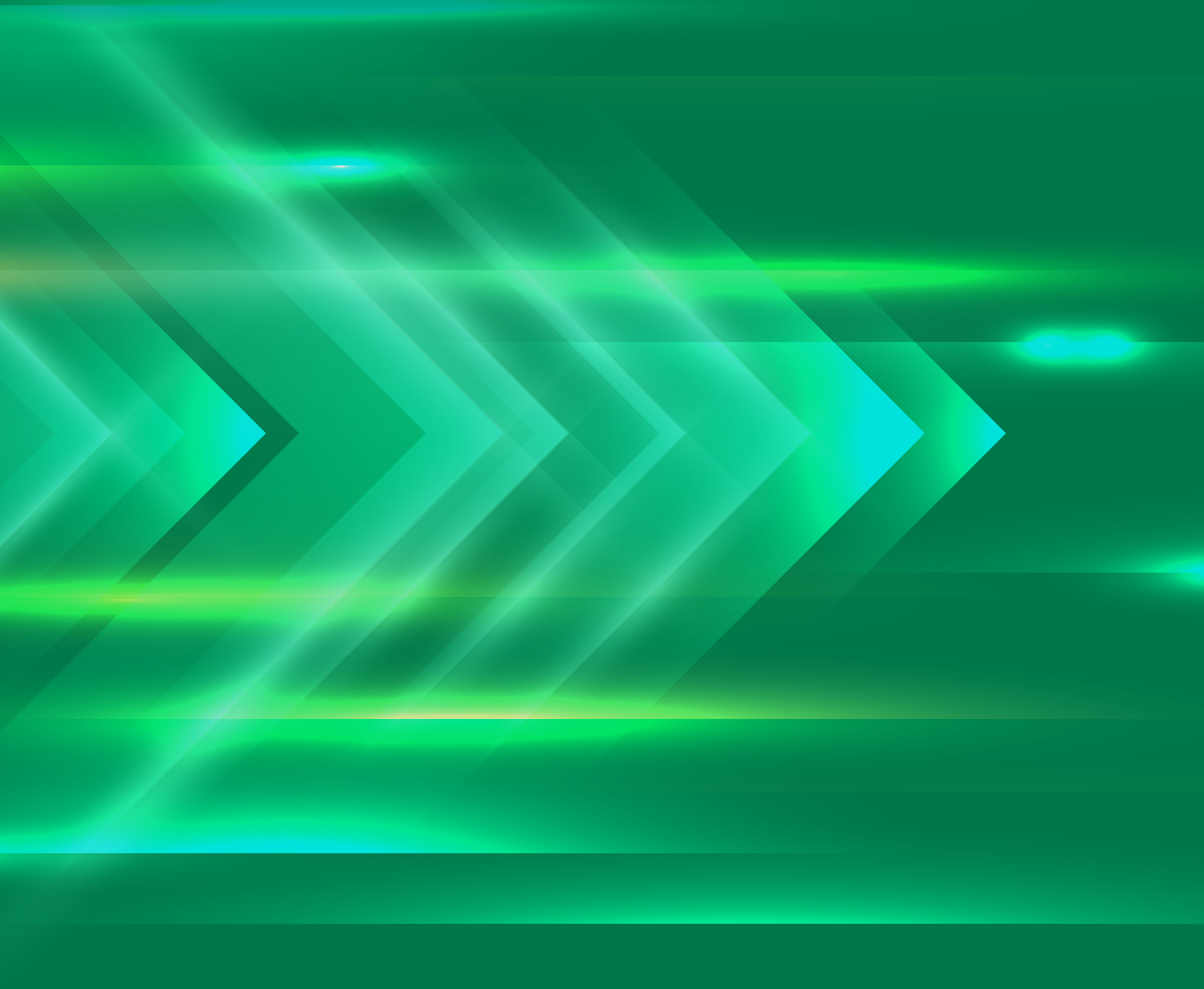


Value chain innovation

Outcomes and opportunities

Reporting FY21–25 project outcomes and identifying
emerging opportunities across the innovation value chain





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For a more comprehensive understanding of MLA's value chain innovation outcomes and opportunities, this report can be read in conjunction with the organisation's *Annual Investment Plan* and its most recent *Annual Report*.

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 MLA acknowledges the Traditional Custodians of the lands on which we live, work and care for. We pay our respects to Elders past and present, as we recognise their history, culture, connection to land and water, and share in their commitment to caring for Country.

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About this report

As the red meat and livestock industry's designated research body, Meat & Livestock Australia (MLA) continuously strives to enable the world-leading outcomes required to ensure a sustainable future for our industry – one that delivers both value and opportunity for producers and the rest of the supply chain.

This report articulates the project outcomes delivered by MLA's investments in value chain innovation over the FY21–25 reporting period and demonstrates the many benefits which have been realised by producers, co-partners, investors, and the wider red meat supply chain, as a result.

Beyond these existing innovation outcomes, this report also explores emerging opportunities by focussing on new or early-stage projects which demonstrate significant promise, as well as identifying the key market growth investment opportunities that help inform MLA's future innovations.

Critically, the priorities outlined in this report align to the overarching objectives of both the MLA *Strategic Plan 2030* and the Red Meat Advisory Council's (RMAC) *Red Meat 2030*.

How value chain innovation is funded

The projects showcased in this report have been predominately funded via the MLA Donor Company (MDC) with co-investment from commercial partners. In addition, modest contributions from processor and producer levies are sometimes used to seed fund other relevant selected work.

MLA also acknowledges the Australian Government's contribution of matching funds which supported the research and development activities detailed in this publication.

MLA has also successfully leveraged Commonwealth funds, such as the Rural R&D for Profit scheme, and supported program partners to secure Cooperative Research Centres (CRC) and Australian Research Council (ARC) grants.

Where relevant, additional funding sources are noted throughout the body of this report.

▶ Scan or click the QR code to learn more about MDC and access information about funding applications.



Value chain innovation

Beyond its rich farming tradition, today's red meat industry is a sophisticated data-rich sector where science and innovation play an increasingly important role.

The industry, and the markets in which it operates, have changed significantly over recent years, with trading environments becoming increasingly complex and competitive.

Over this time, MLA has focused on transforming innovation into impact by working with producers and industry partners to test, adapt and evaluate novel technologies and value chain designs within early adoption test environments.

This work has impacted many aspects of the industry and provided red meat producers with a range of benefits, including:

- enablement of new value-based trading models underpinned by the emergence of objective measurement technologies which can now deliver improved trait measurement and grading accuracy
- de-risked adoption of on-farm digital and data solutions which have improved safety, productivity and profitability
- development of new products to which drive full-carcase utilisation while capturing premium prices for low-value cuts and by-products
- ensuring individuals, enterprises, communities and entrepreneurs have the technical, leadership and innovation capability required to secure a prosperous future for the industry
- a suite of food technology innovations to extend shelf life and increase size, scope and value of market access
- realisation of the robotics and automation capability required to secure a commercially sustainable processing sector.

Outcomes

This approach has helped MLA de-risk investment and paved the way for many red meat innovations to be more rapidly proven, commercialised and successfully integrated within the value chain.

Transitioning to commercialisation

One compelling example of successful commercialisation is MLA's long-standing partnership with the Australian Meat Processing Corporation (AMPC) and various processing technology providers.

With MLA's investments in off-farm productivity spanning more than two decades, this collaboration has delivered major advancements in robotics and automation, driving significant improvements in productivity, safety and sustainability across the processing sector.

As a result, many of these technologies are now fully commercialised and, in 2025, MLA was able to transition the ongoing management of this processing automation program to AMPC. Read more about this project on page 30.

This report provides further examples of how MLA has supported innovation partners to commercialise transformational technology for the benefit of producers and outlines how it will continue this work in the future.



Returns on investment

Research demonstrates that the outcomes from R&D investment will often benefit the wider value chain, with modelling suggesting that a 1% lift in processing productivity can deliver triple the benefit to producers. Similarly, improvements in on-farm productivity may benefit processors¹.

Between FY21–25, MLA invested \$152 million in red meat value chain innovation, with a combination of producer and processor levies accounting for 10% of that total.

By enabling MDC research and development funds to be pooled with partner and technology provider investment, and minimal levy contributions, MLA has been able to manage cost and project risk more effectively – delivering stronger outcomes and extracting optimum value from the investment of government and levy payer funds.

This has enabled MLA to deliver the innovation impacts highlighted in this report, as well as leaving MLA in a strong position to pursue the key ambitions outlined in MLA's *Strategic Plan 2030*.

MLA INVESTED

\$152M



IN RED MEAT VALUE CHAIN
INNOVATION BETWEEN FY21–25

Strategic alignment

In line with its strategic objectives, MLA will continue to invest in research and development designed to secure the long-term profitability, resilience and sustainability of the industry.

Many of the projects discussed in this report (together with our ongoing work in this area) will play an important role in helping MLA realise its 2030 ambitions.

By continuing to work with producers, partners and stakeholders to unlock value creation and capture across the supply chain, MLA is helping ensure the wider industry will be better prepared to capitalise on new opportunities and respond to emerging challenges.

Importantly, red meat producers will be the long-term beneficiaries of this work as MLA expands its strategic focus on value chain innovation across three key priority areas.

Value-based marketing

The advances made in product leadership, processor automation and objective measurement will be key to embedding value-based marketing (VBM) across the supply chain – ensuring the industry is delivering what consumers value and rewarding those who do it best.

To this end, MLA investments in value chain innovation will continue to focus on objective measurement technologies while also incorporating meat science research and development.

Through a focus on enhanced trait feedback, objective measurement will provide producers with vital guidance to inform their genetic decision making and improve breeding outcomes in alignment with market demands.

👉 Scan or click on the QR Code to learn more about MLA's approach to value-based marketing.



Product innovation

Through its High-value food frontiers sub-program, MLA has used market insights to identify innovative product and packaging opportunities to help industry capture new markets and increase carcase value.

Capability building

The Innovation capability building program will continue supporting the development of a skilled workforce and create the leadership and value chain design required to accelerate and invest in innovation at multiple level across the supply chain, ensuring the industry will be well placed to move forward.

Rewarding producers and brand owners with value-based returns

MLA has worked with industry over many years to drive the advancement and adoption of objective measurement (OM) technologies, which are now delivering enhanced grading accuracy and improved decision making ability.

Informed by data and supply chain transparency, OM technologies (which can reliably measure or estimate key carcass traits such as lean meat yield (LMY), eating quality (EQ) characteristics and health attributes) are now critical enablers of red meat value creation and capture.

The development of commercial-ready objective measurement solutions (including enabling systems and processes) will support real-time decisions from data. This will allow producers and processors to make data-informed decisions based on carcass or live animal feedback.

This technology will be pivotal to realising the full potential of MLA's value-based marketing (VBM) initiative and ensuring industry is best placed to provide the quality products consumers value and demand – and reward the producers, processors and brand owners who deliver it best.

Identifying and evaluating OM technology

In 2016, with Rural Research and Development for Profit funding, MLA began working with the Australian Livestock Measurement Technology (ALMTech) program to find and evaluate OM technology that could accurately identify and measure new carcass and live animal traits, predict boning cutting lines, and detect carcass disease or defects.

The ALMTech program identified and validated three new traits that can now be traded upon for added returns:

- lamb lean meat yield percentage (LMY%)
- lamb intramuscular fat percentage (IMF%)
- beef intramuscular fat percentage (IMF%).

Each trait has been endorsed by the Australian Meat Industry Language and Standards Committee (AMILSC) and is now included in the AUS-MEAT language.

Producers who receive this detailed carcass trait data can apply it to their on-farm decisions around breeding, feeding and finishing, to produce animals that align with the demands of higher-value markets.

For the Australian beef industry, this approach presents an opportunity to capture an estimated \$130 million per year in additional value. A similar opportunity exists for the lamb industry, with early adopting lamb producers and processors already enjoying improved profits, quality and consistency of supply².

When ALMTech II concluded in 2024, it was estimated that live animal and carcass-based OM could deliver a net benefit of \$1.38 billion to the beef industry and \$497 million to the sheepmeat industry between 2025–2045³.

However, to ensure these ambitious returns are realised, digital platforms capable of linking production, genetics and market data will be required.

MLA is now working with supply chain partners and technology providers to ensure real-time feedback and predictive analytics are enabled, providing the information producers (together with processors and brand owners) will need to align their on-farm decision making with market demand.

🔍 Scan or click on the QR code to read more about the ALMTechII program outcomes.



LIVE ANIMAL AND CARCASS-BASED OM COULD DELIVER



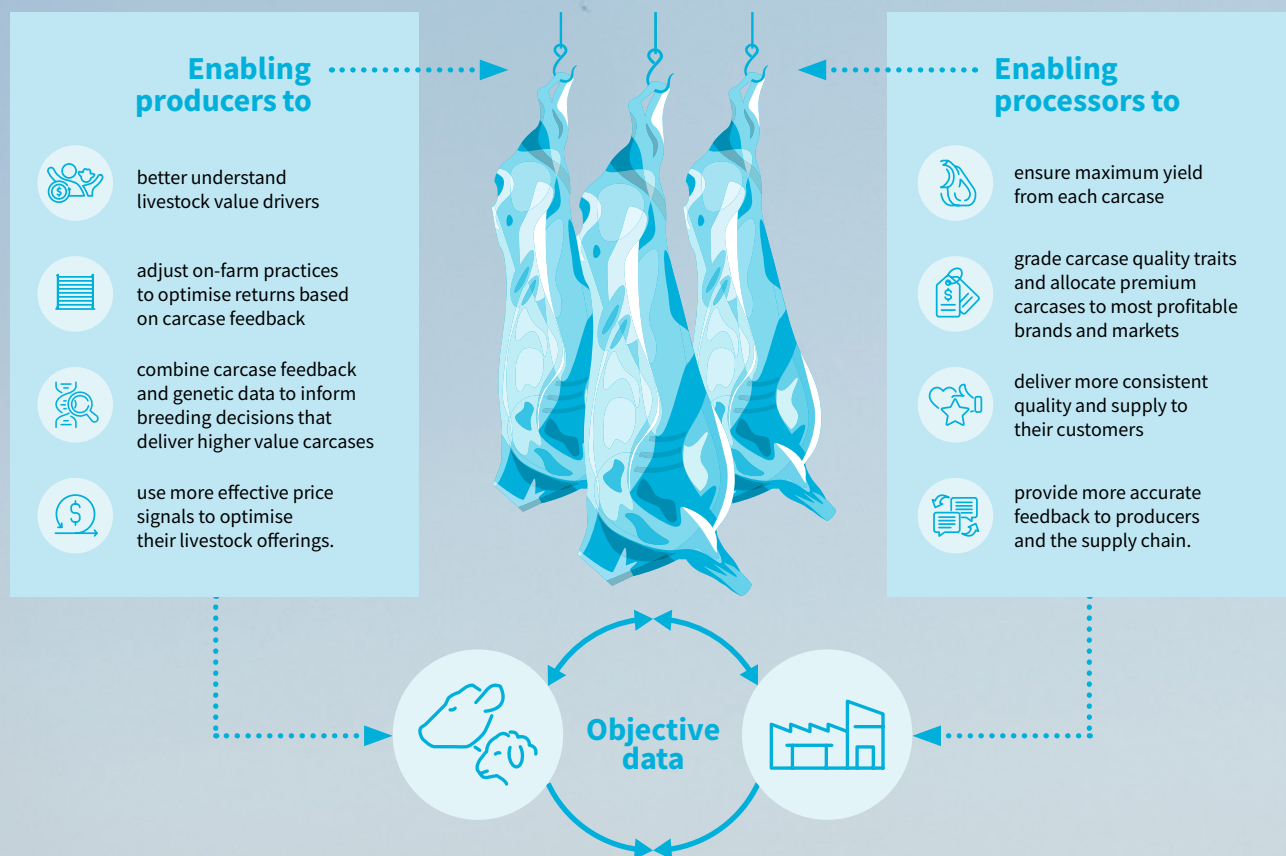
\$1.38B

\$497M



**net
benefit
by 2045**

Objective measurement improves decision making across the supply chain



▼ Gundagai Lamb suppliers SJ McDonnell and Sons are helping unlock new premium markets for Australian lamb, using objective carcase data to improve marbling, eating quality and flock performance. Through detailed feedback on every lamb processed, producers can identify top-performing genetics and management practices, supporting more consistent, higher-value lamb for chefs, consumers and the value chain.



Developing and commercialising the technology

MLA has worked with technology and processing partners to support the testing and AUS-MEAT accreditation of a range of beef and lamb OM technologies.

This early adoption program comprised 14 standalone projects and tested 15 different OM solutions across more than 35 Australian red meat supply chains. These projects are helping de-risk early adoption and deliver insights to encourage deployment across the wider industry.

The OM program has helped industry explore many of these technologies, including:

MEQ Probe

A fibre-optic hyperspectral (spectral analysis) probe, paired with machine-learning models, to objectively measure eating quality traits such as marbling and IMF% in meat at line speed.

Miniprobos

A miniaturised needle-scanner that measures IMF% in lamb carcasses using technology derived from optical coherence tomography (OCT) more commonly used in medical imaging of human eyes and hearts.

Frontmatec Q-FOM

A hand-held camera that grades a range of eating quality and yield attributes at the rib eye grading site in beef carcasses.

Microwave

A hand-held, non-invasive microwave sensing system that uses low-power, non-ionising electromagnetic waves to measure fat depth and IMF% in live animals and hot lamb carcasses.

E+V (Marel) VBS2000

A full carcass side vision system installed at the end of the slaughter line using high resolution industrial cameras and controlled LED lighting together with video image analysis software to measure yield traits in beef carcasses including LMY, conformation and retail cut weights.

InMR Marbl™

Uses single-sided nuclear magnetic resonance (NMR), the same underlying physics as MRI, to non-invasively and directly measure IMF% in live animals and lamb carcasses.

MEQ Camera

Uses AI-driven computer vision, combining video and 3D depth sensing to objectively grade marbling and yield traits from the cold beef carcass cut surface.

E+V (Marel) VBG2000

Uses computer vision of the rib eye grading site and applies image-analysis algorithms to grade marbling and yield traits in beef carcasses.

SAR DEXA

A Dual-Energy X-Ray Absorptiometry (DEXA) device, that directly measures internal lean, fat and bone composition of each carcass and is accredited to output the LMY trait in sheep.

SOMA

A near-infrared spectroscopy (NIR) device, that analyses reflected light from the meat cut surface to predict IMF% of lamb carcasses.

Meat Image Japan (MIJ)

Uses optical imaging of the rib eye cut surface combined with computer image analysis to objectively grade quality and yield traits of the beef carcass grading site.

While some OM technology trials have been completed, there are still a number ongoing across both the beef supply chains.



🔍 Scan or click the QR code to read more about these early adoption technologies.



▶ A new fibre-optic imaging needle developed by Miniprobos to measure meat quality, detects IMF% – the key driver of juiciness and flavour. Developed in collaboration with MLA and The University of Adelaide, this technology allows meat processors to quickly and accurately identify premium products.

Carcase measurement

Beef

The integration of OM technologies will enhance the well-adopted Meat Standards Australia (MSA) carcass grading measures and support the shift toward real-time data-driven decision making. Modelling suggests it could deliver \$50.2 million in additional value for the cattle industry by 2030, rising to \$174.5 million by 2040⁴.

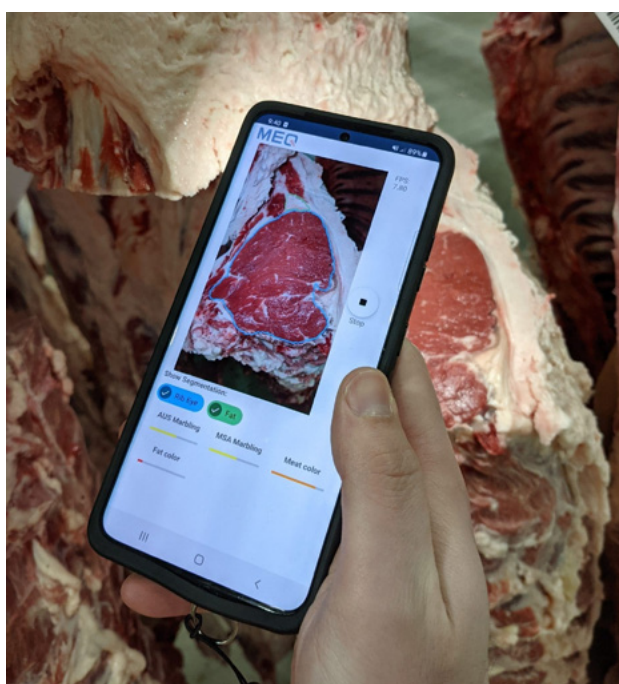
Validation and accreditation of beef OM yield technology is ongoing. The results of these trials will be evaluated against computed tomography (CT) scans that are the gold standard in accurate assessment of LMV.

Cold carcass grading

In 2025, JBS Australia became Australia's first beef processor to receive Facility Objective Carcass Measurement Device Approval from AUS-MEAT for the MEQ Solutions cold carcass grading camera.

The camera replaces traditional visual assessment methods with technology-enabled eating quality predictions. This is providing improved uniformity in overall eating quality and visual traits such as marbling, both of which are key requirements for product positioning in both domestic and international markets.

▶ Scan or click the QR code to learn more about the MEQ cold carcass grading camera



▲ The MEQ Camera uses advanced computer vision and dual-camera technology to objectively capture marbling, rib eye area and other key carcass traits, helping processors improve grading consistency and carcass value.

OM-LED MSA CARCASS
GRADING COULD DELIVER
\$174.5M BY 2040
IN ADDITIONAL VALUE



Hot grading

Traditional MSA grading relies on AUS-MEAT chiller assessment conditions. Hot grading capability would enable processors to sort and group carcasses into 'boning runs/brand programs' at a much earlier stage, enabling efficiency gains and better alignment to market specifications.

With hot grading trials of OM technology delivering accurate and repeatable real-time data, processors and brand owners can better segment products, tailor offerings to specific market needs and optimise value across the carcass.

MLA will partner with processors and technology providers to evaluate an OM-enabled hot grading pre-sortation protocol for beef processing.

The project will evaluate whether individual carcass feedback can be integrated into company management systems, to enable:

- producer feedback on quality and animal health measures
- efficient pre-chiller product sortation with products of similar quality/yield assigned to boning runs aligned to market specifications
- hot carcass measurement of marbling, saving time and allowing processors to channel carcasses to high value markets.



▲ Hot grading measurement provides individual carcass marble scores within two hours of slaughter, supporting same-day chiller sorting, boning runs and market allocation while reducing energy and chiller space costs.

Sheep

The installation, calibration and monitoring of DEXA systems across a number of processors have enabled the delivery of world-first value-based pricing models for sheep.

▶ Scan or click the QR code to read more about DEXA devices for lamb OM.



Enabled by this technology and the advent of multiple accredited OM devices to measure both IMF% and LMY% on individual carcasses, MSA launched the world's first sheepmeat cut-based predictive eating quality model in 2024.

Once adopted, this model will enable processors and brand owners to sort carcass cuts based on eating quality. This will deliver significant value capture across the supply chain – a process that is now possible due to MLA's investment in OM devices capable of measuring IMF% at chain speed.

▶ Scan or click QR code to read more about how the model captures more value.



Understanding the value proposition

While the OM value proposition will vary depending on the structure of each particular supply chain, modelling demonstrates significant returns are possible.

For instance, in a lamb supply chain, modelling indicates additional value realisation of \$9.15 per head through reduced processing costs, optimised carcass value, and improved feedback – with producers capturing around 30% of that value uplift.

Across a multitude of beef supply chains, the benefits could be anywhere from ~\$15/head for grassfed beef to ~\$560/head for grainfed beef with high marbling.

MLA is happy to answer questions and welcomes discussion with prospective partners about projected value propositions for specific supply chains.

▶ Scan or click the QR Code to learn more about MLA's new OM-enabled value propositions for carcass and live animal scenarios.



New eating quality predictor

Already a proven enabler of LMY measurement and robotic cutting, preliminary analysis by Murdoch University suggests DEXA may also be a powerful, independent predictor of lamb eating quality.

The research found that when DEXA scans were compared to consumer sensory data across four flocks, they demonstrated a consistently negative correlation between bone density (known as DEXA bone R values) and MSA MQ4 scores (which rate tenderness, juiciness, flavour and overall liking), especially in loin, rack and hindquarter cuts.

With six DEXA systems currently installed in Australia, accounting for more than 50% of lambs processed annually, this discovery could further evolve the MSA sheepmeat model and strengthen the case for OM technologies to be integrated with commercial grading systems.

Further work is ongoing to validate the correlation between DEXA bone R values and MQ4 scores.

▶ Scan or click the QR code to read more about the potential for DEXA bone R to be a game changer for sheepmeat eating quality.



*MSA MQ4 scores relate to ratings of tenderness, juiciness, flavour and overall liking.

▼ Comparative DEXA images of an individual lamb carcass as the natural log values of the low-energy image (left), the pixels allocated as bone-containing pixels using the old bone-detection method (centre), and the pixels allocated as bone-containing pixels using the new bone-detection method (right).



From "Accreditation of in-abattoir Dual Energy X-ray Absorptiometry scanning apparatus to predict lamb carcass composition in Australia," by S. L. Connaughton, A. Williams, and G. E. Gardner, 2025, *Meat Science*, 220, Article 109707. <https://doi.org/10.1016/j.meatsci.2024.109707>

Turning carcase feedback into value

Objective measurement and carcase feedback are giving lamb producers an unprecedented view of what drives value in their livestock and two Australian programs show how that information translates into real returns, whether the goal is building a premium brand or rewarding productivity directly.

Building a premium brand

Using OM-enabled carcase feedback to provide an in-depth analysis of IMF levels, Kinross Station and Endeavour Meats have been able to deliver a world-first 7%+ IMF grading across their premium KS7 lamb product.

The brand has used feedback on consumer demands for quality, provenance and a luxury eating experience to inform breeding and feeding decisions on farm.

▶ Scan or click the QR code to read how MLA's Co-innovation Partnership supported the brand's genetic decision making.



Where that feedback is adopted, Kinross Station is now seeing flocks in their supply chain with up to 60% of lambs meeting KS7's stringent specifications – resulting in a significant payoff for their supplying producers and the consistency of supply premium markets demand.

▶ Scan or click the QR code to read how the ultra-premium Kinross-brand has used OM and carcase feedback to capture a premium market.



▶ KS7's IMF delivers a luxurious mouthfeel, superior juiciness, and depth of flavour that rivals the best cuts of beef, making it ideal for premium dining experiences.



Producer productivity and profitability

Gundagai Meat Processors (GMP) was an early adopter of value-based pricing, with the GMP Lamb program paying a premium for carcasses that score highly on their incentivised pricing grid based on IMF%, LMY and animal health measures.

▶ Scan or click the QR Code to read how MLA's Co-innovation Partnership with GMP supported value-based returns for producers.



GMP Lamb producers receive carcase feedback via the company's proprietary dashboard, enabling them to identify the key value drivers in their livestock and make breeding, feeding and management decisions to maximise future returns. Animal health feedback is also enabling issues such as liver fluke to be identified and effectively treated at a very early stage.

▶ Scan or click the QR code to learn more about GMP's program and how one producer is earning an additional \$1.50/kg for their Merino lambs.



◀ Having the right data is key when it comes to assessing the quality of a carcass, and GMP Lamb are leading the way thanks to their industry-first GLQ+ score and their innovative technologies.

Disease and defect detection

At present, inspection for internal disease requires meat inspectors to slash offal, with processors acknowledging the downgraded value of slashed offal, and the significant yield losses due to mis-grading or misdiagnosis of healthy offal.

OM technologies could soon change this by enabling accurate disease and defect detection in lungs, livers and kidneys – potentially reducing disease incidence by 10–30% and delivering between \$800,000 and \$6.42 million in additional value to the supply chain each year.

The use of automated scanning of offal (alongside manual skilled inspectors) could help improve efficiency and reduce demand for skilled workers. Early trials of automated disease and defect detection technology have demonstrated ~90% accuracy⁵ and this improved data could enable producers to reduce the incidence of disease via changes to on-farm management practices, potentially delivering enhanced offal yields.

UP TO **\$6.4M**
IN ADDED ANNUAL VALUE
WITH OM-LED DISEASE
AND DEFECT DETECTION

P&P Optica hyperspectral camera

While used extensively across the chicken and pork industries, the use of the P&P Optica hyperspectral camera as a disease and defect solution for beef offal is yet to be commercialised.

However, recent trials of the device have demonstrated accurate detection of several disease and defect states in up to three types of beef offal running at commercial line speed.

The technology module can be integrated into existing over-belt operations and works autonomously across multiple locations, with processor feedback enabling a number of contexts in which the device could be effectively leveraged, including:

- improving the accuracy and specificity of health feedback data to enable feedlots and producers to identify and address undetected animal health issues in their livestock and make changes to reduce incidents and improve future carcass quality
- helping bridge the gap between food safety inspections and disease/defect detection by providing specificity around any disease or defects
- improving efficiency for meat inspectors and potentially reducing the burden of inspection costs.

In 2026, MLA will commence work on a 12-month project to incorporate this technology into an existing offal inspection process, enabling our processing partner to collect increasingly accurate data as the system evolves. This will help close existing knowledge gaps and inform the full commercial design of a robust and effective solution.

Scan or click the QR code to learn more about how the P&P Optica hyperspectral camera could help transform disease and defect detection in beef offal.

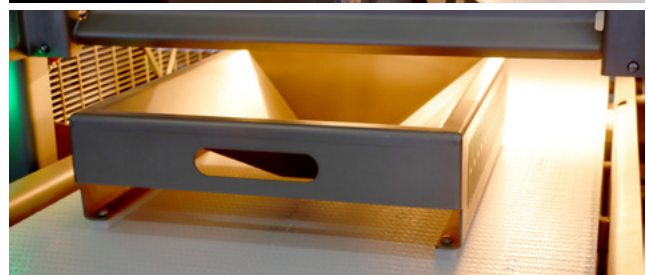


► Current offal health monitoring at processors relies on visual and manual assessment by meat inspectors, a costly and labour-intensive process. The P&P Optica hyperspectral camera can collect offal health data on the processing line in real-time, to partially automate offal health scoring in-abattoir and provide greater consistency, accuracy and integrated traceability.

MEXA hyperspectral imaging

A trial of this dual-sensor device is exploring its potential to deliver automatic sorting of organs and disease detection to enable real-time animal health feedback to producers.

Scan or click the QR code to understand the projected value of OM technology in detecting disease and defects in offal.



Live animal measurement

Development and early adoption of non-invasive live animal objective measurement technologies are demonstrating improvements in production efficiency, sustainability and animal health attributes.

By using live animal measures to predict carcass traits such as marble scores, it may be possible to better assess and sort animals into pen allocations during feedlot induction to suit end-market requirements. This will enable more efficient sorting and feeding strategies to deliver productivity gains, cost reductions and measurable sustainability outcomes.

Helping feedlot management measure up

Trials of MEQ Live technology are currently underway at multiple beef feedlots and abattoirs.

The technology is already showing promising results across a range of traits, including Marble Score, and has the potential to maximise production efficiency without sacrificing quality.

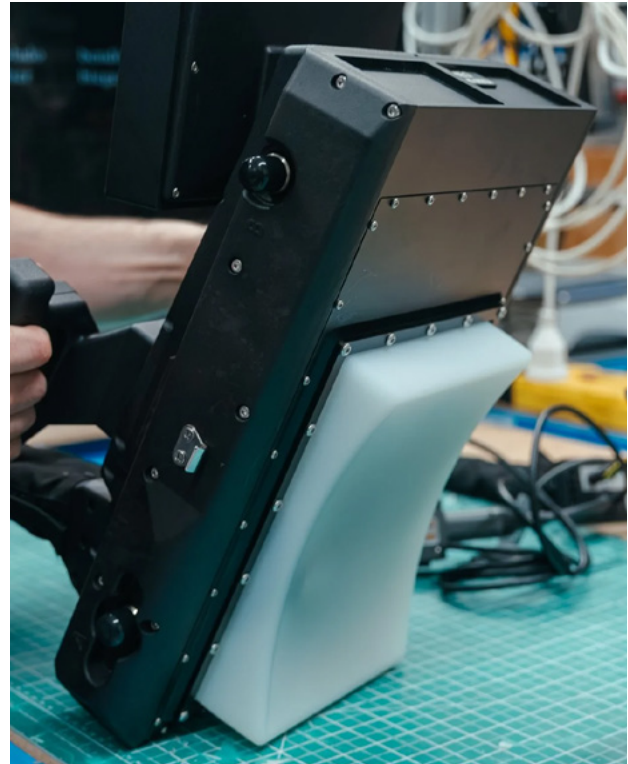
By capturing highly accurate data and combining it with advanced machine learning algorithms, MEQ Live enables feedlot operators to rank cattle from induction – empowering data-driven decisions that can inform optimised feeding and management decisions⁶.

It supports sustainability by helping to reduce the average days on feed, with an independent report by EnergyLink suggesting the immediate benefits of MEQ Live when optimising feeding programs to suit predicted animal and carcass performance, would offer a 9% reduction in dry matter feed requirements across the Australian feedlot industry.

This would translate to annual savings of up to \$263.5 million and could reduce carbon emissions by up to 450,000 tonnes⁷.

Another partner, Harmony Agriculture & Food Co. has committed to incorporate the MEQ Live technology and genetic feeder check measures into its full-scale business-as-usual feedlot operations. It is expected this will help the business identify optimal processing windows and improve feedlot management, while also using the data to guide commercial breeding and genetic decisions.

🔍 Scan or click on the QR code to read about MEQ Live technology.



▲ MEQ Live brings carcass prediction into the feedlot, using live animal measurement and predictive modelling to support smarter sorting, feeding and market decisions.

Live sheep measurement prototype edges closer to commercialisation

MLA's work with inMR Measure has demonstrated that, with accurate positioning of the Marbl™ sensor, measurement of IMF in live sheep is possible.

With proof-of-concept now complete, the focus has shifted to delivering a commercially viable product. This is the first technology available capable of delivering live sheep measurement and MLA plans to continue partnering with inMR Measure to bring these products to market for the benefit of Australian sheep producers.

🔍 Scan or click the QR code to read about the emerging inMR Marbl™ sensor technology designed to measure eating quality in live sheep and cattle.



USING MEQ LIVE COULD SAVE UP TO
\$263.5M AND
 CUT CARBON EMISSIONS BY
\$450K t



Processor enablement

To unlock the full value of OM technologies across the supply chain, processors must become data-enabled with the ability to analyse, share and integrate information in real-time.

This will require feedback platforms to provide producers with individual carcase trait analysis to better inform their on-farm decision making, as well as powerful data-analytics tools to improve processing efficiency and market fulfilment.

MLA is partnering with AMPC, processors, researchers and technology providers to identify and deliver these solutions.

Individual carcase tracking

The successful adoption of individual data collection will play a vital role in the red meat industry's transition to a value-based model – delivering higher returns for red meat producers and ensuring improved consistency for processors.

Recognising its importance, MLA has projects either underway or in the pipeline to test and validate hook tracking systems for both sheep and beef supply chains.

From 1 January 2027, it will be mandatory for all sheep and farmed goats in Australia to be fitted with electronic identification (eID) devices. To leverage the individual traceability that this will enable, trials are underway in three lamb processing plants – with hook-tracking and multiple pre-chiller checkpoint platforms installed and validated to link carcase compliance data to individual eID data.



Future focus

Going forward, the OM program will consider value propositions around credentialling attributes such as wellbeing, sustainability and provenance, including:

- **Nutrient density:** Single and multi-energy x-ray systems could grade and evaluate the nutrient density of 'fifth quarter' products (such as offal, hides, blood, and bones) to help capture additional premiums when converted to high-value food and nutraceutical ingredients.
- **Validated provenance:** DNA mapping could accurately identify region of origin and enhance brand value and differentiation with validated provenance claims.
- **Grainfed versus grassfed status:** Technologies such as MEQ Probe and Ramon Spectroscopy could reliably validate the grainfed or grassfed status of cattle.

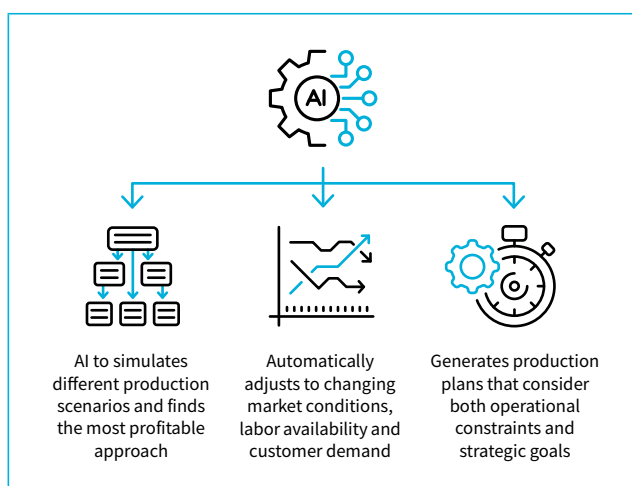
Data-enabled processor efficiency

The introduction of integrated data analytics systems and real-time visualisation of data could deliver a rapid improvement in processor efficiency as well as increased carcase yields.

MLA is partnering with the Davies Livestock Research Centre at Adelaide University to deliver Meat Logic – a new data analytics platform drawing on the carcase optimisation tools and calculators developed as part of the ALMTech project.

MLA is also working with Norwegian technology partner, Völur, to explore an AI-powered dashboard for carcase optimisation and efficiency⁸.

Figure 2: How Völur's AI platform predicts, optimises and plans with AI



Both the Meat Logic and Völur solutions will help processors and brand owners utilise carcase composition data to determine optimal cutting plans. These solutions will enable processors to define carcase value more accurately, with optimised breakdowns by cut and market providing carcase-to-carton visibility and an improved ability to meet customer demand.

As the tool matures, it will develop predictive intelligence capabilities such as accurate forecasting of livestock supply and the ability to make dynamic adjustments to cutting plans – helping processors improve procurement decisions, anticipate market trends and optimise overall efficiency.

Improving on-farm safety, productivity and profitability

Technology enablement has the potential to rapidly reshape on-farm management capability, with advances in AI, data and predictive analytics, and remote or autonomous tools all helping to deliver uplifts in productivity, efficiency and safety.

MLA's wider on-farm productivity portfolio of investments has been to identify these early-stage opportunities for digital enablement, testing and validating the technology to de-risk investment, and adoption. This will enable producers to create sustainable, efficient, safer and more profitable red meat enterprises.

Using co-funded partnership models that accelerate on-farm adoption of complex digital agriculture tools, producers are taken on the journey – increasing potential for wide-scale impact and the integration of multiple data sources to support decision making and demonstrate impact and value.

▼ MLA continues to investigate the viability of virtual fencing technology (VFT) which relies on GPS tracking to contain animals within an electronically generated boundary using wireless technologies, sensors and sensory cues



Data-driven decision making

Grazing management

MLA partnered with Cibo Labs to launch the Australian Feedbase Monitor (AFM) in 2022 – enabling producers to access near real-time monitoring of their on-farm feedbase, including ground cover, pasture status and environmental trends based on satellite imagery.

This world-first tool helps producers make better and more informed grazing decisions to improve productivity and support environmental stewardship.

In April 2026, the AFM had 5,100 user accounts that manage 6,000 producer farms covering 235 million hectares.

👉 Scan or click the QR code to learn more about the Australian Feedback Monitor.



▲ The Australian Feedbase Monitor uses satellite data to provide property-scale insights into pasture biomass and ground cover at one-hectare resolution. Updated every five days, it helps producers monitor remote areas, adjust feed budgets, and track long-term changes in pasture, ground cover and woody vegetation.

Scenario planning

MLA has partnered with Food Agility CRC and Agriwebb to develop Foragecaster.

Powered by AI and machine-learning, Foragecaster can forecast pasture growth, grazing livestock performance and farm sustainability metrics that support better on-farm planning and decision making.

The tool's predictive modelling relies on data collected from 60 million animals tracked over the last eight years by more than 12,000 AgriWebb users.

Foragecaster trials are underway with 37 producer groups drawn from Natural Resource Management regions across NSW, Victoria, QLD, SA, WA and Tasmania.

More than 515 farms have created 2,977 grazing plans via the Foragecaster's Grazing Planner and 3,249 feed plans via the Feeding Planner.

Red meat producers are engaging with Foragecaster by participating in beta trials and sharing on-farm data and feedback, which are enabling researchers to refine forecasting models and improve the tool's accuracy and usefulness for industry-wide planning.

👉 Scan or click the QR code to learn more about Foragecaster.

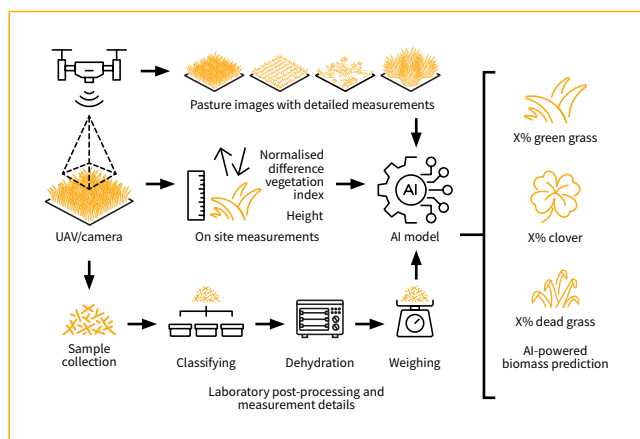


AI-informed pasture management

AI will become increasingly important in the development of ag-tech solutions and MLA (in partnership with CSIRO and Google Australia) is helping discover new and outstanding talent in this area through its support of the Kaggle CSIRO - Image2Biomass Prediction challenge.

Competitors in the Kaggle challenge are judged on their ability to train an AI model to estimate pasture availability using pasture images and detailed field measurements.

Figure 3: How Kaggle competitors train AI models



Adapted from Infographic showing how pasture imagery and data are collected through UAVs and in-field sampling, then used to train AI models [Image], by CSIRO, 2025, in CSIRO, MLA and Google launch global AI challenge to transform pasture management. <https://www.csiro.au/en/news/all/news/2025/october/kaggle-competition>

The competition received 98,375 submissions from 109 countries and the solutions identified will help producers effectively balance livestock needs with pasture regrowth to create more sustainable pastures and better support long-term land health.

👉 Scan or click the QR code to learn more about the Kaggle challenge.



De-risking ag-tech investment

MLA partnered with the Southern NSW Drought Innovation Hub to develop a web-based Return on Investment (ROI) calculator – giving producers an understanding of where on-farm ag-tech will benefit their operation and helping to de-risk their investment decisions.

Since the launch in mid-May 2025, there have been 1,339 sessions, 1,127 active users and 7,373 page views.

👉 Scan or click the QR code to learn more about the ROI calculator.



Remote technologies

To identify investment priorities, MLA has run innovation hubs to connect ag-tech providers with producer hubs and networks (such as the Romani Digital Farm, the Agtech and Logistics Hub, and Farmers2Founders).

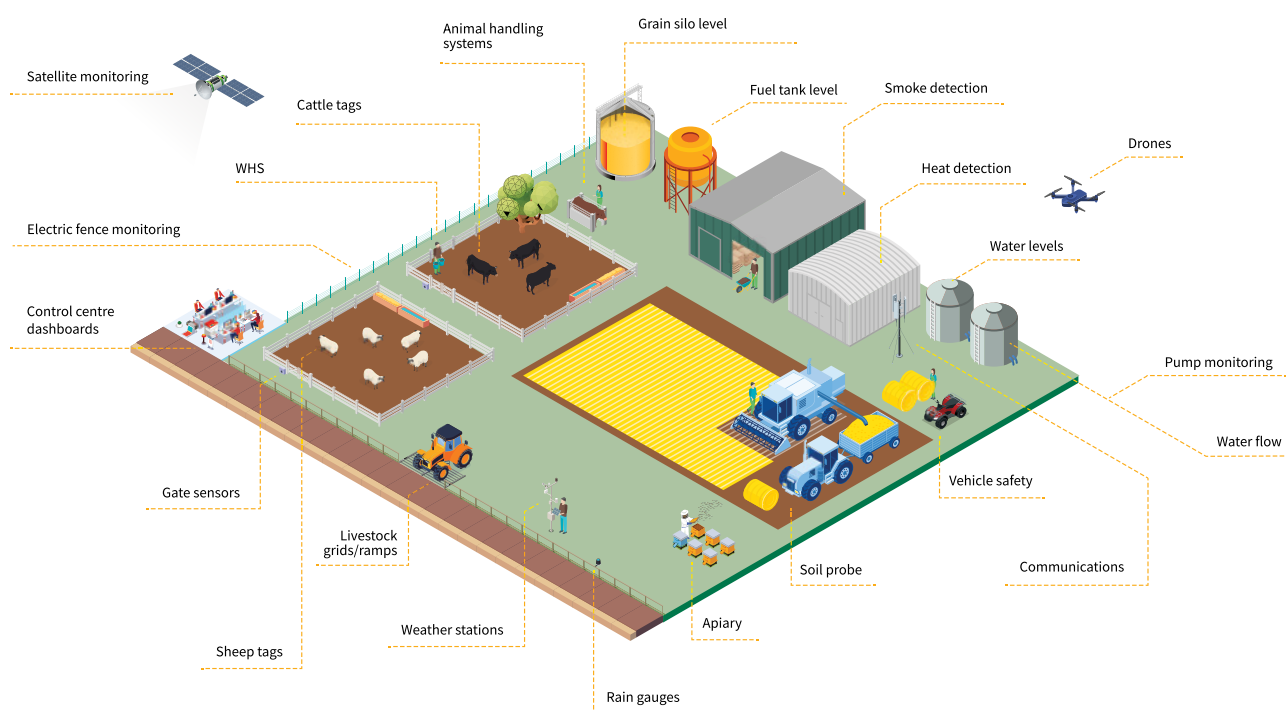
This has enabled MLA to validate key producer pain points, ground truth prototypes and identify priorities such as remote water tank and trough monitoring sensors and other on-farm solutions (such as smart walk-over weighing units and smart tag technologies) tailored to geographical and production system needs.

Participating producers have seen significant gains in on-farm productivity and data-driven decision making, particularly on remote properties with limited connectivity.

In one case, a participating producer using a remote water management product achieved a 9% increase in gross margin with a benefit-cost ratio of 2:1 and a three-year payback period.

Figure 4: Example of on-farm ag-tech

Producer hubs like the Romani Digital Farm provide pathways and opportunities for technology service providers to demonstrate what connectivity platform options were available to red meat producers.



Recognising the continued need to bridge the adoption gap, MLA will continue to focus on better understanding the barriers to adoption and supporting producers to overcome them.

👉 Scan or click the QR code to learn more about how producers have utilised ag-tech to build drought resilience.



Virtual fencing

MLA continues to investigate the viability of virtual fencing technology (VFT) which relies on GPS tracking to contain animals within an electronically-generated boundary using wireless technologies, sensors and sensory cues.

MLA is partnering with a consortium led by the University of Adelaide (UoA) that will test the technology in different terrains across three states (in both northern and southern Australia) to evaluate the potential ROI for producers, as well as assessing animal welfare and sustainability outcomes.

Together with learnings from a separate pilot being conducted by Russell Pastoral's Co-Innovation Manager, the UoA project outcomes will inform the value proposition for VFT adoption. It will also identify any potential on-farm impacts or barriers to adoption – all of which will inform an implementation guide for best practice VFT adoption.

👉 Scan or click the QR code to hear the South Australian Research and Development Institute (SARDI) partnership discuss VFT at MLA Updates.



Remote mustering

MLA partnered with Cloncurry cattle producer, Luke Chaplin, to develop and commercialise SkyKelpie – a remote mustering tool enabled by drone technology.

SkyKelpie now boasts 347 users, covering more than 2.4 million hectares and more than 500,000 head mustered.

Drone-enabled mustering has the potential to improve safety while reducing time and money spent, with the possibility of expanding its application to remotely monitor the management of livestock, pasture-invasive pests, fence lines, crops and water.

MLA continues to work with SkyKelpie in evolving this technology and its delivery of online masterclasses designed to help producers build their skills as aerial stockmen.

▶ Scan or click the QR code to read how SkyKelpie is helping transform on-farm management.



▲ SkyKelpie founder, Luke Chaplin, says what began as a tool for mustering has quickly become one for checking troughs, fence lines and pest management.



▲ An eSAT-enabled ear tag and Smart Paddock dashboard used during the 13-day Rockhampton trial, where cattle locations were transmitted directly via satellite and visualised remotely. Across the livestock-tag trials, the technology achieved an 87.1% burst success rate, supporting message delivery rates of 99% or higher, while the Rockhampton trial also highlighted the need to improve solar energy harvesting during prolonged overcast conditions.

Remote real-time monitoring

MLA worked with technology partner eSat Global to develop and trial a new low-cost, low-power satellite communication system designed for livestock ear tags and on-farm Internet of Things (IoT) sensors, enabling direct-to-satellite connectivity from anywhere in Australia.

The team conducted live-animal trials using prototype smart tags on cattle, as well as field tests of IoT devices such as water-level and soil-moisture sensors. These trials demonstrated reliable two-way communication and robust real-time reporting – proving the technology can deliver ubiquitous coverage at a much lower cost.

By 2027, the total cost of ownership for this GPS smart ear tag prototype is anticipated to be around \$15/animal annually over a five-year lifecycle, with this cost expected to reduce further once economies of scale are realised. For IoT devices such as remote water-monitoring sensors, access to satellite connectivity will cost around \$4/device annually.

Cost is one of the major barriers to digital adoption and these solutions are helping overcome that hurdle and positioning Australia's red meat producers to benefit from improved livestock management, enhanced productivity and reduced labour and monitoring costs.

▶ Scan or click the QR code to read more about the remote real-time monitoring trial outcomes.



The AgFarm digital twin

In 2026, MLA will invest in assessing the opportunities ‘digital twins’ present for Australia’s red meat industry. This virtual replica of an on-farm environment will be built around a living digital twin framework that will enable the rapid validation and de-risk modelling of new productivity and sustainability solutions and scenarios. The digital twin will be comprised of:

- an integration hub where a multitude of industry datasets will converge and live
- a simulation engine for testing ‘what-if’ scenarios to improve on-farm productivity, and/or threat risks (such as potential biosecurity incursions or pasture recovery under different climatic conditions)
- a validation environment for refining new AI models that can be compared to traditional longitudinal research.

Figure 5: A unified ‘digital twin’

The National Digital Twin for Australian Agriculture will operate as shared, sovereign digital infrastructure that connects data, research and innovation across the agricultural system, transforming fragmented inputs into trusted, decision-ready intelligence.



Eventually, a delivery channel will enable managers, agronomists, producers and researchers to access the digital twin tools and testing outcomes from the digital twin and distil them into real world outcomes.

The new digital twin will be a collaboration between MLA and the Australian Space Innovation Institute (ASII), that engages partners and suppliers from across the red meat supply chain.

🔗 Learn more about the AgFarm digital twin initiative at agsim.au

Capturing premium prices for low-value cuts and by-products

At present, 20% of the carcase delivers 80% of the value derived from beef and sheepmeat – with much of what's left viewed as under-valued parts or by-products that must either dispose of or render and sell for a nominal amount.

To reduce organic waste, maximise carcase yield and capture new markets, MLA has remapped the carcase to understand its high-value opportunities and identify innovative product concepts and processing solutions. This is helping reverse the existing wealth-to-waste ratio and boost value chain profitability through expanded carcase utilisation.

In response to the trending consumer focus on health and wellness, MLA has partnered with a number of brands to transform low-value 'fifth quarter' products (such blood, bone, offal, trimmings and hides) into high-value health supplements, foods and skincare.

Partnerships to create value

Through new and existing partnerships, MLA will continue to identify and commercialise opportunities to create value-added 'fifth quarter' products in domestic and overseas markets⁹.

Similarly, advancements in food technology and ingredients present opportunities for industry partnerships to support an incremental growth in demand for Australian red meat via innovative new solutions for ready-to-heat or fast food, service-ready products.

▼ Through an MLA partnership, Chief Nutrition successfully tested and launched collagen protein and dried beef bars, demonstrating how cattle hides and low-value red meat cuts can be transformed into premium snack products that create significant additional value and demand for industry.



Nutraceuticals

GLOBAL NUTRACEUTICAL
MARKET VALUE (2020)

\$320B



DEMAND FOR NUTRACEUTICALS
FORECAST
TO GROW
BY 2030 **7.6%**

In 2020, the global nutraceutical market was valued at US\$320 billion and demand for nutraceuticals (such as dietary supplements and functional foods) is forecast to grow at 7.6% from 2025–2030.

Red meat organs and glands are rich in proteins, peptides, vitamins and minerals, as well as containing a range of high energy metabolism and bodily function bioactive compounds such as carnitine, taurine, creatine, glucosamine, sulphate, albumin and collagen.

This makes these ‘fifth quarter’ products the ideal ingredient for a range of nutraceutical products. MLA has partnered with several nutraceutical brands to capture this untapped value and commercialise a range of products that retain these nutritional benefits.

Bone broth

Beef bones can account for up to 20% of an animal’s liveweight and are typically treated as a waste by-product and converted into low value products such as tallow and bone meal.

In June 2024, the average price of 50% meat bone meal (MBM) was valued at \$0.52/kg. Converting this to a nutritionally dense health and wellness product could generate up to \$40/kg – delivering 77 times the value of the raw product (excluding production, packaging and any associated marketing costs)¹⁰.

MLA partnered with Highlands Natural to develop, test and market a premium broth brand that realised 18 times the value of the bones used to create the broth, demonstrating the product’s viability as a new red meat revenue stream.

➔ Scan or click the QR code to learn more about beef bone broth value add opportunities or read MLA’s *Beef Bone Disposition Australia 2024* industry review at mla.com.au/beef-bone-disposition



Spray-dried offal

Under the banner of Kilcoy Nutrition, MLA partnered with Kilcoy Global Foods to develop and launch a range of spray-dried beef organ supplements.

Depending on the organ, freeze-dried powders can attract 100–400 times the margin of rendered offal and 5–15 times the margin of frozen.

➔ Scan or click the QR code to learn more about the the Kilcoy Nutrition strategy.



▼ Kilcoy Nutrition’s spray-dried powders are produced quickly and efficiently through a gentle process that preserves product efficacy, improves bioavailability, and delivers super-fine, stable particles with a reduced carbon footprint.



Wealth from hides

Research shows that collagen has strong appeal, particularly among Gen Y/Millennials, Gen X and the high-income earner segments, with more than half of global consumers believing collagen has positive impacts on health and 55% seeing it as an appealing beauty solution.

This is reflected in the size of the global collagen market, which had an estimated value of \$US21 billion in 2024 with a compound annual growth rate (CAGR) of 9% until 2029.

By 2035, it's estimated that 6.5 million hides would be required to meet annual demand.

Collagen

Beef

Australia produces around eight million cattle hides and one million calf skins annually. A steady decline in the global leather market is resulting in many of these needing to be disposed of, or sold for a nominal amount.

At the same time, the demand for collagen products driven by global wellness, beauty and fitness trends continues to grow exponentially.

Recognising this opportunity, MLA partnered with Naturally Bovine Australia (NBA) – Australia's first state of the art collagen processing facility – to help increase Australia's collagen annual production capacity to 700 tonnes.

NBA uses proprietary extraction technology developed by Organic Tech Holdings to transform freshly processed beef hides into high grade, hydrolysed collagen peptides.

Ovine

Australia produces around 32 million sheep skins annually. The production of organic ovine collagen will help reduce the cost and sustainability impacts of sheep skin (and cattle hide) disposal, while enhancing carcase value.

Based on a shorn Merino sheep pelt weight of 1.2kg, the opportunity potential for Australian ovine collagen hydrolysate by 2023 equates to 3,600 megatonnes (Mt) or almost 10% of the predicted global collagen shortfall.

At a market price of \$30,000/Mt, this could translate to a significant annual revenue of \$1 billion for the Australian sheep industry without having to grow or slaughter any extra animals¹¹.

High value collagen and keratin concentrates are also in high demand for a range of food, nutraceutical and cosmetic products. Ovine collagen can also be used to produce hyaluronic acid (used in a wide range of skincare, cosmetics and medicines), which could be an area MLA pursues as it is projected to reach a global market value of US\$16.8 billion by 2030¹².

Global collagen opportunity unlocked

MLA partnered with Freeze Dried Industries (FDI) to produce human-grade collagen protein powder via an organic extraction process. This has enabled it to launch 'Organic Collagen Australia' – a range of world-first, certified organic skincare and supplements sold in Australia and the United States.

FDI's process can use any quality of sheepskin and, by guaranteeing a minimum price for its skins, it seeks to capture a larger market share of the Australian ovine collagen market.

MLA has also supported FDI to successfully extract and produce beef collagen.

🔍 Scan or click the QR code to learn more about MLA's collaboration with FDI.



Understanding Australian red meat's role in the future of health and wellness

Not only is red meat a primary source of high-quality protein, it provides at least eight different vitamins and minerals, a variety of bioactive substances, as well as choline and omega-3s.

This nutrient density makes beef, lamb and goat meat valuable components in any healthy diet and, for consumer over 65, it has been associated with increased longevity and improved quality of life – helping older adults ‘make the most of every bite’.

▶ Scan or click the QR code to learn more about red meat's role in supporting the future of health and wellness.



Snack foods

With global market demand for meat snacks estimated to hit \$261 million by 2035, MLA partnered with Chief Nutrition to test and successfully launch a range of collagen protein and dried beef bars.

Manufactured using cattle hides and low-value red meat cuts, these products have demonstrated the potential for beef snacks to create significant additional value and demand for industry.

For example, raw beef sells for around \$11/kg while value-added beef snack products can sell for more than \$70/kg. While yields and manufacturing costs need to be considered, this scenario provides almost seven-fold increase in value compared to the raw product.

Similarly, an average hide sells for around \$1/kg, while a value-added beef collagen product could retail for more than \$100/kg, potentially delivering a 100-fold increase in value compared to the raw product.

▶ Scan or click the QR code to learn more about opportunities for bovine collagen and other value-added Australian red meat products.



Texture modified foods

Good nutrition is critical for ageing populations and a common complaint across the aged care sector is that more than 50% of residents are malnourished, with a similar number suffering from dysphagia (difficulty chewing or swallowing).

This challenge is reflected in the global demand for texture modified food (TMF), which was valued at USD14.9 billion in 2023, with a predicted CAGR of 5.5% until 2032.

In 2024, estimated TMF demand in Australia was 146 million meals worth \$1.752 billion (based on two meals per day per sufferer at a retail value of \$12/meal) – delivering a value multiplier of 7.7 when compared to the raw product.

Identifying this opportunity, MLA partnered with Care Food Co to manufacture and sell a range of fresh meals containing red meat protein that had undergone high-pressure processing (HPP) to make it easier to chew and more bio accessible. HPP was pioneered by MLA in 2010 and if commercially proven, this project will demonstrate the potential to transform low-value red meat trimmings into high-value foods.

▶ Scan or click the QR code to learn more about delivering red meat to an ageing population.



Helping overcome non-tariff trade barriers

Australia is one of the world's largest exporters of red meat, with more than 70% of its raw, cooked, cured, fermented and dried meat products exported, via chilled or frozen supply chains to more than 100 international markets annually.

In recent years, global demand for Australian red meat reached record levels, with 2.24 million tonnes exported in 2025.

Behind each international shipment sits a complex web of technical barriers to trade including regulations, standards and conformity assessments. Australian exporters are required to address these, with the Australian Meat Industry Council (AMIC) leading policy and advocacy in this area.

Overcoming some of these barriers will require identifying new ways to maintain a reliable and extended shelf life (such as sustainable packaging, supply chain refrigeration and traceability), while also responding to evolving consumer expectations around health and sustainability.

MLA is helping to address these existing challenges as well as anticipate new opportunities to extend shelf life, minimise food waste and identify world-first solutions to capture new markets and remove non-tariff trade barriers.

In recent years, MLA has transitioned leadership of key food safety initiatives related to boning room operations to AMPC.

▼ MLA's Red Meat Packaging Stewardship Framework is helping the red meat and packaging industries invest in sustainable packaging solutions that protect product quality, support shelf life and maintain access to valuable global market.



RED MEAT
EXPORTS TO
GCC COUNTRIES

\$1.58B **↑↑57%** FROM
FY23

Sustainable packaging

In 2023, recognising the vital role packaging plays in market access, MLA delivered the Red Meat Packaging Stewardship (RMPS) Framework. By embracing a product stewardship approach, MLA and its members demonstrate leadership in the evolving frontier of sustainable packaging and Commonwealth-mandated packaging regulation. This proactive stance not only helps navigate emerging regulations but also fosters innovation and circularity within the industry, ensuring a more sustainable future for Australian red meat production and packaging..

🔍 Scan or click the QR code to learn more about the RMPS Framework.



Extended shelf life solutions

MLA's cold chain management tools support the shelf life claims of both domestic retailers and exporters – boosting consumer confidence and increasing revenue by reducing unnecessary product loss.

This suite of predictive tools includes the MLA Meat shelf life calculator, the Refrigeration Index and the Refrigeration cost and emissions calculator. The benefit of adopting these tools across the beef and small stock supply chains in FY25 alone was estimated at \$6.18 million.

Since 2023, MLA's market access calculators have been used more than 1,200 times with over 20% of users based outside Australia.

Shelf life calculator

The MLA Shelf life calculator is a free tool that enables meat processors and exporters to validate quality and reduce wastage across diverse cold chains. Its algorithm accurately predicts the shelf life of retail-ready beef and lamb products across a range of packaging options, including overwrap, thermoformed packs, modified atmospheric packaging and vacuum packs.

For many brand owners, the use of both MLA's Shelf life tool and the MSA Eating Quality pathway continues to provide an integral baseline against which new innovations and product lines can be benchmarked.

🔍 Scan or click the QR code to access a spreadsheet or online version of the Shelf life calculator.



Expanded access to the Middle East

In 2020, MLA's Shelf life calculator demonstrated that chilled Australian red meat exported to Saudi Arabia had a longer shelf life than previously thought – proving the existing 70-day limits could be safely extended to 120 days for beef, and 90 days for sheep and goatmeat¹³.

In 2023, these limits were unilaterally adopted by the Gulf Cooperation Council (GCC) (comprising Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) and this decision enabled red meat products to be shipped to the region by sea – reducing the transport cost by around A\$3/kg (\$1.90).

In FY25, the value of Australian red meat exports to GCC countries was \$1.586 billion – a 57% increase on the FY23 figure of \$1.008 billion¹⁴.

Safe handling guidelines

While the substantial research undertaken to establish MLA's market access calculators has gone on to inform future projects (such as the *Dry Aged Beef and Sheepmeat Guidelines*), it's worth noting that leadership of key food safety initiatives within boning room operations has now fully transitioned to AMPC.

In 2025, the Australian Meat Industry Council released the *Guidelines for the Safe Manufacture of Smallgoods 3rd edition*, which builds on the *2nd edition* released by MLA in 2015.

🔍 Scan or click the QR code to read the *Guidelines for the Safe Manufacture of Smallgoods*.



Future focus

The Shelf life calculator continues to evolve in response to the demands of industry and new calculator extensions are underway to predict the rate of spoilage for vacuum-packed Wagyu and goatmeat across a range of commercial export cold chains.

Exploring to new technology solutions

MLA continues to partner with technology providers to identify new technologies that could help maintain and expand existing access to global markets.

Vibration technology

To date, one project has successfully demonstrated the value of electronic vibration technology to accelerate freezing (12% faster) and defrosting (6.25% faster) – delivering reduced yield loss, extended shelf life and a reduced bacterial load. Further work is being considered to investigate the potential of this technology.

Improved label accuracy

MLA and AMPC have partnered with Coles Retail Ready Operations Australia (Coles RROA) to trial a new deep learning smart camera system trained to identify meat cuts and primals in beef and lamb processing. This has improved red meat label accuracy, reduced the risk of product recalls and helped safeguard the reputation of Australian red meat domestically and internationally.

▶ Scan or click the QR code to learn more about deep learning smart camera system technology.



▲ AI-operated vision systems are among the innovations developed through Coles RROA and MLA's co-innovation program, using camera technology to improve product quality, consistency and efficiency across the red meat value chain.

Future focus

Ambient supply chain technology

Ambient supply chains present significant growth potential across a number of markets (including India and Cambodia) where chilled refrigeration is not as readily available.

MLA continued to investigate ambient supply chain solutions, such as dehydrated/rehydrated beef. While it was proven to be a safe option, the initial findings were that eating quality was too negatively affected for it to be a viable solution.

However, in the future, there may be market opportunities in circumstances where cold chain storage is not available and nutrition, rather than eating quality, is the primary concern. For example, the provision of rations or emergency response meals, as well as nutrition for space or sea travel, may present new supply models.

▶ Scan or click the QR code to learn more about ambient supply chains.



Differentiation in Halal markets

MLA has partnered with a processor and technology provider to deliver a new microwave-based technology (DTS: Diathermic Syncope®) which delivers a stun from which the animal can recover. This provides a reliable and more humane alternative to current methods, which may better suit Halal and Kosher slaughter requirements.



The technology is AUS-MEAT provisionally approved for use in Australian abattoirs and is currently seeking recognition as a humane slaughter method in both the United States and the European Union.

MLA has a commercialisation agreement in place and will work with AMPC to explore market adoption opportunities for interested parties.

▶ To learn more about DTS: Diathermic Syncope® visit diathermicsyncope.com.au

Delivering the skilled and innovative people our industry needs to thrive

With Australia's red meat supply chain estimated to employ around 200,000 people, it is critical we have a skilled, safe, diverse and resilient workforce to ensure future sustainability of our industry.

MLA is committed to supporting a future-ready workforce that has embraced innovation at every level – from individuals, leaders, and supply chain partners to communities, investors and entrepreneurs. Our capability building programs have been delivering career pathways and leadership development for many years, while our co-innovation partners have embraced innovation within their day-to-day operation.

MLA has also commenced partnerships to explore new value chain designs, including a three-year project to establish a new Circularity Hub within one of NSW's key beef producing regions.

Combined, these investments will help support value chains with developed capability priming them for long-term profitability, resilience and sustainability.

To further expand capability across the value chain, MLA is exploring private innovation investment through its new Cultiv8 Livestock Technology Fund, providing entrepreneurship opportunities across selected startup accelerators and venture capital partners.

▶ Scan or click the QR code to learn more about the Cultiv8 Livestock Technology Fund.



▼ MLA's Co-Innovation Partnership program helps red meat businesses fast-track strategic innovation across the value chain, driving improvements in sustainability, productivity, product development, data integration and value-based marketing.



Building capability. Inspiring careers. Strengthening industry.

A skilled workforce that is well-equipped to meet future challenges will be central to ensuring the sustainability of Australia's red meat and livestock industry.

MLA fosters the education, skill building and leadership development required to ensure our people are able to serve the needs of today's industry while also ensuring we are well prepared for the future.

Since 2021, MLA has supported more than 1,000 industry representatives through a range of leadership and professional development programs, including:

- AgriFutures Horizon Scholarship
- CSIRO's iPhD Program
- Australian Beef Industry Foundation Scholarship
- Nuffield Scholarship
- Australian Rural Leadership Program
- Advancing Beef Leaders Program.

MLA also co-funds Co-Innovation Managers, Digital Project Officers and university students embedded within a number of key funded research projects with industry co-partners.

As outlined in MLA's *Strategic Plan 2030*, future capability building initiatives to be explored include new value chain designs that consider circular economy principles, Indigenous entrepreneurship, and improved on-farm safety, along with continued support for MLA's School Education program.

📱 Scan or click the QR code to learn more about MLA's work supporting skill development and leadership across Australia's red meat industry.



Empowering the next gen of agri-leaders

The Zanda McDonald Award (together with its associated Innovation Summit) is a flagship initiative designed to cultivate leadership and innovation capability among young professionals in the agriculture sector across Australia and New Zealand.

Over the course of this partnership, the annual Innovation Summit has attracted more than 500 delegates and recognised eight award recipients.

📱 Scan or click the QR code to learn more about how MLA supports The Zanda McDonald Award and the current recipient.



▶ 2025 winner Jack O'Connor sees the award as a shared achievement and is keen to give credit to his tight-knit farming family who run their multigenerational cropping, wool and prime lamb farm, 'Oxton Park', at Harden, NSW.



Inspiring careers for a new generation

The Intercollegiate Meat Judging (ICMJ) Program is a trusted and proven platform that attracts and develops a new generation of talent from the red meat and livestock industries.



Now in its thirty-fifth year, ICMJ is recognised across the sector for its role in building capability, fostering leadership and driving transformational change – all of which are critical to building a sustainable future for the industry. During this time, the program has attracted more than 3,500 participants.

AMPC is also a key supporter and co-investor in the ICMJ program.

📱 Scan or click the QR code to learn more about the ICMJ program.



The Co-Innovation Partnership program

Since 2007, MLA's co-innovation partnerships have enabled many red meat enterprises from across the value chain to fast-track innovation aligned to their organisation's strategic priorities.

Since 2021, the Co-Innovation Partnership program cohort has represented a range of organisations that, when combined, account for around 15% of total MLA Donor Company (MDC) value chain innovation investments over that time.

Through its support of integrated supply chains, livestock producers and value-adding businesses, the Co-Innovation Partnership program has driven change and improvement in areas such as:

- on-farm sustainability and productivity strategy
- product development that grows demand and value
- big data and objective measurement integration
- value-based marketing.



Accelerating innovation in Australia's red meat value chains

Each year, the program supports Co-Innovation program managers and delivers a structured capability development program.

The Program Managers are embedded within MLA's value chain partners to help them accelerate and de-risk their innovation activity, as well as assisting them to deliver ambitious programs which reflect key industry priorities.

Each Co-Innovation partnership relies on a triple bottom line evaluation framework, and the success of the overall program was independently evaluated by Hargraves Institute in February 2025.

The Hargraves report indicated the majority of partners believed the program had enhanced their Co-Innovation Program Manager's capability and had made a significant contribution to the company's improved innovation capability and readiness.

- Every co-innovation partner had invested in at least one project designed to increase environmental sustainability, with almost half the partners successfully implementing emission reduction strategies which reflect the industry's sustainability aspirations.
- Seven of the co-innovation partners attributed significant economic benefits to the work of the Co-Innovation Manager, with 25% reporting that new product sales now accounted for 10–15% of their enterprise turnover.
- Three of the co-innovation partners implemented value-based marketing systems which have provided feedback and delivered payment premiums to their supplying producers.

Future focus

The Co-Innovation Partnership program will continue to focus on helping our partners understand, manage, accelerate and optimise the innovation process within their supply chain, with the wider industry benefiting from opportunities to apply these learnings where opportunities exist.

The program will continue to be a cornerstone of MLA's innovation strategy with the following principles guiding future investment decisions:

- strategic alignment with MLA priorities
- partner diversity and external innovation focus
- capability development and knowledge sharing
- clear logic for phase continuation or exit.



▲ Sophie Angus, LAMBPRO's Co-Innovation Program Manager, is helping deliver an MLA-supported program to adopt objective measurement technology, manage consistent premium lamb supply, and return more value to producers through marbling-based feedback and pricing.

Unlocking value through co-innovation

Co-innovation partnerships between MLA and industry are demonstrating how collaboration can unlock new value, drive sustainability and transform the way products move from paddock to plate.

From building value-based brands underpinned by genetic and carcass data, to delivering innovative products and packaging at retail scale, to pioneering vertically integrated organic supply chains, these projects share a common ambition – to help producers and processors capture additional value while strengthening market opportunities and sustainability performance. Together they offer practical, replicable models that point the way forward.

How premium lamb brands are changing the game for producers

With a view to capturing additional value for LAMBPRO's premium lamb brands, MLA partnered with the company to deliver a three-year Co-Innovation Partnership program designed to drive adoption of OM technologies.

A first for industry, the project sought to emulate the beef industry's success in creating a value-based product by capturing baseline genetic and carcass data, increasing capability in supply chain management and engaging producers to ensure consistent year-round supply that complies with brand specifications.

▶ Scan or click the QR code to learn how the Co-Innovation Partnership Program helped producer Tom Bull and LAMBPRO deliver more kgs/ha and more \$/kg.



▲ The MLA/Hewitt Foods 'Food for the Future' study demonstrates how combined environmental, social and governance actions (carbon, biodiversity, natural capital and regenerative agriculture) can be successfully implemented and monetised within red meat value chains.

Retail Ready Operations Australia

This three-year Co-Innovation Partnership program was designed to support Coles RROA deliver high value growth strategies via innovative products, packaging, processes and new business model concepts.

The Co-Innovation Partnership program supported 89 new initiatives and resulted in a 180-tonne increase in red meat sales over the 2021–2024 reporting period, with 158 new red meat product launches.

It also contributed to the following sustainability outcomes over the three-year reporting period:

- 87.4% recyclable packaging
- 45% renewable electricity sources
- 36% emissions reductions
- 86.7% of solid waste diverted from landfill.

▶ Scan or click the QR code to learn more about how Coles RROA innovated to create supply chain efficiencies.



Sustainability pathways for a vertically integrated organic supply chain

Responding to the growing need for enhanced sustainability and environmental performance within the agri-food supply chain, Hewitt Foods aimed to develop a vertically integrated organic supply chain that could serve as a model for the broader red meat industry.

The project resulted in a comprehensive carbon footprint for the supply chain, identification of market opportunities for well-credentialed red meat, and the development of new products with sustainability attributes.

These outcomes will deliver an improved understanding of sustainability practices for the wider industry. It will also enhance market opportunities for certified products and provide practical knowledge to aid the implementation of emission reduction strategies.

▶ Scan or click the QR code to learn more about the Hewitt Co-Innovation partnership.



Regional circularity and red meat supply chains

In 2025, MLA investigated the feasibility of establishing Circular Northern Rivers, a circular economy cooperative that would coordinate regional industry and business transformation initiatives to support a circular economy in NSW's Northern Rivers region.

The region already possesses the cultural readiness, policy alignment and economic diversity required to become a national exemplar of circular economy transformation.

This presents an opportunity to design a unique and scalable Circularity Hub with the Northern Rivers region – one that is grounded in its local strengths, industries and values but connected to national and global circular economy initiatives.

Enhancing the local value chain

Beef production contributes more than a 27% of the region's gross value of production, and the industry remains a major employer across the Northern Rivers.

Consequently, the creation of new or regenerative products and systems would directly and indirectly benefit the meat supply chain and support regenerative farmland practices.

Specifically, a Circular Economy Hub in the region would enable:

- cross-sector collaboration with manufacturing, construction, and community sectors, unlocking waste recovery, logistics, and infrastructure synergies.
- alignment with national climate and circularity frameworks, including Australia's Circular Economy Framework and Net Zero targets
- data-driven decision making through regional material flow mapping and digital platforms, improving traceability and transparency
- facilitation and access to green loans through partnerships with national banks, policy incentives, including circular procurement collaboration frameworks and carbon credit generation.

Establishing a new circularity hub

Throughout the initial design phase, MLA has engaged stakeholders and the community to co-design a hub that supports cross-sector collaboration and integrates Indigenous knowledge.

Initial project outcomes recommend a hybrid governance model and provide a detailed business case and funding model, together with a phased implementation roadmap.

MLA has designed a collaborative MDC project that will support Southern Cross University as it implements an initial three-year project to establish the necessary funding and support for establishing Circular Northern Rivers.

▶ Scan or click the QR code to read the initial findings of the Northern Rivers circular economy hub project.



▶ A region-based circular economy hub will deliver outcomes that align with MLA's *Strategic Plan 2030* by investing in solutions to strengthen communities and support long-term sustainability, carbon abatement and environmental credentials. Circular Northern Rivers can support this transition by enabling regional coordination, measurement and value creation.



Partnering with industry to enable a more profitable, sustainable and safe processing sector

The future prosperity of Australia's red meat producers relies on a sustainable processing sector – one that provides choice and flexibility while also delivering improved efficiency, cost competitiveness and worker safety.

However, the dual problem of rising costs and reduced capacity presents a real challenge for industry.

Australia has some of the highest processing costs in the world, significantly outpacing countries such as the US, Brazil and Argentina¹⁵. This issue is compounded by ongoing labour shortages, together with the processing, storage and logistics challenges arising from our variable carcase weights.

Seeking to deliver grading and sortation efficiencies while also reducing processing costs, MLA (together with AMPC) partnered with a range of processors and technology providers to develop and drive the adoption of new technologies capable of supporting a data-driven culture.

Many of these primary processing solutions are now fully commercialised, delivering lower operating costs and reduced reliance on skilled labour, while improving yield, efficiency and safety outcomes.

After more than two decades of investment, this program has reached maturity, with AMPC assuming responsibility for future commercialisation and adoption of these primary processing technologies.

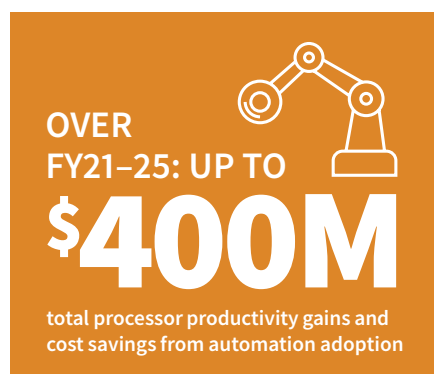
► MLA and AMPC's work with processors and technology providers supports more efficient grading and sortation, reduces processing costs and builds a stronger data-driven culture across red meat processing.



Automated processing

MLA first partnered with Scott Automation Robotics (SAR) to develop the LEAP™ Sheepmeat automated precision cutting systems in the late 2000s. Since then, MLA's investment in new systems has helped implement artificial intelligence (AI)-machine learning modules that have further increased carcass value by minimising waste, maximising the volume of higher-value cuts, and delivering a high throughput on a large scale.

Since 2011, AMPC has invested around \$40 million of processor levies with MLA in these projects and the accelerated adoption of automation technology in recent years has seen processors realise an annual benefit of \$70–\$80 million – delivering an estimated total of \$350–\$400 million in additional productivity and cost savings over the course of FY21–25¹⁶.



LEAP4Lamb

After two decades of research and development, the automated LEAP4Lamb cutting system is now fully commercialised and processing around 60% of Australian lambs annually via the three modules:

- LEAP III: A lamb primal system that separates carcasses into shoulder, middle and hindquarters. In 2022, a lower-cost version of this system was introduced to increase uptake among smaller processors who could then upgrade to the full LEAP III at a later date.
- LEAP IV: A middle system that breaks the rack and loin barrel into various sub-primal components.
- LEAP V: A bone-in forequarter system that uses a 3D camera to identify cut lines for optimal carcass value and consistency, coupled with a robotic arm to grasp the forequarter and a bandsaw to make the precision cuts.

Since 2023, upgrades to these integrated LEAP4Lamb boning systems enabled better incorporation of data from AI and machine learning, resulting in improved cutting line accuracy and delivering a combined benefit of more than \$7/head.

LEAP4Beef

Leveraging the success of LEAP4Lamb technology, a pre-commercial LEAP4Beef middle system is moving industry one step closer to delivering the world's first fully automated beef boning system.

The pre-commercial system was successfully trialled in a major beef processing company in early 2024 and delivered impressive accuracy and throughput results. AMPC is now leading the further design and delivery of LEAP4Beef's long-term vision to deliver a whole-of-animal beef boning carcass solution.

Once fully developed and integrated, the LEAP4Beef system will unlock large-scale, high throughput and sophisticated automation to maximise cutting accuracy and yield – with an estimated \$29/head benefit or \$10 million annual return for high throughput beef processors¹⁷.

▼ LEAP4Beef follows the success of the LEAP4Lamb project to automate lamb cutting and seeks to apply the learnings from that work to the beef processing sector. Once fully developed and integrated, the system will unlock large-scale, high throughput and sophisticated automation to maximise cutting accuracy and yield.



A safer workplace

While MLA's investment in the LEAP systems has improved worker safety by enabling carcasses and blades to be operated remotely, many tasks continue to require manual intervention.

This led to the creation of safety solutions such as BladeStop™ (which is now fully commercialised) and to MLA investigating the viability of 'exo-suit' solutions.

AMPC is now exploring opportunities to conduct further trials to test and potentially commercialise this technology.

👉 Scan or click on the QR code to learn more about MLA's exo-suit research.



BladeStop™

Bandsaws are an essential tool in meat processing, but they carry a substantial risk of severe injury.

MLA and AMPC partnered with SAR to develop and deliver BladeStop™ – a bandsaw that instantly senses when the blade comes into contact with the operator and stops it within 10 milliseconds, meaning the difference between losing a limb or receiving a skin cut. With AMPC's support, a series of units were successfully adopted by processors.

In 2021, Safe Work Australia estimated that systems such as BladeStop™ had helped reduce serious work-related injury and compensation claims by 23% since 2009¹⁸.

As at February 2026, more than 1,453 BladeStop™ units have been sold across multiple countries, generating around \$1.4 million in royalties for the benefit of MLA members.

👉 Scan or click the QR code to learn more about BladeStop™.



Improved over-the-hook yield

In 2024, MLA's technology partner MPSC modified its existing Rinse & Chill® Technology (RCT) that involved flushing the carcass with a chilled control-release of an isotonic solution. A review of the modified RCT found it was able to deliver, on average, a further 3% increase for beef and a corresponding 1.5% increase in yield for sheep carcasses – with no negative impact on shelf life. MSPC estimates this could return an additional \$10.8 million in yield value if adopted by existing Australian customers¹⁹.

AMPC now manages industry R&D investment in this technology and continues to explore its potential with interested processors and brand owners.

👉 Scan or click the QR code to read *Lamb meat yield benefit of Rinse & Chill®* final report.



Transforming waste to profits

Each year, Australia's red meat, dairy and pork industries produce around 79 gigalitres of liquid waste and two million tonnes of solid waste. Managing this volume of organic livestock waste across the on-farm, feedlot and processor sectors costs more than AUD\$100 million annually²⁰.

To address this challenge, MLA led the government-funded Waste to Profits project that established a collaborative and diverse group of stakeholders from across Australia's livestock industries. This project led to the development of the ADAdvisor tool (launched in 2022) which enables businesses to assess sustainability criteria such as the economic feasibility of adopting anaerobic co-digestion projects for their livestock sector waste streams.

The large-scale conversion of livestock waste at abattoirs into commercially viable products such as fertilisers, feeds, energy and chemicals could unlock new revenue streams – contributing to future profitability while helping offset rising costs and improving productivity.

Following MLA's initial work in this area, AMPC now leads the processing sector's pursuit of operational excellence in wastewater and energy conversion technologies, such as biogas, biodiesel, and hydrogen derived from animal fats and other waste.

👉 To learn more about the ADAdvisor tool visit adadvisor.info

👉 Scan or click the QR code to read the *Waste to Profits* final report.



Going forward, MLA's contribution to value chain innovation will focus on:



Opportunities to develop and integrate objective measurement devices and feedback systems



End-to-end traceability systems which enable individual trait identification and grading



Reducing on-farm plastics and exploring new upcycling streams for manure



Transforming fifth quarter products (low-value processing by-products such as offal, blood, bones and hides/skins along with trimmings and fat) into high-value food, nutraceutical and petfood products



Investing in our people and new business models to drive productivity and performance

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