biosecurity

#### Development of an accreditation scheme for lay spayers using the Dropped Ovary technique

Project code	L.PDN.1701	Location	Northern Australia
Start date	15-May-17	Vendor	AgForce Queensland
End date	30-Jun-22	Funding source	Levy
Initiation of research	Industry		

This project will develop an industry accreditation process for lay spayers to comply with the impending change in cattle welfare legislation, by establishing the criteria for initial accreditation, monitoring of accredited spayers, renewal of accreditation, refusal of accreditation and review of accreditation. The project will identify and resolve issues related to accreditation criteria, processes, records, costs and integrity.

#### Q-fever: A new approach to combatting an old Australian livestock problem

Project code	P.PSH.1307	Location	National
Start date	31-Mar-21	Vendor	University of Sydney
End date	1-Dec-24	Funding source	MLA Donor Company
Initiation of research	External partnership		

Q Fever is a debilitating bacterial disease of humans, with close association with cattle the most commonly reported risk factor. This project will investigate the progress of the infection in cattle, in order to better understand the risk posed to humans, and the possibility of vaccinating livestock to mitigate this risk.

#### Artificial Intelligence (AI) powered mobile app for the assessment of eye disease in cattle

Project code	P.PSH.1305	Location	National
Start date	3-May-21	Vendor	University of Sydney
End date	30-Nov-24	Funding source	MLA Donor Company
Initiation of research			

Eye disease impacts animal health, welfare and poses occupational health and safety risks for personnel working with animals that have an eye disorder. It also causes significant productivity and economic losses in Australia. Apart from services of veterinarians who can correctly diagnose eye disease, there is no other mechanism to make an assessment. This is particularly challenging in remote areas of Australia. This project will develop computer aided cutting edge assessment tool for eye disease which will be delivered in the form of an app that uses artificial intelligence.

#### A single-shot fertility vaccine in cattle

Project code	B.AWW.0202	Location	National
Start date	2-Mar-21	Vendor	University of Queensland



<b>End date</b>	11-Aug-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		
<p>The project aims to develop a single-shot and long-acting immuno-contraceptive vaccine specifically for cattle. The vaccine will incorporate adjuvant (lipids), self-adjuvanting delivery systems (branched peptides, polymer or poly-hydrophobic amino acids), the target antigen GnRH, and T helper epitopes, all within a single molecular construct.</p>			

### Probio-TICK - Tick control, Nature's way

<b>Project code</b>	P.PSH.1301	<b>Location</b>	Northern Australia
<b>Start date</b>	3-May-21	<b>Vendor</b>	Microbial Screening Technologies PTY LTD
<b>End date</b>	3-Jul-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>			
<p>Ticks remain the costliest condition confronting Australian grass-fed cattle, with host genotype and chemicals of diminishing desirability the only means of controlling them. There is intriguing evidence that naturally occurring microbes from Australian soil samples produce acaricidal and insecticidal metabolites, and that applying a mixture of such microbes to cattle reduces their tick counts. This project aims to further develop the invention of applying natural microbes to the hides of cattle to reduce tick numbers. Scientific studies will further improve efficacy through microbe refinement and scale-up of production to good manufacturing practice (GMP) standards. A pathway to registration and a licensable product will be established.</p>			

### Rumensin capsules for bloat control and sustainability

<b>Project code</b>	P.PSH.1329	<b>Location</b>	Southern Australia
<b>Start date</b>	5-Jul-21	<b>Vendor</b>	Elanco Australasia
<b>End date</b>	1-Apr-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>			
<p>Frothy bloat in grass-fed cattle is a well-known phenomenon and is estimated to have cost southern Australian producers around \$80 million dollars in 2015. The condition was largely controlled by administering low doses of the ionophore chemical monensin, but this was disrupted when Rumensin® slow release rumen capsules were withdrawn from the market in 2013 due to inconsistent performance. This project will validate the efficacy of a new and improved version of Rumensin in wide-scale field trials, whilst also developing the commercially upscaled production method.</p>			

### Immunisation against virulent genotypes of *Theileria orientalis*

<b>Project code</b>	P.PSH.1312	<b>Location</b>	National
<b>Start date</b>	1-May-21	<b>Vendor</b>	University of Sydney
<b>End date</b>	1-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		
<p>There is currently no remedy available in Australia for treating <i>Theileria orientalis</i>. This project will test the strong evidence that cattle can be protected from the disease by inoculating them with blood containing the benign <i>T orientalis Buffeli</i>, before they become infected with the virulent genotypes, which are now widespread in eastern Australia and have also been found in WA.</p>			

**Integrated tick management communications**

<b>Project code</b>	B.AWW.0264	<b>Location</b>	National
<b>Start date</b>	30-Aug-21	<b>Vendor</b>	Dawbuts Pty Ltd.
<b>End date</b>	1-Feb-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will deliver six practical, producer-facing articles and supply relevant photographs/images associated with integrated tick management for increased awareness and knowledge of existing strategies to reduce the impact of ticks in Australian cattle herds.

**'The sweet spot': Improving breeder herd performance through optimal pasture utilisation**

<b>Project code</b>	B.GBP.0029	<b>Location</b>	Northern Australia
<b>Start date</b>	02-Apr-18	<b>Vendor</b>	Northern Territory of Australia
<b>End date</b>	30-May-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

The level of pasture utilisation required for optimal cattle breeder productivity in northern Australia is unknown. This project aims to find existing data to identify the pasture utilisation rates, improve the capacity of models to predict breeder performance and develop tools to improve breeder productivity in the north.

**Reducing calf loss due to exposure**

<b>Project code</b>	B.GBP.0031	<b>Location</b>	Northern Australia
<b>Start date</b>	15-Jun-18	<b>Vendor</b>	Department of Primary Industries
<b>End date</b>	30-May-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will investigate the impact of providing shade to commercial beef heifers to reduce foetal and calf loss in rangeland situations. The findings will help support on-farm management recommendations, particularly in the Northern Downs where large numbers of breeding females graze treeless rangelands.

**'Paddock power': increasing reproductive productivity through evidence-based paddock design**

<b>Project code</b>	B.GBP.0039	<b>Location</b>	Northern Australia
<b>Start date</b>	15-Feb-19	<b>Vendor</b>	Northern Territory of Australia
<b>End date</b>	29-Feb-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will assess the impact of paddock area and watered area (distance to water) on calf wastage and breeder herd performance in northern Australia. It will quantify the extent to which reducing paddock area and/or reducing distance to



water could reduce calf wastage, to create evidence-based recommendations on where to place new infrastructure to maximise return on investment.

### Calf 48 hour – better detection of calving events for improved productivity

Project code	B.GBP.0052	Location	National
Start date	22-Jun-20	Vendor	Central Queensland University
End date	30-Nov-23	Funding source	Levy
Initiation of research	Industry		

This project aims to develop and evaluate the Calf Alert System, to create a process that enables detection of birthing events and diagnosis of causes of calf loss in extensive grazing systems. The system will also provide cow behavioural data to inform understanding of causal effects of calf mortalities.

### Cattle tick and buffalo fly host genetics, susceptibility to buffalo fly lesions and biomarkers for resistance

Project code	P.PSH.0798	Location	National
Start date	02-Feb-17	Vendor	University of Queensland
End date	01-Oct-23	Funding source	MLA Donor Company
Initiation of research	External partnership		

There are known differences in susceptibility to cattle tick, buffalo fly and lesions. This project will develop more practical methods of assessing tick and fly numbers, identify indirect criteria such as biomarkers and immunological indicators, and determine genomic markers for more cost-effective selection for resistance.

### Improving fertility in northern cattle through host and pathogen molecular diagnosis

Project code	P.PSH.0799	Location	Northern Australia
Start date	01-Dec-17	Vendor	University of Queensland
End date	01-Mar-23	Funding source	MLA Donor Company
Initiation of research	External partnership		

By exploring the genome of the microbiome in the bull's prepuce and the cow's vagina, this project aims to identify factors that make cows more susceptible or resistant to infectious agents that impair their reproductive performance, plus genetic markers that could be used to select for resistance.

### Development of a single shot immune-contraceptive vaccine for cattle

Project code	B.AWW.0260	Location	National
Start date	01-Nov-17	Vendor	University of Queensland
End date	30-Nov-22	Funding source	Levy
Initiation of research	Investment call		



Unplanned pregnancies in cull cows and surplus heifers in extensively managed beef herds where continuous mating is common practice is a serious welfare and productivity issue for live exporters and processors. This project will develop a contraceptive vaccine using a *zona pellucida* antigen, as a replacement for surgical spaying.

### Objective, robust, real-time animal welfare measures for the Australian red meat industry

Project code	P.PSH.0819	Location	National
Start date	20-Jun-17	Vendor	University of Sydney
End date	19-Sep-22	Funding source	MLA Donor Company
Initiation of research	External partnership		

This project will benchmark indicators of cattle welfare from birth to slaughter. Resilience behaviour of cattle will be monitored remotely with robotic and ear tag-based technology to form objective measures of welfare.

### Welfare benchmarking and management for the beef cattle and sheep meat industries

Project code	P.PSH.0807	Location	National
Start date	28-Jun-17	Vendor	CSIRO; NSW DPI
End date	01-Sep-22	Funding source	MLA Donor Company
Initiation of research	External partnership		

This project will introduce a new framework for describing and assessing animal welfare criteria for use across Australia's red meat industries. The framework will enable management of information on the animal welfare status of individual enterprises and identify options available to them for improving their performance.

### A novel semen extender to accelerate genetic improvement programs

Project code	B.GBP.0030	Location	Northern Australia
Start date	01-Jul-18	Vendor	University of New Castle
End date	30-Jun-22	Funding source	Levy
Initiation of research	Investment call		

The aim of this project is to make artificial insemination viable for more producers by developing a medium that extends the life of bull semen. This means that semen samples will be able to maintain fertility over several weeks without the need for cryopreservation, which will improve the logistics of artificial insemination in rural areas.

### Investigating the causes of calf losses in extensive pastoral systems - calf watch

Project code	B.GBP.0027	Location	Northern Australia
Start date	30-Jan-18	Vendor	Northern Territory of Australia
End date	30-May-22	Funding source	Levy
Initiation of research	Investment call		



This project seeks to revolutionise research into calf mortality by facilitating the identification of the time and location of calving. The activity of calves can then be monitored, so that researchers can be notified when a calf dies and can easily locate the calf to conduct a necropsy.

### Agscent cow breath sampling: pregnancy diagnosis proof of concept

<b>Project code</b>	B.AWW.0007	<b>Location</b>	National
<b>Start date</b>	24-Jun-19	<b>Vendor</b>	Agscent Pty Ltd
<b>End date</b>	15-May-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project aims to further develop, refine and commercialise a non-invasive point of need (field) device capable of early detection of pregnancy in cattle as an alternative to palpation and ultrasound. It will also be developed for use in the detection of Bovine Respiratory Disease (BRD).

## Animal production, husbandry and nutrition

### Fit for purpose biochar to improve efficiency

<b>Project code</b>	B.GBP.0032	<b>Location</b>	Northern Australia
<b>Start date</b>	19-Dec-18	<b>Vendor</b>	CSIRO
<b>End date</b>	30-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will demonstrate that the manufacture of biochar can be manipulated to yield a high quality, consistent product that can be readily incorporated into ruminant diets to help reduce methane emissions and boost liveweight gain.

### Fit for purpose biochar to improve efficiency

<b>Project code</b>	B.GBP.0032	<b>Location</b>	Northern Australia
<b>Start date</b>	19-Dec-18	<b>Vendor</b>	CSIRO
<b>End date</b>	30-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will demonstrate that the manufacture of biochar can be manipulated to yield a high quality, consistent product that can be readily incorporated into ruminant diets to help reduce methane emissions and boost liveweight gain.

### Nitrogen recycling as determinant for feed efficiency of *Bos indicus* cattle

<b>Project code</b>	P.PSH.1016	<b>Location</b>	Northern Australia
<b>Start date</b>	01-Dec-17	<b>Vendor</b>	University of Queensland
<b>End date</b>	28-May-23	<b>Funding source</b>	MLA Donor Company



<b>Initiation of research</b>	External partnership
<p>The ability of the animal to recycle nitrogen back to the rumen, instead of eliminating in the urine, is crucial. As such, this project will test if feed efficiency in low-protein diets is associated with nitrogen and if rumen efficiency can be practically measured and incorporated into genomic selection for net feed efficiency.</p>	

**NB2: QDAF delivery of Pathway to Practice pillar of Northern Breeding Business (NB2) program**

<b>Project code</b>	P.PSH.1310	<b>Location</b>	Northern Australia
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	Queensland Department of Agriculture and Fisheries
<b>End date</b>	31-Mar-28	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Investment call		
<p>The Pathways to Practice project, part of the larger Northern Breeding Business (NB2) program, will actively engage northern beef producers in the use of objective data to inform business decisions and provide a direct conduit from research and development outcomes to changes in business practice.</p> <p>The focus of the Pathways to Practice project is adoption and practice change, led by producers for producers, thereby maximising the opportunity for peer-to-peer communication as the primary method of creating, acquiring, testing and implementing innovations.</p>			

**NB2: Assessing practical interventions to reduce calf wastage and herd mortality in northern systems**

<b>Project code</b>	P.PSH.1314	<b>Location</b>	Northern Australia
<b>Start date</b>	5-Jul-21	<b>Vendor</b>	University of Queensland
<b>End date</b>	15-Oct-26	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Investment call		
<p>Poor nutrition and environmental stress during calving have been identified as major causes of calving difficulty and calf mortality. This proposal aims to assess the impact of nutritional interventions and environmental stress around calving on cow and calf mortality, and to validate the use of relevant on-farm diagnostic tools to objectively measure baseline performance against that achieved with the interventions.</p>			

**BeefLinks: pivot irrigation**

<b>Project code</b>	P.PSH.1257	<b>Location</b>	Northern Australia
<b>Start date</b>	31-May-21	<b>Vendor</b>	University of Western Australia
<b>End date</b>	15-Dec-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>			
<p>Irrigated pasture production is well understood in more temperate environments – however, it is a relatively new fodder production system in northern Australia and presents a number of challenges in semi-arid and tropical environments. The overall aim of the project is to determine if pivot irrigation systems can be developed to create viable, cost effective alternatives to current supply chains and assist in the transitioning of cattle off the rangelands earlier to enable sustainable production systems.</p>			



## Objective real-time assessment of *Bos taurus* cattle to improve profitability and productivity of the beef value chain

Project code	B.GBP.0051	Location	Northern Australia
Start date	3-Feb-20	Vendor	NSW DPI
End date	3-Nov-23	Funding source	Levy
Initiation of research	Investment call		

Through this project, NSW DPI and UTS will expand 3D camera application for *Bos taurus* breeds to provide a predictive tool that objectively assesses fat, muscle score, frame score and body condition score at different stages of growth on live cattle in real-time, on farm and in feedlots. This project will demonstrate and validate proof of concept for a commercial-ready product and validate and develop new predictive algorithms for carcass characteristics.

## NB2: The Northern Breeding Business (NB2) program pilot producer groups

Project code	P.PSH.1324	Location	Northern Australia
Start date	1-Jun-21	Vendor	NABRC
End date	1-Sep-23	Funding source	MLA Donor Company
Initiation of research	Investment call		

As part of the Northern Breeding Business (NB2) initiative, this project will establish four pilot producer groups throughout 2021–2023. This project is designed to drive extension and adoption outcomes for NB2 using a peer-to-peer learning format. The four pilot groups (two in Qld, one in NT and one in WA) will run concurrently across northern Australia under the Pathway to Practice pillar of the program. The aim is to use these pilots to fine-tune the data collection system, along with the peer-to-peer learning platform, to enable a full roll-out including up to 250 producers by the end of 2027.

## Grassfed beef (N Australia) consultancy 2021-2023

Project code	B.GBP.0059	Location	Northern Australia
Start date	1-Jul-21	Vendor	Geoff Neithe
End date	30-Jun-23	Funding source	Levy
Initiation of research	Industry		

This project employs a consultant to review R&D relating to beef productivity, to advise on future areas of work relevant to the northern Australian beef industry, to engage with industry stakeholders and to support related programs of within MLA, namely NB2 and dairy2BEEF.

## BeefLinks: defining the potential and application of native Australian plants for a carbon neutral northern beef value chain in Western Australia

Project code	P.PSH.1262	Location	Northern Australia
Start date	15-Jun-20	Vendor	University of Western Australia
End date	30-Jun-23	Funding source	MLA Donor Company
Initiation of research			



Previous investments by MLA (B.CCH.1012) have examined the anti-methanogenic characteristics of the southern rangelands feed base. However, there is a gap in knowledge regarding the anti-methanogenic feed base options available for producers in the northern rangelands. The objective of this project is to quantify the diversity in anti-methanogenic and productivity properties of a number of commercially available and naturally occurring plant species that make up the feed base of northern WA mosaics used for beef production. The data from this project will provide producers with a range of feed base options that support the drive for methane abatement from beef cattle as well as the drive for a carbon neutral value chain.

### BeefLinks: growing WA backgrounding through adoption

<b>Project code</b>	P.PSH.1233	<b>Location</b>	Northern Australia
<b>Start date</b>	3-Feb-20	<b>Vendor</b>	University of Western Australia
<b>End date</b>	27-Jun-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>			

This project will identify and measure best practice management for transitioning cattle from the northern WA rangelands to backgrounding properties to support improvements to the production capacity of the WA value chain. By supporting north-south alliances in WA, this project also aims to enable alternative market opportunities for cattle in the region.

### BeefLinks: virtual fencing

<b>Project code</b>	P.PSH.1306	<b>Location</b>	Northern Australia
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	University of Western Australia
<b>End date</b>	31-May-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

The use of virtual herding technologies has been demonstrated to be effective for intensive systems and now provides a unique opportunity to manage beef cattle across the northern WA rangelands. This project will provide proof of concept using virtual fencing at scale for better monitoring and management of cattle and to assist the WA industry with the integration of virtual herding into extensive grazing systems.

### BeefLinks 'DietID' feedbase mapping to raise productivity of cattle

<b>Project code</b>	P.PSH.1245	<b>Location</b>	Northern Australia
<b>Start date</b>	15-Mar-20	<b>Vendor</b>	University of Western Australia
<b>End date</b>	1-Feb-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Investment call		

Utilisation of rangeland mosaics drive the profitability and productivity of the WA beef industry. This project will deliver a comprehensive assessment of the nutritional value and bioactive properties of a number of commercially available and naturally occurring plant species that make up northern WA rangelands and key backgrounding areas for the WA supply chain.

**NB2: Needs and gaps analysis/literature review for NB2 – Alan Bell**

<b>Project code</b>	B.GBP.0055	<b>Location</b>	Northern Australia
<b>Start date</b>	01-Jun-21	<b>Vendor</b>	Dr Alan William Bell
<b>End date</b>	22-Feb-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

The purpose of this agreement is to engage an external consultant to review existing Australian and international R&D material to identify needs and gaps that have direct relevance to the Northern Breeding Business (NB2) program.

**NB2 - 'uSuckled': Detection of maternal behaviours associated with suckling in beef cattle**

<b>Project code</b>	B.GBP.0058	<b>Location</b>	Northern Australia
<b>Start date</b>	1-Jul-21	<b>Vendor</b>	Northern Territory Department of Industry, Tourism and Trade
<b>End date</b>	14-Sep-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will explore the concept that suckling can be detected using remote monitoring devices such as accelerometers, sound monitors and GPS trackers attached to free-grazing cows. In doing so, it will document a non-invasive and remotely detectable dam-based method to approximate when a calf has been born, indicate whether the calf was born alive, if it suckled normally or not and if the occurrence of suckling prematurely stops indicating a self-weaning or mortality event.

**Increasing adoption of phosphorus supplementation in northern Australia**

<b>Project code</b>	L.ADP.2030	<b>Location</b>	Northern Australia
<b>Start date</b>	30-Oct-20	<b>Vendor</b>	Northern Territory DPI&R
<b>End date</b>	28-May-27	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The purpose of this project is to increase adoption of phosphorus (P) supplementation in northern Australia through the testing and demonstration of an 'Easy P' strategy. The adoption emphasis is focused on livestock producers who have not adopted P supplementation because they feel that it is too difficult to implement in the wet season.

**Optimising heifer development and management to increase whole herd profit**

<b>Project code</b>	B.GBP.0038	<b>Location</b>	Northern Australia
<b>Start date</b>	01-Oct-18	<b>Vendor</b>	University of Adelaide
<b>End date</b>	30-Sep-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

Achieving maximum lifetime reproductive performance requires that heifers conceive early, calve unassisted, raise a viable calf and re-breed early. This project comprises an integrated RD&E effort that aims to achieve a 10% increase in reproductive efficiencies.

**Objective real-time assessment of *Bos taurus* cattle to improve profitability and productivity**

<b>Project code</b>	B.GBP.0051	<b>Location</b>	Southern Australia
<b>Start date</b>	03-Feb-20	<b>Vendor</b>	NSW DPI
<b>End date</b>	03-Nov-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will help address cattle non-compliance with processor grid specifications by delivering a validated, on-farm portable 3D camera technology. The camera will be integrated with BeefSpecs to objectively assess P8 fat, muscle score, frame score and body condition score at different stages of growth on live cattle.

**LPP – improving profit from pasture through increased feed efficiency**

<b>Project code</b>	P.PSH.1000	<b>Location</b>	National
<b>Start date</b>	22-Feb-18	<b>Vendor</b>	CSIRO
<b>End date</b>	01-Jul-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		

This project is part of the Livestock Productivity Partnership (LPP) and will lead to greater understanding of the rumen digestive/microbiome complex, grazing behaviour and pasture intake. Applying this knowledge to practical feeding, management and breeding programs will result in higher efficiencies for grazing cattle.

**Improving beef production through management of plant toxins**

<b>Project code</b>	B.GBP.0023	<b>Location</b>	National
<b>Start date</b>	01-Nov-17	<b>Vendor</b>	University of Queensland
<b>End date</b>	30-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project seeks to isolate microbes capable of degrading plant toxins and investigate absorbents and/or biopolymers to foster toxin-degrading microbe populations. This will help to devise strategies that enable ruminal degradation of compounds before absorption into the bloodstream.

**Managing welfare and production at weaning: northern beef pain relief project**

<b>Project code</b>	B.PRS.2001	<b>Location</b>	Northern Australia
<b>Start date</b>	19-Jul-19	<b>Vendor</b>	Northern Territory of Australia
<b>End date</b>	30-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will investigate the use of analgesics at the time of castration and/or dehorning, to determine any resulting impacts on welfare and production outcomes in beef cattle.

**Feeding leucaena to manage the rumen for maximum beef profit**

<b>Project code</b>	B.GBP.0026	<b>Location</b>	Northern Australia
<b>Start date</b>	27-Apr-18	<b>Vendor</b>	DAFF
<b>End date</b>	29-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project is investigating the comparative animal performance of the new psyllid resistant leucaena, Redlands, against a standard modern cultivar, Wondergraze. It will also quantify the reduction in methane emissions by cattle from Redlands and Wondergraze and collected data on the growth performance of cattle fed both cultivars.

**Increased pasture intake and reduced supplement requirements of sheep and cattle**

<b>Project code</b>	B.NBP.0813	<b>Location</b>	Northern Australia
<b>Start date</b>	02-Jan-19	<b>Vendor</b>	University of Queensland
<b>End date</b>	30-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

The overall aim of this project is to utilise novel, non-nutritional approaches to increase feed intake for cattle that graze nutrient deficient pastures, to reduce supplement requirements.

**Digital agriculture****Romani Pastoral Bull tracking**

<b>Project code</b>	P.PSH.1313	<b>Location</b>	New South Wales
<b>Start date</b>	20-May-21	<b>Vendor</b>	AgTech Pty Ltd.
<b>End date</b>	15-Oct-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project aims to improve productivity from bull herds and business profitability through the deployment of individual animal monitoring smart tag technology to enable reduced labour costs, increased utilisation of bulls, increased longevity of bull working life and reduced cost of infrastructure damage.

**Carwoola Digital Ag 4.0 – phase 2**

<b>Project code</b>	V.DIG.0017	<b>Location</b>	New South Wales
<b>Start date</b>	25-Jun-19	<b>Vendor</b>	Pairtree Intelligence Pty Ltd
<b>End date</b>	01-Jan-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Digital farms are important for the longevity of Australian red meat supply chains, whether that be to inform consumers of our credentials or to improve business productivity. This project will install technology to allow integration and evaluation of digital farm requirements at Carwoola as part of the digital agriculture pilot study.



## Eating quality

### myMSA and data capture unit application maintenance services

<b>Project code</b>	L.MSG.2202	<b>Location</b>	National
<b>Start date</b>	01-Oct-21	<b>Vendor</b>	Data in Motion
<b>End date</b>	30-Mar-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>This project provides MSA system, MLA staff and system vendor support in relation to the myMSA databases and DCU application.</p>			

### Support & Maintenance of myMSA

<b>Project code</b>	L.MSG.2201	<b>Location</b>	National
<b>Start date</b>	01-Oct-21	<b>Vendor</b>	Management for Technology Pty Ltd
<b>End date</b>	30-Mar-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>This project provides support, maintenance and further developments to the myMSA comprehensive system.</p>			

### IT services maintenance agreement 2021/22

<b>Project code</b>	L.MSG.2203	<b>Location</b>	National
<b>Start date</b>	01-Oct-21	<b>Vendor</b>	Apheta Data Solutions
<b>End date</b>	30-Mar-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>The MSA program has several standalone IT programs that are outside the general support commitment from the corporate MLA IT team. The consultant contracted through this project is responsible for providing ongoing support to MSA IT systems including self-assessment, end user and producer training, online ordering systems and SQL database servers linked to INFOSYS.</p>			

### Technical support for MSA research and development

<b>Project code</b>	L.EQT.2202	<b>Location</b>	National
<b>Start date</b>	20-Sept-21	<b>Vendor</b>	Scibus
<b>End date</b>	30-Mar-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>The purpose of this consultancy agreement is to provide project and study design consultation as well as statistical support for MSA research and development, as directed by authorised MSA personnel.</p>			

### MSA EEQ awards case study videos

<b>Project code</b>	L.MSA.2205	<b>Location</b>	National
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<b>Start date</b>	1-Sep-21	<b>Vendor</b>	Sound Images
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The MSA EEQ awards will be held to recognise the top performing MSA producers in each state for the 2019–20 and 2020–21 financial years. This project involves the production of video case studies of each of the award winners, helping to share the benefits of the MSA system with industry more broadly.

### MSA saleyard pathway evaluation and feeding options

<b>Project code</b>	P.PSH.0513	<b>Location</b>	National
<b>Start date</b>	1-Jan-21	<b>Vendor</b>	RLX Operating Company
<b>End date</b>	31-Nov-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project is a joint initiative between the Regional Livestock Exchange (RLX) Operating Company and MLA which aims to increase cattle eligibility for the MSA system via saleyard consignment. The project will investigate the impact on eating quality of various time frames for cattle consigned via saleyards as well as the impact of supplementary feeding options to manage any potential eating quality outcomes.

### Development of app for beef carcass grading by camera technologies

<b>Project code</b>	L.MSG.2110	<b>Location</b>	National
<b>Start date</b>	21-Dec-20	<b>Vendor</b>	Management for Technology
<b>End date</b>	15-Jun-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will enable beef grading to be conducted by industry-endorsed objective camera technologies and interface with existing MLA systems. The development of this app could support MSA grading, AUS-MEAT chiller assessment as well as animal health data capture and reporting.

### Biomarkers for reducing non-compliance in beef carcasses

<b>Project code</b>	L.EQT.2104	<b>Location</b>	National
<b>Start date</b>	01-Oct-20	<b>Vendor</b>	CSIRO
<b>End date</b>	30-Oct-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project aims to identify and generate a library of biomarkers present in saliva samples that may be linked to dark cutting in beef carcasses. This will help determine at risk animals before slaughter and prior to carcass chilling. The project will aim to identify and implement commercialisation opportunities.

### Determining the impact of long distance road and rail transport on the eating quality of beef

<b>Project code</b>	L.EQT.1807	<b>Location</b>	National
<b>Start date</b>	15-May-18	<b>Vendor</b>	University of New England
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy



<b>Initiation of research</b>	Industry
<p>This project aims to determine the impact of long distance rail transportation on the eating quality of beef, when compared to similar road transport times and distances, as well as investigate options for refeeding. Rail transport as a MSA pathway has the potential to provide further marketing opportunities for northern Australia beef businesses with an aim of generating further value.</p>	

### Wagyu beef eating quality and MENA sensory testing

<b>Project code</b>	L.EQT.1903	<b>Location</b>	National
<b>Start date</b>	30-Nov-19	<b>Vendor</b>	University of New England
<b>End date</b>	15-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>This project aims to investigate if there is a “Wagyu” breed effect on eating quality over and above the current MSA model prediction, utilising both purebred and first cross animals. The opportunity to increase the quantity of Wagyu animals MSA-graded in Australia has the potential to increase returns through the supply chain.</p>			

### Reconditioning and eating quality potential of older female cattle

<b>Project code</b>	L.EQT.1910	<b>Location</b>	National
<b>Start date</b>	01-Jun-19	<b>Vendor</b>	Charles Sturt University
<b>End date</b>	31-Jan-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>The project aims to investigate the ability of older female cattle to regain body condition at short feeding intervals of four, six and eight weeks, as well as the subsequent effect on meat eating quality and compliance to market specifications.</p>			

### Creating a dairy beef supply chain to increase the value and volume of beef and veal products

<b>Project code</b>	P.PSH.1023	<b>Location</b>	National
<b>Start date</b>	01-Apr-18	<b>Vendor</b>	Charles Sturt University
<b>End date</b>	30-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		
<p>This project will investigate the impact of genetic, nutritional and management growth paths on the performance and quality of beef and veal products from dairy and dairy-cross breeds. This will provide a feasible beef production model and extend to implications for understanding production of dairy based calves and targeting valuable marketing potential.</p>			

## Environmental sustainability

### Defining the pathway for remediating mining land for productive, profitable and sustainable beef production

<b>Project code</b>	P.PSH.2135	<b>Location</b>	Northern
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<b>Start date</b>	1-Sep-21	<b>Vendor</b>	Central Queensland University
<b>End date</b>	31-Oct-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will engage with the resources sector to position beef production as a change agent for carbon sequestration and biodiversity. The project will define the commercial opportunity that rehabilitation and mine closure processes afford the beef industry, identify and characterize livestock systems that sequester carbon and build biodiversity and develop an action-research strategy for outcomes that provide scalable beef production on land relinquished through mine closures.

### NEXUS I&P project - biochar feeding regime

<b>Project code</b>	P.PSH.2134	<b>Location</b>	Tasmania
<b>Start date</b>	2-Aug-21	<b>Vendor</b>	University of Tasmania
<b>End date</b>	31-Dec-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project is linked to the University of Tasmania NEXUS project and will work in collaboration with a commercial beef producer (TasAgCo) to model and measure the impact of a biochar feeding regime on whole farm productivity, profitability and GHG emissions.

### Harvest Road Group carbon neutral supply chains 2025

<b>Project code</b>	P.PSH.1259	<b>Location</b>	National
<b>Start date</b>	29-May-20	<b>Vendor</b>	Harvest Road & Western Australian Agricultural Authority
<b>End date</b>	1-Dec-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will develop an implementable and costed plan to achieve carbon neutral goals within the Harvest Road Group's supply chain, as well as assist in understanding the carbon footprint of the individual enterprise and developing a carbon neutral product line. It will develop an implementable emissions reduction strategy to deliver reduced or sequestered carbon outcomes.

### Use of 3-NOP for methane mitigation by programming rumen microbiome development in calves

<b>Project code</b>	P.PSH.1295	<b>Location</b>	National
<b>Start date</b>	1-Mar-21	<b>Vendor</b>	DSM & CSIRO
<b>End date</b>	1-Aug-23	<b>Funding source</b>	MLA Donor Company/Commercial
<b>Initiation of research</b>	Industry		

An investigational compound, 3-nitrooxypropanol (3-NOP) acts as a GHG mitigant by inhibiting methane production in the rumen. Recent evidence suggests that changes in colonisation of the rumen by microbes prior to weaning may influence the rumen and modify function later in life. This project aims to demonstrate that 3-NOP delivered to calves from birth will influence the rumen microbiome development in a way that reduction in methane will persist for a long time after treatment has stopped.



## Determining which of the halogenated small molecules from *Asparagopsis* (red algae) is responsible for the observed activity in inhibiting methane production in cattle

<b>Project code</b>	P.PSH.1264	<b>Location</b>	National
<b>Start date</b>	15-Jun-20	<b>Vendor</b>	Macquarie University
<b>End date</b>	15-Nov-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry (CN30)		
Bromoform was postulated as the anti-methanogenic bioactive from <i>Asparagopsis</i> in B.FLT.0394 but this is not proven. This project will determine whether the bioactive is bromoform or other halogenated methane analogues. The long-term goal is to use this knowledge to replicate the active ingredient(s) in <i>Asparagopsis</i> through synthetic pathways, thereby reducing the cost of production of methane-reducing supplements.			

## Feedbase and grazing land management

### Biology of Pasture Mealybug and identification of natural enemies (CAS-1)

<b>Project code</b>	B.PAS.0004	<b>Location</b>	Queensland
<b>Start date</b>	20-Feb-20	<b>Vendor</b>	Queensland University of Technology
<b>End date</b>	1-Dec-22	<b>Funding source</b>	Federal grant
<b>Initiation of research</b>	Industry		
This project will investigate a potential causal agent of pasture dieback, the mealybug, to provide further information and understanding. Potential natural enemies of the mealybug will also be identified.			

### Data driven system optimising the forage base for sustainable beef production

<b>Project code</b>	P.PSH.1340	<b>Location</b>	Queensland, New South Wales
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	University of Sydney
<b>End date</b>	2-Oct-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		
This project will develop tools to support the management of diverse landscapes and forages, including the use of a zonal approach to optimum species selection, placement in the landscape and grazing management to ensure persistence of a diverse species pasture/forage base. It will deliver a robust, data driven performance-based system for livestock production with a minimum 10% increase in pasture utilisation and increased feedbase sustainability.			

### Desktop analysis of opportunities for oil-enhanced forages

<b>Project code</b>	B.PAS.0362	<b>Location</b>	Queensland; New South Wales
<b>Start date</b>	12-May-21	<b>Vendor</b>	CSIRO
<b>End date</b>	6-Feb-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		



This project will identify and prioritise investment opportunities for the development of oil-enhanced forages for Australian livestock industries. Increasing the oil content of forages will potentially benefit livestock production systems through higher feed intake, liveweight gain, feed efficiency, and reductions in methane emissions.

### Serradellas for new environments

<b>Project code</b>	B.PAS.0361	<b>Location</b>	Queensland; New South Wales
<b>Start date</b>	01-Apr-21	<b>Vendor</b>	CSIRO
<b>End date</b>	1-Aug-25	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will explore the use of serradellas to address the pasture yield gap across south-eastern Australia, including the issue of nitrogen deficiency. The project will address key gaps in knowledge regarding how to establish and manage serradellas in permanent pasture environments and appropriate cultivar selection, coupled with demonstrations and development of producer advocates to support practice change.

### Dieback: grazier engagement to increase knowledge, skills and ability to combat pasture dieback

<b>Project code</b>	B.PAS.0511	<b>Location</b>	Queensland; New South Wales
<b>Start date</b>	3-Aug-20	<b>Vendor</b>	Queensland DAFF
<b>End date</b>	17-Aug-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project aims to provide knowledge and support to producers to accurately identify and diagnose dieback on their property and understand the practices that could potentially combat dieback. This will be achieved by forming a grazier group in central Queensland, a region heavily affected by dieback. Graziers will participate in action learning processes where knowledge, skills and attitudes are developed to facilitate informed management practice on-farm.

### NEXUS project: exploring profitable, sustainable livestock businesses in an increasingly variable climate

<b>Project code</b>	P.PSH.1236	<b>Location</b>	Queensland; New South Wales
<b>Start date</b>	17-Feb-20	<b>Vendor</b>	CSIRO
<b>End date</b>	30-Dec-25	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The NEXUS program will explore the nexus between profitability, productivity, greenhouse gas mitigation, carbon sequestration and consumer perceptions of livestock businesses in an increasingly variable climate. An integrated assessment of seven farm case studies in regions from the northern Queensland to the Midlands of Tasmania will be conducted to identify systems adaptations that are profitable, environmentally sustainable and targeted towards future market opportunities.

### Legume best management practice in the brigalow belt bio-region – stage 2

<b>Project code</b>	B.PAS.0354	<b>Location</b>	Queensland; New South Wales
<b>Start date</b>	01-Apr-17	<b>Vendor</b>	DAFF
<b>End date</b>	01-Jun-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		



This project aims to increase the productivity of grass pastures in the Brigalow Belt bio-region through more reliable and successful adoption of legumes. A coordinated RD&E program has developed and is delivering via awareness events training, producer demonstrations and legume management plans to improve establishment reliability and long term (20+ years) performance of legumes in grass pastures.

### Dieback: determining the role of ground pearls in pasture dieback

<b>Project code</b>	B.PAS.0506	<b>Location</b>	Northern Australia
<b>Start date</b>	15-May-20	<b>Vendor</b>	University of Queensland
<b>End date</b>	30-Jul-24	<b>Funding source</b>	Federal grant
<b>Initiation of research</b>	Industry		

The primary objective of this project is to determine whether ground pearls are linked with the cause of pasture dieback and if so, how they can be effectively managed.

### Resistant grass varieties and endophytes (CAS-3)

<b>Project code</b>	B.PAS.0006	<b>Location</b>	Northern Australia
<b>Start date</b>	20-Feb-20	<b>Vendor</b>	Queensland University of Technology
<b>End date</b>	15-Dec-22	<b>Funding source</b>	Federal grant
<b>Initiation of research</b>	Industry		

This project aims to identify pasture species that are resistant to dieback and find endophytes that protect grasses from mealybug attack. If successful, the outcomes will provide short term pasture species recommendations, assist plant breeding and longer restoration and protection of dieback-affected areas.

### Glasshouse assays to determine the role of mealybug and screening of controls (CAS-2)

<b>Project code</b>	B.PAS.0003	<b>Location</b>	Queensland
<b>Start date</b>	20-Feb-20	<b>Vendor</b>	Queensland University of Technology
<b>End date</b>	15-Dec-22	<b>Funding source</b>	Federal grant
<b>Initiation of research</b>	Industry		

This project will determine the progress of dieback from initial infestation with mealybugs to death of the grass, to identify any association with other pathogens that may lead to dieback.

### Wambiana - Grazing strategies and tools to improve profitability and land condition

<b>Project code</b>	B.ERM.0108	<b>Location</b>	Queensland
<b>Start date</b>	15-Jan-18	<b>Vendor</b>	DAFF
<b>End date</b>	15-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		



This project will address challenges of northern beef producers by testing, developing and demonstrating adaptive, flexible grazing management strategies to improve profitability and land condition. It will also develop advanced decision support tools to assist producers adapt their management to changing seasonal conditions in north and central Queensland.

**Dieback: Comprehensive diagnostic analysis of pastures affected by dieback**

<b>Project code</b>	B.PAS.0509	<b>Location</b>	Queensland; New South Wales
<b>Start date</b>	30-Aug-20	<b>Vendor</b>	QDAF
<b>End date</b>	30-Nov-22	<b>Funding source</b>	Federal grant
<b>Initiation of research</b>	Industry		

The project will complete an analysis of pastures in the main areas affected by pasture dieback to identify the range of pathogenic and pest organisms present and assess their role in pasture dieback expression.

**Indian couch invasion: scope production impacts, and management options**

<b>Project code</b>	B.ERM.1105	<b>Location</b>	Queensland
<b>Start date</b>	15-Apr-18	<b>Vendor</b>	DAFF
<b>End date</b>	30-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will address producer concerns about Indian couch grass significantly reducing the carrying capacity of pastures by quantifying the extent of invasion, ecology and spread patterns of Indian couch and identification of potential management and control options.

**Progressing superior tropical grasses and legumes in seasonally dry Queensland**

<b>Project code</b>	B.NBP.0812	<b>Location</b>	Queensland
<b>Start date</b>	30-Apr-17	<b>Vendor</b>	DAFF
<b>End date</b>	30-Apr-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will test combinations of the better performing legumes and grasses in field plots using grazing management more typical of ‘weaner’ or ‘grower’ paddocks. Measurements of success will be based on plant population dynamics, productivity and quality and animal utilisation.

**Dieback: grazier engagement to increase knowledge, skills and ability to combat pasture dieback**

<b>Project code</b>	B.PAS.0511	<b>Location</b>	Northern Australia
<b>Start date</b>	03-Aug-20	<b>Vendor</b>	QDAF
<b>End date</b>	17-Aug-22	<b>Funding source</b>	Federal grant
<b>Initiation of research</b>	Industry		



This project aims to provide knowledge and support for producers to accurately identify and diagnose dieback on their property and understand the practices that could potentially combat dieback. Graziers will participate in action-learning processes where knowledge and skills are developed to facilitate informed management practice on-farm.

### Development of a sterile leucaena to enhance red meat production in new regions of Australia

<b>Project code</b>	P.PSH.0884	<b>Location</b>	Northern Australia
<b>Start date</b>	25-Jun-17	<b>Vendor</b>	Western Australian Agriculture Authority
<b>End date</b>	4-Jun-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will develop a sterile variety of leucaena so that production benefits can be realised in states other than Queensland, where leucaena plantings are prevented due to the potential weed threat it presents.

### Phosphorus map of Queensland grazing lands

<b>Project code</b>	B.GBP.0043	<b>Location</b>	Queensland
<b>Start date</b>	17-May-19	<b>Vendor</b>	Department of Environment and Resource Management
<b>End date</b>	30-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will produce a one-hectare, high resolution phosphorus map for three of Queensland’s major beef producing regions and create a strategy to extend the Geographic Information System (GIS) dataset using innovative digital soil mapping processes across northern Australia.

## Food safety, traceability and integrity

### Molecular risk assessment of Salmonella in red meat

<b>Project code</b>	V.MFS.0460	<b>Location</b>	International
<b>Start date</b>	3-Jan-22	<b>Vendor</b>	CSIRO
<b>End date</b>	29-Jun-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Salmonellosis remains a significant public health issue and foods of animal origin are most frequently considered to be the vehicle through which humans are infected. Regulatory authorities in the USA are considering changes to their position on Salmonella which may require a response from Australian exporters. This work will characterise Salmonella isolated from red meat sources using approaches emerging from the US regulator to prepare industry and government to respond to expected regulatory changes.

### Planning the Commercialisation of DTS: Diathermic Syncope (R) Stunning Technology

<b>Project code</b>	P.PIP.0587	<b>Location</b>	National
<b>Start date</b>	25-Aug-21	<b>Vendor</b>	Wagstaff Food Services



<b>End date</b>	16-Feb-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

Diathermic Syncope(R), or DTS stunning, is a new method of reversible stunning for cattle that has been developed, primarily through MDC funding. The purpose of this project is to assist in the development of an acceptable business plan to examine the routes to market adoption that will best ensure return on investment and balance the religious and animal welfare sensitivities between existing and new technology.

### Whole of beef supply chain waste mapping and interventions

<b>Project code</b>	V.MFS.0457	<b>Location</b>	National and international
<b>Start date</b>	15-Jun-21	<b>Vendor</b>	Fight Food Waste CRC
<b>End date</b>	27-Jun-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will be similar to the WRAP meat waste reduction strategies implemented in the UK, which resulted in significant cost savings for agricultural supply chains. It will measure waste in the supply chain and identify and implement interventions.

### Temperature, shock and location tracking of chilled Beef through international and domestic supply chains by air & sea

<b>Project code</b>	P.PIP.0580	<b>Location</b>	National
<b>Start date</b>	11-Mar-20	<b>Vendor</b>	Anon
<b>End date</b>	1-Feb-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The project will use the latest real time data loggers available on the market to track international air and sea freights, including temperature, location and shock. This will provide information about novel approaches that can be integrated in the shelf life model, and will be a valuable decision-support tool.

### Diathermic Syncope(R) (DTS) - dossier for regulatory acceptance

<b>Project code</b>	V.SRP.0002	<b>Location</b>	National
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	CSIRO
<b>End date</b>	1-Oct-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		

Diathermic Syncope(R), or DTS, is a new method of reversible stunning of cattle that has been developed primarily through MDC funding. The purpose of this project is to develop a dossier for regulatory approval, which will be delivered to EU animal welfare authorities. The dossier will also be useful to gain approval in other jurisdictions with less formal processes, and for religious acceptance.

### Pilot trial of track and trace label for retail ready vacuum skin-pack beef into China

<b>Project code</b>	V.RMH.0103	<b>Location</b>	National
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<b>Start date</b>	01-Nov-19	<b>Vendor</b>	My Crazy Aunties Food Pty Ltd
<b>End date</b>	30-Sep-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will facilitate producer-led brand exporting into China, to demonstrate the value of using a fraud proof track and trace labelling system and promote True Aussie products. This technology can be applied to any products that need a label.

### Artificial Intelligence (AI) cattle recognition pilot

<b>Project code</b>	P.PSH.1263	<b>Location</b>	National
<b>Start date</b>	16-Jun-20	<b>Vendor</b>	Asymmetric innovation
<b>End date</b>	21-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

The aim of the project is to conduct a proof of concept pilot using Artificial Intelligence (AI) to enable facial recognition of individual cattle. The project uses video images and advanced computer software algorithms to enable automatic tracking and identification of individual animals.

### Molecular assessment and characterisation of Australian Shiga toxin-producing E. coli (STEC)

<b>Project code</b>	V.MFS.0440	<b>Location</b>	National
<b>Start date</b>	30-Aug-19	<b>Vendor</b>	CSIRO
<b>End date</b>	15-May-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Shiga toxin-producing E. coli (STEC) produce potentially lethal toxins, however, only a very small percentage of STEC are known to cause illness. This project will assess the potential implications that adoption of risk classification schemes would have on the current testing program and product disposition regarding STEC.

## Genetic analysis

### Northern beef information nucleus - Brian pastures phase 3

<b>Project code</b>	P.PSH.2131	<b>Location</b>	National
<b>Start date</b>	1-Jul-21	<b>Vendor</b>	Australian Brahman Breeders' Association
<b>End date</b>	30-Jan-23	<b>Funding source</b>	MLA Donor Company/Commercial
<b>Initiation of research</b>	Industry		

The project is an extension of the Australian Brahman Breeders Assoc Ltd, Droughtmaster Stud Breeders Society Ltd and Santa Gertrudis Research Herds Beef Information Nucleus (Project P.PSH.0774).

The project will continue to build capacity and broaden the scope of phenotypic carcass and meat quality data in participating breeds which are not yet at an optimum level for single-step genetic evolutions. Data also collected through processing will be used to deliver a more accurate genomic EBV for meat yield.

**Northern beef information nucleus - Spyglass phase 3**

<b>Project code</b>	P.PSH.2132	<b>Location</b>	National
<b>Start date</b>	1-Jul-21	<b>Vendor</b>	Australian Brahman Breeders' Association
<b>End date</b>	31-Dec-22	<b>Funding source</b>	MLA Donor Company/Commercial
<b>Initiation of research</b>	Industry		

The project is an extension of the Australian Brahman Breeders Assoc Ltd, Droughtmaster Stud Breeders Society LTD and Santa Gertrudis Research Herds Beef Information Nucleus (Project P.PSH0774).

The project will continue to build capacity and broaden the scope of phenotypic carcass and meat quality data in participating breeds which are not yet at an optimum level for single-step genetic evaluations. Data also collected through processing will be used to deliver a more accurate genomic EBV for meat yield.

**Coordination of beef reference populations**

<b>Project code</b>	L.GEN.2201	<b>Location</b>	National
<b>Start date</b>	1-May-21	<b>Vendor</b>	University of New England & NSW DPI
<b>End date</b>	16-Jan-25	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will provide coordination and direction across a number of R&D projects all focused on collecting reference data in beef cattle. Deliverables of this project include: project design, genotyping strategies, in-project data analysis/reporting, communications/stakeholder reporting, as well as data flows/annotation to a central database and to BREEDPLAN.

**Development of genomic multi-breed eating quality trait estimates using shared global data**

<b>Project code</b>	L.GEN.2000	<b>Location</b>	National
<b>Start date</b>	13-May-20	<b>Vendor</b>	University of New England
<b>End date</b>	01-May-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will accelerate the development and commercial application of multi-breed genomic estimated breeding values by establishing a collaborative international reference dataset that links leading global genetic resources with the Australian beef CRC and MSA genomic and phenotypic data.

**Building and delivering effective genomic selection for northern Australia**

<b>Project code</b>	P.PSH.1221	<b>Location</b>	Northern Australia
<b>Start date</b>	22-Nov-19	<b>Vendor</b>	University of New England and NSW DPI
<b>End date</b>	20-Apr-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project builds on the successful Repronomics project (B.NBP.0759) to provide additional data and knowledge to better position the northern breeding industry to take advantage of genetic selection, particularly for improving female



reproduction rate. The project will double the number of animals that have high quality phenotypes and genotypes, particularly for reproduction traits for an expanded total of sires and breeds.

### Australian Angus reference population

<b>Project code</b>	P.PSH.1172	<b>Location</b>	National
<b>Start date</b>	01-Dec-18	<b>Vendor</b>	Angus Society of Australia
<b>End date</b>	31-Jan-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The main objective of the Australian Angus Reference Population is to increase the accuracy of breeding values, and in turn, increase the rate of genetic progress of the Australian beef industry through the generation of a comprehensive reference population of phenotypes and genotypes for Australian Angus cattle.

### Enhancing technology adoption across the Angus genetic improvement pipeline

<b>Project code</b>	P.PSH.1063	<b>Location</b>	National
<b>Start date</b>	01-Mar-18	<b>Vendor</b>	Angus Society of Australia
<b>End date</b>	02-Jan-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will implement an integrated suite of R&D, adoption and supply chain communication activities designed to harness disruptive technologies and to accelerate the application of continuous genetic improvement programs among breeders of Angus and Angus-influenced cattle.

### Increasing uptake of performance-recording genetics through automated livestock management systems

<b>Project code</b>	P.PSH.1186	<b>Location</b>	Northern Australia
<b>Start date</b>	15-Mar-19	<b>Vendor</b>	Central Queensland University
<b>End date</b>	30-Jun-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project is phase two in the automated livestock management systems (ALMS) program and will address the challenge of increasing uptake of genetic performance recording in beef production systems in northern Australia. The project will extend the use of ALMS across a wide range of properties to demonstrate the feasibility of ALMS for genetic improvement programs.

### Northern beef information nucleus

<b>Project code</b>	P.PSH.0743; P.PSH.0774	<b>Location</b>	Northern Australia
<b>Start date</b>	27-May-15	<b>Vendor</b>	Australian Brahman Breeders
<b>End date</b>	30-Mar-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		



These projects aim to use Brahman, Santa Gertrudis and Droughtmaster steer progeny data on reproduction and weight gain to extrapolate information on carcase and product quality and market suitability. The projects provide data to balance the suite of traits relevant to the beef industry in northern Australia.

### Accelerating genetic gain for productivity and profitability in northern beef cattle with genomic technologies

<b>Project code</b>	P.PSH.0833	<b>Location</b>	Northern Australia
<b>Start date</b>	01-Apr-17	<b>Vendor</b>	University of Queensland
<b>End date</b>	27-Jan-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project is designed to close the gap between the gains that are possible and the gains that are being achieved by using genetics to boost productivity. This process will draw from other livestock industries where it has been worked, by developing multi-breed analyses, new SNP chips and trialling with producers and gathering their perceptions to assist with adoption.

### Wagyu collaborative genetics research project – stage II

<b>Project code</b>	P.PSH.0715	<b>Location</b>	National
<b>Start date</b>	31-Jan-15	<b>Vendor</b>	Australian Wagyu Association Ltd
<b>End date</b>	30-Sep-21	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project aims to increase the rate of genetic gain in Australian Wagyu at a faster rate than any other Australian beef breed over the next ten years, by developing a low-cost, whole of Wagyu industry genetic advancement model.

### Southern beef technology project

<b>Project code</b>	P.PSH.0714	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Jul-16	<b>Vendor</b>	Agricultural Business Research Institute
<b>End date</b>	30-Jul-21	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The Southern Beef Technology Services (SBTS) project provides the southern beef industry with hands-on technical support to improve the understanding and adoption of BREEDPLAN and related genetic improvement technologies. This next phase of the SBTS project will feature a strategy for structured coordination of BREEDPLAN related R&D priorities, an industry capacity-building component and a refined, more focused approach on consultation with key influential seedstock herds.

### Improving productivity of commercial cattle through utilising superior sires within and across breeds

<b>Project code</b>	P.PSH.0716	<b>Location</b>	National
<b>Start date</b>	01-Jan-14	<b>Vendor</b>	Herefords Australia Ltd
<b>End date</b>	30-Jan-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		



This project is part of the development of the second phase of the Beef Information Nucleus (BIN) projects. This trial aims to quantify reproductive, growth and carcass outcomes for Black Baldy (Hereford x Angus) progeny compared to purebred Hereford and purebred Angus progeny that have been bred and managed in Australian conditions.

## Livestock export

### Best practice treatment factsheets for cattle

<b>Project code</b>	W.RDE.0001	<b>Location</b>	Northern Australia
<b>Start date</b>	6-Aug-21	<b>Vendor</b>	Harris Park Group
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	LEP		

This project will develop best practice treatment factsheets for cattle for use by stockpersons and employees onboard livestock export vessels. LEP R&D project W.LIV.2008 (Shipboard provision of animal health equipment and medications) outlines and provides recommendations that will form the basis of these resources.

## People and business

### BeefLinks: Socio-economic research platform

<b>Project code</b>	P.PSH.2136	<b>Location</b>	WA
<b>Start date</b>	15-Jun-21	<b>Vendor</b>	University of Western Australia
<b>End date</b>	14-Sep-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry partnership		

A peer to peer learning group will be established with managers of five to seven northern ILSC properties as part of the Northern Breeding Business (NB2) program. The learning group will undertake activities using immersive technologies, covering monitoring animal health and welfare, autopsy and sampling for disease testing.

### NB2-ILSC-AHA partnership to grow Indigenous capacity

<b>Project code</b>	P.PSH.1278	<b>Location</b>	Northern Australia
<b>Start date</b>	14-Oct-20	<b>Vendor</b>	Animal Health Australia; Indigenous Land and Sea Corp
<b>End date</b>	28-Apr-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry partnership		

A peer-to-peer learning group will be established with managers of 5–7 northern Indigenous Land and Sea properties as part of the Northern Breeding Business (NB2) program. This group will undertake extension activities using immersive technologies covering monitoring animal health and welfare, autopsy and sampling for disease testing. The group will also develop and implement customised breeding management plans.

**NB2: Chair of the Northern Breeding Business (NB2) Management Committee role**

<b>Project code</b>	B.GBP.0054	<b>Location</b>	Northern Australia
<b>Start date</b>	24-Aug-20	<b>Vendor</b>	Dr Lee Fitzpatrick
<b>End date</b>	15-Dec-27	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry partnership		

The purpose of this project is to appoint and fund the position of the 'Management Committee Chair' for NB2 who will support program/project delivery, industry engagement, governance and reporting to industry and MLA.

**Pardoo Beef Building a Sustainable Wagyu Operation**

<b>Project code</b>	P.PSH.1349	<b>Location</b>	Northern Australia
<b>Start date</b>	15-Nov-21	<b>Vendor</b>	Pardoo
<b>End date</b>	15-Nov-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will support the development of the Pardoo sustainability strategy, the design and development of a carbon neutral wagyu brand strategy and an industry-first enterprise level sustainability dashboard.

**Stanbroke Co-Innovation Program Manager**

<b>Project code</b>	P.PIP.0588	<b>Location</b>	National
<b>Start date</b>	16-Aug-21	<b>Vendor</b>	Stanbroke Beef Australia
<b>End date</b>	28-Mar-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project aims to develop and implement a high value product, brand and market co-innovation strategy. The project supports a Co-Innovation Program Manager to scope, develop and implement the high value product innovation strategy at Stanbroke, assisting the business to build the capability required to effectively differentiate their offer to become a trusted source of high-quality protein and capturing additional long-term value for the business.

**Casino Food CN30 innovation program**

<b>Project code</b>	P.PSH.1322	<b>Location</b>	NSW
<b>Start date</b>	15-Jun-21	<b>Vendor</b>	Northern Cooperative Meat Co
<b>End date</b>	1-Jun-26	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will develop carbon management capability within Casino Food Co Op (NCCMC) and their producer base with the objective of enabling the generation of carbon credits that can be used within the NCCMC supply chain. The project will also include the development of a methodology that supports a modelled approach to estimating soil organic carbon change that will provide a more cost-effective alternative to verify the change needed for carbon markets.



### CPC Digital integration and connectivity of extensive pastoral businesses for sustainable business resilience

<b>Project code</b>	P.PSH.1323	<b>Location</b>	National
<b>Start date</b>	6-May-21	<b>Vendor</b>	CPC
<b>End date</b>	15-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

CPC have now reached a point in their strategic plan where data creation and connectivity across the supply chain is impeding the ability of each business unit to adapt to emerging market trends. The lack of data integration limits visibility of how operational decisions impact financial decisions and how livestock management influences the end product. This project will test and validate the extent to which digital creation, capture and connectivity technologies in extensive pastoral enterprises can increase value, productivity and profitability.

### Pardoo Beef Corporation - Data Value Chain Optimization and Integration Digital Officer

<b>Project code</b>	P.PSH.1267	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Pardoo Beef Corporation
<b>End date</b>	1-Mar-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project covers the engagement of a full time digital value chain officer for two years within Pardoo Beef Corporation to drive the adoption of enhanced digital capability, specifically through the provision of advanced data analysis that will generate new insights for the business.

### Kilcoy Global Foods digital value chain strategy development and Digital Marketing Manager

<b>Project code</b>	P.PIP.5019	<b>Location</b>	Queensland
<b>Start date</b>	30-Jan-20	<b>Vendor</b>	Kilcoy Pastoral Company
<b>End date</b>	31-Dec-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This three-year program will build capability to implement a market insights strategy and a portfolio of new markets, sectors and customers identified through emerging food trends and market insights. The marketing manager will facilitate the development and implementation of KGF's market insights strategy in domestic and global markets.

### Transforming beef supply chains through digital integration and value-based marketing (STANBROKE)

<b>Project code</b>	P.PSH.1294	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Stanbroke
<b>End date</b>	20-Jun-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The project will quantify the magnitude of value and trade-offs on digitalising value chains, the opportunity and value of integrating them to the wider industry data networks, and the opportunities this creates for value-based trading. The project will investigate and implement a range of objective measurement on-farm digital technologies, market signal technology and



data systems to experiment, optimise and demonstrate the differences in value that can be realised within a commercial environment and how barriers to wider adoption of value-based marketing could be addressed.

### Design and delivery of an Innovation Hub (three-year pilot developing innovation capability - Phase 1)

Project code	P.PIP.0584	Location	Queensland
Start date	2-Oct-20	Vendor	Kilcoy Pastoral Company
End date	1-Oct-23	Funding source	MLA Donor Company
Initiation of research	External partnership		

This project is a pilot to design and deliver a test kitchen Innovation Hub as part of Kilcoy's service offering. Specifically, the project proposes to experiment with increasing customer engagement and consumer experiences by focusing on simulating foodservice and retail testing using more virtual experience tools than the traditional "site visits".

### OBEX Supply Chain Extension & Adoption Officer

Project code	P.PIP.0583	Location	National
Start date	2-Aug-20	Vendor	Oakey Beef Exports
End date	1-May-23	Funding source	MLA Donor Company
Initiation of research	External partnership		

This project is designed to develop feedback systems and associated extension material that can be supplied to producers to help increase uptake of improved genetics, nutrition and husbandry practice. Feedback will cover Meat Standards Australia (MSA) data, animal disease and defect data, Lean Meat Yield percentage (LMY%) and any potential new data sets.

### Pardoo Beef Corporation Collaborative Innovation Program Innovation Manager (Stage 2)

Project code	P.PSH.1249	Location	WA
Start date	1-Jul-20	Vendor	Pardoo Beef Corporation
End date	30-Jun-23	Funding source	MLA Donor Company
Initiation of research	External partnership		

This project, which follows on from Stage 1, will continue to provide data and information to assess the viability of various management approaches within a Northern Australian irrigated beef production system.

## Processing productivity

### Prime X Connect – automated boxed beef marketplace

Project code	P.PSH.0821	Location	National
Start date	15-Jan-17	Vendor	PrimeX Connect Pty Ltd
End date	30-Mar-22	Funding source	MLA Donor Company



Initiation of research	External partnership
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Sale of beef takes place through multiple channels in an inconsistent manner and is different between each buyer and seller across the market. PrimeX Connect aims to develop an online marketplace that will streamline the entire process, introduce operational efficiencies and greatly increase Australia's ease of doing business with the world.

### DEXA and CT prediction of retail beef cut weights

Project code	V.TEC.1717	Location	National
Start date	01-Jun-19	Vendor	Murdoch University
End date	03-Nov-21	Funding source	Levy
Initiation of research	Industry		

By establishing the relationships between DEXA and CT measurements and beef cut weights from a range of specifications, this project will underpin the development of a Beef Value Calculator. This tool will allow the supply chain to predict the retail value of a carcass based on its composition, the cut specifications, estimated processing costs and market value.

### Automated chine, button and fat trim proof of concept for the Striploin and Cube Roll

Project code	P.PSH.0893	Location	National
Start date	15-Jun-17	Vendor	Scott Automation & Robotics Pty Ltd
End date	09-Aug-21	Funding source	MLA Donor Company
Initiation of research	External partnership		

This project facilitated the build of the first 'Leap 4 Beef' prototype module as part of the MLA Beef Boning Program that aims to automate the removal of the chine bone from striploins and cube rolls.

### Verification of grassfed beef claims using spectroscopic technologies

Project code	P.PSH.1034	Location	National
Start date	01-Feb-18	Vendor	NSW DPI
End date	13-Jul-23	Funding source	MLA Donor Company
Initiation of research	External partnership		

Fat differs between grass and grainfed animals due to different fatty acid profiles and carotenoids. This project will investigate the capacity of Raman spectroscopy to differentiate chemical composition aspects of beef and provide the industry with a scientific verification method for the production system and raise claims on grassfed beef products.

### TEYS beef E+V carcass lean meat yield grading

Project code	P.PIP.0576	Location	National
Start date	01-Jul-18	Vendor	Teys Australia Pty Ltd
End date	30-Nov-21	Funding source	MLA Donor Company
Initiation of research	Processing industry		



This project will evaluate the accuracy of the lean meat yield (LMY) prediction using an E+V yield camera when compared with a full side DEXA. The system will provide a platform to develop a LMY measurement algorithm and a producer feedback scheme, potentially for smaller processors that may be significantly cheaper than DEXA to install.

## Product innovation

### Hides to Riches - Extracting food grade collagen from beef hides

Project code	P.PSH.1274	Location	National
Start date	06-Nov-20	Vendor	Freeze Dry Industries Pty Ltd
End date	30-Jun-22	Funding source	MLA Donor Company
Initiation of research	External partnership		

This project intends to discover and develop an all-natural method to process bovine hides to extract human food grade collagen.

### Clean labels – opportunity identification for value added Australia red meat innovation

Project code	V.RMH.0107	Location	National
Start date	20-Dec-19	Vendor	Laetatio Pty Ltd
End date	30-Jul-21	Funding source	Levy
Initiation of research	Industry		

‘Clean label’ and ‘free from’ trends have continued to evolve across the food industry. This project will review these trends and explore opportunities for Australian red meat industry to create and capture associated value.

### Comparison of the traditional and artificial beef production systems

Project code	V.RMH.0081	Location	National
Start date	01-Jun-18	Vendor	University of Queensland
End date	21-Jun-21	Funding source	Levy
Initiation of research	Industry		

The purpose of this project is to understand the environmental, supply and demand (value) impact of artificial meat production on traditional red meat and by-products production in Australia. A lifecycle assessment of artificial meat production pathways versus traditional red meat production systems will be investigated.

### Wellness carcass map meat and size of the prize value proposition identification (2Morrows Foods)

Project code	V.RMH.0106	Location	National
Start date	15-Dec-19	Vendor	Greenleaf Enterprises Pty Ltd
End date	01-May-21	Funding source	Levy
Initiation of research	Industry		



The overall objective of this project is to understand if mapping carcasses for wellness and mood traits has potential for the Australian red meat industry, beyond the current meat cuts and generic nutritional messaging. Consumer and market insights and a cost-benefit analysis will be completed to determine desirability and viability assessment.

### Development of on-pack visual indicators of eating quality and freshness for beef and lamb products

<b>Project code</b>	P.PSH.0889	<b>Location</b>	National
<b>Start date</b>	25-Jun-17	<b>Vendor</b>	Monash University
<b>End date</b>	30-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will focus on designing a set range of specific packaging 'sensors' or informative reads that can detect a range of markers of the change in meat either as it's approaching its end of life or the optimal eating zone, as well as naturally occurring reactions in the pack. It will model different environments, time models and meats, and validate the right in/on pack sensors and their applications.

### Supply chain sustainability

#### Analysis and extension to support beef producers in improving animal health performance

<b>Project code</b>	P.PIP.0753	<b>Location</b>	Northern Australia
<b>Start date</b>	01-Jan-18	<b>Vendor</b>	Teys Australia Pty Ltd
<b>End date</b>	29-Jan-21	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Processing industry		

This project builds on current and completed work that identifies a major opportunity for the supply chain to work together to improve the animal health performance of the Australian beef industry. The project will include a detailed analysis of animal health data to identify the cost of animal health conditions to producers, as well as veterinary support to assist in interpretation of feedback and validation of inspection data.



## Grainfed cattle

### Completed R&D projects

#### Animal health, welfare and biosecurity

##### Effect of liver defects on carcass characteristics, performance and health of feedlot cattle

<b>Project code</b>	B.FLT.3006	<b>Location</b>	National
<b>Start date</b>	01-Nov-18	<b>Vendor</b>	University of Queensland
<b>End date</b>	03-Nov-21	<b>Funding source</b>	Levy
<b>Publication date</b>	22-Feb-21	<b>Initiation of research</b>	Feedlot industry

This project will examine the effect of liver defects on carcass characteristics, performance and health of feedlot cattle. It is expected that the impact of liver abscess, liver fluke and any other pertinent liver conditions will be quantified across three feedlots supplying one abattoir.

##### **Determination of bovine respiratory disease diagnostic accuracy for multiple modalities**

<b>Project code</b>	B.FLT.3010	<b>Location</b>	National
<b>Start date</b>	28-Nov-19	<b>Vendor</b>	Quirindi Feedlot Services
<b>End date</b>	30-Nov-21	<b>Funding source</b>	Levy
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Feedlot industry

This project will determine the accuracy, sensitivity, specificity and ability to determine stage of disease for a range of currently available and developing bovine respiratory disease diagnostic tests, relative to the 'gold standard' of pulmonary lesions at the time of diagnosis.

##### Development of a novel oral vaccine for bovine respiratory disease

<b>Project code</b>	B.FLT.3008	<b>Location</b>	National
<b>Start date</b>	01-Jan-19	<b>Vendor</b>	University of Sydney
<b>End date</b>	15-Nov-21	<b>Funding source</b>	Levy
<b>Publication date</b>	3-Dec-21	<b>Initiation of research</b>	Feedlot industry

This project will determine whether an oral yeast reporter-vaccine platform can induce specific immunity for bovine respiratory disease in cattle. If deemed successful, further research and development will be required to determine the value proposition of yeast lines.

##### Animal welfare benefits of feedlot shade - a short review

<b>Project code</b>	B.FLT.4014	<b>Location</b>	National
<b>Start date</b>	21-Sep-20	<b>Vendor</b>	Murdoch University



<b>End date</b>	31-May-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	07-Dec-20	<b>Initiation of research</b>	Industry
<p>This project conducted a review to support further industry knowledge and understanding of the animal welfare benefits of providing shade in beef feedlots. Continuous improvement of animal welfare is essential for maintaining consumer and community support for grain-fed beef. The Australian feedlot industry is interested to develop easy to understand resources for lot feeders on feedlot shade.</p>			

## CMA Feedlot Animal Welfare Benchmarking Steering Committee

<b>Project code</b>	B.FLT.4012	<b>Location</b>	National
<b>Start date</b>	1-Mar-20	<b>Vendor</b>	n/a
<b>End date</b>	30-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	21-Jul-20	<b>Initiation of research</b>	Industry
<p>This project facilitated the coordination and operational costs associated with the Animal Welfare Benchmarking Steering Committee.</p>			

## Development of a bovine leukocyte differential index for Australian feedlot cattle

<b>Project code</b>	P.PSH.1066	<b>Location</b>	National
<b>Start date</b>	15-Mar-18	<b>Vendor</b>	Advanced Animal Diagnostics Inc
<b>End date</b>	01-Jan-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	07-Dec-20	<b>Initiation of research</b>	External partnership
<p>This project developed a model to predict bovine respiratory disease (BRD) risk for Australian feedlot cattle based on the bovine leukocyte differential index and other information available at arrival.</p>			

## Antimicrobial resistance in commensal bacteria in bovine faeces at slaughter

<b>Project code</b>	V.MFS.0432	<b>Location</b>	National
<b>Start date</b>	15-Aug-18	<b>Vendor</b>	CSIRO
<b>End date</b>	29-May-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Oct-20	<b>Initiation of research</b>	Industry
<p>In 2013, a survey demonstrated the low prevalence of antimicrobial resistance (AMR) in bacteria in Australian cattle production systems (including grass fed, grain fed and dairy). This project surveyed cattle faeces again and compared the results to see if there have been changes from the previous survey. Knowing about changes in AMR rates will inform the design of future surveillance.</p>			

## Evaluation of feedlot heat load model adjustments

<b>Project code</b>	B.FLT.4006	<b>Location</b>	National
<b>Start date</b>	01-Mar-19	<b>Vendor</b>	University of Queensland
<b>End date</b>	14-Nov-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	20-Feb-20	<b>Initiation of research</b>	Feedlot industry



To follow on from a previous MLA project which found that accumulated heat load units significantly altered the heat load response of feedlot cattle, this study conducted further evaluation of the heat load at two south-east Queensland feedlots. This project determined the adequacy of adjustments to the heat load model to explain the proportion of cattle of different breed types with a panting score equal to, or greater than two, which indicates higher levels of heat stress in cattle.

### Antimicrobial surveillance - bovine respiratory disease pathogens

<b>Project code</b>	B.FLT.3004	<b>Location</b>	National
<b>Start date</b>	01-Sep-18	<b>Vendor</b>	University of Adelaide
<b>End date</b>	20-Jul-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Sep-20	<b>Initiation of research</b>	Feedlot industry

This project conducted pilot surveillance of resistance of bovine respiratory disease pathogens to common veterinary antimicrobial agents across seven Australian feedlots to encourage the adoption of best practice antimicrobial stewardship practices by the industry.

### Calibration of a remote early disease identification system for Australian feedlots

<b>Project code</b>	B.FLT.3005	<b>Location</b>	National
<b>Start date</b>	01-Nov-18	<b>Vendor</b>	Precision Animal Solutions, LLC
<b>End date</b>	25-Feb-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	17-Jun-20	<b>Initiation of research</b>	Feedlot industry

This project evaluated data from two Australian feedlots to determine potential associations between behaviour, lung condition (pleurisy) and carcass outcomes in cattle with bovine respiratory disease, using the remote early disease identification (REDI) system.

### Evaluation of a mycobacterium cell wall fraction to reduce bovine respiratory disease

<b>Project code</b>	B.FLT.3007	<b>Location</b>	National
<b>Start date</b>	01-Jan-19	<b>Vendor</b>	CSIRO
<b>End date</b>	12-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	20-Jul-21	<b>Initiation of research</b>	Feedlot industry

This project investigated the potential of an innate immune stimulating compound, a mycobacterium cell wall fraction (MCWF), to provide short term, broad-based disease protection against bovine respiratory disease (BRD) until protective responses from vaccination develop. It also investigated the potential for the MCWF to enhance responses to vaccination when co-administered with BRD vaccines.

### Production impacts and resistance of gastrointestinal parasites in feedlot cattle

<b>Project code</b>	B.FLT.3002	<b>Location</b>	National
<b>Start date</b>	01-Feb-18	<b>Vendor</b>	Bovine Dynamics
<b>End date</b>	01-Aug-20	<b>Funding source</b>	Levy



<b>Date of publication</b>	09-Jun-20	<b>Initiation of research</b>	Feedlot industry
<p>This project identified the genus of gastrointestinal nematodes that commonly infect cattle during feedlot induction in Southern Queensland and evaluated the effect of different treatment protocols on parasite resistance, average daily gain and carcase characteristics of feedlot cattle, including a mix of oral and injectable treatments.</p>			

## Reducing induction stress in the Australian feedlot system

<b>Project code</b>	P.PSH.0805	<b>Location</b>	National
<b>Start date</b>	15-Mar-17	<b>Vendor</b>	Charles Sturt University
<b>End date</b>	01-Mar-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	9-Jul-21	<b>Initiation of research</b>	External partnership

This project trialled potassium bromide as an intervention strategy to reduce stress at feedlot induction, improve animal welfare and reduce disease incidence during this critical phase. This approach aims to improve animal welfare outcomes, increase productivity and support consumer confidence in the Australian beef feedlot sector.

## Review of grain devitalization methods

<b>Project code</b>	B.FLT.1011	<b>Location</b>	National
<b>Start date</b>	07-Jun-19	<b>Vendor</b>	Colere Group Pty Ltd
<b>End date</b>	16-Oct-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	02-Dec-19	<b>Initiation of research</b>	Feedlot industry

This project consisted of a desktop review and industry interviews to provide an overview of the current challenges to bulk grain and plant-based stockfeed importation. The review focused on global grain sterilisation techniques and the capacity for these techniques to meet Australian biosecurity requirements, to identify domestic and international supply chains that import viable grain.

## Effect of heat load and other factors on the incidence of dark cutting carcasses of feedlot cattle

<b>Project code</b>	B.FLT.0399	<b>Location</b>	National
<b>Start date</b>	01-Mar-17	<b>Vendor</b>	University of New England
<b>End date</b>	12-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Oct-19	<b>Initiation of research</b>	Feedlot industry

Three comprehensive experiments were conducted to examine the effect of production, transport, heat load, climate, environmental conditions, time in lairage and time to grading on the rate of dark cutting carcasses of feedlot cattle in Australia.

## Animal health and welfare workshops

<b>Project code</b>	B.FLT.7016	<b>Location</b>	National
<b>Start date</b>	01-Apr-19	<b>Vendor</b>	MLA
<b>End date</b>	30-Sep-19	<b>Funding source</b>	Levy



<b>Date of publication</b>	30-Sep-19	<b>Initiation of research</b>	Feedlot industry
<p>This investment consisted of a suite of projects to develop and present animal health and welfare workshop materials, to deliver the latest information on animal health and welfare management to feedlot producers on an annual basis.</p>			

**[Effect of orchard fans on heat load amelioration](#)**

<b>Project code</b>	B.FLT.4005	<b>Location</b>	National
<b>Start date</b>	01-Mar-19	<b>Vendor</b>	Australian Country Choice Processing
<b>End date</b>	03-Sep-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	27-Sep-19	<b>Initiation of research</b>	Feedlot industry
<p>This project determined the effects of adding industrial fans used in orchard farms on the health, welfare and profitability of feedlot cattle.</p>			

**Animal production, husbandry and nutrition**

**[Adjacent paddock feeding discussion paper](#)**

<b>Project code</b>	B.FLT.8014	<b>Location</b>	National
<b>Start date</b>	07-Feb-20	<b>Vendor</b>	Scolexia Pty Ltd
<b>End date</b>	15-Aug-21	<b>Funding source</b>	Levy
<b>Publication date</b>	23-Jul-21	<b>Initiation of research</b>	Feedlot industry
<p>The increasing use of areas adjacent to feedlots for backgrounding and pre-feeding preparation of feeder cattle may give rise to animal welfare, environmental, biosecurity, sustainability and public perception concerns for the Australian feedlot industry. This project will review these activities and associated regulations and industry programs and prepare a discussion paper to better inform industry of the extent, implications and potential options to manage any identified issues.</p>			

**[Optimising rumen modifier use for feedlot performance and carcass attributes](#)**

<b>Project code</b>	B.FLT.1002	<b>Location</b>	National
<b>Start date</b>	01-Apr-18	<b>Vendor</b>	University of New England
<b>End date</b>	30-Jan-21	<b>Funding source</b>	Levy
<b>Publication date</b>	1-Apr-21	<b>Initiation of research</b>	Feedlot industry
<p>This project will confirm and quantify feeding, growth and carcass advantages from combining and rotating different antibiotics (ionophore monensin) and assess the underlying rumen fermentation differences and rumination changes associated with these responses.</p>			



## MISP feedlot productivity data collection

<b>Project code</b>	B.FLT.9002	<b>Location</b>	National
<b>Start date</b>	01-Mar-18	<b>Vendor</b>	Management for Technology Pty Ltd
<b>End date</b>	05-Dec-20	<b>Funding source</b>	Levy
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Feedlot industry

This project will determine whole of industry progress in feedlot productivity between the 2015–2016 and 2019–2020 financial years to identify if cost of gain (\$/kg liveweight) has been reduced by in real terms and minimum whole of sector productivity growth has been above baseline levels.

## Effect of feedlot pen stabilisation on cleanliness of slaughter cattle

<b>Project code</b>	P.PIP.0569	<b>Location</b>	National
<b>Start date</b>	01-Mar-18	<b>Vendor</b>	Teys Australia Pty Ltd
<b>End date</b>	30-Dec-20	<b>Funding source</b>	MLA Donor Company
<b>Publication date</b>	2-Mar-22	<b>Initiation of research</b>	Processing industry

This project will investigate, for the first time in Australia, the effect of cement stabilisation in open air feedlot pens. The goal of this project is to develop an improved pen foundation with greater load bearing capacity, which will allow heavy machinery to enter and regularly clean pens during prolonged wet weather conditions. Pen surface repairs and maintenance and cleanliness (dags load) of cattle are hypothesised to improve.

## APVMA assessment dag removal enzymes

<b>Project code</b>	B.FLT.1003	<b>Location</b>	National
<b>Start date</b>	01-Dec-18	<b>Vendor</b>	Redcap Solutions Pty Ltd
<b>End date</b>	15-Mar-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Jun-20	<b>Initiation of research</b>	Feedlot industry

This project determined the APVMA registration requirements for a topically applied, enzyme-based dag solution for feedlot cattle and provided recommendations on the testing and documentation required to support the registration application.

## Heat load nutrition program

<b>Project code</b>	B.FLT.0157	<b>Location</b>	National
<b>Start date</b>	15-Jun-13	<b>Vendor</b>	CSIRO
<b>End date</b>	30-Jan-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Feedlot industry

This project investigated the use of nutrition for alleviating the lead causes of high heat load morbidity and poor recovery after heat stress in Australian feedlot cattle, with an aim to deliver new nutritional strategies for forecasted heat events.



## Digital agriculture

### [Te Pari feedlot and auto handler](#)

<b>Project code</b>	B.FLT.1013	<b>Location</b>	National
<b>Start date</b>	20-Dec-19	<b>Vendor</b>	Te Pari Products Ltd
<b>End date</b>	30-May-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	1-Sep-21	<b>Initiation of research</b>	Industry

This project engaged Te Pari Products Ltd to develop a feedlot auto-handler for the feedlot induction process. The design of the prototype was determined during the first phase of the project. After approval from MLA, the prototype was constructed and installed in a New Zealand feedlot for pilot testing of operability and initial testing of its value proposition. The finalised prototype will be shipped to the Darling Downs, Queensland for future evaluation in separate projects.

### Sandalwood feedlot – WAN and wide area Wi-Fi solutions

<b>Project code</b>	P.PSH.1052	<b>Location</b>	Queensland
<b>Start date</b>	15-Apr-18	<b>Vendor</b>	March IT Pty Ltd
<b>End date</b>	30-Dec-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project will install a fixed wireless Wide Area Network (WAN) to the existing mill tower at the Sandalwood feedlot. The baseline data collected from this project will facilitate MLA documenting the array of connectivity options available to the red meat industry, where they do and don't work, and benchmarking improvements.

### Stanbroke Chinchilla feedlot – WAN and wide area Wi-Fi

<b>Project code</b>	P.PSH.1020	<b>Location</b>	Queensland
<b>Start date</b>	18-Dec-17	<b>Vendor</b>	March IT Pty Ltd
<b>End date</b>	29-May-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project will update WAN and WA Wi-Fi at Stanbroke feedlots at Chinchilla. This feedlot has recently invested in new modern facilities, but the communications and connectivity must match the infrastructure investment to ensure that productivity gains from innovative R&D can be realised and measured for wider industry benefit.

### MDH feedlot and homestead – WAN and wide area Wi-Fi solutions

<b>Project code</b>	P.PSH.1049	<b>Location</b>	Queensland
<b>Start date</b>	01-Mar-18	<b>Vendor</b>	March IT Pty Ltd
<b>End date</b>	30-Apr-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership



This project will install two separate fixed wireless Wide Area Network (WAN) links to a feedlot property in Queensland. The baseline data collected from this project will facilitate a future study to document and benchmark improvements.

### Prototype feedlot biometric, gender and breed identification system

<b>Project code</b>	B.FLT.1009	<b>Location</b>	National
<b>Start date</b>	01-Feb-19	<b>Vendor</b>	Manabotix Pty Ltd
<b>End date</b>	30-Oct-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	2-Mar-22	<b>Initiation of research</b>	Feedlot industry

This project aimed to develop a cost-effective automated system to capture biometrics on large numbers of diverse feedlot cattle, enabling future research and development on the value proposition of the data.

### **Prototype automatic feed bunk management**

<b>Project code</b>	B.FLT.1007	<b>Location</b>	National
<b>Start date</b>	15-Oct-18	<b>Vendor</b>	Manabotix Pty Ltd
<b>End date</b>	01-Jan-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Feedlot industry

This project developed algorithms to determine daily feed allocation for feedlot cattle, which has previously been a manual process.

### Prototype feedlot autonomous mobile robot for bunk calling

<b>Project code</b>	B.FLT.1006	<b>Location</b>	National
<b>Start date</b>	15-Oct-18	<b>Vendor</b>	Manabotix Pty Ltd
<b>End date</b>	31-Oct-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	10-Oct-19	<b>Initiation of research</b>	Feedlot industry

The project developed a prototype of an automated feedlot mobile robot to complement the bunk scanner, which can be used to determine feed remaining in cattle feed bunks with greater precision and accuracy than human operators.

### Prototype feed truck auto delivery refinements

<b>Project code</b>	B.FLT.1008	<b>Location</b>	National
<b>Start date</b>	14-Jan-19	<b>Vendor</b>	Manabotix Pty Ltd
<b>End date</b>	20-Aug-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	28-Aug-19	<b>Initiation of research</b>	Feedlot industry

Previous MLA research delivered an automatic feed delivery system that is retrofittable to commercial grade feed trucks for the beef feedlot sector. This project refined the prototype for commercialisation.



## Environmental sustainability

### [Revision of key national greenhouse gas inventory report methods for Australian feedlots](#)

<b>Project code</b>	B.FLT.5012	<b>Location</b>	National
<b>Start date</b>	24-Aug-20	<b>Vendor</b>	Integrity Ag and Environment Pty Ltd
<b>End date</b>	01-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	23-Aug-21	<b>Initiation of research</b>	Feedlot industry

Some methods used in the National Inventory Report appear to overestimate the emissions from feedlot beef. This project seeks to revise these methods, including the nitrous oxide emission factor from feedlot manure pads and the emission estimation method for enteric methane.

### [Pathways to carbon neutrality for Australian feedlots - booklet](#)

<b>Project code</b>	B.FLT.5008	<b>Location</b>	National
<b>Start date</b>	23-Apr-20	<b>Vendor</b>	Integrity Ag & Environment
<b>End date</b>	15-Apr-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	23-Aug-21	<b>Initiation of research</b>	Feedlot industry

This project will create a booklet that outlines pathways to carbon neutrality for Australian feedlot organisations and compile five case studies on the economics of carbon neutrality for grainfed beef brands, whole product lines and feedlots.

### [Tailored feed additives for targeted inhibition of methanogenesis](#)

<b>Project code</b>	B.FLT.5007	<b>Location</b>	National
<b>Start date</b>	30-Aug-20	<b>Vendor</b>	CSIRO
<b>End date</b>	1-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project intends to develop feed additives that disrupt methanogenesis, with the aim to reduce methane emissions of livestock.

### [Long-term total greenhouse gas emissions from beef feedlots](#)

<b>Project code</b>	B.FLT.0396	<b>Location</b>	National
<b>Start date</b>	01-Mar-16	<b>Vendor</b>	University of Melbourne
<b>End date</b>	30-Jan-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Feedlot industry

This project utilised a suite of state-of-the-art measurement technologies to measure long-term methane, nitrous oxide and ammonia emissions from two Australian beef feedlots as the basis for understanding the whole farm system greenhouse gas emissions profile.



### Manure use as soil organic amendments in broadacre agriculture

<b>Project code</b>	B.FLT.0382	<b>Location</b>	National
<b>Start date</b>	15-Sep-13	<b>Vendor</b>	David Hall Consultancy Pty Ltd
<b>End date</b>	30-Mar-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	30-Mar-19	<b>Initiation of research</b>	Feedlot industry

This project utilised field trials to examine the effect of long-term applications of feedlot manure and other manure/soil amendment products on a range of soil parameters, including nutrient and organic matter levels, microbial activity and physical structure.

## People and business

### Feedlot industry training materials – Feed Truck module

<b>Project code</b>	B.FLT.8203	<b>Location</b>	National
<b>Start date</b>	01-Dec-20	<b>Vendor</b>	ALFA
<b>End date</b>	15-Sep-21	<b>Funding source</b>	Levy
<b>Publication date</b>	1-Sep-21	<b>Initiation of research</b>	Feedlot industry

MLA and ALFA are collaboratively executing a feedlot career development and training pathway. This project developed a module on feed truck operation as a case example to test feedlot engagement and impact from training.

### Feedlot industry training materials – feed loader module

<b>Project code</b>	B.FLT.8204	<b>Location</b>	National
<b>Start date</b>	01-Dec-20	<b>Vendor</b>	ALFA
<b>End date</b>	15-Sep-21	<b>Funding source</b>	Levy
<b>Publication date</b>	1-Sep-21	<b>Initiation of research</b>	Feedlot industry

MLA and ALFA are collaboratively executing a feedlot career development and training pathway. This project developed a module on feed loader operation.

### Feedlot industry training review

<b>Project code</b>	B.FLT.8202	<b>Location</b>	National
<b>Start date</b>	30-Jan-20	<b>Vendor</b>	MINTRAC
<b>End date</b>	31-Mar-21	<b>Funding source</b>	Levy
<b>Publication date</b>	2-Jun-21	<b>Initiation of research</b>	Feedlot industry

A series of eight sub-projects have been put together to deliver a feedlot industry training portal that supports the Australian feedlot industry to attract, retain and grow a professional and skilled workforce. The portal provides access to information that reflects a clear career development pathway and delivers associated training, professional development and support networks.



### Australian Feedlot Research Institute – feasibility review

<b>Project code</b>	B.FLT.9010	<b>Location</b>	National
<b>Start date</b>	3-Mar-20	<b>Vendor</b>	Ernst & Young
<b>End date</b>	1-Dec-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	23-Jul-21	<b>Initiation of research</b>	External partnership

This project produced two reports for ALFA Council and MLA Board consideration – a risk review and a structure and feasibility review – to enable both Boards to reach a final decision on funding of the Australian Feedlot Research Institute.

### Target Review of NFAS

<b>Project code</b>	B.FLT.8013	<b>Location</b>	National
<b>Start date</b>	18-Dec-19	<b>Vendor</b>	Schuster Consulting Group Pty Ltd
<b>End date</b>	30-Dec-20	<b>Funding source</b>	Levy
<b>Publication date</b>	2-Feb-21	<b>Initiation of research</b>	Feedlot industry

This project constitutes the first periodic review of the National Feedlot Accreditation Scheme (NFAS). The aim of the review was to make recommendations on where the current NFAS rules, standards and auditing processes could be strengthened or changed to deliver improved animal welfare and environmental outcomes.

### Quarterly Feed e-newsletter

<b>Project code</b>	B.FLT.7014	<b>Location</b>	National
<b>Start date</b>	01-Nov-18	<b>Vendor</b>	Cox Inall Communications
<b>End date</b>	01-Oct-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	21-Jul-20	<b>Initiation of research</b>	Feedlot industry

The Quarterly Feed is a central communications platform and is distributed four times per year to provide updates to feedlot stakeholders on new R&D, technologies and cattle management strategies, as well as provide relevant grainfed marketing updates; and inform stakeholders of upcoming MLA and MLA-ALFA feedlot events.

## Resource management

### Improving feedlot water and energy use efficiency

<b>Project code</b>	B.FLT.5003	<b>Location</b>	National
<b>Start date</b>	15-Oct-18	<b>Vendor</b>	Smart Business Hub Pty Ltd
<b>End date</b>	30-Apr-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	08-Oct-19	<b>Initiation of research</b>	Feedlot industry

Water use and energy use efficiency are important issues for the feedlot industry to ensure long-term sustainability. This project monitored water and energy use over a one-year period to determine opportunities to improve efficiency for 30,000 standard cattle units in steam flaking feedlots.



### Survey of Australian feedlot drinking water quality

<b>Project code</b>	B.FLT.1005	<b>Location</b>	National
<b>Start date</b>	15-Oct-18	<b>Vendor</b>	University of New England
<b>End date</b>	18-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	08-Oct-19	<b>Initiation of research</b>	Feedlot industry

This project summarised the range of total dissolved solids and salts in feedlot drinking water across Australia to determine potential impacts on cattle health and production. The outcomes will improve feedlot decision-making regarding the conditions when water quality parameters may decrease feedlot production, while also scoping the potential for future R&D.

### Revised econometric analysis- effects of biofuels mandates on wheat and sorghum prices

<b>Project code</b>	B.FLT.9008	<b>Location</b>	National
<b>Start date</b>	01-Nov-19	<b>Vendor</b>	ACIL Allen Consulting Pty Ltd
<b>End date</b>	30-Oct-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	21-Jul-20	<b>Initiation of research</b>	Feedlot industry

An investigation of the market impacts and influences of biofuel mandates on feedlots was conducted in 2018 (B.FLT.0167). Following the investigation, this project determined the market impact and influences of biofuel mandates on the feedlot sector and the broader Australian community.

### Feedlot hydrological modelling incorporation into MEDLI

<b>Project code</b>	B.FLT.5001	<b>Location</b>	National
<b>Start date</b>	15-Jun-17	<b>Vendor</b>	Premise Toowoomba Pty Ltd
<b>End date</b>	15-Dec-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	19-Jun-20	<b>Initiation of research</b>	Feedlot industry

This project updated an outdated version of the feedlot hydrological modelling component of the Model for Effluent Disposal Using Land Irrigation (MEDLI) to a new platform and incorporated it into a new version of MEDLI (MEDLI Pro V2). This new product, built on the MEDLI V2 framework, will be made available commercially as 'MEDLI Pro V2' by the Queensland Department of Environment and Science.

### Feedlot energy efficiency and cost reduction

<b>Project code</b>	B.FLT.5002	<b>Location</b>	National
<b>Start date</b>	15-Oct-18	<b>Vendor</b>	All Energy Ptd Ltd
<b>End date</b>	07-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	07-Jun-19	<b>Initiation of research</b>	Feedlot industry

This project updated current knowledge on energy use practices and costs in the Australian feedlot industry. This included how energy is generated/sourced, used, and any energy efficiency/re-use measures already in place, utilizing previous data and literature.



## R&D projects in progress

### Animal health, welfare and biosecurity

#### Cattle heat load toolbox 2021 to 2022

Project code	B.FLT.4016	Location	National
Start date	1-May-21	Vendor	Weather Intelligence
End date	1-Feb-23	Funding source	Levy
Initiation of research	Industry		

This project covers the operating costs of the Cattle heat load toolbox service for April 2021 to June 2022, which includes daily operation of the service, including issuing alerts plus HLDN data acquisition, quality assurance and integration into the forecasts.

#### BRD preventative practice guide update

Project code	B.FLT.3013	Location	National
Start date	31-May-21	Vendor	Australian Livestock Production Services
End date	15-Jun-22	Funding source	Levy
Initiation of research	Industry		

This project will oversee the update of *Evaluation of practices used to reduce the incidence of bovine respiratory disease in Australian feedlots* that was published by MLA in 2016 with industry best practice developed through R&D in recent years.

#### Effectiveness of enzyme formulations for removing dags on cattle in feedlots

Project code	B.FLT.1019	Location	National
Start date	1-May-21	Vendor	QUT
End date	1-Dec-23	Funding source	Levy
Initiation of research	Industry		

Dags are a major issue to the Australian and international feedlot industry causing significant costs to feedlots and processors, water usage and animal stress. Previous work by QUT funded by MLA developed an enzymatic formulation for breaking down the dag-hair bond which was shown to be effective in laboratory trials. The primary objective of this project is to further refine the previously developed formulation into a formulation that is practical and easy to apply and then test its effectiveness in a commercial setting.

#### Bovine respiratory disease pathogen antimicrobial resistance surveillance and genetic sequencing

Project code	B.FLT.3011	Location	National
Start date	17-Jun-20	Vendor	University of Adelaide
End date	30-May-22	Funding source	Levy
Initiation of research	Industry		

This project will conduct bovine respiratory disease pathogen surveillance at eight Australian feedlots to understand the correlation between use of in-feed and injectable meta-phylaxis on antimicrobial resistance. In addition, long range



sequencing of *Pasteurella multocida* and *Mannheimia hemolytica* will occur to understand genetic mechanisms driving antimicrobial resistance.

### Feedlot animal welfare benchmarking

Project code	B.FLT.4007	Location	National
Start date	7-Jan-20	Vendor	University of Melbourne
End date	20-Feb-23	Funding source	Levy
Initiation of research	Feedlot industry		

Continuous improvement of animal welfare is essential for maintaining consumer and community support for grain-fed beef. This project proposes to develop a framework for internal animal welfare benchmarking for the Australian feedlot industry. Industry will be consulted on the format, transparency, certification and draft framework prior to piloting it in seven feedlot organisations and developing the final framework.

### Monitoring health and welfare using emerging diagnostic technologies in the beef feedlot sector

Project code	P.PSH.0873	Location	National
Start date	01-Jun-18	Vendor	Charles Sturt University
End date	31-May-23	Funding source	MLA Donor Company
Initiation of research	External partnership		

This project will quantify the cost of disease in feedlots including carcass condemn costs associated with bovine respiratory disease. It will test and use emerging real time diagnostic methods for disease agents and stress, while also defining at risk animals to allow fast decisions about treatment or removal.

### Improving bovine respiratory disease control through the characterisation of pathogen-host interactions

Project code	P.PSH.0874	Location	National
Start date	01-Jun-17	Vendor	University of Queensland
End date	15-Feb-23	Funding source	MLA Donor Company
Initiation of research	Northern Beef Collaborative Partnership		

This study will define the microbiome of the bovine respiratory system of healthy and diseased cattle and examine the bovine responses to changes in the microbiome from a healthy to a disease state. This will be achieved by analysing biomolecules circulating in the blood (biomarkers), enabling the development of a range of novel diagnostic predictive assays.

## Animal production, husbandry and nutrition

### The effect of lairage duration on carcass quality, yield and microbiological status

Project code	B.FLT.4017	Location	National
Start date	15-Jul-21	Vendor	Bovine Dynamics
End date	9-Mar-23	Funding source	Levy



<b>Initiation of research</b>	Feedlot industry	
<p>Following on from a successful pilot study (MLA project B.FLT.4002), this project aims to determine if reduced lairage duration improves carcase yield, meat quality and animal welfare at a commercial scale. The pilot study demonstrated that a shorter duration of lairage, involving transport and slaughter on the same day, increased carcase yield and quality with an economic benefit of at least \$20 per head.</p>		

### Assessment of grain edge technology to meet Australian government quarantine requirements for imported grain

<b>Project code</b>	B.FLT.1018	<b>Location</b>	National
<b>Start date</b>	1-Oct-20	<b>Vendor</b>	Colere Group
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Feedlot industry		
<p>This project will assess Grain Edge™ technology to meet Australian government quarantine requirements for imported grain to provide the fundamental data that supports livestock enterprises to import grain, giving them options on how to maintain productivity during periods of domestic low supply and high prices.</p>			

### Effect of monensin on antimicrobial resistance of feedlot manure

<b>Project code</b>	B.FLT.3012	<b>Location</b>	National
<b>Start date</b>	16-Jun-20	<b>Vendor</b>	University of Adelaide
<b>End date</b>	1-Oct-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Feedlot industry		
<p>This project will conduct a literature review on the effect of ionophores and bambermycins on antimicrobial resistance of the microbiome, E coli, salmonella and enterococcus in beef cattle and wider food animal production. Through experimentation in the feedlot industry, it will also determine the effect of monensin on antimicrobial resistance of feedlot manure.</p>			

### Evaluation of shade and shelter solutions in a southern Australian feedlot

<b>Project code</b>	B.FLT.4009	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Jun-19	<b>Vendor</b>	University of New England
<b>End date</b>	15-Dec-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Feedlot industry		
<p>This project will evaluate the influence of unshaded areas, shaded areas and shelter on the health, welfare, performance and carcase characteristics from feedlot cattle in southern climatic zones.</p>			

### Evaluation of the benefits of shade for feedlot cattle in a temperate climatic region

<b>Project code</b>	B.FLT.4013	<b>Location</b>	Western Australia
<b>Start date</b>	01-Jun-20	<b>Vendor</b>	Murdoch University
<b>End date</b>	01-Jan-23	<b>Funding source</b>	Levy



<b>Initiation of research</b>	Feedlot industry
This project will evaluate the economic and animal welfare benefits of shade for feedlot cattle in a WA feedlot.	

## Digital agriculture

### Regulatory requirements and risk assessment framework for use of automated vehicles in feedlots

<b>Project code</b>	B.FLT.1020	<b>Location</b>	National
<b>Start date</b>	1-Jul-21	<b>Vendor</b>	Australian Road Research Board
<b>End date</b>	15-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	MLA		
The use of autonomous vehicles in the feedlot is a new and emerging field. There is a need to develop the appropriate risk assessment framework for the incorporation of these technologies into the operation of feedlots. Using the MLA BunkBot as a test case, this project will engage Australian Road Research Board Limited (ARRB) which is the national transport research organization. ARRB have been involved with establishing the framework for use of autonomous vehicles on private and public roads with various state regulatory authorities in Australia.			

### BunkBot lot feeder demonstration site

<b>Project code</b>	B.FLT.1017	<b>Location</b>	National
<b>Start date</b>	1-Mar-20	<b>Vendor</b>	Manabotix and Mort & Co
<b>End date</b>	30-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
This project will support a demonstration of the BunkBot for the lot feeding industry for a two year period. The MLA BunkBot will be integrated into routine bunk management practices at Mort & Co Pinegrove feedlot under both day and night operating conditions. Monthly tours of the demonstration site will be made available to all interested lot feeders and stakeholders in the red meat industry to encourage adoption of the system.			

### Evaluation of automated bunk management – Mort & Co cattle management

<b>Project code</b>	B.FLT.1015	<b>Location</b>	National
<b>Start date</b>	30-Aug-19	<b>Vendor</b>	Manabotix and Mort & Co
<b>End date</b>	15-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
MLA and Manabotix have commercialised a lidar-based bunk scanner (Australian patent number: 2018203945) which is more precise and accurate at determining feed remaining in cattle feed bunks than human callers. Mort & Co will host a trial site at Grassdale Feedlot to determine the value proposition of the scanner over a one-year period.			

### Evaluation of automated bunk management – feedlot cattle performance

<b>Project code</b>	B.FLT.1012	<b>Location</b>	National
<b>Start date</b>	01-Jun-19	<b>Vendor</b>	Bovine Dynamics



<b>End date</b>	15-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Feedlot industry		

This project will determine the feasibility and value proposition regarding animal performance response (carcase weight, feed intake, morbidity and mortality) to semi and full automation of bunk management.

### Evaluation of automated bunk management – bunk scanner monitoring

<b>Project code</b>	B.FLT.1015	<b>Location</b>	National
<b>Start date</b>	10-Jun-19	<b>Vendor</b>	Manabotix
<b>End date</b>	15-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project (MLA project B.FLT.1010) will provide technical support for installation, commissioning, operation and monitoring of bunk scanners for MLA project B.FLT.1012. MLA project B.FLT.1012 will execute experimental methodology to determine the value of semi and full automation of bunk management at two feedlot sites.

### Manure value calculator

<b>Project code</b>	B.FLT.5005	<b>Location</b>	National
<b>Start date</b>	01-Jun-19	<b>Vendor</b>	Queensland University of Technology
<b>End date</b>	02-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Feedlot industry		

This project will develop and validate a decision support tool for organo-mineral nutrient budgeting. This will assist the red meat industry in reducing fertiliser inputs and improve soil health, through optimising the mix of manures and mineral fertilisers.

### Development of a validation dataset for MEDLI Pro V2

<b>Project code</b>	B.FLT.5004	<b>Location</b>	National
<b>Start date</b>	01-Apr-19	<b>Vendor</b>	Premise Australia Pty Ltd
<b>End date</b>	01-Oct-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Feedlot industry		

This project will update an outdated version of the feedlot hydrological modelling component of the Model for Effluent Disposal Using Land Irrigation (MEDLI) to a new platform and incorporate it into a new version (MEDLI Pro V2). This new version incorporates a fully tested and functional feedlot module.

## Environmental sustainability

### Value proposition for 3-NOP feed additive as an emission reduction fund method

<b>Project code</b>	B.FLT.7029	<b>Location</b>	National
<b>Start date</b>	15-May-21	<b>Vendor</b>	Integrity Ag and Environment



End date	4-Apr-22	Funding source	Levy
Initiation of research	Feedlot industry		

There are currently no Emission Reduction Fund (ERF) methods available for adoption by the feedlot industry. Recent MLA research has reported the feed additive 3-NOP can inhibit methane production by 74% in feedlot cattle. This project will build the value proposition for 3-NOP ERF method development to be considered by the Department of Industry, Science, Energy and Resources. If prioritised by the minister, the ERF method will be formally developed by the Clean Energy Regulator.

### Truck effluent trial

Project code	B.FLT.5009	Location	National
Start date	1-Jun-20	Vendor	ACCP
End date	30-Dec-22	Funding source	Levy
Initiation of research	Feedlot industry		

Truck effluent has been identified as a potential environmental, amenity and safety risk for the Australian beef industry. Possible management techniques include capture of effluent in truck tanks with appropriate disposal at approved discharge points. This project will support development of sound practices for management of truck effluent for feedlot cattle.

### Effect of feed withdrawal on truck effluent, animal welfare, carcass characteristics and microbiological contamination of feedlot cattle

Project code	B.FLT.5009	Location	National
Start date	12-Jun-20	Vendor	Australian Country Choice Processing
End date	01-Nov-22	Funding source	Levy
Initiation of research	Feedlot industry		

This project will support development of sound practices for management of truck effluent for feedlot cattle. Possible management techniques include capture of effluent in truck tanks with appropriate disposal at approved discharge points.

## Food safety, traceability and integrity

### NFAS Communication and Adoption Strategy development and implementation

Project code	V.ISC.2035	Location	National
Start date	18-Jan-21	Vendor	AgStrat Associates
End date	30-Jun-24	Funding source	Levy
Initiation of research	Industry		

This project will develop a communication and adoption strategy for the National Feedlot Accreditation Scheme (NFAS). This project also covers the implementation of the strategy over a three-year period (2021 to 2023).



## Genetic analysis

### Quantifying the benefits of breeding for immune competence in high disease risk feedlots

Project code	L.GEN.1817	Location	National
Start date	31-May-19	Vendor	CSIRO
End date	31-May-22	Funding source	Levy
Initiation of research	Feedlot industry		

The aim of this project is to validate findings from a previous MLA project (MLA project B.STU.0244) and generate additional immune competence data required to improve the accuracy of genetic parameter estimation. This will work toward the generation of an immune competence estimated breeding value for sires.

## People and business

### Feedlot industry training materials - feeding and milling modules

Project code	B.FLT.8205	Location	National
Start date	24-May-21	Vendor	SAVV-E
End date	6-Jun-22	Funding source	Levy
Initiation of research	Feedlot industry		

MLA and ALFA are collaboratively executing a feedlot career development and training pathway. This project will develop four modules covering feeding and milling, priorities identified through ALFA. This will contribute towards the feed mill operation and cattle feeding course planned for a supporting project.

### Update of Feedlot R&D evaluation model

Project code	B.FLT.7028	Location	National
Start date	17-Feb-20	Vendor	RMCG
End date	30-Jun-22	Funding source	Levy
Initiation of research	MLA		

Over the past year, RMCG and the MLA Feedlot team have updated and streamlined the Feedlot R&D evaluation model to align it with current market segments and production data for these market segments. This project will undertake further updates of the model to incorporate MLA evaluation framework requirements and make the model available in a format that is consistent with MLA's M&E evaluation framework.

### Smithfield Cattle Company Collaborative Co Innovation Program

Project code	P.PSH.1342	Location	National
Start date	15-Oct-21	Vendor	Smithfield Cattle Co.
End date	30-Oct-25	Funding source	MLA Donor Company
Initiation of research	External partnership		



The focus of this partnership program will be to support the development of Smithfield Cattle Company growth strategies to be achieved via the development of innovation capability in the following areas; feedlot digital innovation and infrastructure, antimicrobial stewardship, sustainability and environmental stewardship (CN30), and animal health, welfare and genetic improvement.

### Feasibility of redevelopment of a meat processing site including a food innovation precinct to optimise profitability and land use

<b>Project code</b>	P.PSH.1268	<b>Location</b>	Queensland
<b>Start date</b>	13-Aug-20	<b>Vendor</b>	Australian Country Choice
<b>End date</b>	31-May-21	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

Australian Country Choice (ACC) will undertake a master planning exercise over one of their processing sites to create profitability from optimal land use. This includes the feasibility of development of a centralised food innovation centre for red meat companies to access for rapid assessment of new technologies, products and processes to meet customer needs.

## Processing productivity

### Australian optimal carcass endpoint and sorting system – development

<b>Project code</b>	B.FLT.1014	<b>Location</b>	National
<b>Start date</b>	17-Jan-20	<b>Vendor</b>	University of Sydney
<b>End date</b>	15-Nov-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	MLA		

No commercialised decision support systems exist for Australian lot feeders to enable cattle sorting and optimisation of days on feed for profit maximisation. This project will produce the first version of the Australian Optimal Carcass Endpoint and Sorting System. It will be available for commercial beta-testing at the project’s conclusion.



## Sheep & lamb

### Completed R&D projects

#### Animal health, welfare and biosecurity

##### New approaches to the understanding of underlying causes for neonatal lamb mortality

<b>Project code</b>	P.PSH.0808	<b>Location</b>	National
<b>Start date</b>	28-Jun-17	<b>Vendor</b>	CSIRO
<b>End date</b>	30-Dec-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project will undertake numerous research projects that focus on the incidence of dystocia and the understanding of underlying causes. This will lead to better understanding of the problem to better inform future control efforts. Focus on twin bearing ewes and inclusion of maternal cross ewes will ensure relevance to red meat producers.

##### Unlocking the keys to ewe survival

<b>Project code</b>	L.LSM.0019	<b>Location</b>	National
<b>Start date</b>	31-Oct-18	<b>Vendor</b>	Livestock Logic
<b>End date</b>	30-Oct-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Investment call

This project conducted reviews and surveys to improve understanding of the causes of death of non-Merino ewes over the lambing period, with the aim to ultimately reduce ewe mortality by 30%.

##### Phase 2 - maximising the reproductive potential of the meat sheep industry by eliminating high oestrogen clovers, more live lambs on the ground

<b>Project code</b>	P.PSH.1171	<b>Location</b>	National
<b>Start date</b>	01-Mar-19	<b>Vendor</b>	University of Western Australia
<b>End date</b>	01-Oct-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

Ewe reproductive performance is being compromised by the return of high-oestrogen clovers that cause infertility. This project will provide producers and advisors with the information and skills required to identify the problem cultivars and remedy infertility problems to boost lamb production.

##### Designing farm specific nematode control programs for sheep

<b>Project code</b>	B.AHE.0308	<b>Location</b>	National
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<b>Start date</b>	01-Mar-17	<b>Vendor</b>	University of New England
<b>End date</b>	01-Jul-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Investment call

The project will develop and validate a mathematical model which will allow input of site-specific climatic, management, husbandry and chemical use data, to predict the productivity, parasitological and cost consequences of intended sheep integrated parasite management interventions. The model will be integrated into the WormBoss decision support tools.

### Identifying public and producer attitudes to sheep and cattle animal welfare to inform education strategies

<b>Project code</b>	P.PSH.0804	<b>Location</b>	National
<b>Start date</b>	26-Jun-17	<b>Vendor</b>	University of Melbourne
<b>End date</b>	25-Jun-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project will identify producer and community knowledge of and attitudes towards livestock welfare issues in the red meat industry, as well as their relationships with relevant outcome variables that can impact on the sustainability of the red meat industry. It will also identify develop and evaluate education strategies targeting the general community and producers.

### Evaluation of the Sterile Insect Technique for sheep blowfly control

<b>Project code</b>	B.AHE.0261	<b>Location</b>	National
<b>Start date</b>	01-May-19	<b>Vendor</b>	Macquarie University
<b>End date</b>	01-May-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	02-Feb-21	<b>Initiation of research</b>	Investment call

This project will review the concept of using Sterile Insect Technique (SIT) to control sheep blowfly in Australia, including a literature review, benefit-cost analysis, research plan and plans for a production and release program.

### Optimising ewe reproductive performance in containment areas

<b>Project code</b>	L.LSM.0028	<b>Location</b>	National
<b>Start date</b>	15-Mar-20	<b>Vendor</b>	Charles Sturt University
<b>End date</b>	31-Jan-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Dec-20	<b>Initiation of research</b>	Industry

This project will develop evidence-based guidelines that will assist producers to optimise reproductive and feeding management of containment fed ewes. Key outcomes will demonstrate R&D gaps and include a suite of producer facing extension materials.

### Sheep reproduction RD&E impact assessment

<b>Project code</b>	L.LSM.0025	<b>Location</b>	National
<b>Start date</b>	24-Sep-19	<b>Vendor</b>	Australian Wool Innovation



<b>End date</b>	30-Oct-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	24-Aug-20	<b>Initiation of research</b>	Industry

This project reviewed 120 sheep reproduction research, development and extension (RD&E) projects to assess the benefits, costs and impacts of current and recently completed sheep reproduction RD&E and identify any remaining gaps.

### A review of maternal dystocia - nutritional and non-nutritional factors

<b>Project code</b>	L.LSM.0027	<b>Location</b>	National
<b>Start date</b>	26-Feb-20	<b>Vendor</b>	Murdoch University
<b>End date</b>	01-Nov-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Jun-20	<b>Initiation of research</b>	Industry

This review identified nutritional and non-nutritional factors that affect dystocia in ewes. The project focused on the economic costs of maternal dystocia, gaps in knowledge and prospective mitigation strategies.

### Strategic and novel approaches to reducing flystrike in sheep

<b>Project code</b>	B.AHE.2020	<b>Location</b>	National
<b>Start date</b>	01-Apr-19	<b>Vendor</b>	Nextgen Agri Limited
<b>End date</b>	06-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	09-Apr-20	<b>Initiation of research</b>	Investment call

A review of the current state of knowledge of flystrike was conducted, including a review of developing technologies that may assist in its elimination. An integrated portfolio of work outlined in the final report (breeding non-susceptible sheep, resilient management systems, and reliable insect control) provides producers with the tools and information necessary to reduce the incidence and prevalence of flystrike.

### A review of the impact of heat stress on reproductive performance in sheep - stage 1

<b>Project code</b>	L.LSM.0024	<b>Location</b>	National
<b>Start date</b>	01-Aug-19	<b>Vendor</b>	University of Adelaide
<b>End date</b>	14-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	12-Feb-20	<b>Initiation of research</b>	Industry

The core focus of this project was to conduct a review of literature on the effect of heat stress on male and female reproductive physiology to identify knowledge gaps. The project developed a program strategy to investigate short, medium and long-term methods of mitigating and managing the effects of heat stress on the reproductive performance of sheep.

### SCRC: reducing the risk of compromised wellbeing of individual sheep

<b>Project code</b>	B.SCR.0112	<b>Location</b>	National
<b>Start date</b>	01-Jul-14	<b>Vendor</b>	Sheep CRC Ltd
<b>End date</b>	30-Jun-19	<b>Funding source</b>	Levy



<b>Date of publication</b>	07-Jan-20	<b>Initiation of research</b>	Industry
<p>This project developed risk models that use a wide range of data collected on individual animals to make improved animal selection and management decisions, leading to improved wellbeing and reduced adult mortality. Information on the genetic background of animals, their production history, current status and the seasonal outlook was used to determine the best course of action for individual sheep within a flock.</p>			

## Diagnostic protocols and test kits for ovine pneumonia

<b>Project code</b>	P.PSH.0814	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Dec-17	<b>Vendor</b>	Joan Lloyd Consulting Pty Ltd
<b>End date</b>	01-Dec-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	10-Dec-19	<b>Initiation of research</b>	External partnership
<p>The main objective of this project was to analyse at least 200 lung and blood samples from five abattoirs to investigate the primary types of bacteria that cause pneumonia in sheep in south-eastern Australia.</p>			

## Phase 1 - maximising the reproductive potential of the meat sheep industry by eliminating high oestrogen clovers, more live lambs on the ground

<b>Project code</b>	P.PSH.1138	<b>Location</b>	National
<b>Start date</b>	01-Jun-18	<b>Vendor</b>	University of Western Australia
<b>End date</b>	30-Jul-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	09-Oct-19	<b>Initiation of research</b>	External partnership
<p>This project was designed to provide producers and advisors with the information and skills needed to identify problematic high oestrogen cultivars, understand the risk and remedy the problem through pasture renovation.</p>			

## Improved ruminant health and productivity through neonatal microbiome manipulation

<b>Project code</b>	P.PSH.0830	<b>Location</b>	National
<b>Start date</b>	01-Jul-17	<b>Vendor</b>	University of Adelaide
<b>End date</b>	31-Aug-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	29-Aug-19	<b>Initiation of research</b>	External partnership
<p>This project had two components: two parts; the first component being to determine the effect of diet and genotype on the rumen microbiome of ewes, as a prelude to the manipulation of their offspring, and the second to identify the extent to which early exposure of ruminant neonates to different maternal microbes influences their subsequent health and growth.</p>			

## National sheep health monitoring project

<b>Project code</b>	P.PSH.0907	<b>Location</b>	National
<b>Start date</b>	02-Jan-18	<b>Vendor</b>	Animal Health Australia
<b>End date</b>	01-Oct-19	<b>Funding source</b>	MLA Donor Company



<b>Date of publication</b>	24-Jun-19	<b>Initiation of research</b>	External partnership
<p>The National Sheep Health Monitoring Project (NSHMP) has been in operation for twelve years and involves lines of sheep monitored for animal health and welfare conditions. The NSHMP currently monitors around 25% of all sheep (lamb and mutton) slaughtered in Australia (when South Australia is included).</p>			

## Animal production, husbandry and nutrition

### [Characterising the vaginal microbes of high and low producing Poll Merino and White Suffolk ewes](#)

<b>Project code</b>	P.PSH.1227	<b>Location</b>	National
<b>Start date</b>	10-Jan-20	<b>Vendor</b>	University of Adelaide
<b>End date</b>	28-Feb-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	13-Oct-20	<b>Initiation of research</b>	Industry
<p>This project characterised the vaginal microbes of domesticated sheep, determined if vaginal microbes differ across sheep breeds with differing growth and wool growth potentials and determined whether any link between vaginal microbes and high and low producing animals. Manipulation of the vaginal microbiome, one of the primary inoculum sources of neonatal lambs, could improve productivity and health.</p>			

### [The nutritive value of modern crop stubbles](#)

<b>Project code</b>	L.LSM.0016	<b>Location</b>	National
<b>Start date</b>	16-Oct-18	<b>Vendor</b>	CSIRO
<b>End date</b>	30-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	03-Dec-21	<b>Initiation of research</b>	Investment call
<p>A recent scoping study found that modern crop stubbles are notoriously variable in quality, with non-cereal crops even more variable. This project will provide farmers with up-to-date digital information on the feeding value of modern stubbles.</p>			

### [Sheep feedlotting and containment management guidelines update](#)

<b>Project code</b>	L.LSM.0022	<b>Location</b>	National
<b>Start date</b>	15-Jul-19	<b>Vendor</b>	AgriPartner Consulting
<b>End date</b>	10-Jan-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	17-Jan-20	<b>Initiation of research</b>	Industry
<p>This project focused on updating the relevant information on best practice management, performance targets, new R&amp;D and primary information sources for sheep producers. Central to this was identifying current knowledge gaps and recommendations for future research in the sector.</p>			



## Digital agriculture

### EID enabled – stimulating the information supply chain

Project code	P.PSH.0923	Location	National
Start date	17-Nov-17	Vendor	Department of Economic Development
End date	30-Jun-20	Funding source	MLA Donor Company
Date of publication	<i>Not yet available</i>	Initiation of research	External partnership

This project aimed to increase the capability of value chain participants to make informed decisions to improve whole-of-chain productivity and business performance using a data-driven approach by leveraging mandatory introduction of individual electronic identification (EID) for sheep in Victoria.

## Food safety, traceability and integrity systems

### [Shelf life of lamb primals in domestic retail and export market](#)

Project code	P.PIP.0579	Location	National
Start date	20-Jun-18	Vendor	Australian Lamb Pty Ltd
End date	15-Feb-20	Funding source	MLA Donor Company
Date of publication	19-Jan-21	Initiation of research	Processing industry

This project performed shelf life testing and validation of ALC lamb products, and utilised the shelf life model to prove Australian lamb can last up to and beyond 90 days, to inform processors and exporters that shelf life does not correlate to total bacteria count in lamb.

### [Dry ageing Australian sheep meat for potential markets, technical guidelines and financial benefits](#)

Project code	P.PSH.0863	Location	National
Start date	22-May-17	Vendor	Western Australia Agriculture
End date	01-Dec-19	Funding source	MLA Donor Company
		Initiation of research	External partnership

This project aimed to transform the scale of dry-aged sheep meat production in Australia to a commercially viable level by defining potential market opportunities, optimal processing protocols and awareness of appropriate regulations, including the development of guidelines for safe dry ageing that can also be applied to beef.

### [Toxoplasma gondii – sheep](#)

Project code	V.MFS.0419	Location	National
Start date	01-Nov-16	Vendor	Primary Industries and Resources SA
End date	15-Mar-21	Funding source	Levy
Publication date	23-Mar-21	Initiation of research	Industry



Toxoplasma gondii is considered a significant foodborne public health hazard, as it can be transmitted via raw or undercooked meat. There is a lack of data regarding the presence of infective toxoplasma in Australian sheepmeat, as such, this project will determine the presence of infective toxoplasma cysts in Australian sheep meat and genotype them through a national survey.

## Genetic analysis

### [Sheep Genetics website](#)

<b>Project code</b>	L.GEN.2101	<b>Location</b>	National
<b>Start date</b>	31-Aug-20	<b>Vendor</b>	Niteco
<b>End date</b>	31-Oct-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	07-Feb-22	<b>Initiation of research</b>	Industry

This project updated the Sheep Genetics content site. This site is the first entry point into MLA's Sheep Genetics - Australia's Sheep genetic evaluation service. The website was updated because the information and web system were outdated.

### [Sheep Genetics software and technical support](#)

<b>Project code</b>	L.GEN.2105	<b>Location</b>	National
<b>Start date</b>	31-Aug-20	<b>Vendor</b>	Servian
<b>End date</b>	31-Oct-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	07-Feb-22	<b>Initiation of research</b>	Industry

This project provided digital infrastructure and software support for the Sheep Genetics team. Sheep Genetics has a range of digital products and software that are in different platforms and using different program languages. This support included identifying risks in products that Sheep Genetics need to manage and support from third parties. as well assupporting Sheep Genetics staff to maintain current infrastructure.

### [Further development of the Sheep Genetics search site - phase 2](#)

<b>Project code</b>	L.GEN.2011	<b>Location</b>	National
<b>Start date</b>	9-Nov-20	<b>Vendor</b>	Tigerspike
<b>End date</b>	31-Jan-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	07-Feb-22	<b>Initiation of research</b>	Industry

This project continued to build upon the updated release of the Sheep Genetics website based on feedback received after launch. These enhancements improved the user experience and minimised support required of the site.

### [National workshop - feed intake and efficiency of sheep](#)

<b>Project code</b>	L.GEN.2005	<b>Location</b>	National
<b>Start date</b>	9-Apr-20	<b>Vendor</b>	WA Agriculture Authority
<b>End date</b>	1-Oct-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project held a national workshop to address issues around the measurement of feed intake and efficiency for sheep. National experts and industry colleagues who have coordinated research efforts into this area were invited to contribute and



participate in a national discussion on what constitutes efficiency at an individual and system level of sheep production, providing recommendations for future collaborative R&D.

## Sheep Genetics Breeders Guide editing

Project code	L.GEN.2010	Location	National
Start date	1-Apr-20	Vendor	Bahr Ag
End date	30-Nov-21	Funding source	Levy
Date of publication	<i>Not yet available</i>	Initiation of research	Industry

This project was an update to the Sheep Genetics Breeders Guide to enhance industry's understanding of Sheep Genetics.

## Sheep Genetics Breeders Guide design

Project code	L.GEN.2009	Location	National
Start date	1-Apr-20	Vendor	Modo Pty Ltd
End date	28-Jul-21	Funding source	Levy
Date of publication	28-Jul-21	Initiation of research	Industry

This project was an update to the Sheep Genetics Breeders Guide to enhance industry's understanding of Sheep Genetics.

## Data quality metrics for Sheep Genetics and BREEDPLAN

Project code	L.GEN.2004	Location	National
Start date	08-Apr-20	Vendor	Animal Genetics and Breeding Unit
End date	15-Dec-21	Funding source	Levy
Date of publication	<i>Not yet available</i>	Initiation of research	Industry

This project will develop suitable methodology for estimating data quality metrics for the Sheep Genetics and BREEDPLAN software. Fast tracking a data quality tool will allow producers to make better selection and management decisions.

## Information feedback dashboard

Project code	L.GEN.2008	Location	National
Start date	4-Mar-20	Vendor	MicroStrategy
End date	30-Jun-20	Funding source	Levy
Date of publication	<i>Not yet available</i>	Initiation of research	Industry

This project updated and improved the Sheep Genetics Breeders dashboard for clients and staff.

## Sheep Genetics database re-development – phase 1

Project code	L.GEN.1906	Location	National
Start date	9-Mar-20	Vendor	Servian



<b>End date</b>	23-Apr-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

Sheep Genetics and MLA manage, fund and interact with at least six databases that contain sheep pedigree, data and genotypes. These vary in design and architecture, creating a number of risks to Sheep Genetics and MLA. This project will outsource expert assistance to complete three stages (new solution architecture, data flow systems and website re-development) to bring together a single sheep database system.

### Sheep Genetics database interface upgrade - phase 2

<b>Project code</b>	L.GEN.1905	<b>Location</b>	National
<b>Start date</b>	17-Jan-20	<b>Vendor</b>	University of New England
<b>End date</b>	18-Jan-21	<b>Funding source</b>	Levy
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project aimed to improve the rate of genetic gain by simplifying the tools, language and descriptions offered through the Sheep Genetics results database interface. A user experience and app design company was contracted to develop novel ways of displaying breeding values through design led thinking user research.

### Development and delivery of improved genomic prediction tools for sheep

<b>Project code</b>	L.GEN.1815	<b>Location</b>	National
<b>Start date</b>	15-May-19	<b>Vendor</b>	University of New England
<b>End date</b>	15-Nov-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

The project aims to develop genotyping tools for the sheep industry to improve prediction accuracy for productivity traits and genetic defects. Advanced statistical methods will be used to optimize and validate predictive SNP sets to be added to genotyping tools used in industry.

### Sensory testing to underpin genomic prediction of lamb eating quality

<b>Project code</b>	L.GEN.1811	<b>Location</b>	National
<b>Start date</b>	30-Oct-18	<b>Vendor</b>	Murdoch University
<b>End date</b>	1-Mar-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project provides a database of sufficient magnitude to determine genomic predictions of MSA based eating quality scores and the development of new ASBVs for actual eating quality of lamb cuts. The data will allow further development of the MSA Mark II cuts-based model for lamb and connect the new model to the genetic prediction of eating quality.

### Corriedale eating quality genomics

<b>Project code</b>	P.PSH.1001	<b>Location</b>	National
<b>Start date</b>	06-Nov-17	<b>Vendor</b>	University of Adelaide
<b>End date</b>	01-Nov-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership



This project aimed to address the insufficient numbers of Corriedales with recorded phenotypes and genotypes, which is required for genomic tools to be properly utilised by the breed.

### Genetics of Merino meat value and lifetime performance

<b>Project code</b>	P.PSH.1032	<b>Location</b>	National
<b>Start date</b>	01-Mar-18	<b>Vendor</b>	NSW DPI
<b>End date</b>	30-Jan-22	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project will utilise wethers born in 2017 and 2018 from the foundation Merino Lifetime Productivity (MLP) ewes. Phenotypes recorded on the animals will lead to more accurate estimates of the genetic relationships of lean meat yield and eating quality traits with reproduction and wool production traits, resulting in more accurate ASBVs to be used when making selection decisions.

### Sheep Genetics database re-development - phase 2

<b>Project code</b>	L.GEN.2104	<b>Location</b>	National
<b>Start date</b>	16-Nov-20	<b>Vendor</b>	Servian Pty Ltd
<b>End date</b>	31-May-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will outsource expert assistance to complete phase two of three stages (new solution architecture, data flow systems and website re-development) to bring together a single sheep database system.

### Eating quality in Merino breeding programs

<b>Project code</b>	L.EQT.1908	<b>Location</b>	National
<b>Start date</b>	30-Nov-19	<b>Vendor</b>	NSW DPI
<b>End date</b>	15-Dec-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

The project will provide phenotypic and genetic data on eating quality and lean meat yield of Merino sires, as well as relationships with wool and ewe reproduction, to support reporting of Australian Sheep Breeding Values and the development of Merino selection indexes that balance quality wool and meat production.

### [Sheep genetics database interface upgrade working group support](#)

<b>Project code</b>	L.GEN.0002	<b>Location</b>	National
<b>Start date</b>	15-Jun-19	<b>Vendor</b>	NSW DPI
<b>End date</b>	29-Nov-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	02-Mar-20	<b>Initiation of research</b>	Industry



This project engaged a NSW Department of Primary Industries Technical Specialist for sheep breeding to provide input into the other MLA projects that fed into the upgrade of the Sheep Genetics web tool.

## [SCRC: using full genome sequence information to accelerate genetic gain](#)

<b>Project code</b>	B.SCR.0312	<b>Location</b>	National
<b>Start date</b>	01-Jul-14	<b>Vendor</b>	Sheep CRC Ltd
<b>End date</b>	30-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	07-Jan-20	<b>Initiation of research</b>	Industry

This project focused on whether the use of high density (700K) and full sequence genomic information would significantly improve the accuracy of genomic information for sheep that are related to the resource flock.

## [Sheep CRC annual report II](#)

<b>Project code</b>	B.SCR.0322	<b>Location</b>	National
<b>Start date</b>	01-Jul-14	<b>Vendor</b>	Sheep CRC Ltd
<b>End date</b>	24-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	07-Jan-20	<b>Initiation of research</b>	Industry

This project reported on the final five-year stage of the Sheep CRC (2015-2019). The key publication, *Concept to impact – the story of the sheep CRC 2001-2019*, was also released, detailing its 18-year history.

## [BREEDPLAN and Sheep Genetics short video series](#)

<b>Project code</b>	L.GEN.1809	<b>Location</b>	National
<b>Start date</b>	01-Aug-18	<b>Vendor</b>	Sound Images Pty Ltd
<b>End date</b>	29-Nov-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	29-Nov-19	<b>Initiation of research</b>	Industry

This project developed a short video series targeted at commercial producers who are new to BREEDPLAN and Sheep Genetics to improve their knowledge and skills when using the databases.

## [Sheep genetics database interface upgrade](#)

<b>Project code</b>	L.GEN.0001	<b>Location</b>	National
<b>Start date</b>	30-Mar-19	<b>Vendor</b>	TigerSpike Pty Ltd
<b>End date</b>	15-Feb-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	21-Oct-19	<b>Initiation of research</b>	Industry

MLA launched this project to improve the rate of genetic gain of the Australian sheep industry by simplifying the tools, language and descriptions offered through the Sheep Genetics database web tool. The new web tool will provide users with simplified, intuitive access to information and improved flexibility to customise the tool to match goals specific to individual operations.



## Livestock export

### [Value analysis of the Australian live sheep trade \(2019\)](#)

<b>Project code</b>	W.LIV.1001	<b>Location</b>	National
<b>Start date</b>	01-Oct-19	<b>Vendor</b>	Mecardo
<b>End date</b>	01-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	21-Sep-20	<b>Initiation of research</b>	Industry

This project used desktop analysis and surveys to gather factual information about the live sheep export industry's contribution to the Australian economy and identify the level of reliance on the trade for sheep producers and other participants across the supply chain.

### Automated sheep counting for the live export industry

<b>Project code</b>	W.LIV.2000	<b>Location</b>	National
<b>Start date</b>	30-Jul-18	<b>Vendor</b>	University of Technology Sydney
<b>End date</b>	01-Mar-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project used video technology and developed algorithms to automatically count sheep within the supply chain with very high accuracy.

### [Heat management in the Middle East phase 3 – part 2](#)

<b>Project code</b>	W.LIV.3044	<b>Location</b>	National
<b>Start date</b>	15-Sep-16	<b>Vendor</b>	University of Western Australia
<b>End date</b>	30-Aug-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Jul-20	<b>Initiation of research</b>	LEP

This suite of projects focused on research into heat mitigation of sheep exported to the Middle East, which involved the comparison and evaluation of different shade structures and other heat-reducing methods to identify which options will significantly cool sheep during hot/dry and hot/humid conditions.

## Processing productivity

### [Rapid measurement of intramuscular fat in lamb using imaging needles](#)

<b>Project code</b>	V.TEC.1718	<b>Location</b>	National
<b>Start date</b>	30-May-19	<b>Vendor</b>	University of Adelaide
<b>End date</b>	20-Dec-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	05-Feb-20	<b>Initiation of research</b>	Industry



This project tested the potential for a high-resolution imaging needle probe to measure the IMF percentage in lamb. The imaging needle was originally developed for human medical use but is being repurposed for application in meat.

**Investigating the viability of using MEXA for objective measurement of IMF and WBSF in Australian new and old season lambs**

<b>Project code</b>	V.TEC.1712	<b>Location</b>	National
<b>Start date</b>	30-Apr-19	<b>Vendor</b>	Murdoch University
<b>End date</b>	01-Dec-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	30-Sep-19	<b>Initiation of research</b>	Industry

The main objective of this project was to conduct an initial evaluation of the potential for MEXA to measure shear force and intramuscular fat percentage in the lamb loin to inform further investment.

**Product innovation**

**Preliminary evaluation of flavourless smoke in chilled Australian lamb**

<b>Project code</b>	V.RMH.0095	<b>Location</b>	National
<b>Start date</b>	30-May-19	<b>Vendor</b>	Market Synergy Pty Ltd
<b>End date</b>	15-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	13-Aug-21	<b>Initiation of research</b>	Industry

This project tests the value proposition(s) for the inclusion of flavourless smoke with Australian sheepmeat – a technology that is able to enhance and maintain colour stability for up to 25 days post-retail pack and extend the shelf life by up to 20%.

**Aussie Select Cuts: development and testing new lamb US deli products and insights (Meat Tender)**

<b>Project code</b>	P.PSH.1213	<b>Location</b>	National
<b>Start date</b>	20-Oct-19	<b>Vendor</b>	Meat Tender
<b>End date</b>	30-Apr-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project developed and tested a suite of Australian lamb products (Aussie Select Cuts) to build on the ready to eat/heat and deli meats trend and grow demand in value-added Australian lamb in USA.

**Organic freeze dried lamb liver pet treat**

<b>Project code</b>	P.PSH.1209	<b>Location</b>	National
<b>Start date</b>	4-Nov-19	<b>Vendor</b>	NexGen Wholefoods
<b>End date</b>	3-Feb-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	10-Dec-20	<b>Initiation of research</b>	External partnership

This project developed and tested proof of concept Australian Organic Lamb Liver Pet Food treats and/or sprinkles. The freeze drying process can be used to deliver extended chilled life with premium flavour and nutritive values to current offerings.



**Proof of concept - cold smoked red meat (Smoke T – Lamb Bacon Co)**

<b>Project code</b>	V.RMH.0099	<b>Location</b>	National
<b>Start date</b>	30-Jul-19	<b>Vendor</b>	The Original Lamb Bacon Co
<b>End date</b>	08-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	24-Apr-20	<b>Initiation of research</b>	Industry

This project developed proof of concept red meat products based on cold smoke technology and developed quality systems and validation of shelf life protocols for these products.

**Supply chain sustainability**

**Shelf life experience in chilled lamb export supply chains**

<b>Project code</b>	V.MFS.0001	<b>Location</b>	National
<b>Start date</b>	18-Jan-21	<b>Vendor</b>	MINTRAC
<b>End date</b>	11-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	28-Apr-21	<b>Initiation of research</b>	Industry

The shelf life of chilled sheep meats (lamb) is significantly consumed in transport to distant markets and logistics, particularly when shipped to North America or Europe. Successfully growing the value of international trade in these products and maximising opportunities for sale of product would benefit from a longer shelf life than can currently be achieved. This project investigated and interviewed industry about their experience with lamb shelf life and interventions they may use to increase the shelf life.

**Building sustainable value chains that link producers to high value chilled lamb export markets in China**

<b>Project code</b>	P.PIP.0562	<b>Location</b>	National
<b>Start date</b>	04-Dec-17	<b>Vendor</b>	Greenleaf Enterprises Pty Ltd
<b>End date</b>	28-Aug-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	29-Jan-20	<b>Initiation of research</b>	Processing industry

This project demonstrated how new integrated value chains that target high value market opportunities should be designed and implemented. This involved the development of new product opportunities with the objective of increasing profitability and returns for the industry.

**Improved lamb supply through a value chain approach**

<b>Project code</b>	P.PIP.0741	<b>Location</b>	National
<b>Start date</b>	03-Jun-17	<b>Vendor</b>	Australian Lamb Pty Ltd
<b>End date</b>	29-Nov-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	6-Apr-21	<b>Initiation of research</b>	Processing industry



This project took a value chain approach to build relationships with ALC suppliers. It also addressed key supply chain issues including market compliance, continuity of supply, capability building, information flow between ALC and producers, and investigated the opportunity for an ALC assurance program.



## R&D projects in progress

### Animal health, welfare and biosecurity

#### Investigating heat stress in ewes - reproductive performance

<b>Project code</b>	P.PSH.1292	<b>Location</b>	National
<b>Start date</b>	6-Apr-21	<b>Vendor</b>	University of Western Australia
<b>End date</b>	31-May-26	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Investment call (SRSP)		

In sheep production, extreme heat events are known to affect development, growth, and reproduction. In the extensive pasture and pastoral based systems that are typical of Australia, sheep are exposed to a diverse range of extreme climatic conditions and have little to moderate access to shade. This project aims to definitively, and more comprehensively, quantify the effects of heat events on sheep reproduction, thermoregulatory capacity, behaviour and wellbeing through long term data collection during a range of climatic conditions in diverse production settings.

#### Investigating animal health and diseases in Australian lamb feedlots

<b>Project code</b>	P.PSH.1321	<b>Location</b>	National
<b>Start date</b>	30-Apr-21	<b>Vendor</b>	Animal Health Australia
<b>End date</b>	30-Apr-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project seeks to better understand the incidence of animal health issues specific to lamb feedlotting in Australia. This will be done by using animal health and performance information from established feedlots, performing post mortem examinations on a cohort of lambs which die in these feedlots and gathering abattoir surveillance data in relation to lambs which come from the selected feedlots.

#### Developing and implementing objective sheep lifetime pain measurement and mitigation strategies

<b>Project code</b>	P.PSH.2057	<b>Location</b>	National
<b>Start date</b>	1-Feb-21	<b>Vendor</b>	University of Adelaide
<b>End date</b>	30-Apr-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project seeks to provide guidance around targeted prevention, diagnosis and treatment of persistence of pain in sheep. It will help to deliver tools that can objectively diagnose and measure pain in sheep with associated innovations in new persistent pain mitigation that stop the pain pathology developing.

#### Abattoir survey of ovine pneumonia pathogens in Australian sheep flocks

<b>Project code</b>	P.PSH.2054	<b>Location</b>	National
<b>Start date</b>	18-Sep-20	<b>Vendor</b>	Animal Health Australia



<b>End date</b>	1-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will build on the research findings of MLA project P.PSH.0814 to provide information on the prevalence of the ovine respiratory pathogens circulating in sheep flocks in southern Australia. This will provide comprehensive understanding of the aetiological agents involved in pneumonia in Australian sheep and help underpin the development of control measures.

### Formulating a research pathway to provide new options for flystrike control

<b>Project code</b>	B.AHE.0262	<b>Location</b>	National
<b>Start date</b>	01-Jul-19	<b>Vendor</b>	CSIRO
<b>End date</b>	01-Sep-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will review past research on flystrike control methods and identify if modern scientific advances can provide new motivation to past approaches. Recommendations for future research programmes into flystrike control will also be made.

### New approaches to increase the weaning rate of the national sheep flock

<b>Project code</b>	L.LSM.0015	<b>Location</b>	National
<b>Start date</b>	01-Dec-17	<b>Vendor</b>	University of Adelaide
<b>End date</b>	15-Jun-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will develop and demonstrate new methods to increase weaning rate via a collaborative network of producers, producer groups and animal scientists. This will be achieved across four sub-projects, with project one focusing on improving survival of embryos through nutritional management while the other projects each take novel approaches to boosting lamb survival.

### Boosting lamb survival by supplementing ewes with vitamins and minerals

<b>Project code</b>	L.LSM.0014	<b>Location</b>	Southern Australia
<b>Start date</b>	28-Jan-18	<b>Vendor</b>	Murdoch University
<b>End date</b>	15-Nov-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project will establish producer demonstration sites across southern Australia to validate the results of a previous small-scale experiment, which has shown that supplementing ewes during late pregnancy with vitamin D or E plus selenium may improve lamb survival by up to 10%. Ewes will also be tested for vitamin D, E and selenium levels and guidelines on the best supplementation regimes will be developed.

### Managing fecund flocks to improve survival of triplet dams and their lambs

<b>Project code</b>	L.LSM.0013	<b>Location</b>	National
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<b>Start date</b>	01-Jan-18	<b>Vendor</b>	Murdoch University
<b>End date</b>	30-May-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		

This project seeks to define the size of the issue and develop best practice management strategies to reduce the mortality of triplet-bearing maternal ewes and their lambs, to capitalise on the profit opportunity and mitigate welfare risks.

### More lambs from ewe lambs through developing and extending best practice

<b>Project code</b>	P.PSH.1180	<b>Location</b>	National
<b>Start date</b>	15-Jan-19	<b>Vendor</b>	JT Agri-Source Pty Ltd
<b>End date</b>	30-Apr-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Investment call		

This project aims to significantly increase the number of ewe lambs being mated and their reproductive performance by developing and validating best practices to deliver reproductive success.

### A novel amino acid approach to lamb survival

<b>Project code</b>	L.LSM.0026	<b>Location</b>	National
<b>Start date</b>	08-Oct-19	<b>Vendor</b>	University of Adelaide
<b>End date</b>	15-Mar-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will establish whether maternal amino acid supplementation increases energy supply to the reproductive tract and foetal development, thus reducing *in utero* and peri-natal lamb losses. It is expected that through practical and cost-effective amino acid supplementation during gestation, twin-lamb survival could increase by 5%.

### Increasing lambing percentages through better use of pregnancy scanning technology

<b>Project code</b>	L.LSM.0021	<b>Location</b>	National
<b>Start date</b>	24-Jun-19	<b>Vendor</b>	University of Adelaide
<b>End date</b>	28-Feb-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will seek to overcome key barriers to adoption of pregnancy scanning using a number of approaches, including strengthening the business case for pregnancy scanning and addressing concerns about scanning accuracy, the economics of adopting the technology and the associated logistics of managing ewes separately according to litter size.

### Extended commercial trial of Numnuts

<b>Project code</b>	B.AWW.0263	<b>Location</b>	National
<b>Start date</b>	15-Apr-20	<b>Vendor</b>	CSIRO
<b>End date</b>	02-Dec-22	<b>Funding source</b>	Levy



<b>Initiation of research</b>	Industry
<p>By validating the commercial application and animal safety of the NUMNUTS® device and confirming its efficacy for castration, this project will provide livestock producers with the evidence needed to build trust in the product and confidence in its use. In so doing, it will ultimately provide an accelerated path to adoption of improved pain relief for lambs at marking.</p>	

### Refining body condition score for region, season, breed and responsiveness

<b>Project code</b>	L.LSM.0020	<b>Location</b>	National
<b>Start date</b>	01-Jun-19	<b>Vendor</b>	NSW DPI
<b>End date</b>	15-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>This project will refine current advice on body condition score (BCS) targets for ewes across a wide range of regions, breeds and season of mating. Results will support and enhance the current cost-benefit estimates in the Life Time Ewe Management (LTEM) adoption package for a wider set of conditions.</p>			

### Reducing foetal and lamb losses in young ewes

<b>Project code</b>	B.AHE.0318	<b>Location</b>	National
<b>Start date</b>	01-Jan-18	<b>Vendor</b>	Murdoch University
<b>End date</b>	31-Jul-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		
<p>This project will determine the extent and timing of reproductive wastage during ewe pregnancy and between birth and marking and identify opportunities for addressing reproductive wastage. It will also determine whether infectious diseases are associated with foetal losses and the potential role of husbandry and nutrition as part of a multifactorial problem to lamb loss.</p>			

### Reducing the financial impact of endemic conditions in sheep – a value chain approach

<b>Project code</b>	P.PSH.0852	<b>Location</b>	National
<b>Start date</b>	01-Jan-18	<b>Vendor</b>	University of Adelaide
<b>End date</b>	31-Jul-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		
<p>This project will develop systems for recording individual carcass data and report actual incidence of endemic conditions to producers. This will expand the scope of the Enhanced Abattoir Surveillance (EAS) by including at least one more abattoir and including all lot sizes.</p>			



## Animal production, husbandry and nutrition

### Lamb survival in SE Qld Rangelands

<b>Project code</b>	P.PSH.1348	<b>Location</b>	Queensland
<b>Start date</b>	11-Oct-21	<b>Vendor</b>	Sheepmatters
<b>End date</b>	1-Jul-26	<b>Funding source</b>	Industry partnerhip
<b>Initiation of research</b>	Integrated PDS		

This integrated Producer Demonstration Site (PDS) will facilitate and demonstrate the adoption of objective management technologies to increase on-farm productivity of sheep. The project will upskill core and observer producers, and producers nationally, by providing the skills and confidence to use the data collected on their sheep that can be interpreted with reliable confidence to help make informed decisions. With the investment in remote objective weight measurement (WOW) and objective condition scoring, this will have direct influence in increasing reproduction and decreasing mortality in the core and observer producers breeding flocks.

### Design, establishment and benefits of edible shelter to improve lamb survival and whole-farm profitability

<b>Project code</b>	P.PSH.1316	<b>Location</b>	Southern
<b>Start date</b>	31-Jul-21	<b>Vendor</b>	Murdoch University
<b>End date</b>	14-Jan-27	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Investment call (SRSP)		

This project will investigate the impacts of different types and designs of edible shelter on the physiology, behaviour, welfare and survival of sheep along with the nutritional benefits of the feedbase in mixed farming enterprises.

### SheepLinks: Climate adaptation to ensure a sustainable WA sheep industry (WA Nexus)

<b>Project code</b>	P.PSH.1318	<b>Location</b>	WA
<b>Start date</b>	15-May-21	<b>Vendor</b>	Western Australian Agriculture Authority
<b>End date</b>	30-Aug-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry (Nexus project)		

This project will model the impact of climate scenarios on sheep production systems in WA, examine existing adaptations and develop tactics for WA sheep producers to adapt to the likely scenarios. An adoption component is also included to ensure producer capacity is built and practice change achieved.

### Improving twin lamb survival through melatonin implants: commercial validation

<b>Project code</b>	P.PSH.1287	<b>Location</b>	National
<b>Start date</b>	1-Feb-21	<b>Vendor</b>	CEVA Animal Health
<b>End date</b>	31-Mar-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		



This project will validate research trial observations that demonstrate significant (14–15%) improvements in twin lamb survival through maternal supplementation of melatonin, on 15 commercial properties. The delivery mechanism for melatonin is an easily administered implant (Regulin) to the ewe at pregnancy scanning. The Regulin implant is currently commercially available for application to non-pregnant ewes 30-40 days prior to joining in order to reduce the seasonality of breeding. If successful, the commercial provider will apply for a label change to also register the implants for use during pregnancy.

## Managing Merino weaners to survive and thrive

<b>Project code</b>	P.PSH.1281	<b>Location</b>	Southern
<b>Start date</b>	8-Jan-21	<b>Vendor</b>	Murdoch University
<b>End date</b>	30-Dec-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will identify opportunities for post-weaning nutrition and management to deliver cost-effective improvements in weaner survival and subsequent reproductive performance across a range of Merino genotypes. Demonstration sites with direct links to producer networks will showcase strategies that achieve cost-effective outcomes for weaner survival and maiden reproductive performance focussing on genetics, optimum use of stubbles, supplementary feeding and use of electronic ID to capture data that informs decision-making.

## Optimal supplementary feeding strategies for lamb survival

<b>Project code</b>	P.PSH.2050	<b>Location</b>	Southern
<b>Start date</b>	20-Mar-20	<b>Vendor</b>	Murdoch University
<b>End date</b>	TBC	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will evaluate the effects of various methods for trail feeding and self-feeders at lambing on ewe behaviour and lamb survival. It will deliver guidelines to producers for supplementary feeding during lambing to optimise lamb survival.

## Lamb feedlotting program

<b>Project code</b>	P.PSH.1253	<b>Location</b>	Southern
<b>Start date</b>	1-Mar-20	<b>Vendor</b>	CSU
<b>End date</b>	1-Mar-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will support a five-year R&D program focused on the lamb feedlotting sector. The program will take an integrated supply chain approach, with a focus from the weaner lamb through to the feedlot, into the value chain and onto the consumer.

## Phasing out of mulesing: cost, benefits and opportunities

<b>Project code</b>	B.AWW.0006	<b>Location</b>	National
<b>Start date</b>	07-May-19	<b>Vendor</b>	University of Melbourne
<b>End date</b>	15-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		



This project will examine the benefits and costs of ceasing mulesing in prime lamb systems. It will also examine the key drivers for farmer behaviour and attitudes towards continuation of mulesing prime lambs' dams and barriers for behavioural change towards mulesing-free systems. Outcomes will inform future extension programs and approaches to encourage phasing out of mulesing in prime lamb enterprises.

## Digital agriculture

### Making real farms smart – mixed sheep ag tech

<b>Project code</b>	P.PSH.1179	<b>Location</b>	National
<b>Start date</b>	01-Jul-19	<b>Vendor</b>	Origo Pty Ltd
<b>End date</b>	15-Mar-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will develop, install and evaluate a whole of farm connectivity solution and monitor the productivity and efficiency impacts of autonomous on-farm connectivity and Internet of Things (IoT) systems. It will describe the social and economic benefits of well-planned use of IoT technologies and allow broad extension and evaluation by other producers.

## Eating quality

### Calibration and accreditation of the SOMA device to measure IMF in sheepmeat

<b>Project code</b>	L.EQT.2203	<b>Location</b>	National
<b>Start date</b>	20-Sep-21	<b>Vendor</b>	Fujihara Industry
<b>End date</b>	29-Dec-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	MSA		

This project will support for the final calibration of three SOMA optics devices to predict intramuscular fat (IMF) in sheepmeat. It will also support subsequent AUS-MEAT accreditation and data upload into plant systems, as well as exploring opportunities for Australian distribution. The SOMA device IMF prediction will enable the Meat Standards Australia Sheepmeat Cut x Cooking method model, with IMF as one of the traits.

### Statistical development of MSA Sheepmeat Model

<b>Project code</b>	L.EQT.2110	<b>Location</b>	National
<b>Start date</b>	20-May-21	<b>Vendor</b>	Pleasants Farms Ltd
<b>End date</b>	31-Jan-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	MSA		

This project will provide statistical development of the MSA cuts based sheepmeat grading model to include new cut x cook information.

### MSA Sheepmeat Grading Model and systems development

<b>Project code</b>	L.MSG.2111	<b>Location</b>	National
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<b>Start date</b>	1-May-21	<b>Vendor</b>	Management for Technology
<b>End date</b>	31-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	MSA		

This project will provide support for the development, delivery and implementation of the 'Mark II' sheepmeat cuts based system.

### MSA sheepmeat research, development, technical and analytical support

<b>Project code</b>	L.EQT.2109	<b>Location</b>	National
<b>Start date</b>	1-Oct-20	<b>Vendor</b>	David William Pethick
<b>End date</b>	30-Oct-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	MSA		

This project provides for a consultant to assist with the development and implementation of selected lamb and sheepmeat eating quality research projects as directed by MLA.

### Resource Flock Limited Cut x Cook Sensory Evaluation and MSA Mark II Model Development

<b>Project code</b>	L.EQT.2106	<b>Location</b>	National
<b>Start date</b>	1-Oct-20	<b>Vendor</b>	University of New England
<b>End date</b>	15-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	MSA		

This project aims to conduct sensory testing of the INF and Resource flock based at Kirby, Armidale NSW. The Resource flocks are a representation of industry sires across all breeds with a first cross merino base. This is indicative of industry and will build the reference population for industry genomic tools.

### Resource flock MSA Mark II limited cut x cook

<b>Project code</b>	L.EQT.2107	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Murdoch University
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	MSA		

This project aims to conduct sensory testing of the INF and resource flock based around the country, with particular reference to the Katanning lambs in WA. The resource flocks are a representation of industry sires across all breeds with a first cross merino base. This is indicative of industry and has great potential to investigate eating quality for the development of the MSA Mark II Sheepmeat model.



## Feedbase and grazing land management

### Spatially Resilient Grazing Systems Measuring and optimising landscape utilisation in rangeland sheep and goats

<b>Project code</b>	P.PSH.1235	<b>Location</b>	Queensland
<b>Start date</b>	3-Feb-20	<b>Vendor</b>	Central Queensland University
<b>End date</b>	15-Feb-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

Through participatory research sites, this project will develop rangeland-specific small ruminant management strategies that can be integrated and applied to optimise productivity and pasture use efficiency and manage landscape condition. Outcomes will have implications for infrastructure investment decisions, supplementation strategies and grazing management, as well as for further R&D activities.

### SheepLinks FEED365 all year livestock forage systems

<b>Project code</b>	P.PSH.1288	<b>Location</b>	WA
<b>Start date</b>	31-Mar-20	<b>Vendor</b>	Western Australian Agriculture Authority
<b>End date</b>	30-Dec-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry partnership		

This project is a part of the SheepLinks Program Initiative. Grazing systems in southern WA are challenged by climate change with increasingly hotter, drier and more variable seasons. In this context, the FEED365 project will re-design livestock forage systems for grazing all year round in Mediterranean environments. The goal is to create resilient sheep production systems, allowing farmers to increase livestock returns by grazing quality green forage all year round with minimal supplementary feeding.

### No more gaps with superior shrub systems

<b>Project code</b>	L.LSM.0018	<b>Location</b>	National
<b>Start date</b>	15-Oct-18	<b>Vendor</b>	CSIRO
<b>End date</b>	30-Oct-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will develop high-value shrub systems to improve utilisation of the summer/autumn/early winter feed base in Mediterranean and low rainfall mixed farming systems.

### Dual purpose crops for lamb production in southern Queensland and northern NSW

<b>Project code</b>	P.PSH.1045	<b>Location</b>	Queensland; New South Wales
<b>Start date</b>	23-Apr-18	<b>Vendor</b>	CSIRO
<b>End date</b>	15-Nov-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		



This project is part of the Livestock Productivity Partnership (LPP) and will evaluate whole farm system changes to lamb production in the summer rainfall zone. It will compare autumn lambing versus winter/spring lambing and incorporate dual purpose crops in the grazing system to evaluate production, animal health and gross margins for modelling outcomes.

### LPP perennial pasture and forage combinations to extend summer feed for southern NSW

<b>Project code</b>	P.PSH.1048	<b>Location</b>	Southern Australia
<b>Start date</b>	23-Apr-18	<b>Vendor</b>	CSIRO
<b>End date</b>	01-May-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		

This project is part of the Livestock Productivity Partnership (LPP) and aims to maximise profitability in southern NSW meat production systems. This project aims to identify pasture and forage species/mixtures that combine a reasonably high level of summer activity with adequate drought tolerance, which are of sufficient quality to grow and fatten young stock in summer.

## Food safety, traceability and integrity systems

### Shelf life of all lamb primals using new high adhesion vacuum packaging

<b>Project code</b>	P.PIP.0589	<b>Location</b>	National
<b>Start date</b>	1-Aug-21	<b>Vendor</b>	WAMMCO International
<b>End date</b>	27-Nov-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

With the success of the pilot trial on lamb racks and shanks, this project will assess the shelf life of the whole range of lamb products using new vacuum packaging. This project will trial the packaging on product ranging from the legs to shoulders, both bone in and bone out products – a total of nine different primals will be tested and matched with the shelf-life calculator.

### New packaging for extending lamb shelf life and cold chain management

<b>Project code</b>	P.PIP.0586	<b>Location</b>	National
<b>Start date</b>	30-Apr-21	<b>Vendor</b>	WAMMCO International
<b>End date</b>	30-Apr-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

This project will use real time data loggers to track key international sea freights and plant performance in conjunction with a shelf life trial on new vacuum packaging to reduce oxygen transfer, improve high fat adhesion and protect against bone punctures.



### Tracking and tracing sheep

<b>Project code</b>	V.RDA.2010	<b>Location</b>	National
<b>Start date</b>	22-Feb-21	<b>Vendor</b>	Asymmetric Innovation
<b>End date</b>	28-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	ISC		

Via desktop studies, industry consultation and prototype development, this project seeks to validate assumptions related to the technical and adoption challenges for an implantable ID in sheep and test improvements of the implantable ID concept.

### Extending the shelf life of vacuum-packed sheep meats

<b>Project code</b>	V.MFS.0452	<b>Location</b>	National
<b>Start date</b>	22-Jan-21	<b>Vendor</b>	University of Tasmania
<b>End date</b>	21-Jun-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The practical shelf life of vacuum-packed sheep meat stored at around -0.5°C is about 90 days for lamb but it may be advantageous for supply chains and customers if this shelf life could be extended. The factors leading to the relatively short shelf life of sheep meat products (compared to beef), further exacerbated in bone-in products, will be investigated through this project, and practical approaches to the extension of shelf life will be suggested and trialled.

## Genetic analysis

### Sheep Genetics software and technical support

<b>Project code</b>	L.GEN.0003	<b>Location</b>	National
<b>Start date</b>	15-Jul-21	<b>Vendor</b>	Servian
<b>End date</b>	15-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project provides support for digital infrastructure and software for the Sheep Genetics team. Sheep Genetics has a range of digital products and software that are in different platforms and using different program languages.

### Sheep Genetics Database re-development - Phase 3

<b>Project code</b>	L.GEN.2202	<b>Location</b>	National
<b>Start date</b>	1-Jul-21	<b>Vendor</b>	Servian
<b>End date</b>	4-Apr-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This overall aim of this project is to deliver a single sheep database system containing sheep pedigree, data and genotypes. This information is currently spread across more than six databases. This component will complete the new reporting



systems, allowing ram breeders and buyers to make improved breeding decisions. It will also migrate the Sheep Genetic Data Warehouse to the ISC data warehouse, allowing more data to be shared to inform projections and decisions.

### Adding sustainability traits to the MLA resource flock - phase 1

<b>Project code</b>	L.GEN.2103	<b>Location</b>	National
<b>Start date</b>	30-Sep-20	<b>Vendor</b>	Department of Agriculture and Food
<b>End date</b>	21-Jun-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will provide the collection of sustainability traits on MLA’s resource flock sheep. This will provide datasets to establish Australian Sheep Breeding Values (ASBVs) for feed use efficiency, methane and potentially body composition, as well as linking to productivity and eating quality traits to establish genetic correlation.

### Further development of a reference population for genomic prediction

<b>Project code</b>	L.GEN.1814	<b>Location</b>	National
<b>Start date</b>	15-Nov-18	<b>Vendor</b>	University of New England
<b>End date</b>	30-Jun-25	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project aims to further develop the reference population needed for genomic predictions in the Australian sheep industry. The project will extend the MLA resource flock and increase use of data from industry flocks to contribute to more accurate genomic predicted Australian Sheep Breeding Values through Sheep Genetics.

### Accelerating rates of genetic gain in Merinolink with DNA testing

<b>Project code</b>	P.PSH.0961	<b>Location</b>	National
<b>Start date</b>	15-Dec-17	<b>Vendor</b>	University of New England
<b>End date</b>	30-Jul-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will build producer and service provider capability to make data-informed decisions from increased adoption of tools that enable increased accuracy of selection and faster rates of genetic gain. It will aid in funding initial DNA tests and support in improving the genetic merit of the participating flocks through implementing an adoption strategy.



## People and Business

### Making More from Sheep Website and Maintenance Agreement 2020-22

<b>Project code</b>	L.MMS.2101	<b>Location</b>	Vic, NSW
<b>Start date</b>	20-Dec-21	<b>Vendor</b>	AWI
<b>End date</b>	28-Feb-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry partnership		

This project will ensure the Making More From Sheep website remains current and updated to capture the ‘must dos’ of managing a successful sheep enterprise, generated from years of research and on-farm experience. To ensure producers are receiving the most current and accurate information, content from the 12 modules will be reviewed by subject matter experts and updated with latest research outcomes and tools.

### AUS Agrifood Data Exchange phase 2: experiment 1- compliance

<b>Project code</b>	V.ISC.2137	<b>Location</b>	Vic, NSW
<b>Start date</b>	15-Nov-21	<b>Vendor</b>	Rezare Systems
<b>End date</b>	31-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry partnership		

A consortium of leading agrifood stakeholders including government, industry and research bodies have established the Australian AgriFood Data Exchange to enable fluid collaboration up and down Australian agrifood value chains. This project will look to address the cumulative burden of compliance for producers through to processors operating in Victoria and NSW to enable producers to collate data for compliance purposes and share permissioned data with the relevant compliance programs in the required format.

### Investigating flock rebuild strategies

<b>Project code</b>	L.LSM.0032	<b>Location</b>	National
<b>Start date</b>	15-Dec-20	<b>Vendor</b>	University of Adelaide
<b>End date</b>	30-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

While the future of Australia’s sheepmeat industry is bright, there remains a significant missed opportunity at both the enterprise and industry level to increase supply of premium sheepmeat products to our customers, benefiting the whole supply chain. The decline in the national sheep flock needs to be arrested and reversed to capture this opportunity. A key element to this will be equipping sheep producers with the necessary skills, confidence and ability to implement timely and beneficial flock rebuilding. This project focuses primarily on providing the confidence and material on optimal pathway(s) and consideration for flock rebuilding.

### Sheep Reproduction Strategic Partnership - Program Coordinator

<b>Project code</b>	L.LSM.0031	<b>Location</b>	National
<b>Start date</b>	15-Nov-20	<b>Vendor</b>	Makin Outcomes



<b>End date</b>	30-Apr-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call (SRSP)		

This project is to contract an external Program Coordinator for the Sheep Reproduction Strategic Partnership. The contract will run for 12 months and is for a maximum of 50 days. Key roles and responsibilities include development of an engagement framework, implementation of a monitoring & evaluation plan and coordination of program communications.

### Accelerating sheep reproduction best practice

<b>Project code</b>	L.LSM.0033	<b>Location</b>	Vic, SA, WA
<b>Start date</b>	1-Aug-20	<b>Vendor</b>	A.J Kennedy & K.L Kennedy
<b>End date</b>	1-Jun-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call (SRSP)		

This project will create a Producer Demonstration Site-style adoption program, linking facilitated producer groups to a focus farm that emulates a best-practice farm system. The project will also engage R&D specialists to design and oversee the management and implementation of protocols within participating groups, the development of learning materials and tools, and the linkage of participatory and facilitated adoption mechanisms to accelerate best practice in sheep reproduction.

## Processing productivity

### GMP Collaborative Innovation Program Manager

<b>Project code</b>	P.PSH.1304	<b>Location</b>	NSW
<b>Start date</b>	1-Sep-21	<b>Vendor</b>	Gundagai Meat Processors
<b>End date</b>	30-Sep-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

This agreement makes provision for a Co-innovation Program Manager to support implementation, validation and commercialisation of objective measurement technologies and a value based marketing (VBM) system for lamb at Gundagai Meat Processors (GMP).

### LEAP V Forequarter integration arm mechanical upgrade to improve accuracy, reliability and uptime

<b>Project code</b>	P.PSH.1304	<b>Location</b>	National
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	Scott Automation & Robotics
<b>End date</b>	30-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project plans to further refine components of the integrated LEAP system to gain additional value for lamb value chain through yield and reliability improvements. The lifter/transfer arm is integral to both the reliable removal of the forequarter from the LEAP III primal machine as well as the transfer of forequarters to the LEAP V forequarter bone in processing cells. It is imperative that this mechanism works accurately and reliably at all times.



### LEAP III sensing and stabilisation upgrade

<b>Project code</b>	P.PSH.1302	<b>Location</b>	National
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	Scott Automation & Robotics
<b>End date</b>	30-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will develop improved DEXA bone identification methods through skeletal identification software to improve accuracy and rib counting as well as upgrade the network communications software to achieve identified reliability improvements.

### LEAP IV middle system performance upgrades and value Engineering

<b>Project code</b>	P.PSH.1303	<b>Location</b>	National
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	Scott Automation & Robotics
<b>End date</b>	30-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will utilise advancements in 3D vision analysis, combined with artificial intelligence techniques, to target and significantly improve high value areas of benefit in the LEAP IV module. As an outcome of this project there will be a number of upgrades that can be rolled out as retrofittable packages to any existing machines or incorporated as standard into new machines. This will present an opportunity for greater ROI for these machines and for the industry as a whole.

### Lamb meat yield benefit of Rinse & Chill®

<b>Project code</b>	P.PSH.1327	<b>Location</b>	National
<b>Start date</b>	30-Nov-20	<b>Vendor</b>	MPSC Australia
<b>End date</b>	22-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

This project will quantify the yield benefits of Rinse and Chill® technology in Australian lamb. The objective of this project is to quantify the average differential in HSCW in trade lamb processed with RCT as compared to lamb processed without, in order to provide reliable guidelines on yield outcomes of RCT to both producers and processors.

### Automated assessment of intramuscular fat in lamb

<b>Project code</b>	P.PSH.1244	<b>Location</b>	National
<b>Start date</b>	20-Feb-20	<b>Vendor</b>	University of Adelaide
<b>End date</b>	15-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

The project will develop a prototype needle probe and image interpretation algorithms to investigate the potential for optical coherence tomography imaging to predict intramuscular fat in uncut lamb carcasses.



### Prototype single-sided NMR sensor for non-destructive IMF measurement – design, build and test

Project code	P.PSH.1275	Location	National
Start date	1-Nov-20	Vendor	inMR Measure Ltd
End date	15-Jan-22	Funding source	MLA Donor Company
Initiation of research	Industry		

The lamb industry does not yet have a way to accurately determine intramuscular fat (IMF) under commercial abattoir conditions. This project will develop and test a single-sided Nuclear Magnetic Resonance (NMR) system that aims to measure IMF on lamb carcasses without a grading cut.

### Camera grading for lamb meat quality to enable MSA mark II cuts based lamb grading

Project code	V.TEC.1715	Location	National
Start date	31-May-19	Vendor	Murdoch University
End date	30-Dec-22	Funding source	Levy
Initiation of research	Industry		

This project is designed to enable the implementation of MSA mark II lamb cuts-based grading. The project will develop automated camera grading of the cut lamb loin, utilising the Scott’s middle machine, to allow product segregation (loins and legs) into at least two or more eating quality classes based on the new MSA lamb prediction model.

### Lamb OCM hot side DEXA for lean meat yield, producer feedback, process optimisation and cutting data verification

Project code	P.PIP.0747	Location	National
Start date	16-Mar-19	Vendor	Hirino Pty Ltd
End date	01-Apr-22	Funding source	MLA Donor Company
Initiation of research	Processing industry		

This project will use a hot side production DEXA grading system to determine the benefit of OCM to producers when measured on hot product and if the cutting data obtained in a hot carcass translated to real cut location in chilled product.

### Lamb DEXA grading with producer feedback and value chain integrated system to deliver the JBS ‘buy/make/sell’ strategy

Project code	P.PIP.0466	Location	National
Start date	04-Jan-16	Vendor	Scott Automation & Robotics Pty Ltd
End date	15-Feb-22	Funding source	MLA Donor Company
Initiation of research	Processing industry		

This project will develop and integrate a technological, transformational, whole of supply chain initiative with a commitment to deliver a fully traceable quality product, distributing additional benefits to the Australian red meat industry and across the entire value chain.



## Product innovation

### Validation market desirability and useability of Ovine Collagen – phase 1

<b>Project code</b>	P.PSH.1297	<b>Location</b>	National
<b>Start date</b>	7-May-21	<b>Vendor</b>	Organic Technology Holdings
<b>End date</b>	18-Feb-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

Animal-based collagen products continue to be in demand. With the current collapse of sheep skins, this project will evaluate the market potential and technical feasibility in extracting and purifying ovine collagen from sheep skins.

### Ovine collagen opportunities using freeze dry technology

<b>Project code</b>	P.PSH.1347	<b>Location</b>	National
<b>Start date</b>	1-Dec-21	<b>Vendor</b>	Freeze Dry Industries
<b>End date</b>	14-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

This project will establish the potential opportunities and feasibility of extracting collagen from ovine skin using freeze drying technology. This prototype will further build collagen know-how with MDC's current investment with Organic Technology Holdings ovine powder offering (MLA project P.PSH.1297) as well as current FDI produced beef collagen powder (MLA project P.PSH.1274).

### Increased lamb participation in QSRs (quick service restaurants)

<b>Project code</b>	V.RMH.0120	<b>Location</b>	National
<b>Start date</b>	11-Jan-21	<b>Vendor</b>	CSIRO
<b>End date</b>	18-Aug-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Lamb is generally not a mainstay item on most QSR (quick service restaurant) restaurant menus. This project will investigate the barriers for value added lamb and possible processing and formulation interventions that could increase their usability in QSR channels.



# Goats

## Completed R&D projects

### Animal health, welfare and biosecurity

#### [FEC PAC validation for use in goats](#)

<b>Project code</b>	B.GOA.0130	<b>Location</b>	National
<b>Start date</b>	20-May-20	<b>Vendor</b>	Dawbuts Pty Ltd
<b>End date</b>	31-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	03-Dec-20	<b>Initiation of research</b>	Industry

FEC PAC is an internet connected, image based diagnostic platform used to conduct faecal egg counts (FEC) tests on animals with the potential to make FEC testing easier and faster. This project will address validation of diagnostic methods for worm burdens in goats, to allow goat producers to make informed decisions on worm control.

#### [Reducing kid loss – select and protect, phase 1](#)

<b>Project code</b>	B.GOA.1905	<b>Location</b>	National
<b>Start date</b>	01-Dec-18	<b>Vendor</b>	NSW DPI
<b>End date</b>	01-Nov-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	03-Dec-20	<b>Initiation of research</b>	Industry

This project established a baseline understanding of reproductive wastage as well as causes and costs of reproductive wastage in the Australian goatmeat industry and made recommendations to effectively address reproductive wastage, including additional RD&A requirements.

#### [Dough from does](#)

<b>Project code</b>	B.GOA.1902	<b>Location</b>	National
<b>Start date</b>	20-Nov-18	<b>Vendor</b>	Forest Hill Consulting
<b>End date</b>	12-Jul-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	20-Jun-19	<b>Initiation of research</b>	Industry

The aim of this project was to investigate existing and potential advanced reproductive programs to optimise the productivity of does in goat meat enterprises in Australia. A literature review of reproduction in sheep, goats and deer, producer consultations, and a review of existing extension material were used to identify possibilities to modify and improve reproduction systems.



## Animal production, husbandry and nutrition

### [Goat levy, industry and producer performance indicators](#)

<b>Project code</b>	B.GOA.1903	<b>Location</b>	National
<b>Start date</b>	20-Nov-18	<b>Vendor</b>	Holmes Sackett Pty Ltd
<b>End date</b>	15-Jul-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	03-Mar-21	<b>Initiation of research</b>	Industry

This project will generate transparent and robust indicators of goat levy, industry and producer performance to gauge the effectiveness of goat levy investment and performance of the industry. It will also develop a producer capability building and extension program.

### South African goat management versus Australian

<b>Project code</b>	P.PSH.1152	<b>Location</b>	National
<b>Start date</b>	01-Oct-18	<b>Vendor</b>	Farmanco Management Consultants
<b>End date</b>	01-Nov-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This study tour will take commercial Australian goatmeat producers on a tour of the South African goatmeat industry, to gain insight into practices that could be adapted to Australian circumstances to increase profitability and production.

## People and business

### Goat Industry Leadership Program Scholarship: course 26

<b>Project code</b>	B.GOA.1901	<b>Location</b>	National
<b>Start date</b>	2-Feb-21	<b>Vendor</b>	Australian Rural Leadership Foundation
<b>End date</b>	15-Dec-21	<b>Funding source</b>	Industry
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project provides funding for an Australian Rural Leadership Program scholarship to a suitable goat industry candidate.

## Product Innovation

### [Nexgen Wholefoods Goat Powder](#)

<b>Project code</b>	P.PSH.1272	<b>Location</b>	National
<b>Start date</b>	30-Sep-20	<b>Vendor</b>	Nexgen Wholefoods
<b>End date</b>	31-May-21	<b>Funding source</b>	MLA Donor Company



<b>Date of publication</b>	18-May-21	<b>Initiation of research</b>	Commercial partnership
NexGen have identified market interest in freeze dried Australian goat tongue powder. This project will develop a proof of concept for a goat tongue powder for use in nutraceuticals, where raw goat tongue is freeze dried and milled into a fine powder. The project includes preliminary brand development, market feedback and lab assays, along with a process map and costings for transforming goat tongue into a high value offering suitable for the health supplement market.			

### Goat treats – proof of concept development and testing

<b>Project code</b>	V.RMH.0115	<b>Location</b>	National
<b>Start date</b>	30-May-20	<b>Vendor</b>	CB and JE Stewart
<b>End date</b>	01-Apr-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry
This project will explore the proof of concept development of goat-based pet treats, such as goat horns and ears. The project will allow preliminary testing of the goat products in the target pet treats segment and includes developing formulation, yields and indicative costings.			

### Goat beauty cream – proof of concept development and testing

<b>Project code</b>	V.RMH.0104	<b>Location</b>	National
<b>Start date</b>	12-Dec-19	<b>Vendor</b>	CB and JE Stewart
<b>End date</b>	24-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Jul-20	<b>Initiation of research</b>	Industry
Whilst beef fat has, in the past, been adopted for beauty products, this project was led by a NSW goat producer to investigate the use of goat tallow in beauty products to develop and test a proof of concept product.			



## R&D projects in progress

### Animal health, welfare and biosecurity

#### Sustainable internal parasite control in goats: effective and safe anthelmintic use

<b>Project code</b>	B.GOA.1907	<b>Location</b>	National
<b>Start date</b>	01-Jan-19	<b>Vendor</b>	University of New England
<b>End date</b>	01-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

There are few effective anthelmintic products registered for use in goats and some producers are incorrectly using products off label. This project will generate data for vets to provide better advice to producers and give them confidence that they are supplying products without violative residues that could risk goatmeat markets.

### Animal production, husbandry and nutrition

#### Goat industry data collation and tracking

<b>Project code</b>	B.GOA.0123	<b>Location</b>	National
<b>Start date</b>	20-Jul-16	<b>Vendor</b>	NSW DPI
<b>End date</b>	30-Oct-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will implement processes to improve, collate, track and report existing and new data on goat production in Australia. These processes will increase goat industry access to, and reliability of, data for supply and market forecasting.

#### Response of rangeland goats to supplementation and development of least-cost supplement calculator

<b>Project code</b>	B.GOA.0127	<b>Location</b>	National
<b>Start date</b>	15-Jun-18	<b>Vendor</b>	University of Queensland
<b>End date</b>	01-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will evaluate the production responses from the use of a range of supplements in rangeland goats to assist producers to make decisions on the cost and likely returns of various supplements.

### Eating quality

#### Goatmeat quality – pathway to the future

<b>Project code</b>	B.GOA.0001	<b>Location</b>	National
<b>Start date</b>	01-Mar-19	<b>Vendor</b>	Murdoch University



<b>End date</b>	01-Dec-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will map out and test pathways to address the issue of inconsistent goatmeat eating quality and product differentiation. Australian goat standards will be developed for implementation at the producer and processing level, based on the current Meat Standards Australia (MSA) sheepmeat pathways system.

## Genetic analysis

### Survey of Australian goat producers' use of KIDPLAN

<b>Project code</b>	P.PSH.2137	<b>Location</b>	National
<b>Start date</b>	30-Aug-21	<b>Vendor</b>	University of Queensland
<b>End date</b>	30-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project aims to evaluate the understanding of, and impediments to the use of KIDPLAN amongst breeders and producers of goats in Australia. The findings from this project will allow MLA to revisit and refine their strategy around the implementation of KIDPLAN.

## People and business

### Goat industry data collation and tracking - phase 2

<b>Project code</b>	B.GOA.0131	<b>Location</b>	National
<b>Start date</b>	25-Jan-21	<b>Vendor</b>	NSW DPI
<b>End date</b>	30-Oct-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

A critical requirement for a viable, long-term goat industry is accurate and reliable data on supply. This project will implement processes to improve, collate, track and report existing and new data. These processes will increase goat industry access to, and reliability of, data for supply and market forecasting.

### Quarterly Goats on the Move e-newsletter

<b>Project code</b>	B.GOA.0129	<b>Location</b>	National
<b>Start date</b>	31-Mar-20	<b>Vendor</b>	Cox Inall
<b>End date</b>	30-Sep-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project supports the delivery of the quarterly Goats on the Move eNewsletter – a central communications platform to drive adoption of MLA products and best practice strategies for the goat industry.



### Goat industry TRAIL Program Scholarships 2019–2021

<b>Project code</b>	B.GOA.1906	<b>Location</b>	National
<b>Start date</b>	15-Jan-19	<b>Vendor</b>	Australian Rural Leadership Foundation
<b>End date</b>	15-Jul-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will fund scholarships for six goat producer candidates (two per year) to undertake the Australian Rural Leadership Foundation TRAIL Program courses held in 2019-2021.



## All grassfed species

### Completed R&D projects

#### Animal production, husbandry and nutrition

##### Productivity (On Farm) & Feedlot Evaluation

Project code	L.ADP.1903	Location	National
Start date	08-Apr-19	Vendor	Beattie Consulting Services Pty Ltd
End date	27-Sep-19	Funding source	Levy
Date of publication	21-Oct-19	Initiation of research	Industry

This project evaluated the productivity and cost saving impacts from 17 of MLA's key product investments from 2015–2020 in producer adoption, on-farm and feedlot productivity.

##### Promatic direct nutrient water supplementation technical feasibility project

Project code	P.PSH.1105	Location	National
Start date	01-Apr-18	Vendor	Direct Injection Systems Pty Ltd
End date	01-Aug-19	Funding source	MLA Donor Company
Date of publication	01-Aug-19	Initiation of research	External partnership

This project was set up to prove the technical feasibility, safety and reliability of the unique proportional dosing water nutrient supplementing unit in grazing systems throughout Australia.

#### Digital agriculture

##### Developing an Online AgTech Savings and Benefits Calculator

Project code	V.DIG.0023	Location	National
Start date	15-Apr-21	Vendor	KPMG
End date	31-Dec-21	Funding source	Levy
Publication date	31-Dec-21	Initiation of research	Industry

This project developed a clickable prototype of the 'AgTech Savings and Benefits Calculator' tool to help livestock producers to determine the relative cost-benefit of different technologies for their enterprise.

##### Autonomous map and zap weed program application – stage 1

Project code	P.PSH.1039	Location	National
Start date	01-May-18	Vendor	Agresearch Limited



<b>End date</b>	15-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	21-Jun-19	<b>Initiation of research</b>	External partnership

This project aimed develop a system that would autonomously detect and selectively control weeds. This aims to create significant reductions in chemical herbicide use, prevent herbicide induced loss of pasture species, improve lifespan and yield of pasture, reduce the annual productivity loss due to weeds. This project was terminated with no results pending.

## [Utilising innovative GPS IoT technology to investigate multi-species grazing for improved pasture management and meat quality](#)

<b>Project code</b>	P.PSH.1151	<b>Location</b>	National
<b>Start date</b>	30-Jul-18	<b>Vendor</b>	Sterlings to Coast Farmers
<b>End date</b>	13-Aug-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	28-Nov-19	<b>Initiation of research</b>	External partnership

The aim of this project was to assess the opportunity for production benefits by co-grazing sheep and cattle. It also showcased the practical implementation of Internet of Things (IoT) technology on farm by using GPS tracking collars on cattle and sheep.

## Environmental sustainability

### [Trial electric, two-wheel motorbikes on grazing properties](#)

<b>Project code</b>	P.PSH.1185	<b>Location</b>	National
<b>Start date</b>	19-Mar-19	<b>Vendor</b>	Kondinin Group
<b>End date</b>	30-Jun-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	09-Sep-20	<b>Initiation of research</b>	External partnership

Electric two-wheel motorbikes were trialled to compare safety, weight cost and fossil fuel use relative to quad bikes as a mode of personal transport and mustering on farm.

### [Sustainable pasture systems under climate extremes](#)

<b>Project code</b>	P.PSH.0793	<b>Location</b>	National
<b>Start date</b>	01-Mar-17	<b>Vendor</b>	Western Sydney University
<b>End date</b>	30-Apr-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	06-Jun-20	<b>Initiation of research</b>	External partnership

In this project, the resilience of grasses, legumes and grass-legume mixtures were tested through exposure to manipulated rainfall, temperatures, soil and nutrients to mimic extreme winter and spring climate extremes.

### [Desmanthus pasture in grazed pastures and its role in methane emissions](#)

<b>Project code</b>	P.PSH.1055	<b>Location</b>	Queensland
<b>Start date</b>	15-Feb-18	<b>Vendor</b>	Agrimix Pastures Pty Ltd



<b>End date</b>	31-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	08-Jan-21	<b>Initiation of research</b>	External partnership

This project was carried out to determine the methane emissions from desmanthus grass diets to determine an equation of methane-desmanthus intake. This equation would form the basis for inclusion in a method to calculate emissions for the Department of Environment under the Emissions Reduction Fund.

## Biological-based or biological models for methane capture

<b>Project code</b>	B.CCH.2110	<b>Location</b>	National
<b>Start date</b>	15-Apr-19	<b>Vendor</b>	The Biomimicry Institute
<b>End date</b>	22-Jul-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	08-Nov-19	<b>Initiation of research</b>	Industry

This project aimed to research biological methods relating to methane sources or sinks in livestock grazing systems. Methods identified could be included in Australia's Carbon Marketplace to incentivise producers and increase adoption to technologies and practices that reduce methane emissions or store carbon.

## Feedbase and grazing land management

### The more sub clover project

<b>Project code</b>	L.FAP.1904	<b>Location</b>	Southern Australia
<b>Start date</b>	31-Oct-18	<b>Vendor</b>	Southern Farming Systems
<b>End date</b>	30-Nov-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Feb-22	<b>Initiation of research</b>	Industry

This project will provide producers and advisors with a simple diagnostic approach to assess clover pastures, identify the leading reasons for possible sub clover decline and determine what management practices are available to address these limitations.

### LPP - Developing a framework for tactical decision making to address feed deficits

<b>Project code</b>	P.PSH.1027	<b>Location</b>	New South Wales
<b>Start date</b>	01-Feb-18	<b>Vendor</b>	Department of Regional NSW
<b>End date</b>	01-Apr-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet Available</i>	<b>Initiation of research</b>	Livestock Productivity Partnership

The project aimed to increase the profitability of the red meat industry in NSW by increasing certainty of feed supply and better predicting the need for drought feeding, while at the same time avoiding possible overgrazing and land degradation.



### Impact of herbicides, pesticides and other farm management tactics

<b>Project code</b>	B.PAS.0360	<b>Location</b>	National
<b>Start date</b>	10-Dec-19	<b>Vendor</b>	NSW Department of State
<b>End date</b>	30-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet Available</i>	<b>Initiation of research</b>	Industry

This project will review published literature and consult with industry to identify the impact of management practices, such as the use of herbicides, pesticides and soil inputs, on legume-rhizobia interactions and devise legume re-inoculation strategies. This will help inform future R&D investment to optimise N-fixation and legume, biomass and livestock production.

### Quantifying spatial and temporal changes in feed supply and demand

<b>Project code</b>	B.TGP.2001	<b>Location</b>	National
<b>Start date</b>	15-Sep-19	<b>Vendor</b>	NSW DPI
<b>End date</b>	30-Sep-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet Available</i>	<b>Initiation of research</b>	Industry

This project will identify technically feasible pathways to create a tool that provides an early warning of imbalanced feed supply and demand to manage livestock and wild herbivores. It will deliver a costed implementation plan and provide a means to verify environmental impacts and total grazing pressure on pastures.

### Addressing herbicide resistance - options and non-chemical approaches for mixed farmers

<b>Project code</b>	B.WEE.0146	<b>Location</b>	National
<b>Start date</b>	30-Jun-14	<b>Vendor</b>	Charles Sturt University
<b>End date</b>	14-Aug-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project performed extensive surveys over a five-year period across the southern region to determine current estimates of economic and productivity losses due to weed infestation. Emphasis was placed on minimising the rate of herbicide resistance in pastures by evaluation of non-chemical options (weed suppressive pastures and crops, silage) for weed management and new herbicide choices for pasture legumes.

### DAFWA mosaic agriculture

<b>Project code</b>	P.PSH.0730	<b>Location</b>	Western Australia
<b>Start date</b>	02-Nov-15	<b>Vendor</b>	Western Australia Agriculture
<b>End date</b>	30-Jul-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

The main objective of this project was to quantify the seasonal production and feed quality profiles of a range of tropical annual and perennial forages, and develop locally relevant best management guidelines.



### Pasture Trial Network

<b>Project code</b>	P.PSH.0687	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Apr-14	<b>Vendor</b>	Pasture Trials Network Ltd
<b>End date</b>	15-Jun-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

The Pasture Trial Network (PTN) complements and builds on the existing Pasture Variety Trial Network (PVTN). The PVTN evaluated the performance of varieties of perennial and annual ryegrass, phalaris, cocksfoot, tall fescue, subterranean clover and lucerne at six sites in south-eastern Australia. As a result of this project, objective evaluation of pasture varieties which are commonly used by sheep, cattle and goat producers are publicly available.

### Phosphorus efficient pastures

<b>Project code</b>	B.PSP.0018	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Sep-16	<b>Vendor</b>	NSW DPI
<b>End date</b>	01-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Rural R&D for Profit (RRDfP)

Phosphorus (P) is the primary nutrient input that drives legume nitrogen fixation. This Rural R&D for Profit (RRDfP) partnership demonstrated that low P pasture systems suited to cereal zones and southern high rainfall zones are viable by addressing inefficiencies in P use through more P-efficient pastures and targeting P application to soil type.

### Evaluating promising stylo lines for southern Queensland

<b>Project code</b>	B.NBP.0749	<b>Location</b>	Queensland
<b>Start date</b>	01-Nov-12	<b>Vendor</b>	DAFF
<b>End date</b>	07-Apr-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not available</i>	<b>Initiation of research</b>	Industry

This project aimed to assess whether the tropical legume stylos, which has been persisting at 36-year-old pasture evaluation sites, is worth commercialising. Production was compared with commercialised lines relevant to some regions. Currently there are no commercially available summer growing legumes for light textured soils in southern inland Queensland that are widely adapted, persistent and productive. Elite lines from the evaluation are being commercialised.



## R&D projects in progress

### Digital agriculture

#### Pairtree - Moving Agtech from decision support to decision making

<b>Project code</b>	P.PSH.1299	<b>Location</b>	National
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	Pairtree Intelligence
<b>End date</b>	30-Nov-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will create an MVP central farm management platform which brings together relevant production and environmental data to enable productivity-driven improvement in environmental stewardship, improved animal management and operational excellence (labour, fuel, etc), as well as creation of additional revenue from provision of environmental services during red meat production.

#### Digitalisation Pilot of Operational & Supply chain data management

<b>Project code</b>	P.PSH.1300	<b>Location</b>	NSW, WA
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	Stone Axe
<b>End date</b>	31-Mar-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

Stone Axe, a high value Wagyu producer, will confirm and demonstrate benefits on offer to beef producers from the digitalisation and linking of data across key value chain elements of their business. On-farm and off-farm data inputs will be ingested into a single platform to develop and validate a range of data enabled production and market decision support mechanisms.

#### Using devices & data to generate ROIs in a mixed farming enterprise

<b>Project code</b>	P.PSH.1293	<b>Location</b>	WA
<b>Start date</b>	1-Apr-21	<b>Vendor</b>	Coolindown Farms
<b>End date</b>	31-Mar-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

This project will partner with Coolindown Farms (a mixed farming enterprise in WA) to develop and demonstrate the value of converging data from multiple on-farm Internet of Things (IoT) devices to enable improved decision support for more complex farm use cases including livestock and pasture management.



## Feedbase and grazing land management

### Pasture Trials Network - phase three development

<b>Project code</b>	P.PSH.2138	<b>Location</b>	Southern Australia
<b>Start date</b>	1-Oct-21	<b>Vendor</b>	Pasture Trials Network Ltd
<b>End date</b>	15-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

Pasture Variety Trials testing commenced in 2011 to provide an evidence-based approach to evaluating the performance of different pasture varieties throughout the agro-ecological regions of southern Australia. This transitioned to MLA project P.PSH.0687, Pasture Trials Network (PTN). This project provides continuation of the work in this area, including a 12-month development project, publication of results, and seasonal measurement and analysis of existing trials.

### A new hope for the biological control of blackberry

<b>Project code</b>	B.WEE.0149	<b>Location</b>	Southern Australia
<b>Start date</b>	29-Jun-20	<b>Vendor</b>	Primary researcher DJPR
<b>End date</b>	30-Apr-26	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

European blackberry is one of the top ten weeds of priority to Australian grazing industries. This project aims to undertake rigorous host specificity testing studies on the blackberry cane-boring sawfly, to assess the suitability for release into Australia to control blackberry spread.

### SA non-wetting sand pasture project

<b>Project code</b>	L.FAP.2101	<b>Location</b>	South Australia
<b>Start date</b>	30-Oct-20	<b>Vendor</b>	Coorong District Council
<b>End date</b>	15-May-26	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The South Australian non-wetting soils project will apply soil amelioration techniques tested in cropping systems to sandy soil based grazing systems, to improve biomass production and test longevity of these treatments under commercial livestock grazing systems. This aims to reduce the overall cost of production per hectare for feedbase finishing systems to ensure increased livestock productivity and performance.

### Growing red meat productivity through the selection and establishment of perennial legumes

<b>Project code</b>	P.PSH.2052	<b>Location</b>	Tasmania
<b>Start date</b>	29-May-20	<b>Vendor</b>	University of Tasmania
<b>End date</b>	31-Jan-26	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		



This project aims to extend the growing season of rain-fed pasture in Tasmania through the successful selection, establishment and management of legumes. From the research and involvement of producers, the project will develop extension materials to enhance adoption of the practice.

### Grazing system impact on livestock productivity, soil moisture and soil organic carbon

<b>Project code</b>	P.PSH.2005	<b>Location</b>	New South Wales
<b>Start date</b>	28-Feb-20	<b>Vendor</b>	Orkney Management Pty Ltd
<b>End date</b>	30-Apr-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

With an increase in demand for information and support of regenerative agriculture practices, this project will compare changes to soil and pasture condition under a variety of high and low intensity grazing best management practices. Ten trial sites will be developed to establish the baseline data required to determine the optimal blend of pasture production and feedbase utilisation for improved livestock productivity and increases in soil carbon levels.

### NSW rangelands living skin project

<b>Project code</b>	L.ADP.2019	<b>Location</b>	New South Wales
<b>Start date</b>	30-Apr-20	<b>Vendor</b>	Department of Regional NSW
<b>End date</b>	30-Apr-25	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The project will engage leading feedbase, climate and environmental scientists from NSW DPI and other agriculture consultants to implement and measure best practice rangeland management, including grazing management and other interventions. The project will initiate with baselines on four sites and then upscaled to a further 20 properties to support implementation and measurement of best practice management over a number of years.

### Boosting natural regeneration of the nitrogen capital in grazing lands

<b>Project code</b>	B.PAS.0502	<b>Location</b>	National
<b>Start date</b>	01-Nov-19	<b>Vendor</b>	University of Queensland
<b>End date</b>	30-Apr-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project aims to quantify bioavailable nitrogen (N) under contrasting spelling, fire and stocking regimes. It will also identify and characterise the microbial communities that generate nitrogen and identify N-smart management strategies that maximise nitrogen and bioeconomic outcomes.

### Integrated management and development of additional agents for Parkinsonia

<b>Project code</b>	B.WEE.0148	<b>Location</b>	National
<b>Start date</b>	02-Dec-19	<b>Vendor</b>	CSIRO
<b>End date</b>	01-Apr-24	<b>Funding source</b>	Levy



<b>Initiation of research</b>	Industry
<p>This project builds on previous MLA research that focused on biological control of Parkinsonia, by releasing additional leaf defoliating biological control agents, developing a method to enable monitoring of their establishment and spread, and investigating a new agent from South America that has been identified with potential to assist managing Parkinsonia.</p>	

### Impact of bushfires on soil, pasture and the microbiome

<b>Project code</b>	P.PSH.1222	<b>Location</b>	National
<b>Start date</b>	02-Nov-20	<b>Vendor</b>	University of Sydney
<b>End date</b>	30-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		
<p>The purpose of this project is to investigate the impacts of post-bushfire recovery of agroecosystems – the management of soils, pastures and effects on livestock production. The project will identify and deliver adaptation and mitigation strategies for the post-fire recovery of soil quality and vegetation necessary for pasture production and livestock wellbeing.</p>			

### LPP - increasing livestock production by integrating tropical pastures into farming systems

<b>Project code</b>	P.PSH.1029	<b>Location</b>	National
<b>Start date</b>	01-Jan-18	<b>Vendor</b>	NSW DPI
<b>End date</b>	14-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		
<p>This project is part of the Livestock Productivity Partnership (LPP) and will define the area suitable for tropical grass species that fit into production systems under current and future climate scenarios. It will also develop regionally relevant agronomy packages (e.g. weed control and maintaining high feed quality), enhance companion legumes and refine their management.</p>			

### Advancing the agronomy package for tедера to fill feed-gaps

<b>Project code</b>	B.CCH.6621	<b>Location</b>	National
<b>Start date</b>	01-Apr-17	<b>Vendor</b>	Western Australia Agriculture
<b>End date</b>	31-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Investment call		
<p>This project will advance the agronomy package for the cultivar of tедера to increase successful producer adoption. It will establish a series of trials to evaluate regional adaptation (soils and rainfall), establishment techniques, fertilisation requirements, herbicide tolerance and defoliation management to maximize green leaf production in the out-of-season period plant population dynamics.</p>			

### National pasture genetic resources genebank

<b>Project code</b>	B.PBE.0039	<b>Location</b>	National
<b>Start date</b>	15-Jun-14	<b>Vendor</b>	Department of Agriculture
<b>End date</b>	03-Dec-22	<b>Funding source</b>	Levy



<b>Initiation of research</b>	Industry
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Australia is a signatory to the International Treaty on Plant Genetic Resources for Food and Agriculture for pasture and forage species. The genebank acquires, documents, conserves and supplies plant genetic diversity of all plants important to livestock production in Australia. This project funds MLA's ongoing commitment to the genebank.

## The healthy soils project

<b>Project code</b>	L.FAP.1902	<b>Location</b>	Southern Australia
<b>Start date</b>	31-Oct-18	<b>Vendor</b>	Southern Farming Systems
<b>End date</b>	30-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will provide practical information and actions to producers and advisors on the management of common soil issues impacting pasture production, in consultation with technical field officers, experienced agronomists and the major industry advisors.

## Persistent and Productive Pasture project (P&P Pastures)

<b>Project code</b>	L.FAP.1903	<b>Location</b>	Southern Australia
<b>Start date</b>	31-Oct-18	<b>Vendor</b>	Southern Farming Systems
<b>End date</b>	30-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The Persistent and Productive pasture package will enable producers and advisors to apply management practices to maintain good pastures on their farms and address pasture run down. The project will develop resources to get sown pastures to persist and perform, and engage producers and key advisors to understand when and how to assess pastures for desirable species composition and know when to intervene in the life of the pasture to optimise profitability and persistence.

## LPP extending the boundaries of legume adaptation through better soil management

<b>Project code</b>	P.PSH.1030	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Jan-18	<b>Vendor</b>	NSW DPI
<b>End date</b>	01-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		

This project is part of the Livestock Productivity Partnership (LPP) and targets the 600–850mm rainfall region of south-eastern Australia where pasture legume productivity is unreliable. Opportunity exists to add up to \$750 million dollars annually to the red meat industry by addressing the pasture yield gap that exists across 7 million hectares of grazing land in south-east Australia, 60% of which is thought to be attributable to nitrogen deficiency.

## LPP - novel dual purpose perennial cereals for grazing

<b>Project code</b>	P.PSH.1036	<b>Location</b>	National
<b>Start date</b>	15-Jan-18	<b>Vendor</b>	NSW DPI



<b>End date</b>	31-Aug-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		

This project is part of the Livestock Productivity Partnership (LPP) and will determine the livestock productivity benefits of grazing perennial cereal crops grown in mixtures with a legume – a practice which offers substantial benefits to livestock health, meat quality and reduced input costs compared to conventional grazing crops.

## LPP phosphorus management and requirements of tropical legume pasture swards

<b>Project code</b>	P.PSH.1050	<b>Location</b>	Northern Australia
<b>Start date</b>	27-Feb-18	<b>Vendor</b>	University of New England
<b>End date</b>	30-Aug-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		

This project links to other LPP projects regarding legume persistence and water efficiency, and legume persistence and amendment of nutrient constraints outside of phosphorus, particularly in the key area of tropical legume varieties.

## RRDfP novel pasture legumes in dry areas

<b>Project code</b>	P.PSH.1136	<b>Location</b>	Southern Australia
<b>Start date</b>	15-May-18	<b>Vendor</b>	Grains Research & Development Corp
<b>End date</b>	30-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Rural R&D for Profit (RRDfP)		

This project is researching resilient, low-cost pasture legumes to benefit crop and livestock enterprises, and develop appropriate management packages to promote their adoption over one million hectares in the low and medium rainfall areas of Western Australia, South Australia, Victoria and southern NSW.

## Development and delivery of Pasture Paramedic in southern and Western Australia

<b>Project code</b>	L.FAP.2102	<b>Location</b>	Southern Australia; Western Australia
<b>Start date</b>	20-Jul-20	<b>Vendor</b>	Nicon Rural Services
<b>End date</b>	20-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Due to the success of MLA project 'successful implementation of Pasture Paramedic tool kit' (L.FAP.1903) developed for the southern high rainfall zone, interest has come from other regions around Australia including in NSW, Western Australia and the medium rainfall zone of Victoria. This project will modify the content of the tool to suit different species in areas across Australia, expectations of what is a good, average and poor pasture, and the growing conditions of each region.

## LPP improving the use of forage brassicas in mixed farming systems

<b>Project code</b>	P.PSH.1044	<b>Location</b>	National
<b>Start date</b>	23-Apr-18	<b>Vendor</b>	CSIRO



<b>End date</b>	24-Mar-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		

This project is part of the Livestock Productivity Partnership (LPP) and will deliver evidence-based guidelines on the best brassica genotypes for different production environments and systems, improved grazing and agronomic management, needs for supplementation, and on how forage brassicas are best used to fill feed gaps in livestock-feed systems.

### The 'less weeds, better pasture' package

<b>Project code</b>	L.FAP.1901	<b>Location</b>	Southern Australia
<b>Start date</b>	31-Oct-18	<b>Vendor</b>	Southern Farming Systems
<b>End date</b>	28-Feb-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The 'less weeds, better pasture' package will provide practical information and actions for producers and advisors on the growth and management of common weeds in pasture. The project will provide assessment methods and trigger points to inform when to intervene with weed control and what tactics to use to keep weeds to a manageable level.

### New powdery mildew resistant and spineless barrel medics for temperate and subtropical Australia

<b>Project code</b>	P.PSH.0749	<b>Location</b>	Southern Australia
<b>Start date</b>	01-Dec-15	<b>Vendor</b>	Pasture Genetics Pty Ltd
<b>End date</b>	31-Jan-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

Barrel medics are highly valued by red meat producers as they have high dry matter digestibility (DMD) and protein levels, fix nitrogen and have high persistence. This project will complete the breeding, selection, evaluation and pre-commercial seed build-up of a powdery mildew resistant barrel medic cultivar and a spineless barrel medic cultivar.

## Genetic analysis

### Building faster and improved genetic evaluation tools and systems

<b>Project code</b>	L.GEN.2204	<b>Location</b>	National
<b>Start date</b>	1-Sep-21	<b>Vendor</b>	University of New England
<b>End date</b>	31-Mar-27	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The genetic engine that has powered cumulative and permanent genetic gain in the Australian red meat industry will be amplified to meet industry demands for a bold future under this project. Genetic evaluations for new traits such as methane output and novel measures of animal welfare and resilience, along with more specific measures of consumer acceptance and nutritional value traits will be developed. The systems will be developed to respond to demands of commercial farmers including novel approaches to utilising genomic data that will empower multi-breed predictions including faster analyses and methods for continuous evaluation with instant feedback for genotype-only data, and models for delivery to the full range of players in red meat value chains.



## People and business

### Improving the productivity and profitability of South Australia's red meat and wool industries

<b>Project code</b>	P.PSH.1256	<b>Location</b>	South Australia
<b>Start date</b>	15-Jun-20	<b>Vendor</b>	Primary Industries & Resources SA
<b>End date</b>	30-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The Red Meat and Wool Growth Program is a key component of South Australia's Growth State Agenda and is being developed in response to targets set by the SA Sheep and Beef Industry blueprints developed by industry. This program will contribute to improved productivity, profitability and enhanced market access for the South Australian red meat and wool sectors. It will also provide valuable support to industry in preparation for recovery and restocking post drought and bushfire.



## All red meat species

### Completed R&D projects

#### Animal health, welfare and biosecurity

##### ParaBoss – Phase II

<b>Project code</b>	P.PSH.0792	<b>Location</b>	National
<b>Start date</b>	15-Jan-17	<b>Vendor</b>	University of New England
<b>End date</b>	30-Dec-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project supports the continuation of ParaBoss, through the maintenance and improvement of the websites, support for a national technical committee for worms, flies and lice, and national coordination for sheep and goat parasite management.

#### Immune fitness as a measure of animal health, welfare and productivity

<b>Project code</b>	P.PSH.0816	<b>Location</b>	National
<b>Start date</b>	01-Mar-17	<b>Vendor</b>	University of Sydney
<b>End date</b>	01-Nov-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	29-Aug-21	<b>Initiation of research</b>	External partnership

This project will investigate the overall well-being of red meat animals from the perspective of their immune fitness, aligned with susceptibility to disease and response to common external stressors encountered during production.

#### Resilience on-farm: mechanisms, markers and applications

<b>Project code</b>	P.PSH.0813	<b>Location</b>	National
<b>Start date</b>	14-Feb-17	<b>Vendor</b>	University of Sydney
<b>End date</b>	31-Oct-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	15-Sep-21	<b>Initiation of research</b>	External partnership

This project will build on previous discovery of variable susceptibility to disease and apply state-of-the-art technology in gastro-intestinal immunology and genomics, metabolomics and microbiome analysis to determine the impacts of co-infections with pathogens and parasites. It will review their effects on productivity, gut microbiota and immune performance and then clarify factors of efficient growth, reproduction and gastrointestinal disease resilience.

#### Impact of MLA animal health and welfare investments (2015–2020)

<b>Project code</b>	B.AHE.0263	<b>Location</b>	National
<b>Start date</b>	28-Feb-19	<b>Vendor</b>	AusVet Pty Ltd
<b>End date</b>	02-Aug-19	<b>Funding source</b>	Levy



<b>Date of publication</b>	25-Mar-20	<b>Initiation of research</b>	Industry
<p>This project provided an independent estimate of the expected rate of adoption and industry impacts from seven areas of research investment in the previous five years, including vaccine development, probiotics and pain management.</p>			

### Wild Dog Alert

<b>Project code</b>	B.AHE.0260	<b>Location</b>	National
<b>Start date</b>	01-Sep-15	<b>Vendor</b>	Invasive Animals Ltd
<b>End date</b>	24-Sep-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	24-Jul-19	<b>Initiation of research</b>	Industry
<p>This project aimed to develop an early alert system, Wild Dog Alert, which allows for real-time recognition of species and individual recognition and transmission of an alert. Producers and land managers will be alerted by mobile phone, satellite phone, radio or pager as to the location of the incursion, along with a photo of the dog.</p>			

## Animal production, husbandry and nutrition

### The gateway to selecting for nutrient efficient livestock – ‘better doers’

<b>Project code</b>	B.GBP.0024	<b>Location</b>	National
<b>Start date</b>	01-Dec-17	<b>Vendor</b>	NSW DPI
<b>End date</b>	30-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	03-Sep-21	<b>Initiation of research</b>	Investment call
<p>This project aims to develop diagnostic tests that enable sheep and beef producers to cost effectively identify animals early in life, with better nutrient use efficiency and productivity potential to increase profit.</p>			

## Digital agriculture

### Evaluation of connectivity and Internet of Things solutions

<b>Project code</b>	P.PSH.1112	<b>Location</b>	National
<b>Start date</b>	30-Apr-18	<b>Vendor</b>	Origo Pty Ltd
<b>End date</b>	11-Oct-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership
<p>This project will install and evaluate a connectivity solution and provide a case study for other producers by documenting and benchmarking any improvements. A 350,000 acre station and Origo will develop, evolve and provide autonomous on-farm connectivity and Internet of Things (IoT) systems.</p>			



### Developing AgTech prioritisation & ROI estimator tools for the livestock sector (phase 1)

<b>Project code</b>	V.DIG.0018	<b>Location</b>	National
<b>Start date</b>	15-Jun-20	<b>Vendor</b>	KPMG
<b>End date</b>	30-May-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Nov-21	<b>Initiation of research</b>	External partnership

Using insights and cost/benefits data from MLA’s Carwoola and Romani trials, other relevant MLA projects and vendor research, this project facilitated the build of an Excel ROI model. The model may provide key insights such as net payback period to help inform red meat producer’s investment decision making taking into consideration direct and indirect costs.

### Evaluation of on-farm sensing devices using mobile technology

<b>Project code</b>	P.PSH.1143	<b>Location</b>	National
<b>Start date</b>	01-Aug-18	<b>Vendor</b>	Stanbroke Pty Ltd
<b>End date</b>	30-Apr-21	<b>Funding source</b>	MLA Donor Company p
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

The project will evaluate how mobile technology can be used to increase efficiencies, reduce labour and enhance on-farm safety. The outcomes of the project will be used to demonstrate to the red meat industry how connectivity can be used to benefit productivity and safety.

### Understanding the value of farm specific sensors with LoRaWAN

<b>Project code</b>	P.PSH.1046	<b>Location</b>	National
<b>Start date</b>	11-May-18	<b>Vendor</b>	Discovery Ag Pty Ltd
<b>End date</b>	31-Jan-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>11-May-21</i>	<b>Initiation of research</b>	External partnership

This project seeks to establish eight demonstration properties across different livestock enterprise types to install LoRaWAN (Long Range Wide-Area Network) network coverage, evaluate different LoRaWAN enabled sensors and undertake a pricing sensitivity assessment in order to assess appropriate business models for connectivity options.

### From IoT exploration to strategic impact

<b>Project code</b>	V.DIG.0016	<b>Location</b>	National
<b>Start date</b>	15-Dec-17	<b>Vendor</b>	Greenleaf
<b>End date</b>	24-Sep-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project assessed MLA’s investment into on-farm digital IoT technologies, consolidating learnings to date and applying a strategic lens to determine the value of on-farm IoT in enabling supply chain transformation. It provided recommendations for further development.



**High speed wireless link with solar infrastructure evaluation pilot**

<b>Project code</b>	P.PSH.1018	<b>Location</b>	Queensland
<b>Start date</b>	15-Dec-17	<b>Vendor</b>	Wi-Sky Queensland Pty Ltd
<b>End date</b>	15-Jun-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	17-Nov-20	<b>Initiation of research</b>	External partnership

This project evaluated and demonstrated how a connectivity system can work in parallel with the broadband Skymuster satellite to provide a wider connectivity solution than just Skymuster in isolation.

**Field solutions - connectivity evaluation and design studies**

<b>Project code</b>	P.PSH.1168	<b>Location</b>	Queensland
<b>Start date</b>	01-Mar-19	<b>Vendor</b>	Field Solutions Group Pty Ltd
<b>End date</b>	13-Aug-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

Field Solutions engaged with producers in Blackall-Tambo, Longreach and Barcaldine council areas to provide them with a self-assessment program to review their IT systems, future needs and potential connectivity solutions.

**Aerodyne – intelligent livestock and asset management system**

<b>Project code</b>	P.PSH.0917	<b>Location</b>	National
<b>Start date</b>	01-Dec-17	<b>Vendor</b>	Aerodyne Australia Pty Ltd
<b>End date</b>	30-Apr-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project worked with Aerodyne, Malaysia’s largest drone service provider, to further develop drone offerings into a fully autonomous service. A successful platform would result in drones being a ‘quiet service’ to Australian producers by automatically undertaking their tasks, without a producer tethered to the controls.

**Development of a whole of farm IoT reporting and analytics offering**

<b>Project code</b>	P.PSH.1111	<b>Location</b>	National
<b>Start date</b>	16-Apr-18	<b>Vendor</b>	Farmbot Australia Pty Ltd
<b>End date</b>	24-Mar-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	24-Mar-20	<b>Initiation of research</b>	External partnership

Data collected by a range of sensors was combined, analysed and displayed to enable all users, regardless of their technical and other skills, to benefit at a glance from the information. Analytics on water level, water flow, water consumption and precipitation were used to provide guidance on system issues, animal behaviour, in and out of water flow, and usage, and provide better visualisation and communication of overall system behaviour.



### Mobile Hitachi process intelligence and UAV control centre demonstration unit

<b>Project code</b>	P.PSH.1162	<b>Location</b>	National
<b>Start date</b>	20-Sep-18	<b>Vendor</b>	Hitachi Australia Pty Ltd
<b>End date</b>	16-Mar-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project aimed to generate awareness of the HPI Control Centre and Hitachi Eagle Unmanned Aerial Vehicle (UAV) and demonstrate its capability for the Australian red meat industry.

### Develop whole of farm integrated sensors and control (electric fence, water quality, flow monitor)

<b>Project code</b>	P.PSH.1042	<b>Location</b>	National
<b>Start date</b>	05-Mar-18	<b>Vendor</b>	Farmbot Australia Pty Ltd
<b>End date</b>	28-Feb-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project aimed to develop and trial easily installed self-contained farm asset management sensors with satellite connectivity, using trend analysis, data compressions and noise reduction algorithms.

### Remote monitoring of supplementary feeders –phase three

<b>Project code</b>	P.PSH.1178	<b>Location</b>	National
<b>Start date</b>	14-Jan-19	<b>Vendor</b>	Crown Agriculture
<b>End date</b>	15-Nov-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project investigated a system whereby lick feeder levels were remotely monitored and real-time data was accessed via an online portal to make quick informed decisions about the levels of supplementation livestock are receiving and whether feeders need refilling.

### [Smart management technology for feral animals](#)

<b>Project code</b>	P.PSH.1025	<b>Location</b>	National
<b>Start date</b>	05-Feb-18	<b>Vendor</b>	OutofBox Solutions Tech Pty Ltd
<b>End date</b>	30-Jun-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	24-Oct-19	<b>Initiation of research</b>	External partnership

This project developed a minimum viable product (MVP) for a proposed solution to feral animal control, called Alfie. Alfie is intended to integrate with existing feral animal controls, such as traps, to provide capability to avoid non-targeted species.



**Evaluating data capture and predictive analytics for managing the C footprint of red meat value chains**

<b>Project code</b>	P.PSH.1176	<b>Location</b>	National
<b>Start date</b>	15-Jan-19	<b>Vendor</b>	Hitachi Australia Pty Ltd
<b>End date</b>	30-Jun-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	09-Oct-19	<b>Initiation of research</b>	External partnership

This project tested whether or not a SCOR™ model, alongside a certification from the Association of Supply Chain Management, would provide an appropriate standard for managing the carbon footprint of the Australian red meat value chain.

**Connectivity evaluation and design study**

<b>Project code</b>	P.PSH.1004	<b>Location</b>	National
<b>Start date</b>	15-Nov-17	<b>Vendor</b>	March IT
<b>End date</b>	30-Jul-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	29-Sep-19	<b>Initiation of research</b>	External partnership

This project investigated connectivity solutions for red meat producers, their cost and the business benefit that could be derived from having connectivity.

**Integrity Systems Company solution provider engagement strategy**

<b>Project code</b>	V.DIG.1903	<b>Location</b>	National
<b>Start date</b>	21-Dec-18	<b>Vendor</b>	Australian Farm Institute
<b>End date</b>	30-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	27-Sep-19	<b>Initiation of research</b>	Industry

The project took a systemised approach to identify and deliver a categorised database of 128 technology solution providers that Integrity Systems Company (ISC) could collaborate with to support delivery of its strategic initiatives.

**Google Glass augmented reality: assessment of opportunities for use and potential value to red meat industry**

<b>Project code</b>	P.PSH.1130	<b>Location</b>	National
<b>Start date</b>	30-May-18	<b>Vendor</b>	Wiley & Co Pty Ltd
<b>End date</b>	30-Sep-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project involved the acquisition and assessment of the Google Glass Enterprise Edition developer kit – which is at the cutting edge of augmented reality technology – to determine its relevance and value to the red meat industry.



### Autonomous diesel-electric feed truck concept vehicle

<b>Project code</b>	P.PSH.1169	<b>Location</b>	National
<b>Start date</b>	01-Nov-18	<b>Vendor</b>	Autonomous Tractor Corporation
<b>End date</b>	30-Sep-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

The vision of this project was to create a new autonomous platform to convert and integrate a ROTO-MIX truck and feed bin into an autonomous, diesel-electric/digital drive train concept vehicle.

### Autonomous Range Management Vehicle (ARM-V): experimental prototype – phase 2

<b>Project code</b>	P.PSH.0931	<b>Location</b>	National
<b>Start date</b>	01-Nov-17	<b>Vendor</b>	HDT Expeditionary Systems
<b>End date</b>	31-Aug-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

HDT has developed a half-tonne unmanned vehicle, WOLF, which is rugged and capable of driving hundreds of kilometres, 24 hours per day, over rough unstructured terrain. Phase 2 of this project involved the delivery of a WOLF unit to Australia for further research to determine its applicability to livestock production enterprises.

### Embedivet implantable device

<b>Project code</b>	P.PSH.1037	<b>Location</b>	National
<b>Start date</b>	10-Jan-18	<b>Vendor</b>	Livestock Labs Pty Ltd
<b>End date</b>	06-Apr-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project researched an implantable device that could precisely measure key health indicators of animals throughout the animal life cycle. Some of these indicators include pregnancy, heart rate, blood oxygenation, temperature, blood pressure, hydration, respiration, glucose, muscle pH and muscle to fat ratios.

### Development of an interactive farm management application for livestock producers and mixed farmers

<b>Project code</b>	P.PSH.0725	<b>Location</b>	National
<b>Start date</b>	23-Mar-15	<b>Vendor</b>	Practical Systems Ltd
<b>End date</b>	01-Jun-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	01-Jun-19	<b>Initiation of research</b>	External partnership

This project was developed to deliver an interactive farm management tool that presented real-time, whole-farm management information to inform decisions, encompassing labour, livestock and general mixed farming activities.



### FarmGate mobile slaughter unit (MSU)

Project code	P.PSH.1019	Location	National
Start date	26-Jan-18	Vendor	FarmGate MSU Pty Ltd
End date	23-Jun-19	Funding source	MLA Donor Company
Date of publication	23-Mar-19	Initiation of research	External partnership

FarmGate MSU developed a mobile slaughter unit (MSU) to travel from farm to farm conducting on-farm processing that is licensed and certified by relevant state-based regulatory authorities. This project was designed to establish a mobile meat processing offering providing humane and ethical on-farm slaughtering services to high end meat producers.

## Eating quality

### Estimation of the age/maturity of beef and sheep using spatially resolved visible-near-infrared spectroscopy – phase 2

Project code	L.EQT.1905	Location	National
Start date	15-Mar-19	Vendor	Charles Darwin University
End date	30-Nov-21	Funding source	Levy
Date of publication	<i>Not yet available</i>	Initiation of research	Industry

This project will examine whether NIRS of skin/hide samples can be used to accurately estimate the age/maturity of slaughter animals, with a focus on beef and sheep. Conceptually, a small area of skin and muscle could be evaluated online and at line speed, providing an accurate estimate of animal age/maturity and its effect on eating quality.

### MSA Model and Research and Development Statistical Support

Project code	L.EQT.2102	Location	National
Start date	1-Jul-20	Vendor	Polkinghorne
End date	30-Mar-22	Funding source	Levy
Date of publication	<i>n/a</i>	Initiation of research	Industry

This project provided statistical support to MSA stakeholders and MSA staff, focusing on completion of the MSA Beef Model V2.0 and commencing development and statistical analysis of MSA Model V2.1.

### MSA Meat Science Course 2020-21

Project code	L.MSA.2009	Location	National
Start date	1-Sep-20	Vendor	Western Analytics
End date	30-Jan-22	Funding source	Levy
Date of publication	<i>n/a</i>	Initiation of research	Industry

This project included the delivery of the two week MSA Meat Science training course. The MSA meat science course offers industry participants an opportunity to learn about the scientific factors affecting the eating quality of red meat from production through to consumer, with a focus on beef and sheepmeat.



## Project Consultation, Study Design and Statistical Support for MSA Research and Development

<b>Project code</b>	L.EQT.2103	<b>Location</b>	National
<b>Start date</b>	1-Jul-20	<b>Vendor</b>	Scibus
<b>End date</b>	30-Sep-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>n/a</i>	<b>Initiation of research</b>	Industry
<p>This project provided project and study design consultation, as well as statistical support for MSA research and development, as directed by authorised MSA personnel.</p>			

## MSA Trademark Surveillance

<b>Project code</b>	L.MSG.2109	<b>Location</b>	National
<b>Start date</b>	20-Dec-20	<b>Vendor</b>	Hoed Research
<b>End date</b>	27-Sep-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	30-Mar-21	<b>Initiation of research</b>	Industry
<p>The purpose of this project, as part of maintaining a robust integrity program, was to monitor the use of the MSA Trademark amongst MSA licensed retail and supermarket outlets who have indicated to third party auditors that they are not utilising the trademark at point of sale.</p>			

## Environmental sustainability

### Northern Australian Climate Project (NACP) phase 2 - innovative drought and climate variability RD&E to enhance business resilience and build producer capacity to manage climate risk across the north

<b>Project code</b>	P.PSH.0951	<b>Location</b>	Northern Australia
<b>Start date</b>	01-Jan-18	<b>Vendor</b>	University of Southern Queensland
<b>End date</b>	31-Dec-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership
<p>The 'Northern Australian Climate Project' (NACP) will deliver innovative research, development and extension outcomes to improve the capacity of the red meat industry to manage drought and climate risk across northern Australia through a variety of research projects and extension activities.</p>			

## Assessment of climate accounting metrics for the Australian red meat industry

<b>Project code</b>	B.CCH.2117	<b>Location</b>	National
<b>Start date</b>	31-Aug-20	<b>Vendor</b>	CSIRO
<b>End date</b>	31-Dec-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>14-Sep-21</i>	<b>Initiation of research</b>	Industry



This project will calculate emissions from Australian red meat using alternative greenhouse gas accounting metrics and radiative forcing footprint.

### [Review of producer information needs for seasonal climate forecasting](#)

<b>Project code</b>	B.CCH.2119	<b>Location</b>	National
<b>Start date</b>	18-Jan-21	<b>Vendor</b>	Quantum Market Research
<b>End date</b>	30-Nov-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	14-Sep-21	<b>Initiation of research</b>	Industry

This research project aimed to understand the use of seasonal climate forecasts and where producer knowledge or information gaps exists that would aid improved interpretation and on-farm decision making. The project findings will equip the Australian Ag industry with information to determine the next best areas of investment to improve the interpretation of seasonal climate forecasts.

### [Scoping the development of a best practice manual for managing pesticide use while maintaining healthy dung beetle populations](#)

<b>Project code</b>	P.PSH.1270	<b>Location</b>	National
<b>Start date</b>	7-Sep-20	<b>Vendor</b>	Animal Health Australia
<b>End date</b>	30-Nov-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	8-Jun-21	<b>Initiation of research</b>	Industry partnership

This project mapped out the research required to create a Best Practice Manual (BMP) for cattle and sheep producers on pesticide use in livestock production. The aim is to provide farmers with clear recommendations on how they can best integrate pesticides and dung beetles in their farming system in a sustainable and productive approach.

### [Analysis of the carbon footprint of Rural Funds Management’s livestock production](#)

<b>Project code</b>	P.PSH.1228	<b>Location</b>	National
<b>Start date</b>	20-Jan-20	<b>Vendor</b>	Agricultural Research Advisors
<b>End date</b>	10-Nov-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	6-Jul-20	<b>Initiation of research</b>	Industry

This project involved the development of a carbon account for Rural Funds Management’s (RFM’s) red meat production assets. It also identified GHG emissions reduction and carbon storage opportunities. It will provide the industry with case studies showing the carbon footprint of a range of red meat enterprises.

### [Carbon accounting workshops](#)

<b>Project code</b>	V.SCS.0016	<b>Location</b>	National
<b>Start date</b>	21-Feb-20	<b>Vendor</b>	Integrity Ag & Environment
<b>End date</b>	30-Sep-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	26-Oct-20	<b>Initiation of research</b>	Industry



This project addressed greenhouse gas (GHG) measurement, accounting and reporting (MAR) at the enterprise scale by working with beef and sheep producers to develop baseline carbon accounts. An improved accuracy and understanding of farm carbon accounting are essential steps in working towards achieving carbon neutrality within the industry.

**[Key research to assist the development of Emissions Reduction Fund carbon sequestration methods for savanna fire management in northern Australia](#)**

<b>Project code</b>	P.PSH.0823	<b>Location</b>	Northern Australia
<b>Start date</b>	01-Apr-18	<b>Vendor</b>	Indigenous Land Corporation
<b>End date</b>	01-Aug-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	18-Mar-20	<b>Initiation of research</b>	External partnership

This project involved the development of a revised method for the sequestration of carbon through savanna fire management in the low rainfall area of northern Australia (600–1000mm average annual rainfall zone).

**[Construction and testing of the first commercial-scale SCANS unit for measuring soil carbon in the Australian red meat industry](#)**

<b>Project code</b>	P.PSH.1145	<b>Location</b>	National
<b>Start date</b>	22-Jun-18	<b>Vendor</b>	Carbon Link Limited
<b>End date</b>	01-Jul-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	02-Dec-19	<b>Initiation of research</b>	External partnership

CSIRO developed a prototype soil core scanning system (SCANS unit) to measure soil organic carbon. Through this project, MLA assisted the development of a practical, fast, non-destructive soil analysis test and software to effectively estimate soil carbon yield in Australian grazing land.

**Food safety, traceability and integrity systems**

**[The cost of manipulating temperature within the meat supply chain to control shelf life of red meat](#)**

<b>Project code</b>	V.MFS.0449	<b>Location</b>	National
<b>Start date</b>	30-May-20	<b>Vendor</b>	All Energy Pty Ltd
<b>End date</b>	27-Feb-22	<b>Funding source</b>	Levy
<b>Publication date</b>	24-Nov-20	<b>Initiation of research</b>	Industry

This project will inform industry of the cost and benefits of changing the temperature across individual segments of the red meat supply chain, by comparing shelf life advantages to the cost of chilled and frozen meat.

**Business Cases for Data Use in the Red Meat Supply Chain**

<b>Project code</b>	V.ISC.1935	<b>Location</b>	National
<b>Start date</b>	8-Feb-21	<b>Vendor</b>	AgThentic



<b>End date</b>	18-Dec-21	<b>Funding source</b>	Levy
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

The purpose of this project is to help facilitate the adoption of technology and data solutions by stakeholders across the Australian red meat industry through development of businesses cases and case studies. The outcomes of this project will help industry stakeholders understand the business and economic value of data use, and provide guidance and examples of how successful implementation can be achieved.

**Identifying the barriers to integrity system technology adoption**

<b>Project code</b>	V.RDA.2008	<b>Location</b>	National
<b>Start date</b>	15-Jun-20	<b>Vendor</b>	Rural analytics Pty Ltd
<b>End date</b>	04-Aug-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	24-Feb-21	<b>Initiation of research</b>	Industry

This project will focus on the identification of potential barriers to the adoption of digital technologies and tools that enable real time traceability from birth through to slaughter and beyond. It will deliver adoption strategies to overcome barriers to technology adoption.

**eNVD user research 2020**

<b>Project code</b>	V.RDA.2004	<b>Location</b>	National
<b>Start date</b>	1-Jul-20	<b>Vendor</b>	Hello Human
<b>End date</b>	30-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	14-Jan-21	<b>Initiation of research</b>	Industry

This project delivered user research in the following areas of eNVD use: 1) offline capability, 2) consignment receivers (feedlots, saleyards, abattoirs etc.), and 3) police and state departments, which can be used to ensure the eNVD is responsive to the needs of various users groups and their unique interactions with the system.

**Defining the overarching requirements for automated product verification and the development of key industry standards**

<b>Project code</b>	V.RDA.2004	<b>Location</b>	National
<b>Start date</b>	30-May-20	<b>Vendor</b>	CSIRO
<b>End date</b>	18-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	14-Jan-21	<b>Initiation of research</b>	Industry

This project will identify attributes of Australian red meat that require product verification of key product claims. It will also identify existing systems and technology that will assist in meeting these requirements in terms of ability to automate and meet regulatory requirements.



### Assessing real time tracking technologies to integrate with identification methods and national traceability requirements

<b>Project code</b>	V.RDA.2005	<b>Location</b>	National
<b>Start date</b>	15-Jun-20	<b>Vendor</b>	Central Queensland University
<b>End date</b>	04-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	14-Jan-21	<b>Initiation of research</b>	Industry

This project will conduct a global scan of end-to-end tracking technologies (existing and under development) to provide whole of life tracking of animals, looking at systems and technologies used in other industries and/or other countries.

### Establishing new integrated systems approaches and technology

<b>Project code</b>	V.RDA.2007	<b>Location</b>	National
<b>Start date</b>	15-May-20	<b>Vendor</b>	Greenleaf Enterprises
<b>End date</b>	04-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	12-Jan-21	<b>Initiation of research</b>	Industry

This project will lay the foundations and define the overarching requirements for the future state of traceability systems in terms of objectives, data points, storage and analysis. The project will conduct a deep dive into systems approaches and technology, and will develop the overall architecture of the future integrity system.

### Phase 2: Development of a single processor data feed

<b>Project code</b>	V.DIG.0020	<b>Location</b>	National
<b>Start date</b>	01-Nov-20	<b>Vendor</b>	Rezare Systems Pty Ltd
<b>End date</b>	30-Apr-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	14-Feb-22	<b>Initiation of research</b>	Industry

Phase 1 of this project delivered a single carcass data scheme with the data requirements for NLIS, LDL, MSA and animal disease reporting. The purpose of phase 2 is to refine and build on the single carcass feedback data dictionary and schema to make sure that MSA Next Generation, Genetics R&D, animal disease and DEXA requirements are incorporated.

### **OzAg Data Exchange**

<b>Project code</b>	V.DIG.1908	<b>Location</b>	National
<b>Start date</b>	07-May-20	<b>Vendor</b>	KPMG Australia
<b>End date</b>	21-Apr-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

The purpose of this project is to assist with the first stage of a large-scale multi-year program, which will ultimately produce an agrifood industry-wide data exchange platform. This will enable primary producers and other value chain participants to elect to exchange their data efficiently on agreed terms with trusted service providers or other interested parties, such as government and researchers.



### Health 4 Wealth Red meat pilot trials APL Management Agreement

Project code	V.RDP.2100	Location	National
Start date	1-Dec-19	Vendor	Australian Pork
End date	31-Mar-21	Funding source	Levy
Publication date	26-Jul-21	Initiation of research	Industry

This project supported red meat pilot trials to enhance the use and sharing of disease and defect data for the benefit of the supply chain. These trials tested the capture and collection of disease and defect data during processing to provide feedback to producers through Livestock Data Link and alternative systems.

### Global scan of technologies and systems enabling data capture and transfer across supply chains

Project code	V.RDA.2001	Location	National
Start date	13-Jan-20	Vendor	CSIRO
End date	15-Mar-21	Funding source	Levy
Date of publication	23-Nov-21	Initiation of research	Industry

This project will review best practice systems and technologies from agricultural and non-agricultural sectors that enable data capture and transfer across global red meat supply chains. The recommendations will inform further development of IS2025 implementation plans and future investment decisions relevant to data capture and traceability systems for the red meat sector in Australia.

### FACRC Data Sprint. Leveraging Red Meat Data for Analytics

Project code	V.DIG.0021	Location	National
Start date	16-Nov-20	Vendor	Food Agility Ventures
End date	31-Mar-21	Funding source	Levy
Date of publication	n/a	Initiation of research	Industry

This 12 week sprint was used to identify, quantify and qualify the highest impact research areas in red meat data analytics so that Integrity Systems Company could focus on R&D with the highest possible ROI.

### Characterisation of Pristine NLIS Tags

Project code	V.ISC.1914	Location	International
Start date	15-Jan-20	Vendor	
End date	30-Mar-21	Funding source	MLA Donor Company
Date of publication	<i>Not yet available</i>	Initiation of research	External partnership

This project builds on the development of a white paper on national and international laboratory-based quality testing protocols, the trial of a wide range of tests on tags, and application of three tests to a range of pristine and “in-field” tags. This stage of the project obtained ‘baseline’ data analysis of dimensions, mechanical strength, chemical structure and molecular weight distribution of NLIS pristine tags.



### Proof of concept for International cold chain monitoring and automated reporting

<b>Project code</b>	P.PSH.1247	<b>Location</b>	International
<b>Start date</b>	9-Mar-20	<b>Vendor</b>	Escavox
<b>End date</b>	17-Feb-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	21-Apr-21	<b>Initiation of research</b>	External partnership

In this project, Escavox data loggers were used to track international air and sea freight to key markets, with automated reporting and dashboard for quick view of issues including temperature and location. The purpose of the project was to identify alternative methods to monitor and perform automated analysis of the cold chain, and make informed choices to ensure product quality.

### Data Privacy and Security Handbook

<b>Project code</b>	V.ISC.2018	<b>Location</b>	National
<b>Start date</b>	2-Feb-20	<b>Vendor</b>	
<b>End date</b>	31-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	2-Mar-21	<b>Initiation of research</b>	Industry

This project delivered a best practice guide on data security for producers. The document provides detailed steps for producers to take in order to ensure they understand the risks and implications of data security and privacy actions and what to do in order to minimise and mitigate risks

### Review of Data Utilisation Approaches in other Industries

<b>Project code</b>	V.ISC.2019	<b>Location</b>	National
<b>Start date</b>	3-Feb-20	<b>Vendor</b>	
<b>End date</b>	30-Nov-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

The purpose of this project was to analyse organisations from other non-agricultural industries (retail, mining, manufacturing, health etc) to determine what the critical success factors were in the adoption of digital technology use, organisational culture, and change management that could be adapted to the red meat industry.

### Global scan of risk models used to manage compliance

<b>Project code</b>	V.RDA.2002	<b>Location</b>	National
<b>Start date</b>	4-May-20	<b>Vendor</b>	GED Advisory
<b>End date</b>	30-Sep-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	12-Jan-22	<b>Initiation of research</b>	Industry

The purpose of this project was to get a better understanding of existing global systems, frameworks or models, which underpin risk compliance among other industries, which may be applicable to integrity systems.



**Advanced livestock data insights for improving performance in the Australian red meat industry**

<b>Project code</b>	V.LDL.2001	<b>Location</b>	National
<b>Start date</b>	5-Sep-20	<b>Vendor</b>	University of New England
<b>End date</b>	2-Jul-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	12-Jan-22	<b>Initiation of research</b>	Industry

The aim of this project was to assess and rank carcase and health dashboards and visualisations that producers and processors can use to improve management and genetic outcomes in their enterprises. In addition, it aimed to maximise the value that processors and producers can get from their aggregated data in a range of specified geographic benchmarks.

**Australian implementation of NeoSeek for molecular detection and confirmation of Shiga toxin producing *Escherichia coli***

<b>Project code</b>	P.PSH.1078	<b>Location</b>	National
<b>Start date</b>	15-Apr-18	<b>Vendor</b>	Neogen Australasia
<b>End date</b>	15-Oct-19	<b>Funding source</b>	External partnership
<b>Date of publication</b>	08-Dec-20	<b>Initiation of research</b>	MLA Donor Company Partnership

Currently, the confirmation of regulated shiga toxin producing *Escherichia coli* using the NeoSeek molecular method of confirmation is only performed in America. This project produced data to support the use of the method as a screening method, established the method in Australia and determined its performance characteristics under Australian conditions.

**Compositional traceability – origin fingerprints for Australian beef and lamb**

<b>Project code</b>	P.PSH.1170	<b>Location</b>	National
<b>Start date</b>	11-Mar-19	<b>Vendor</b>	Oritian Pty Ltd
<b>End date</b>	22-Jun-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	02-Dec-20	<b>Initiation of research</b>	External partnership

The demand to tackle rising product fraud and the requirement to prove authenticity and transparency of products is increasing. This project applied Oritian’s scientific, analytical and statistical methods to show that beef and sheepmeat produced in Australia can be scientifically distinguished from meat produced in other countries.

**Establishing new integrity system approaches and technology**

<b>Project code</b>	V.RDA.2006	<b>Location</b>	National
<b>Start date</b>	29-May-20	<b>Vendor</b>	Deloitte Touche Tohmatsu
<b>End date</b>	12-Nov-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	17-Nov-20	<b>Initiation of research</b>	Industry

The project conducted a six-week sprint to scope out the high-level requirements of a future traceability system. The review also looked into traceability frameworks and technologies to identify possible technologies, both inside and outside the livestock industry, that enable real time tracking.



### Commercial application of supply chain integrity and shelf life systems

<b>Project code</b>	V.MFS.0447	<b>Location</b>	National
<b>Start date</b>	06-Apr-20	<b>Vendor</b>	McKinna et al.
<b>End date</b>	15-Sep-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Sep-20	<b>Initiation of research</b>	Industry

This project involved extensive research and analysis of prior work, together with engagement with industry stakeholders, to develop case studies and provide detailed analysis and specific examples regarding the value of applying integrity systems to industry.

### Training and professional development strategy to support 2019 changes to post-mortem inspection practice

<b>Project code</b>	V.RBP.0027	<b>Location</b>	National
<b>Start date</b>	25-Jun-19	<b>Vendor</b>	MINTRAC
<b>End date</b>	30-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-Jun-20	<b>Initiation of research</b>	Industry

This project informed the meat processing industry about the changes to the *Australian Standard for Hygienic Production and Transportation of Meat and Meat Products for Human Consumption* and updated training and assessment materials for post-mortem inspection.

### Understanding future feedback mechanisms

<b>Project code</b>	V.LDL.1905	<b>Location</b>	National
<b>Start date</b>	19-Aug-19	<b>Vendor</b>	Greenleaf Enterprises
<b>End date</b>	20-Mar-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	30-Mar-21	<b>Initiation of research</b>	Industry

Continuing to ensure objective, real-time and enhanced feedback is being delivered upstream is still a priority for Integrity Systems Company (ISC). To understand the business case for further investment, ISC initiated this project to determine the industry and stakeholder requirements for the future delivery of feedback to producers.

### Microbial quality of Australian offal

<b>Project code</b>	V.MFS.0430	<b>Location</b>	National
<b>Start date</b>	15-Mar-18	<b>Vendor</b>	Symbio Laboratories
<b>End date</b>	17-Oct-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	19-Sep-19	<b>Initiation of research</b>	Industry

The Harris report on non-tariff barriers to trade identified offal as a priority for the Australian meat industry, with an estimated worth of \$363m. For Australia to address possible trade issues and to open new markets, the hygienic quality of offal needed to be assessed and documented. This study estimated the occurrence and quantity of bacteria in a range of Australian red meat offal by sampling processing plants to determine the microbial quality of their products.



### Risk assessment of botulism from chilled, VP/MAP fresh meat held at 3°C to 8°C

<b>Project code</b>	P.PSH.1033	<b>Location</b>	National
<b>Start date</b>	30-May-18	<b>Vendor</b>	QIB Extra Ltd
<b>End date</b>	31-Mar-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	19-Mar-19	<b>Initiation of research</b>	External partnership

The UK Food Standards Agency VP/MAP (Vacuum Packed/Modified Atmosphere Packed) Guidance restricts the shelf-life of VP/MAP foods (including fresh meat) held at 3°C to 8°C to 10 days, unless suitable grounds for a longer shelf-life can be identified. This project used a risk assessment approach and carried out a challenge test experiment to establish whether a shelf-life of greater than 10 days could be applied to fresh chilled meat.

### Open innovation invention solutions for livestock traceability and monitoring

<b>Project code</b>	P.PSH.0752	<b>Location</b>	National
<b>Start date</b>	12-Oct-15	<b>Vendor</b>	Xinova LLC
<b>End date</b>	05-Oct-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	20-Nov-18	<b>Initiation of research</b>	External partnership

This project researched transformational approaches to livestock identification throughout the supply chain, including a review of the existing radio frequency identification-based solution.

### Principal research organisation: microbial ecology and physiology II

<b>Project code</b>	V.MFS.0402	<b>Location</b>	National
<b>Start date</b>	01-Apr-16	<b>Vendor</b>	University of Tasmania
<b>End date</b>	30-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	01-Jul-17	<b>Initiation of research</b>	Industry

This project conducted industry-relevant research, knowledge and technology transfer to enhance the technical capacity of the Australian meat industry to innovate and respond positively to the market concerning microbiological issues. The project demonstrates Australian vacuum-packed chilled red meat has a superior shelf life in major export markets.

## Genetic analysis

### **Advanced genetic evaluation tools and systems enabling faster and more valuable genetic gain**

<b>Project code</b>	L.GEN.1704	<b>Location</b>	National
<b>Start date</b>	01-Aug-16	<b>Vendor</b>	University of New England
<b>End date</b>	30-Dec-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will significantly enhance the genetic evaluation tools and systems used in BREEDPLAN and Sheep Genetics, to better utilise genomic information and develop improved methods of handling, storing and utilising data for R&D. The



improvements will provide the basis for faster rates of genetic progress in beef and sheep and underpin planned integrated technology transfer activities.

### Female reproduction phenobank and validation herds

<b>Project code</b>	L.GEN.1710	<b>Location</b>	National
<b>Start date</b>	30-Mar-18	<b>Vendor</b>	University of Queensland
<b>End date</b>	20-Oct-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will use stored DNA samples to genotype animals with existing phenotypic records, to help reduce the time to validate genetic estimated breeding values (gEBVs). Accurate gEBVs can transform the rate of genetic gain and the pathways to adoption of improved genetics in Australia.

### Community attitudes toward gene editing in the red meat sector

<b>Project code</b>	L.GEN.2003	<b>Location</b>	National
<b>Start date</b>	08-Apr-20	<b>Vendor</b>	University of Adelaide
<b>End date</b>	01-Oct-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	16-Feb-22	<b>Initiation of research</b>	Industry

This project will use qualitative methods to explore and understand current public and producer knowledge and attitudes to gene editing and its use in meat production animals. Results from the project will guide informed industry strategies including future investment in R&D and engagement with the public.

### Predicting age of livestock from DNA samples

<b>Project code</b>	L.GEN.1808	<b>Location</b>	National
<b>Start date</b>	01-Dec-18	<b>Vendor</b>	University of Queensland
<b>End date</b>	30-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will adopt methodology developed in the field of forensic science and apply it to livestock in order to predict the age of animals. Knowledge of the age of animals is often a barrier to implementing large scale genetic improvement programs, especially in the northern beef industry.

### Benefit and cost of performance recording in the beef and sheep studs

<b>Project code</b>	L.GEN.1802	<b>Location</b>	National
<b>Start date</b>	31-Jan-18	<b>Vendor</b>	Animal Genetics and Breeding Unit
<b>End date</b>	30-Nov-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	03-Dec-19	<b>Initiation of research</b>	Industry

This project collected data on costs associated with operating a stud and costs specific to performance recording using BREEDPLAN and Sheep Genetics. This information was used to develop a cost benefit analysis to determine the profitability of performance recording in Australian ram and bull studs.



## Livestock export

### [Animal welfare indicators pilot for the live export industry supply chain](#)

<b>Project code</b>	W.LIV.3047	<b>Location</b>	International
<b>Start date</b>	31-Jul-17	<b>Vendor</b>	Murdoch University
<b>End date</b>	31-May-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	30-Jun-21	<b>Initiation of research</b>	Industry

This project will pilot and record animal welfare indicators through the supply chain and develop a dashboard for collecting data that will contribute towards benchmarking the live export industry. The welfare indicators to be used include resource-based, animal-based and management-based measures, which have been identified from previous research as both important and practical.

### Shipboard provision of animal health equipment and medications

<b>Project code</b>	W.LIV.2008	<b>Location</b>	International
<b>Start date</b>	15-Nov-19	<b>Vendor</b>	Andrew Way Veterinary and Consulting
<b>End date</b>	30-Mar-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Available via LiveCorp</i>	<b>Initiation of research</b>	Industry

This project will undertake a comprehensive review of shipboard diseases and treatments and make recommendations to improve the current *ASEL v2.3 minimum veterinary supplies A4.1.8-A4.1.9* document. This will further provide industry with reference material and recommendations to ensure best practice, knowledge, extension and constant improvement in animal health management in exported livestock.

### [Animal welfare indicators for on-board surveillance](#)

<b>Project code</b>	W.LIV.2019	<b>Location</b>	International
<b>Start date</b>	15-May-20	<b>Vendor</b>	Oliver & Doam Pty Limited
<b>End date</b>	30-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	31-Jan-21	<b>Initiation of research</b>	Industry

This project will bring together a team of skilled experts to identify animal welfare indicators that are required for the livestock export industry, and how and when they will be measured and reported.

### Data pipeline & LIVEX Collect technology development

<b>Project code</b>	W.LIV.2001	<b>Location</b>	National
<b>Start date</b>	15-Nov-18	<b>Vendor</b>	Business Strategic Management Group
<b>End date</b>	30-Aug-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Available via LiveCorp</i>	<b>Initiation of research</b>	Industry



This project aimed to expedite and refine the smartphone app, LIVEX Collect, and training materials that have been developed as part of the animal welfare indicators pilot project. The app will be enhanced and extended across industry as a standardised data collection tool.

### LEP RD&E Blueprint Development 2020-2025

<b>Project code</b>	W.LIV.0199	<b>Location</b>	National
<b>Start date</b>	30-Aug-19	<b>Vendor</b>	Noetic Solutions Pty Ltd
<b>End date</b>	22-Jan-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Jul-20	<b>Initiation of research</b>	Industry

This project developed the Livestock Export Program (LEP) RD&E 2020-2025 Blueprint by engaging with stakeholders to develop priorities and draft the blueprint for the medium to long term. It also tested and collected feedback from stakeholders on the draft to determine its accuracy.

### Review and update of the ERP & CRMP for the live export industry

<b>Project code</b>	W.LIV.0195	<b>Location</b>	National
<b>Start date</b>	30-Jun-18	<b>Vendor</b>	Noetic Solutions Pty Ltd
<b>End date</b>	21-Jan-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Jun-20	<b>Initiation of research</b>	Industry

This project reviewed and updated the live export Industry Response Plan (IRP) for risk mitigation, which included a risk simulation exercise and the development of an implementation plan for ongoing simulations and document review.

### Shipboard Mortality Database (SMDB) version two upgrade

<b>Project code</b>	W.LIV.0295	<b>Location</b>	National
<b>Start date</b>	23-Jan-17	<b>Vendor</b>	AusVet Pty Ltd
<b>End date</b>	30-Aug-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	01-Oct-18	<b>Initiation of research</b>	Industry

In 2016, the shipboard mortality database (SMDB) application was updated from a 1980s-style dedicated application to a modern secure web-based system. This project upgraded the second version SMDB to maintain the security of the system, improve its usability and implement an automated data import system.

## People and business

### Farmers2Founders – Phase 2

<b>Project code</b>	L.PIF.0002	<b>Location</b>	National
<b>Start date</b>	28-Aug-20	<b>Vendor</b>	Farmers2Founders
<b>End date</b>	20-Jun-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		



The overarching purpose of Farmers2Farmers (F2F) is to deliver a unique support system designed to attract and develop proactive, innovative Australian primary producers looking to grow and transform their businesses through cutting edge innovation and adoption of new technologies. F2F will develop producer entrepreneurship and technology capabilities so they can solve critical industry challenges and successfully bring new agtech, foodtech, and food ventures to market.

### Joint-RDC community trust project

<b>Project code</b>	E.CEM.1907	<b>Location</b>	National
<b>Start date</b>	01-Aug-18	<b>Vendor</b>	AgriFutures Australia
<b>End date</b>	30-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

A number of Rural Research and Development Corporations (RDCs) have come together to progress a collective approach to build research capability and understanding of issues around community trust and social licence in primary industries (agriculture, fisheries and forestry). This project aims to scope a work program for joint-RDC investment that directly addresses community trust issues.

### Developing capability for external strategic partnerships with experts from Texas Tech University

<b>Project code</b>	P.PIP.0550	<b>Location</b>	National
<b>Start date</b>	15-Mar-17	<b>Vendor</b>	Teys Australia Pty Ltd
<b>End date</b>	10-Feb-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	Not yet available	<b>Initiation of research</b>	Processing industry

This project provides the framework for Teys Australia to partner with Texas Tech University (TTU) over a three-year period in a number of strategically applied research initiatives in meat science disciplines, to drive their business and innovation strategies.

### [People in agriculture](#)

<b>Project code</b>	E.INV.1601	<b>Location</b>	National
<b>Start date</b>	23-Jun-15	<b>Vendor</b>	Dairy Australia
<b>End date</b>	30-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	13-Nov-20	<b>Initiation of research</b>	Industry

This project supported a collaborative investment by Australia's agricultural Research and Development Corporations (RDCs) in a new website, The People in Agriculture - Employment Starter Kit.

### [Productivity and profitability webinars for red meat producers](#)

<b>Project code</b>	L.ADP.1901	<b>Location</b>	National
<b>Start date</b>	25-Mar-19	<b>Vendor</b>	Holmes Sackett
<b>End date</b>	31-Aug-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	13-Nov-20	<b>Initiation of research</b>	Industry



The purpose of this project was to deliver practical and timely webinars in a cost-effective way to reach a wide audience of red meat producers across Australia through an online platform. This would provide stakeholders with access to a broad selection of presenters and give flexibility to viewers to engage with the content.

**Building CEO capability for export into high value markets**

<b>Project code</b>	P.PSH.0781	<b>Location</b>	Western Australia
<b>Start date</b>	01-Jun-16	<b>Vendor</b>	Western Australian Agriculture Authority
<b>End date</b>	30-Jul-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	19-Nov-19	<b>Initiation of research</b>	External partnership

This project aimed to inform senior management from WA red meat businesses on how they could use best practice to improve their international competitiveness and substantially expand exports, to attract appropriate investment and to capture high value, premium export markets in Asia.

**APM/MLA collaborative innovation strategies program**

<b>Project code</b>	P.PSH.0785	<b>Location</b>	National
<b>Start date</b>	01-Jul-16	<b>Vendor</b>	Argyle Prestige Meats
<b>End date</b>	30-Sep-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	22-Oct-19	<b>Initiation of research</b>	External partnership

The primary objective of this project was to further develop Argyle Prestige Meats innovation culture to drive high value growth strategies in domestic and global markets.

**Evaluation of an adoption model with a vertical integrated company: a case study on livestock nutrition EDGE workshops**

<b>Project code</b>	P.PIP.0570	<b>Location</b>	National
<b>Start date</b>	15-Sep-18	<b>Vendor</b>	Stanbroke Pty Ltd
<b>End date</b>	20-Jun-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	21-Oct-19	<b>Initiation of research</b>	Processing industry

The purpose of the project was to evaluate the customisation of an EDGE training package to a vertically integrated company and how it could be modified to increase adoption of skills and technology on-property and across all levels of management.

**NH Foods Oakey - implementing a culture driven innovation framework**

<b>Project code</b>	P.PIP.0760	<b>Location</b>	National
<b>Start date</b>	16-Apr-18	<b>Vendor</b>	NH Foods Australia Pty Ltd
<b>End date</b>	31-Oct-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Processing industry



This project delivered an industry relevant case study on the value of a culture-driven innovation framework to effective management of innovation. The project examined past, present and future investment in building innovation capability for Australian red meat supply and value chains.

## Processing productivity

### RoboDock - Automated Load-out Logistics - RoboDock-L (carton fed) Technical Trials

<b>Project code</b>	P.PSH.2055	<b>Location</b>	National
<b>Start date</b>	11-Jan-21	<b>Vendor</b>	Intelligent Robotics
<b>End date</b>	2-Feb-22	<b>Funding source</b>	MLA Donor Company
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project developed and tested a system to automate the logistics of load out areas, carton automatic storage and retrieval for processing plants.

### Rapiscan RTT-110 system upgrade accuracy validation

<b>Project code</b>	V.TEC.1722	<b>Location</b>	National
<b>Start date</b>	12-Oct-20	<b>Vendor</b>	Murdoch University
<b>End date</b>	30-Nov-21	<b>Funding source</b>	MLA Donor Company
<b>Publication date</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

Rapiscan have successfully manufactured customised imaging components and software to adapt the RTT-110 airline inspection CT for carcass assessment, with successful preliminary trials in their UK facility. The RTT-110 unit in Australia is being upgraded with these components in project V.RDP.2020. This project validated scan accuracy to underpin the RTT-110 transition into the Teys beef boning automation program to provide the sensing required.

### Calibration and repeatability of CT images for predicting lean meat yield in beef and lamb carcasses

<b>Project code</b>	V.TEC.1714	<b>Location</b>	National
<b>Start date</b>	20-Apr-19	<b>Vendor</b>	Murdoch University
<b>End date</b>	28-Nov-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will deliver a calibration device that can link industry 'gold standard' CT calibration data. The variables that could impact repeatability of CT images will also be investigated, so that a robust prediction of lean meat yield can be delivered to the Australian meat industry.

### Using microwave to detect foreign objects in meat

<b>Project code</b>	V.TEC.1710	<b>Location</b>	National
<b>Start date</b>	30-Mar-19	<b>Vendor</b>	Murdoch University



<b>End date</b>	15-Nov-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will design, build and test a prototype microwave system for detecting plastics and other contaminants in meat. The proposed microwave system will be a low-cost solution for processing plants.

### Red meat water jet cutting and fat trimming

<b>Project code</b>	P.PSH.0932	<b>Location</b>	National
<b>Start date</b>	16-Nov-17	<b>Vendor</b>	Retail Ready Operations Australia
<b>End date</b>	30-Jun-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	21-Aug-21	<b>Initiation of research</b>	External partnership

This project will modify a high-pressure automated water jet trimming system with photographic recognition technology, to guide high pressure water jets to trim difficult cuts of meat such as lamb loin chops, porterhouse steaks and T bones.

### Trial of HMT-1 industrial wearable computer in processing environment

<b>Project code</b>	V.TEC.1719	<b>Location</b>	National
<b>Start date</b>	30-May-19	<b>Vendor</b>	Virtual Method
<b>End date</b>	29-May-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	15-Aug-21	<b>Initiation of research</b>	Industry

This project is designed to identify core functionality, potential productivity and safety improvements enabled by the Realwear HMT-1 wearable computer in meat processing facilities. The outcome is to get user feedback to list, measure, discuss and map innovative wearable computers for meat and livestock industries.

### **MEXA assisted offal sortation technical feasibility phase 1, part 2**

<b>Project code</b>	V.RDP.2018	<b>Location</b>	National
<b>Start date</b>	30-Jan-20	<b>Vendor</b>	Rapiscan Systems
<b>End date</b>	15-Mar-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

The project will conduct part two of phase one of the MEXA-assisted offal sortation technical feasibility scoping study. The study will determine whether a multi-sensor system, combined with hyperspectral and colour imaging cameras, can be used to identify defects and abnormalities during screening of red and green offal.

### RnD4Profit-15-02-031 Advanced measurement technologies for globally competitive Australian meat value chains

<b>Project code</b>	V.RDP.2000	<b>Location</b>	National
<b>Start date</b>	16-Dec-16	<b>Vendor</b>	Murdoch University
<b>End date</b>	31-Dec-20	<b>Funding source</b>	Levy



<b>Date of publication</b>	23-Nov-21	<b>Initiation of research</b>	Rural R&D for Profit (RRDFP)
<p>This project is an important component of the overall MLA objective measurement and value-based marketing program. It has a specific focus on fast tracking the development of advanced measurement technologies that will enable beef, sheep and pig producers to have access to more accurate descriptions of the key attributes that influence the value of their livestock.</p>			

### Evaluation of processing methods and visioning systems for low density contamination

<b>Project code</b>	P.PSH.1129	<b>Location</b>	National
<b>Start date</b>	01-Jun-18	<b>Vendor</b>	Retail Ready Operations Australia
<b>End date</b>	30-Apr-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership
<p>This project will evaluate processing interventions and an innovative new vision system to detect low density contamination, such as plastics and other poly products, which may be present in red meat.</p>			

### Rapiscan Aviation Spec RTT110 for offline meat R&D in Australia

<b>Project code</b>	P.PSH.0930	<b>Location</b>	National
<b>Start date</b>	01-Oct-17	<b>Vendor</b>	Rapiscan Laboratories Inc
<b>End date</b>	30-Jan-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	17-Jul-20	<b>Initiation of research</b>	External partnership
<p>This project assessed the feasibility of adapting an x-ray CT scanner developed for the aviation industry – which produces continuous, high resolution 3D x-ray images – to scan carcasses at full process speed over extended operating periods, to sort on quality and identify robotic cutting lines.</p>			

### 4DDI Equine CT – system demonstrated in 1 x beef plus 1 x lamb Australian processor

<b>Project code</b>	P.PSH.0914	<b>Location</b>	National
<b>Start date</b>	12-Nov-17	<b>Vendor</b>	4DDI
<b>End date</b>	15-May-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership
<p>4DDI’s equine CT scanner is a solution recently developed and commercialised for vets to scan race horses while standing. This project determined whether this technology would complement 2D DEXA installations for use in the red meat industry.</p>			

### Processor supply chain diagnostics to improve efficiency and effectiveness of lamb and beef processing

<b>Project code</b>	P.PIP.0767	<b>Location</b>	National
<b>Start date</b>	22-Mar-19	<b>Vendor</b>	Partners in Performance
<b>End date</b>	30-Dec-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	27-Feb-20	<b>Initiation of research</b>	Processing industry



This project applied a structured set of business improvement diagnostic tools to the red meat industry, which were initially developed in the mining industry. The toolset was applied to an Australian processor (JBS Southern) as a test case to demonstrate performance and capability.

### Manual measure single tower primal cutting system demonstration

<b>Project code</b>	P.PSH.0825	<b>Location</b>	National
<b>Start date</b>	02-Jan-17	<b>Vendor</b>	Scott Automation & Robotics Pty Ltd
<b>End date</b>	20-Feb-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

A previous project with Scott Automation & Robotics (MLA project P.PSH.0737) developed a manual measure cutting R&D system. This subsequent project installed and trialled that unit in a production environment.

### Integrated primal and middle performance upgrade kits - Bordertown

<b>Project code</b>	P.PIP.0766	<b>Location</b>	National
<b>Start date</b>	15-Feb-19	<b>Vendor</b>	JBS Australia
<b>End date</b>	15-Dec-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Processing industry

This project developed and implemented design improvements to increase the mechanical reliability and operational longevity of the JBS Bordertown system by providing a series of repairs/upgrades for incorporation into future installations and retrofitting to existing systems. This presents an opportunity to ensure return on investment for these machines.

### Scott - evaluation of eating quality attributes measured by TD-NMR

<b>Project code</b>	P.PSH.0878	<b>Location</b>	National
<b>Start date</b>	12-Oct-17	<b>Vendor</b>	Scott Automation & Robotics Pty Ltd
<b>End date</b>	31-Dec-18	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	20-Jun-19	<b>Initiation of research</b>	External partnership

This project undertook trials of a time-domain (TD) NMR (nuclear magnetic resonance) methodology that has shown to correlate with meat quality to assess the robustness/wider application of the method.

### Automation and sorting carcasses into and out of chillers

<b>Project code</b>	P.PIP.0268	<b>Location</b>	National
<b>Start date</b>	01-Nov-11	<b>Vendor</b>	Cedar Creek Company Pty Limited
<b>End date</b>	14-Dec-18	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	19-Jun-19	<b>Initiation of research</b>	Processing industry



This project addressed the laborious and sometimes inaccurate task of pushing carcasses into chillers, by implementing radio frequency identification technologies interfaced with pneumatic rams and sensors for more automated processes.

### Bessel beam microwave platform for livestock and carcass surface fat depth imaging

<b>Project code</b>	P.PSH.1135	<b>Location</b>	National
<b>Start date</b>	01-Oct-18	<b>Vendor</b>	Lincoln Agritech Limited
<b>End date</b>	01-Nov-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	13-May-19	<b>Initiation of research</b>	External partnership

This project undertook the underpinning research and development of a prototype for the first application of an ‘on-the-hoof’ body condition sensor. This could be a valuable stock management tool for production, livestock health and nutrition, which would be developed in collaboration with our industry partners.

### Unique designed plastic slip loading pallet

<b>Project code</b>	P.PIP.0740	<b>Location</b>	National
<b>Start date</b>	10-Jun-17	<b>Vendor</b>	Fletcher International Exports
<b>End date</b>	20-Feb-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	20-Feb-19	<b>Initiation of research</b>	Processing industry

This project aimed to dramatically reduce the cost of current pallets by reproducing them in a mould with modern materials.

### Pricing for DEXA systems for the red meat industry

<b>Project code</b>	V.TEC.1704	<b>Location</b>	National
<b>Start date</b>	01-Oct-17	<b>Vendor</b>	Scott Automation & Robotics Pty Ltd
<b>End date</b>	30-Jun-18	<b>Funding source</b>	Levy
<b>Date of publication</b>	05-Feb-19	<b>Initiation of research</b>	Industry

This project was an independent review on the per-plant costings associated with the lamb and beef dual-energy X-ray absorptiometry (DEXA) implementation. The survey determined the cost of implementing the DEXA system and any relevant considerations for participating plants.

### Beef and lamb OCM with CT *in situ* further development

<b>Project code</b>	A.TEC.0123	<b>Location</b>	National
<b>Start date</b>	20-Nov-14	<b>Vendor</b>	Scott Automation & Robotics Pty Ltd
<b>End date</b>	01-Aug-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	18-May-17	<b>Initiation of research</b>	Industry



In this project, Scott Technology continued to improve their knowledge about computed tomography (CT) by moving the CT developments from a research/laboratory type setting to an *in situ*, online, processor location.

## Product innovation

### [2021 A horizon scan of Sustainable Red Meat Packaging- Whats New, Innovative and Approaching commercialisation](#)

Project code	V.RMH.0127	Location	National
Start date	24-Sep-21	Vendor	Prof Consulting Group
End date	17-Dec-21	Funding source	Levy
Publication date	24-Jan-22	Initiation of research	Industry

The aim of this review was to provide a comprehensive international overview of red meat packaging across retail and food service that could be implemented to support the Australian red meat industry, its sustainability commitments and its 2030 growth strategy.

### Beauty food snacks with inclusion of Australian red meat - product and market development

Project code	P.PSH.1220	Location	National
Start date	20-Dec-19	Vendor	Chief Nutrition Pty Ltd
End date	01-Dec-22	Funding source	MLA Donor Company
Date of publication	<i>Not yet available</i>	Initiation of research	External partnership

This project will explore the ‘where to play and how to win’ approach to developing new products and markets, accessing new markets and securing Australian red meat origin components. It includes a case study to be shared with wider industry, presenting lessons learnt and examples of high value meat snack solutions that meet growing red meat demand.

### [Development of new innovative meat snacks for Australian and export markets](#)

Project code	P.PSH.0811	Location	National
Start date	01-Dec-16	Vendor	Jim’s Jerky Unit Trust
End date	01-Dec-21	Funding source	MLA Donor Company
Date of publication	3-Dec-18	Initiation of research	External partnership

Jim’s Jerky is a leading domestic meat snack manufacturer and brand. This project will seek new markets, value chains and product opportunities (including use of mixed protein sources) and process improvement initiatives to secure Asian export opportunities for Australian meat snacks.

### Development of high value structured cooked meat shreds and snacks using red meat and HMEC

Project code	P.PSH.1013	Location	National
Start date	01-Dec-17	Vendor	ProForm Gourmet Pty Limited



<b>End date</b>	30-Nov-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

A prototype plant using HMEC (high moisture extrusion) technology was constructed as part of ProForm’s MDC project P.PSH.0673. This project will investigate and develop snacks and shredded products that use the technology and add high value to red meat.

**Design led development of novel pack solutions for origin assured high valued export meat products**

<b>Project code</b>	P.PSH.0810	<b>Location</b>	National
<b>Start date</b>	15-Jan-18	<b>Vendor</b>	Monash University
<b>End date</b>	30-Aug-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	13-Aug-19	<b>Initiation of research</b>	External partnership

This project proposes to use a design-led approach, technical expertise and existing project and industry knowledge to advance supply chain integrity through innovation and incorporation of newly developed technologies. This will help primary producers, value adding processors and brand owners to improve profitability, particularly in export markets.

**New meat products testing Shopper 360 case study**

<b>Project code</b>	V.RMH.0108	<b>Location</b>	National
<b>Start date</b>	20-Dec-19	<b>Vendor</b>	Lumaten Australia Pty Limited
<b>End date</b>	10-Aug-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	02-Dec-20	<b>Initiation of research</b>	Industry

This project will build on an existing MLA marketing project with Lumaten to utilise a virtual supermarket to build and test new value-added meat product concepts. Categories include meat-plant snacks and beauty/wellness products made from red meat.

**Baseline consumer sensory testing of alternate protein burgers**

<b>Project code</b>	V.RMH.0111	<b>Location</b>	National
<b>Start date</b>	13-Feb-20	<b>Vendor</b>	Polkinghorne
<b>End date</b>	11-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	12-Feb-21	<b>Initiation of research</b>	Industry

This project evaluates the sensory profiles of several types of burgers made from either plant-proteins, meat, meat and seasonings, or blended meat-plant protein. This will provide a sensory baseline for burgers and insights into the emerging flexitarian diet and alternate proteins category.

**Fast prototyping value added meat products - pilot trial of Watch me Think**

<b>Project code</b>	V.RMH.0113	<b>Location</b>	National
<b>Start date</b>	30-May-20	<b>Vendor</b>	WatchMeThink Pty Ltd



<b>End date</b>	11-Jun-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will case study several minimum viable product (MVP) concepts from MLA's product and packaging program to bring to life the MVP approach for consideration to the wider Australian red meat industry. This tool will be used as part of MLA's 'running to ground' pilot where global food trends/food tech advancements will be evaluated using behavioural-based research.

### Behind the glass – ready to heat red meat concepts (retail pilot)

<b>Project code</b>	V.RMH.0102	<b>Location</b>	National
<b>Start date</b>	18-Sep-19	<b>Vendor</b>	Andrews Meat Industries
<b>End date</b>	30-Apr-21	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

This project will investigate the operational protocols and consumer/market insights for a 'behind the glass offer' ready to eat meal and analyse the role that pre-cooked red meat plays at the dinner table.

### Novel soaker pad development to improve red meat quality

<b>Project code</b>	P.PSH.0890	<b>Location</b>	National
<b>Start date</b>	25-Jun-17	<b>Vendor</b>	Monash University
<b>End date</b>	30-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project aims to significantly improve the appearance, longevity and quality of retail-ready red meat by using an efficient and low-cost superabsorbent composite to absorb any free blood (drip) released by the meat.

### Smart pack/coatings design to optimise meat quality

<b>Project code</b>	P.PSH.0891	<b>Location</b>	National
<b>Start date</b>	01-Jul-17	<b>Vendor</b>	Monash University
<b>End date</b>	30-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

The project will focus on developing new polymer Smart Packaging technologies to improve meat colour and eating quality of red meat products.

### Blended meat and plant protein products – concept development and market testing (RTC Foods)

<b>Project code</b>	P.PSH.1237	<b>Location</b>	National
<b>Start date</b>	1-Feb-20	<b>Vendor</b>	RTC Foods
<b>End date</b>	31-Mar-21	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	24-Jun-21	<b>Initiation of research</b>	Industry partnership



This project delivered a case study identifying market feedback on blended food concepts (plant and animal-based protein), including pain/gain points on the products, consumer attitudes and taste preferences towards blended meat products and flexitarian diets.

### [Review of emerging \(food industry\) clean technologies for potential high value red meat opportunities](#)

<b>Project code</b>	V.RMH.0110	<b>Location</b>	National
<b>Start date</b>	07-Feb-20	<b>Vendor</b>	CSIRO
<b>End date</b>	15-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	04-Jan-21	<b>Initiation of research</b>	Industry

This project will review at least five novel processing technology platforms against a matrix of five value added red meat product applications, which may reduce the requirement of salt and other additives in many foodstuffs.

### [Mince cooling by liquid nitrogen- phase 1 feasibility](#)

<b>Project code</b>	V.RMH.0096	<b>Location</b>	National
<b>Start date</b>	01-Jun-19	<b>Vendor</b>	Retail Ready Operations Australia
<b>End date</b>	30-Jun-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	02-Dec-20	<b>Initiation of research</b>	Industry

This project was a case study pilot review of using nitrogen gas in plant chilling operations for the production of minced meat.

### [Review paper: beyond meat to quality ingredient component strategy](#)

<b>Project code</b>	V.RMH.0114	<b>Location</b>	National
<b>Start date</b>	03-Jun-20	<b>Vendor</b>	Food Innovation Partners - Russel Rankin
<b>End date</b>	02-Nov-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	06-Nov-20	<b>Initiation of research</b>	Industry

This project investigated the opportunity to utilise low value red meat as an ingredient in the wider food industry. A literature review and a series of interviews with leading ingredient manufacturers and food technology experts provided a information for a 'meat as an ingredient' strategy.

### **Investigating opportunities for interactive packaging and Australian red meat**

<b>Project code</b>	V.RMH.0098	<b>Location</b>	National
<b>Start date</b>	25-Jun-19	<b>Vendor</b>	Wunderman Thompson Pty Ltd
<b>End date</b>	01-Nov-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	Industry

MLA has been investigating advances in 'smart packaging' and mega trends, such as gamification. This project used key drivers and consumer behaviour insights to present an overview of the smart packaging platform and develop a strategy and opportunity spaces for Australian red meat.



### MLA RocketSpace (TERRA) 2019 Industry Collaborative Program (2Morrows Foods)

<b>Project code</b>	V.RMH.0002	<b>Location</b>	National
<b>Start date</b>	30-Nov-18	<b>Vendor</b>	Rabobank
<b>End date</b>	01-Dec-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	02-Jul-20	<b>Initiation of research</b>	Industry

Rabobank’s TERRA program is a global innovation accelerator program that brings together experts and innovators in a range of areas. During this five month program, MLA partnered with five companies to co-create several new products, including biodegradable packaging and pet food containing upcycled beef.

### Concept development of a meat pie for dysphagia sufferers (TCF)

<b>Project code</b>	V.RMH.0085	<b>Location</b>	National
<b>Start date</b>	25-May-19	<b>Vendor</b>	Textured Concept Foods Pty Ltd
<b>End date</b>	30-Oct-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	11-Jun-20	<b>Initiation of research</b>	Industry

This project explored the creation and commercialisation of a pureed meat pie to satisfy the correct consistency, taste, low-allergen and nutritional profile of a normal meat pie. The prototypes were tested on dysphagia sufferers living in aged care facilities.

### Preliminary review of liquid lock red meat trays as an alternate to soaker pads

<b>Project code</b>	V.RMH.0097	<b>Location</b>	National
<b>Start date</b>	01-Jun-19	<b>Vendor</b>	Retail Ready Operations Australia
<b>End date</b>	22-Jan-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	12-Mar-20	<b>Initiation of research</b>	Industry

This project completed a review of red meat soaker pads and evaluated a liquid locking system that uses an array of small cells in the bottom of a plastic tray to capture and retain meat drippings in a commercial Coles facility.

### Gamification (Experience More) – Zappar AR proof of concept developments for red meat

<b>Project code</b>	V.RMH.0092	<b>Location</b>	National
<b>Start date</b>	15-Apr-19	<b>Vendor</b>	Virtual Method
<b>End date</b>	01-Oct-20	<b>Funding source</b>	Levy
<b>Date of publication</b>	20-Dec-19	<b>Initiation of research</b>	Industry

This project developed proof of concept packaging designs for red meat products using embedded augmented reality (Zappar). These concepts will be used as a case study to share with Australian red meat brand-owners and retailers.



### Preliminary evaluation of red meat in Meal Me (Hot Fridge technology)

<b>Project code</b>	V.RMH.0093	<b>Location</b>	National
<b>Start date</b>	15-Apr-19	<b>Vendor</b>	Greenleaf Enterprises Pty Ltd
<b>End date</b>	21-Dec-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	10-Dec-19	<b>Initiation of research</b>	Industry

This project considered the desirability of a 'grab-and-go' red meat product to consumers and supply chain stakeholders in Australia, as well as the feasibility of increasing the value of red meat products. The hot fridge technology and its application to the red meat industry is quite revolutionary and has a substantial value proposition.

### **Evaluation of red meat in vacuum skin packed on board retail ready format**

<b>Project code</b>	P.PSH.1005	<b>Location</b>	National
<b>Start date</b>	15-Dec-17	<b>Vendor</b>	Retail Ready Operations Australia
<b>End date</b>	30-Dec-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	<i>Not yet available</i>	<b>Initiation of research</b>	External partnership

This project evaluated and implemented a new case-ready packaging format and assessed the operational, merchandising, eating profile and consumer attitudinal behaviour this format could deliver.

### Design and deliver novel meat extract concepts

<b>Project code</b>	P.PSH.1165	<b>Location</b>	National
<b>Start date</b>	20-Mar-19	<b>Vendor</b>	AgResearch Ltd.
<b>End date</b>	03-Mar-20	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	21-Oct-19	<b>Initiation of research</b>	External partnership

This project investigated the opportunities for developing natural meat flavour products from low-value red meat cuts and organs by determining what consumers find desirable, and then using that information to design feasible product prototypes.

### Whole carcass map – an alternate high value model for fabrication based on nutritive values

<b>Project code</b>	P.PSH.1163	<b>Location</b>	National
<b>Start date</b>	10-Oct-18	<b>Vendor</b>	AgResearch Ltd.
<b>End date</b>	31-Jul-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	30-Sep-19	<b>Initiation of research</b>	External partnership

This project explored 'sensing platforms' to predict the nutritive quality of meat and explore a new model for marketing meat to target consumers who desire food for fuel rather than just taste.



**Exploring high valued opportunities for natural flavour and wellness extracts derived from red meat (2Morrows Foods)**

<b>Project code</b>	V.RMH.0003	<b>Location</b>	National
<b>Start date</b>	01-Dec-18	<b>Vendor</b>	DI Jenkinson Pty Ltd
<b>End date</b>	25-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	20-Sep-19	<b>Initiation of research</b>	Industry

This project defined and tested value propositions for transferring red meat ingredients into high valued natural flavour extracts and health tonics as part of MLA’s 2Morrows Foods Program.

**Stage 2 upscaling 3D printed meat**

<b>Project code</b>	V.RMH.0087	<b>Location</b>	National
<b>Start date</b>	30-Oct-18	<b>Vendor</b>	RS3DPrint LLC
<b>End date</b>	26-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	19-Sep-19	<b>Initiation of research</b>	Industry

This project designed and built an updated 3D printing machine that can turn tonnes of low-value meat into high-value products. Marketability of the 3D-printed products was also tested.

**Meat mood map: investigate sensory red meat cues (by cut) and their effect on consumer choice and wellness (mood)**

<b>Project code</b>	P.PSH.1164	<b>Location</b>	National
<b>Start date</b>	10-Oct-18	<b>Vendor</b>	AgResearch Ltd.
<b>End date</b>	31-Jul-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	10-Sep-19	<b>Initiation of research</b>	External partnership

This project analysed consumers who seek to choose food to change/improve their wellness/mood, to better understand how red meat can address this opportunity.

**Review of pet food category – Identifying high value opportunity spaces for Australian red meat industry (insights2innovation)**

<b>Project code</b>	V.RMH.0091	<b>Location</b>	National
<b>Start date</b>	14-Apr-19	<b>Vendor</b>	Greenleaf Enterprises Pty Ltd
<b>End date</b>	26-Dec-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	10-Sep-19	<b>Initiation of research</b>	Industry

The pet food category is rapidly shifting due to changes in consumer expectations and global trends. This project identified new opportunities for the red meat industry to capture value currently lost to multinational pet food manufacturers.



## Resource management

### [Development of an energy conservation and cost reduction tool for the Australian red meat industry](#)

<b>Project code</b>	P.PSH.0867	<b>Location</b>	National
<b>Start date</b>	14-Mar-18	<b>Vendor</b>	All Energy Pty Ltd
<b>End date</b>	15-Oct-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	8-Nov-19	<b>Initiation of research</b>	External partnership

This project involved development of a web-based energy management tool for the Australian red meat industry. The tool enables red meat producers, lot feeders and processors to receive instantaneous guidance on energy management options.

### [Development of funding and finance models for an integrated solar battery solution](#)

<b>Project code</b>	P.PSH.1133	<b>Location</b>	National
<b>Start date</b>	15-May-18	<b>Vendor</b>	Wiley & Co. Pty. Ltd.
<b>End date</b>	15-Oct-19	<b>Funding source</b>	MLA Donor Company
<b>Date of publication</b>	1-May-19	<b>Initiation of research</b>	External partnership

This project involved an assessment of solar-storage solutions for Australian red meat processing facilities. The report includes case study investigations, desktop simulations and in-depth consultation with solar experts.

## Supply chain sustainability

### [Quantifying the impact of MLA's supply chain sustainability on farm program in contributing to the Australian red meat industry's social license to operate](#)

<b>Project code</b>	V.SCS.0011	<b>Location</b>	National
<b>Start date</b>	04-Mar-19	<b>Vendor</b>	University of Melbourne
<b>End date</b>	18-Jun-19	<b>Funding source</b>	Levy
<b>Date of publication</b>	12-Jun-19	<b>Initiation of research</b>	Industry

This project involved the development of a triple bottom line approach to measuring and evaluating the impact of investments made under MLA's supply chain sustainability on-farm sub-program over the financial years 2016–17 and 2017–18.



## R&D projects in progress

### Animal health, welfare and biosecurity

#### Development of practical measures of animal welfare

<b>Project code</b>	P.PSH.1232	<b>Location</b>	National
<b>Start date</b>	01-Jan-20	<b>Vendor</b>	University of Queensland
<b>End date</b>	15-Mar-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This program aims to develop quantifiable and practical measures of animal welfare in sheep and cattle that can be applied both on-farm and post-farm gate, identifying and validating biomarkers associated with reward, fear, pain and stress resilience.

#### Centre Invasive Species solutions – investment in wild dogs

<b>Project code</b>	B.AHE.0317	<b>Location</b>	National
<b>Start date</b>	01-Dec-17	<b>Vendor</b>	Invasive Animals Ltd
<b>End date</b>	30-Jun-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The annual economic cost of pest animal impacts is at least \$1.5 billion. MLA has contracted this project to undertake research into wild dog management and rabbit control, which demonstrates a long-term commitment to invest in national coordinated research to combat invasive animals and plants that threaten the red meat industry.

#### Improving animal welfare in the red meat industry – pain relief

<b>Project code</b>	P.PSH.0818	<b>Location</b>	National
<b>Start date</b>	01-Oct-17	<b>Vendor</b>	University of Sydney
<b>End date</b>	31-Mar-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The application of topical anaesthetics to inhibit pain sensation requires supplementation of longer acting analgesics to reduce sensitisation of wound pain and improve overall welfare outcomes. This project will investigate options for practical administration of analgesics and the potential for long-acting analgesics to provide prolonged therapy.

#### Live *Salmonella typhimurium* vaccine development

<b>Project code</b>	P.PSH.0767	<b>Location</b>	National
<b>Start date</b>	01-May-17	<b>Vendor</b>	Intervet International Pty Ltd
<b>End date</b>	30-Sep-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		



This project will trial a live salmonellosis vaccine for registration in Australia. The initial focus of the project is based on the trials and registration for a vaccine for live export sheep, followed by trials in cattle for use in beef and dairy calves, as an aid in the prevention of salmonellosis and to reduce the faecal shedding of salmonella.

### Reducing mortality rates in beef and sheep enterprises

<b>Project code</b>	P.PSH.0817	<b>Location</b>	National
<b>Start date</b>	20-Jun-17	<b>Vendor</b>	University of Sydney
<b>End date</b>	19-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The purpose of this project is to reduce mortality rates of cattle and sheep using new technologies and prediction models for early warning and detection of the risk of mortality of individuals and groups.

### Veterinary Antimicrobial Prescribing Guidelines for red meat species

<b>Project code</b>	V.MFS.0437	<b>Location</b>	National
<b>Start date</b>	10-Jun-19	<b>Vendor</b>	Australian Veterinary Association
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project has been established to prepare prescribing guidelines for antimicrobial use relevant to extensive cattle production, feedlot cattle production and extensive sheep production. The guidelines will be made publicly available to improve best practice management of antimicrobial resistance in Australian red meat production.

### Linking life-time objective welfare and slaughter measurement data to optimise meat quality

<b>Project code</b>	P.PSH.0872	<b>Location</b>	National
<b>Start date</b>	01-Jul-17	<b>Vendor</b>	University of Sydney
<b>End date</b>	30-May-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project aimed to link carcass quality information at slaughter with life-time animal management, health and production data to identify risk factors associated with sub-optimal animal welfare. The project was terminated when it proved impossible to trace individual animals from paddock to plate in the vertically integrated enterprise chosen for the project.

## Animal production, husbandry and nutrition

### LPP Revise Australian feeding standards to better achieve product specifications and improve ruminant efficiency

<b>Project code</b>	P.PSH.0998	<b>Location</b>	National
<b>Start date</b>	22-Jan-18	<b>Vendor</b>	CSIRO



<b>End date</b>	30-Oct-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Livestock Productivity Partnership		

This project is part of the Livestock Productivity Partnership (LPP) and will create revised feeding standards, protocols and platforms that will deliver quantitative, biologically sound nutritional and growth information to the red meat industry.

### Strengthening the viral rabbit biocontrol pipeline for sustainable long term rabbit control

<b>Project code</b>	P.PSH.1059	<b>Location</b>	National
<b>Start date</b>	29-Jun-18	<b>Vendor</b>	CSIRO
<b>End date</b>	01-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will maximise outcomes from rabbit biocontrol research by investigating a new approach (via tissue organoids to culture pathogenic viruses), to strengthen the long-term viral biocontrol pipeline strategy to sustainably reduce rabbit impacts in Australia.

## Digital agriculture

### Romani digital farm - Australian digital farm program roll out

<b>Project code</b>	V.DIG.2022	<b>Location</b>	National
<b>Start date</b>	29-Oct-19	<b>Vendor</b>	AxisTech Pty Ltd
<b>End date</b>	01-Jun-23	<b>Funding source</b>	Industry
<b>Initiation of research</b>	Levy		

Digital farms are important for the longevity of Australian red meat supply chains, whether that be to inform consumers of our credentials (CN30 and Beef Sustainability initiative) or to improve business productivity. This project is the second of the eight digital farms to be rolled out.

### Integrated digital connectivity solution using long range wireless high-speed internet link to connect several adjacent properties: build, commission & test – stage 2

<b>Project code</b>	P.PSH.1182	<b>Location</b>	National
<b>Start date</b>	10-Feb-19	<b>Vendor</b>	Stanbroke Pty Ltd
<b>End date</b>	01-Mar-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will evaluate and demonstrate how a connectivity system can work across adjacent properties and demonstrate the ongoing monitoring of a long-range wireless high-speed internet link to connect eight properties using a Wi-Sky connectivity solution.



## Eating quality

### Design of Livestock Language Guidelines

<b>Project code</b>	L.MSA.2207	<b>Location</b>	National
<b>Start date</b>	8-Oct-21	<b>Vendor</b>	GSM Press
<b>End date</b>	31-May-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The purpose of this project is to professionally design the National Bovine Livestock Language Guidelines so that it they be finalised and presented to the Australian Meat Language and Standards Committee for endorsement, before being published online.

### MSA Meat Science Course 2021-22

<b>Project code</b>	L.MSA.2209 L.MSA.2208	<b>Location</b>	National
<b>Start date</b>	1-Sep-21	<b>Vendor</b>	Graham Gardner Peter McGilchirst
<b>End date</b>	24-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project provides for the delivery of the two week-long MSA Meat Science training course. The MSA meat science course offers industry participants an opportunity to learn about the scientific factors affecting the eating quality of red meat from production through to consumer, with a focus on beef and sheepmeat.

### MSA Business Development in Western Australia

<b>Project code</b>	L.MSA.2206	<b>Location</b>	WA
<b>Start date</b>	1-Sep-21	<b>Vendor</b>	Ramirez & Gnech Trust
<b>End date</b>	30-Mar-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The purpose of this project is to support the MSA implementation plan and five-year strategic plan through the identification and implementation of business development opportunities in Western Australia.

### MSA Audit and Training Services

<b>Project code</b>	L.MSI.2201	<b>Location</b>	National
<b>Start date</b>	1-Jul-21	<b>Vendor</b>	Aus-Meat
<b>End date</b>	30-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		



This project is for the management of the MSA audit and training services for 2021-22. The program is in place to audit MSA licensees to verify compliance to MSA standards and maintain integrity of the program. Audits cover wholesalers, retail, food service outlets, supermarkets, independent boning rooms and saleyards. It provides for a maximum of 566 audits.

### MSA EEQ Awards Case Studies

<b>Project code</b>	L.MSA.2204	<b>Location</b>	National
<b>Start date</b>	21-Jun-21	<b>Vendor</b>	Cox Inall
<b>End date</b>	15-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The MSA Excellence in Eating Quality producer awards are conducted biennially and receive a high level of media attention. Case studies of the winners will be constructed by the consultant to be used in media releases across industry and for MSA content over an extended period of time.

### Event coordination of 2021 MSA EEQ Series

<b>Project code</b>	L.MSA.2000	<b>Location</b>	National
<b>Start date</b>	1-Jun-21	<b>Vendor</b>	Jackie Kyte Conference and Events Specialist
<b>End date</b>	15-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The project provides event support services for the 2021 MSA Excellence in Eating Quality Series – a biennial initiative consisting of six state-based events. Each event is comprised of a producer forum, followed by an awards presentation.

### MSA eLearning Platform Development

<b>Project code</b>	L.MSG.2112	<b>Location</b>	National
<b>Start date</b>	30-May-21	<b>Vendor</b>	Apheta Data Solutions
<b>End date</b>	31-May-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The purpose of this project is to provide software development support to revise and refresh the current MSA e-learning platforms, delivering new, self-managed e-learning content packages for producers and end-users. It will link with the replacement of the MSA registration and licencing portal (L.MSG.2104), with linkages to myMSA and CRM.

### Development of DATAbank IT System for Research Project Design and Data Storage

<b>Project code</b>	L.MSG.2107	<b>Location</b>	National
<b>Start date</b>	1-Dec-20	<b>Vendor</b>	Birkenwood
<b>End date</b>	28-Feb-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		



This project will develop a cloud-based system to manage eating quality research trial design and a database to securely house consumer sensory eating quality research data for beef and sheepmeat, including details of meat samples collected and related consumer scores. The database structure and controls will provide secure confidential storage and aid in future-proofing Australian research eating quality data.

### MSA and Industry Statistical Analysis support and training

<b>Project code</b>	L.EQT.2108	<b>Location</b>	National
<b>Start date</b>	14-Sep-20	<b>Vendor</b>	University of Sydney
<b>End date</b>	30-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will support independent experts to statistically evaluate the MSA program, and where required, will provide independent statistical evaluation of MSA research outcomes. This project also supports the capability building of other industry stakeholders through data analysis training workshops.

### Measurement of pH in high intramuscular fat samples and existing technology validation

<b>Project code</b>	L.EQT.2105	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	University of Queensland
<b>End date</b>	10-Oct-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

One of the MSA grading measurements is muscle pH, used in conjunction with temperature. This project will verify any processes and devices used in MSA grading for usability and accuracy. It will ensure the devices used in grading are accurate for the variability which exists in the cattle type supplied through MSA grading.

### Development of a MSA registration and licensing portal

<b>Project code</b>	L.MSG.2104	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Management for Technology
<b>End date</b>	30-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The purpose of this project is to provide software development support for a new MSA registration and licensing portal with links to myMSA and CRM.

### Development of MSA Training system with CRM and Ausmeat integration

<b>Project code</b>	L.MSG.2105	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Management for Technology
<b>End date</b>	30-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		



This project will deliver the replacement of the current Infosys Microsoft Access Database through development of CRM and the AUSMeat-linked training system integration development.

### MSA CRM Development

<b>Project code</b>	L.MSG.2106	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Empired
<b>End date</b>	14-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project is to facilitate the development of the current MSA Infosys program to a Customer Relationship Management (CRM) platform.

### MSA end user surveys 2020-23

<b>Project code</b>	L.MSA.2103	<b>Location</b>	National
<b>Start date</b>	20-Jul-20	<b>Vendor</b>	Kantar
<b>End date</b>	8-Dec-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The purpose of the MSA end user surveys (butcher and wholesaler) is to collect pricing data for independent beef and lamb retail butcher outlets and gauge levels of satisfaction and engagement with the MSA program.

### MSA End User Training Services and Business Development

<b>Project code</b>	L.MSC.2101	<b>Location</b>	National
<b>Start date</b>	1-Jul-20	<b>Vendor</b>	Deakin University
<b>End date</b>	30-Sep-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project covers the MSA end-user program nationally including licensing, training, and compliance. It includes collaboration with the MLA Food Service Domestic Marketing team to deliver MSA food service training master classes nationally, with the objective to raise awareness and educate national and global food service caterers.

### MSA Research and Development, Eating Quality Testing and Technical Support 2020/21, 2021/22

<b>Project code</b>	L.EQT.2101	<b>Location</b>	National
<b>Start date</b>	1-Jul-20	<b>Vendor</b>	Polkinghorne
<b>End date</b>	30-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will include input into strategic development and experimental designs of nominated R&D plans and projects; continual development and innovation of the MSA Model; provision of scientific and industry support to MSA team members;



and management and maintenance of the MSA R&D databases (AUSBlue) including scoping and the transfer of the database to an international platform.

## Environmental sustainability

### EAP - Development of a Microalgal and Brewers' Spent Grain (BSG) Feed Supplement

<b>Project code</b>	P.PSH.2105	<b>Location</b>	National
<b>Start date</b>	30-Sep-21	<b>Vendor</b>	University of Technology Sydney
<b>End date</b>	28-Jul-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	CN30 partnership		

This project aims to create a novel supply chain of a ruminant feed supplement using Brewers' Spent Grain (BSG) bolstered with a nutrient-rich microalgae that has the potential to reduce ruminant methane production, also grown using CO2 brewery waste emissions. This will create a circular bioeconomy utilising two brewery waste-streams, adding a new profit line to breweries by establishing a supply chain of nutritious feed to Australian farmers, whilst also preparing for future carbon price policies.

### Driving adoption of objective measurement of pasture biomass for Australian livestock producers

<b>Project code</b>	P.PSH.1336	<b>Location</b>	National
<b>Start date</b>	15-Sep-21	<b>Vendor</b>	CIBO Labs
<b>End date</b>	1-Jul-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project aims to provide all MLA members with an indicator of baseline feedbase biomass through a remote monitoring solution. The product will be easily accessible through current MLA online platforms.

### CSP Module 1 - Sustainable pathways to CN30

<b>Project code</b>	B.CCH.2121	<b>Location</b>	National
<b>Start date</b>	1-Jul-21	<b>Vendor</b>	University of Tasmania
<b>End date</b>	1-Nov-26	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will use design-led thinking and interactive workshops to provide producers with the understanding of regionally-specific GHG emissions mitigation practices required to achieve production-led environmental outcomes. This investment addresses the lack of understanding of how GHG emissions mitigation practices affect production-led environmental outcomes, including effects of grazing on natural capital and biodiversity, which is a barrier to adoption of regionally specific management options that enable key grazing regions to contribute to CN30.

### A Common Approach to Sector-Level GHG Accounting for Australian Agriculture

<b>Project code</b>	P.PSH.2128	<b>Location</b>	National
<b>Start date</b>	30-May-21	<b>Vendor</b>	Agriculture Innovation Australia



<b>End date</b>	15-Nov-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry partnership (AIA)		

Australia has a National Greenhouse Gas Inventory (NGGI), however commodity GHG accounts are being undertaken in a fragmented way and there is increasing development of disparate farm-level accounting tools. This project aims to develop a common approach to sector-level GHG accounting for Australian agriculture.

### CSP - Hyperspectral Remote Sensing of Soil Organic Carbon

<b>Project code</b>	P.PSH.2103	<b>Location</b>	Southern Australia
<b>Start date</b>	20-May-21	<b>Vendor</b>	Cloud Agronomics
<b>End date</b>	31-Dec-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	CN30 partnership		

This investment will identify whether hyperspectral-driven remote carbon measurement has accuracy comparable with that of physical soil coring and lab analysis at quantifying field-level soil organic carbon (SOC) content and demonstrate that the approach is significantly more cost effective than current approaches. The project will involve conducting field soil sampling at specific georeferenced locations in southern Australia and comparing results from carbon quantification with remotely sensed data collected using manned-aircraft flights. The outputs from the investment include a hyperspectral approach for quantifying SOC data, a report of model calibration and validation, and an economic analysis of the cost of implementing the new approach.

### CSP Module 2 - Data platform for increasing soil carbon in Australian agricultural systems

<b>Project code</b>	P.PSH.2126	<b>Location</b>	Eastern Australia
<b>Start date</b>	20-May-21	<b>Vendor</b>	AgriMix
<b>End date</b>	30-Apr-26	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry (CN30) CN30 partnership		

This project will develop a soil carbon quantification and verification system to increase the number of producers deriving revenue from environmental services and/or natural capital trading markets.

### CSP - Time controlled grazing for soil C sequestration and improved ecosystem services

<b>Project code</b>	P.PSH.2104	<b>Location</b>	National
<b>Start date</b>	20-May-21	<b>Vendor</b>	Queensland University of Technology
<b>End date</b>	30-Nov-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	CN30 partnership		

This project aims to determine if time-controlled grazing (TCG) can increase soil carbon stocks and improve delivery of ecosystem services, leading to increased production-led environmental outcomes and more producers deriving revenue from natural capital trading markets/environmental services. This investment addresses the lack of robust scientific evidence quantifying the benefits of TCG in Australia, which is stalling the uptake of potentially useful management options that will help achieve CN30 objectives.

### CSP Module 4 - Maximising co-benefits of trees on farms

<b>Project code</b>	P.PSH.1239	<b>Location</b>	National
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<b>Start date</b>	1-May-21	<b>Vendor</b>	University of Melbourne
<b>End date</b>	31-May-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	CN30 partnership		

This project will develop knowledge products for producers on the benefits of trees on farms and identify optimal tree planting configurations that result in production led environmental outcomes and contribute to the CN30 target. This investment addresses the lack of sufficient on-farm research to provide evidence for the value proposition of trees on farms to livestock and other farm systems, which is currently a barrier to adoption for CN30 initiatives.

### CSP Module 5 - Steak 'n wood: demonstrating livestock productivity and environmental service benefits of trees on farm in northern systems

<b>Project code</b>	P.PSH.2104	<b>Location</b>	Northern Australia
<b>Start date</b>	20-May-21	<b>Vendor</b>	Queensland DAF
<b>End date</b>	30-Nov-26	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	CN30 partnership		

This project will quantify productivity and ecosystem services (ie, carbon and biodiversity) gains of silvopastoral systems (SPS) as a pathway to achieving CN30 and to increase the number of producers deriving revenue from environmental services.

### Trees on farms: a tool for decision-making

<b>Project code</b>	P.PSH.1277	<b>Location</b>	National
<b>Start date</b>	20-May-21	<b>Vendor</b>	University of Melbourne
<b>End date</b>	30-Nov-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	CN30 partnership		

This project will develop a decision matrix template, supported by a database that will allow farmers to include estimates of various productivity and environmental benefits of planting trees on farms. It is phase 1 of a two-phase project that will form part of the CN30 pathways consortium being led by UTAS. The project addresses key CN30 initiative stretch target to integrate trees on 10 million hectares of land under grazing management, increasing livestock productivity by 10% (through providing shade, shelter, and other benefits) and storing > 25 MT CO<sub>2</sub>e emissions p.a.

### Insights into barriers and bridges to the adoption of multiweek and seasonal climate forecasts

<b>Project code</b>	B.CCH.2122	<b>Location</b>	National
<b>Start date</b>	2-Dec-20	<b>Vendor</b>	Meaningful Social Research
<b>End date</b>	28-Aug-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will look at the use of multi-week and seasonal forecasts in agriculture – it will categorise the barriers to adoption and prioritise them using social science research involving in-depth interviews with stakeholders from several industries. This will help build an improved understanding of how different industries respond to climate information and what action could be taken to improve their adaptation responses.

### Screening feed additives for methane mitigation using in vitro studies

<b>Project code</b>	P.PSH.1260	<b>Location</b>	National
<b>Start date</b>	25-Jun-20	<b>Vendor</b>	University of Queensland



<b>End date</b>	15-Nov-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry (CN30)		

Australia’s red meat industry can be carbon neutral by 2030. Dietary manipulation as a mitigation strategy is thought to be the most viable method for reducing GHG emissions from ruminants. This project aims to identify feed additives that are potential candidates to suppress methane production, whilst maintaining favourable ruminal digestion and fermentation using laboratory studies.

**Co-Funding Deed AgScore project under the Managing Climate Variability (MCV) program**

<b>Project code</b>	B.CCH.2114	<b>Location</b>	National
<b>Start date</b>	30-Jun-20	<b>Vendor</b>	GRDC, RIRDC, CRDC, SRA
<b>End date</b>	28-Feb-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry partnership		

The AgScore project will make use of an innovative software tool that provides robust comparisons of seasonal climate models using agriculturally relevant metrics to help growers and producers assess seasonal forecasts for more profitable decision making and climate-risk management.

**NEXUS project: exploring profitable, sustainable livestock businesses in an increasingly variable climate – University of Melbourne**

<b>Project code</b>	P.PSH.1248	<b>Location</b>	Victoria, NSW, Queensland
<b>Start date</b>	26-Feb-20	<b>Vendor</b>	University of Melbourne
<b>End date</b>	15-Nov-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry partnership		

The NEXUS program explores the nexus between profitability, productivity, greenhouse gas mitigation, carbon sequestration and consumer perceptions of livestock businesses in an increasingly variable climate. An integrated assessment of seven farm case studies in various regions will be conducted to identify systems adaptations that are profitable, environmentally sustainable and targeted towards future market opportunities.

**From method to market – unlocking ecosystem service opportunities for livestock producers**

<b>Project code</b>	P.PSH.1246	<b>Location</b>	Queensland
<b>Start date</b>	21-Feb-20	<b>Vendor</b>	Queensland DAF
<b>End date</b>	31-May-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project seeks overcome technical and economic barriers to producer participation in ecosystem services markets whilst producing livestock. QDAF will engage with livestock producers to review existing and develop new scientific methods for livestock producers to be remunerated for providing ecosystem services (generation of carbon credits, biodiversity credits, water quality credits) whilst producing livestock.

**Forewarned is forearmed: managing the impacts of extreme climate events, Bureau of Meteorology activity areas**

<b>Project code</b>	B.CCH.8100	<b>Location</b>	National
<b>Start date</b>	01-Jan-18	<b>Vendor</b>	Bureau of Meteorology; University of Southern Queensland; South Australian Agricultural Research



			Institute; Birchip Cropping Group; University of Melbourne
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		

This project will research and develop a state-of-the-art forecasting service for extreme climate events, which will be delivered via the Bureau of Meteorology website. This program aims to deliver direct value to producers by providing forecasts of climate extremes and equipping producers with the information and tools to be forewarned and prepared.

## Food safety, traceability and integrity systems

### Aus Agrifood Data Exchange

<b>Project code</b>	V.ISC.2115 V.ISC.2118 V.ISC.2134 V.ISC.2139 V.ISC.2138 V.ISC.2141	<b>Location</b>	National
<b>Start date</b>	2021	<b>Vendor</b>	Various
<b>End date</b>	2023	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

A consortium of leading agrifood stakeholders including government, industry and research bodies have established the Australian AgriFood Data Exchange to enable fluid collaboration up and down Australians Agrifood value chains.

### Supply Chain integrity analysis

<b>Project code</b>	V.MFS.0459	<b>Location</b>	National and international
<b>Start date</b>	15-Dec-21	<b>Vendor</b>	Insight Outlook Consulting
<b>End date</b>	31-May-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will explore supply chain integrity for Australian red meat by exploring the supply chains and relationships that exist between Australian processors/exporters and the final retail customer. The research focuses on exploring the proposition that there is a middle market where consumers are prepared to pay a slightly higher price for enhanced integrity in both export and domestic markets. If such segments exist, technological solutions to providing information and assurances may add value to these mid-tier segments.

### Resources for data platform continuous improvement and BAU activities

<b>Project code</b>	V.DIG.0024	<b>Location</b>	National
<b>Start date</b>	25-Nov-21	<b>Vendor</b>	Servian
<b>End date</b>	30-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The purpose of this project is to provide continuous improvement, maintenance, and dedicated support for the MLA/ISC Industry Data Platform. This project supports the refreshed IS 2025 Strategic objectives, the resources will allow continuous delivery of BAU activities, support to projects, and feature enhancement in the Data Platform.



### Market scan for Australian origin of Australian labelled product

<b>Project code</b>	P.PSH.1343	<b>Location</b>	National and international
<b>Start date</b>	15-Oct-21	<b>Vendor</b>	Oritain
<b>End date</b>	15-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will estimate the extent of product substitution in two markets by taking a collection of samples of red meat labelled 'Australian', in market, and using the database created by Oritain through project P.PSH.1170, to analyse the samples and determine unequivocally if the meat is Australian. Currently, there is no objective market data available to inform the prevalence of fraud and counterfeiting of Australian red meat in export markets (other than the anecdotal) and it is a challenge for any action or mitigation strategies to be developed as both the supply chains and extent of the issue are unknown.

### Technical Advisor: Antimicrobial resistance

<b>Project code</b>	V.MFS.0458	<b>Location</b>	National and international
<b>Start date</b>	1-Aug-21	<b>Vendor</b>	Coombe Consulting
<b>End date</b>	31-Jul-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Antimicrobial resistance is an international One Health concern extending to humans, animals and the environment. Resistance is associated with usage of antimicrobials and their stewardship by animal industries and promises to become a significant trade consideration for Australian red meat. The purpose of this project is to assist MLA in planning, investigating and communicating aspects of the science, policy and strategy concerning industry's response to this issue.

### Real-time, data-driven approach to assessing networked biosecurity risk

<b>Project code</b>	V.RDA.2102	<b>Location</b>	National
<b>Start date</b>	30-Aug-21	<b>Vendor</b>	Exoflare
<b>End date</b>	30-Jul-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project contributes to the development of a real-time data driven system for assessing biosecurity risks in the red meat and pork sectors, building on the cross-sector Operational Biosecurity Risk Assessment (COBRA) platform. The project will cover expert interviews to determine the barriers and opportunities for data sharing between government and industry to advise the COBRA data integration project plan.

### Animal Identification Technology Roadmap

<b>Project code</b>	V.ISC.2037	<b>Location</b>	National
<b>Start date</b>	18-Jul-21	<b>Vendor</b>	KPMG
<b>End date</b>	10-May-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will support ISC in developing the processes and workflows to underpin the implementation of the NLIS Animal Identification Technology Approval Program. It will also identify feasible delivery frameworks to fast-track its rollout.



## Understanding the requirements and enabling the integration of livestock data link feedback into lifetime performance systems

<b>Project code</b>	V.ISC.2112	<b>Location</b>	National
<b>Start date</b>	30-Jun-21	<b>Vendor</b>	Argyle Foods
<b>End date</b>	31-Dec-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project aims to identify and understand the data required along the complete supply chain including farm, carcass compliance and product traceability information to enhance industry insights. This project will directly support the integration of these data sets from a commercial supply chain into the MLA dataset.

## Scoping future LPA audit program requirements

<b>Project code</b>	V.RDA.2100	<b>Location</b>	National
<b>Start date</b>	21-Jun-21	<b>Vendor</b>	Hello Human
<b>End date</b>	1-Feb-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

ISC seeks to identify ways to improve and digitise the LPA program to capture a range of data points or events that could be used to help ISC assess core areas of risk, better target resources for audits and gain insights across a far greater proportion of the LPA participant base. Through this project, ISC's methods for assessing compliance with LPA program requirements will be reviewed and improvements proposed. The project will develop a roadmap for ISC which mitigates current challenges and takes into account future system requirements around auditing.

## ISC Controlled Reporting Platform

<b>Project code</b>	V.ISC.2110	<b>Location</b>	National
<b>Start date</b>	14-Jun-21	<b>Vendor</b>	Servian
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The aim of this project is to develop the platform, governance, workflows, tooling and standard reports required to enable efficient and controlled reporting of industry data under ISC stewardship by approved government, industry, supply chain and research stakeholders through the MLA Industry Data Platform.

## eNVD Migration to ISC AWS Infrastructure

<b>Project code</b>	V.ISC.2128	<b>Location</b>	National
<b>Start date</b>	14-Jun-21	<b>Vendor</b>	Hello Human
<b>End date</b>	1-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The purpose of this project is to bring eNVD infrastructure in line with the long-term strategic goals of the ISC infrastructure team so that there is a structured support process across all of ISC's products and services.



### Consumer refrigerator data, behaviour and waste reduction for red meat

<b>Project code</b>	V.MFS.0456	<b>Location</b>	National
<b>Start date</b>	22-Jun-21	<b>Vendor</b>	Fight Food Waste
<b>End date</b>	30-Mar-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will provide a baseline on consumer refrigerator performance and behaviour. The data will be used to assist industry, including retailers and regulators, to reevaluate best before dates, which are currently extremely conservative for many foods, including for fresh meat.

### NLIS Animal Movements Data Visualisation Phase 2

<b>Project code</b>	V.ISC.2107	<b>Location</b>	National
<b>Start date</b>	31-May-21	<b>Vendor</b>	Small Multiples
<b>End date</b>	15-Apr-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

In 2019 ISC developed the NLIS Animal Movements Visualisation Tool, the purpose of which was to show the depth of data we have within NLIS and its potential use for providing insights. The extension of that now is to add more historical data and additional visualisation features to create a more compelling story of NLIS animal movements.

### To ingest climate data into the data platform to enable dependent research and decisions

<b>Project code</b>	V.ISC.1936	<b>Location</b>	National
<b>Start date</b>	15-Mar-21	<b>Vendor</b>	Bureau of Meteorology
<b>End date</b>	14-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will develop a dataset to explore, validate and support the industry environmental, integrity, sustainability and food safety claims which are part of the global mega trends of the ISC 2025 strategy. This is being established to license the chosen set of climate data.

### Phase 1: Scoping for a common approach or process to regional benchmarking

<b>Project code</b>	V.ISC.2106	<b>Location</b>	National
<b>Start date</b>	1-Mar-21	<b>Vendor</b>	Food and Veterinary Services
<b>End date</b>	30-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

ISC is wanting to understand how different industry datasets can be benchmarked to provide powerful insights to improve productivity and profitability. The purpose of this project is to assess and determine whether a common framework can be applied for benchmarking across the array of industry data sets. This is the scoping and discovery phase that will provide the groundwork for future development and testing.



### Shelf life models for beef and lamb

<b>Project code</b>	V.MFS.0453	<b>Location</b>	International
<b>Start date</b>	22-Jan-21	<b>Vendor</b>	University of Tasmania
<b>End date</b>	21-Jan-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

A model to predict the shelf life of vacuum packed (VP) beef and lamb has been developed and found to be useful in managing the shelf life of product in supply chains, with benefits including fewer customer complaints and claims, resulting in a financial benefit. This project seeks to extend the VP model to other forms of packaging commonly used in supply chains, such as modified atmosphere, overwrap, and vacuum skin packs, which are often applied to retail product after a period of storage under vacuum. It is expected that these models will further enhance the reputation of Australian product and reduce product loss and waste in supply chains.

### Stand by What You Sell campaign: NLIS & LPA video development and video assets

<b>Project code</b>	V.ISC.2125 V.ISC.2124	<b>Location</b>	National
<b>Start date</b>	1-May-21	<b>Vendor</b>	Anvil Media
<b>End date</b>	30-Oct-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will develop key video assets for the delivery of one of ISC's flagship projects, The Stand By What You Sell campaign. The project will adapt the existing SBWYS video to a consumer facing video and an international audience video. Other videos will also include record keeping, obtaining a PIC and target small landholders.

### Implantable identification for cattle - field trials

<b>Project code</b>	V.RDA.0004	<b>Location</b>	National
<b>Start date</b>	1-May-21	<b>Vendor</b>	Asymmetric Innovation
<b>End date</b>	29-Jan-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This cattle trial is the recommended next step for Tracking and Tracing Cattle (V.RDA.0002). The project will confirm the discoveries made during the V.RDA.0002, (in)validate the remaining adoption hurdles and build a strong evidence base for more expansive trials and widespread industry adoption of an implantable device. This proposal involves the investigation and validation of the technology in two trials – a commercial feedlot and a pasture/feedlot system.

### Benchmark testing of RFID transponders

<b>Project code</b>	V.NLI.2101	<b>Location</b>	National
<b>Start date</b>	30-Apr-21	<b>Vendor</b>	Elexon Electronics
<b>End date</b>	30-Oct-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		



This is an ongoing project to conduct benchmark testing of both new and existing RFID cattle and sheep devices against reference transponders. This is done to assess performance characteristics of these transponders so they can adequately meet the required read range of RFID tags as specified in the NLIS RFID Standard.

### Residues in Livestock Production – On-Farm Risk Mitigation

<b>Project code</b>	V.RDA.2101	<b>Location</b>	National
<b>Start date</b>	29-Apr-21	<b>Vendor</b>	Edmund Simon Winter
<b>End date</b>	13-Jun-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will strengthen on-farm risk management around biosecurity and food safety by exploring mechanisms to enhance data accuracy where potential incidences of contamination or exposure are required to be declared on the LPA NVD or require an NLIS Property Identification Code (PIC) status to be applied. Ideally, the solution will enable automatic verification and notification to users and stakeholders of the traceability/integrity system in order to manage and mitigate the risk of sending livestock to sensitive markets that don't meet the required contamination and/or exposure specifications. This is the discovery and define phase in solution development (including prototype testing), which will then inform a separate phase for the full build and rollout.

### Opportunities for utilising DNA-based technologies to enhance traceability and profitability in the Australian Red Meat industry

<b>Project code</b>	V.RDA.2222	<b>Location</b>	National
<b>Start date</b>	22-Mar-21	<b>Vendor</b>	Food Agility CRC
<b>End date</b>	5-Jan-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Genotyping has potential as a traceability technology in the red meat industry. The potential goes across live animal identification, as well as product verification; and therefore genotyping is a promising technology for end-to-end traceability and could deliver many outcomes. Yet, implementation of the technology poses several challenges and costs. This project will provide a detailed assessment of the benefits against the costs in order to develop a business case for implementation of genotyping technologies within the traceability system.

### Livestock and transport recording system to improve animal traceability

<b>Project code</b>	P.PSH.1317	<b>Location</b>	National
<b>Start date</b>	21-Feb-21	<b>Vendor</b>	Barko Security
<b>End date</b>	23-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

One of Integrity Systems Company's (ISC) primary targets is that National Vendor Declarations (NVDs) can be replaced by automated verification systems. This project funds trials and demonstrations of a saleyard or processing plant based solution to this challenge where critical details of every truckload of livestock arriving or departing a facility can be captured and recorded on film and matched up to either the paper version of the NVD or electronic NVDs (eNVDs), providing valuable cross validation of the data recorded on farm.



### Producer led deployment of Smart GPS ear tags for livestock

<b>Project code</b>	P.PSH.1315	<b>Location</b>	National
<b>Start date</b>	25-Feb-21	<b>Vendor</b>	Smart Paddock
<b>End date</b>	1-Jan-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

One of ISC's targets is lifetime traceability. This is a demonstration project seeking to embed and test GPS tracking ear tags showcasing improved traceability, assurance and other value-add initiatives in several red meat supply chains. This project will deploy existing smart ear tag technology within a range of production systems to provide the data to document and develop the most effective and efficient processes that any producer can refer to for deploying this type of technology.

### Technical review and comparison of red meat integrity systems – how does Australia stack up against the world?

<b>Project code</b>	V.RDA.2009	<b>Location</b>	National
<b>Start date</b>	25-Feb-21	<b>Vendor</b>	AgStrat Associates
<b>End date</b>	23-Feb-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Competitors around the world are implementing integrity systems that are comparable to our current red meat integrity system. Through this project red meat integrity systems from across the world will be compared in terms of their technical capability, sophistication, overall success and reputation.

### Project Cyclone: Defining insights into Australia’s global positioning of MLA’s integrity system to understand the value proposition for the supply chain (trade and consumers) across markets

<b>Project code</b>	V.RDA.2011	<b>Location</b>	National
<b>Start date</b>	23-Feb-21	<b>Vendor</b>	Kantar Insights
<b>End date</b>	30-Apr-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

By understanding trust as a proxy for product and systems integrity of red meat production, this research aims to generate insights that will support the view that, globally, Australia’s red meat integrity system is the best. This trust positioning could be expressed in a number of ways (e.g traceability, provenance, product verification & quality, animal welfare, environment, safety, etc) that are meaningful to different parts of the value chain based on their interpretation.

### Trakka - Making Data Flow

<b>Project code</b>	V.RDA.2223	<b>Location</b>	National
<b>Start date</b>	5-Feb-21	<b>Vendor</b>	Charles Sturt University
<b>End date</b>	31-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry partnership (Food Agility CRC)		



This project exists to drive a critical mass of red meat producers to make available real time animal identification and tracking data for service providers. Initially this will ease meeting compliance requirements (e.g. through automated NLIS forms), however soon it will allow service providers (insurers, auction houses etc) to provide new services and value back to red meat producers.

### Proof of Concept Trial for Retinal Scanning of Cattle for Identification

<b>Project code</b>	P.PSH.1279	<b>Location</b>	National
<b>Start date</b>	1-Dec-20	<b>Vendor</b>	ITRAK
<b>End date</b>	30-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

The aim of the project is to conduct a proof of concept pilot using retinal scanning for individual animal identification, which has been developed for the security industry and is now being made available for animal applications. This is an initial trial to demonstrate that the technology can be used on cattle, as a first step in assessing its application to the livestock sector, identifying any challenges for its use and identifying next steps in commercialising it in the livestock industries. Using computers to monitor and record animal movements could greatly reduce human labour and costs associated with NLIS compliance.

### Application Monitoring and Alerts

<b>Project code</b>	V.ISC.1934	<b>Location</b>	National
<b>Start date</b>	30-Nov-20	<b>Vendor</b>	Australian Centre for Advanced Computing and Communications
<b>End date</b>	30-Dec-21	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will assist with deploying a best practice application monitoring solution across all the ISC application stacks. This is a crucial component of the ISC 2025 Strategic Plan and Technology Roadmap implementation.

### ISC Livestock Marketing Campaign 20/21

<b>Project code</b>	V.ISC.2031	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Sefton & Associates
<b>End date</b>	30-Jun-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will coordinate the development and delivery of the ISC flagship initiative 'Livestock Marketing Campaign' (LMC). The project includes the establishment of LMC pilot sites, engaging with stakeholders, establishing local advisory groups and developing nationally consistent but locally relevant communications material for the sites to support the selling of livestock.

### Implementation of the ISC MERI framework 20/21 and development of the IS2025 MERI plan

<b>Project code</b>	V.ISC.2028	<b>Location</b>	National
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Umbers Rural Services
<b>End date</b>	28-Feb-23	<b>Funding source</b>	Levy



<b>Initiation of research</b>	Industry
<p>This project will coordinate the development and support delivery of the ISC’s Monitoring, Evaluation, Reporting and Improvement (MERI) framework. The project will include continued implementation of the MERI framework, development of a MERI framework for the ISC 2025 strategy and other MERI activities as required to improve the services offered by ISC.</p>	

**Modernisation of national saleyard integrity and assurance**

<b>Project code</b>	V.ISC.2102	<b>Location</b>	National
<b>Start date</b>	3-Aug-20	<b>Vendor</b>	Schuster Consulting
<b>End date</b>	30-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>This project will create a set of standards and rules for a saleyard integrity program at a national level. It is expected that the development of this program will improve on the foundation laid by the National Saleyard Quality Assurance Program (NSQA) and will deliver a governance structure and set of program materials for assessing and monitoring saleyard integrity and assurance in alignment with other red meat assurance programs, including the Livestock Production Assurance (LPA) program.</p>			

**Technical advisors for the joint food safety program 2020-2025**

<b>Project code</b>	V.MFS.0450	<b>Location</b>	National and international
<b>Start date</b>	1-Jul-20	<b>Vendor</b>	Various
<b>End date</b>	30-Jun-25	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>This project will engage five technical advisors to provide expert advice and support relating to projects within the MLA Food Safety Program. Examples of work will include epidemiological advice and statistical analysis to the four antimicrobial resistance projects, foodborne disease epidemiology, statistical analysis, antimicrobial resistance, global food safety policy, public health, international food standards, and chemical residue trade policy.</p>			

**Stage one of the National Food Traceability Implementation project**

<b>Project code</b>	V.RDA.2003	<b>Location</b>	National
<b>Start date</b>	11-Jun-20	<b>Vendor</b>	Deakin University
<b>End date</b>	01-Apr-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		
<p>This national, multi-sector project aims to develop consistent data formats to share traceability data between trusted supply chain partners. This will assist with achieving end-to-end traceability of the product from production through to the end consumer, unlocking greater value for product claims and Australia’s agricultural trade.</p>			

**Technical field officer for shelf life and cold chain management trials**

<b>Project code</b>	V.MFS.0446	<b>Location</b>	National and international
<b>Start date</b>	1-Apr-20	<b>Vendor</b>	Various
<b>End date</b>	30-Nov-22	<b>Funding source</b>	Levy



<b>Initiation of research</b>	Industry
This project will provide six technical field officers to work with plants throughout Australia to implement shelf life models and cold chain management into their existing operations to improve internal processes, product integrity and provenance.	

### ISC Awareness and opinion gathering activities for 2020

<b>Project code</b>	V.ISC.2022	<b>Location</b>	National
<b>Start date</b>	31-Mar-20	<b>Vendor</b>	Down to Earth Research
<b>End date</b>	30-Mar-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project is to support the delivery of the 2020/2021 ISC MERI Implementation, which will capture data from producers, value chain partners and stakeholders around awareness and understanding of ISC, the integrity system and core integrity programs (LPA, NLIS, NVD and LDL). The project includes a range of monitoring and evaluation activities of value chain partners, stakeholders, regulators and customers and consumers.

### Secretariat for the Animal Industry Antimicrobial Stewardship Research, Development, and Extension Strategy

<b>Project code</b>	V.MFS.0444	<b>Location</b>	National
<b>Start date</b>	1-Mar-20	<b>Vendor</b>	Hello Human
<b>End date</b>	1-Sep-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The 'Animal Industry Antimicrobial Stewardship (AMS) Research, Development and Extension Strategy' (AIAS) is nearing finalisation. This strategy is focused on prioritising RD&E that enhances AMS activities. The purpose of this contract is to provide for a secretariat for the coordination of RDC activity.

### SAFEMEAT Crisis Response Simulation

<b>Project code</b>	V.SMA.2103	<b>Location</b>	National
<b>Start date</b>	2-Feb-20	<b>Vendor</b>	Agesecure Investments Australia
<b>End date</b>	15-Oct-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will coordinate and conduct a crisis response simulation exercise that will test the SAFEMEAT Incident Response Manual. The project will develop recommendations for SAFEMEAT for the implementation of a process for regular review and testing of the Incident Response Manual and SAFEMEAT's crisis response processes.

### Export market integrity trial- traceability through to consumer

<b>Project code</b>	P.PSH.1230	<b>Location</b>	International
<b>Start date</b>	2-Jan-20	<b>Vendor</b>	Fresh Supply Co
<b>End date</b>	15-Aug-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		



Stockyard Beef and MLA are collaborating with two technology providers to trial implementation of a whole of supply chain traceability provenance guarantee in three major markets; Singapore, UAE and Japan. Through this project, a system to capture information at multiple points to provide a single source of truth will be developed and conveyed to the consumer using QR codes.

### Microbiological food safety of effluent from animal industries

<b>Project code</b>	V.MFS.0448	<b>Location</b>	National
<b>Start date</b>	15-May-20	<b>Vendor</b>	Symbio Laboratories
<b>End date</b>	30-Jan-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will survey microbiological quality of processed waste and effluent from the red meat supply chain, to provide clarity and identify potential risks that may not been previously considered and can be used to identify gaps and defend the industry.

### Enterprise level antimicrobial usage measurement - pilot

<b>Project code</b>	V.MFS.0442	<b>Location</b>	National
<b>Start date</b>	04-Nov-19	<b>Vendor</b>	AgVet Projects Pty Ltd
<b>End date</b>	30-Jan-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

Measurement of antimicrobial usage (AMU) is an essential aspect of the management of antimicrobial resistance and provides evidence to support optimising the usage of antimicrobials. This project will work with a range of livestock enterprises to develop appropriate metrics for AMU and a practical system to collect, collate and report enterprise level data.

### LPA Service Centre user experience service design

<b>Project code</b>	V.ISC.2126	<b>Location</b>	National
<b>Start date</b>	30-Aug-19	<b>Vendor</b>	Hello Human
<b>End date</b>	14-Apr-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

The Livestock Production Assurance (LPA) program services approximately 190,000 red meat producers enabling them to manage their accreditation. The purpose of this project to redesign the web application user experience, bringing it in line with other products and services offered by ISC.

### The shelf life of Australian frozen red meat

<b>Project code</b>	V.MFS.0428	<b>Location</b>	National
<b>Start date</b>	05-Mar-18	<b>Vendor</b>	TEC Partnership
<b>End date</b>	07-Jan-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		



There are numerous publications on the freezing and frozen storage of meat but a lack of scientific data to support the shelf life for frozen red meat being 36 months. Some countries have restricted shelf life to 12 months, which has disrupted the market. This project will fill the research gap and provide shelf life data for Australian frozen product.

## Livestock export

### Data stocktake, analysis and implementation roadmap

<b>Project code</b>	LC.RDE.0002	<b>Location</b>	International
<b>Start date</b>	31-Sept.21	<b>Vendor</b>	KPMG
<b>End date</b>	1-Apr-22	<b>Species</b>	All red meat species
<b>Initiation of research</b>	Industry partnership (LEP)		

Significant amounts of animal welfare and productivity data are collected through the livestock export supply chain, but it is often managed through isolated systems. This project will carry out a stocktake to understand how data is currently being collected and how it can be more connected, to help participants use it to make informed business decisions.

### Uptake of training and animal health and welfare practices

<b>Project code</b>	LC.RDE.0004	<b>Location</b>	International
<b>Start date</b>	1-Sept-21	<b>Vendor</b>	MINTRAC
<b>End date</b>	30-Jan-22	<b>Species</b>	All red meat species
<b>Initiation of research</b>	Industry partnership (LEP)		

This project aims to identify the training opportunities in the livestock export supply chain and develop a strategy to increase uptake of best practice animal health and welfare practices.

### Economic Analysis of Regulation in the Livestock Export Industry

<b>Project code</b>	W.RDE.0005	<b>Location</b>	International
<b>Start date</b>	31-Aug-21	<b>Vendor</b>	Ernst & Young
<b>End date</b>	30-Jun-22	<b>Species</b>	All red meat species
<b>Initiation of research</b>	Industry partnership (LEP)		

This project will analyse the economic and business impacts of regulation on the livestock export industry, map the current regulatory compliance effort (including costs) of the livestock export industry against risks, assess the likely impacts/benefits of currently identified/planned reforms and how these could be maximised, and explore and identify additional priority reform opportunities.

### Updating Shipping Route Data for the Heat Stress Risk Assessment (HSRA) model

<b>Project code</b>	W.LIV.2025	<b>Location</b>	International
<b>Start date</b>	20-Aug-21	<b>Vendor</b>	University Corporation for Atmospheric Research



## All red meat species

<b>End date</b>	1-Jun-22	<b>Species</b>	All red meat species
<b>Initiation of research</b>	LEP		

This project will fund the assessment and analysis of the climate data required to enable the expansion of the Heat Stress Risk Assessment (HSRA) to incorporate up to 63 new shipping routes for voyages crossing the equator. It is complementary and essential to the HSRA software/platform upgrade, which is happening simultaneously.

### Standardisation of Export Declarations

<b>Project code</b>	W.RDE.0003	<b>Location</b>	International
<b>Start date</b>	11-Aug-21	<b>Vendor</b>	Unique Excellence
<b>End date</b>	30-Jun-22	<b>Species</b>	All red meat species
<b>Initiation of research</b>	Industry partnership (LEP)		

In order to support market access for exporters, the project aims to improve regulatory efficiency and consistency by developing standardised documentation for declarations required for Australian livestock export, beginning with the South-East Asian cattle markets.

### Validating the shipping routes to ports north of the equator and updating their respective Port Climate Data for the HSRA Model

<b>Project code</b>	W.LIV.2017	<b>Location</b>	National
<b>Start date</b>	15-Dec-20	<b>Vendor</b>	Weather Australia
<b>End date</b>	1-May-22	<b>Species</b>	All red meat species
<b>Initiation of research</b>	LEP		

The current heat stress risk assessment (HSRA) model relies on historical weather data for ship routes to port and port climatic data to predict risk. There is an imperative to update and better understand ship sailing routes and port climatic conditions to better manage sailing and port climate risk to livestock. This project will deliver an updated validated data set of up to sailing routes to 63 ports and their respective updated port climate data that will then be fed into the HSRA model as it undergoes an upgrade simultaneously.

### Managing ammonia emissions and pad moisture of confined livestock and identifying the effects of stocking density on behaviour and group dynamics of exported cattle and sheep

<b>Project code</b>	W.LIV.0299	<b>Location</b>	National
<b>Start date</b>	15-May-19	<b>Vendor</b>	University of New England
<b>End date</b>	30-Jan-24	<b>Species</b>	All red meat species
<b>Initiation of research</b>	LEP		

This project will research the effects of stocking density, bedding use and ammonia production, and their interactions on animal welfare, health and performance outcomes during live export transport.



## People and business

### ARLP Scholarship Course 29/30/31

<b>Project code</b>	L.STU.2203	<b>Location</b>	National
<b>Start date</b>	30-Oct-21	<b>Vendor</b>	Australian Rural Leadership Foundation
<b>End date</b>	15-Nov-25	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		

The Australian Rural Leadership Program (ARLP) is a high impact, immersive experiential learning program focused on the development of leadership for individuals and collectives who are contributing to the future prosperity of rural and regional Australia. The project will support the development of industry leadership and MLA ambassadorship through supporting an annual scholarship in the ARLP from October 2021- December 2025.

### Argyle Foods Group Carbon Neutrality Co-Innovation Program Manager

<b>Project code</b>	P.PSH.1331	<b>Location</b>	NSW
<b>Start date</b>	1-Oct-21	<b>Vendor</b>	Argyle Foods
<b>End date</b>	30-Apr-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The project addresses the lack of innovation capability across industry to address greenhouse gas (GHG) management interventions as outlined in the industry CN30 Roadmap. This project presents an opportunity to explore, pilot and scale greenhouse gas (GHG) management interventions in a mid-size supply chain.

### Nuffield Scholarship - FY 2022 / 2023 / 2024

<b>Project code</b>	L.STU.2201	<b>Location</b>	National
<b>Start date</b>	30-Sep-21	<b>Vendor</b>	Nuffield Australia
<b>End date</b>	31-Dec-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		

This project provides annual scholarships to Australian livestock producers to research innovative global concepts, techniques and systems with the potential to create positive change in their own businesses, communities and the broader agriculture sector.

### Coles RROA Collaborative Innovation Program Manager

<b>Project code</b>	P.PSH.1332	<b>Location</b>	National
<b>Start date</b>	1-Sep-21	<b>Vendor</b>	Retail Ready Operations Australia
<b>End date</b>	1-Apr-25	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project aims to develop and implement an innovation program that focuses on processor automation and the development of high value products for new markets and channels. It will support an Innovation Program Manager to



implement the Coles RROA collaborative innovation strategy which aligns to MLA strategic priorities and builds capability in the business.

### Building digital capability in Australian agriculture

<b>Project code</b>	P.PSH.1354	<b>Location</b>	National
<b>Start date</b>	2-Aug-21	<b>Vendor</b>	Australian Farm Institute
<b>End date</b>	25-Dec-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

Identification of digital capability obstacles and opportunities in Australian agriculture can improve the cost-benefit ratio of investment aimed at improving technology adoption in the sector. This project will map and define agriculture-specific digital capability issues within an iterative capability framework to enable organisations to assess appropriate points for intervention.

### Zanda McDonald Award Scholarship

<b>Project code</b>	P.PSH.1334	<b>Location</b>	National
<b>Start date</b>	2-Aug-21	<b>Vendor</b>	The Zanda McDonald Award Association
<b>End date</b>	25-Dec-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

MLA and the Zanda MacDonal Award Association have partnered under a collaborative research program to support and further develop the Zanda MacDonal Award program for a three year period. The investment forms part of the innovation capability sub program industry leadership imperative - developing enhanced leadership capability.

### Hargraves Institute Development and Delivery of Capability Building Modules for the MLA Co-Innovation Program

<b>Project code</b>	V.RMH.0126	<b>Location</b>	National
<b>Start date</b>	15-Aug-21	<b>Vendor</b>	Hargraves Institute
<b>End date</b>	30-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		

MLA supports innovation across the red meat sector by co-funding innovation managers for a term of three years. This project supports the performance of these managers in their roles by providing a qualified service provider to develop innovation capability resources and to assist in running co-innovation network meetings.

### Farmers2Founders – Phase 3

<b>Project code</b>	L.PIF.0003	<b>Location</b>	National
<b>Start date</b>	31-Jul-21	<b>Vendor</b>	Farmers2Founders
<b>End date</b>	30-Sep-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		



The overarching purpose of Farmers2Farmers (F2F) is to deliver a unique support system designed to attract and develop proactive, innovative Australian primary producers looking to grow and transform their businesses through cutting edge innovation and adoption of new technologies. F2F will develop producer entrepreneurship and technology capabilities so they can solve critical industry challenges and successfully bring new agtech, foodtech, and food ventures to market.

### Horizon Scholarship: Cohort 11

<b>Project code</b>	L.STU.2202	<b>Location</b>	National
<b>Start date</b>	1-Jul-21	<b>Vendor</b>	AgriFutures
<b>End date</b>	31-Dec-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		

The AgriFutures Horizon Scholarship is awarded to students studying an agriculture-related undergraduate degree or a Science, Technology, Engineering, Maths/Finance (STEM) degree with relevant majors which align to agriculture. This scholarship has been developed to entice, support and retain the next generation of a skilled and capable red meat workforce. The goal of the scholarship is to enhance the future supply of graduates available for employment in the red meat sector.

### ACC/MLA CN30 Co-innovation program

<b>Project code</b>	P.PSH.1256	<b>Location</b>	National
<b>Start date</b>	30-Apr-21	<b>Vendor</b>	Consolidated Pastoral Company
<b>End date</b>	17-Jul-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

The ACC CN30 co-innovation program has been developed to explore, pilot and scale greenhouse gas management interventions outlined in the industry’s CN30 Roadmap to deliver environmental, economic, and social impacts to ACC and the Australian red meat industry. This project is focused on accelerating CPC’s carbon management aspirations moving towards CN30.

### Greenham Tasmania Digital Value Chain Officer

<b>Project code</b>	P.PIP.0582	<b>Location</b>	Tasmania
<b>Start date</b>	1-Sep-20	<b>Vendor</b>	Greenham Tasmania
<b>End date</b>	30-Jun-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project supports the professional development and producer engagement activities for a digital value chain officer within Greenham Tasmania Pty Ltd to enhance digital capability, specifically through the provision of advanced analytics of data sets in order to generate new insights for the business.

### Greenham Victoria Digital Value Chain Officer

<b>Project code</b>	P.PIP.0581	<b>Location</b>	Victoria
<b>Start date</b>	1-Aug-20	<b>Vendor</b>	Greenham Gippsland
<b>End date</b>	30-Sep-23	<b>Funding source</b>	MLA Donor Company



<b>Initiation of research</b>	External partnership
<p>This project facilitates the employment of a digital value chain officer within Greenham Gippsland Pty Ltd to enhance digital capability, specifically through the provision of advanced analytics of data sets in order to generate new insights for the business</p>	

### Postgraduate Scholarships FY20

<b>Project code</b>	B.STU.2001	<b>Location</b>	National
<b>Start date</b>	22-Jun-20	<b>Vendor</b>	Various
<b>End date</b>	28-Feb-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	External partnership		
<p>MLA is making available ten awards, tenable at Australian universities or institutions, for PhD study commencing in 2020. The awards facilitate research and training in areas of practical value to the Australian beef, sheepmeat and goatmeat industries. The awards are designed to 'top up' remuneration held by students and to support project expenses. Funding will also support the annual postgraduate conference for students to develop presentation skills and network across RDCs.</p>			

### Elders - MLA co-innovation and adoption pilot

<b>Project code</b>	P.PSH.1117	<b>Location</b>	National
<b>Start date</b>	02-May-18	<b>Vendor</b>	Elders Rural Services Australia Ltd
<b>End date</b>	31-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		
<p>This project will run a three-year pilot with 75 Elders agents and senior managers to develop, establish and evaluate a co-innovation and adoption model.</p>			

## Processing productivity

### Translating intramuscular fat measurement technology to the sheepmeat industry

<b>Project code</b>	V.TEC.1726	<b>Location</b>	National
<b>Start date</b>	1-Dec-21	<b>Vendor</b>	Miniprobes
<b>End date</b>	31-Oct-24	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		
<p>This project will deliver a commercially applicable probe to measure intramuscular fat in un-cut carcasses. This project will focus on lamb but the device being developed will also be applicable to beef.</p>			

### Carcase analysis for lean meat yield measurement (DEXA) and cutting lines (stage 3)

<b>Project code</b>	P.PSH.1344	<b>Location</b>	National
<b>Start date</b>	31-Jul-21	<b>Vendor</b>	Nuctech



<b>End date</b>	30-Nov-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project (Stage 3) will build on the learnings from Stage 1 (development of a prototype lamb DEXA imaging system) and Stage 2 (Carcase analysis for lean meat yield measurement (DEXA) and cutting lines). Stage 3 will design, build and install in a purpose built DEXA system in a processing plant to enable automation and LMY measurements for lamb processing.

### Review of Advanced (Livestock & Carcase) Imaging Technologies

<b>Project code</b>	P.PSH.1290	<b>Location</b>	National
<b>Start date</b>	1-Mar-21	<b>Vendor</b>	Greenleaf
<b>End date</b>	1-Mar-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

Substantial in-roads have been made in the development and commercialisation of visioning technologies in the Australian red meat industry. Visioning is fundamental to the extensive programs of work covering both automation and objective measurement. This project aims to draw upon insights from these previous and current programs of work, focusing on the results of technical feasibility trials, testing the value propositions of increased accuracy of cutting lines, objective eating quality grading across multiple sectors of the supply chain, animal health inspection and the inspection of cartons for product integrity and quality.

### Review of Assistive Technologies for the Meat sector

<b>Project code</b>	P.PSH.1289	<b>Location</b>	National
<b>Start date</b>	28-Feb-21	<b>Vendor</b>	Greenleaf
<b>End date</b>	1-Mar-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project is a critical review of recent advancements in assisted technologies applicable for the red meat industry. This project represents the first phase of an Assisted Technologies Roadmap for the red meat industry. The project emphasis is on de-risking the adoption process by progressively demonstrating customer value propositions and commercial provider business model fit for the red meat industry. Findings from this report will consider the future workforce needs of a modern red meat sector.

### Re-locatable medical CT for DEXA and other device calibration

<b>Project code</b>	V.TEC.1708	<b>Location</b>	National
<b>Start date</b>	1-Mar-20	<b>Vendor</b>	Siosymm
<b>End date</b>	15-Jan-23	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Industry		

This project will evaluate the current generation of manual assistance exo-suits for on-farm and off-farm productivity. Industry participants will be offered an ergonomic assessment of their current manual tasks. The assessment will make recommendations to improve productivity with appropriate task design, and the potential use of exo-suit manual assist devices.



### Developing and commercialising advanced measurement technologies and feedback systems into globally competitive Australian meat value chains (ALMTech II)

<b>Project code</b>	V.RDP.4001	<b>Location</b>	National
<b>Start date</b>	28-Oct-19	<b>Vendor</b>	Murdoch University
<b>End date</b>	06-May-23	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project aims to facilitate and support commercialisation of successful technologies from the ALMTech I project and associated objective measurement projects. It will also further develop promising new technologies and continue existing activities that enable data flow back to industry, the generation of new genetic tools, and industry engagement to facilitate adoption.

### Microwave systems for measuring lamb and beef carcass composition and intramuscular fat

<b>Project code</b>	P.PSH.1181	<b>Location</b>	National
<b>Start date</b>	01-Mar-19	<b>Vendor</b>	Murdoch University
<b>End date</b>	30-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will design and test a low-cost microwave system to measure fat depth and intra-muscular fat in lamb and beef carcasses in a commercial abattoir environment and in live animals. The key goal is to produce accurate and low-cost microwave solutions to provide enhanced selection and feedback to producers, to inform value-based pricing and to optimise the use of carcasses to meet market specifications and volumes.

### Re-locatable medical CT for DEXA and other device calibration

<b>Project code</b>	V.TEC.1708	<b>Location</b>	National
<b>Start date</b>	15-Jan-19	<b>Vendor</b>	Murdoch University
<b>End date</b>	15-Dec-24	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will develop a reliable predictor of lean meat yield (LMY%) using DEXA within processing plants. The results will underpin producer feedback and value-based payment systems, support the calibration of other LMY% prediction devices and develop a standardisation system to ensure in-plant DEXA systems reliably measure LMY% within and between processing plants.

### Real-time meat eating quality probe: technology refinement and commercialisation

<b>Project code</b>	P.PSH.1132	<b>Location</b>	National
<b>Start date</b>	01-Jun-18	<b>Vendor</b>	MEQ Probe Pty Ltd
<b>End date</b>	28-Feb-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

MEQ Probe Pty Ltd have completed proof of concept for a hyper-spectral imaging-based eating quality probe to produce a real-time read on intra-muscular-fat (IMF), shear force (SF) and pH in carcasses. This project is focused on testing the MEQ Probe technology and its commercial readiness for beef and lamb processors in Australia.



### Effect of ionizing radiation on important foodborne bacteria during meat processing

<b>Project code</b>	V.TEC.1713	<b>Location</b>	National
<b>Start date</b>	15-Apr-19	<b>Vendor</b>	Murdoch University
<b>End date</b>	01-Feb-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will test the outcomes of radiation from DEXA on bacteria during meat processing and validate the impact and risk to the food industry. The outcome is predicted to be quality assurance for the use of x-ray in the meat industry.

### Rapiscan Multispectral Continuous CT Scanner - development and evaluation of the benefits and application of continuous MEXA CT systems

<b>Project code</b>	P.PSH.0886	<b>Location</b>	National
<b>Start date</b>	01-Oct-17	<b>Vendor</b>	Rapiscan Laboratories Inc
<b>End date</b>	30-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will develop a high-duty cycle multi energy x-ray CT, which constitutes a key part of the comprehensive multi-species full carcass 3D scanning objective measurement initiative. This device will provide a full physical model of the carcass, including offal, which will enable optimisation of automated physical carcass breakdown and comprehensive health feedback to assist value chain efficiency and productivity.

## Product innovation

### Pressurised CO2 technology (Farther Farms) and its ability to reduce reliance on a chilled supply chain literature review

<b>Project code</b>	V.RMH.0124	<b>Location</b>	National
<b>Start date</b>	27-Aug-21	<b>Vendor</b>	Prof Consulting Group
<b>End date</b>	25-Mar-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will investigate the viability of new pressurised CO2 technology for the storage and distribution of fresh foods, reducing reliance on refrigeration required to transport Australian red meat.

### "WeeknightCook" getting red meat back on the weeknight household menu

<b>Project code</b>	P.PSH.1319	<b>Location</b>	National
<b>Start date</b>	14-Jun-21	<b>Vendor</b>	Busy Beef
<b>End date</b>	30-Sep-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Commercial partnership		

The team at Busy Beef have developed a range of concept red meat meals under the WeeknightChef brand that are designed to feed a family of four, have been precooked and require only 30 minutes to assemble, heat and serve. This project will



assess the commercial viability for this range of red meat products as a family meal option in an increasingly competitive environment.

### Red Meat Protein Ingredient Opportunities

<b>Project code</b>	V.RMH.0125	<b>Location</b>	National
<b>Start date</b>	31-Mar-21	<b>Vendor</b>	CSIRO
<b>End date</b>	25-Nov-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will determine, qualify and quantify additional opportunities for different consumer segments to purchase, consume and enjoy red meat proteins in new formats and for new occasions. Having identified these new formats and occasions, the “job to be done” will be to develop a red meat protein supplement/ingredient that, as an additive, will exceed the taste, nutrition, availability and price requirements of consumers, whilst satisfying the functional requirements of new and existing supplement, ingredient and product manufacturers.

### Thrive Corporate Roundtable – Food trends Innovation

<b>Project code</b>	V.RMH.0122	<b>Location</b>	National
<b>Start date</b>	8-Feb-21	<b>Vendor</b>	Thrive
<b>End date</b>	26-May-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project aims to test and learn how multinationals respond to several key mega trends facing the food industry. The aim will be to complete series of discovery workshops that can help MLA frame and test key assumptions to unlock higher valued opportunity spaces for Australian red meat.

### Independent Ageing - New Red Meat Meal Opportunities

<b>Project code</b>	P.PSH.1282	<b>Location</b>	National
<b>Start date</b>	27-Nov-20	<b>Vendor</b>	Freeze Dry Industries Pty Ltd
<b>End date</b>	4-Mar-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project will use proof of concept to determine the acceptability of freeze dried red meat ready-made meals (RMRMM) to support the aged care industry.

### Hides to Riches - Extracting food grade collagen from beef hides

<b>Project code</b>	P.PSH.1274	<b>Location</b>	National
<b>Start date</b>	06-Nov-20	<b>Vendor</b>	Freeze Dry Industries Pty Ltd
<b>End date</b>	30-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		



This research project intends to discover and develop an all-natural method to process bovine hides to extract human food grade collagen. This research and development will follow a proven production process that aims to generate a high quality collagen with measurable scientific results. These results will be compared to known commercial products and will set the foundation for commercial collagen peptide production for the Australian red meat industry.

### Visual tags to monitor shelf life in Australian retail supply chains

<b>Project code</b>	P.PSH.1271	<b>Location</b>	National
<b>Start date</b>	20-Sep-20	<b>Vendor</b>	Australian Beef Group
<b>End date</b>	1-Jun-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This project explores the use of inexpensive tags applied to product to support cold chain management to give greater assurance at pack level. Tags will be validated against the shelf life of Australian beef, and consumer research will be conducted in retail supply chains to determine impact on consumer confidence, perceived value and changes in purchase behaviour.

### Developing high valued freeze dried Australian red meat products

<b>Project code</b>	P.PSH.0999	<b>Location</b>	National
<b>Start date</b>	06-Nov-17	<b>Vendor</b>	Freeze Dry Industries Pty Ltd
<b>End date</b>	30-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	External partnership		

This High Value Foods Frontier MDC project seeks to evaluate what value can be created and captured in high quality freeze-dried Australian beef and sheepmeat products, and in which markets.

### Aged Care 2025+ – identifying demand and new value opportunities for Australian red meat industry

<b>Project code</b>	V.RMH.0112	<b>Location</b>	National
<b>Start date</b>	27-Mar-20	<b>Vendor</b>	Andrews Meat Industries
<b>End date</b>	31-May-22	<b>Funding source</b>	Levy
<b>Initiation of research</b>	Industry		

This project will investigate and identify several higher value opportunity spaces for the inclusion of Australian red meat in domestic residential aged care facilities. An opportunity exists to explore innovations to grow red meat demand for this sector.

## Resource management

### Demonstration of an industrial microgrid as a means of enabling red meat processing facilities to operate independently of mains electricity

<b>Project code</b>	P.PIP.0745	<b>Location</b>	National
<b>Start date</b>	02-Oct-17	<b>Vendor</b>	Hardwick Meatworks Pty Ltd



<b>End date</b>	23-Dec-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Processing industry		

This project involves the design, implementation and demonstration of a ‘microgrid’ as a means of enabling red meat processing facilities to operate independently of the mains electricity grid.

### RRDfP dung beetle ecosystem engineers – enduring benefits for livestock producers via science and a new community partnership model

<b>Project code</b>	P.PSH.1134	<b>Location</b>	National
<b>Start date</b>	15-May-18	<b>Vendor</b>	Charles Sturt University
<b>End date</b>	22-May-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Rural R&D for Profit (RRDfP)		

This project will investigate how dung beetles can improve profitability and productivity for primary producers by rolling out a dung beetle services to a network of producers and producer groups, improving access to information and importing four new species of dung beetles to manage sheep and cattle dung.

### RRDfP wastes to profits

<b>Project code</b>	V.RDP.3010	<b>Location</b>	National
<b>Start date</b>	22-Mar-18	<b>Vendor</b>	Queensland University of Technology and its sub-contractors
<b>End date</b>	21-Apr-22	<b>Funding source</b>	Levy; MDC; Commonwealth Government; Voluntary contributions
<b>Initiation of research</b>	External partnership		

This project involves identifying and developing ways to capture a market opportunity in excess of \$100M per annum by converting agricultural waste into valuable products.

### Anaerobic Ammonium Removal (AAR) waste water treatment facility

<b>Project code</b>	P.PIP.0497	<b>Location</b>	New South Wales
<b>Start date</b>	04-Dec-15	<b>Vendor</b>	TFI
<b>End date</b>	28-Feb-22	<b>Funding source</b>	MLA Donor Company
<b>Initiation of research</b>	Processing industry		

The purpose of this project is to implement anaerobic ammonium removal (AAR) technology at a processing facility. AAR is a biological treatment process that converts ammonia in wastewater to nitrogen gas using bacteria that is entirely different to conventional systems.



# Adoption projects

MLA's investments into adoption aim to increase the uptake of on-farm R&D by producers through the delivery of awareness raising, short term training and long-term practice change programs. Between June 2019 and December 2021, MLA's RD&A investments funded 59 Profitable Grazing Systems (PGS) projects and 83 Producer Demonstration Sites (PDS) projects in the 'long term practice change' area (Appendix A).

### **Profitable Grazing Systems (PGS)**

[MLA's Profitable Grazing Systems \(PGS\) program](#) takes small groups of like-minded producers who want to improve their whole-farm performance and matches them with a qualified deliverer who builds their knowledge, skills and experience through hands-on training. PGS projects run between June 2019 and December 2021 are listed below.

### **Producer Demonstration Sites (PDS)**

[MLA's Producer Demonstration Sites \(PDS\) program](#) aims to increase the rate of adoption of key management practices and technologies that improve business profitability, productivity and sustainability. This is achieved through supporting livestock producers working in peer to peer groups to pursue new skills, knowledge and management practices applicable to their own commercial livestock production systems. PDS projects run between June 2019 and December 2021 are listed below.

### **MeatUp (L.MUP.2000)**

MLA's MeatUp forums deliver updates on the latest in red meat R&D to beef, sheep and goat producers. They are developed by Regional Producer Working Groups to provide topical, relevant information in regions across southern Australia. The events offer practical information for livestock producers and signpost attendees to programs and resources that support practice change to lift on-farm productivity and profitability.

### **BeefUp (B.FUP.2021)**

MLA's BeefUp forums deliver updates on the latest in red meat R&D to beef producers in northern Australia. They are developed with support of local organising groups to provide topical, relevant information. The events offer practical information for livestock producers and signpost attendees to programs and resources that support practice change to lift on-farm productivity and profitability.

### **'Back to Business' Bushfire Recovery Project**

Following devastating bushfires for producers in 2019-20, MLA launched the 'Back to Business' program to provide producers in fire-affected regions across Tas, Vic, NSW, SA and WA with up to three free one-on-one sessions with a local farm business consultant. These projects all concluded in late 2020 and early 2021.

### **EDGEnetwork (L.EDG.2201)**

The EDGEnetwork provides tailored, practical short courses in the fundamentals of business management, breeding, grazing land management and nutrition through workshops across Australia.



Workshops provide knowledge and skills for producers to enhance business and livestock management and positively influence farm profitability, sustainability and productivity.

### **Bred Well Fed Well (L.ADP.2029)**

BredWell FedWell is a practical, one-day workshop highlighting the key production benefits of superior genetics, plus feed management for improved reproductive performance and livestock productivity.

Producers will be able to use the outcomes of the workshop to help analyse and plan a genetics and nutrition regime suited to their environment and markets to boost profitability.

### **Productivity and Profitability Webinar series for red meat producers 2020-2022 (L.ADP.2101)**

This project will deliver 40 practical webinars to red meat producers to increase awareness of practices that can be implemented to increase productivity and profitability. The webinar series is targeted at southern Australia but accessible to producers Australia-wide. It allows access to a broad selection of presenters and gives flexibility to viewers to watch the live event and participate in a Q&A session, or watch the recording at anytime.

### **Livestock Advisor Updates (L.FAP.1910)**

Livestock Advisor Updates is a national program designed to better connect livestock advisors with outcomes and resources from MLA-funded R&D. The program is designed to enhance the service that advisors can provide to the red meat industry, fast-track adoption of technologies and practices and improve industry profitability and sustainability through the application of this information.

### **Red Meat and Wool Growth Program (P.PSH.1256)**

The Red Meat and Wool Growth Program (the Program) is a key component of South Australia's Growth State Agenda and is being developed in response to targets set by the SA Sheep and Beef Industry blueprints developed by industry. In order to help achieve these targets, the South Australian Government has committed \$7.5 million to the Red Meat and Wool Growth Program over the next three years (2019/20 to 2021/22). The Program will contribute to improve productivity, profitability and enhanced market access for the South Australian red meat and wool sectors. It will also provide valuable support to industry in preparation for recovery and restocking post drought and bushfire.

### **A review of global adoption practices and outcomes, and recommendations for implementation within the Australian Red Meat Industry (L.ADP.2110)**

This project will review national and international extension and adoption practices across industries, in order to identify novel strategies, programs and practices to add to those currently being implemented by MLA.

With increased focus and investment towards adoption outlined in Red Meat 2030, this has been identified as an opportunity to explore new and complementary adoption models to enhance the existing MLA Adoption strategy and add to the current suite of adoption and extension products.

### **Grazing system impact on livestock productivity, soil moisture and soil organic carbon (P.PSH.2005)**

This project involves ten trial sites across the New England region and aims to establish the baseline data required to determine the optimal blend of pasture production and feedbase utilisation for improved livestock productivity and increases in soil carbon levels.



### **Development and Delivery of Pasture Paramedic in Southern and Western Australia (L.FAP.2102)**

The successful Implementation of [Pasture Paramedic toolkit](#) (L.FAP.1903) has been developed for perennial pastures in the southern high rainfall zone. It was developed to assist producers and advisors to assess if and when pastures require intervention or resowing to optimise persistence. Due to the success of the tool, interest has come from other regions around Australia including in NSW, Western Australia and the medium rainfall zone of Victoria. While the approach used in Pasture Paramedic is applicable around Australia, the content needs to be modified to suit different species, systems and growing conditions.

### **Unlocking new opportunities and audiences for delivery of MLA products in Southern Australia farming groups (L.FAP.2104)**

This project will provide coordinated delivery of MLA products to seven farming groups in southern Australia. The aim of the project is to accelerate awareness of MLA resources, and to identify opportunities to develop new products and delivery pathways for producers. Stage one of this project will survey producers looking to grow and transform their farming business through a co-ordinated delivery plan to enable producers to build knowledge, skills and make meaningful on-farm practice change.

### **Joining Ewe Lambs Tool (L.ADP.2109)**

This project will leverage past research to develop a decision support tool that supports producer decision making around joining ewe lambs. A pilot adoption program will be run within the project to ensure user training and engagement with the tool and broader practice.

### **Bullseye 2 Livestock Productivity (P.PSH.1341)**

The project engages the Southern Rangelands Pastoral Alliance (SRPA) and experienced rangelands practitioners to facilitate and support the adoption of a suite of best management practices by 24 pastoralists across 5 million hectares of the WA southern rangelands. Focus will be placed on the dual outcomes of increasing range condition while increasing enterprise productivity through practices such as feed budgeting, weaning, vaccination, addressing nutritional deficiencies and increasing mustering efficiency.



## Appendix A - Adoption projects

### Completed PGS projects

Project code	Project title	Start date	End date	Location
<b>Grassfed cattle</b>				
<b>Reproductive efficiency</b>				
L.PGS.1827	Delivery of PGS Supported Learning Projects - <i>Heifers for Profit</i>	15-Sep-18	28-Feb-20	Southern Australia
<b>Sheep &amp; lamb</b>				
<b>Reproductive efficiency</b>				
L.PGS.2053	PGS Delivery Lifting Lamb Survival Tasmania	1-Jul-20	15-Dec-21	Tasmania
L.PGS.2030	PGS Delivery Lifting Lamb Survival WA	4-Jun-20	15-May-21	WA
L.PGS.1841	PGS Supported Learning Package Delivery - <i>Improving Ewe Lamb Performance</i>	15-Apr-19	30-Oct-19	Victoria
L.PGS.1845	Delivery of PGS Supported Learning Project - <i>Lifting Lamb Survival</i>	06-May-19	18-Oct-19	Southern Australia
L.PGS.2005	Achieve Ag - <i>Lifting Lamb Survival</i>	16-Sep-19	08-Jun-19	Southern Australia
L.PGS.1828	Delivery of PGS Supported Learning Projects - <i>Lifting lamb survival</i>	15-Sep-18	30-Mar-19	Tasmania
L.PGS.1819	Delivery of PGS Supported Learning Projects - <i>Livestock logic</i>	30-Jun-18	31-Jan-19	Victoria
L.PGS.1820	Delivery of PGS Supported Learning Projects - <i>Lifting Lamb Survival</i>	30-Jun-18	15-Jan-19	Southern Australia
<b>Eating quality</b>				
L.PGS.1833	PGS Off-The-Shelf Supported Learning Packages - <i>Improving lamb Lean Meat Yield and eating quality</i>	18-Mar-19	23-Sep-19	National
<b>Goats</b>				
<b>Animal production, husbandry and nutrition</b>				
L.PGS.2026	Profitable Grazing Systems Supported Learning Package Goat Productivity	30-Apr-20	15-Mar-21	National
<b>All grassfed species</b>				
<b>Animal production, husbandry and nutrition</b>				
L.PGS.1830	PGS Off-The-Shelf Supported Learning Packages - <i>Optimising herd productivity</i>	14-Feb-19	28-Jun-19	Southern Australia
L.PGS.1837	PGS Off-The-Shelf Supported Learning Packages - <i>Drought feeding economically</i>	01-Apr-19	20-Jun-19	National



Feedbase and grazing land management				
L.PGS.2034 L.PGS.2035	PGS Package Development PayDirt QLD Southern Inland	1-Jul-20	15-May-22	Northern Australia
L.PGS.2031	Grazing Matcher WA	26-Jun-20	13-May-22	WA
L.PGS.2102	PGS Pasture Resowing Package	27-Nov-20	17-Dec-21	Southern Australia
L.PGS.2122	Delivery of PGS SLP - Pasture Principles King Island NRM	13-Sep-21	1-Dec-21	Tasmania
L.PGS.2007	Delivery PGS B Doonan TRT Tasmania	22-Nov-19	30-Nov-21	Tasmania
L.PGS.2032	Profitable Grazing Systems Delivery Pasture Principles Tasmanian Southern Midlands	26-Jun-20	15-Nov-21	Tasmania
L.PGS.2101	PGS Pasture Manipulation Development Package	25-Sep-20	20-Aug-21	Southern Australia
L.PGS.2018	PGS Resource Development Gra\$ to Dollars	24-Mar-20	15-Jun-21	Southern Australia
L.PGS.2023	PGS Delivery Pasture Principles Flinders Island	20-Mar-20	15-May-21	SA
L.ADP.2003	PGS Feeder Optimising irrigated clover production	17-Jan-20	30-Mar-21	Tasmania
L.PGS.2006	Delivery PGS B Doonan Waverley Tasmania	22-Nov-19	15-Nov-20	Tasmania
L.PGS.1843	Delivery of PGS Supported Learning Project – Pasture Principles	22-Apr-19	30-Sep-20	Tasmania
L.PGS.1821	Delivery of PGS Supported Learning Projects - <i>Pasture principles</i>	30-Aug-18	20-Jan-20	Southern Australia
L.PGS.1822	Delivery of PGS Supported Learning Projects - <i>Pasture principles</i>	30-Aug-18	20-Jan-20	Southern Australia
L.PGS.1832	PGS Off-The-Shelf Supported Learning Packages – <i>Optimising investment in fertiliser and soil ameliorants</i>	01-Apr-19	30-Aug-19	National
L.PGS.1838	Delivery of PGS Supported Learning Project - <i>Holistic grazing</i>	01-Apr-19	20-Jun-19	Southern Australia
People and business				
L.PGS.2024	Delivery of Profitable Grazing Systems Supported Learning Project Benchmarking for Profit and Production	20-Apr-20	10-Aug-21	WA
L.PGS.2004	<i>ACE Benchmarking</i> - Supported Learning Project	30-Sep-19	09-Jun-20	Victoria
L.PGS.1849	Delivery of PGS Supported Learning Projects - <i>Business skills development</i>	07-Jun-19	03-Dec-19	New South Wales
L.PGS.1847	Delivery of PGS Supported Learning Projects - <i>Benchmarking for profit and production</i>	01-Jun-19	06-Nov-19	Western Australia
L.PGS.1824	Delivery of PGS Supported Learning Projects - <i>Benchmarking for profit and production</i>	30-Sep-18	25-Sep-19	Western Australia
L.PGS.1834	Delivery of PGS Supported Learning Projects - <i>Business skills development</i>	14-Mar-19	23-Sep-19	New South Wales
L.PGS.1831	PGS Off-The-Shelf Supported Learning Packages - <i>Making better on-farm investments</i>	14-Feb-19	28-Jun-19	National
L.PGS.1829	PGS Off-The-Shelf Supported Learning Packages - <i>Business essentials</i>	01-Mar-19	20-Jun-19	National



## PGS projects in progress

Project code	Project title	Start date	End date	Location
<b>Grassfed cattle</b>				
<b>Animal production, husbandry and nutrition</b>				
L.PGS.2033	PGS - <i>Phosphorus management in beef cattle</i> - Package development	19-Jun-20	13-May-22	Northern Australia
P.PSH.1038	Adoption of best practice vertebrate pest control in northern Queensland	15-Jan-18	15-Sep-21	Northern Australia
<b>Feedbase and grazing land management</b>				
L.PGS.2029	PGS Delivery Pasture Principles South Coast Beef Group	26-May-20	30-Jan-22	NSW
<b>Livestock genetics</b>				
L.PGS.2128	8 PGS SLP Delivery Building Better Breeders Riverina NSW	15-Dec-21	15-Dec-22	NSW
L.PGS.2120	PGS SLP Delivery - Building Better Breeders AC Bundle	1-Oct-21	1-Dec-22	NSW
L.PGS.2121	PGS SLP Delivery - Building Better Breeders Central West NSW	30-Oct-21	30-Oct-22	NSW
<b>Sheep and lamb</b>				
<b>Reproductive efficiency</b>				
L.PGS.2112	PGS SLP Delivery Lifting Lamb Survival Wagga NSW	7-Apr-21	25-May-22	NSW
<b>All grassfed species</b>				
<b>Animal production, husbandry and nutrition</b>				
L.PGS.1840	Delivery of Profitable Grazing Systems - <i>Paperless feeder activities</i>	08-Apr-19	15-Jul-22	Western Australia
<b>Feedbase and grazing land management</b>				
L.PGS.2107	PGS SLP Delivery PayDirt VIC	1-Apr-21	30-Mar-23	Vic
L.PGS.2105	PGS SLP Delivery Pasture Principles Holbrook NSW	1-Apr-21	30-Sep-22	NSW
L.PGS.2106	PGS SLP Delivery Grazing Matcher WA	31-Mar-23	30-Sep-22	WA
L.PGS.2028	Profitable Grazing Systems Delivery Satellite Assisted Forage Budgeting	15-Jul-20	15-Jun-22	Qld
L.PGS.2115	PGS SLP Delivery PayDirt SA	1-Jun-21	31-May-22	SA
L.PGS.2031	Profitable Grazing Systems Delivery - <i>Grazing matcher</i>	26-Jun-20	23-May-22	Western Australia
L.PGS.2034	PGS Package Development - <i>PayDirt</i> - QLD Southern Inland	01-Jul-20	15-May-22	Queensland
L.PGS.2014	PGS Supported Learning Project Delivery - <i>Gra\$\$ to Dollars</i> - Barossa	14-Feb-20	26-Feb-22	South Australia
L.PGS.2029	PGS Delivery - <i>Pasture principles</i> - South Coast Beef Group	26-May-20	30-Jan-22	New South Wales



People and business				
L.PGS.2109	PGS SLP Delivery Meat the Market Gundagai NSW	1-Apr-31	31-Aug-22	NSW
L.PGS.2111	PGS SLP Delivery Improving Tactical Decision Making NSW	5-Apr-21	14-Oct-22	NSW
L.PGS.2113	PGS SLP Delivery Benchmarking for Profit & Production WA	1-Jul-21	30-Sep-22	WA
L.PGS.2024	Delivery of PGS Supported Learning Project - <i>Benchmarking for profit and production</i>	20-Apr-20	15-May-22	Western Australia
L.PGS.2103	PGS SLP Lead with Certainty	3-May-21	30-Jun-22	Northern



## Completed PDS projects

Project code	Project title	Start date	End date	Service provider	Location
<b>Grassfed cattle</b>					
<b>Feedbase and grazing land management</b>					
L.PDS.1711	Improving heifer productivity by integrating FTAI into Commercial Cow Enterprises	31-Mar-17	30-Dec-20	Swans Veterinary Services	National
L.PDS.1706	Good clover bad clover	17-Mar-17	14-Jan-20	MacKillop Farm Management Group	National
B.PDS.1602	Leucaena productivity in grass pastures	15-Sep-15	28-Jun-19	Leucaena Network Association	Northern Australia
<b>Sheep &amp; lamb</b>					
<b>Animal health, welfare and biosecurity</b>					
L.PDS.1713	PDS - Temporary Fencing for Improved Lamb Survival	02-Aug-17	30-Aug-20	Dynamic Ag Pty Ltd	National
L.PDS.1602	PDS: New England Wormboss	15-Feb-16	19-Sep-19	University of New England	New South Wales
<b>Animal production, husbandry and nutrition</b>					
L.PDS.1714	Chaff carts as sheep management tools	20-Jun-17	30-Jun-20	AgPro Management	National
L.PDS.1803	Innovative Use of Gibberellic Acid (GA)	01-May-18	01-May-20	Department of Job, Precincts and Regions	Victoria
L.PDS.1803	Finishing systems for growing lambs	01-May-18	01-May-20	Department of Job, Precincts and Regions	Victoria
L.PDS.1701	Finishing Systems for the Future	31-Jan-17	29-Nov-19	Monaro Farming Systems CMC Inc	National
L.PDS.1601	Demonstration of diet to influence lamb sex-ratio	12-Feb-16	24-Sep-19	Holbrook Landcare Group	New South Wales
L.PDS.1808	PDS: Using eID to improve ewe performance	30-Jun-18	28-Feb-21	University of Melbourne	National
<b>Feedbase and grazing land management</b>					
L.PDS.1704	Improved pastoral feedbase management	1-Feb-17	28-Feb-21	Vanguard Business Services	NSW
L.PDS.1710	Managing Crop Grazing Producer Demonstration Site	30-Jun-17	03-Apr-20	Facey Group Inc.	Western Australia
L.PDS.1705	Advantages of Pasture Manipulation	01-Apr-17	01-Apr-20	Moore Catchment Council Inc	Western Australia
L.PDS.1702	Integrating dual-purpose crops and eID into mixed farming systems	28-Feb-17	31-Jan-20	Stirlings to Coast Farmers	National
L.PDS.1606	Integrated control of Chilean Needle Grass	15-Apr-16	26-Sep-19	Lewis Kahn	New South Wales



L.PDS.1603	Maximising Pasture Production in a Variable Climate	15-Apr-16	12-Aug-19	Angaston Agricultural Bureau	South Australia
L.PDS.1604	PDS: Seed Free Lamb	01-Jun-16	30-Jun-19	MacKillop Farm Management Group	Queensland
<b>All grassfed species</b>					
<b>Feedbase and grazing land management</b>					
L.PDS.1708	High Production Annual Forage in Perennial Systems	01-Jun-17	30-Jun-20	Perennial Pasture Systems	Victoria
L.PDS.1709	Tamar Pasture Improvement Demonstration Project	31-May-17	30-Jun-20	Tamar Natural Resource Management Inc.	Tasmania
L.PDS.1802	PDS: Impact of Spring Active Dung Beetles on Pasture Growths	01-Aug-17	31-May-20	Riverina Highlands Landcare Network	Southern Australia
L.PDS.1812	PDS: Feed management based on quantified information	30-Jun-18	30-Apr-20	Facey Group Inc.	National
L.PDS.1703	PDS: Real time Biomass Imaging & the FOO App for Improved Feed Budgeting	13-Feb-17	31-Jan-20	Southern DIRT Inc	National
L.PDS.1712	PDS: Improve Winter Feed Availability	05-Jun-17	30-Sep-19	Local Land Services	New South Wales
<b>Reproductive efficiency</b>					
L.PDS.1803	EPDS: Weaning Strategies for Improved Productivity	01-May-18	01-May-20	Department of Jobs, Precincts and Regions	Victoria



## PDS projects in progress

Project code	Project title	Start date	End date	Service provider	Location
<b>Grassfed cattle</b>					
<b>Animal production, husbandry and nutrition</b>					
P.PSH.2008	Increasing adoption of Phosphorous Supplementation in Northern Australia	1-Jul-21	30-Apr-26	Queensland DAF, NT DITT, WA DPIRD	Northern Australia
P.PSH.2100	PDS - Pastoral Partners Accelerating the Transition	1-Mar-21	15-Nov-24	University of Western Australia	WA
L.PDS.2109	PDS - Demonstrating new technologies for providing mineral supplementation via water	1-Dec-20	9-Dec-22	NT DITT	NT
L.PDS.1908	Post-weaning management strategies for cattle herds	01-Aug-19	30-Jun-24	MacKillop Farm Management Group	National
L.PDS.1810	Better Bega beef	30-Sep-18	30-Dec-22	Far South Coast Dairy Development	New South Wales
<b>Digital agriculture</b>					
L.PDS.2009	Central Australian self herding	30-Mar-20	29-Jan-26	Department of Primary Industries	Central Australia
<b>Feedbase and grazing land management</b>					
L.PDS.2108	PDS - Improved Beef Productivity through Predator Control	1-Dec-20	28-Nov-25	Fitzroy Basin Association	Queensland
P.PSH.2006	PDS: Value Chain Economics for Leucaena	18-Mar-20	9-Oct-23	Leucaena Network	Queensland, NT
L.PDS.2002	Demonstrating productive, regenerative Burdekin grazing practices	25-Feb-20	28-Aug-25	NQ Dry Tropics Ltd	Northern Australia
P.PSH.2003	Cooperative, integrated weed management in the BBB catchment	2-Feb-20	28-Aug-23	NQ Dry Tropics Ltd	Queensland
L.PDS.1910	The Derwent catchment project - forage shrub trial	30-Jul-19	15-Dec-23	The Derwent Catchment Project	Tasmania
L.PDS.1907	Winter forage tropical grass systems for cattle	13-Sep-19	15-May-23	Norco Rural Stores	Northern Australia
L.PDS.1909	Sustainable long term leucaena grass producer in northern Australia	01-Aug-19	01-Mar-23	Leucaena Network Association	Northern Australia
L.PDS.1806	Forage systems for optimal weaning management and finishing	25-Jun-18	25-Nov-22	Corrigan Farm Improvement Group	Western Australia
L.PDS.1804	Grazing crops to increase farm profitability	15-Jan-18	28-Oct-22	Corrigan Farm Improvement Group	Western Australia



Genetic analysis					
L.PDS.2008	Genomics for commercial Angus cattle	25-Jun-20	30-Dec-26	CJ & JE Mirams	Southern Australia
Reproductive efficiency					
P.PSH.1280	PDS - Reproductive health and management practices for beef heifers	15-Dec-20	1-Jan-24	Mackillop Farm Management	SA
L.PDS.2018	Girl Power: Prioritising Heifer Performance	13-Mar-20	26-Feb-25	Desert uplands	Northern Australia
Sheep & lamb					
Animal production, husbandry and nutrition					
L.ADP.2031	Supporting sheep producers transition to non-mulesed sheep	4-Jan-21	30-Sep-24	Lisa Warn Ag Consulting	Southern Australia
P.PSH.1346	PDS: Assessing Economic Benefits of Confinement Feeding	1-Nov-21	1-Jul-24	Stirlings to Coast Farmers	Qld, NSW, Vic
L.PDS.2111	PDS - Less predators, more lambs	1-Oct-22	1-Nov-23	AgriDome Consultancy	Vic
L.PDS.2011	Supported shift to non-mulesing systems in WA	06-Mar-20	30-Sep-24	AgPro Management	Western Australia
L.PDS.1809	Managing trace element deficiencies in sheep	01-Nov-18	30-Apr-24	Ag Consulting Pty Ltd	National
L.PDS.1905	The sense in supplementation	28-Feb-19	30-Jul-23	Monaro Farming Systems CMC Inc	Southern Australia
L.PDS.2005	Best practice predator control for lambing	07-Feb-20	30-Jun-23	Inspiring Excellence Pty Ltd	Southern Australia
L.PDS.2001	Exclusion feeding for lambs in drought	09-Aug-19	15-Dec-22	Farmlink Research Limited	National
L.PDS.1901	Increasing production using containment areas	01-May-19	30-Nov-22	Barossa Improved Grazing Group Inc	South Australia
L.PDS.2101	PDS - Managing growth of ewe weaners	01-Oct-20	31-Oct-22	Elders	Queensland
L.PDS.1811	Weaner to yearling production pays off	30-Jun-18	30-Jul-22	Monaro Farming Systems CMC Inc	Southern Australia
L.PDS.1807	Increasing carrying capacity and poor season resilience: Bulking pastures and diversity	15-Oct-18	31-Jan-22	AgPro Management	National
Feedbase and grazing land management					
P.PSH.2004	PDS: Realising benefits from sheep eIDs	1-Mar-20	30-Dec-25	Southern Farming Systems	Vic
L.PDS.2013	Pasture variety trials	01-Mar-20	30-Sep-25	ASHEEP	Western Australia
L.PDS.2006	Alternative fodder crops for turning off weaner lambs/hoggets	19-Feb-20	30-Oct-23	Southern DIRT Inc	Southern Australia
L.PDS.2019	Fodder Systems and Feed Gaps	13-Mar-20	15-Sep-23	Monaro Farming Systems CMC Inc	Southern Australia



Reproductive efficiency					
L.PDS.2106	PDS - Pregnancy scanning in extensive sheep flocks	1-Mar-21	31-May-24	Merinolink	NSW
L.PDS.2107	PDS - Increasing number of lambs weaned / ewe unit	2-Nov-20	1-Nov-23	Nutrien Ag	WA
L.PDS.2016	Genetics of reproduction and lamb survival	23-May-20	25-Feb-26	Nextgen Agri Limited	National
L.PDS.2015	Magnificent maidens	01-Mar-20	30-Jan-26	Nextgen Agri Limited	Southern Australia
L.PDS.2021	Breeding Objectives - setting and getting change	30-Apr-20	20-Jul-25	DJPR	National
L.PDS.2017	Maximising Dorper Reproductive Performance	13-Mar-20	15-Aug-23	GI & AL Collins	National
All grassfed species					
Animal production, husbandry and nutrition					
L.PDS.2003	Restoring pasture productivity in the Northern Tablelands	7-Feb-20	15-Jun-26	Glenrac Inc.	NSW
L.PDS.2102	PDS - Alternative pasture legumes in NSW Central West	11-Jan-21	11-Jan-24	Central West Farming Systems	NSW
L.PDS.2010	Integrating livestock and timber production	30-Apr-20	17-Oct-23	DAFF	National
L.PDS.2109	PDS - Demonstrating new technologies for providing mineral supplementation via water	01-Nov-20	09-Dec-22	Department of Industry, Tourism and Trade	Northern Territory
Feedbase and grazing land management					
L.PDS.2214	PDS: Healthy Subsoils Produce More Red Meat	1-Nov-21	17-Jun-28	Agridome Consultancy	Vic, Tas
L.PDS.2208	PDS: Testing Tropicals - NSW Southern Slopes	1-Jun-21	1-Jun-27	Holbrook Landcare Group	NSW
L.PDS.2014	Growing perennial pastures in a variable climate	1-Feb-20	31-Dec-25	Gippsland Agricultural Group	Vic
L.PDS.2104	PDS - Legume and Shrub Grazing Systems Adoption Trial	1-Dec-20	1-Dec-25	Merredin and Districts Farm Improvement Group	WA
L.PDS.2207	PDS: Effective Rangeland EID Decision Making Systems	1-Dec-21	15-Aug-25	NALA Agribusiness	NSW
P.PSH.2002	PDS - Precision soil management for pasture productivity	1-Nov-20	3-Jun-24	Precision Agriculture	SA
L.PDS.2105	PDS - Optimising Pastures in Low Rainfall Zones	01-Nov-20	30-Aug-26	The Liebe Group	Western Australia
L.PDS.2110	PDS - Precision soil mapping in Central Victorian Pastures	01-Nov-20	30-Jun-26	Precision Agriculture Pty Ltd	Victoria
L.PDS.2012	Alternate forage crops for Southern WA	01-Mar-20	30-Sep-24	Stirlings to Coast Farmers	Western Australia



L.PDS.1904	Increasing profit with dual purpose crops	28-Feb-19	27-Sep-24	Southern DIRT Inc	Southern Australia
L.PDS.2020	Filling the autumn feed gap	14-Feb-20	30-Jul-24	Lower Blackwood Land Conservation	Western Australia
L.PDS.2004	Fescue; a low rainfall pasture tool	19-Feb-20	30-Oct-23	Perennial Pasture Systems	Southern Australia
L.PDS.2007	Tough Systems	06-Mar-20	30-Sep-23	AgPro Management	National
L.PDS.1902	Is fertilizing sown pastures economically worthwhile	25-Mar-19	30-May-22	Carnamah Investment Trust	National