MEAT & LIVESTOCK AUSTRALIA

RD&A stocktake

A summary of MLA's research, development and adoption (RD&A) projects from June 2018 – November 2020

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Contents

Abbreviations

ABSF	Australian Beef Sustainability Framework
ALMS	automated livestock management system
AMU	Antimicrobial usage
APVMA	Australian Pesticides and Veterinary Medicines Authority
AR	Augmented Reality
AWI	Australian Wool Innovation
BIN	Beef information nucleus (project)
BRD	Bovine respiratory disease
CISP	Collaborative Innovation Strategies Program
CN30	Carbon Neutral 30
CRC	Cooperative Research Centres
CT	Computerized Tomography
DAFF	Department of Agriculture and Fisheries
DEXA	Dual Energy X-ray Absorptiometry
DNA	Deoxyribonucleaic acid
EBV	Estimated Breeding Value
eID	Electronic identification
eNVD	Electronic National Vendor Declaration
GHG	Greenhouse gas
ILSC	Indigenous Land and Sea Corp
IMF	Intramuscular fat
IoT	Internet of things
ISC	Integrity Systems Company
LEP	Livestock Export Program
LGAP	Livestock Global Assurance Program
LPP	Livestock Productivity Partnership
MAP	Modified atmosphere packaging
MDC	MLA Donor Company
MEDLI	Model for Effluent Disposal Using Land Irrigation
MENA	Middle East and North Africa
MEXA	Multi Energy X-ray Absorptiometry
MISP	Meat Industry Strategic Plan
MSA	Meat Standards Australia
NACP	Northern Australian Climate Project
NFAS	National Feedlot Accreditation Scheme
NLIS	National Livestock Identification System
NSW	New South Wales
NSW DPI	New South Wales Department of Primary Industries
OCM	Objective Carcase Measurement
Pty Ltd	Proprietary limited
R&D	Research and Development
RD&A	Research, Development and Adoption
RDE&A	Research, Development, Extension and Adoption
REDI	Remote early disease identification
RFID	Radio-frequency Identification
RRD4P	Rural Research and Development for Profit
SA	South Australia
SCRC	Sheep Cooperative Research Centre
SMDB	Ship Mortality Database
STEC	Shiga toxin-producing Escherichia *coli*
TGP	Total grazing pressure
WA	Western Australia
WAN	Wide Area Network
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 2019-20, MLA had a total portfolio of 582 research contracts worth $523.4 million across its RD&A programs.

Further 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, Integrity Systems Company and International Marketing R&D portfolios, from June 2018 through to November 2020. 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'.

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 terms of interest (keyword, region, species, etc).

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

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

Grassfed cattle

Completed R&D projects

Animal health, welfare and biosecurity

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
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 paratosis 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 colostridal 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 9 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
Start date	01-Dec-16	**Vendor**	University of Queensland
End date	31-Dec-19	**Funding source**	Levy
Date of publication	23-Dec-19	**Initiation of research**	Investment call

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 un-vaccinated controls. Injection site reactions necessitate further refinement of the formulation.

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

Project code	P.PSH.0969	**Location**	National
Start date	15-Nov-17	**Vendor**	University of Adelaide
End date	30-Jun-18	**Funding source**	MLA Donor Company
Date of publication	19-Aug-19	**Initiation of research**	External partnership

Female-focussed 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.

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

Project code	B.AHE.0322	**Location**	National
Start date	01-May-18	**Vendor**	University of Sydney
End date	01-Sep-19	**Funding source**	Levy
Date of publication	17-Jun-19	**Initiation of research**	Industry

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 need to be validated in the field.

Developing a national standard for pregnancy testing

Project code	B.AWW.0261	**Location**	National
Start date	01-Jun-18	**Vendor**	Industry Beef Consulting Pty Ltd
End date	30-Apr-19	**Funding source**	Levy
Date of publication	30-Apr-19	**Initiation of research**	Industry

This project assessed the supply and demand characteristics of pregnancy testing services across Australia, investigated the capacity to respond to gaps identified and determined the need for ongoing work in the area. Non-veterinary pregnancy testers are unrepresented and not engaged with the veterinary profession. There is a need for a national competency standard, with an audit-based accreditation and registration process.

Alternative *Onchocerca gibsoni* detection and management in Cattle

Project code	V.RBP.0023	**Location**	National
Start date	01-Mar-16	**Vendor**	Food and Veterinary Service Pty Ltd
End date	30-Jun-18	**Funding source**	Levy
Date of publication	06-Mar-19	**Initiation of research**	Industry

This project looked at alternate risk management of *Onchocerca gibsoni* by removing current procedures and using alternative methods.

Agscent cow breath sampling and testing prototype development

Project code	P.PSH.1166	**Location**	National
Start date	25-Sep-18	**Vendor**	Agscent Pty Ltd
End date	24-Jan-19	**Funding source**	MLA Donor Company
Date of publication	24-Jan-19	**Initiation of research**	External partnership

This project developed a proof of concept tool to determine the feasibility and efficacy of detecting specific volatile biomarkers in breath samples to determine pregnancy status in cattle. This device also has the potential to be applied to other non-invasive diagnostics related to productivity, health and welfare status.

Animal production, husbandry and nutrition

Northern Breeding Business: NB2 Strategic Partnership Development

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

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

The impact of handling conditions and new environments on the stress of cattle

Project code	P.PIP.0743	**Location**	National
Start date	01-Jul-17	**Vendor**	Harvey Industries Group Pty Ltd
End date	30-Dec-18	**Funding source**	MLA Donor Company
Date of publication	17-Apr-19	**Initiation of research**	Processing industry

This project aimed to assess time points in the supply chain from the time of induction to a feedlot through to slaughter to assess the relative levels of stress at these time points and the impact of cattle temperament on stress.

Hitting the grid with culled cows in the Northern Territory

Project code	B.NBP.1617	**Location**	Northern Australia
Start date	29-Feb-16	**Vendor**	Department of Primary Industries
End date	10-Dec-18	**Funding source**	Levy
Date of publication	10-Dec-18	**Initiation of research**	Industry

This project evaluated methods for increasing the weight and value of cull cows and document the required data (biological and economic) to estimate the potential economic benefits for feeding different classes of cull cows to increase market value.

Development and validation of novel tool to assess reproductive traits and improve beef cattle reproductive efficiency

Project code	B.GBP.0003	**Location**	Northern Australia
Start date	01-Jun-16	**Vendor**	Central Queensland University
End date	15-Sep-18	**Funding source**	Levy
Date of publication	30-Oct-18	**Initiation of research**	Industry

This project integrated existing technologies (telemetry, social networking and remote management devices) to determine how precision livestock management could be used within the seed stock industry. The focus was on delivering more accurate quantitative measures of reproductive performance for extensively managed herds.

Detoxification of fluoroacetate by naturally occurring rumen microorganisms

Project code	B.AHE.0248	**Location**	Northern Australia
Start date	30-May-18	**Vendor**	CSIRO
End date	30-Jun-18	**Funding source**	Levy
Date of publication	31-May-18	**Initiation of research**	Industry

Poisoning of cattle in northern Australia due to ingestion of plants containing fluoroacetate (FA) causes significant economic loss to producers. This project aimed to identify rumen bacteria capable of degrading FA and to determine whether rumen detoxification may be a viable strategy to protect animals from FA poisoning.

Digital agriculture

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

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

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

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

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

Evaluating Fort Supply's FaST Track-Monitor animal health and inventory system on feedlot cattle

Project code	P.PSH.1080	**Location**	Queensland
Start date	20-Apr-18	**Vendor**	Australian Country Choice Properties
End date	22-Jan-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
This project evaluated high-frequency ear-tag technology through a series of pilot trials over two production cycles to assess cattle sickness by monitoring cattle movements.			

LiveCare (Health Bolus) IoT proof of concept

Project code	P.PSH.1064	**Location**	Queensland
Start date	01-Apr-18	**Vendor**	ST Solutions Australia Pty Ltd
End date	29-Aug-18	**Funding source**	MLA Donor Company
Date of publication	30-Sep-18	**Initiation of research**	External partnership
This project researched and developed a proof of concept prototype of an IoT (internet of things) technology solution to monitoring animal welfare. The 'LiveCare' system is designed to integrate into current practices to enhance the quality of care producers can provide to their livestock.			

Potential use of autonomous vehicles on cattle stations, feedlots and processing plants

Project code	P.PSH.1118	**Location**	Queensland
Start date	01-May-18	**Vendor**	HDT Expeditionary Systems Inc.
End date	01-Sep-18	**Funding source**	MLA Donor Company
Date of publication	14-Aug-18	**Initiation of research**	External partnership
For the past few years, HDT has been delivering an autonomous work vehicle for livestock management to Australia. This project investigated several additional applications for this vehicle, beyond those already identified.			

Eating quality

Sensory evaluation of Australian and American briskets, striploins and ribs by Australian and American consumers utilising genomic tested cattle

Project code	L.EQT.1814	**Location**	National
Start date	15-Nov-17	**Vendor**	University of New England
End date	30-Jun-18	**Funding source**	Levy
Date of publication	05-May-20	**Initiation of research**	Industry
This project conducted consumer sensory testing on Australian and American consumers for the purpose of testing new cook methods and developing further accuracy on eating quality prediction of secondary cuts within a carcase.			

Consumer sensory evaluation of stored product

Project code	L.EQT.1809	**Location**	National
Start date	22-Jan-18	**Vendor**	Tastepoint Pty Ltd
End date	15-Jun-18	**Funding source**	Levy
Date of publication	05-May-20	**Initiation of research**	Industry
This project conducted consumer sensory testing of stir fry and yakiniku samples currently in storage at the University of New England. This sensory evaluation contributed to the accuracy of prediction of these cook methods in the Meat Standards Australia Model.			

Using consumer sensory testing to further enhance MSA beef model expansion and accuracy

Project code	L.EQT.1720	**Location**	National
Start date	22-Jan-18	**Vendor**	Tastepoint Pty Ltd
End date	15-Jun-18	**Funding source**	Levy
Date of publication	30-Sep-19	**Initiation of research**	Industry
This project improved the accuracy of the Meat Standards Australia (MSA) model on cuts of beef with limited information. The MSA model was expanded with new cut-by-cook combinations and cooking methods, and existing cooking methods were tested to determine any changes in consumer sensory preferences.			

Quantifying the impact of Modified Atmospheric Packaging (MAP) and alternative packaging solutions on eating quality

Project code	L.EQT.1813	**Location**	National
Start date	24-Nov-17	**Vendor**	Charles Sturt University
End date	30-Sep-18	**Funding source**	Levy
Date of publication	16-Sep-19	**Initiation of research**	Industry
This project addressed critical commercial challenges and evaluated various meat packing methods that affect product eating quality.			

An investigation into improving the product quality in hot boned beef

Project code	V.RMH.0077	**Location**	National
Start date	30-Mar-18	**Vendor**	Murdoch University
End date	20-Sep-18	**Funding source**	Levy
Date of publication	20-May-19	**Initiation of research**	Industry
This study tested post-slaughter processing methods that can improve the tenderisation of hot boned striploin. Hot boning is commonly used for the grinding market because it is more economically beneficial, but often results in poorer meat quality and tenderness.			

Feedbase and grazing land management

Dieback Buffel

Project code	B.PAS.0358	**Location**	Queensland
Start date	11-Oct-17	**Vendor**	Multiple
End date	13-May-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.1015	**Location**	National
Start date	15-Dec-17	**Vendor**	Leucaena Network Association Inc
End date	15-Dec-19	**Funding source**	MLA Donor Company
Date of publication	07-Jan-20	**Initiation of research**	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.			

Grazing with Self Herding

Project code	B.GBP.0025	**Location**	Northern Australia
Start date	01-Jan-18	**Vendor**	Rangelands NRM WA
End date	30-Mar-19	**Funding source**	Levy
Date of publication	22-Nov-19	**Initiation of research**	Investment call

Self-herding is a method of livestock management that uses a combination of nutritional rewards and signals (sight, sound and smell) to move livestock around a paddock. This project was designed as a proof of concept to test the effectiveness of self-herding for grazing land management and as a fire management tool.

Assessing productivity gains for cattle grazing "Redlands" (R12) leucaena in northern Queensland

Project code	B.NBP.1618	**Location**	Northern Queensland
Start date	29-Mar-16	**Vendor**	Department of Agriculture and Fisheries
End date	30-Dec-18	**Funding source**	Levy
Date of publication	21-Oct-19	**Initiation of research**	Industry

The main purpose of this project was to develop a trial site of psyllid resistant leucaena (Phase 1) and measure the liveweight gain, performance and carcase characteristics of the grazing cattle (Phase 2), which would guide economic modelling to support the adoption and establishment of leucaena in north Queensland.

Assessment of promising pasture legumes and grasses

Project code	B.NBP.0766	**Location**	Queensland
Start date	01-Jun-13	**Vendor**	Department of Agriculture & Fisheries
End date	25-Jun-19	**Funding source**	Levy
Date of publication	30-Sep-19	**Initiation of research**	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 north Queensland.

Preparation and revision for 2nd Edition of the grazier manual 'Leucaena

Project code	B.GBP.0028	**Location**	Northern Australia
Start date	29-Jan-18	**Vendor**	University of Queensland
End date	21-Jun-19	**Funding source**	Levy
Date of publication	20-Sep-19	**Initiation of research**	Industry

The primary aim of this project was to update the first edition of the grazier manual 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.

Data collation, analysis and recommendations to support adoption of leucaena-grass pastures

Project code	B.GFB.1809	**Location**	National
Start date	01-Apr-18	**Vendor**	Rural Consulting Group Pty Ltd
End date	30-Jan-19	**Funding source**	Levy
Date of publication	15-Jan-19	**Initiation of research**	Industry
This project collected data on current areas sown to leucaena and market research on producers already growing leucaena, to ascertain what adoption approach is likely to be the most successful and demonstrate return to MLA R&D investment in leucaena.			

Use of fodder beet to increase post weaning growth rate, MSA compliance and winter throughput of pasture finished cattle in southern Australia

Project code	P.PSH.0755	**Location**	Southern Australia
Start date	10-Feb-16	**Vendor**	University of Adelaide
End date	22-Nov-18	**Funding source**	MLA Donor Company
Date of publication	23-Nov-18	**Initiation of research**	External partnership
This project was centred on establishing fodder beet trial sites in the Limestone Coast region to assess its suitability as an alternative feed for pasture finished cattle in southern Australia. This represents the first major trials in Australia incorporating consideration for animal performance and carcase quality.			

Food safety, traceability and integrity systems

Real-time faecal detection on the beef slaughter line as a means of quality control

Project code	P.PIP.0552	**Location**	National
Start date	13-Feb-17	**Vendor**	CSIRO
End date	20-Apr-19	**Funding source**	MLA Donor Company
Date of publication	17-Nov-20	**Initiation of research**	Processing industry
The primary aim of this project was to validate a new real-time faecal detection technology, to understand how faecal detection can be used to reduce pathogenic contamination, increase the shelf life of red meat and increase the profitability of a carcase.			

Antimicrobial resistance in commensal bacteria in bovine faeces at slaughter

Project code	V.MFS.0432	**Location**	National
Start date	15-Aug-18	**Vendor**	CSIRO
End date	29-May-20	**Funding source**	Levy
Date of publication	15-Oct-20	**Initiation of research**	Industry
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.			

Egypt beef shelf life verification trials

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

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

Project code	P.PSH.0828	**Location**	National
Start date	08-Jan-18	**Vendor**	Ceres Tag Pty Ltd
End date	03-Jul-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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.

Predictive modelling pilot trial on vacuum skinned beef through a retail supply chain

Project code	P.PIP.0563	**Location**	National
Start date	15-Aug-18	**Vendor**	Greenleaf Enterprises Pty Ltd
End date	30-Apr-19	**Funding source**	MLA Donor Company
Date of publication	06-Nov-19	**Initiation of research**	Processing industry

The aim of this project was to demonstrate that Australian vacuum-packed chilled Australian red meat has a superior shelf life in major export markets and ensure supply chains are implementing tools and practices to achieve superior shelf life.

Developing eNVD capability for Coles beef supply chain

Project code	P.PSH.1141	**Location**	National
Start date	26-Jun-18	**Vendor**	Coles Supermarkets Australia
End date	19-Nov-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
The purpose of this project was to develop a Coles mobile native eNVD software application and to integrate eNVD data within Coles' booking system.			

Genetic analysis

Optimizing temperate cow herd efficiency - a Trans-Tasman collaboration

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

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

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

Project code	P.PSH.0503	**Location**	National
Start date	15-Feb-16	**Vendor**	Herefords Australia Limited
End date	30-Jul-20	**Funding source**	MLA Donor Company
Date of publication	01-Jul-20	**Initiation of research**	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

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

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

Project code	P.PSH.0837	**Location**	National
Start date	01-Jun-17	**Vendor**	Agricultural Business Research Institute
End date	31-Dec-19	**Funding source**	MLA Donor Company
Date of publication	25-Feb-20	**Initiation of research**	External partnership
This project reviewed stud client and industry databases, including the BREEDPLAN software, to investigate which one's 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

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

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

Enabling genetic improvement of reproduction in tropical beef cattle

Project code	B.NBP.0759	**Location**	Northern Australia
Start date	01-Nov-13	**Vendor**	University of New England
End date	28-Feb-19	**Funding source**	Levy
Date of publication	24-Sep-19	**Initiation of research**	Industry
The primary aim of this project was to improve techniques for genetic analysis to increase the ability of producers to breed cattle that have better reproductive performance in northern Australia.			

Beef CRC genomics database annotation

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

Northern commercial producer case studies

Project code	L.GEN.1805	**Location**	Northern Australia
Start date	05-Feb-18	**Vendor**	Anvil Media
End date	19-Mar-19	**Funding source**	Levy
Date of publication	19-Mar-19	**Initiation of research**	Industry
This project investigated and compiled four case studies of commercial producers, to demonstrate the benefits and improvements of that genetic analysis can have to reproductive performance in northern beef cattle production.			

Poll DNA marker test improvements for industry sampling biases

Project code	L.GEN.1803	**Location**	National
Start date	28-Feb-18	**Vendor**	Animal Genetics and Breeding Unit
End date	31-Jan-19	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	Industry
This project improved the accuracy and reliability of the commercial poll DNA tests by actively sourcing horned animals from particular breeds and obtaining their genotypes and phenotypes for inclusion into the test dataset.			

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

Project code	P.PSH.1041	**Location**	National
Start date	11-Feb-18	**Vendor**	Central Queensland University
End date	30-Jun-18	**Funding source**	MLA Donor Company
Date of publication	21-Jun-18	**Initiation of research**	External partnership
This project focused on a preliminary assessment of simplified phenotypic data recording methods commercially available to seed stock producers with the aim to make it easier to record phenotypic data and make more accurate selection decisions.			

Development of a National Beef Genotyping Strategy

Project code	L.GEN.1806	**Location**	National
Start date	15-Apr-18	**Vendor**	University of New England
End date	15-Jun-18	**Funding source**	Levy
Date of publication	15-Jun-18	**Initiation of research**	Industry
This project developed a nationwide industry strategy for genotyping cattle. The strategy was produced to determine the best animals to genomic test to ensure that there is reliability in the genetics tools available and maintain reference populations.			

Livestock export

Eye disease in cattle on long-haul voyages

Project code	W.LIV.0181	**Location**	International
Start date	15-Mar-14	**Vendor**	Murdoch University
End date	01-Mar-19	**Funding source**	Levy
Date of publication	26-Sep-19	**Initiation of research**	Industry

Research into the vaccination for eye disease in *Bos taurus* cattle during quarantine periods was commissioned after veterinarians and workers in the live cattle export supply chain noticed irregular, severe outbreaks of eye disease during overseas voyages. This project reviewed current literature and disease data from recent outbreaks to identify the causes of current eye diseases and develop strategies for prevention.

Alternative options to power captive bolts devices for cattle

Project code	W.LIV.3045	**Location**	International
Start date	30-Nov-16	**Vendor**	Herd Health Pty Ltd
End date	01-Jun-19	**Funding source**	Levy
Date of publication	17-Sep-19	**Initiation of research**	Industry

This project explored potential options for alternative technologies to power captive bolt stun devices that may be able to cost effectively replace the current stunners used throughout the live export supply chains.

Economic analysis of the live cattle export trade

Project code	W.LIV.0196	**Location**	International
Start date	14-May-18	**Vendor**	Mercardo
End date	30-Sep-18	**Funding source**	Levy
Date of publication	01-Nov-18	**Initiation of research**	Industry

This project performed an economic analysis to redefine and emphasise the importance of the live cattle trade to Australia and importing countries.

People and business

Global Veal Market: Innovation opportunities for Australia

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

This project provides an update on the global veal market and identify 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	*Not yet available*	**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.			

Australian Country Choice (ACC) integrated livestock management

Project code	P.PSH.1096	**Location**	National
Start date	01-Apr-18	**Vendor**	Australian Country Choice Properties
End date	31-May-19	**Funding source**	MLA Donor Company
Date of publication	17-Oct-19	**Initiation of research**	External partnership
The primary objective of this work was to implement a fully integrated, supply chain data management system by upgrading existing software. The key learnings were to be incorporated into reference materials, processes and principles to apply to other businesses in the Australian red meat supply chain.			

Scoping the viability, feasibility and capacity for a Northern beef centre of excellence

Project code	B.GBP.0033	**Location**	Northern Australia
Start date	01-Sep-18	**Vendor**	Gatenby Investments Pty Ltd
End date	01-Feb-19	**Funding source**	Levy
Date of publication	17-Sep-19	**Initiation of research**	Industry
This project developed a business plan to support the concept and initiation of a postgraduate training facility for the northern beef industry and South-East Asia.			

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	*Not yet available*	**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

Automated MSA/AusMeat hyperspectral handheld grading for beef

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

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

Frontmatec BCC3 beef classification system study and installation in Australia beef industry

Project code	P.PSH.0996	**Location**	National
Start date	01-Dec-17	**Vendor**	Frontmatec
End date	30-Oct-18	**Funding source**	MLA Donor Company
Date of publication	24-Jun-19	**Initiation of research**	External partnership
Frontmatec have designed and built a 360° 3D classification system for the European beef grading system with the potential of estimating primal weights. This project was to build on this work, by designing and building an algorithm to suit the Australian Beef processing industry.			

Investigating neural network algorithms for imaging points of interest identification

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

High value food frontiers impact data and return on investments

Project code	V.RMH.0088	**Location**	National
Start date	30-Oct-18	**Vendor**	Greenleaf Enterprises Pty Ltd
End date	30-Mar-19	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	Industry
The objective of this project was to review all MLA R&D projects from the 2015-2020 period to provide an estimate of red meat industry benefit from these investments. Projects were grouped by outputs that would have attributable outcomes and impact to industry.			

Scott – JBS Automated rib cutting - detector upgrade

Project code	P.PIP.0749	**Location**	National
Start date	10-Sep-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	31-Aug-18	**Funding source**	MLA Donor Company
Date of publication	08-Feb-19	**Initiation of research**	Processing industry
This project designed and re-configured the x-ray component of the “LEAP4Beef” system to include any future upgraded components to ensure the system is more robust.			

Feasibility and pre-production development of integrated data capture/management and product handling in beef processing (Phase 1)

Project code	P.PIP.0544	**Location**	National
Start date	15-Sep-16	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	20-Jul-18	**Funding source**	MLA Donor Company
Date of publication	08-Feb-19	**Initiation of research**	Processing industry
This project evaluated and tested a production prototype concept for a fully integrated and automated data management and product handling system to empty and fully assemble pallets through to end of line delivery to chilled and frozen storage.			

Automated 3D non-uniform volumetric primal box packing for Beef – Proof of concept and Prototype build

Project code	P.PSH.0909	**Location**	National
Start date	01-Oct-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	31-Dec-18	**Funding source**	MLA Donor Company
Date of publication	05-Jan-19	**Initiation of research**	External partnership
This project developed a proof of concept and prototype construction of an automated carton load station to locate cartons in a magazine, incorporate a load fixture for controlled loading of primals to the correct fill and feature a refinement of a gripper concept to reliably pick up a range of primals.			

Heavy Bone Saw – demonstration and evaluation unit

Project code	P.PSH.0759	**Location**	National
Start date	15-Nov-16	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	01-Jul-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
This project demonstrated, evaluated and further developed the beef heavy bone saw, with the aim of commercialising the product.			

Frontmatec - Investigate the development of an automated chine bone cutting solution for Australian cattle boning lines

Project code	P.PSH.0912	**Location**	National
Start date	15-Sep-17	**Vendor**	Frontmatec
End date	01-Jul-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
This project investigated the feasibility of evolving the current Frontmatec pork automated chine bone removal solution into an application for beef chine bones.			

Product innovation

Farm Gate to Plate – Preliminary study of Argyle's China Retail Ready Solution

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

Quantify baseline value of Australian collagen market relative to new and emerging global opportunities

Project code	V.RMH.0079	**Location**	National
Start date	20-Apr-18	**Vendor**	Greenleaf Enterprises Pty Ltd
End date	26-Nov-18	**Funding source**	Levy
Date of publication	21-Feb-19	**Initiation of research**	Industry
This project reviewed the current Australian collagen marketplace to inform future strategy development to increase market access and value-add in this space.			

Resource management

Oakey Beef Exports water resource sustainability

Project code	P.PIP.0538	**Location**	Queensland
Start date	15-Jul-16	**Vendor**	Oakey Beef Exports Pty Ltd
End date	29-Apr-19	**Funding source**	MLA Donor Company
Date of publication	15-Jul-19	**Initiation of research**	Processing industry
This project assessed water efficiency, water supply risk, water savings initiatives and irrigation management tools/options for the Oakey Beef Exports meat processing facility in the Darling Downs region of Queensland.			

Investigation into resource recovery approach, including biogas production Harvey Beef abattoir (WA)

Project code	P.PIP.0758	**Location**	Western Australia
Start date	02-Jan-18	**Vendor**	Harvey Industry Group Pty Ltd
End date	14-Jun-18	**Funding source**	MLA Donor Company
Date of publication	15-May-18	**Initiation of research**	Processing industry
This project investigated biogas production, capture and use for energy purposes at Harvey Beef's processing facility in Western Australia.			

Supply chain sustainability

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

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

A supply chain approach to supporting sustainable beef production

Project code	P.PSH.0681	**Location**	National
Start date	01-Jan-14	**Vendor**	Department of Economic Development
End date	31-Oct-18	**Funding source**	MLA Donor Company
Date of publication	21-May-19	**Initiation of research**	State Government

This project supported established work on pasture-fed beef value chains that address continuity of supply, information flows and market signals, with increased emphasis on sustainable beef production.

R&D projects in progress

Animal health, welfare and biosecurity

"The Sweet Spot": Improving breeder herd performance through optimal pasture utilisation

Project code	B.GBP.0029	**Location**	Northern Australia
Start date	02-Apr-18	**Vendor**	Northern Territory of Australia
End date	30-May-24	**Funding source**	Levy
Initiation of research	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

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

Project code	B.GBP.0039	**Location**	Northern Australia
Start date	15-Feb-19	**Vendor**	Northern Territory of Australia
End date	29-Feb-24	**Funding source**	Levy
Initiation of research	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 of 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/resistant to infectious agents that impair their reproductive performance, plus genetic markers that could be used to select for resistance.

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

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

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
Initiation of research	Industry		

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

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
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.

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	15-Sep-21	**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.

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	01-Sep-21	**Funding source**	Levy
Initiation of research	Industry		

This project will compare 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 will be 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
Start date	01-Nov-16	**Vendor**	University of Queensland
End date	01-Aug-21	**Funding source**	Levy
Initiation of research	Investment call		

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

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-May-21	**Funding source**	Levy
Initiation of research	Industry		

This project will develop an industry accreditation process for lay spayers to comply with the impeding 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.

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
Initiation of research	Industry		

This project will conduct an extensive survey (aiming for 60% of southern beef producers) to quantify the extent, cause and effect of neonatal calf losses in southern Australia, which is estimated to cost the Australian beef industry $96.2 million each year.

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	28-Feb-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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

Animal production, husbandry and nutrition

Increasing adoption of phosphorus supplementation in Northern Australia

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

The purpose of this project is to increase adoption of phosphorus (P) supplementation in northern Australia. 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

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

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

Project code	P.PSH.1000	**Location**	National
Start date	22-Feb-18	**Vendor**	CSIRO
End date	01-Jul-23	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	B.GBP.0023	**Location**	National
Start date	01-Nov-17	**Vendor**	University of Queensland
End date	30-Dec-22	**Funding source**	Levy
Initiation of research	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

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

Project code	B.GBP.0026	**Location**	Northern Australia
Start date	27-Apr-18	**Vendor**	DAFF
End date	29-Jun-22	**Funding source**	Levy
Initiation of research	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

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

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

Project code	P.PSH.1016	**Location**	Northern Australia
Start date	01-Dec-17	**Vendor**	University of Queensland
End date	28-Dec-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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.

Fit for purpose biochar to improve efficiency

Project code	B.GBP.0032	**Location**	Northern Australia
Start date	19-Dec-18	**Vendor**	CSIRO
End date	01-Nov-21	**Funding source**	Levy
Initiation of research	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.

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

Project code	B.GBP.0050	**Location**	Southern Australia
Start date	15-Jan-20	**Vendor**	DAFF
End date	27-Jul-21	**Funding source**	Levy
Initiation of research	Industry		

This project aims to define the potential of a dairy-beef supply chain. This will identify further R&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.

Optimising supplement use in Australia's northern beef industry

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

Using remote drafting, weighing and block intake recorders, this project will monitor 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.

Digital agriculture

Carwoola Digital Ag 4.0 – Phase 2

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

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

Project code	B.SBP.1701	**Location**	Southern Australia
Start date	01-Jul-16	**Vendor**	Dairy Australia Limited
End date	01-Mar-21	**Funding source**	Levy
Initiation of research	Industry		

This project aims to improve the productivity and profitability of livestock enterprises by optimising the management of individual grazing animals. The project aims to demonstrate the application of virtual herding technology on farm to improve environmental and animal welfare outcomes.

Eating quality

Biomarkers for reducing non-compliance in beef carcases

Project code	L.EQT.2104	**Location**	National
Start date	01-Oct-20	**Vendor**	CSIRO
End date	30-Oct-24	**Funding source**	Levy
Initiation of research	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 carcases. This will help determine 'at risk' animals before slaughter and prior to carcase chilling.

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

Project code	L.EQT.1807	**Location**	National
Start date	15-May-18	**Vendor**	University of New England
End date	30-Jun-22	**Funding source**	Levy
Initiation of research	Industry		

This project aims to determine the impact of long distance rail transportation on the eating quality of beef. It will compare road and rail transport over a common time period and utilise current stress technologies and genomics to determine relationships between potential stress measures and MSA consumer outcomes.

Wagyu beef eating quality and MENA sensory testing

Project code	L.EQT.1903	**Location**	National
Start date	30-Nov-19	**Vendor**	University of New England
End date	15-Mar-22	**Funding source**	Levy
Initiation of research	Industry		

This project aims to investigate and determine if there is a 'Wagyu effect' on eating quality over and above the current MSA model prediction, utilising purebred and first generation animals. The opportunity to increase the quantity of Wagyu animals MSA-graded in Australia has the potential to increase returns through the supply chain.

Reconditioning and eating quality potential of older female cattle

Project code	L.EQT.1910	**Location**	National
Start date	01-Jun-19	**Vendor**	Charles Sturt University
End date	31-Jan-22	**Funding source**	Levy
Initiation of research	Industry		

The project aims to investigate the ability of older female cattle to regain body condition at short feeding intervals, as well as the subsequent effect on meat eating quality and compliance to market specifications.

MSA beef model expansion: sensory evaluation of entire males

Project code	L.EQT.1909	**Location**	National
Start date	30-Apr-19	**Vendor**	Polkinghornes
End date	30-Sep-21	**Funding source**	Levy
Initiation of research	Industry		

The project is 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 aims to conduct a sensory evaluation on 18 'young bulls' that have been purposefully produced for meat production by collecting 34 primals for each carcase and testing five cook methods.

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

Project code	P.PSH.1023	**Location**	National
Start date	01-Apr-18	**Vendor**	Charles Sturt University
End date	30-Jul-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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.

Feedbase and grazing land management

Legume best management practice in the Brigalow belt bio-region (Stage 2)

Project code	B.PAS.0354	**Location**	Queensland; New South Wales
Start date	01-Apr-17	**Vendor**	DAFF
End date	01-Jun-23	**Funding source**	Levy
Initiation of research	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 Legume Management plans to improve establishment reliability and long term (20+yrs) performance of legumes in grass pastures.

Dieback: Determining the role of ground pearls in pasture dieback

Project code	B.PAS.0506	**Location**	Northern Australia
Start date	15-May-20	**Vendor**	University of Queensland
End date	30-May-23	**Funding source**	Federal grant
Initiation of research	Industry		

The primary objective of this project is to determine whether or not ground pearls are linked with the cause of pasture dieback and if so, how they can be effectively managed.

Dieback: Comprehensive diagnostic analysis of pastures affected by dieback

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

Project code	B.ERM.1105	**Location**	National
Start date	15-Apr-18	**Vendor**	DAFF
End date	30-Nov-22	**Funding source**	Levy
Initiation of research	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

Project code	B.NBP.0812	**Location**	Queensland
Start date	30-Apr-17	**Vendor**	DAFF
End date	30-Apr-22	**Funding source**	Levy
Initiation of research	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.

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

Project code	P.PSH.0884	**Location**	Northern Australia
Start date	25-Jun-17	**Vendor**	Western Australian Agriculture Authority
End date	31-Mar-22	**Funding source**	MLA Donor Company
Initiation of research	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 because of the potential weed threat.

Phosphorus map of Queensland grazing lands

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

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-Dec-21	**Funding source**	Federal grant
Initiation of research	Industry		

This project will integrate 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. Once developed, this capability will also allow further monitoring and mitigation practices to reduce infestations of dieback.

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

Project code	B.PAS.0511	**Location**	Northern Australia
Start date	03-Aug-20	**Vendor**	QDAF
End date	30-Dec-21	**Funding source**	Federal grant
Initiation of research	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.

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
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 will test 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.

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

Project code	B.PAS.0003	**Location**	Queensland
Start date	20-Feb-20	**Vendor**	Queensland University of Technology
End date	30-Nov-21	**Funding source**	Federal grant
Initiation of research	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.

Biology of Pasture Mealybug and Identification of Natural Enemies (CAS-1)

Project code	B.PAS.0004	**Location**	Queensland
Start date	20-Feb-20	**Vendor**	Queensland University of Technology
End date	30-Nov-21	**Funding source**	Federal grant
Initiation of research	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.

Resistant grass varieties and endophytes (CAS-3)

Project code	B.PAS.0006	**Location**	Northern Australia
Start date	20-Feb-20	**Vendor**	Queensland University of Technology
End date	30-Nov-21	**Funding source**	Federal grant
Initiation of research	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.

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

Project code	B.ERM.0108	**Location**	Queensland
Start date	15-Jan-18	**Vendor**	DAFF
End date	18-Nov-21	**Funding source**	Levy
Initiation of research	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: supporting and providing diagnostics to a national issue

Project code	B.PAS.0508	**Location**	Northern Australia
Start date	06-Jul-20	**Vendor**	NSW DPI; LLS
End date	31-May-21	**Funding source**	Federal grant
Initiation of research	Industry		

This project will investigate the cause of pasture dieback through replicated plot evaluation of tropical and temperate grass pasture, forage and crop species. Best practice guides will also be produced to raise awareness and increase surveillance to help manage its spread.

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-Apr-21	**Funding source**	Federal grant
Initiation of research	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.

Food safety, traceability and integrity

Pilot trial of track and trace label for retail ready VSP beef into China

Project code	V.RMH.0103	**Location**	National
Start date	01-Nov-19	**Vendor**	My Crazy Aunties Food Pty Ltd
End date	30-Sep-21	**Funding source**	Levy
Initiation of research	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 can be applied to any products that need a label.

Assessing the feasibility of an implantable ID for cattle

Project code	V.RDA.0002	**Location**	National
Start date	05-May-20	**Vendor**	Asymmetric innovation
End date	05-Aug-21	**Funding source**	Levy
Initiation of research	Industry		

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.

Genetic analysis

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

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

Australian Angus reference population

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

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

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

This project is phase 2 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

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

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

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

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

Project code	P.PSH.0716	**Location**	National
Start date	01-Jan-14	**Vendor**	Herefords Australia Ltd
End date	30-Jul-21	**Funding source**	MLA Donor Company
Initiation of research	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 carcase 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.

An evaluation of new business models for breed societies

Project code	L.GEN.2002	**Location**	National
Start date	07-Apr-20	**Vendor**	Australian Venture Consultants
End date	04-Jun-21	**Funding source**	Levy
Initiation of research	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.

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

Project code	P.PSH.0942	**Location**	National
Start date	02-Oct-17	**Vendor**	NSW DPI
End date	02-Mar-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

The purpose of this project is 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 carcase RBY% estimated breeding values to suit the modern beef cattle population.

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

Project code	L.GEN.1818	**Location**	National
Start date	24-Feb-19	**Vendor**	CSIRO
End date	20-Jan-21	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.0847	**Location**	National
Start date	02-Jan-18	**Vendor**	NSW DPI
End date	18-Dec-20	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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

Livestock export

Upgrading non stun abattoir facilities to stunning - Indonesia

Project code	W.CFP.2101	**Location**	International
Start date	01-Nov-20	**Vendor**	Halleen
End date	30-Nov-21	**Funding source**	Levy
Initiation of research	Industry		

This pilot project will target those Indonesian abattoirs that still don't incorporate stunning in their facilities and will identify ways to help them understand and accept stunning, which will lead to them upgrading their facilities.

Vietnam – Phase 1 implementation of LGAP

Project code	W.LGP.2101	**Location**	International
Start date	25-Sep-20	**Vendor**	AniMark Pty Ltd
End date	30-Jun-21	**Funding source**	Levy
Initiation of research	Industry		

The Livestock Global Assurance Program (LGAP) is a key focus identified by LiveCorp and MLA. This project aims to facilitate the adoption of the program by working directly with AniMark to inform the implementation strategy and connect it with key stakeholders.

People and business

NB2-ILSC-AHA partnership to grow indigenous capacity

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

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		

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	15-Dec-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 carcase 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	29-May-21	**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 carcase lean meat yield grading

Project code	P.PIP.0576	**Location**	National
Start date	01-Jul-18	**Vendor**	Teys Australia Pty Ltd
End date	28-Feb-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 carcases 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

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

Project code	P.PIP.0753	**Location**	Northern Australia
Start date	01-Jan-18	**Vendor**	Teys Australia Pty Ltd
End date	29-Jan-21	**Funding source**	MLA Donor Company
Initiation of research	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; veterinary support to assist in interpretation of feedback and validation of inspection data.

Grainfed cattle

Completed R&D projects

Animal health, welfare and biosecurity

Development of a Bovine Leukocyte Differential index for Australian feedlot cattle

Project code	P.PSH.1066	**Location**	National
Start date	15-Mar-18	**Vendor**	Advanced Animal Diagnostics Inc
End date	01-Jan-20	**Funding source**	MLA Donor Company
Date of publication	07-Dec-20	**Initiation of research**	External partnership

This project developed a model to predict bovine respiratory disease (BRD) risk of Australian feedlot cattle based on the bovine leukocyte differential index and other information available at arrival.

Evaluation of feedlot heat load model adjustments

Project code	B.FLT.4006	**Location**	National
Start date	01-Mar-19	**Vendor**	University of Queensland
End date	14-Nov-19	**Funding source**	Levy
Date of publication	20-Feb-20	**Initiation of research**	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 2, which indicates higher levels of heat stress in cattle.

Antimicrobial surveillance - bovine respiratory disease pathogens

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

Project code	B.FLT.3005	**Location**	National
Start date	01-Nov-18	**Vendor**	Precision Animal Solutions, LLC
End date	25-Feb-20	**Funding source**	Levy
Date of publication	17-Jun-20	**Initiation of research**	Feedlot industry
This project evaluated data from two Australian feedlots to determine potential associations between behaviour, lung condition (pleurisy) and carcase 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

Project code	B.FLT.3007	**Location**	National
Start date	01-Jan-19	**Vendor**	CSIRO
End date	12-Jun-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	B.FLT.3002	**Location**	National
Start date	01-Feb-18	**Vendor**	Bovine Dynamics
End date	01-Aug-20	**Funding source**	Levy
Date of publication	09-Jun-20	**Initiation of research**	Feedlot industry
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.			

Reducing induction stress in the Australian feedlot system

Project code	P.PSH.0805	**Location**	National
Start date	15-Mar-17	**Vendor**	Charles Sturt University
End date	01-Mar-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

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

Project code	B.FLT.0399	**Location**	National
Start date	01-Mar-17	**Vendor**	University of New England
End date	12-Jun-19	**Funding source**	Levy
Date of publication	15-Oct-19	**Initiation of research**	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 carcases of feedlot cattle in Australia.			

Animal health and welfare workshops

Project code	B.FLT.7016	**Location**	National
Start date	01-Apr-19	**Vendor**	MLA
End date	30-Sep-19	**Funding source**	Levy
Date of publication	30-Sep-19	**Initiation of research**	Feedlot industry
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.			

Effect of Orchard Fans on Heat Load Amelioration

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

Evaluation of a Remote Early Disease Identification system to detect bovine respiratory disease in beef cattle in commercial Australian feeding operations – Site 1

Project code	B.FLT.0242	**Location**	National
Start date	01-Jan-17	**Vendor**	Precision Animal Solutions, LLC
End date	01-Jul-18	**Funding source**	Levy
Date of publication	18-Sep-19	**Initiation of research**	Feedlot industry

The Remote Early Disease Identification (REDI) system uses continuous cattle monitoring to generate locational, behavioural and social indices to determine bovine respiratory disease status. This project evaluated the REDI system to determine its applicability to the Australian feedlot industry.

Open innovation invention solution for feedlot dag prevention and management

Project code	P.PSH.0700	**Location**	National
Start date	01-Aug-14	**Vendor**	Xinova LLC
End date	160-Jan-19	**Funding source**	MLA Donor Company
Date of publication	29-Jul-19	**Initiation of research**	External partnership

This study took a design-led approach to explore and examine the impact of dag contamination on the Australian cattle industry and its stakeholders, to better understand the basic requirements for developing solutions to the dag problem.

Feedlot animal health management program

Project code	B.FLT.0243	**Location**	National
Start date	01-Apr-16	**Vendor**	Bell Veterinary Services
End date	31-Oct-18	**Funding source**	Levy
Date of publication	23-May-19	**Initiation of research**	Feedlot industry

The Australian feedlot industry is developing a comprehensive animal health management program. This program was designed to ensure that feedlots have access to information on evidence-based infection prevention and control measures, and ensure that when animal health treatments are required, that they are used appropriately and prudently to minimise the potential development of antimicrobial resistance in cattle and humans.

Effects of vaccination in backgrounded feedlot cattle

Project code	B.FLT.0235	**Location**	National
Start date	15-Sep-13	**Vendor**	Paul Cusack & Jacqueline Cusack
End date	01-May-18	**Funding source**	Levy
Date of publication	15-Mar-19	**Initiation of research**	Feedlot industry

This project refined industry's knowledge of the effects of backgrounding cattle with and without the use of vaccines, and clarified the most appropriate use of vaccines for bovine respiratory disease to optimise animal health outcomes and financial returns.

Cost of feedlot dags to Australian beef industry

Project code	B.FLT.0165	**Location**	National
Start date	10-May-17	**Vendor**	ACIL Allen Consulting Pty Ltd
End date	15-May-18	**Funding source**	Levy
Date of publication	14-Feb-19	**Initiation of research**	Feedlot industry

This project evaluated and quantified the cost of dags to the Australian beef industry, through an assessment of the cost to each aspect of the supply chain. It also produced a high-level cost benefit analysis of two proposed interventions for dag management.

Heat Load Forecast Service

Project code	B.FLT.4001	**Location**	National
Start date	20-May-17	**Vendor**	Katestone Environmental Pty Ltd
End date	30-Aug-18	**Funding source**	Levy
Date of publication	21-Dec-18	**Initiation of research**	Feedlot industry

This project improved and maintained the Cattle Heat Load Toolbox (CHLT), which supplies a heat load forecast service for the Australian feedlot industry. There are currently 251 National Feedlot Accreditation Scheme (NFAS) accredited feedlot subscribers to the service, representing more than 85% of the cattle on feed.

Feedlot best practice management - pregnant heifers

Project code	B.FLT.3001	**Location**	National
Start date	01-Oct-17	**Vendor**	Swans Veterinary Services
End date	27-May-18	**Funding source**	Levy
Date of publication	04-Oct-18	**Initiation of research**	Feedlot industry

This project developed clear and concise guidance for cattle producers, backgrounders and lot feeders to reduce the incidence of unwanted pregnancies within populations of lot fed heifers. The outcomes will help develop guidelines that explore the merit of different options to assist lot feeders to mitigate unwanted pregnancies in these heifers.

Impact of subclinical bovine respiratory disease

Project code	B.FLT.0246	**Location**	National
Start date	01-Feb-17	**Vendor**	Charles Sturt University
End date	31-Aug-18	**Funding source**	Levy
Date of publication	30-Aug-18	**Initiation of research**	Feedlot industry

This project generated data to quantify the economic impact of bovine respiratory disease (BRD) on Australian feedlots through an analysis of feedlot induction records, BRD treatment records, lung abnormalities and carcase data at slaughter.

Animal production, husbandry and nutrition

APVMA assessment dag removal enzymes

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

Asparagopsis feedlot feeding trial

Project code	B.FLT.0394	**Location**	National
Start date	01-Nov-15	**Vendor**	CSIRO
End date	01-May-18	**Funding source**	Levy
Date of publication	11-Mar-20	**Initiation of research**	Feedlot industry

Previous research has shown that Asparagopsis (red seaweed) as a feed additive can reduce ruminants' methane production. This project assessed the impact on methane production by using Asparagopsis as a supplement in Australian cattle feedlots. This was assessed by measuring animal productivity, carcase characteristics, eating quality and chemical residues in the beef.

Heat load nutrition program

Project code	B.FLT.0157	**Location**	National
Start date	15-Jun-13	**Vendor**	CSIRO
End date	30-Jan-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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.

Clean cattle manual

Project code	B.FLT.7010	**Location**	National
Start date	15-Jun-18	**Vendor**	Premise Australia Pty Ltd
End date	29-Jan-19	**Funding source**	Levy
Date of publication	10-May-19	**Initiation of research**	Feedlot industry

This project developed a manual that outlines available solutions that different feedlots (small, medium and large) can utilise to keep cattle clean (remove or prevent dags) and prepare them for pre-slaughter inspection.

Graded levels of woodchip during wet feedlot conditions

Project code	B.FLT.0244	**Location**	National
Start date	01-Apr-18	**Vendor**	University of New England
End date	30-May-19	**Funding source**	Levy
Date of publication	30-May-19	**Initiation of research**	Feedlot industry

This project researched the effects of woodchip bedding on feedlot cattle performance, animal health and welfare, dag score, pre-slaughter washing time, labour and carcase characteristics.

Effect of lairage timing and duration on rumen physiology and muscle glycogen

Project code	B.FLT.4002	**Location**	National
Start date	15-Mar-18	**Vendor**	Bovine Dynamics
End date	30-Jun-18	**Funding source**	Levy
Date of publication	09-May-19	**Initiation of research**	Feedlot industry

This project determined the effect of duration and timing of lairage on rumen physiology, muscle glycogen levels and carcase characteristics. This experiment will guide future recommendations for best practice dispatch and lairage of grainfed cattle.

Evaluation of a heat load model for feedlot cattle

Project code	B.FLT.0387	**Location**	National
Start date	01-Jun-17	**Vendor**	University of Queensland
End date	26-Sep-17	**Funding source**	Levy
Date of publication	21-Mar-19	**Initiation of research**	Feedlot industry

As part of a continuous improvement process in the feedlot industry, this project evaluated the ability of the Heat Load Index (HLI) model to predict heat load responses (panting scores, feed intake and mortality) of cattle under commercial feeding conditions.

Photogrammetric feed trough assessment system

Project code	P.PSH.0994	**Location**	National
Start date	10-Jan-18	**Vendor**	CompassData Inc
End date	30-Sep-18	**Funding source**	MLA Donor Company
Date of publication	1-Nov-18	**Initiation of research**	External partnership

This project outlines a system design and presents preliminary results of a digital photogrammetric camera system to measure varying amounts of feed in a standard feed bunk. This will negate the need to manually check feed bunk levels.

Digital agriculture

Prototype feedlot biometric, gender and breed identification system

Project code	B.FLT.1009	**Location**	National
Start date	01-Feb-19	**Vendor**	Manabotix Pty Ltd
End date	30-Oct-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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

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

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

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

Feasibility of Induction Automation R&D - Phase 1

Project code	B.FLT.1004	**Location**	National
Start date	01-Jul-18	**Vendor**	University of Southern Queensland
End date	05-Feb-19	**Funding source**	Levy
Date of publication	15-Feb-19	**Initiation of research**	Feedlot industry
This project established the feasibility of a feedlot Integrated Automation Development Facility (IADF), which could be used to evaluate the cost-benefit of potential induction automation investments.			

Prototype feed truck auto-delivery system

Project code	P.PSH.1079	**Location**	National
Start date	02-Apr-18	**Vendor**	Manabotix Pty Ltd
End date	14-Sep-18	**Funding source**	MLA Donor Company
Date of publication	22-Nov-18	**Initiation of research**	External partnership
This project designed and evaluated a prototype feed truck auto-delivery system, suitable for retrofitting on one of the existing feed trucks at the host site. For this first stage, the automation of the feed delivery process was developed: automatic control of the feed delivery chute.			

Getting connected: Pathways for improving connectivity for our feedlot industry

Project code	B.FLT.8009	**Location**	National
Start date	01-Jan-18	**Vendor**	Premise Australia Pty Ltd
End date	01-Jul-18	**Funding source**	Levy
Date of publication	23-Oct-18	**Initiation of research**	Feedlot industry
This study identified the connectivity requirements and education needs of Australian feedlots. This included the availability of communications infrastructure (phone, internet, etc) and the future requirements of this infrastructure to support emerging technologies.			

Feedlot Adoption - bunk scanner field trials

Project code	B.FLT.7009	**Location**	National
Start date	29-Jun-18	**Vendor**	Manabotix Pty Ltd
End date	31-Aug-18	**Funding source**	Levy
Date of publication	12-Oct-18	**Initiation of research**	Feedlot industry
Manabotix recently delivered a prototype automatic bunk calling system for feedlots and demonstrated that the prototype's feed remaining predictions were more precise and accurate than human callers. This project undertook additional validation through in-field observations with different bunk designs and road conditions to determine the robustness of the technology, to drive industry confidence for adoption.			

Environmental sustainability

Long-term total greenhouse gas emissions from beef feedlots

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

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

Genetic analysis

Feed intake measurement of cattle in the Tullimba R&D Feedlot BIN Project – Angus 2017/18

Project code	L.GEN.1807	**Location**	National
Start date	01-May-18	**Vendor**	University of New England
End date	15-Jul-18	**Funding source**	Levy
Date of publication	31-May-19	**Initiation of research**	Feedlot industry
This project collected net feed intake genetic information for the 2017/2018 Angus cohort of cattle in the Beef Information Nucleus (BIN) program. This investment in data recording will be valuable for future genetic analysis, including making the feed intake data available for the National Genetics Data Platform.			

People and business

Quarterly Feed E-Newsletter

Project code	B.FLT.7014	**Location**	National
Start date	01-Nov-18	**Vendor**	Cox Inall Communications
End date	01-Oct-20	**Funding source**	Levy
Date of publication	21-Jul-20	**Initiation of research**	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; provide relevant grainfed marketing updates; and inform stakeholders of upcoming MLA and MLA-ALFA feedlot events.

Communication resources NFAS Rules and Standards changes

Project code	B.FLT.8005	**Location**	National
Start date	28-Oct-17	**Vendor**	Currie Communications Pty Ltd
End date	30-Apr-18	**Funding source**	Levy
Date of publication	13-Aug-19	**Initiation of research**	Feedlot industry

This project supports the industry's commitment to implement continual improvement in the production, welfare and environmental management of feedlot cattle. The project developed communication resources to assist accredited feedlots to prepare for introduction of new industry requirements.

Business Case - Industry Research Feedlot

Project code	B.FLT.8007	**Location**	National
Start date	01-Jan-18	**Vendor**	Peter Paradice Family Trust
End date	30-Jun-18	**Funding source**	Levy
Date of publication	20-May-19	**Initiation of research**	Feedlot industry

The development of a small pen research facility aligned with commercial operating principles could benefit the wider industry and increase return on investment from expenditure of grain-fed levies. This project assessed the business case for such an investment.

Feedlot education, training and technical services

Project code	B.FLT.0490	**Location**	National
Start date	20-May-15	**Vendor**	Australian Lot Feeders Association
End date	18-Sep-18	**Funding source**	Levy
Date of publication	10-Apr-19	**Initiation of research**	Feedlot industry

This project delivered information, education, training and technical services to improve management practices among cattle lot feeders throughout Australia by providing on the ground extension support. This provides better leveraging of R&D levy investments and reduces potential risk exposure within individual feedlots and the industry.

Maximum profit endpoints of Australian feedlot cattle – Phase 1

Project code	B.FLT.1001	**Location**	National
Start date	15-Jun-18	**Vendor**	University of Sydney
End date	29-Jan-19	**Funding source**	Levy
Date of publication	10-Apr-19	**Initiation of research**	Feedlot industry
This project was the first phase of a multi-stage project to develop a model to predict maximum profit endpoints of Australian feedlot cattle to aid in cattle sorting decisions. This project consisted of observation of serial slaughter, dissection and analysis of the chemical body composition to inform subsequent phases of the project.			

Market impacts and influences of biofuel mandates on feedlots

Project code	B.FLT.0167	**Location**	National
Start date	01-Jan-18	**Vendor**	ACIL Allen Consulting Pty Ltd
End date	31-Jul-18	**Funding source**	Levy
Date of publication	30-Oct-18	**Initiation of research**	Feedlot industry
This project determined the market impact and influences of biofuel mandates on the feedlot sector and the broader Australian community.			

Feedlot e-Newsletter

Project code	B.FLT.0499	**Location**	National
Start date	01-Jun-16	**Vendor**	Cox Inall Communications
End date	30-Jun-18	**Funding source**	Levy
Date of publication	04-Oct-18	**Initiation of research**	Feedlot industry
This project developed and trialled an eNewsletter to increase engagement with feedlot stakeholders. This quarterly eNewsletter contained brief articles, interviews, videos and podcasts to update feedlot stakeholders on current and completed feedlot R&D projects and upcoming events.			

Feedlot technology adoption group

Project code	B.FLT.9005	**Location**	National
Start date	01-Jul-17	**Vendor**	Premise Australia Pty Ltd
End date	30-Jun-18	**Funding source**	Levy
Date of publication	03-Oct-18	**Initiation of research**	Feedlot industry
A need for MLA and ALFA to engage more with small to medium sized feedlot operations and feedlot staff in the 18 – 35-year-old demographic was identified to improve information flow and increase adoption of technologies across the sector. This project increased awareness about important feedlot R&D outputs for animal welfare, management, environmental management, nutrition and OH&S issues within the feedlot industry.			

Resource management

Improving feedlot water and energy use efficiency

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

Project code	B.FLT.1005	**Location**	National
Start date	15-Oct-18	**Vendor**	University of New England
End date	18-Jun-19	**Funding source**	Levy
Date of publication	08-Oct-19	**Initiation of research**	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; and scope the potential for future R&D.

Revised Econometric Analysis- Effects of biofuels mandates on Wheat and Sorghum Prices

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

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

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

Waste to revenue: Novel fertilisers and feeds RnD4Profit-14-1-022

Project code	B.FLT.0395	**Location**	National
Start date	26-Jun-15	**Vendor**	Australian Pork Limited
End date	30-Jun-18	**Funding source**	Levy and Commonwealth Government
Date of publication	10-Apr-19	**Initiation of research**	Feedlot industry
This project represents an MLA contribution to an Australian Pork Limited (APL)-led RnD4Profit grant to develop new waste treatment technologies to recapture nutrients in waste as feed and fertiliser products. The conversion of under-utilised and low-value waste products into innovative fertilisers and feed will help to develop new markets off-farm.			

Water security for the Australian feedlot industry

Project code	B.FLT.8008	**Location**	National
Start date	01-Jan-18	**Vendor**	Balmoral Group Australia Pty Ltd
End date	01-Oct-18	**Funding source**	Levy
Date of publication	31-Oct-18	**Initiation of research**	Feedlot industry
This project aimed to document and assess the current legislative ‘state of play’ as it relates to water access and allocation for feedlots, assess if it met the water demands of industry, and identify any gaps, inconsistencies, risks or legislative inadequacies.			

Conversion of biomass to renewable energy at a feedlot

Project code	P.PSH.0836	**Location**	National
Start date	13-Feb-17	**Vendor**	All Energy Pty. Ltd
End date	30-Jun-18	**Funding source**	MLA Donor Company
Date of publication	31-May-18	**Initiation of research**	External partnership
This project involved a concept design and trial of a technology that converts bio-wastes into renewable energy and fertiliser.			

R&D projects in progress

Animal health, welfare and biosecurity

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 carcase condemn costs associated with bovine respiratory disease. It will test and use emerging real time diagnostic methods for disease agents and stress, and define '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.

Feedlot animal welfare benchmarking

Project code	B.FLT.4007	**Location**	National
Start date	28-Nov-19	**Vendor**	University of Melbourne
End date	28-Mar-22	**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.

Determination of bovine respiratory disease diagnostic accuracy for multiple modalities

Project code	B.FLT.3010	**Location**	National
Start date	28-Nov-19	**Vendor**	Quirindi Feedlot Services
End date	30-Nov-21	**Funding source**	Levy
Initiation of research	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

Project code	B.FLT.3008	**Location**	National
Start date	01-Jan-19	**Vendor**	University of Sydney
End date	15-Nov-21	**Funding source**	Levy
Initiation of research	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.

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

Project code	B.FLT.3006	**Location**	National
Start date	01-Nov-18	**Vendor**	University of Queensland
End date	03-Nov-21	**Funding source**	Levy
Initiation of research	Feedlot industry		

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

Animal production, husbandry and nutrition

Evaluation of shade and shelter solutions in a southern Australian feedlot

Project code	B.FLT.4009	**Location**	Southern Australia
Start date	01-Jun-19	**Vendor**	University of New England
End date	15-Dec-23	**Funding source**	Levy
Initiation of research	Feedlot industry		

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.

Optimising rumen modifier use for feedlot performance and carcase attributes

Project code	B.FLT.1002	**Location**	National
Start date	01-Apr-18	**Vendor**	University of New England
End date	30-Jan-21	**Funding source**	Levy
Initiation of research	Feedlot industry		

This project will confirm and quantify feeding, growth and carcase advantages from combining and rotating different antibiotics (ionophore Monensin) and assess the underlying rumen fermentation differences and rumination changes associated with these responses.

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

Project code	B.FLT.4013	**Location**	Western Australia
Start date	01-Jun-20	**Vendor**	Murdoch University
End date	01-Jan-23	**Funding source**	Levy
Initiation of research	Feedlot industry		

This project will evaluate the economic and animal welfare benefits of shade for feedlot cattle in a West Australian feedlot. In Western Australia, a clear value proposition (dollars per head) needs to be established to drive shade adoption.

Adjacent paddock feeding discussion paper

Project code	B.FLT.8014	**Location**	National
Start date	07-Feb-20	**Vendor**	Scolexia Pty Ltd
End date	15-Aug-21	**Funding source**	Levy
Initiation of research	Feedlot industry		

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.

MISP feedlot productivity data collection

Project code	B.FLT.9002	**Location**	National
Start date	01-Mar-18	**Vendor**	Management for Technology Pty Ltd
End date	05-Dec-20	**Funding source**	Levy
Initiation of research	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

Project code	P.PIP.0569	**Location**	National
Start date	01-Mar-18	**Vendor**	Teys Australia Pty Ltd
End date	30-Dec-20	**Funding source**	MLA Donor Company
Initiation of research	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.

Digital agriculture

Manure value calculator

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

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

Sandalwood Feedlot – WAN and wide area Wi-Fi solutions

Project code	P.PSH.1052	**Location**	Queensland
Start date	15-Apr-18	**Vendor**	March IT Pty Ltd
End date	30-Dec-21	**Funding source**	MLA Donor Company
Initiation of research	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.

Evaluation of automated bunk management – feedlot cattle performance

Project code	B.FLT.1012	**Location**	National
Start date	01-Jun-19	**Vendor**	Bovine Dynamics
End date	15-Dec-21	**Funding source**	Levy
Initiation of research	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.			

Stanbroke Chinchilla Feedlot – WAN and Wide Area Wi-Fi

Project code	P.PSH.1020	**Location**	Queensland
Start date	18-Dec-17	**Vendor**	March IT Pty Ltd
End date	29-May-21	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.1049	**Location**	Queensland
Start date	01-Mar-18	**Vendor**	March IT Pty Ltd
End date	30-Apr-21	**Funding source**	MLA Donor Company
Initiation of research	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.			

Environmental sustainability

Effect of feed withdrawal on truck effluent, animal welfare, carcase 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.			

Revision of key National Greenhouse Gas Inventory Report methods for Australian feedlots

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

Some methods used in the National Inventory Report appear to over-estimate 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

Project code	B.FLT.5008	**Location**	National
Start date	23-Apr-20	**Vendor**	Integrity Ag & Environment
End date	15-Apr-21	**Funding source**	Levy
Initiation of research	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.

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 (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

Project code	B.FLT.8013	**Location**	National
Start date	18-Dec-19	**Vendor**	Schuster Consulting Group Pty Ltd
End date	30-Dec-20	**Funding source**	Levy
Initiation of research	Feedlot industry		

This project constitutes the first periodic review of the National Feedlot Accreditation Scheme (NFAS). The aim of the review is 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.

Feedlot industry training materials

Project code	B.FLT.8203	**Location**	National
Start date	01-Dec-20	**Vendor**	ALFA
End date	15-Sep-21	**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 a module on feed truck operation as a case example to test feedlot engagement and impact from training.

Feedlot industry training review

Project code	B.FLT.8202	**Location**	National
Start date	30-Jan-20	**Vendor**	MINTRAC
End date	31-Mar-21	**Funding source**	Levy
Initiation of research	Feedlot industry		

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

Processing productivity

Australian optimal carcase endpoint and sorting system development

Project code	B.FLT.1014	**Location**	National
Start date	17-Feb-20	**Vendor**	University of Sydney
End date	30-Jun-22	**Funding source**	Levy
Initiation of research	Feedlot industry		

This project will produce the first version of the Australian optimal carcase endpoint and sorting system. Currently, no commercialised decision support systems exist for Australian lot feeders to enable cattle sorting and optimisation of days on feed for profit maximisation.

Sheep & lamb

Completed R&D projects

Animal health, welfare and biosecurity

Sheep reproduction RD&E impact assessment

Project code	L.LSM.0025	**Location**	National
Start date	24-Sep-19	**Vendor**	Australian Wool Innovation
End date	30-Oct-20	**Funding source**	Levy
Date of publication	24-Aug-20	**Initiation of research**	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

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

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

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

Project code	B.SCR.0112	**Location**	National
Start date	01-Jul-14	**Vendor**	Sheep CRC Ltd
End date	30-Jun-19	**Funding source**	Levy
Date of publication	07-Jan-20	**Initiation of research**	Industry

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.

Diagnostic protocols and test kits for ovine pneumonia

Project code	P.PSH.0814	**Location**	Southern Australia
Start date	01-Dec-17	**Vendor**	Joan Lloyd Consulting Pty Ltd
End date	01-Dec-19	**Funding source**	MLA Donor Company
Date of publication	10-Dec-19	**Initiation of research**	External partnership

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.

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

Project code	P.PSH.1138	**Location**	National
Start date	01-Jun-18	**Vendor**	University of Western Australia
End date	30-Jul-19	**Funding source**	MLA Donor Company
Date of publication	09-Oct-19	**Initiation of research**	External partnership

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.

Improved ruminant health and productivity through neonatal microbiome manipulation

Project code	P.PSH.0830	**Location**	National
Start date	01-Jul-17	**Vendor**	University of Adelaide
End date	31-Aug-19	**Funding source**	MLA Donor Company
Date of publication	29-Aug-19	**Initiation of research**	External partnership

This project was comprised of two parts; the first 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.

Piloting an automated endemic disease investigation service for sheep producers

Project code	B.AHE.0313	**Location**	National
Start date	02-Jan-17	**Vendor**	Herd Health Pty Ltd
End date	01-Feb-19	**Funding source**	Levy
Date of publication	27-Jun-19	**Initiation of research**	Investment call

This project delivered a user-friendly web tool – sheep health tool – to allow sheep producers to assess the quality and cost-effectiveness of alternative control measures of endemic disease diagnosed in their sheep at slaughter.

The potential for vaccines against gastrointestinal nematodes of small ruminants

Project code	B.AHE.0325	**Location**	National
Start date	01-Jul-18	**Vendor**	University of Sydney
End date	28-Mar-19	**Funding source**	Levy
Date of publication	26-Jun-19	**Initiation of research**	Investment call

This project reviewed past and current research investments into vaccines addressing scour-worms, to identify and reduce production losses in the livestock industry and maintain capacity and capability in parasitological research. It maps out a staged approach for an integrated multi-institutional research program for developing a vaccine.

National sheep health monitoring project

Project code	P.PSH.0907	**Location**	National
Start date	02-Jan-18	**Vendor**	Animal Health Australia
End date	01-Oct-19	**Funding source**	MLA Donor Company
Date of publication	24-Jun-19	**Initiation of research**	External partnership

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).

New option for monitoring drench resistance and movement of Barber's Pole Worm

Project code	B.AHE.0315	**Location**	National
Start date	12-Dec-16	**Vendor**	CSIRO
End date	02-Apr-19	**Funding source**	Levy
Date of publication	18-Apr-19	**Initiation of research**	Investment call

This project developed a DNA test which evaluates genetic diversity in Barber's Pole Worm populations. This test can detect changes over time due to chemical selection (drenching) and mixing of populations due to migration. The test can possibly be used by producers for determining the drench susceptibility of the worms in their sheep flock.

Supplementation of pregnant ewes with 25-hydroxyvitamin D3 (HyD®)

Project code	P.PSH.0866	**Location**	National
Start date	01-Jun-17	**Vendor**	Charles Sturt University
End date	30-Apr-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership

This project aimed to identify the benefits of 25-(OH) D3 (Vitamin D) supplementation of ewes during mid pregnancy through to lactation. The hypothesis is that supplementation with 25-(OH) D3 will improve sheep health and lamb survival through benefits to calcium (Ca) status.

Economic modelling of ewe lamb mating enterprises

Project code	L.LSM.0007	**Location**	National
Start date	01-Jan-18	**Vendor**	Murdoch University
End date	31-Oct-18	**Funding source**	Levy
Date of publication	13-Feb-19	**Initiation of research**	Industry

This analysis generated an understanding and the economic response curves to factors influencing the reproductive performance of ewe lambs. The analysis informed the development of a decision support tool for consultants and producers to help them decide whether mating ewe lambs is a technology that they should be evaluating compared to other production alternatives.

Preliminary investigation into on farm factors contributing to Ecchymosis

Project code	P.PSH.1065	**Location**	South Australia
Start date	15-Mar-18	**Vendor**	Naracoorte Lucindale Council
End date	30-Sep-18	**Funding source**	MLA Donor Company
Date of publication	28-Sep-18	**Initiation of research**	External partnership

Ecchymosis causes localised haemorrhaging and causes darkened spots on the muscle tissue surface of carcases. This project quantified the incidence of ecchymosis in lambs processed in South Australia and identified nutritional, pre-slaughter management and abattoir lairage factors that are contributing to the incidence.

Animal production, husbandry and nutrition

Sheep Feedlotting and Containment Management Guidelines Update

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

Feeding standards for modern maternal ewes

Project code	L.LSM.0008	**Location**	National
Start date	01-Jun-17	**Vendor**	Murdoch University
End date	30-May-19	**Funding source**	Levy
Date of publication	30-Aug-19	**Initiation of research**	Industry
This project redefined the Australian Feeding Standards for Ruminants (AFSR) for modern maternal genetics, to enable whole-farm modelling to determine the economically optimal condition score profiles for a range of production systems. The new feeding standards will be required for future whole farm systems modelling for maternal ewe lamb production systems.			

Improving lamb survival by optimising lambing density

Project code	L.LSM.0004	**Location**	National
Start date	01-Dec-15	**Vendor**	Australian Wool Innovation
End date	15-Feb-19	**Funding source**	Levy
Date of publication	03-May-19	**Initiation of research**	Industry
This project aimed to quantify the effects of mob size and stocking rate on the survival of Merino and non-Merino lambs born across southern Australia, to deliver improved recommendations for sheep producers regarding the allocation of ewes to mobs and paddocks at lambing.			

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	*Not yet available*	**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.

Maximising the value of eID technology for sheep producers

Project code	L.LSM.0011	**Location**	National
Start date	30-Oct-17	**Vendor**	AgriPartner Consulting
End date	15-May-19	**Funding source**	Levy
Date of publication	24-May-19	**Initiation of research**	Investment call

This project consisted of a desktop study to model a range of common breeding management systems used by commercial sheepmeat enterprises to highlight the long-term cost benefits of adopting electronic tags (eID).

Return on investment for implementing electronic identification tags in a commercial sheep flock – WA

Project code	P.PSH.1047	**Location**	Western Australia
Start date	21-Jan-18	**Vendor**	Farmanco Management Consultants
End date	15-Mar-19	**Funding source**	MLA Donor Company
Date of publication	22-Mar-19	**Initiation of research**	External partnership

Electronic identification (eID) can be used to identify individual performance of animals, allowing for significant improvements to sheep flock from informed selection decisions and labour savings through ease of management and handling. This project presented the economic benefits of using eID tags in a commercial sheep flock.

SmartShepherd system fast tracking of product innovation and validation stages

Project code	P.PSH.0897	**Location**	National
Start date	08-Jul-17	**Vendor**	Panoptistar Research Pty Ltd
End date	31-Dec-18	**Funding source**	MLA Donor Company
Date of publication	20-Oct-18	**Initiation of research**	External partnership

This project was undertaken to fast track the innovation and validation stages of the SmartShepherd system, an innovative technology solution that enables livestock breeders to collect maternal pedigree quickly and cost effectively.

Feedbase and grazing land management

Managing subterranean clover Red Leaf Syndrome in Western Australia: Stage 1

Project code	L.CON.1805	**Location**	Western Australia
Start date	20-Feb-18	**Vendor**	Department of Primary Industries
End date	13-Jul-18	**Funding source**	Levy
Date of publication	19-Sep-18	**Initiation of research**	Industry

Surveys conducted in 2017 identified soybean dwarf virus (SbDV) as the dominant virus species infecting the majority of the clover plants in Western Australia. This project conducted research at sites where SbDV had been detected, to identify plants that host the virus in summer and to provide producers with advice to prevent and manage any outbreak of the syndrome.

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.

Pathogen and antimicrobial resistance in ovine faeces at slaughter

Project code	V.MFS.0417	**Location**	National
Start date	30-Sep-16	**Vendor**	CSIRO
End date	30-Apr-19	**Funding source**	Levy
Date of publication	10-Sep-19	**Initiation of research**	Industry

This study was designed to assist the Australian sheepmeat industry improve the value of its commodities by objectively defining food safety risks present in the processing stage of sheepmeat production, with a specific focus on pathogenic STEC and antimicrobial-resistant bacteria.

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
Date of publication	03-Jun-19	**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.

The correlation of cadmium levels in sheep liver and kidney

Project code	V.RBP.0012	**Location**	National
Start date	15-Feb-16	**Vendor**	Animal Health Australia
End date	30-Aug-18	**Funding source**	Levy
Date of publication	30-Aug-18	**Initiation of research**	Industry
This project collected data on the occurrence of cadmium residues in sheep offal, for the purpose of calculating and mapping the probability of offal originating from certain geographic locations exceeding international maximum limits. The results will be used to negotiate new requirements for condemnation of sheep offal.			

NLIS database changes for Victoria sheep and goat eID

Project code	V.NLI.1811	**Location**	National
Start date	11-Dec-17	**Vendor**	Object Consulting
End date	30-Mar-18	**Funding source**	Levy
Date of publication	30-Mar-18	**Initiation of research**	Industry
The objective of this project was to make the necessary changes to the National Livestock Identification System (NLIS) database to accommodate mandatory sheep and goat electronic identification (eID) reporting in Victoria by sale yards, abattoirs, knackeries and properties.			

Genetic analysis

Sheep genetics database interface upgrade working group support

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

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

Project code	B.SCR.0322	**Location**	National
Start date	01-Jul-14	**Vendor**	Sheep CRC Ltd
End date	24-Jun-19	**Funding source**	Levy
Date of publication	07-Jan-20	**Initiation of research**	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

Project code	L.GEN.1809	**Location**	National
Start date	01-Aug-18	**Vendor**	Sound Images Pty Ltd
End date	29-Nov-19	**Funding source**	Levy
Date of publication	29-Nov-19	**Initiation of research**	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

Project code	L.GEN.0001	**Location**	National
Start date	30-Mar-19	**Vendor**	TigerSpike Pty Ltd
End date	15-Feb-20	**Funding source**	Levy
Date of publication	21-Oct-19	**Initiation of research**	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.			

LAMBPRO resource flock

Project code	P.PSH.0773	**Location**	National
Start date	06-Apr-16	**Vendor**	Lambpro Partnership
End date	01-Oct-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
This project focused on terminal sire eating quality and composite maternal prime lamb production systems that will complement the genetic resource flock and the current weight of R&D on traditional terminal, merino and first-cross prime lamb production systems.			

Livestock export

Value analysis of the Australian live sheep trade (2019)

Project code	W.LIV.1001	**Location**	National
Start date	01-Oct-19	**Vendor**	Mecardo
End date	01-Jun-20	**Funding source**	Levy
Date of publication	21-Sep-20	**Initiation of research**	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

Project code	W.LIV.2000	**Location**	National
Start date	30-Jul-18	**Vendor**	University of Technology Sydney
End date	01-Mar-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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 three – part two

Project code	W.LIV.3044	**Location**	National
Start date	15-Sep-16	**Vendor**	University of Western Australia
End date	30-Aug-19	**Funding source**	Levy
Date of publication	15-Jul-20	**Initiation of research**	Industry
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.			

People and business

Making More from Sheep webinar program

Project code	L.MMS.1702	**Location**	National
Start date	01-Jun-17	**Vendor**	Holmes Sackett Pty Ltd
End date	15-Sep-18	**Funding source**	Levy
Date of publication	09-May-19	**Initiation of research**	Industry
Making More from Sheep is the key extension and communication program for MLA and AWI for the sheep industry. The delivery of a series of webinars took place from December 2016 through to early 2017 to provide producers with updated information.			

Developing the basis for an attitude-behaviour training program for stockpeople in the sheep transport and abattoir sectors

Project code	B.AWW.0259	**Location**	National
Start date	26-Jun-17	**Vendor**	University of Melbourne
End date	30-Jun-18	**Funding source**	Levy
Date of publication	28-Jun-18	**Initiation of research**	Industry

This project collaborated with key sheepmeat stakeholders to review the general content of a cognitive-behavioural training program for stock people in the sheep transport and abattoir sectors. The outcome can help industry decide on the platform for the program and its training delivery method(s) and identify potential funders and sheep-meat industry collaborators.

Processing productivity

Rapid measurement of intramuscular fat in lamb using imaging needles

Project code	V.TEC.1718	**Location**	National
Start date	30-May-19	**Vendor**	University of Adelaide
End date	20-Dec-19	**Funding source**	Levy
Date of publication	05-Feb-20	**Initiation of research**	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 seasons lambs

Project code	V.TEC.1712	**Location**	National
Start date	30-Apr-19	**Vendor**	Murdoch University
End date	01-Dec-19	**Funding source**	Levy
Date of publication	30-Sep-19	**Initiation of research**	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.

Evolution of standalone lamb chine machine to develop dual purpose lamb/mutton chine/flap machine

Project code	P.PIP.0496	**Location**	National
Start date	15-Dec-15	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	30-Oct-18	**Funding source**	MLA Donor Company
Date of publication	13-Feb-19	**Initiation of research**	Processing industry

This project aimed to expand the capabilities of the chine system into mutton whilst extracting and implementing the flap cutting station, by developing standalone vision and sensing and increasing the flap station capability to process mutton and lamb simultaneously.

Standalone lamb chine bone saw Australian sales and marketing demonstration and commercialisation unit

Project code	P.PSH.0668	**Location**	National
Start date	14-Apr-14	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	15-Sep-18	**Funding source**	MLA Donor Company
Date of publication	13-Feb-19	**Initiation of research**	External partnership

This project aimed to develop a prototype standalone chine removal machine and demonstrate this machine at various processor sites within Australia.

Carcase analysis for lean meat yield measurement (DEXA)

Project code	P.PSH.0933	**Location**	National
Start date	15-Feb-18	**Vendor**	Gibraltar Capital Pty Ltd
End date	31-Jan-19	**Funding source**	MLA Donor Company
Date of publication	20-Jan-19	**Initiation of research**	External partnership

This pilot study evaluated the ability of a prototype NUCTECH DEXA system to differentiate fat, lean muscle and bone tissue using tissue calibration blocks of known composition. Additionally, this study assessed the ability of this DEXA prototype to predict the CT fat, lean muscle and bone % of lamb carcases.

Designs lamb automation for high throughput (LEAP VIII, IX, X)

Project code	P.PSH.1167	**Location**	National
Start date	30-Oct-18	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	15-Jan-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership

This project undertook a design review of the existing LEAP modules to identify work required to increase throughput capability to 15 carcases per minute. A set of high-level designs and layout arrangements were developed and shown overlaid into an exemplar processor facility that operates at these speeds.

Fat cap machine upgrade for Australian lamb and validation trial

Project code	P.PSH.0839	**Location**	National
Start date	15-Apr-17	**Vendor**	Western Australia Meat Marketing
End date	01-Nov-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership

This project performed trials at WAMMCO, New Zealand, to prove that the fat cap removal machine is capable of processing the size of stock that the Australian market requires, reliably and at a rate that meets process expectations.

LEAP Suite monitoring and reporting package for machine performance management

Project code	P.PIP.0564	**Location**	National
Start date	15-Oct-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	15-Jul-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	Processing industry
This project aimed to design, develop and test a machine monitoring and reporting system that will enable processors to proactively maintain system performance and accuracy, and service the automated primal, middle and forequarter bone in processing machinery for lamb.			

LEAP II (Hindquarter) Australian site ready prototype development - lamb boning

Project code	P.PSH.0736	**Location**	National
Start date	20-Apr-15	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	22-Nov-18	**Funding source**	MLA Donor Company
Date of publication	09-May-18	**Initiation of research**	External partnership
Automating the hindquarter boning process is seen as a useful portion of the fully automated lamb boning room. This project proposed new technologies to address the yield demands and test the new technologies on a prototype development rig.			

Product innovation

Proof of concept - cold smoked red meat (Smoke T – Lamb Bacon Co)

Project code	V.RMH.0099	**Location**	National
Start date	30-Jul-19	**Vendor**	The Original Lamb Bacon Co
End date	08-Jun-20	**Funding source**	Levy
Date of publication	24-Apr-20	**Initiation of research**	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

Building sustainable value chains that link producers to high value chilled lamb export markets in China

Project code	P.PIP.0562	**Location**	National
Start date	04-Dec-17	**Vendor**	Greenleaf Enterprises Pty Ltd
End date	28-Aug-19	**Funding source**	MLA Donor Company
Date of publication	29-Jan-20	**Initiation of research**	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

Project code	P.PIP.0741	**Location**	National
Start date	03-Jun-17	**Vendor**	Australian Lamb Pty Ltd
End date	29-Nov-19	**Funding source**	MLA Donor Company
Date of publication	-	**Initiation of research**	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.

Development of a WA sheep industry collaboration

Project code	P.PSH.1113	**Location**	Western Australia
Start date	01-May-18	**Vendor**	Sheep Alliance of WA
End date	01-Aug-18	**Funding source**	MLA Donor Company
Date of publication	30-Jul-18	**Initiation of research**	External partnership

This project was commissioned by the Sheep Alliance of WA (SAWA), whose members had identified a need to provide an independent and detailed business prospectus for investment in a WA sheep industry integrated RD&E program.

R&D projects in progress

Animal health, welfare and biosecurity

New approaches to increase the weaning rate of the national sheep-flock

Project code	L.LSM.0015	**Location**	National
Start date	01-Dec-17	**Vendor**	University of Adelaide
End date	15-Jun-24	**Funding source**	Levy
Initiation of research	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: project one focuses on improving survival of embryos through nutritional management and the other projects each take novel approaches to boosting lamb survival.

Boosting lamb survival by supplementing ewes with vitamins and minerals

Project code	L.LSM.0014	**Location**	Southern Australia
Start date	28-Jan-18	**Vendor**	Murdoch University
End date	15-Nov-23	**Funding source**	Levy
Initiation of research	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

Project code	L.LSM.0013	**Location**	National
Start date	01-Jan-18	**Vendor**	Murdoch University
End date	30-May-23	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.1180	**Location**	National
Start date	15-Jan-19	**Vendor**	JT Agri-Source Pty Ltd
End date	30-Apr-23	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	L.LSM.0026	**Location**	National
Start date	08-Oct-19	**Vendor**	University of Adelaide
End date	15-Mar-23	**Funding source**	Levy
Initiation of research	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

Project code	L.LSM.0021	**Location**	National
Start date	24-Jun-19	**Vendor**	University of Adelaide
End date	28-Feb-23	**Funding source**	Levy
Initiation of research	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

Project code	B.AWW.0263	**Location**	National
Start date	15-Apr-20	**Vendor**	CSIRO
End date	02-Dec-22	**Funding source**	Levy
Initiation of research	Industry		

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.

Refining body condition score for region, season, breed and responsiveness

Project code	L.LSM.0020	**Location**	National
Start date	01-Jun-19	**Vendor**	NSW DPI
End date	15-Nov-22	**Funding source**	Levy
Initiation of research	Industry		

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.

Reducing foetal and lamb losses in young ewes

Project code	B.AHE.0318	**Location**	National
Start date	01-Jan-18	**Vendor**	Murdoch University
End date	31-Jul-22	**Funding source**	Levy
Initiation of research	Investment call		

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.

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

Project code	P.PSH.0808	**Location**	National
Start date	28-Jun-17	**Vendor**	CSIRO
End date	30-Dec-21	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	L.LSM.0019	**Location**	National
Start date	31-Oct-18	**Vendor**	Livestock Logic
End date	30-Oct-21	**Funding source**	Levy
Initiation of research	Investment call		

This project will conduct 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 percent.

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

Project code	P.PSH.1171	**Location**	National
Start date	01-Mar-19	**Vendor**	University of Western Australia
End date	01-Oct-21	**Funding source**	MLA Donor Company
Initiation of research	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.

Formulating a research pathway to provide new options for flystrike control

Project code	B.AHE.0262	**Location**	National
Start date	01-Jul-19	**Vendor**	CSIRO
End date	01-Sep-21	**Funding source**	Levy
Initiation of research	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.

Reducing the financial impact of endemic conditions in sheep – a value chain approach

Project code	P.PSH.0852	**Location**	National
Start date	01-Jan-18	**Vendor**	University of Adelaide
End date	31-Jul-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

This project will develop systems for recording individual carcase 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.

Designing farm specific nematode control programs for sheep

Project code	B.AHE.0308	**Location**	National
Start date	01-Mar-17	**Vendor**	University of New England
End date	01-Jul-21	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.0804	**Location**	National
Start date	26-Jun-17	**Vendor**	University of Melbourne
End date	25-Jun-21	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	B.AHE.0261	**Location**	National
Start date	01-May-19	**Vendor**	Macquarie University
End date	01-May-21	**Funding source**	Levy
Initiation of research	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

Project code	L.LSM.0028	**Location**	National
Start date	15-Mar-20	**Vendor**	Charles Sturt University
End date	31-Jan-21	**Funding source**	Levy
Initiation of research	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.

Animal production, husbandry and nutrition

Phasing out of mulesing: cost, benefits and opportunities

Project code	B.AWW.0006	**Location**	National
Start date	07-May-19	**Vendor**	University of Melbourne
End date	15-Nov-22	**Funding source**	Levy
Initiation of research	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.

The nutritive value of modern crop stubbles

Project code	L.LSM.0016	**Location**	National
Start date	16-Oct-18	**Vendor**	CSIRO
End date	30-Jun-21	**Funding source**	Levy
Initiation of research	Investment call		

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.

Digital agriculture

Making real farms smart – mixed sheep ag tech

Project code	P.PSH.1179	**Location**	National
Start date	01-Jul-19	**Vendor**	Origo Pty Ltd
End date	15-Mar-23	**Funding source**	MLA Donor Company
Initiation of research	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.

Feedbase and grazing land management

Dual purpose crops for lamb production in southern QLD and northern NSW

Project code	P.PSH.1045	**Location**	Queensland; New South Wales
Start date	23-Apr-18	**Vendor**	CSIRO
End date	15-Nov-22	**Funding source**	MLA Donor Company
Initiation of research	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 vs. 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 & forage combinations to extend summer feed for southern NSW

Project code	P.PSH.1048	**Location**	Southern Australia
Start date	23-Apr-18	**Vendor**	CSIRO
End date	01-May-22	**Funding source**	MLA Donor Company
Initiation of research	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.

No more gaps with superior shrub systems

Project code	L.LSM.0018	**Location**	National
Start date	15-Oct-18	**Vendor**	CSIRO
End date	31-Dec-21	**Funding source**	Levy
Initiation of research	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.

Food safety, traceability and integrity systems

Toxoplasma gondii (sheep)

Project code	V.MFS.0419	**Location**	National
Start date	01-Nov-16	**Vendor**	Primary Industries and Resources SA
End date	28-Aug-21	**Funding source**	Levy
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

Further development of a reference population for genomic prediction

Project code	L.GEN.1814	**Location**	National
Start date	15-Nov-18	**Vendor**	University of New England
End date	30-Jun-25	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.0961	**Location**	National
Start date	15-Dec-17	**Vendor**	University of New England
End date	30-Jul-22	**Funding source**	MLA Donor Company
Initiation of research	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.

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
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.

Development and delivery of improved genomic prediction tools for sheep

Project code	L.GEN.1815	**Location**	National
Start date	15-May-19	**Vendor**	University of New England
End date	15-Nov-21	**Funding source**	Levy
Initiation of research	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.

Corriedale eating quality genomics

Project code	P.PSH.1001	**Location**	National
Start date	06-Nov-17	**Vendor**	University of Adelaide
End date	01-Nov-21	**Funding source**	MLA Donor Company
Initiation of research	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.

Sensory testing to underpin genomic prediction of lamb eating quality

Project code	L.GEN.1811	**Location**	National
Start date	30-Oct-18	**Vendor**	Murdoch University
End date	01-Nov-21	**Funding source**	Levy
Initiation of research	Industry		

This project will create and maintain a database to determine genomic predictions of Meat Standards Australia-based eating quality scores. It will also develop new Australian Sheep Breeding Values for eating quality of lamb cuts.

Genetics of Merino meat value and lifetime performance

Project code	P.PSH.1032	**Location**	National
Start date	01-Mar-18	**Vendor**	NSW DPI
End date	02-Mar-21	**Funding source**	MLA Donor Company
Initiation of research	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.

Adding sustainability traits to the MLA resource flock (phase one)

Project code	L.GEN.2103	**Location**	National
Start date	30-Sep-20	**Vendor**	Department of Agriculture and Food
End date	21-Jun-21	**Funding source**	Levy
Initiation of research	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.

Sheep Genetics database re-development - phase 2

Project code	L.GEN.2104	**Location**	National
Start date	16-Nov-20	**Vendor**	Servian Pty Ltd
End date	31-May-21	**Funding source**	Levy
Initiation of research	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.

Further development of the Sheep Genetics search site - phase 2

Project code	L.GEN.2011	**Location**	National
Start date	09-Nov-20	**Vendor**	TigerSpike Pty Ltd
End date	31-Jan-21	**Funding source**	Levy
Initiation of research	Industry		

This project will continue to build upon the new release of the Sheep Genetics website. These website enhancements will further improve the user experience and minimise support required of the site.

Eating quality in Merino breeding programs

Project code	L.EQT.1908	**Location**	National
Start date	30-Nov-19	**Vendor**	NSW DPI
End date	15-Dec-21	**Funding source**	Levy
Initiation of research	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.

Processing productivity

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 carcase 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

Preliminary evaluation of flavourless smoke in chilled Australian lamb

Project code	V.RMH.0095	**Location**	National
Start date	30-May-19	**Vendor**	Market Synergy Pty Ltd
End date	15-Jun-21	**Funding source**	Levy
Initiation of research	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%.

Goats

Completed R&D projects

Animal health, welfare and biosecurity

Reducing kid loss – select and protect; phase 1

Project code	B.GOA.1905	**Location**	National
Start date	01-Dec-18	**Vendor**	NSW DPI
End date	01-Nov-20	**Funding source**	Levy
Date of publication	03-Dec-20	**Initiation of research**	Industry

This project established a baseline understanding of reproductive wastage, 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

Project code	B.GOA.1902	**Location**	National
Start date	20-Nov-18	**Vendor**	Forest Hill Consulting
End date	12-Jul-19	**Funding source**	Levy
Date of publication	20-Jun-19	**Initiation of research**	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.

Processing productivity

Wodonga cubing (Goat)

Project code	P.PIP.0759	**Location**	National
Start date	01-Apr-18	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	12-Dec-18	**Funding source**	MLA Donor Company
Date of publication	08-Feb-21	**Initiation of research**	Processing industry

This project evaluated methodologies, tested, trialled and designed a prototype system to automate the hot goat cubing process, capable of cutting warm/hot goat product of cube dimension from 50mm to 100mm.

Product Innovation

Goat beauty cream – proof of concept development and testing

Project code	V.RMH.0104	**Location**	National
Start date	12-Dec-19	**Vendor**	CB and JE Stewart
End date	24-Jun-20	**Funding source**	Levy
Date of publication	15-Jul-20	**Initiation of research**	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.

R&D projects in progress

Animal health, welfare and biosecurity

Sustainable internal parasite control in goats: effective and safe anthelmintic use

Project code	B.GOA.1907	**Location**	National
Start date	01-Jan-19	**Vendor**	University of New England
End date	01-Mar-22	**Funding source**	Levy
Initiation of research	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

Project code	B.GOA.0123	**Location**	National
Start date	20-Jul-16	**Vendor**	NSW DPI
End date	30-Oct-23	**Funding source**	Levy
Initiation of research	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.

South African goat management versus Australian

Project code	P.PSH.1152	**Location**	National
Start date	01-Oct-18	**Vendor**	Farmanco Management Consultants
End date	01-Nov-19	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

This study tour will take commercial Australian goatmeat producers on a tour of the South African goatmeat industry, to gain insight into practises that could be adapted to Australian circumstances to increase profitability and production.

Response of Rangeland goats to supplementation and development of least-cost supplement calculator

Project code	B.GOA.0127	**Location**	National
Start date	15-Jun-18	**Vendor**	University of Queensland
End date	01-Mar-22	**Funding source**	Levy
Initiation of research	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.

Goat levy, industry and producer performance indicators

Project code	B.GOA.1903	**Location**	National
Start date	20-Nov-18	**Vendor**	Holmes Sackett Pty Ltd
End date	15-Jul-21	**Funding source**	Levy
Initiation of research	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.

Eating quality

Goatmeat quality – pathway to the future

Project code	B.GOA.0001	**Location**	National
Start date	01-Mar-19	**Vendor**	Murdoch University
End date	01-Dec-21	**Funding source**	Levy
Initiation of research	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.

Product innovation

Goat treats – proof of concept development and testing

Project code	V.RMH.0115	**Location**	National
Start date	30-May-20	**Vendor**	CB and JE Stewart
End date	01-Apr-21	**Funding source**	Levy
Initiation of research	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.

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

Utilising Innovative GPS IoT technology to investigate multi-species grazing for improved pasture management and meat quality

Project code	P.PSH.1151	**Location**	National
Start date	30-Jul-18	**Vendor**	Sterlings to Coast Farmers
End date	13-Aug-19	**Funding source**	MLA Donor Company
Date of publication	28-Nov-19	**Initiation of research**	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.			

Integrating spatial technologies in a mixed farming system to increase production efficiency of crop grazing

Project code	P.PSH.0834	**Location**	Western Australia
Start date	01-Mar-17	**Vendor**	Spatial Information Systems Research
End date	29-Nov-18	**Funding source**	MLA Donor Company
Date of publication	22-Jun-18	**Initiation of research**	External partnership
This project evaluated contemporary spatial technologies to assist in crop grazing management on a mixed farming enterprise in Western Australia.			

Environmental sustainability

Trial electric, two-wheel motorbikes on grazing properties

Project code	P.PSH.1185	**Location**	National
Start date	19-Mar-19	**Vendor**	Kondinin Group
End date	30-Jun-20	**Funding source**	MLA Donor Company
Date of publication	09-Sep-20	**Initiation of research**	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

Project code	P.PSH.0793	**Location**	National
Start date	01-Mar-17	**Vendor**	Western Sydney University
End date	30-Apr-20	**Funding source**	MLA Donor Company
Date of publication	06-Jun-20	**Initiation of research**	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

Project code	P.PSH.1055	**Location**	Queensland
Start date	15-Feb-18	**Vendor**	Agrimix Pastures Pty Ltd
End date	31-Mar-21	**Funding source**	MLA Donor Company
Date of publication	08-Jan-21	**Initiation of research**	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

Project code	B.CCH.2110	**Location**	National
Start date	15-Apr-19	**Vendor**	The Biomimicry Institute
End date	22-Jul-19	**Funding source**	Levy
Date of publication	08-Nov-19	**Initiation of research**	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

Addressing herbicide resistance - options and non-chemical approaches for mixed farmers

Project code	B.WEE.0146	**Location**	National
Start date	30-Jun-14	**Vendor**	Charles Sturt University
End date	14-Aug-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.0730	**Location**	Western Australia
Start date	02-Nov-15	**Vendor**	Western Australia Agriculture
End date	30-Jul-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.0687	**Location**	Southern Australia
Start date	01-Apr-14	**Vendor**	Pasture Trials Network Ltd
End date	15-Jun-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	B.PSP.0018	**Location**	Southern Australia
Start date	01-Sep-16	**Vendor**	NSW DPI
End date	01-Jun-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	Rural R&D for Profit (RRDfP)

Phosphorus (P) is the primary nutrient input that drives legume nitrogen fixation. This 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

Project code	B.NBP.0749	**Location**	Queensland
Start date	01-Nov-12	**Vendor**	DAFF
End date	07-Apr-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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.

Addressing feed supply and demand through total grazing pressure management

Project code	B.TGP.1702	**Location**	Southern Australia
Start date	01-Feb-17	**Vendor**	NSW Department of Industry
End date	01-Oct-18	**Funding source**	Levy
Date of publication	11-Mar-19	**Initiation of research**	Investment call

This project quantified the impacts of grazing pressure management on primary production and natural resources and identified relevant knowledge gaps to produce a research and development investment plan.

The profitable of cropping and livestock in Southern Australia

Project code	L.MXF.0001	**Location**	Southern Australia
Start date	07-Nov-16	**Vendor**	Rural Directions
End date	06-Sep-18	**Funding source**	Levy
Date of publication	06-Feb-19	**Initiation of research**	Investment call

This project reviewed benchmark data, conducted a skills audit and applied a risk-analysis tool to define the primary profit drivers in mixed farming systems throughout southern Australia.

Social acceptability of pest animal management in meeting TGP targets

Project code	B.TGP.1701	**Location**	Southern Australia
Start date	10-Dec-16	**Vendor**	NSW Department of Industry
End date	15-Aug-18	**Funding source**	Levy
Date of publication	01-Dec-18	**Initiation of research**	Investment call

This project reviewed other research and current industry best management practices regarding total grazing pressure in extensive livestock production systems. The project assessed the social acceptability among key stakeholders of the control measures to manage kangaroos, rangeland goats and feral pigs in the southern Australian rangelands.

Blackberry biological control

Project code	B.WBC.0030	**Location**	National
Start date	01-Oct-15	**Vendor**	CSIRO
End date	01-Sep-18	**Funding source**	Levy
Date of publication	01-Sep-18	**Initiation of research**	Industry

This project developed an efficient system for mass-production and field application of the fungus *Phytophthora bilorbang*, which has caused severe blackberry dieback in Western Australia and is naturally found across Australia. Host-specificity testing examined the susceptibility of a range of blackberry species to the fungus to confirm the resistance of ten key non-target plant species.

Development of simplified MaiaGrazing module for mainstream graziers

Project code	P.PSH.0913	**Location**	National
Start date	10-Dec-17	**Vendor**	FMS Solutions Pty Ltd
End date	14-Aug-18	**Funding source**	MLA Donor Company
Date of publication	02-Jun-18	**Initiation of research**	External partnership

The purpose of this project was to apply a human-centred design approach to develop a simplified, mainstream version of MaiaGrazing, an online grazing management tool, that can be easily adopted and used by any grazier.

Silverleaf nightshade biological control

Project code	B.WBC.0080	**Location**	Southern Australia
Start date	01-Oct-15	**Vendor**	Primary Industries and Resources SA
End date	01-Oct-18	**Funding source**	Levy
Date of publication	30-Apr-18	**Initiation of research**	Industry

This project assessed whether the release of silverleaf nightshade leaf beetle, as a control for silverleaf nightshade, is an acceptable risk to economic, ecological and social values in Australia.

R&D projects in progress

Digital agriculture

Autonomous map and zap weed program application (Stage 1)

Project code	P.PSH.1039	**Location**	National
Start date	01-May-18	**Vendor**	Agresearch Limited
End date	15-Mar-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

This project aimed develop a system that would autonomously detect and selectively control weeds. The purpose being 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.

Feedbase and grazing land management

A new hope for the biological control of blackberry

Project code	B.WEE.0149	**Location**	Southern Australia
Start date	29-Jun-20	**Vendor**	Primary researcher DJPR
End date	30-Apr-26	**Funding source**	Levy
Initiation of research	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

Project code	L.FAP.2101	**Location**	South Australia
Start date	30-Oct-20	**Vendor**	Coorong District Council
End date	15-May-26	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.2052	**Location**	Tasmania
Start date	29-May-20	**Vendor**	University of Tasmania
End date	31-Jan-26	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.2005	**Location**	New South Wales
Start date	28-Feb-20	**Vendor**	Orkney Management Pty Ltd
End date	30-Apr-25	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	L.ADP.2019	**Location**	New South Wales
Start date	30-Apr-20	**Vendor**	Department of Regional NSW
End date	30-Apr-25	**Funding source**	Levy
Initiation of research	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

Project code	B.PAS.0502	**Location**	National
Start date	01-Nov-19	**Vendor**	University of Queensland
End date	30-Apr-24	**Funding source**	Levy
Initiation of research	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

Project code	B.WEE.0148	**Location**	National
Start date	02-Dec-19	**Vendor**	CSIRO
End date	01-Apr-24	**Funding source**	Levy
Initiation of research	Industry		

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.

Impact of bushfires on soil, pasture and the microbiome

Project code	P.PSH.1222	**Location**	National
Start date	02-Nov-20	**Vendor**	University of Sydney
End date	30-Dec-22	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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.

LPP - Increasing livestock production by integrating tropical pastures into farming systems

Project code	P.PSH.1029	**Location**	National
Start date	01-Jan-18	**Vendor**	NSW DPI
End date	14-Dec-22	**Funding source**	MLA Donor Company
Initiation of research	Livestock Productivity Partnership		

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.

National pasture genetic resources genebank

Project code	B.PBE.0039	**Location**	National
Start date	15-Jun-14	**Vendor**	Department of Agriculture
End date	03-Dec-22	**Funding source**	Levy
Initiation of research	Industry		

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

Project code	L.FAP.1902	**Location**	Southern Australia
Start date	31-Oct-18	**Vendor**	Southern Farming Systems
End date	30-Sep-22	**Funding source**	Levy
Initiation of research	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)

Project code	L.FAP.1903	**Location**	Southern Australia
Start date	31-Oct-18	**Vendor**	Southern Farming Systems
End date	30-Sep-22	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.1030	**Location**	Southern Australia
Start date	01-Jan-18	**Vendor**	NSW DPI
End date	01-Sep-22	**Funding source**	MLA Donor Company
Initiation of research	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 $750M annually to the red meat industry by addressing the pasture yield gap that exists across 7M ha 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

Project code	P.PSH.1036	**Location**	National
Start date	15-Jan-18	**Vendor**	NSW DPI
End date	31-Aug-22	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.1050	**Location**	Northern Australia
Start date	27-Feb-18	**Vendor**	University of New England
End date	30-Aug-22	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.1136	**Location**	Southern Australia
Start date	15-May-18	**Vendor**	Grains Research & Development Corp
End date	30-Jun-22	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	L.FAP.2102	**Location**	Southern Australia; Western Australia
Start date	20-Jul-20	**Vendor**	Nicon Rural Services
End date	20-Jun-22	**Funding source**	Levy
Initiation of research	Industry		

Due to the success of the 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

Project code	P.PSH.1044	**Location**	National
Start date	23-Apr-18	**Vendor**	CSIRO
End date	24-Mar-22	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	L.FAP.1901	**Location**	Southern Australia
Start date	31-Oct-18	**Vendor**	Southern Farming Systems
End date	28-Feb-22	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.0749	**Location**	Southern Australia
Start date	01-Dec-15	**Vendor**	Pasture Genetics Pty Ltd
End date	31-Jan-22	**Funding source**	MLA Donor Company
Initiation of research	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.

The more sub clover project

Project code	L.FAP.1904	**Location**	Southern Australia
Start date	31-Oct-18	**Vendor**	Southern Farming Systems
End date	30-Nov-21	**Funding source**	Levy
Initiation of research	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.

Advancing the agronomy package for tedera to fill feed-gaps

Project code	B.CCH.6621	**Location**	National
Start date	01-Apr-17	**Vendor**	Western Australia Agriculture
End date	30-Aug-21	**Funding source**	Levy
Initiation of research	Investment call		

This project will advance the agronomy package for the cultivar of tedera 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.

LPP - Developing a framework for tactical decision making to address feed deficits

Project code	P.PSH.1027	**Location**	New South Wales
Start date	01-Feb-18	**Vendor**	Department of Regional NSW
End date	01-Apr-21	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	B.PAS.0360	**Location**	National
Start date	10-Dec-19	**Vendor**	NSW Department of State
End date	30-Dec-20	**Funding source**	Levy
Initiation of research	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

Project code	B.TGP.2001	**Location**	National
Start date	15-Sep-19	**Vendor**	NSW DPI
End date	30-Sep-20	**Funding source**	Levy
Initiation of research	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.

People and business

Improving the productivity and profitability of South Australia's red meat and wool industries

Project code	P.PSH.1256	**Location**	South Australia
Start date	15-Jun-20	**Vendor**	Primary Industries & Resources SA
End date	30-Dec-22	**Funding source**	MLA Donor Company
Initiation of research	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

Impact of MLA animal health and welfare investments (2015–2020)

Project code	B.AHE.0263	**Location**	National
Start date	28-Feb-19	**Vendor**	AusVet Pty Ltd
End date	02-Aug-19	**Funding source**	Levy
Date of publication	25-Mar-20	**Initiation of research**	Industry
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.			

Wild Dog Alert

Project code	B.AHE.0260	**Location**	National
Start date	01-Sep-15	**Vendor**	Invasive Animals Ltd
End date	24-Sep-19	**Funding source**	Levy
Date of publication	24-Jul-19	**Initiation of research**	Industry
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.			

On-farm faecal worm egg count proof of principle

Project code	B.AHE.0320	**Location**	National
Start date	20-Apr-18	**Vendor**	Solentive Systems Pty Ltd
End date	07-Nov-18	**Funding source**	Levy
Date of publication	20-Nov-18	**Initiation of research**	Industry
The project examined the feasibility of designing a new device which will enable the determination of faecal worm egg counts on farm, using existing magnifying equipment and new image recognition software.			

Rabbit RHD Boost Plus and exploring future RHD biocontrol

Project code	B.AHE.0259; B.AHE.0217	**Location**	National
Start date	01-Sep-15	**Vendor**	Invasive Animals Ltd
End date	30-Aug-18	**Funding source**	Levy
Date of publication	30-Aug-18	**Initiation of research**	Industry

Rabbits impact on Australian agriculture, ecological communities and 321 nationally threatened species. These projects produced new strains of Rabbit Haemorrhagic Disease Virus (RHDV) that are able to overcome immunity and potentially resistance to existing RHDV strains.

Field euthanasia of livestock

Project code	B.AWW.0257	**Location**	National
Start date	31-May-17	**Vendor**	University of Melbourne
End date	15-Oct-18	**Funding source**	Levy
Date of publication	21-Aug-18	**Initiation of research**	Industry
This project determined the efficacy and humaneness of intravenous magnesium sulphate (epsom salts) for field euthanasia of livestock.			

Transmissible Spongiform Encephalopathy Freedom Assurance Program

Project code	P.PSH.1014	**Location**	National
Start date	18-Dec-17	**Vendor**	Animal Health Australia
End date	31-Jul-18	**Funding source**	MLA Donor Company
Date of publication	30-Jun-18	**Initiation of research**	External partnership
The Transmissible Spongiform Encephalopathies Freedom Assurance Program supports market compliance for cattle and sheep. This project supported data collection for the program, which is used to ensure ongoing market access for Australia's cattle and sheep to domestic and world markets.			

Digital agriculture

High speed wireless link (with solar infrastructure) evaluation pilot

Project code	P.PSH.1018	**Location**	Queensland
Start date	15-Dec-17	**Vendor**	Wi-Sky Queensland Pty Ltd
End date	15-Jun-20	**Funding source**	MLA Donor Company
Date of publication	17-Nov-20	**Initiation of research**	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

Project code	P.PSH.1168	**Location**	Queensland
Start date	01-Mar-19	**Vendor**	Field Solutions Group Pty Ltd
End date	13-Aug-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.0917	**Location**	National
Start date	01-Dec-17	**Vendor**	Aerodyne Australia Pty Ltd
End date	30-Apr-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.1111	**Location**	National
Start date	16-Apr-18	**Vendor**	Farmbot Australia Pty Ltd
End date	24-Mar-20	**Funding source**	MLA Donor Company
Date of publication	24-Mar-20	**Initiation of research**	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

Project code	P.PSH.1162	**Location**	National
Start date	20-Sep-18	**Vendor**	Hitachi Australia Pty Ltd
End date	16-Mar-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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)

Project code	P.PSH.1042	**Location**	National
Start date	05-Mar-18	**Vendor**	Farmbot Australia Pty Ltd
End date	28-Feb-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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 3)

Project code	P.PSH.1178	**Location**	National
Start date	14-Jan-19	**Vendor**	Crown Agriculture
End date	15-Nov-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.1025	**Location**	National
Start date	05-Feb-18	**Vendor**	OutofBox Solutions Tech Pty Ltd
End date	30-Jun-19	**Funding source**	MLA Donor Company
Date of publication	24-Oct-19	**Initiation of research**	External partnership

This project developed a minimum viable product (MVP) for a proposed solution to feral animal control - 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

Project code	P.PSH.1176	**Location**	National
Start date	15-Jan-19	**Vendor**	Hitachi Australia Pty Ltd
End date	30-Jun-19	**Funding source**	MLA Donor Company
Date of publication	09-Oct-19	**Initiation of research**	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

Project code	P.PSH.1004	**Location**	National
Start date	15-Nov-17	**Vendor**	March IT
End date	30-Jul-19	**Funding source**	MLA Donor Company
Date of publication	29-Sep-19	**Initiation of research**	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

Project code	V.DIG.1903	**Location**	National
Start date	21-Dec-18	**Vendor**	Australian Farm Institute
End date	30-Jun-19	**Funding source**	Levy
Date of publication	27-Sep-19	**Initiation of research**	Industry
The project took a systemised approach to identify and deliver a categorised database of 128 technology solution providers that 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

Project code	P.PSH.1130	**Location**	National
Start date	30-May-18	**Vendor**	Wiley & Co Pty Ltd
End date	30-Sep-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.1169	**Location**	National
Start date	01-Nov-18	**Vendor**	Autonomous Tractor Corporation
End date	30-Sep-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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)

Project code	P.PSH.0931	**Location**	National
Start date	01-Nov-17	**Vendor**	HDT Expeditionary Systems
End date	31-Aug-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.1037	**Location**	National
Start date	10-Jan-18	**Vendor**	Livestock Labs Pty Ltd
End date	06-Apr-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.0725	**Location**	National
Start date	23-Mar-15	**Vendor**	Practical Systems Ltd
End date	01-Jun-19	**Funding source**	MLA Donor Company
Date of publication	01-Jun-19	**Initiation of research**	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.			

Farm Gate 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.			

SeedSpotter - real time imaging and quantification of seeds in live animals

Project code	P.PSH.1017	**Location**	National
Start date	08-Jan-18	**Vendor**	Xinova LLC
End date	28-Feb-19	**Funding source**	MLA Donor Company
Date of publication	28-Feb-19	**Initiation of research**	External partnership
This project undertook a technical proof of concept study of Tera-Hertz technology to determine if it could detect seed infestation in skin-on lamb carcases and carcases, to assess market viability and path(s) to market, and determine user requirements.			

Digital supermarket of the future

Project code	V.RMH.0084	**Location**	National
Start date	29-Aug-18	**Vendor**	Carlo Ratti Associatti
End date	17-Jan-19	**Funding source**	Levy
Date of publication	11-Jan-19	**Initiation of research**	Industry
To improve user experience and demonstrate how the consumer will buy food in the future, this project explored how data could change the way that we interact with the food that we eat, informing us about its origins and characteristics and promoting more informed consumption habits.			

Aglive Version 3 API mobile app development project

Project code	P.PSH.1131	**Location**	National
Start date	20-May-18	**Vendor**	Aglive Pty Ltd
End date	19-Dec-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
The purpose of this project was to upgrade the Aglive IntegriPro mobile native software application, a blockchain technology that enables livestock accreditation integration, from Version 2 (V2 - Trial) to Version 3 (V3 - Production).			

ALC traceability in small stock processing

Project code	P.PIP.0443	**Location**	National
Start date	14-Sep-14	**Vendor**	Australian Lamb Pty Ltd
End date	31-Dec-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	Processing industry
This project supported the research and development of a radio frequency identification traceability system, to allow the tracking of a livestock unit from stunning through to the boning room band saw.			

Developing the use of ground robotics for data gathering and analysis to assist farming decisions

Project code	P.PSH.0879	**Location**	National
Start date	01-Jun-17	**Vendor**	University of Sydney
End date	31-Aug-18	**Funding source**	MLA Donor Company
Date of publication	01-Dec-18	**Initiation of research**	External partnership
The primary objective of this project was to demonstrate the application of mobile ground robotics for collecting high spatial and spectral resolution data of pasture and animal state on-farm. To achieve this, SwagBot, a prototype robotic vehicle developed by the Australian Centre for Field Robotics, was adapted and developed.			

Investigating potential Augmented Reality and Virtual Reality applications within Australian agriculture and food supply chains

Project code	P.PSH.1099	**Location**	National
Start date	17-Mar-18	**Vendor**	Wiley & Co. Pty Ltd
End date	17-Jun-18	**Funding source**	MLA Donor Company
Date of publication	25-Nov-18	**Initiation of research**	External partnership

This project evaluated the opportunities for use of augmented reality and virtual reality in the red meat industry and other Australian agriculture sectors.

Business intelligence solutions for Western Australian mixed farm enterprises

Project code	P.PSH.1142	**Location**	Western Australia
Start date	01-Jul-18	**Vendor**	Wheatbelt Science
End date	30-Oct-18	**Funding source**	MLA Donor Company
Date of publication	30-Oct-18	**Initiation of research**	External partnership

This project enabled a group of Western Australian mixed farmers to meet with identified data integration and business intelligence providers in Sydney to determine the relevance of their products and services for mixed farming businesses.

Integrated digital connectivity solution using long range wireless high-speed internet link to connect several adjacent properties (Stage 1 of 2)

Project code	P.PSH.1125	**Location**	Queensland
Start date	01-Aug-18	**Vendor**	Stanbroke Pty Ltd
End date	30-Sep-18	**Funding source**	MLA Donor Company
Date of publication	29-Oct-18	**Initiation of research**	External partnership

Internet connectivity is critical to every modern business. Through this project, Wi-Sky QLD worked with Stanbroke and MLA on Project Downpour, to provide a high-speed internet connection on every one of its major stations in north-west Queensland as an alternative to their current underperforming and unreliable services.

Farm worker emergency notification device - Save Our Souls - Phase 1

Project code	P.PSH.0922	**Location**	National
Start date	01-Oct-17	**Vendor**	Nakatomi Pty Ltd
End date	08-Oct-18	**Funding source**	MLA Donor Company
Date of publication	08-Oct-18	**Initiation of research**	External partnership

Producers are often doing remote work by themselves for large periods of time and have no truly reliable method of alerting others when incapacitated by injury. This project involved the development and testing of a prototype emergency detection and alerting smart shoe insole, the Save Our Souls device, for producers in Australia.

Development of the strategic partnership: UNE SMART Farms¬ connect

Project code	P.PSH.1012	**Location**	National
Start date	15-Dec-17	**Vendor**	University of New England
End date	04-Jun-18	**Funding source**	MLA Donor Company
Date of publication	30-Jun-18	**Initiation of research**	External partnership
This project explored the potential for strategic partnerships between MLA and tertiary education providers that would catalyse technology development for the benefit of the red meat industry and Australia more broadly.			

Customer led design thinking aerial drone strategy

Project code	P.PSH.0861	**Location**	National
Start date	01-Jun-17	**Vendor**	Ruralco Holdings Limited
End date	30-Sep-18	**Funding source**	MLA Donor Company
Date of publication	28-Jun-18	**Initiation of research**	External partnership
This project assisted in the development of an aerial drone strategy to identify current aerial drone deployment, new uses and future development needs.			

Eating quality

MSA Model (V1.9) Development

Project code	L.EQT.1621	**Location**	National
Start date	1-Mar-17	**Vendor**	Polkinghornes
End date	30-Jun-18	**Funding source**	Levy
Date of publication	30-Jun-18	**Initiation of research**	Industry
The Meat Standards Australia (MSA) model is a world leading eating quality program. This project managed new updates to the MSA model, including further MSA marble validation, hump height vs. tropical breed content validation, mixing and stress pathway changes, meat colour and packaging changes.			

Environmental sustainability

Carbon accounting workshops

Project code	V.SCS.0016	**Location**	National
Start date	21-Feb-20	**Vendor**	Integrity Ag & Environment
End date	30-Sep-20	**Funding source**	Levy
Date of publication	26-Oct-20	**Initiation of research**	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

Project code	P.PSH.0823	**Location**	Northern Australia
Start date	01-Apr-18	**Vendor**	Indigenous Land Corporation
End date	01-Aug-19	**Funding source**	MLA Donor Company
Date of publication	18-Mar-20	**Initiation of research**	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

Project code	P.PSH.1145	**Location**	National
Start date	22-Jun-18	**Vendor**	Carbon Link Limited
End date	01-Jul-19	**Funding source**	MLA Donor Company
Date of publication	02-Dec-19	**Initiation of research**	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.

Improving producer decision by quantifying carbon footprints of 3 Western Australia pasture systems

Project code	B.ERM.0087	**Location**	Western Australia
Start date	26-Apr-13	**Vendor**	Curtin University of Australia
End date	01-Sep-18	**Funding source**	Levy
Date of publication	01-Sep-18	**Initiation of research**	Industry

This project evaluated the cost of production from annual and perennial systems in Western Australia. It aimed to develop a framework for assessing the environmental performance of these pasture systems and evaluate appropriate environmental mitigation strategies.

Greenhouse gas mitigation potential of the Australian red meat production and processing sectors

Project code	B.CCH.7714	**Location**	National
Start date	30-Jan-17	**Vendor**	CSIRO
End date	30-Dec-18	**Funding source**	Levy
Date of publication	03-May-18	**Initiation of research**	Industry

The purpose of this project was to investigate if the Australian red meat industry could become carbon neutral by 2030 (CN30), and if so, how. This involved firstly establishing a greenhouse gas (GHG) emissions baseline year (2005) encompassing farm, feedlot and processing sectors. Following this, the most promising practices to reduce and offset GHG emissions were identified and a series of RD&A pathways proposed.

Food safety, traceability and integrity systems

Australian implementation of NeoSeek for molecular detection and confirmation of Shiga toxin producing *Escherichia coli*

Project code	P.PSH.1078	**Location**	National
Start date	15-Apr-18	**Vendor**	Neogen Australasia
End date	15-Oct-19	**Funding source**	External partnership
Date of publication	08-Dec-20	**Initiation of research**	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

Project code	P.PSH.1170	**Location**	National
Start date	11-Mar-19	**Vendor**	Oritian Pty Ltd
End date	22-Jun-20	**Funding source**	MLA Donor Company
Date of publication	02-Dec-20	**Initiation of research**	External partnership

The demand to tackle rising product fraud and the requirement to prove authenticity and transparency of products is increasing. This project applied Oritain'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

Project code	V.RDA.2006	**Location**	National
Start date	29-May-20	**Vendor**	Deloitte Touche Tohmatsu
End date	12-Nov-20	**Funding source**	Levy
Date of publication	17-Nov-20	**Initiation of research**	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

Project code	V.MFS.0447	**Location**	National
Start date	06-Apr-20	**Vendor**	McKinna et al.
End date	15-Sep-20	**Funding source**	Levy
Date of publication	18-Sep-20	**Initiation of research**	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

Project code	V.RBP.0027	**Location**	National
Start date	25-Jun-19	**Vendor**	MINTRAC
End date	30-Dec-20	**Funding source**	Levy
Date of publication	18-Jun-20	**Initiation of research**	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

Project code	V.LDL.1905	**Location**	National
Start date	19-Aug-19	**Vendor**	Greenleaf Enterprises
End date	20-Mar-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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.

Feasibility of using linerless cartons for the storage and transport of meat and meat products

Project code	P.PIP.0529	**Location**	National
Start date	09-May-16	**Vendor**	Teys Australia Pty Ltd
End date	31-Jul-18	**Funding source**	MLA Donor Company
Date of publication	24-Dec-19	**Initiation of research**	Processing industry

This project assessed the possibility of using liner-less cartons for red meat products, which meant coating the cardboard with plastic instead of using a plastic liner to offer more protection to meat products. The liner-less cartons were evaluated in regard to the chemical, physical and microbiological risks associated with storage and transport.

Microbial quality of Australian offal

Project code	V.MFS.0430	**Location**	National
Start date	15-Mar-18	**Vendor**	Symbio Laboratories
End date	17-Oct-19	**Funding source**	Levy
Date of publication	19-Sep-19	**Initiation of research**	Industry

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

Project code	P.PSH.1033	**Location**	National
Start date	30-May-18	**Vendor**	QIB Extra Ltd
End date	31-Mar-19	**Funding source**	MLA Donor Company
Date of publication	19-Mar-19	**Initiation of research**	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.

Evaluate, design and develop capabilities to replace NLIS Connect within ACC's Promptu software system

Project code	P.PSH.1147	**Location**	National
Start date	29-Jun-18	**Vendor**	Australian Country Choice Processing
End date	31-Jan-19	**Funding source**	MLA Donor Company
Date of publication	31-Dec-18	**Initiation of research**	External partnership

This project evaluated, designed and developed capabilities to replace the NLIS Connect application within Protrace's Promptu system, through use of the NLIS web service interface, to integrate data across the company's supply chain.

BioMérieux GeneUP STEC assays for routine use for export meat testing from Australia

Project code	P.PSH.1110	**Location**	National
Start date	01-Jul-18	**Vendor**	CSIRO
End date	31-Jan-19	**Funding source**	MLA Donor Company
Date of publication	18-Dec-18	**Initiation of research**	External partnership

Testing for shiga toxin-producing *Escherichia coli* (STEC) is essential for the export of manufacturing beef from Australia to several export markets. This project evaluated a recently introduced test kit to determine its efficiency for screening compared to existing kits.

Survey of beef and lamb for spores of non-proteolytic *Clostridium botulinum*

Project code	V.MFS.0425	**Location**	National
Start date	01-Jan-18	**Vendor**	CSIRO
End date	26-Nov-18	**Funding source**	Levy
Date of publication	26-Nov-18	**Initiation of research**	Industry

The retail shelf life of vacuum packed beef and lamb is restricted in the UK due to concerns about the potential for *Clostridium botulinum* to produce toxin at the temperatures often found in retail display. This survey aimed to determine the prevalence of *Clostridium botulinum* spores in chilled, vacuum packed beef and lamb as a first step in assessing risk.

Open innovation invention solutions for livestock traceability and monitoring

Project code	P.PSH.0752	**Location**	National
Start date	12-Oct-15	**Vendor**	Xinova LLC
End date	05-Oct-19	**Funding source**	MLA Donor Company
Date of publication	20-Nov-18	**Initiation of research**	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.			

Review of the Post-mortem Inspection and Disposition Schedules of the Australian Standard 4696

Project code	V.RBP.0020	**Location**	National
Start date	26-Nov-15	**Vendor**	AP Food Integrity Pty Ltd
End date	01-Dec-18	**Funding source**	Levy
Date of publication	31-Oct-18	**Initiation of research**	Industry
This project reviewed the post-mortem annex in AS 4696, which is used by all meat processors. This work aimed to provide scientific justification for removing procedures no longer necessary, altering or removing those that are not effective, using alternate procedures, and transferring procedures to companies' quality assurance systems.			

Using GS1 barcoding to resolve missing port marks in the USA – stage 2

Project code	P.PIP.0523	**Location**	National
Start date	09-May-16	**Vendor**	Teys Australia Pty Ltd
End date	21-Mar-19	**Funding source**	MLA Donor Company
Date of publication	29-Oct-18	**Initiation of research**	Processing industry
This project demonstrated the robustness, reliability and timeliness of the electronic messaging and the Meat Messaging portal to Food Safety Inspection Service. This also supported a proposal to replace the shipping mark with the GS1 barcode to improve efficiency.			

eNVD software development and field trials with eLynx

Project code	P.PSH.0789	**Location**	National
Start date	29-Aug-16	**Vendor**	Elynx Pty Ltd
End date	26-Oct-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
The purpose of this project was to develop Electronic National Vendor Declaration (eNVD) capabilities within eLynx software and participate in the eNVD field trials to help determine the feasibility of implementing the eNVD system within the red meat industry.			

Development & roll-out of ACC's eNVD software capabilities

Project code	P.PSH.0826	**Location**	National
Start date	12-Jan-17	**Vendor**	Australian Country Choice Pty Ltd
End date	20-Oct-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
The purpose of this project was to develop Electronic National Vendor Declaration (eNVD) capabilities as part of Australian Country Choice's software.			

Development and beta testing of Cedar Creek's eNVD capabilities

Project code	P.PSH.1035	**Location**	National
Start date	05-Feb-18	**Vendor**	Cedar Creek Company Pty Limited
End date	27-Sep-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
The purpose of this project was to develop eNVD retrieval and update capabilities within Cedar Creek software, 'FoodChain', and conduct beta testing within two Cedar Creek customer sites.			

Cold chain management manual for China

Project code	V.MFS.0429	**Location**	National
Start date	15-Feb-18	**Vendor**	MINTRAC
End date	20-Jun-18	**Funding source**	Levy
Date of publication	21-Jun-18	**Initiation of research**	Industry
This project aimed to create a manual and other materials to allow cold chain participants (managers, supervisors and staff) to manage the cold chain integrity, shelf life and quality of Australian chilled meat exported to China. The development of a practical manual will assist future workshop and would support trade.			

Livestock Data Link Development 2017/18 - Stage 1

Project code	V.LDL.1802	**Location**	National
Start date	30-Oct-17	**Vendor**	Infologica Pty Ltd
End date	30-Jun-18	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	Industry
This project helped implement the key work that has been endorsed by industry through the annual Livestock Data Link (LDL) development plan. This project focused on delivering the existing features and improved development of LDL.			

Developing an industry strategy for use of new genetic identification systems and surveillance technologies

Project code	V.MFS.0415	**Location**	National
Start date	23-Jan-17	**Vendor**	CSIRO
End date	30-Jun-18	**Funding source**	Levy
Date of publication	05-Mar-18	**Initiation of research**	Industry

This project reviewed what is being done both in Australia and internationally in regards to new molecular analysis techniques, such as whole genome sequencing. Discussions with key industry bodies helped to determine a strategy for future work in this area.

Process validation of an antibacterial treatment against *Escherichia coli* and *Enterococus faecium*

Project code	V.RMH.0072	**Location**	National
Start date	20-Nov-17	**Vendor**	Eurofins Microbiology Laboratories
End date	30-Jun-18	**Funding source**	Levy
Date of publication	22-Jan-18	**Initiation of research**	Industry

This project evaluated the ability of a microwave to reduce the concentration of enteric bacteria on the surface of meat without altering its appearance.

Principal research organisation: microbial ecology and physiology II

Project code	V.MFS.0402	**Location**	National
Start date	01-Apr-16	**Vendor**	University of Tasmania
End date	30-Jun-20	**Funding source**	Levy
Date of publication	01-Jul-17	**Initiation of research**	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.

Review of food safety and market access risks in red meat supply chains

Project code	V.MFS.0410	**Location**	National
Start date	29-Aug-16	**Vendor**	Charles Sturt University
End date	30-Jun-18	**Funding source**	Levy
Date of publication	19-Apr-18	**Initiation of research**	Industry

This project determined actual and potential market compliance risks (food safety risks, risks that can be understood as food safety risks, other technical risks) arising from the use of Australian red meat products in domestic and (potential) export markets.

Genetic analysis

Benefit and cost of performance recording in the beef and sheep studs

Project code	L.GEN.1802	**Location**	National
Start date	31-Jan-18	**Vendor**	Animal Genetics and Breeding Unit
End date	30-Nov-19	**Funding source**	Levy
Date of publication	03-Dec-19	**Initiation of research**	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

Data pipeline & LIVEX Collect technology development

Project code	W.LIV.2001	**Location**	National
Start date	15-Nov-18	**Vendor**	Business Strategic Management Group
End date	30-Aug-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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 2020-25

Project code	W.LIV.0199	**Location**	National
Start date	30-Aug-19	**Vendor**	Noetic Solutions Pty Ltd
End date	22-Jan-20	**Funding source**	Levy
Date of publication	15-Jul-20	**Initiation of research**	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

Project code	W.LIV.0195	**Location**	National
Start date	30-Jun-18	**Vendor**	Noetic Solutions Pty Ltd
End date	21-Jan-20	**Funding source**	Levy
Date of publication	15-Jun-20	**Initiation of research**	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.			

Live export industry annual transport mortality report – 2017 & 2018

Project code	W.LIV.0297	**Location**	05-May-19
Start date	01-Nov-17	**Vendor**	Western Australia Agriculture
End date	31-May-19	**Funding source**	Levy
Date of publication		**Initiation of research**	Industry

This project provided data regarding sheep, cattle and goats exported live from Australia during 2018 by sea and air. The collection of this information has enabled the long-term mapping of the Australian livestock export industry's overall performance year on year.

LEP RD&E program review

Project code	W.LIV.0194	**Location**	National
Start date	01-Dec-17	**Vendor**	Noetic Solutions Pty Ltd
End date	01-Aug-18	**Funding source**	Levy
Date of publication	08-May-19	**Initiation of research**	Industry

This review was designed to ensure that the Livestock Export Program (LEP) RD&E program continues to uphold its reputation by undertaking targeted, prioritised, effective and transparent research that helps the live export industry succeed in the international market.

Shipboard Mortality Database (SMDB) version two upgrade

Project code	W.LIV.0295	**Location**	National
Start date	23-Jan-17	**Vendor**	AusVet Pty Ltd
End date	30-Aug-19	**Funding source**	Levy
Date of publication	01-Oct-18	**Initiation of research**	Industry

In 2016, the shipboard mortality database (SMDB) application was updated from a 1980's 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.

Capacity constraints and inefficiencies in the live export supply chain process

Project code	W.LIV.3049	**Location**	National
Start date	31-Jul-17	**Vendor**	CSIRO
End date	01-Oct-18	**Funding source**	Levy
Date of publication	01-Oct-18	**Initiation of research**	Industry

This project undertook a detailed analysis of the beef and sheep livestock supply chains between property, export depot, export port and overseas receival port. It identified current and potential future logistics and infrastructure/operational bottlenecks by times of year that create critical delays, increase costs or restrict supply.

Identifying opportunities for continued improvements to the on-board live export feed ration

Project code	W.LIV.0298	**Location**	National
Start date	12-Feb-18	**Vendor**	CSIRO
End date	31-Aug-18	**Funding source**	Levy
Date of publication	31-Aug-18	**Initiation of research**	Industry

This project reviewed the findings and recommendations of a previous project regarding fodder quality and quantity in the livestock export trade. It investigated the quality and delivery mechanism of pelleted feed during livestock export voyages to minimise pellets turning to powder.

Livestock Global Assurance Program

Project code	W.LIV.3051	**Location**	National
Start date	01-Feb-18	**Vendor**	Australian Livestock Exporters Corporation
End date	30-Jun-18	**Funding source**	Levy
Date of publication	30-Jun-18	**Initiation of research**	Industry

This project established the Livestock Global Assurance Program (LGAP) company and undertook further research to achieve the goal of one centralised industry traceability and control system to align with LGAP requirements.

Development of a manual for the best practice and design of quarantine premises and associated biosecurity management plans

Project code	W.LIV.0192	**Location**	National
Start date	1-May-17	**Vendor**	AgStar Projects
End date	1-Jun-18	**Funding source**	Levy
Date of publication	01-Jun-18	**Initiation of research**	Industry

This project delivered a reference manual and a suite of best practice materials covering biosecurity, quarantine, environmental, animal welfare, importing country requirements and operational obligations for the planning, establishment and operation of livestock export in registered and approved premises.

Environmental and heat risk assessment for live export holding facilities in Northern Australia

Project code	W.LIV.0191	**Location**	Northern Australia
Start date	1-Oct-16	**Vendor**	EnviroAg Australia Pty Ltd
End date	31-May-18	**Funding source**	Levy
Date of publication	31-May-18	**Initiation of research**	Industry

This project attempted to identify and assess the risks resulting from the operational activities of live export facilities in northern Australia from an environmental and heat stress perspective. This course of continual improvement is important for the sustainability and longevity of the live export industry in northern Australia and remains a key focus.

People and business

People in agriculture

Project code	E.INV.1601	**Location**	National
Start date	23-Jun-15	**Vendor**	Dairy Australia
End date	30-Jun-20	**Funding source**	Levy
Date of publication	13-Nov-20	**Initiation of research**	Industry

This project supported a collaborative investment by Australia's agricultural Research and Development Corporations (RDC's) in a new website; The People in Agriculture - Employment Starter Kit.

Productivity & Profitability webinars for red meat producers

Project code	L.ADP.1901	**Location**	National
Start date	25-Mar-19	**Vendor**	Holmes Sackett
End date	31-Aug-20	**Funding source**	Levy
Date of publication	13-Nov-20	**Initiation of research**	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 (cattle, sheep and goat) across Australian 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.

A Leg Up – mentor support for new entrants to the red meat RD&A profession

Project code	B.STU.0310	**Location**	National
Start date	30-Sep-16	**Vendor**	Meridian Agriculture Pty Ltd
End date	10-Jan-19	**Funding source**	Levy
Date of publication	10-Jan-20	**Initiation of research**	Industry

The A Leg Up program was designed to provide mentor support for new entrants into the red meat research, development and adoption (RD&A) workforce by pairing them with experienced industry professionals. This project focused on facilitating effective communication, enabling skill transfer and building professional networks to assist RD&A entrants to set and achieve career goals.

Building CEO capability for export into high value markets

Project code	P.PSH.0781	**Location**	Western Australia
Start date	01-Jun-16	**Vendor**	Western Australian Agriculture Authority
End date	30-Jul-19	**Funding source**	MLA Donor Company
Date of publication	19-Nov-19	**Initiation of research**	External partnership

This project aimed to inform senior management from Western Australia 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

Project code	P.PSH.0785	**Location**	National
Start date	01-Jul-16	**Vendor**	Argyle Prestige Meats
End date	30-Sep-19	**Funding source**	MLA Donor Company
Date of publication	22-Oct-19	**Initiation of research**	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

Project code	P.PIP.0570	**Location**	National
Start date	15-Sep-18	**Vendor**	Stanbroke Pty Ltd
End date	20-Jun-19	**Funding source**	MLA Donor Company
Date of publication	21-Oct-19	**Initiation of research**	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

Project code	P.PIP.0760	**Location**	National
Start date	16-Apr-18	**Vendor**	NH Foods Australia Pty Ltd
End date	31-Oct-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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.			

Australian agriculture: an increasingly risky business

Project code	F.EVA.1803	**Location**	National
Start date	30-Apr-18	**Vendor**	Australian Farm Institute
End date	12-Dec-18	**Funding source**	Levy
Date of publication	08-Aug-19	**Initiation of research**	Industry
This project was designed to create better understanding of risk in subsectors of Australian agriculture and analysed options to manage risk. It also developed an assessment framework to compare risk management strategies and identify initiatives to facilitate improved risk management options for Australian agriculture.			

Development of integrity systems to connect international consumers with Australian red meat for increased value

Project code	V.RMH.0080	**Location**	National
Start date	20-Apr-18	**Vendor**	Greenleaf Enterprises Pty Ltd
End date	19-Apr-19	**Funding source**	Levy
Date of publication	20-May-19	**Initiation of research**	Industry

The purpose of this project was to understand how the development of digital integrity systems connect Chinese consumers with Australian red meat for increased value.

Stimulating private sector extension in Australian agriculture to increase returns from R&D

Project code	B.INV.1501	**Location**	National
Start date	01-Jun-15	**Vendor**	Dairy Australia Limited
End date	06-Jul-18	**Funding source**	Levy
Date of publication	16-May-19	**Initiation of research**	Industry

This project delivered targeted interventions and activities that, supported by research, could stimulate the necessary private sector engagement in the RDE&A system to better meet the future needs of producers and to secure productivity of Australia's agricultural industry.

Development of a fully integrated electronic national vendor declaration (eNVD) system

Project code	V.ISC.1911	**Location**	National
Start date	4-Feb-19	**Vendor**	Hello Human Pty Ltd
End date	30-Apr-19	**Funding source**	Levy
Date of publication	30-Apr-19	**Initiation of research**	Industry

A scoping study was undertaken to identify the technical and commercial barriers to the broad adoption of an integrated electronic livestock declaration system, including the development of a business requirements specification. Based on these documents, the project assessed the business case for, or against, proceeding with the development of a pilot trial.

Reinventing Australian agricultural statistics

Project code	F.EVA.1802	**Location**	National
Start date	1-Mar-18	**Vendor**	Australian Farm Institute
End date	17-Dec-18	**Funding source**	Levy
Date of publication	17-Dec-18	**Initiation of research**	Industry

This project investigated the potential to improve Australian agricultural statistics through the use of existing industry datasets. It also identified potential issues that may arise from the use of datasets for statistical analysis.

Teys Australia Collaborative Innovation Strategies Partnership Program stage 3

Project code	P.PIP.5011	**Location**	National
Start date	01-Oct-15	**Vendor**	Teys Australia Pty Ltd
End date	30-Oct-18	**Funding source**	MLA Donor Company
Date of publication	19-Oct-18	**Initiation of research**	Processing industry
This project was part of Teys Australia and MLA's Collaborative Innovation Strategies Partnership (CISP). This Stage 3 CISP included expansion of work along the value chain to involve producers and an increase in work conducted at the consumer level.			

Processing productivity

Rapiscan Aviation Spec RTT110 for offline meat R&D in Australia

Project code	P.PSH.0930	**Location**	National
Start date	01-Oct-17	**Vendor**	Rapiscan Laboratories Inc
End date	30-Jan-20	**Funding source**	MLA Donor Company
Date of publication	17-Jul-20	**Initiation of research**	External partnership
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 carcases at full process speed over extended operating periods, to sort on quality and identify robotic cutting lines.			

4DDI Equine CT – system demonstrated in 1 x beef plus 1 x lamb Australian processor

Project code	P.PSH.0914	**Location**	National
Start date	12-Nov-17	**Vendor**	4DDI
End date	15-May-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
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			

Processor supply chain diagnostics to improve efficiency and effectiveness of lamb and beef processing

Project code	P.PIP.0767	**Location**	National
Start date	22-Mar-19	**Vendor**	Partners in Performance
End date	30-Dec-19	**Funding source**	MLA Donor Company
Date of publication	27-Feb-20	**Initiation of research**	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

Project code	P.PSH.0825	**Location**	National
Start date	02-Jan-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	20-Feb-20	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
A previous project with Scott Automation & Robotics (P.PSH.0737) developed a manual measure cutting R&D system. This follow on project installed and trialled that unit in a production environment.			

Integrated primal and middle performance upgrade kits - Bordertown

Project code	P.PIP.0766	**Location**	National
Start date	15-Feb-19	**Vendor**	JBS Australia
End date	15-Dec-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.0878	**Location**	National
Start date	12-Oct-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	31-Dec-18	**Funding source**	MLA Donor Company
Date of publication	20-Jun-19	**Initiation of research**	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

Project code	P.PIP.0268	**Location**	National
Start date	01-Nov-11	**Vendor**	Cedar Creek Company Pty Limited
End date	14-Dec-18	**Funding source**	MLA Donor Company
Date of publication	19-Jun-19	**Initiation of research**	Processing industry
This project addressed the laborious and sometimes inaccurate task of pushing carcases 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 carcase surface fat depth imaging

Project code	P.PSH.1135	**Location**	National
Start date	01-Oct-18	**Vendor**	Lincoln Agritech Limited
End date	01-Nov-19	**Funding source**	MLA Donor Company
Date of publication	13-May-19	**Initiation of research**	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

Project code	P.PIP.0740	**Location**	National
Start date	10-Jun-17	**Vendor**	Fletcher International Exports
End date	20-Feb-19	**Funding source**	MLA Donor Company
Date of publication	20-Feb-19	**Initiation of research**	Processing industry

This project aimed to dramatically reduce the cost of the current pallets by reproducing them in a mould with modern materials.

Pricing for DEXA systems for the red meat industry

Project code	V.TEC.1704	**Location**	National
Start date	01-Oct-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	30-Jun-18	**Funding source**	Levy
Date of publication	05-Feb-19	**Initiation of research**	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.

Slaughter floor redesign – Stage 1 – in-paddock trial

Project code	P.PSH.0824	**Location**	National
Start date	21-Sep-17	**Vendor**	Signature Beef Pty Ltd
End date	16-Jan-19	**Funding source**	MLA Donor Company
Date of publication	16-Jan-19	**Initiation of research**	External partnership

This project aimed to design and construct mild steel test 'rigs' for mechanical-assisted beef processing field trials. The objective was to enable cost-effective greenfield processing sites to be established anywhere within Australia, which could possibly provide alternatives to live export in regional locations.

Advanced carton inspection DEXA x-ray machine with extended analytics

Project code	P.PSH.0905	**Location**	National
Start date	01-Sep-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	14-Sep-18	**Funding source**	MLA Donor Company
Date of publication	19-Dec-18	**Initiation of research**	External partnership

This project aimed to deliver an end of line carton inspection x-ray machine combining the functionality of carton fill inspection, contaminant detection, CL measurement and statistical analysis and reporting to provide immediate feedback to operators and historical data to processors.

Scott - Lamb and beef X-Ray data extended OCM benefits and transportability for cutting

Project code	P.PSH.0888	**Location**	National
Start date	01-Aug-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	13-Jun-18	**Funding source**	MLA Donor Company
Date of publication	16-Nov-18	**Initiation of research**	External partnership

The objective of this project was to determine if there is reliable correlation, for DEXA X-ray scanning data, between isolated locations within the processing chain. This could potentially provide processors an option to conduct x-ray scanning in the most appropriate location for the process, while not compromising the cutting determination function.

Augmented reality for automation machine maintenance management

Project code	P.PSH.0908	**Location**	National
Start date	01-Oct-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	31-Dec-18	**Funding source**	MLA Donor Company
Date of publication	3-Oct-18	**Initiation of research**	External partnership

This project addressed training issues in red meat processing plants through the development of an augmented reality immersion concept and a 3D training and maintenance manual for Bladestop and the X-ray, primal, middle and forequarter automation systems.

LEAP suite monitoring and reporting package for machine performance management

Project code	P.PIP.0564	**Location**	National
Start date	15-Oct-17	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	15-Jul-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	Processing industry

This project aimed to design, develop and test a machine monitoring and reporting system that would enable processors to proactively maintain system performance and accuracy, and service the automated primal, middle and forequarter bone in processing machinery for lamb.

Beef and lamb OCM with CT *in situ* further development

Project code	A.TEC.0123	**Location**	National
Start date	20-Nov-14	**Vendor**	Scott Automation & Robotics Pty Ltd
End date	01-Aug-19	**Funding source**	Levy
Date of publication	18-May-17	**Initiation of research**	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

Mince cooling by liquid nitrogen- phase 1 feasibility

Project code	V.RMH.0096	**Location**	National
Start date	01-Jun-19	**Vendor**	Retail Ready Operations Australia
End date	30-Jun-20	**Funding source**	Levy
Date of publication	02-Dec-20	**Initiation of research**	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

Project code	V.RMH.0114	**Location**	National
Start date	03-Jun-20	**Vendor**	Food Innovation Partners - Russel Rankin
End date	02-Nov-20	**Funding source**	Levy
Date of publication	06-Nov-20	**Initiation of research**	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

Project code	V.RMH.0098	**Location**	National
Start date	25-Jun-19	**Vendor**	Wunderman Thompson Pty Ltd
End date	01-Nov-20	**Funding source**	Levy
Date of publication	*Not yet available*	**Initiation of research**	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)

Project code	V.RMH.0002	**Location**	National
Start date	30-Nov-18	**Vendor**	Rabobank
End date	01-Dec-20	**Funding source**	Levy
Date of publication	02-Jul-20	**Initiation of research**	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)

Project code	V.RMH.0085	**Location**	National
Start date	25-May-19	**Vendor**	Textured Concept Foods Pty Ltd
End date	30-Oct-20	**Funding source**	Levy
Date of publication	11-Jun-20	**Initiation of research**	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.

Development of organic meat snacks

Project code	P.PSH.0991	**Location**	National
Start date	26-Mar-18	**Vendor**	Arcadian Organic & Natural Meat Co
End date	30-May-19	**Funding source**	MLA Donor Company
Date of publication	24-Apr-20	**Initiation of research**	External partnership

This project developed organic beef jerky as part of the overarching Co-Innovation Program between MLA and Arcadian Organic & Natural Meat Co.

Preliminary review of liquid lock red meat trays as an alternate to soaker pads

Project code	V.RMH.0097	**Location**	National
Start date	01-Jun-19	**Vendor**	Retail Ready Operations Australia
End date	22-Jan-20	**Funding source**	Levy
Date of publication	12-Mar-20	**Initiation of research**	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

Project code	V.RMH.0092	**Location**	National
Start date	15-Apr-19	**Vendor**	Virtual Method
End date	01-Oct-20	**Funding source**	Levy
Date of publication	20-Dec-19	**Initiation of research**	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)

Project code	V.RMH.0093	**Location**	National
Start date	15-Apr-19	**Vendor**	Greenleaf Enterprises Pty Ltd
End date	21-Dec-19	**Funding source**	Levy
Date of publication	10-Dec-19	**Initiation of research**	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

Project code	P.PSH.1005	**Location**	National
Start date	15-Dec-17	**Vendor**	Retail Ready Operations Australia
End date	30-Dec-19	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	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

Project code	P.PSH.1165	**Location**	National
Start date	20-Mar-19	**Vendor**	AgResearch Ltd.
End date	03-Mar-20	**Funding source**	MLA Donor Company
Date of publication	21-Oct-19	**Initiation of research**	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

Project code	P.PSH.1163	**Location**	National
Start date	10-Oct-18	**Vendor**	AgResearch Ltd.
End date	31-Jul-19	**Funding source**	MLA Donor Company
Date of publication	30-Sep-19	**Initiation of research**	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)

Project code	V.RMH.0003	**Location**	National
Start date	01-Dec-18	**Vendor**	DI Jenkinson Pty Ltd
End date	25-Jun-19	**Funding source**	Levy
Date of publication	20-Sep-19	**Initiation of research**	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

Project code	V.RMH.0087	**Location**	National
Start date	30-Oct-18	**Vendor**	RS3DPrint LLC
End date	26-Jun-19	**Funding source**	Levy
Date of publication	19-Sep-19	**Initiation of research**	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)

Project code	P.PSH.1164	**Location**	National
Start date	10-Oct-18	**Vendor**	AgResearch Ltd.
End date	31-Jul-19	**Funding source**	MLA Donor Company
Date of publication	10-Sep-19	**Initiation of research**	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)

Project code	V.RMH.0091	**Location**	National
Start date	14-Apr-19	**Vendor**	Greenleaf Enterprises Pty Ltd
End date	26-Dec-19	**Funding source**	Levy
Date of publication	10-Sep-19	**Initiation of research**	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.

Development of a meat snack strategy - Evaluation of rapid drying at low temperature technology for new high-quality premium red meat snack products

Project code	P.PIP.0548	**Location**	National
Start date	24-Oct-16	**Vendor**	JBS Australia
End date	30-Oct-18	**Funding source**	MLA Donor Company
Date of publication	4-May-19	**Initiation of research**	Processing industry

This project identified how a red meat-based snack, with unique product features, can be successful in the Australian snacking market. The process identified a target customer segment of significant size who would benefit from this product.

3D printed meat - Phase 2 proof of concept

Project code	V.RMH.0001	**Location**	National
Start date	10-Apr-18	**Vendor**	RS3dPrint LLC
End date	29-Aug-18	**Funding source**	Levy
Date of publication	06-Mar-19	**Initiation of research**	Industry

This project investigated CryoLithography (frozen liquid) with 3D Printing to develop proof of concept meat products.

Developing a high value strategy for red meat based Chinese banquet products (Crazy Dragon)

Project code	P.PSH.0995	**Location**	National
Start date	15-Nov-17	**Vendor**	My Crazy Auntie's Food Pty. Ltd.
End date	30-Sep-18	**Funding source**	MLA Donor Company
Date of publication	20-Oct-18	**Initiation of research**	External partnership

This project developed opportunities to export value added dumplings, containing Australian red meat, directly into China. This initiative was aligned to MLA's 2Morrows Foods Program for developing new products and services for emerging markets and changing consumer lifestyles and life stages to ultimately grow demand for Australian red meat.

Feasibility study for Australian made ready meals for multi markets (TFI-CP Group strategy stage 1)

Project code	P.PIP.0549	**Location**	National
Start date	20-Feb-17	**Vendor**	Thomas Food International
End date	18-Oct-18	**Funding source**	MLA Donor Company
Date of publication	18-Oct-18	**Initiation of research**	Processing industry
The main objective of the project was to increase the value of Australian branded red meat products by creating a new business model that would enable more competitive connection with the end consumer.			

Use of red meat protein as a snack food ingredient

Project code	P.PSH.0812	**Location**	National
Start date	15-Feb-17	**Vendor**	Xinova LLC
End date	22-Jul-18	**Funding source**	MLA Donor Company
Date of publication	28-Aug-18	**Initiation of research**	External partnership
The aim of this project was to use leading-edge science in meat protein isolate extraction for red meat derivatives as an ingredient in snack (or other) food products.			

Intellectual Ventures Smart Packaging open innovation for RnD4profit (insights2innovation)

Project code	P.PSH.0765	**Location**	National
Start date	10-Feb-16	**Vendor**	Xinova LLC
End date	21-Jun-18	**Funding source**	MLA Donor Company
Date of publication	01-Jun-18	**Initiation of research**	Rural R&D for Profit (RRDfP)
This project researched technology and company insights to identify ‘smart packaging’ technologies that could help provide food products to export markets that deliver on food safety, provenance, shelf life, traceability and integrity.			

Review of meat bone by-product processing

Project code	V.RMH.0074	**Location**	National
Start date	01-Oct-17	**Vendor**	Food Innovation Partners Pty Ltd
End date	30-Jun-18	**Funding source**	Levy
Date of publication	01-May-18	**Initiation of research**	Industry
Consumers are demanding high protein food sources that represent new opportunities for Australian red meat industry beyond meat products. This project reviewed emerging technology platforms and consumer trends and insights that provide potential opportunities for Australian red meat industry.			

Resource management

Development of an energy conservation and cost reduction tool for the Australian red meat industry

Project code	P.PSH.0867	**Location**	National
Start date	14-Mar-18	**Vendor**	All Energy Pty Ltd
End date	15-Oct-19	**Funding source**	MLA Donor Company
Date of publication	8-Nov-19	**Initiation of research**	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

Project code	P.PSH.1133	**Location**	National
Start date	15-May-18	**Vendor**	Wiley & Co. Pty. Ltd.
End date	15-Oct-19	**Funding source**	MLA Donor Company
Date of publication	1-May-19	**Initiation of research**	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.

Investigating centralised co-digestion of red meat processing and municipal waste

Project code	P.PSH.0945	**Location**	National
Start date	09-Oct-17	**Vendor**	Hardwick Meatworks Pty Ltd
End date	30-Jun-18	**Funding source**	MLA Donor Company
Date of publication	1-Nov-18	**Initiation of research**	External partnership

The purpose of this project was to evaluate waste treatment options (including anaerobic digestion and composting) for combining paunch and biological wastes from a red meat processing facility with residential organics and green wastes.

Novel phosphorus removal using lanthanum precipitation

Project code	P.PSH.1149	**Location**	National
Start date	21-Jul-18	**Vendor**	V&V Walsh Meat Processors and Exporters
End date	14-Nov-18	**Funding source**	MLA Donor Company
Date of publication	12-Oct-18	**Initiation of research**	External partnership

This project aimed to explore the application of a novel rare earth coagulant, lanthanum, to meat processing wastewater and evaluate its benefits and challenges compared to the more well-known precipitants (specifically, ferric chloride).

Development and application of the anaerobic digester for the biological degradation of meat processing effluent

Project code	P.PIP.0430	**Location**	Victoria
Start date	30-Jul-14	**Vendor**	Environmental Technology Solutions
End date	26-Aug-18	**Funding source**	MLA Donor Company
Date of publication	1-Jul-18	**Initiation of research**	Processing industry

This project involved a review of energy usage at a mixed species abattoir in Victoria, including evaluating the option of co-locating the rendering facility and abattoir in order to reduce energy usage.

Supply chain sustainability

Teys Australia - Creating and sharing unrealised value through the supply chain

Project code	P.PIP.0463	**Location**	National
Start date	02-Jun-15	**Vendor**	Teys Australia Pty Ltd
End date	29-Jun-18	**Funding source**	MLA Donor Company
Date of publication	22-Aug-19	**Initiation of research**	Processing industry

This project was established to deliver transformational change throughout the Teys supply chain, and to the greater industry, via development and implementation of a comprehensive value-based marketing (VBM) system.

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

Project code	V.SCS.0011	**Location**	National
Start date	04-Mar-19	**Vendor**	University of Melbourne
End date	18-Jun-19	**Funding source**	Levy
Date of publication	12-Jun-19	**Initiation of research**	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.

Facilitation of the Australian red meat industry Carbon Neutral 2030 innovation challenge

Project code	V.SCS.0008	**Location**	National
Start date	07-Aug-18	**Vendor**	Cicada Innovations Pty Ltd
End date	25-Feb-19	**Funding source**	Levy
Date of publication	06-Feb-19	**Initiation of research**	Industry

This project investigated two key problem areas identified within MLA's Carbon Neutral 2030 initiative: 1) delivering an appropriate supply of 3-nitrooxypropanol and/or red asparagopsis algae into the rumen of cattle and sheep in order to reduce or eliminate methane emissions without compromising the digestive efficiency of the animal; 2) measuring carbon in soils at depths of at least 1.2m in an accurate, scalable, and cost-effective manner.

Concentrated solar thermal and concentrated solar power – assessment for Australian red meat industry

Project code	V.SCS.0007	**Location**	National
Start date	01-Apr-18	**Vendor**	All Energy Pty Ltd
End date	22-Sep-18	**Funding source**	Levy
Date of publication	01-Oct-18	**Initiation of research**	Industry
This project involved a review of available concentrated solar thermal (CST) and power (CSP) technologies, to understand the technical and financial viability of these systems for installation at Australian feedlots and abattoirs.			

Identifying new markets and product opportunities in China – Coles RROA strategy development

Project code	P.PSH.1058	**Location**	National
Start date	20-Apr-18	**Vendor**	Retail Ready Operations Australia
End date	17-Sep-18	**Funding source**	MLA Donor Company
Date of publication	*Not yet available*	**Initiation of research**	External partnership
This project undertook a systematic approach to reviewing the latest developments in packaging and ingredients to enable Coles Retail Ready Operations Australia (RROA) to identify new opportunities and markets in the Peoples' Republic of China.			

R&D projects in progress

Animal health, welfare and biosecurity

Development of practical measures of animal welfare

Project code	P.PSH.1232	**Location**	National
Start date	01-Jan-20	**Vendor**	University of Queensland
End date	15-Mar-25	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	B.AHE.0317	**Location**	National
Start date	01-Dec-17	**Vendor**	Invasive Animals Ltd
End date	30-Jun-24	**Funding source**	Levy
Initiation of research	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.			

Live *Salmonella typhimurium* vaccine development

Project code	P.PSH.0767	**Location**	National
Start date	01-May-17	**Vendor**	Intervet International Pty Ltd
End date	30-Sep-23	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

This project will triala 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

Project code	P.PSH.0817	**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		

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

Project code	V.MFS.0437	**Location**	National
Start date	10-Jun-19	**Vendor**	Australian Veterinary Association
End date	30-Jun-22	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.0872	**Location**	National
Start date	01-Jul-17	**Vendor**	University of Sydney
End date	30-May-22	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

This project aimed to link carcase 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.

ParaBoss – Phase II

Project code	P.PSH.0792	**Location**	National
Start date	15-Jan-17	**Vendor**	University of New England
End date	30-Dec-21	**Funding source**	MLA Donor Company
Initiation of research	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.

Improving animal welfare in the red meat industry – pain relief

Project code	P.PSH.0818	**Location**	National
Start date	01-Oct-17	**Vendor**	University of Sydney
End date	01-Dec-21	**Funding source**	MLA Donor Company
Initiation of research	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.

Immune fitness as a measure of animal health, welfare and productivity

Project code	P.PSH.0816	**Location**	National
Start date	01-Mar-17	**Vendor**	University of Sydney
End date	01-Nov-20	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.0813	**Location**	National
Start date	14-Feb-17	**Vendor**	University of Sydney
End date	31-Oct-20	**Funding source**	MLA Donor Company
Initiation of research	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.

Animal production, husbandry and nutrition

LPP Revise Australian feeding standards to better achieve product specifications and improve ruminant efficiency

Project code	P.PSH.0998	**Location**	National
Start date	22-Jan-18	**Vendor**	CSIRO
End date	30-Oct-23	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.1059	**Location**	National
Start date	29-Jun-18	**Vendor**	CSIRO
End date	01-Jun-22	**Funding source**	MLA Donor Company
Initiation of research	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.

The gateway to selecting for nutrient efficient livestock – "Better Doers"

Project code	B.GBP.0024	**Location**	National
Start date	01-Dec-17	**Vendor**	NSW DPI
End date	30-Jun-21	**Funding source**	Levy
Initiation of research	Investment call		

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.

Digital agriculture

Romani digital farm - Australian digital farm program roll out

Project code	V.DIG.2022	**Location**	National
Start date	29-Oct-19	**Vendor**	AxisTech Pty Ltd
End date	01-Jun-23	**Funding source**	Industry
Initiation of research	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)

Project code	P.PSH.1182	**Location**	National
Start date	10-Feb-19	**Vendor**	Stanbroke Pty Ltd
End date	01-Mar-23	**Funding source**	MLA Donor Company
Initiation of research	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.

Evaluation of connectivity and Internet of Things solutions

Project code	P.PSH.1112	**Location**	National
Start date	30-Apr-18	**Vendor**	Origo Pty Ltd
End date	11-Oct-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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.

Evaluation of on-farm sensing devices using mobile technology

Project code	P.PSH.1143	**Location**	National
Start date	01-Aug-18	**Vendor**	Stanbroke Pty Ltd
End date	30-Apr-21	**Funding source**	MLA Donor Company p
Initiation of research	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

Project code	P.PSH.1046	**Location**	National
Start date	11-May-18	**Vendor**	Discovery Ag Pty Ltd
End date	31-Jan-21	**Funding source**	MLA Donor Company
Initiation of research	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.

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
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.

Environmental sustainability

Forewarned is forearmed: managing the impacts of extreme climate events, Bureau of Meteorology activity areas

Project code	B.CCH.8100	**Location**	National
Start date	01-Jan-18	**Vendor**	Bureau of Meteorology
End date	30-Jun-22	**Funding source**	Levy
Initiation of research	Rural R&D for Profit (RRDfP)		

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.

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

Project code	P.PSH.0951	**Location**	Northern Australia
Start date	01-Jan-18	**Vendor**	University of Southern Queensland
End date	31-Dec-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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.

Assessment of climate accounting metrics for the Australian red meat industry

Project code	B.CCH.2117	**Location**	National
Start date	31-Aug-20	**Vendor**	CSIRO
End date	31-Dec-21	**Funding source**	Levy
Initiation of research	Industry		

This project will calculate emissions from Australian red meat using alternative greenhouse gas accounting metrics and radiative forcing footprint.

Food safety, traceability and integrity systems

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

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

Stage one of the National Food Traceability Implementation project

Project code	V.RDA.2003	**Location**	National
Start date	11-Jun-20	**Vendor**	Deakin University
End date	01-Apr-22	**Funding source**	Levy
Initiation of research	Industry		

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.

The cost of manipulating temperature within the meat supply chain to control shelf life of red meat

Project code	V.MFS.0449	**Location**	National
Start date	30-May-20	**Vendor**	All Energy Pty Ltd
End date	27-Feb-22	**Funding source**	Levy
Initiation of research	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.

Enterprise level antimicrobial usage measurement - pilot

Project code	V.MFS.0442	**Location**	National
Start date	04-Nov-19	**Vendor**	AgVet Projects Pty Ltd
End date	30-Jan-22	**Funding source**	Levy
Initiation of research	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.

Microbiological food safety of effluent from animal industries

Project code	V.MFS.0448	**Location**	National
Start date	15-May-20	**Vendor**	Symbio Laboratories
End date	30-Jan-22	**Funding source**	Levy
Initiation of research	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 defend the industry. In addition, there will be whole of supply chain mapping of the waste streams to identify any value-adding opportunities.

Identifying the barriers to integrity system technology adoption

Project code	V.RDA.2008	**Location**	National
Start date	15-Jun-20	**Vendor**	Rural analytics Pty Ltd
End date	04-Aug-21	**Funding source**	Levy
Initiation of research	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.

Defining the overarching requirements for automated product verification and the development of key industry standards

Project code	V.RDA.2004	**Location**	National
Start date	30-May-20	**Vendor**	CSIRO
End date	18-Jun-21	**Funding source**	Levy
Initiation of research	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

Project code	V.RDA.2005	**Location**	National
Start date	15-Jun-20	**Vendor**	Central Queensland University
End date	04-Jun-21	**Funding source**	Levy
Initiation of research	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

Project code	V.RDA.2007	**Location**	National
Start date	15-May-20	**Vendor**	Greenleaf Enterprises
End date	04-Jun-21	**Funding source**	Levy
Initiation of research	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

Project code	V.DIG.0020	**Location**	National
Start date	01-Nov-20	**Vendor**	Rezare Systems Pty Ltd
End date	30-Apr-21	**Funding source**	Levy
Initiation of research	Industry		

Phase one of this project delivered a single carcase data scheme with the data requirements for NLIS, LDL, MSA and animal disease reporting. The purpose of phase two is to refine and build on the single carcase 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

Project code	V.DIG.1908	**Location**	National
Start date	07-May-20	**Vendor**	KPMG Australia
End date	21-Apr-21	**Funding source**	Levy
Initiation of research	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.

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
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.

The shelf life of Australian frozen red meat

Project code	V.MFS.0428	**Location**	National
Start date	05-Mar-18	**Vendor**	TEC Partnership
End date	07-Jan-22	**Funding source**	Levy
Initiation of research	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 24 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.

Genetic analysis

Advanced genetic evaluation tools and systems enabling faster and more valuable genetic gain

Project code	L.GEN.1704	**Location**	National
Start date	01-Aug-16	**Vendor**	University of New England
End date	30-Dec-21	**Funding source**	Levy
Initiation of research	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

Project code	L.GEN.1710	**Location**	National
Start date	30-Mar-18	**Vendor**	University of Queensland
End date	20-Oct-21	**Funding source**	Levy
Initiation of research	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

Project code	L.GEN.2003	**Location**	National
Start date	08-Apr-20	**Vendor**	University of Adelaide
End date	01-Oct-21	**Funding source**	Levy
Initiation of research	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

Project code	L.GEN.1808	**Location**	National
Start date	01-Dec-18	**Vendor**	University of Queensland
End date	30-Jun-21	**Funding source**	Levy
Initiation of research	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.

Livestock export

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

Project code	W.LIV.0299	**Location**	National
Start date	15-May-19	**Vendor**	University of New England
End date	30-Jan-24	**Funding source**	Levy
Initiation of research	Industry		

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.

Animal welfare indicators pilot for the live export industry supply chain

Project code	W.LIV.3047	**Location**	National
Start date	31-Jul-17	**Vendor**	Murdoch University
End date	31-May-21	**Funding source**	Levy
Initiation of research	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-, animal- and management-based measures, which have been identified from previous research as both important and practical.

Shipboard provision of animal health equipment and medications

Project code	W.LIV.2008	**Location**	National
Start date	15-Nov-19	**Vendor**	Andrew Way Veterinary and Consulting
End date	30-Mar-21	**Funding source**	Levy
Initiation of research	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.

In-Flight environmental monitoring & management

Project code	W.LIV.2003	**Location**	National
Start date	01-Mar-19	**Vendor**	Apex Flight Operations
End date	15-Nov-22	**Funding source**	Levy
Initiation of research	Industry		

This project will explore the potential application of technology to identify environmental issues during the transport of livestock. In particular, this project will be focused on the transport of livestock via aircraft, with a focus on the monitoring of ammonia (NH3) levels throughout the export process.

Animal welfare indicators for on-board surveillance

Project code	W.LIV.2019	**Location**	National
Start date	15-May-20	**Vendor**	Oliver & Doam Pty Limited
End date	30-Dec-20	**Funding source**	Levy
Initiation of research	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.

People and business

Joint-RDC community trust project

Project code	E.CEM.1907	**Location**	National
Start date	01-Aug-18	**Vendor**	AgriFutures Australia
End date	30-Jun-21	**Funding source**	Levy
Initiation of research	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.

Elders - MLA Co-Innovation and Adoption Pilot

Project code	P.PSH.1117	**Location**	National
Start date	02-May-18	**Vendor**	Elders Rural Services Australia Ltd
End date	31-May-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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.

Developing capability for external strategic partnerships with experts from Texas Tech University

Project code	P.PIP.0550	**Location**	National
Start date	15-Mar-17	**Vendor**	Teys Australia Pty Ltd
End date	10-Feb-21	**Funding source**	MLA Donor Company
Initiation of research	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.

Processing productivity

Re-locatable medical CT for DEXA and other device calibration

Project code	V.TEC.1708	**Location**	National
Start date	15-Jan-19	**Vendor**	Murdoch University
End date	15-Dec-24	**Funding source**	Levy
Initiation of research	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.

Developing and commercialising advanced measurement technologies and feedback systems into globally competitive Australian meat value chains (ALMTech II)

Project code	V.RDP.4001	**Location**	National
Start date	28-Oct-19	**Vendor**	Murdoch University
End date	06-May-23	**Funding source**	Levy
Initiation of research	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 carcase composition and intramuscular fat

Project code	P.PSH.1181	**Location**	National
Start date	01-Mar-19	**Vendor**	Murdoch University
End date	30-Jun-22	**Funding source**	MLA Donor Company
Initiation of research	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 carcases 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 carcases to meet market specifications and volumes.

Real-Time meat eating quality probe: technology refinement and commercialisation

Project code	P.PSH.1132	**Location**	National
Start date	01-Jun-18	**Vendor**	MEQ Probe Pty Ltd
End date	28-Feb-22	**Funding source**	MLA Donor Company
Initiation of research	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 carcases. 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

Project code	V.TEC.1713	**Location**	National
Start date	15-Apr-19	**Vendor**	Murdoch University
End date	01-Feb-22	**Funding source**	Levy
Initiation of research	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.

Calibration and repeatability of CT images for predicting lean meat yield in beef and lamb carcasses

Project code	V.TEC.1714	**Location**	National
Start date	20-Apr-19	**Vendor**	Murdoch University
End date	28-Nov-21	**Funding source**	Levy
Initiation of research	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

Project code	V.TEC.1710	**Location**	National
Start date	30-Mar-19	**Vendor**	Murdoch University
End date	15-Nov-21	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.0932	**Location**	National
Start date	16-Nov-17	**Vendor**	Retail Ready Operations Australia
End date	30-Jun-21	**Funding source**	MLA Donor Company
Initiation of research	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, T bones etc.

Rapiscan Multispectral Continuous CT Scanner - development and evaluation of the benefits and application of continuous MEXA CT systems

Project code	P.PSH.0886	**Location**	National
Start date	01-Oct-17	**Vendor**	Rapiscan Laboratories Inc
End date	30-May-21	**Funding source**	MLA Donor Company
Initiation of research	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 carcase 3D scanning objective measurement initiative. This device will provide a full physical model of the carcase, including offal, which will enable optimisation of automated physical carcase breakdown and comprehensive health feedback to assist value chain efficiency and productivity.

Trial of HMT-1 industrial wearable computer in processing environment

Project code	V.TEC.1719	**Location**	National
Start date	30-May-19	**Vendor**	Virtual Method
End date	29-May-21	**Funding source**	Levy
Initiation of research	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

Project code	V.RDP.2018	**Location**	National
Start date	30-Jan-20	**Vendor**	Rapiscan Systems
End date	15-Mar-21	**Funding source**	Levy
Initiation of research	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

Project code	V.RDP.2000	**Location**	National
Start date	16-Dec-16	**Vendor**	Murdoch University
End date	31-Dec-20	**Funding source**	Levy
Initiation of research	Rural R&D for Profit (RRDfP)		

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.

Evaluation of processing methods and visioning systems for low density contamination

Project code	P.PSH.1129	**Location**	National
Start date	01-Jun-18	**Vendor**	Retail Ready Operations Australia
End date	30-Apr-20	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

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.

Product innovation

Developing high valued freeze dried Australian red meat products

Project code	P.PSH.0999	**Location**	National
Start date	06-Nov-17	**Vendor**	Freeze Dry Industries Pty Ltd
End date	30-Dec-22	**Funding source**	MLA Donor Company
Initiation of research	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.

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
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.

Aged Care 2025+ Identifying demand and new value opportunities for Australian red meat industry

Project code	V.RMH.0112	**Location**	National
Start date	27-Mar-20	**Vendor**	Andrews Meat Industries
End date	31-May-22	**Funding source**	Levy
Initiation of research	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.

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
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 (include 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
End date	30-Nov-21	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.0810	**Location**	National
Start date	15-Jan-18	**Vendor**	Monash University
End date	30-Aug-21	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	V.RMH.0108	**Location**	National
Start date	20-Dec-19	**Vendor**	Lumaten Australia Pty Limited
End date	10-Aug-21	**Funding source**	Levy
Initiation of research	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

Project code	V.RMH.0111	**Location**	National
Start date	13-Feb-20	**Vendor**	Polkinghornes
End date	11-Jun-21	**Funding source**	Levy
Initiation of research	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

Project code	V.RMH.0113	**Location**	National
Start date	30-May-20	**Vendor**	WatchMeThink Pty Ltd
End date	11-Jun-21	**Funding source**	Levy
Initiation of research	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)

Project code	V.RMH.0102	**Location**	National
Start date	18-Sep-19	**Vendor**	Andrews Meat Industries
End date	30-Apr-21	**Funding source**	Levy
Initiation of research	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

Project code	P.PSH.0890	**Location**	National
Start date	25-Jun-17	**Vendor**	Monash University
End date	30-Mar-21	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.0891	**Location**	National
Start date	01-Jul-17	**Vendor**	Monash University
End date	30-Mar-21	**Funding source**	MLA Donor Company
Initiation of research	External partnership		

The project will focus on developing new polymer Smart Packaging technologies to improve meat colour and eating quality of red meat products.

Review of emerging (food industry) clean technologies for potential high value red meat opportunities

Project code	V.RMH.0110	**Location**	National
Start date	07-Feb-20	**Vendor**	CSIRO
End date	15-Dec-20	**Funding source**	Levy
Initiation of research	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.

Resource management

Demonstration of an industrial microgrid as a means of enabling red meat processing facilities to operate independently of mains electricity

Project code	P.PIP.0745	**Location**	National
Start date	02-Oct-17	**Vendor**	Hardwick Meatworks Pty Ltd
End date	23-Dec-22	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	P.PSH.1134	**Location**	National
Start date	15-May-18	**Vendor**	Charles Sturt University
End date	22-May-22	**Funding source**	MLA Donor Company
Initiation of research	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

Project code	V.RDP.3010	**Location**	National
Start date	22-Mar-18	**Vendor**	Queensland University of Technology
End date	21-Apr-22	**Funding source**	Levy
Initiation of research	Rural R&D for Profit (RRDfP)		

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

Project code	P.PIP.0497	**Location**	New South Wales
Start date	04-Dec-15	**Vendor**	TFI
End date	28-Feb-22	**Funding source**	MLA Donor Company
Initiation of research	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 programs aim to increase the uptake of on-farm R&D by producers, with the primary focus of ensuring best practice management is implemented across all areas of on-farm management. Between June 2018 and November 2020, MLA's RD&A investments funded 45 Profitable Grazing Systems (PGS) projects, 61 Producer Demonstration Sites (PDS) and 77 Producer Innovation Fast Track (PIFT) projects (Appendix A).

Profitable Grazing Systems (PGS) projects

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.

Between June 2018 and November 2020, MLA's PGS program supported Australian red meat producers to improve their skills in a variety of areas, including animal nutrition and production, capability building, and feedbase and grazing land management. Grassfed cattle producers gained knowledge on increasing the profit of their heifers, while sheep and lamb producers learned how to improve the reproductive efficiency of their flock by lifting lamb survival rates. Producers of all grassfed livestock species were given a set of guiding principles to manage pastures confidently and developed skills to benchmark their business data to help them make better on-farm investments.

The PGS program continues to provide support to producers, with ongoing training packages being distributed to improve their knowledge and skills regarding animal, pasture and enterprise management. Grassfed cattle producers will be guided through the basics of pasture principles, while sheep, lamb and goat producers will be given tools to help improve the survival rate and productivity of their livestock. Producers of all grassfed livestock species will learn new skills to value-add to current soil testing results to determine how to get the most out of their fertilisers and will be provided with ongoing training on pasture management and business benchmarking.

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.

Between June 2018 and November 2020, MLA's Producer Demonstration Sites helped to increase the rate of on-farm adoption of new skills in a variety of areas, including animal health and welfare, grazing land management and animal nutrition. Grassfed cattle producers established demonstration sites to validate the difference between varieties of clovers and determine the productivity of leucaena in grass pastures. Sheep and lamb producers validated the use of temporary fencing measures and Wormboss to improve the health of their flocks and demonstrated the advantages of a variety of pasture and grazing land management techniques. Producers of all grassfed livestock species also gained insight into the benefits of annual forage, dung beetles and feed budgeting.

Producer Demonstration Sites continue to improve the rate of on-farm R&D adoption for producers of all different species of grassfed livestock across Australia. Demonstration sites currently in progress are helping grassfed cattle

producers validate the use of post-weaning management strategies, self-herding technology and improved grazing systems to increase the profitability of their herds. Sheep and lamb producers are currently working on improving animal nutrition, weaner management and ewe performance, and producers of all grassfed species are hosting demonstration sites to show the benefits of a variety of different pasture and fodder management strategies.

Producer Innovation Fast-Track (PIFT) projects

Producer Innovation Fast-Track (PIFT) was a pilot program to enable producers to be actively involved in driving the innovation agenda. The program was designed to accelerate the development and adoption of innovation and capability that have the potential to significantly improve farm and value chain performance. The program identified industry producer trailblazers and provided expertise, co-funding and support to build their innovation capability. Although the PIFT program is now closed, it completed projects across all aspects of the red meat value chain, including animal health, welfare and husbandry, digital agriculture, genetic analysis, processing productivity and business development.

Grassfed cattle producers investigated:

- new methods of cattle management
- improved data efficiency
- advanced pasture systems
- accelerated genetic gains
- the development of new beef products.

Sheep and lamb producers undertook a variety of projects related to:

- enhanced breeding systems
- new ways to gain from old technologies
- optimised pasture management
- improved profitability from the use of genetics
- innovative product development.

The grainfed cattle industry researched new ways of improving feed intake and branding opportunities, while goat enterprises developed new market ventures.

A variety of innovative producer projects were also performed that benefited the entire red meat industry. These projects researched:

- new supplementary feeding techniques
- improved soil health
- best practice pasture management techniques
- advances in technology that benefit livestock production
- online support tools for producers.

Appendix A - Adoption projects

Completed PGS projects

Project code	Project title	Start date	End date	Location
Grassfed cattle				
Reproductive efficiency				
L.PGS.1827	Delivery of PGS Supported Learning Projects - *Heifers for Profit*	15-Sep-18	28-Feb-20	Southern Australia
Sheep & lamb				
Reproductive efficiency				
L.PGS.1841	PGS Supported Learning Package Delivery - *Improving Ewe Lamb Performance*	15-Apr-19	30-Oct-19	Victoria
L.PGS.1845	Delivery of PGS Supported Learning Project - *Lifting Lamb Survival*	06-May-19	18-Oct-19	Southern Australia
L.PGS.2005	Achieve Ag - *Lifting Lamb Survival*	16-Sep-19	08-Jun-19	Southern Australia
L.PGS.1828	Delivery of PGS Supported Learning Projects - *Lifting lamb survival*	15-Sep-18	30-Mar-19	Tasmania
L.PGS.1819	Delivery of PGS Supported Learning Projects - *Livestock logic*	30-Jun-18	31-Jan-19	Victoria
L.PGS.1820	Delivery of PGS Supported Learning Projects - *Lifting Lamb Survival*	30-Jun-18	15-Jan-19	Southern Australia
L.PGS.1823	Delivery of PGS Supported Learning Projects - *Lifting Lamb Survival*	30-Aug-18	04-Dec-18	Southern Australia
L.PGS.1825	Delivery of PGS Supported Learning Projects - *Lifting Lamb Survival*	30-Aug-18	30-Nov-18	Southern Australia
Eating quality				
L.PGS.1833	PGS Off-The-Shelf Supported Learning Packages - *Improving lamb Lean Meat Yield and eating quality*	18-Mar-19	23-Sep-19	National
All grassfed species				
Animal production, husbandry and nutrition				
L.PGS.1830	PGS Off-The-Shelf Supported Learning Packages - *Optimising herd productivity*	14-Feb-19	28-Jun-19	Southern Australia
L.PGS.1837	PGS Off-The-Shelf Supported Learning Packages - *Drought feeding economically*	01-Apr-19	20-Jun-19	National
Feedbase and grazing land management				
L.PGS.1821	Delivery of PGS Supported Learning Projects - *Pasture principles*	30-Aug-18	20-Jan-20	Southern Australia

L.PGS.1822	Delivery of PGS Supported Learning Projects - *Pasture principles*	30-Aug-18	20-Jan-20	Southern Australia
L.PGS.1832	PGS Off-The-Shelf Supported Learning Packages – *Optimising investment in fertiliser and soil ameliorants*	01-Apr-19	30-Aug-19	National
L.PGS.1838	Delivery of PGS Supported Learning Project - *Holistic grazing*	01-Apr-19	20-Jun-19	Southern Australia
L.PGS.1818	Delivery of PGS Supported Learning Projects - *Pasture principles*	15-Jun-18	07-May-19	Tasmania
L.PGS.1817	Delivery of PGS Supported Learning Projects - *Grazing matcher TM*	01-Apr-18	07-Feb-19	National
People and business				
L.PGS.2004	*ACE Benchmarking* - Supported Learning Project	30-Sep-19	09-Jun-20	Victoria
L.PGS.1849	Delivery of PGS Supported Learning Projects - *Business skills development*	07-Jun-19	03-Dec-19	New South Wales
L.PGS.1847	Delivery of PGS Supported Learning Projects - *Benchmarking for profit and production*	01-Jun-19	06-Nov-19	Western Australia
L.PGS.1824	Delivery of PGS Supported Learning Projects - *Benchmarking for profit and production*	30-Sep-18	25-Sep-19	Western Australia
L.PGS.1834	Delivery of PGS Supported Learning Projects - *Business skills development*	14-Mar-19	23-Sep-19	New South Wales
L.PGS.1831	PGS Off-The-Shelf Supported Learning Packages - *Making better on-farm investments*	14-Feb-19	28-Jun-19	National
L.PGS.1829	PGS Off-The-Shelf Supported Learning Packages - *Business essentials*	01-Mar-19	20-Jun-19	National

PGS projects in progress

Project code	Project title	Start date	End date	Location
Grassfed cattle				
Animal production, husbandry and nutrition				
L.PGS.2033	PGS - *Phosphorus management in beef cattle* - 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
Sheep & lamb				
Reproductive efficiency				
L.PGS.2053	PGS Delivery - *Lifting lamb survival* -Tasmania	01-Jul-20	15-Dec-21	Tasmania
L.PGS.2030	PGS Delivery - *Lifting lamb survival* - WA	04-Jun-20	10-Dec-21	Western Australia

Goats				
People and business				
L.PGS.2026	Profitable Grazing Systems Resource Development - *Goat productivity*	18-May-20	15-Mar-21	National
All grassfed species				
Animal production, husbandry and nutrition				
L.PGS.1840	Delivery of Profitable Grazing Systems - *Paperless feeder activities*	08-Apr-19	15-Jul-22	Western Australia
Feedbase and grazing land management				
L.PGS.2031	Profitable Grazing Systems Delivery -*Grazing matcher*	26-Jun-20	23-May-22	Western Australia
L.PGS.2034	PGS Package Development - *PayDirt* - QLD Southern Inland	01-Jul-20	15-May-22	Queensland
L.PGS.2014	PGS Supported Learning Project Delivery - *Gra$$ to Dollars* - Barossa	14-Feb-20	26-Feb-22	South Australia
L.PGS.2029	PGS Delivery - *Pasture principles* - South Coast Beef Group	26-May-20	30-Jan-22	New South Wales
L.PGS.2007	Delivery PGS B Doonan TRT Tasmania - *Pasture principles*	22-Nov-19	30-Nov-21	Tasmania
L.PGS.2006	Delivery PGS B Doonan Waverley Tasmania - *Pasture principles*	22-Nov-19	15-Nov-21	Tasmania
L.PGS.1836	Delivery of PGS Supported Learning Projects - *Using the diverse feedbase in a mixed farming system*	30-Mar-19	15-Nov-21	Southern Australia
L.PGS.2021	Delivery of PGS Supported Learning Projects - *Pasture principles*	30-Apr-20	15-Nov-21	Tasmania
L.PGS.2022	PGS Delivery - *Pasture principles* - North-East Tasmania	30-Apr-20	15-Nov-21	Tasmania
L.PGS.2023	PGS Delivery - *Pasture principles* - Flinders Island	28-Jun-20	15-Nov-21	Tasmania
L.PGS.1843	Delivery of PGS Supported Learning Project - *Pasture principles*	22-Apr-19	30-Oct-21	Tasmania
L.PGS.2101	PGS - *Pasture manipulation* - Development Package	25-Sep-20	20-Aug-21	Southern Australia
L.PGS.2018	PGS Resource Development - *Gra$$ to Dollars*	04-Mar-20	15-Jun-21	Southern Australia
L.PGS.1846	Delivery of PGS Supported Learning Projects - *Pasture principles*	13-May-19	30-Dec-20	Southern Australia
People and business				
L.PGS.2024	Delivery of PGS Supported Learning Project - *Benchmarking for profit and production*	20-Apr-20	15-May-22	Western Australia

Completed PDS projects

Project code	Project title	Start date	End date	Service provider	Location
Grassfed cattle					
Feedbase and grazing land management					
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
Sheep & lamb					
Animal health, welfare and biosecurity					
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
Animal production, husbandry and nutrition					
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
Feedbase and grazing land management					
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

All grassfed species					
Feedbase and grazing land management					
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
Reproductive efficiency					
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
Grassfed cattle					
Animal production, husbandry and nutrition					
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
L.PDS.1711	Improving heifer productivity by integrating FTAI into Commercial Cow Enterprises	31-Mar-17	30-Dec-20	Swans Veterinary Services	National
Digital agriculture					
L.PDS.2009	Central Australian self herding	30-Mar-20	29-Jan-26	Department of Primary Industries	Central Australia
Feedbase and grazing land management					
L.PDS.2002	Demonstrating productive, regenerative Burdekin grazing practices	25-Feb-20	28-Aug-25	NQ Dry Tropics Ltd	Northern Australia

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					
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.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					
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.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
L.PDS.1808	PDS: Using eID to improve ewe performance	30-Jun-18	28-Feb-21	University of Melbourne	National
All grassfed species					
Animal production, husbandry and nutrition					
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.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

Completed PIFT projects

Project code	Project title	Start date	End date	Location
Grassfed cattle				
Animal production, husbandry and nutrition				
P.PSH.0949	PIFT "Easy-As" - Adaptation and induction of cattle from rangelands to backgrounding systems in WA	01-Oct-17	01-Feb-20	Western Australia
P.PSH.1119	PIFT - Fat Old Cow	15-Jun-18	31-Oct-18	Southern Australia
Digital agriculture				
P.PSH.1087	PIFT - Real-time data to improve beef production efficiency	20-Apr-18	28-Feb-19	National
P.PSH.1088	PIFT - Pasture Tech: Measured decision making for a more profitable grazing system	01-Apr-18	30-Jan-19	National
Feedbase and grazing land management				
P.PSH.0965	PIFT - Grazing Supply and Demand in the Maranoa – matching long term sustainability with profitability	15-Dec-17	30-Nov-19	Queensland
P.PSH.0920	PIFT - Redlands for Regions	04-Jan-18	21-Apr-19	Queensland
P.PSH.0987	PIFT - Northern Leucaena Performance Project	01-Oct-17	31-Jul-18	Northern Australia
Genetic analysis				
P.PSH.0980	PIFT - Fast Tracking Genetic Gains Through the Strategic Combination of Genomics and IVF	20-Dec-17	15-Aug-19	Northern Australia
P.PSH.0989	PIFT - Accelerating genetic gain through integrating genomics and high value MSA carcass traits in genetic evaluation to aid selection	30-Jan-18	30-Apr-19	National
P.PSH.1086	PIFT - Accelerated genetic gain through advanced artificial breeding	01-Apr-18	30-Mar-19	Southern Australia
P.PSH.0953	PIFT EQTV – Understanding eating quality in the Trigger Vale poll stud genotype	10-Dec-17	28-Mar-19	National
P.PSH.0983	PIFT - Transforming genetic availability in the north with embryo transfer	15-Dec-17	29-Jan-19	Western Australia
P.PSH.0947	PIFT - Enhancing artificial breeding performance through efficient data capture, management and analysis	01-Oct-17	30-Sep-18	National
P.PSH.0963	PIFT - Use of genomics and sexed semen to accelerate genetic gain in commercial Angus herds	01-Oct-17	30-Sep-18	Southern Australia
P.PSH.0984	PIFT - Breeding Efficiencies in Extensive Environments related to Carcase Compliance	01-Oct-17	30-Sep-18	National
People and business				
P.PSH.1144	PIFT - WA Accredited Grass-Fed Beef Co-operative and Value Chain	01-Jul-18	15-May-19	Western Australia

P.PSH.1082	PIFT - Improving Soil Health, Sustainability and Resource Management on 'Rosewood'	05-Apr-18	29-Nov-18	Queensland
P.PSH.1043	PIFT - Regional Branding and Meat Product Traceability System Pilot Project	20-Jan-18	30-Oct-18	Western Australia
P.PSH.0988	PIFT - From non-operational to top 25% MSA beef – an opportunity for Aboriginal Pastoralists	15-Jan-18	30-Sep-18	National
P.PSH.0974	PIFT - Australian Natural Beef Co	02-Oct-17	30-Sep-18	Southern Australia
P.PSH.1071	PIFT - Project Stone Group	01-Apr-18	30-Sep-18	National
Product innovation				
P.PSH.0882	PIFT - Feasibility Study for developing an indigenous branded beef range and services (Stage 1)	20-Mar-18	01-Sep-19	Central Queensland
P.PSH.0936	PIFT- The Smokin' Yak Slow cooked beef hump– Discovery & Development phase for business expansion (stage 1)	15-Feb-18	30-Dec-18	National
P.PSH.1073	PIFT - Busy Beef	01-Apr-18	30-Sep-18	National
Grainfed cattle				
Animal production, husbandry and nutrition				
P.PSH.1091	PIFT - Phase 3 – Induction feed supplement for feedlots	01-Apr-18	30-Oct-18	National
P.PSH.1092	PIFT - Feeder Reader Development (Phase 3)	01-Apr-18	30-Oct-18	National
People and business				
P.PSH.0990	PIFT - Branding & Marketing North South Beef in South East Asian Markets	01-Oct-17	30-Nov-18	National
P.PSH.0976	PIFT - Paddock to Plate Production System for Premium Quality Export Beef	01-Oct-17	30-Sep-18	Northern Australia
Sheep & lamb				
Animal health, welfare and biosecurity				
P.PSH.1084	PIFT - Precision Lambing Management for optimising animal welfare and profitable sheep production	01-Apr-18	30-Oct-18	Southern Australia
P.PSH.0964	PIFT - Sheep360 – breeding an advanced welfare sheep	01-Oct-17	30-Sep-18	Southern Australia
Animal production, husbandry and nutrition				
P.PSH.0992	PIFT - Synergy and profit using farm by-products in mixed farming systems	01-Oct-17	30-Sep-18	Southern Australia
Digital agriculture				
P.PSH.1085	PIFT - EID to accelerate flock productivity gains	01-Apr-18	31-Mar-19	National
P.PSH.1089	PIFT - Demonstrating the value chain activities of a high-quality lamb producer using data	01-Apr-18	30-Oct-18	National

Feedbase and grazing land management				
P.PSH.0975	PIFT - Next generation crops for irrigated sheep grazing systems	15-Nov-17	30-Dec-18	Southern Australia
P.PSH.0971	PIFT - Optimising animal performance on dual purpose crops	01-Oct-17	30-Sep-18	New South Wales
Genetic analysis				
P.PSH.0946	PIFT - Using genomic predictions supporting in chain measure of MEQ	02-Oct-17	30-Sep-19	National
P.PSH.0957	PIFT - 'Maternal Worth' - Profit per hectare of different maternal genotypes	30-Mar-18	29-Apr-19	Southern Australia
P.PSH.0962	PIFT - Identifying the efficient commercial ewe	16-Nov-17	17-Mar-19	National
P.PSH.0943	PIFT - Ramping up genetic gain in eating quality and lean meat yield in Australian Lamb	10-Oct-17	30-Oct-18	National
P.PSH.0959	PIFT - Utilising 15K genomic testing to improve data quality issues within Pooginook and the Sheep Genetics Database as a benchmark guide for Merino Studs looking to utilise DNA parentage	01-Oct-17	30-Sep-18	National
People and business				
P.PSH.1097	PIFT - DSSA Stage 2 - Producer Innovation Fast-Track (PIFT) Program – Stream 2: New Products and Value Chains	01-May-18	30-Jun-20	National
P.PSH.0981	PIFT - Biodiversity Lamb – Proving the market for premium lamb grown on biodiversity enhanced farms	27-Nov-17	20-Jan-19	Victoria
P.PSH.1098	PIFT - Prototyping the Kahmoo Prime Lamb Value Chain for the hospitality sector	01-Apr-18	01-Jul-18	Queensland
Product innovation				
P.PSH.0970	PIFT - Evaluation of alternative high valued Merino meat revenue streams	01-Dec-17	31-Dec-20	National
P.PSH.1173	PIFT – Lamb Bacon Concepts (phase 3)	30-Nov-18	30-Jul-19	National
P.PSH.1010	PIFT - Building premium Prime Dorper Lamb (PDL) products, brand and market opportunity	06-Nov-17	30-Oct-18	National
P.PSH.1083	PIFT - Lamb Bacon Concepts	01-Apr-18	30-Sep-18	National
Goats				
People and business				
P.PSH.1072	PIFT - The Gourmet Goat lady	01-Apr-18	30-Dec-18	National
P.PSH.0950	PIFT - Productive Australian Boer Goats	20-Dec-17	30-Sep-18	National
All grassfed species				
Animal production, husbandry and nutrition				
P.PSH.0979	PIFT - Increasing business profitability through liquid supplements	30-Nov-17	14-Jan-19	National

P.PSH.1069	PIFT - Remote monitoring of supplementary feeders	01-Apr-18	30-Oct-18	National
Feedbase and grazing land management				
P.PSH.0918	PIFT - Enhancing grazing profitability through improving soil health	07-Nov-17	27-Dec-20	National
P.PSH.0985	PIFT - Innovations for revitalising soil health and livestock productivity in the WA shrublands	01-Oct-17	01-Oct-19	Western Australia
P.PSH.0993	PIFT - Solving the Sulphur Story	10-Dec-17	30-Mar-19	New South Wales
P.PSH.0967	PIFT - Creating a holistic grazing & soil improvement system that will increase carbon levels, carrying capacity & overall business sustainability	15-Oct-17	05-Dec-18	National
P.PSH.0960	PIFT - Legume Establishment Techniques on Semi-Arid Mitchell Grass Plains	30-Nov-17	30-Oct-18	Northern Australia
P.PSH.1090	PIFT - Grid soil mapping in pastures to generate variable rate lime and phosphorus applications for livestock producers	01-Apr-18	30-Oct-18	National
P.PSH.1128	PIFT - Maximising pasture biomass production through precision agriculture	20-May-18	30-Oct-18	National
P.PSH.0977	PIFT - Gillingarra perennial pasture irrigation	04-Oct-17	24-Oct-18	Western Australia
P.PSH.0982	PIFT - Triple purpose crops for Livestock Emissions Abatement	01-Nov-17	30-Sep-18	Southern Australia
P.PSH.0956	PIFT - Zoning up to optimise potential pasture yield and livestock returns	02-Oct-17	17-Aug-18	New South Wales
All red meat species				
Digital agriculture				
P.PSH.1102	PIFT - Development and evaluations of ALMS in a 3G only environment	19-Jul-18	28-Feb-20	Queensland
P.PSH.0968	PIFT - Bendemere productivity improvement project	20-Oct-17	30-May-19	Queensland
P.PSH.1101	PIFT - Feeding system innovation to increase labour efficiency	10-Apr-18	02-Mar-19	National
P.PSH.1081	PIFT - Solar Powered Drones for Farm Management	01-Apr-18	30-Dec-18	National
P.PSH.1068	PIFT - Low-Cost Livestock Management Software	01-Apr-18	25-Jun-18	National
People and business				
P.PSH.1174	PIFT - Stock Direct	01-May-19	01-Mar-20	National
P.PSH.1103	PIFT - Farm Well Live Well (Phase 3)	20-Sep-18	14-Aug-19	National
P.PSH.0948	PIFT International and domestic supply chain opportunities for West Midlands red meat products	01-Oct-17	15-Jan-19	National
P.PSH.1120	PIFT - Cultivate Farms – online farm-matching service (Phase 3)	01-May-18	31-Dec-18	National
P.PSH.0944	PIFT - Using innovation to increase feed efficiency and profitability	02-Oct-17	12-Dec-18	National
P.MDC.0069	Producer Innovation Fast Track Impact Assessment	20-Aug-18	15-Oct-18	National

P.PSH.1061	PIFT - Feasibility study of new consumer led business models for N2T Meats Pty Ltd	13-Mar-18	02-Sep-18	New South Wales
P.PSH.1070	PIFT - Stock Direct	01-Apr-18	31-Jul-18	National
P.PSH.1067	PIFT - Lovestock – The Livestock opportunity platform	01-Apr-18	27-Jul-18	National
Processing productivity				
P.PSH.1094	PIFT - Small Scale Abattoir Space (Phase 3)	01-Jul-18	30-Nov-18	National
P.PSH.1093	PIFT - Mobile Abattoir Enabled New Value Chain (Phase 3)	01-Apr-18	30-Oct-18	National