

THEME	TITLE	OBJECTIVE	LEAD PROVIDER	CI	LEAD FUNDER	START	END	SECTOR
AW Assessment	Welfare benchmarking and management for the beef cattle industry (P.PSH.0807)	This project will develop a welfare risk assessment and benchmarking framework for use throughout the production system to measure and manage the welfare performance of an enterprise. The framework will enable benchmarking of animal welfare and generate knowledge that will provide the basis for development of welfare assurance schemes. This will benefit primary producers and suppliers by enabling new products to be developed based on welfare and will enable the livestock industries to meet market demands for welfare assured products	CSIRO	C Lee	MDC	2017	2022	Beef
Mgment, Housing & Husbandry	Reducing mortality rates in beef and sheep enterprises (P.PSH.0817)	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. In-paddock walk-over-weighing (WoW) systems fitted with digital and thermal cameras will provide information of cattle live weight, growth rate, body condition and body temperature in near-real time from at least 8 different properties throughout Australia. This information together with data from weather and vegetation will be used by prediction models to predict the risk of mortality in near-real time. The project will increase the understanding of factors affecting cattle and sheep mortality, develop recommendations of best management practices, develop early warning systems of mortality risk and monitor the effect of management and environmental factors on mortality risk.	USYD	L Gonzalez	MDC	2017	2022	Beef
Mgment, Housing & Husbandry	Risk factors, treatment and prevention options for pink eye disease in cattle (B.AHE.0319)	Estimate pink eye prevalence on farms and in feedlots, identify risk factors, evaluate the efficacy of prophylactic and treatment measures.	USYD	N Dhand	MLA	2018	2021	Beef
Pain Assessment & Mgment	Development of a single shot immune-contraceptive vaccine for cattle B.AWW.0260)	Spaying of cows has been shown to significantly improve productivity in extensively managed beef herds where continuous mating is common practice, and reduce farm deaths in cull cows. This project aims to investigate the possibility of using a vaccination to stimulate an immune mediated contraceptive effect.	UQ	M Holland	MLA	2017	2020	Beef
Mgment, Housing & Husbandry	Reducing Induction Stress in Feedlot System (P.PSH.0805)	Assessment of the efficacy of potassium Bromide as a feed additive to reduce the stress of induction in feedlot cattle	CSU	M Travis	MDC	2017	2020	Beef
Pain Assessment & Mgment	Pink Eye in Long Haul Cattle Voyages (W.LIV.0181)	The objectives of this project are to review current literature on pink eye in cattle, gather epidemiological data from the livestock export trade, identify the microorganisms associated with the current syndrome and develop strategies for prevention.	MURD	M Laurence	Livecorp/MLA	2014	2019	Beef
AW Assessment	Automating welfare measurements and interventions for northern Australia (P.PSH.1100)	This project will evaluate the potential for Automated Livestock Management Systems (ALMS) and auto drafters to be used on extensive beef properties with a specific focus on monitoring stock welfare and segregating calves to improve their management and welfare.	CQU	K Pattison	MDC	2017	2019	Beef
Mgment, Housing & Husbandry	Development of an accreditation scheme for lay spayers using the Dropped Ovary Technique (DOT) (L.PDN.1701)	Develop accreditation Rules including processes to clarify grounds for and categories of complaints and appeals. Consider provisional accreditation of Lay Spayer's and a database for Lay Spayer accreditation. The project will identify and resolve issues related to accreditation criteria, processes, records, costs and integrity register. AGFORCE	OTHER	P Smith	MLA	2017	2019	Beef
Mgment, Housing & Husbandry	The Impact of Handling Conditions and New Environments on the Stress of Cattle (P.PIP.0743)	Assessing the relative impact of induction, feedlotting and pre-slaughter stressors on rangeland cattle. COMPLETE	MURD	F Anderson	MDC	2017	2018	Beef

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Mgmt, Housing & Husbandry	Evaluation of a heat load model for feedlot cattle (B.FLT.0387)	Managing Excessive Heat Load (EHL) during the summer months is critical to improving animal welfare outcomes and productivity of feedlot cattle. Heat load forecasting and modelling tools are used to predict animal responses to periods of EHL allowing early response to maximise improved animal welfare outcomes. As part of a continuous improvement process, this project aims to evaluate the ability of the Heat Load Index (HLI) model (Gaughan et al. 2008) to predict heat load responses (panting scores, feed intake and mortality) of cattle under commercial feeding conditions. COMPLETE.	UQ	J Gaughan	MLA	2017	2018	Beef
Transport, Euth & Slaughter	Evaluation of the efficacy and quality outcomes of High Frequency Electrical Stunning (HFES) for Grain-fed Beef Cattle	This project gathers behavioral, neurophysiological and meat quality data to support regulatory approval in Australia, for High Frequency Electrical Stunning for Beef Cattle	CSIRO	A Small	AMPC	2019	2022	Beef
Education, Training & Ext	Lifetime Ewe Management (LTEM)	LTEM is based on groups of five to seven wool producers that meet six times per year. During each hands-on session the groups visit the participating farms and develop the skills and confidence needed to improve ewe nutrition, management and increase reproductive efficiency. LTEM participants have typically recorded a significant reduction in ewe mortality and lifted weaning rates by 7-8 per cent.	OTHER	RIST	AWI	2008	Ongoing	Cross-sector
Education, Training & Ext	RAMPing Up Repro (RUR)	RUR is a hands-on 1 day workshop for growers focussed on improving ram performance and working longevity in commercial sheep enterprises. Each participant is guided through a thorough pre-joining ram inspection by an accredited deliverer and given the opportunity to increase their practical skills to undertake this in their own operation. The workshop is designed to give attendees the confidence to incorporate these skills into their own routine management, thus improving the health, welfare and performance of their rams.	AWI	J Munro	AWI	2018	Ongoing	Cross-sector
Education, Training & Ext	It's Ewe Time Forums	A joint initiative of MLA and AWI, the forums are part of the flagship Making More From Sheep program. The half-day forums deliver practical tools and information designed to increase producer awareness and provide take home tips of the principles, practices and tools of sheep enterprise profitability and productivity. There is regularly health specific presentations, last year the focus was on the welfare and production benefits of meeting nutrition targets.					Ongoing	Cross-sector
Mgmt, Housing & Husbandry	Enhancing the profitability and productivity of livestock farming through virtual herding technology	Develop virtual herding technology and assess welfare impacts for the dairy, beef cattle and sheep industries.	CSIRO	C Lee	Commonwealth Dept	2016	2020	Cross-sector
Mgmt, Housing & Husbandry	The welfare of bobby calves in the meat supply chain (P.PSH.0860)	The goal of this project is to measure the health and welfare status of bobby calves within the supply chain, and to identify variations in calf hydration, glucose levels, and colostral immunity in relation to breed, bodyweight, time off feed and transport distance. The project will then include research on-farm (and onwards in the supply chain) to validate the optimal calf preparation strategies indicated by the initial research. This will provide objective data on industry performance, as well as forming the basis of updated advice to farmers on areas of calf preparation on which to focus for ensuring optimal calf welfare. Together, these outcomes can contribute to a greater resilience of the industry in response to current concerns around calf welfare.	AWSC UoM	A Fisher	MDC	2017	2020	Cross-sector
AW Assessment	Auto monitoring and data collection: sheep wellbeing	To develop remote sensing methodologies in monitor sheep welfare on farm	MURD	D Miller	Sheep CRC	2016	2020	Cross-sector

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Attitudinal Effects	Monitoring public attitudes to livestock industries and livestock welfare	To develop a tool to monitor public perceptions and sources of knowledge relating to animal welfare in the primary industry sector. This will identify trends in community attitudes and behaviour and will assist in the development of communication strategies designed to inform the community on welfare related developments in the livestock industries. Funders - APL, AMPC, MLA, AgriFutures, Livecorp. Fianl report has been accepted and results will be presented at the 2019 Forum.	AWSC UoM	G Coleman	NAWRDE	2018	2019	Cross-sector
Mgment, Housing & Husbandry	Identification of resilient sheep	To identify key measures of resilience in sheep	CSIRO	C Lee	Sheep CRC	2016	2019	Cross-sector
Pain Assessment & Mgment	The Residues of Lignocaine in Sheep (B.AWW.0258)	Establishing the pharmacokinetics of lignocaine in sheep following subcutaneous injection to ensure 0 residues in meat. COMPLETE.	OTHER	invetus	MLA	2017	2018	Cross-sector
Mgment, Housing & Husbandry	Cost-effective weed management using targeted sheep grazing technology	Develop a welfare friendly method virtual fencing for sheep to manage grazing	CSIRO	R Llewellyn	Commonwealth Dept	2016	2018	Cross-sector
AW Assessment	Novel measures of affective states in livestock	To develop novel and practical measure of positive and negative affect in livestock	CSIRO	C Lee	Other	2016	2018	Cross-sector
Mgment, Housing & Husbandry	Development of game birds welfare standards and guidelines	To develop standards and guidelines for Turkeys, Quail, Partridge, Pigeon, Guinea fowl, Pheasants and Geese welfare management.	AHA	K Wall	AgriFutures	2015	2018	Cross-sector
Education, Training & Ext	GAP Analysis Program for non-certified AAWCS Processing Establishments	The Australian Meat Industry Council (AMIC) has identified the opportunity for non-AAWCS processing establishments to nominate themselves through AMIC for an industry funded gap audit against the requirements of the Australian Livestock Processing Industry Animal Welfare Certification System (AAWCS). The purpose the gap audit is to twofold: firstly, to identify areas of potential non-compliance that should serve as focus point for individual plant management; and secondly, as a precursor to encouraging the adoption of the industry's best animal welfare practises as embodied in the AAWCS.	Aus-Meat	Derek Mayal	AMPC	2019	2020	Cross-sector
T'port, Euth & Slaughter	Revision of the Industry Animal Welfare Standard for livestock processing establishments	Following changes in industry practices, regulation and assurance schemes, it is now an appropriate time to update and refine the Industry Standard. It is proposed that the revision of the Standard follows international best practice guidelines for standard development. To compliment the revised Standard, it is essential to develop associated guidance, to ensure effective implementation and verification of the requirements.	OTHER	Dr L Hewitt	AMPC	2019	2020	Cross-sector
Mgment, Housing & Husbandry	Feeding cool cows DEDJTR	This project will investigate nutritional opportunities to alleviate the impacts of hot weather on animal performance, health and welfare and explore the potential interactions between nutritional and genetic interventions.	State Ag	L Marett	State	2017	2023	Dairy
Mgment, Housing & Husbandry	Developing nutritional strategies for early lactation (First 100 days) DEDJTR	This project aims to deliver early lactation feeding strategies for individual cows that increase feed intake and peak milk yield, while minimising the incidence of metabolic diseases.	State Ag	B Wales	State	2017	2023	Dairy
Pain Assessment & Mgment	Characterisation of the welfare and performance responses of calves to disbudding and castration procedures	The PhD Fellowship is a joint research project between Teagasc and the University of Melbourne. This research will deliver practical pain management strategies as a part of standard industry practice at the time of disbudding and castration of calves.	AWSC UoM	A Fisher	Other	2018	2021	Dairy
Education, Training & Ext	Dairy Farm Risk Management and Industry Resilience DEDJTR	More dairy farmers will apply improved biosecurity and animal welfare practices in line with codes of practice.	State Ag	B Davidson	State	2017	2020	Dairy
AW Assessment	Precision livestock robotics	This project aims to provide proof of concept of a novel technology to accurately and autonomously detect dairy cow lameness in real time using non-invasive, remote camera observations and machine learning. A prototype system will be developed and validated on large numbers of cows within the Australian Dairy Industry's Genetic Information commercial herds.	USYD	J Underwood	DA	2016	2019	Dairy

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Attitudinal Effects	Scale of production, attitudes of dairy farmers and stockpeople and the welfare of dairy cows	Understanding the relationships between herd size and work-related attributes of farmers and stockpeople may provide the opportunity through education and training and herd management practices to safeguard cow productivity, health and welfare in situations where increasing herd size is a risk factor. It builds on the PhD research project conducted by David Beggs on dairy animal welfare outcomes and scale of production. Final report has been submitted.	AWSC UoM	P Hemsworth	DA	2018	2018	Dairy
Mgment, Housing & Husbandry	Ensuring cow welfare with increasing scale of production	This project supported David Beggs (PhD student) who has undertaken on-farm studies to determine relationships between farm characteristics and practices associated with scale of production and animal welfare measures. Completed.	AWSC UoM	A Fisher	DA	2014	2018	Dairy
Mgment, Housing & Husbandry	What causes smothering in commercial free-range laying hens?	There are limited overseas reports on the incidence of smothering in free-range laying flocks which suggest that smothering may account for a substantial proportion of overall mortality. While a wide range of potential variables have been implicated, there have been few systematic studies on smothering because outbreaks are sporadic and unpredictable and detection is normally after the incident. Anecdotal reports in the Australian free-range industry suggest that up to 30-40% of mortality of adult birds may be due to smothering. An understanding of the relationships between environmental characteristics and flock characteristics (e.g., such as physical conditions and behavioural characteristics such as fear and exploration behaviour during rearing and in adulthood), relationships and smothering events is likely to lead to benefits for both hen welfare and productivity. Peta Taylor (UNE) is a co-investigator.	AWSC UoM	P Hemsworth	AEL	2018	2021	Eggs
Mgment, Housing & Husbandry	Hen ranging behaviour in relation to light and ultraviolet intensity	To provide knowledge on how range use may be impacted by weather parameters related to sun exposure.	CSIRO	D Campbell	AEL	2018	2021	Eggs
AW Assessment	Development of practical measures of hen welfare	The objectives of this project are to enhance the use of microRNAs as a measure of poultry welfare. The two aims are to, firstly, further develop an existing stress assay so that it can be applied non-invasively using eggs as the source of the microRNAs, and secondly, identify microRNAs that can identify negative and positive affective (emotional) states in chicken.	DEAK	T Crowley	AEL	2018	2020	Eggs
Mgment, Housing & Husbandry	Resilient plants to entice hens outdoors on free range farms	A three year project: firstly, a series of case study free range farms across different climatic zones with fixed ranges will be studied to see how they maintain vegetation on the range (trees and ground cover); secondly, compile agronomic information on what, how, when to plant on the range; thirdly, "a proof of concept trial" testing whether a fast growing shrub and perennial pasture plant combination sown on the outer range area will attract more hens to utilise this area. The main output will be a guideline package on the maintenance of range vegetation.	UoA	C DeKoning	AEL	2017	2020	Eggs
Attitudinal Effects	Animal welfare and values 2.0	This research project will combine quantitative and qualitative approaches to social research and analysis to produce a robust and actionable final report about community values in relation to hen welfare, including how various sectors within the community prioritize, rank, and trade off certain values.	UoA	R Ankeny	AEL	2019	2020	Eggs
Mgment, Housing & Husbandry	Early enrichment of free range laying hens	To determine effective enrichment strategies during rearing to better prepare free-range birds for outdoor access.	CSIRO	D Campbell	Poultry CRC	2017	2019	Eggs
Mgment, Housing & Husbandry	Hen welfare literature review	To inform discussion around hen welfare and to identify research gaps that may benefit from future investment by Australian Eggs.	AWSC UoM	P Hemsworth	AEL	2018	2018	Eggs

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Attitudinal Effects	Animal welfare and values	This project will engage a panel of experts in AW science, veterinary science and social science to identify and describe values based elements that arise in the context of the available frameworks for animal welfare, allowing for rational assessment and productive engagement on hen welfare issues.	AWSC UoM	A Fisher	AEL	2018	2018	Eggs
Mgment, Housing & Husbandry	Early enrichment of free range laying hens	To determine effective enrichment strategies during rearing to better prepare free-range birds for outdoor access.	CSIRO	D Campbell	PoultryHub	2017	2019	Eggs
Mgment, Housing & Husbandry	Animal welfare and sustainability of the Australian kangaroo harvesting industry	The project aims to deliver a detailed report that compiles current expert knowledge and robust evidence on the animal welfare impacts and sustainability of the kangaroo harvesting industry and specifically examines the impacts and issues associated with a male-only harvesting approach. In addition, the animal welfare impacts and sustainability of commercial kangaroo harvesting will also be compared with other meat and skin producing industries (i.e. sheep, cattle, goats). The report can be used as a guide for the kangaroo industry to make improvements to harvesting methods and strategies and will help to deliver balanced outcomes for a range of stakeholders. Ultimately, it will also inform the best-practice management of kangaroos across Australia.	State Ag	S McLeod	AgriFutures	2017	2018	Other
Mgment, Housing & Husbandry	Kangaroo Commercial Code Review	This project aims to deliver a revised National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes.	State Ag	T Sharp	AgriFutures	2017	2018	Other
Mgment, Housing & Husbandry	Early stress exepriences and stress resilience in pigs	Animal stress has substantial implications on the productivity, health and welfare of farm animals and thus farm profitability. This Australian Research Council Linkage Project aims to examine stress resilience in pigs. Modern pig farming is a major source of food, providing substantial nutritional, social and economic benefits in Australia and worldwide. Animal welfare is of increasing concern to the public, consumers and pork producers, and stress vulnerability is an animal health and production problem in the life of the commercial pig. This project will generate new knowledge on early life management to endow stress resilience in pigs, with expected benefits for animal welfare, farm productivity and profitability. Working with collaborators from the University of Queensland (UQ), the University of Vienna (UV) and the United States Department of Agriculture (USDA) and industry partners Rivalea Australia and Sunpork Farms this project will conclude in 2024. Investigators: Paul Hemsworth, Roger Rassool, Alan Tilbrook (UQ), Jeremy Marchand Forde (USDA) and Jean-Loup Rault (UV).	AWSC UoM	P Hemsworth	ARC	2019	2024	Pork
AW Assessment	Developing remote monitoring methods for early detection of respiratory disease in pigs	This project will provide proof of concept that remote monitoring using video imaging can be developed for a whole farm monitoring system for health and welfare of pigs.	AWSC UoM	E Jongman	APRIL	2019	2020	Pork
T'port, Euth & Slaughter	Reducing the impact of on-farm euthanasia on stockpeople through the development of practical protocols and the validation of a new method of euthanasia to ensure good practice euthanasia.	There is a clear need to develop procedures and methodologies that reduce the impact on stockpeople, reduce the potential variation and error in conducting euthanasia and show the consumer that animals under our stewardship receive a good death.	OTHER	B Gleeson	APL	2017	2019	Pork

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Mgment, Housing & Husbandry	Addressing seasonal effects on piglet birth weight and within litter variation	Completed. Background: Variation in piglet birth weights can affect pork production from the time of birth through to slaughter. Feeding dextrose to sows can reduce within-litter weight variation in winter months, but this has not been tested during the summer months. Purpose: To determine whether within-litter variation during summer can be reduced by including 5% dextrose in a 'wean to mate' sow diet Take home messages: <ul style="list-style-type: none"> The number of piglets born alive increased from 12.3 in control sows to 13.7 in sows fed dextrose, irrespective of season. The increased litter size was not associated with an increase in individual piglet weight variation. Dextrose supplementation in the 'wean to mate' diet improved litter size without increasing the variation of within-litter individual piglet weights in both summer and winter. Cost - \$50/ tonne or 5c per kg of feed = ~ \$1 per sow. 	OTHER	K Plush	APL	2017	2019	Pork
AW Assessment	Novel biomarkers of Animal Welfare; microRNA, immunobiology and on farm application	To develop a kit of miRNA and immune based novel biomarkers to assess the welfare of pigs.	SARDI	R Terry	APL	2016	2019	Pork
AW Assessment	Optimising sow body condition throughout gestation and understanding how changes in metabolic status influence reproductive performance	To develop management practices that can adequately maintain body weight and condition during a reproductive cycle have the potential to improve welfare	OTHER	T Muller	APL	2016	2019	Pork
Mgment, Housing & Husbandry	Development of nutritional strategies to reduce initiation of the stress response by suppression of relevant neurotransmitters	Completed. Background - To develop novel nutritional methods (e.g. use of dietary supplements) to reduce weaning stress. Outcomes – <ul style="list-style-type: none"> Increasing Tryptophan (SID 0.315) and reducing LNAA (SID 4.231) in the diet to a ratio of 0.074 (SID Trp:LNAA) can improve performance of weaner pigs regardless of an ETEC infection. Further research is recommended to determine the cost:benefit of this nutritional strategy in pig production before commercial adoption. Following a social or management challenge, supplementation with a combination of 50 mg/day GABA in the water and 0.3% L-Glu, 0.1% L-Gln and 0.34% L-Trp in the feed improved feed conversion ratio and increase plasma glucose, as well as brain-derived neurotrophic factor. The use of dexamethasone to reduce stress responses via negative feedback on the HPA axis showed promise in an experimental environment, although no benefit was seen when applied at a lower dose on a commercial farm. Therefore, it is recommended establishing an association between dose and timing of DEX administration. 	MURD	J Pluske	APL	2016	2019	Pork
AW Assessment	A lab on a chip for real time pain and animal welfare biomarker measurement.	This project aims to measure multiple biomarkers at the same time. From a single blood sample a lab on a chip could measure a couple of key cells in the immune system like tumour necrosis factor α and Interleukin 10, several specific miRNA markers (developed in APL project 2016/077) and a steroid hormone. This would provide the user with multiple markers that could be used to assess the welfare state of the animal on farm. A microfluidic lab on a chip would enable the industry to drive continuous improvement in animal welfare using on farm objective measures.	SARDI	R Terry	APRIL	2018	2019	Pork
Mgment, Housing & Husbandry	Human enrichment program for breeding sows: proof of concept	This proposed experiment is a proof of concept to examine whether or not regular positive human contact is enriching for pigs (i.e., leads to a positive affective state) and facilitates stress resilience.	AWSC UoM	P Hemsworth	Pork CRC	2017	2018	Pork

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Education, Training & Ext	Support for ProHand Pigs and Pork Abattoir	The ProHand® use cognitive-behavioural training, in which the key attitudes and behaviour of stockpeople are targeted for improvement leading to improvements in animal fear, stress, productivity and meat quality. ProHand® is an on-line training program which is used by farm and abattoir stockpeople working in the Australian and New Zealand pork industries.	AWSC UoM	J Skuse	APL	2017	2018	Pork
Mgmt, Housing & Husbandry	Pre-farrowing health and welfare assessment of sows	The aims of the project are to identify health and welfare issues affecting group housed sows upon their transfer to farrowing facilities. Additionally the project will identify the monitoring criteria associated with poor outcomes for sows or their litters which can easily be applied by stockpersons to identify, triage and potentially treat sows identified with health or welfare issues via an assessment of their risk factors.	UNE	K Bunter	APRIL	2017	2018	Pork
Mgmt, Housing & Husbandry	The provision of a curative supplemental block provides enrichment, reduces mutilation and reduces the negative impact on production performance caused by tail and ear bite mutilations in growing pigs	The aim of this experiment is to reduce tail and ear bite mutilations, in growing pigs, through environmental enrichment. The key strategies implemented in this project are: Nutritional enrichment using a supplemental Block resulting in reduced mutilations caused by tail biting and ear biting pig. Sunpork	OTHER	T Muller	APRIL	2017	2018	Pork
Mgmt, Housing & Husbandry	Effect of maternal supplementation with creatine and caffeine prior to farrowing on piglet growth and survival: a commercial study	Two primary objectives: one, to determine the effects of maternal creatine supplementation (75 / g / day) for five days prior to farrowing on sow and piglet performance under commercial conditions; two, to determine whether there is an additive effect of supplementing sows diets with both creatine and caffeine on sow and piglet performance.	UoA	W van Wettere	APL	2016	2018	Pork
Mgmt, Housing & Husbandry	Can oxytocin nasal spray improve gilt behaviour during the peri-partum period and increase the weaning weight of piglets	Stress during farrowing causes the production of opioids, which inhibit oxytocin release. This study will assess the effectiveness of nasal administration of oxytocin on improving maternal behaviour.	SARDI	R Terry	Pork CRC	2016	2018	Pork
Mgmt, Housing & Husbandry	Development of commercially-viable enrichment programs for group-housed sows	To determine the effects of environmental enrichment in the form of straw, Ridley Block, lucerne hay, wooden block and corn silage vs a control on sow aggression, injuries, foraging behaviour and reproductive performance.	AWSC UoM	E Jongman	Pork CRC	2016	2018	Pork

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AW Assessment	Developing ways to measure and increase sow contentment	<p>The team conducted 2 experiments. In experiment 1, enrichment treatments began two days prior to farrowing and consisted of 1kg daily of lucerne hay. Experiment 2 compared daily lucerne hay, straw, or non-nutritive rope to compare the effects of low nutrient enrichments. Providing lucerne or straw to sows for several days before farrowing reduced the number of stillborn piglets across all experiments. In Experiment 1, sows receiving enrichment showed more nesting behaviours and fewer stereotypes such as sham chewing prior to farrowing, both indicating improved welfare. This result was not replicated in Experiment 2, where the parity of sows ranged more widely and the number of sows in each treatment was smaller.</p> <p>The study also focused on testing novel measures of assessing affective state including: cognitive bias, to see whether a sow responded optimistically or pessimistically to an unknown event; startle response that measured reactivity to an abrupt, unpredictable sound; and anticipatory behaviour, that reflected the eagerness of the sow for a reward. Anticipatory behaviour was greater for multiparous sows receiving enrichment in Experiment 2, suggesting these sows were experiencing a more positive affective state. Whilst results varied across sites, the provision of enrichment allowed sows enhanced behavioural expression at the time of nesting, which improved both fitness (evidenced by the reduction in stillbirths) as well as affective state (with older sows responding with higher anticipation to a feed reward at day 14 of lactation).</p>	AWSC UoM	R Doyle	Pork CRC	2015	2018	Pork
Mgment, Housing & Husbandry	Identification of genetic factors affecting tail biting in pigs	<p>Completed. Purpose: To identify genetic and non-genetic factors affecting victims of tail biting</p> <p>Take home messages:</p> <ul style="list-style-type: none"> · A simple medication score (0 (not treated) or 1(treated)), used to identify victims of tail biting, was heritable. This offers new selection avenues to reduce the incidence of tail biting · Current selection strategies for higher lean meat growth were not associated with being a victim of tail biting · Incidence of tail biting was higher in autumn and winter. Producers should monitor indoor climate (cold temperatures and chill factors) in order to reduce the incidence of seasonal tail biting · More tail-biting victims were observed in pens that were in the vicinity of fans which caused higher wind speeds in these particular pens · Pen micro-environments should be evaluated in order to reduce the incidence of tail biting in specific pens. 	UNE	S Hermesch	APL	2016	2018	Pork
Mgment, Housing & Husbandry	Review of the scientific literature and the international pig welfare codes and standards to underpin the future standards and guidelines for pigs	This project conducted a review of the scientific literature of pig welfare and selected international codes and provide recommendations on management practices and future research for the Australian pig industry. Report available http://www.animalwelfarestandards.net.au/pigs/	AWSC UoM	L Hemsworth	APL	2018	2018	Pork
AW Assessment	Novel detection of chicken welfare using machine vision	The project will develop a proof-of-concept system for monitoring chickens and their behaviour in chicken sheds, for the purpose of immediate remote notification of the shed supervisor for events that indicate conditions in the shed that affect flock welfare.	USQ	C McCarthy	AgriFutures	2017	2021	Poultry

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Mgmt, Housing & Husbandry	Resilient plants for free range chicken meat farms	Increase meat chicken welfare on free range farms by utilizing resilient forage plants on the range. Outcome 1. Identify those forage plants with increased resilience to chicken activity resulting in less bare ground exposed on the outdoor range. Outcome 2. Demonstrate that more chickens go outdoors and exhibit a wider range of natural behaviours due to increased usage of the outdoor range area with resilient herbage cover.	SARDI	C de Koning	AgriFutures	2016	2019	Poultry
AW Assessment	The value of perches and the ability to assess leg strength in meat chickens	The value of perches and the ability to assess leg strength in meat chickens	USYD	W Muir	AgriFutures	2017	2018	Poultry
Mgmt, Housing & Husbandry	Effects of an in-shed sprinkler cooling system multiple parameters	Effects of an in-shed sprinkler cooling system multiple parameters	DAFF QLD	M Dunlop	AgriFutures	2016	2018	Poultry
Mgmt, Housing & Husbandry	Review of National Animal Welfare Standard and development of BMP material	The project will form part of a body of work designed to ensure that the Australian public retains its confidence in chicken meat and the welfare of birds during processing.	DAFF QLD	R Osmond	AgriFutures	2019	2021	Poultry
Transport, Euth & Slaughter	Assessment welfare and carcass quality issues during transport (w/truck design)	This project will undertake a study of welfare and carcass quality on trucks. Specifically undertake an assessment of potential welfare and carcass quality issues during transport with development of options for proof-of-concept truck modifications to address these issues.	OTHER	I Johnston	AgriFutures	2018	2020	Poultry
Mgmt, Housing & Husbandry	Electrolyte supplementation to alleviate the adverse effects of severe heat stress	The focus of the research is to extend earlier studies using supplementary electrolytes to alleviate the effects of heat stress on broiler performance and meat quality at processing. The specific objectives are: 1. Alleviate the effects of high temperature on broiler performance in the last week of the 42 day production period. 2. Improve carcass quality by limiting the effects of heat and transport stress on the rate of PSE (Pale Soft Exudative), changes in muscle pH and drip loss water loss post slaughter. 3. Improve broiler welfare by limiting the rate of dehydration during farm pickup, transport and lirage by maintaining intercellular and intracellular muscle water content.	USYD	J Downing	AgriFutures	2018	2019	Poultry
Mgmt, Housing & Husbandry	Optimising ranging behaviour by free-range meat chickens	By altering rearing environments, early life experience and providing resources on the range, this project aims to increase the number of chickens that access an outdoor range, increase the frequency and duration of visits to the range area and improve chicken distribution on the range.	UNE	P Taylor	AgriFutures	2019	2022	Poultry
Education, Training & Ext	The role of education and attitudes towards hen welfare: a case study of furnished cages	investigate the interaction between education and welfare and how this may be able to be used in the future.	UNE	P Taylor	PoultryHub	2018	2019	Poultry
AW Assessment	Development of practical measures of animal welfare	Develop quantifiable indexes of sheep and cattle welfare.	UQ	A Tilbrook	MDC	2019	2023	Redmeat
AW Assessment	Objective, robust, real-time animal welfare measures for the Australian red meat (P.PSH.0819)	When animal welfare is compromised, low resilience behaviours are reduced and the underlying structure of behaviours affected. This project will determine these behaviours which will then form objective measures of cattle welfare from birth to slaughter	USYD	C Clarke	MDC	2017	2022	Redmeat
AW Assessment	Linking life-time objective welfare and slaughter measurement data to optimise meat quality (P.PSH.0872)	This project will link carcass quality information at slaughter with life-time animal management, health and production data to identify risk factors associated with sub-optimal animal welfare as well as carcass quality at identified critical control points.	USYD	R Bush	MDC	2017	2022	Redmeat
AW Assessment	Animal Welfare Indicators Pilot for the Live Export Industry (W.LIV.3047)	Develop and pilot a range of possible indicators across the livestock export supply chain to better measure animal welfare. A comprehensive data recording system and dashboard will also be developed.	MURD	T Collins	Livecorp/MLA	2017	2021	Redmeat

THEME	TITLE	OBJECTIVE	LEAD PROVIDER	CI	LEAD FUNDER	START	END	SECTOR
Attitudinal Effects	Identifying public and producer attitudes to sheep and cattle animal welfare to inform education strategies (P.PSH.0804)	This project will provide the tools for the red meat industry to firstly assess public and producer attitudes to animal welfare issues, their knowledge of the issues and their key opinion leaders and secondly to utilise validated education strategies to address misinformation on practices and disseminate research results on best-animal welfare practice addressing the specific contentious welfare issue in question.	AWSC UoM	G Coleman	MDC	2017	2021	Redmeat
Pain Assessment & Mgmt	Improving welfare – pain relief (P.PSH.0818)	Investigating options for practical administration of analgesics, the potential for long-acting analgesics to provide prolonged therapy and self-medication strategies for use in extensive farming systems. The outcome will provide producers with an affordable, efficacious and practical protocol for delivering pain relief on farm.	USYD	P.White	MDC	2017	2021	Redmeat
AW Assessment	Immune fitness as a measure of animal health welfare and productivity (P.PSH.0816)	Immunocompetent animals fare better in the face of physiological challenges such as exposure to infectious diseases. Additionally, management-related stressors can impact on an animal's ability to thrive, as it is known that stress can suppress immune responses. 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. We aim to develop simple immune measure(s) as a correlate of physiological health and well-being for use as a benchmarking tool for overall herd health and welfare	USYD	A Purdie	MDC	2017	2020	Redmeat
AW Assessment	Review and compare Australian animal welfare systems throughout the supply chain to major trading partners (whole of life animal welfare).	Review of existing schemes to inform Australian practice	OTHER	E Wilcock	AMPC	2017	2018	Redmeat
Education, Training & Ext	Communications for improved livestock welfare		OTHER	AHA	AMPC	2017	2018	Redmeat
Transport, Euth & Slaughter	Alternative Options to Power Captive Bolt Devices (W.LIV.3045)	To investigate and identify an alternative power load for captive bolt devices. If successful, it is hoped it will support continued and expanded use of stunners in overseas markets.	OTHER	R Shephard	Livecorp/MLA	2016	2018	Redmeat
Mgmt, Housing & Husbandry	Bedding, Ammonia and Stocking density (W.LIV.0299)	Managing ammonia emissions and pad moisture of confined livestock and effects of stocking density on behaviour and group dynamics of cattle and sheep exposed to differing live export.	UNE		Livecorp/MLA	2019	2023	Redmeat
Mgmt, Housing & Husbandry	Vessel Heat Stress Technology Trial Program – Sheep 2019	To explore, identify and trial technologies that could mitigate wet bulb temperatures on livestock export vessels from reaching levels that exceed the heat stress thresholds of sheep, but which also provide an environment that supports acclimatisation to destination country conditions.	Livecorp		Livecorp	2018	2020	Redmeat
Pain Assessment & Mgmt	Taking Numnut, pain free castration device to markets (B.CMM.0139, B.COM.0175)	Evaluate the efficacy of NUMNUTS® in providing pain relief for marking (the combination of tail docking and castration, in a mixed gender group of lambs), in a semi-commercial field-type situation.	CSIRO	A Small	MLA	2016	2023	Sheepmeat
Mgmt, Housing & Husbandry	New approaches to the understanding of underlying causes for neonatal lamb mortality (P.PSH.0808)	While increased twinning rates have led to higher weaning rates in both Merino and Maternal cross ewes, the rate of lamb mortality has remained unchanged. This project will focus on the incidence of dystocia, and the understanding of underlying causes. This in turn will lead to better understanding of the problem to better inform future control efforts.	CSIRO	S Schmoelz	MDC	2017	2021	Sheepmeat
Mgmt, Housing & Husbandry	Phasing out of Mulesing: cost, benefits and opportunities (B.AWW.0006)	This project will examine the benefits and costs of ceasing Mulesing in prime lamb systems and will 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.	AWSC UoM	A Fisher	MLA	2019	2021	Sheepmeat

THEME	TITLE	OBJECTIVE	LEAD PROVIDER	CI	LEAD FUNDER	START	END	SECTOR
Transport, Euth & Slaughter	Methods of field euthanasia for livestock that preserve brain material (B.AWW.0257)	To identify a more suitable agent for the euthanasia of livestock for TSE surveillance in Australia, To compare the efficacy and animal welfare responses of sheep euthanased with either an injectable barbiturate (gold standard) and saturated salt solution (KCl and MgSO4), To generate objective, scientific data to support the use of the most appropriate method of euthanasia that facilitates the collection of intact brain samples for TSE surveillance. COMPLETE	AWSC UoM	K Stanger	MLA	2017	2018	Sheepmeat
Education, Training & Ext	Developing the basis for attitude-behaviour training programs for stockpeople in the sheep transport and abattoir sectors. (B.AWW.0259)	This project aims to acquire collaboration with key sheep-meat stakeholders to develop a collaborative research proposal to evaluate the effectiveness of a stockperson attitude and behaviour training programs aimed at minimising handling stress and thus safeguarding sheep welfare during transport and at abattoirs and meat quality. A subsequent research project that demonstrates the effectiveness of these training programs together with the key sheep-meat stakeholders will ensure an effective adoption pathway. COMPLETE	AWSC UoM	P Hemsworth	MLA	2017	2018	Sheepmeat
Mgmt, Housing & Husbandry	Heat management in the Middle East (W.LIV.3044)	This project will compare and evaluate different shade structures and interventions in sheep feedlots to help manage heat stress in the Middle East.	MURD	A Barnes	Livecorp/MLA	2016	2018	Sheepmeat
Mgmt, Housing & Husbandry	Backgrounding & feed lotting strategies to address Inanition in sheep (W.LIV.0142)	This project will address identification and management of inappetent sheep in pre assembly depots/feedlots	MURD	A Barnes	Livecorp/MLA	2010	2018	Sheepmeat
Education, Training & Ext	Winning with Weaners (WWW)	WWW is a 1 day workshop aimed at lifting the lifetime performance from Merino ewes through improved management of weaners. WWW assists participants in understanding the key issues affecting weaner survival and performance. The workshops discuss factors that contribute to weaner mortality and ill thrift and provides practical pathways for improving lifetime performance.	AWI / MLA	M Scott	AWI	2018	Ongoing	Wool
Mgmt, Housing & Husbandry	Shorter Shearing Intervals (ON-00658)	This project will investigate the merits achieved by producers shearing 6- or 8-monthly compared to 12-monthly, including for wool quality and quantity, improved reproduction and reduced incidence of disease, such as flystrike and lice.	UNE	E Doyle	AWI	2017	2021	Wool
Mgmt, Housing & Husbandry	Developing a Smart tag for sheep	A smart tag being developed by AWI aims to enable woolgrowers to track, monitor and assess the welfare status of their stock in real time	AWI	M Majas	AWI	2017	2020	Wool
Mgmt, Housing & Husbandry	Autonomous and Remote Predation Detection and Welfare Alerts	A project to investigate the use of AWI's smart tags in the remote detection of predation attacks and welfare alerts using AWI Smart tags	CQU	M Trotter	AWI	2018	2020	Wool
Mgmt, Housing & Husbandry	Merino Reproduction, Efficiency and Survival (ON-00487)	This project aims to collect comprehensive information on sheep reproduction and survival from scanning right through to yearling age to add to industry knowledge about the factors influencing lamb survival and the quantification of genetic and environmental contributions to lifetime productivity.	CSIRO	J Smith	AWI	2017	2020	Wool
Mgmt, Housing & Husbandry	Shearing and epigenetic stress	Quantify physiological and behavioural responses in Merino ewes during natural joining and varying shearing frequencies	UQ	E Narayan	AWI	2019	2020	Wool
Pain Assessment & Mgmt	Gap Evaluation of Pain Alleviation Research	This project is to provide a stocktake of published research into the welfare impacts of castration, tail docking and mulesing; alternatives to these procedures; and potential pain relief strategies. The project report will include a gap analysis and recommendations as to future research directions.	CSIRO	A Small	AWI	2018	2019	Wool
Pain Assessment & Mgmt	Residue deletion studies	This project is to undertake metabolism and tissue residue deletion studies to provide data to use in applications to the APVMA to reduce withholding periods for the current approved use of the local anaesthetic actives, lignocaine, cetrimide and bupivacaine, and to assist with the broadening of their use options in sheep, such as for shearing cuts.	OTHER	Invetus	AWI	2016	2018	Wool

THEME	TITLE	OBJECTIVE	LEAD PROVIDER	CI	LEAD FUNDER	START	END	SECTOR
Mgmt, Housing & Husbandry	Improving lamb survival by optimising lambing density	This study aims to quantify the effects of flock size and stocking rate on the survival of twin lambs born to Merino or maternal ewes at multiple sites across Australia and New Zealand. Data collected from the Victorian sites will contribute to a larger project which is being conducted across Australia and in New Zealand.	State Ag	L Kubeil	AWI	2016	2018	Wool
Pain Assessment & Mgmt	Promoting welfare solutions for Australian Merinos	This project is seeking to identify research solutions that will contribute to the development and promotion of best practice sheep welfare management practices. Project objectives are to: obtain data on the effect of reduced mules wound size on breech parameters and relative changes in lambs versus weaners; develop and validate a pain model for objectively evaluating procedural pain and analgesia efficacy using EPs (ECG and EEG parameters); obtain data on the effects of age on pain perception using the validated pain model.	USYD	P White	AWI	2015	2018	Wool