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evaluationseries | 2.1 Improving eating quality

Eating quality

The industry impact

Promise

Higher demand, competitive advantage.

Progress

Program outputs have been widely adopted by the Australian industry.

Performance

A $223 million investment is expected to return a net industry benefit of $1.1 billion over 30 years: a benefit-cost ratio of 5:1 based on net present value.

Definitions

MSA beef

The Meat Standards Australia (MSA) voluntary meat grading system is an ongoing program aimed at:

- improving beef quality
- improving consumer certainty about beef quality
- strengthening supply chain linkages.

MSA registered producers have access to standards, best practice guidelines and individual feedback which enable informed on-farm management decisions.
MSA standards help processors to deliver better, more consistent beef eating quality. MSA processing techniques and branding provide wholesalers and retailers with a quality guarantee that can be marketed to consumers.

MSA sheepmeat

MSA Sheepmeat is an ongoing program to better understand and meet consumer preferences for lamb, hogget and mutton. MSA Sheepmeat has built on the learning of the MSA Beef program by investigating how production, processing and cooking methods impact on eating quality. It is using technologies and protocols to reduce quality variability.

MQST

The Meat Quality and Science Technology (MQST) program supports the MSA initiatives by developing technologies to maximise eating quality and increase processing efficiency. Processing and measurement technologies are being used to improve meat tenderness and colour.

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All benefit-cost ratios in this report come from the MLA program evaluation framework unless otherwise stated. The figures in this report represent the net present value of industry and consumer benefits to 2029 and are based on the MLA global meat industry model (CIE).

BACKGROUND

Meat & Livestock Australia (MLA) strives to build demand, increase market access, develop a competitive advantage from 'paddock to plate' and, by partnering with industry, build capability.

Remaining accountable to stakeholders and providing measurable returns on government and industry investment are central to this.

In 2005 MLA engaged the Centre for International Economics (CIE) to conduct an independent review, and to develop an effective evaluation framework* to assess the industry impact of its programs and their compliance with government priorities.

The framework provides independent estimates of the net industry benefits of MLA programs – including achievements relative to targets and the net present value relative to a 'no investment' situation.

It also aims to measure the contribution to the national economy. Benefits are expressed as improved red meat consumer welfare and the net change in value added to the rest of the economy, supporting a rigorous triple bottom line evaluation of MLA initiatives.

Quality investment raises the stakes

Consistent with MLA's strategic objective to use industry systems as a means to lift demand, market entry and competitive advantage, the Eating Quality program embodies a pursuit of excellence through three new quality systems:

- Meat Standards Australia Beef (MSA Beef)
- MSA Sheepmeat
- the Meat Quality Science and Technology (MQST) program.

Program outputs have been widely adopted by the Australian industry.

The Eating Quality program began with beef in 1996. MSA was formally created in 1998 after two years of extensive analysis and the development of the world-leading consumer-based appraisal program.

Subsequent developments have seen MLA's Eating Quality program evolve as a world-leading quality assurance system covering the supply chain from farm to consumer in the beef and sheepmeats industries.

An independent review by CIE revealed that a planned $223 million investment in eating quality by MLA and its research partners over 30 years should return a net industry benefit of $1.1 billion.

MLA's Eating Quality program has developed a world-leading quality assurance system covering the whole supply chain from farm to consumer in the beef and sheepmeat industries.

The industry benefit-cost ratio from the Eating Quality program is 5:1.

MSA Beef constitutes the largest single component of the eating quality investment ($210 million) and it alone is calculated to return a net benefit of $932 million to the red meat industry over 30 years – a benefit-cost ratio of 4:1.

According to MLA's point-of-sale data, retail premiums for MSA-graded beef are up to 20 per cent for some cuts, while overall carcase value is up by 8.4 per cent on average. In addition to MLA's program costs, it is important to acknowledge the processor costs incurred in implementing these new systems and technologies – typically related to staff training, quality assurance management and record keeping. While the costs' pervasive nature makes them hard to quantify, these investments represent an ongoing industry commitment to adoption and are included in the total costs.

MSA Beef and Sheepmeat and the MQST program are demonstrating how an industry-wide commitment to R&D and marketing is achieving clear economic gains and long-term sustainability for Australia's red meat industries and their regional communities.

* MLA's evaluation framework is explained in full in the booklet, *Why does MLA need a framework for independent evaluation?,* that accompanies the MLA program evaluation series.

MSA BOOSTS PROFITS

The MSA system has boosted carcase value by 8 per cent and retail prices on particular cuts by 20 per cent, guaranteeing quality for consumers and establishing firm ground for Australia to compete in export markets.

Terry Nolan

MSA boosts demand at Nolan Meats

Nolan Meats, a large family-owned beef producer and processor, has witnessed growth in domestic demand first-hand since introducing MSA grading at the Gympie-based operation.

Co-director Terry Nolan says MSA provides consumers with an assurance that the meat they are buying is good eating quality. He says the grading system underpins Nolan's domestic wholesale activity and has become a real focus of the business.

"We have backed MSA since the outset 10 years ago and it's pleasing to see that the grading system is now taking off. MSA has been critical in supporting the growth of our business over the past decade."

- Terry Nolan, Nolan Meats co-director

Martin Hieber

Beef meets reef at Watsons Bay Hotel

When executive chef Martin Hieber increased red meat's profile on the menu of the renowned Watsons Bay Hotel seafood restaurant, he wasn't taking any chances.

Lifting steak items from one to three meant the new dishes had to match the quality that has made Watsons Bay synonymous with seafood and a favourite destination for tourists and Sydneysiders alike.

Mr Hieber turned to Meat Standards Australia to ensure he sourced meat graded by the eating quality assurance scheme.

"MSA graded meat is the best on the market – it guarantees consistent quality and tenderness. It's hard to find the standard we have in Australia anywhere else in the world. The change proved to be a great move for the restaurant – we are now well known for our meat dishes."

– Martin Hieber, Watsons Bay Hotel executive chef

Luke Dixon

MSA improves retail margins at Luke's

Victorian butcher Luke Dixon, from Shepparton, has been MSA-accredited for three years and his retail margins have improved out of sight over that time.

Luke's Magic Meats stocks only MSA-graded beef to offer customers guaranteed eating quality – a policy which Mr Dixon says is "easier for staff and customers".

Butchers at Luke's Magic Meats receive onsite MSA end-user training that demonstrates how to use lower-value cuts to create new value-added products.

Through value-adding the business has increased knuckle-primal price by 22 per cent in comparison with an equivalent yearling product.

"We get a better price for main primal and good grilling steaks than our local competitors – for cube roll, strip loin and eye fillet – but we have also added value to butt cuts. The grading reports indicate that these cuts have better eating quality than the equivalent yearling primals when prepared and cooked a certain way."

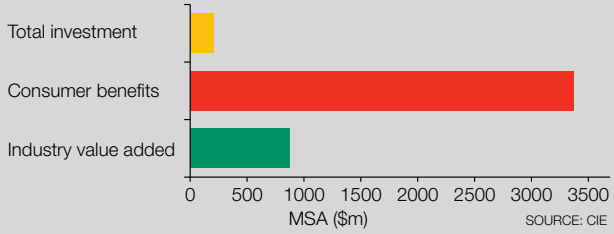
- Luke Dixon, Luke's Magic Meats proprietor

MSA: the industry impact

- MSA grading increases beef value by 8.4 per cent across the entire carcase
- Retail price premiums for MSA-graded beef are up to 20 per cent for some cuts
- By 2010, MSA beef grading techniques are expected to be used by processors representing 60 per cent of the national processing capacity
- MSA continues to drive increased domestic demand

Beef

Benefits from MSA beef
(net present value 2005)



Beef eating quality - industry benefits
(forecast industry benefit over 30 years*)

Approval feeds demand

The benefits arising from MSA beef are the result of an industry decision in the mid-1990s to improve the eating quality of Australian beef. The strategy has been aimed at lifting product demand by building consumer confidence in beef eating quality. This investment followed studies showing consumers are quality-conscious and prepared to pay more if quality can be guaranteed.

Evaluation of the program has shown it has delivered intended quality gains, with increases in consumer satisfaction, prices and industry skill levels.

Tracing MSA beef impacts

MSA beef investment

The $210 million investment in MSA beef continues to leverage additional investments made by state governments, processors, retailers and food service providers. The technical infrastructure to support the implementation and adoption of program outputs has been provided through government and industry investment in the Beef Cooperative Research Centre (CRC).

Inputs to outputs

Consumer sensory research into links between different combinations of meat characteristics and cooking methods informed the development of a voluntary MSA grading system, implemented in 1999-2000, that has seen pricing signals pass along the supply chain more fluently. MSA provides:

- best-practice pathways for producers and processors
- an eating quality guarantee for wholesalers, retailers and consumers
- training services for processors, retailers and food service providers.

MSA beef outcomes

The MSA system, combined with greater awareness of eating quality factors, has produced higher, more consistent beef eating quality, with 42 per cent of consumers identifying improvements between 2002 and 2005 (Stancomb Research & Planning 2005).

A Beef CRC review has confirmed MSA has injected $244 million into the Australian beef industry. The review, based on MLA's price data, reported a $159 million industry premium between 1999 and 2005 and an additional $85 million industry premium in 2005-06†.

Australia's largest beef retailers now use MSA principles in their cattle purchasing and processing protocols.

The adoption forecast is that processors employing MSA techniques will be responsible for more than 60 per cent of the national beef kill by 2010.

At a glance: MSA beef

1. Inputs: $210m, 30-year investment

2. Outputs: consumer testing; MSA grading system; training

3. Outcomes: higher beef eating quality and consistency; steady adoption (80% of eligible beef processed under MSA by 2010)

4. Impacts: 6.7% domestic demand increase by 2010; 0.3% export demand increase by 2010; processor costs 3% higher; 14,000 employees trained in MSA meat science by 2010

5. Benefits: $932m in red meat industry added value; consumer satisfaction; $3.4b net benefits to Australians

MSA beef impacts

Industry changes attributed to MSA, relative to baseline value:

Demand: a 6.7 per cent increase in domestic beef demand by 2010 and a 0.3 per cent increase in export demand.

Supply: a three per cent cost increase imposed on processors with highest impact on processors of grainfed product.

Social: training provided for 14,000 employees in the processing sector by 2010; skilled regional workforces stimulating social effects.

MSA beef benefits‡

MSA beef is forecast to generate $932 million in red meat industry added value. This is in addition to $3.4 billion net benefits to the community including measurable flow-on effects such as a higher skilled and safer workforce, higher incomes flowing from increased red meat production, and consumer wellbeing measured by increased consumer satisfaction.

Direct value from MSA is a result of increased domestic demand, partially offset by increased processing costs.

From January 2007, MLA's National Livestock Reporting Service began collecting market prices for MSA cattle. Analysis of this data over time will allow MLA to confirm that the forecast for adoption of MSA principles leads to whole-of-chain benefits for the beef industry.

Fast financial facts

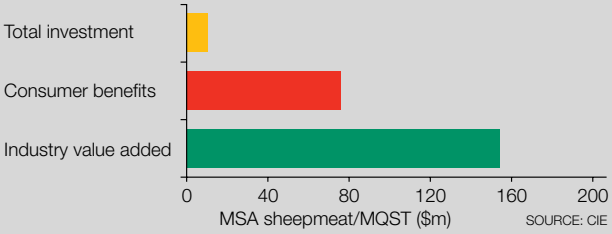
Economic analysis revealed that the return on the industry investment in MSA beef reached break-even point by the end of 2005–06†.

Beef eating quality

Industry investment to 2005	**$178 million**
Industry benefit to 2005†	**$159 million**
Forecast investment over 30 years‡	**$210 million**
Forecast industry benefit over 30 years‡	**$932 million**

* 1996–2026 †*Preliminary estimates of the economic benefits of Meat Standards Australia*, Beef CRC, 2006. ‡Benefits are presented as changes in industry added value. All results are net present values in 2005 dollars, calculated over a 30-year horizon (1996 to 2026) using a five per cent real discount factor.

Benefits from MSA sheepmeat/MQST
(net present value 2005)



Sheepmeat eating quality and MQST - industry benefits
(forecast industry benefit over 30 years*)

Locking in the tenderness

In 1998, tenderness testing on lamb loin cuts indicated that one in three would be rated as 'tough'. By 2004 this consumer dissatisfaction rating applied to only one in five cuts. The result is attributed to a number of factors, including the MSA sheepmeat program launched in 1999.

Under this program new processing technologies electrically stimulate sheep carcases, speeding up the ageing process and locking in the tenderness that underpins eating quality.

Tracing the MSA sheepmeat & MQST impacts

MSA sheepmeat and MQST investment

MLA has pooled resources with industry partners and R&D collaborators and plans to invest a total of $12.8 million in MSA sheepmeat and MQST over the next 30 years.

Inputs to outputs

Initial MSA sheepmeat research identified consumer preferences for sheepmeat. Subsequent investigations developed optimum pathways, processing and cooking methods to meet these preferences. MLA then developed the technical resources, including the MQST process, required to support industry adoption of these pathways. The MQST technology is critical in supporting the ability of meat processors to meet the requirements of MSA sheepmeat pathways.

MSA sheepmeat and MQST outcomes

Information derived from MSA sheepmeat has guided the use of MQST technology to reduce sheepmeat variability, generating marked improvements in eating quality. Data from tenderness testing suggest that the incidence of tough lamb has decreased significantly, from potentially one in three cuts considered tough in 1998 to one in five in 2004.

It is expected that by 2010 MSA sheepmeat and MQST will be used in processing plants representing 78 per cent of sheep processing capacity.

MSA sheepmeat and MQST impacts

Industry changes attributed to MSA sheepmeat and MQST, relative to baseline value:

Demand: a 0.5 per cent domestic demand increase for sheepmeat and a 0.25 per cent export demand increase by 2010.

Supply: a three per cent cost increase imposed on processors plus MQST implementation costs.

Social: lower processing OHS risk, with benefits such as reduced insurance premiums and lower labour on-costs.

At a glance: MSA sheepmeat and MQST

1. Inputs: $10.3m 30-year investment and $2.5m for MQST technology implementation (MLA and industry partners)

2. Outputs: consumer testing; MSA sheepmeat grading system; technical information; electrical stimulation equipment

3. Outcomes: higher sheepmeat eating quality and consistency; 100% adoption of MSA sheepmeat and MQST initiatives by all large sheep processors (78% of total sheepmeat processing capacity in Australia by 2010)

4. Impacts: 0.5% domestic demand increase by 2010; 0.25% export demand increase by 2010; processor costs 3% higher; MQST implementation costs; reduced OHS risk

5. Benefits: $151m in red meat industry added value; consumer satisfaction; $79m net benefits to Australians

MSA sheepmeat and MQST benefits†

MSA sheepmeat and MQST are forecast to generate $151 million in added value to the red meat industry overall, in addition to net benefits of $79 million to the community. Sheep production and processing sectors reap the largest increases in value-added outcomes – a result of higher demand-driven prices and quantities.

Process control to reduce variability

In both the beef and sheepmeat industries, initial research has shown that processing has the largest influence on the variability of eating quality. This is where most of the R&D has been focused. The Meat Quality Science and Technology program (MQST) was initiated to support the MSA programs by developing a suite of processing technologies to maximise eating quality and to increase processing efficiency. MQST process control technology is creating a uniform framework for meat processing similar to that employed in other food-processing industries. The main development has been the use of advanced electronics to control the natural variation in meat eating quality. Electrical stimulation has become key in securing consistent tenderness in sheepmeat and improving colour (by accelerating blood removal) in both beef and sheepmeat. Phase two of the MQST program will enhance process control and build on industry uptake and skills.

Fast financial facts

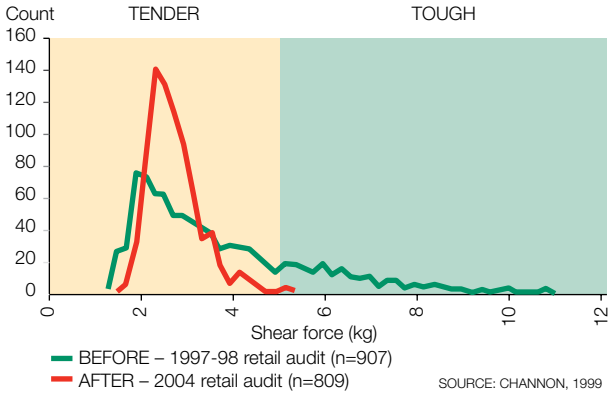
Sheepmeat eating quality and MQST

Industry investment to 2005	**$5 million**
Industry benefit to 2005	**N/A**
Forecast investment over 30 years*	**$12.8 million**
Forecast industry benefit over 30 years*	**$151 million**

*1999–2029 † Benefits are presented as changes in added value. All results are net present values in 2005 dollars, calculated over a 30-year horizon (1999 to 2029) using a five per cent real discount factor.

Consumer quality

Lamb loin eating quality and variability before and after adopting MLA's new dose-controlled meat stimulation



Improved colour upgrades Australian beef

Beef colour is an aesthetic issue with a multi-million-dollar impact. Depending on breed type, animal handling procedures and seasonal factors, up to 10 per cent of beef is downgraded because its colour does not comply with consumer preferences.

Meat processors have to find alternative markets for meat from high-value carcases that have dark colour. Dark meat is often sold as mince rather than table cuts, attracting a lower price. The wholesale price discount is typically an average of $1 per kilogram for longfed beef carcases and about $0.40 to $0.50 per kilogram for grassfed or shortfed carcases (Food Science Australia Meat Industry Services).

However, the widespread adoption of low-voltage electrical stimulation supported under the MQST initiative is producing a lighter, more cherry-coloured product.

MLA estimates the technology – the result of a successful collaboration between MLA, Realcold Milmech and Applied Sorting Technologies – will save about half of the beef that would otherwise be downgraded.

At one beef processing plant supplying a major supermarket chain, the incidence of dark meat was almost eliminated – dropping from six per cent to one per cent – after the low-voltage electrical stimulation technology was introduced.

On the basis of that success, the technology has been adopted by about 80 per cent of the beef industry's processing capacity.

The use of low-voltage electrical stimulation is expected to enhance Australian beef's reputation in the premium domestic market and to support increasing demand for Australian beef in key export markets, particularly the high-quality Japanese market which accounts for more than 70 per cent of Australia's grainfed exports.

Lamb stimulation improves tenderness

Electrical stimulation technology developed under the MQST initiative has reduced the likelihood of consumers eating tough lamb from one in three to less than one in five.

In 1998, before the technology was employed, tenderness testing of more than 900 lamb loin samples showed that more than 30 per cent would be rated as tough. When the same tests were conducted in 2004 on loins that had been subject to electrical stimulation, that figure was reduced to less than 20 per cent (see graph). The results demonstrate that adoption of dose-controlled meat stimulation technology has minimised eating quality variability.

Combined with other MSA sheepmeat protocols for producers and processors, including the development of the sheepmeat grading system, MLA is confident that poor consumer experiences as a result of inconsistent eating quality will be significantly reduced.

Major retailers have specified use of the technology in their processing contracts in order to maximise the eating quality of lamb.

Electrical stimulation: the impacts

- Low-voltage electrical stimulation is expected to enhance Australian beef's reputation in premium domestic and export markets
- Electrical stimulation technology has been rolled out to companies responsible for 80 per cent of Australia's beef and sheepmeat processing capacity

Electrical technology stimulates meat quality

Electrical stimulation accelerates pH decline, the onset of rigor mortis and the natural ageing process, allowing beef and sheepmeat to reach an acceptable eating quality in a shorter period of time. It can also alleviate problems caused by faster chilling of carcases.

Electrical inputs are applied at a number of stages in meat processing, from immobilisation to electronic bleeding, stimulation and back stiffening, with the eating quality effect of each depending on the voltage, its duration and the waveform.

Lighter coloured mutton boosts global performance

Exports worth $442 million in 2005-06 (ABS) account for 76 per cent of total mutton production and have made Australia the world's largest mutton supplier. To retain this competitive lead, processors and exporters must ensure their product continues to have higher consumer appeal than other meat products.

When it comes to mutton, appearance is the key.

The mutton export market demands light coloured meat and buyers will pay higher prices accordingly.

Low-voltage stimulation technology immobilises the animal after slaughter and ensures the maximum amount of blood is removed from the carcase as early as possible to produce a lighter-coloured meat.

Customers of Australian export mutton value the lighter-coloured product over mutton from other sources. Consumer acceptance has driven adoption of this technology by processors responsible for more than 70 per cent of the mutton processing capacity in Australia.

Technology delivers at Australia's largest sheepmeat processor

Fletcher International Exports – Australia's largest sheepmeat processor, exporting mutton to 70 countries – began installing the low-voltage electrical immobilisation and stimulation technology two years ago.

In a company for which exports represent 98 per cent of its production, and mutton constitutes about 80 per cent, plant manager Dave McKay says the investment has returned substantial results.

"Accelerating carcase bleeding aids better carcase presentation by removing residual blood from the meat, and this helps to produce a lighter coloured meat which is more acceptable to export customers.

The technology has also reduced occupational heath and safety risks. Immobilisation before shackling has eliminated involuntary muscle movement in sheep after slaughter, which has provided a safer working environment for operators."

– Dave McKay, Fletcher International Exports plant manager

Frontier technology investment

Parallel to research and development that is modernising meat processing is frontier biotechnology research into the management of cattle genetics. This is improving traits related to feeding efficiency, tenderness and marbling, which are critical for optimising meat eating quality in a feedlot system.

Through its Partners in Innovation program, MLA's original technology has been licensed to Brisbane company Genetic Solutions, which has refined the DNA test and developed a faster, more accurate and cheaper suite of DNA markers.

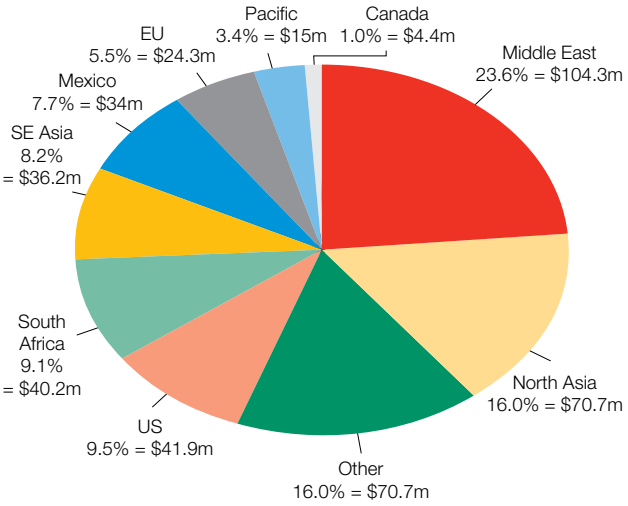
New markers have improved quality predictability and control in the production chain, allowing seedstock breeders and lotfeeders to select animals of low feed intake without reducing fat levels, and to select cattle for higher marbling markets.

"The commercial partnership has added significant value and produced broader industry benefits, potentially saving the beef industry millions of dollars." – Jay Hetzel, Genetic Solutions director

Collaborating for success

The rapid industry adoption of processing technology arising from the MQST program is the result of successful collaboration between a number of organisations. MLA acknowledges the contribution of the Australian red meat industry, state departments of agriculture, CSIRO, the Beef and Sheep CRCs, Meat & Wool New Zealand and Realcold Milmech.

Australian mutton exports (volume) 2005-06

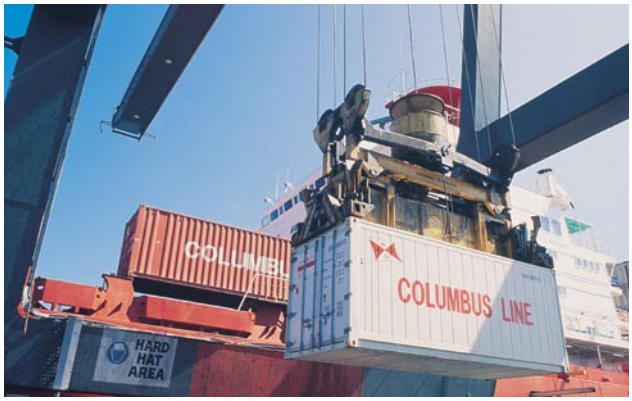


Total = 145,186 tonnes shipped weight
(185,280 tonnes carcase weight)

SOURCE: DAFF/ABS

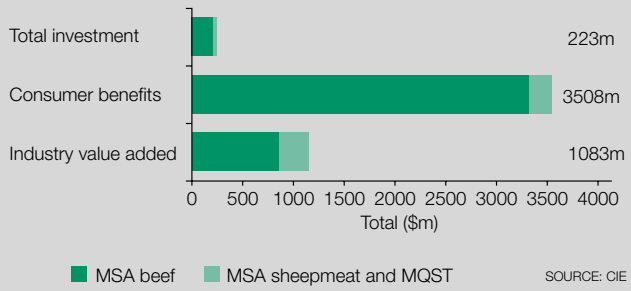
Improved colour: export value

- Exports valued at more than $440 million account for 76 per cent of total domestic mutton production of 243,789 tonnes (ABS 2005–06) and have made Australia the world's largest mutton supplier
- Electrical immobilisation and stimulation technology is being used to produce light coloured meat, satisfying lucrative export market demands
- The technology is applied to more than 70 per cent of the sheep mutton processing capacity in Australia
- Improved colour helps Australia's mutton processors and exporters to retain a competitive lead internationally

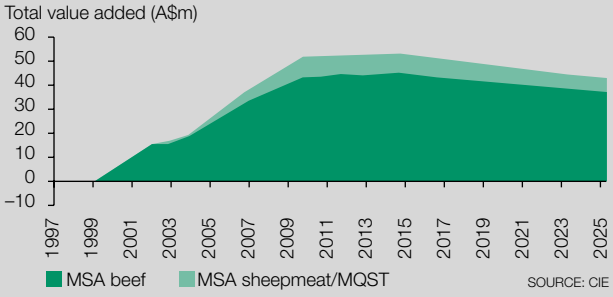


Paddock to plate: the eating quality pay-off

Economic benefits from eating quality (net present value 2005)



Benefits from the Eating Quality program over time



Benefits from MSA beef begin much earlier than for MSA sheepmeat and MQST. However the lessons learned from MSA beef enable faster industry adoption of the MSA sheepmeat and MQST programs, with maximum benefits occurring in 2010.

Lessons learned from this evaluation

The performance targets for MSA beef set by the industry steering committee in 1996 were to achieve a 10 per cent price premium for MSA beef products, with at least 30 per cent of beef carcases being MSA-graded by 1999.

Point-of-sale data comparing prices for similar graded and ungraded cuts demonstrate price premiums have exceeded the target, although it took 10 years to achieve this. Processor adoption of MSA carcase grading has taken longer than originally anticipated and is only now approaching the 30 per cent target.

The original tactics for program implementation were insensitive to industry concerns that a generic eating quality standard could erode the value of company brands and competitive point of difference. These concerns, in addition to the cost burden of MSA graders on meat processors, were key impediments to early adoption of MSA product branding and carcase grading.

MLA responded by refocusing its resources to facilitate higher adoption within the processing sector by supporting the training of company-based MSA graders. MLA has also worked directly with domestic retail and food service supply chains to secure a whole-of-chain commitment to eating quality. The current level of consumer confidence in MSA has been hard-won, and MLA recognises that it must be vigilant to ensure the integrity of eating quality standards. Consumer confidence in MSA is critical for sustaining future industry benefits associated with the eating quality program.

The MSA sheepmeat and MQST programs have enjoyed accelerated adoption by adapting the program implementation tactics used by MSA beef to the sheepmeat industry.

MLA's engagement with supply-chain stakeholders, including major retailers and food service providers, has been backed by high-profile consumer promotions. These efforts have stimulated demand-driven industry adoption of program outputs, with growing evidence of consequent benefits flowing back to the producer.

Fast financial facts

Eating quality

Industry investment to 2005	**$183 million**
Industry benefit to 2005*	**$159 million**
Forecast investment over 33 years†	**$223 million**
Forecast industry benefit over 33 years†	**$1.1 billion**

**Preliminary estimates of the economic benefits of Meat Standards Australia*, Beef CRC 2006. †1996–2029

Inputs to impacts

Total program

- A $223 million investment in eating quality is expected to produce a $1.1 billion benefit for the Australian red meat industry between 1996 and 2029.
- The industry benefit-cost ratio of the Eating Quality program is 5:1.
- The impact on consumers is expected to generate a total $3.5 billion net benefit to Australians between 1996 and 2029.
- The total benefit-cost ratio of the Eating Quality program is 20:1 including flow-on benefits to the national economy.

MSA beef

- The Eating Quality program is delivering social benefits including higher incomes, extensive training and upskilling, and reduced OHS risks.
- The $210 million investment in MSA beef will pay off over the next 30 years. It is expected to generate $932 million in red meat industry added value and $3.4 billion net benefits to Australians.
- It is anticipated that steady adoption will see 80 per cent of all eligible beef processed using MSA pathway technology by 2010.
- Australia's largest beef retailers use MSA principles.

MSA sheepmeat/MQST

- The $10.3 million investment in MSA sheepmeat and MQST, and $2.5 million contribution for technology implementation, are expected to generate $151 million in red meat industry added value and $79 million net benefits to Australians.
- Adoption by all major sheep processors will see up to 78 per cent of Australian sheepmeat processed in accordance with MSA sheepmeat and MQST initiatives by 2010.

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