2019
Australian Beef Sustainability **Annual Update**

Australian Beef Sustainability Framework

Highlights and challenges

FRAMEWORK

Australian Beef Sustainability Framework

Held two Consultative Committee forums with stakeholders in the past year, taking the total to four

Showcased the Framework at major events including Beef Australia, COP24, and ABARES Outlook 2019

Established a three-year Steering Group plan

83%

Collected data for 83% of indicators, a 23-point increase from last year

Developed national indicators and measures for the balance of tree and grass cover priority

Collaborated with businesses to use the Framework as a blueprint for their own initiatives and sustainability reporting

ENVIRONMENTAL STEWARDSHIP

56%

56% reduction in absolute beef CO_2e emissions from the Paris baseline year 2005

Climate Proofing Australia established to advocate for better climate change policy

A target set by National Farmers' Federation for 50% renewable energy use on Australian farms by 2030

PEOPLE AND THE COMMUNITY

World-leading food safety record

Launched the Rural Safety and Health Alliance to invest in work, health and safety solutions

39%

39% of feedlots voluntarily implemented an antimicrobial stewardship plan after only one year of guidelines being released

Sources available on www.sustainableaustralianbeef.com.au/highlights

ANIMAL WELFARE

15%

Pain relief use up from 4% to 15% of the herd, with industry focused on driving rapid uptake

82%

Vaccination of clostridial diseases up from 71% to 82% of herd

86%

Poll gene prevalence significantly up to 86% of the cattle herd removing the need for producers to dehorn

ECONOMIC RESILIENCE

$400 million

National Livestock Genetics Consortium established to deliver more than $400 million in industry improvements

$152 million

$152 million added to farmgate returns by the Meat Standards Australia program

1% increase in average farm business rate of return on capital

CHALLENGES

Extreme climate events, like drought and floods, are impacting on farmers and the land and animals they care for

Rising energy costs increase industry costs and diminish international competitiveness

Australia's cost of beef production continues to be considerably higher than overseas competitors

Labour shortage means the meat processing sector needs 3,000 more workers to be at capacity.

UN report shows that global biodiversity loss is happening at unprecedented rates

China's restriction on recycling waste imports creates challenge for recyclable packaging

Animal activists threaten the safety of Australia's farmers and biosecurity by trespass

The beef industry is one of the high risk industries for work health safety

About this report

The Australian beef industry, in collaboration with stakeholders, developed the Australian Beef Sustainability Framework (the Framework) to meet the changing expectations of consumers, customers, investors and other stakeholders, and promote the longevity and prosperity of the industry. The Framework defines sustainable beef production and tracks performance over a series of indicators annually.

This report is the second Annual Update for the Framework. It includes:

- The progress of the Framework
- Activity underway or planned for six key priorities selected by stakeholders
- A situation statement and, where data permits, reports on industry performance across 23 priority areas
- Case studies of sustainable practice through the value chain.

This update has been prepared following the reporting principles of the Global Reporting Initiative (GRI), but not in accordance with the Standards, recognising that the Standards have been established for entities and not for whole-of-industry reporting.

The scope of the Framework covers the Australian beef industry including farm, feedlot, processor, saleyard, land transport and live export. The Framework's scope does not include domestic and overseas customers, or consumers.

Materiality

A formal materiality assessment was undertaken in 2016 based on both the AA1000 AccountAbility Assurance Standard and GRI content principles. The results of this materiality assessment are presented in our 2016 materiality matrix on page 70 which has informed the development of the Framework's 23 priorities.

A full materiality assessment will be conducted in 2020 and will inform our 2021 report.

OUR APPROACH TO MATERIALITY

Phase 1: Review

- Review of the material issues from an initial materiality assessment undertaken in 2012

Phase 2: AccountAbility Five Part Test in 2016

- Context, risk, media and peer review
- Stakeholder engagement
- Identification of preliminary material issues

Phase 3: Validation

- Validation of preliminary issues by the independent 2016 Sustainability Steering Group

Stakeholder inclusiveness

The Framework has formally engaged industry and external stakeholders in the bi-annual Consultative Committee forum. On average over 40 stakeholders attend each workshop representing different businesses, groups and organisations across the community and value chain. Read more on this engagement process on pages 21-22.

The Framework has engaged experts in academia and data science for the reporting of one of its six key priorities – *the balance of tree and grass cover.* Read more about this engagement on pages 23-31.

More broadly, the Framework engages the wider industry as well as external stakeholders through presentations at large events such as Meat & Livestock Australia's AGM, Beef Australia, ABARES Outlook, Global Food Forum and producer events. These events reached a total audience of several thousand. Read more about these events on page 19. The Framework engages the public through its online consultation platform accessible at **www.sustainableaustralianbeef.com.au** and through Twitter.

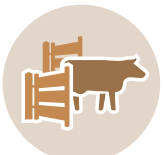
More informal stakeholder engagement occurred throughout the year, including phone calls, meetings and presentations to a broad range of stakeholders. The Framework does not currently track these informal engagements.

We welcome your feedback

Feedback on this report and the Framework generally can be made through **www.sustainableaustralianbeef.com.au/annual-update-2019**.

Six key priorities

Six key priority areas were selected by our stakeholders in 2017. This Annual Update reports on these six key priorities in detail on pages 32-57, providing summary information on the remaining 17 priorities on pages 58-68. While reporting is focused on these six priorities, industry activity continues across all priorities which remain important to our stakeholders and are critical to the Framework.



Animal husbandry techniques

Profitability across value chain

Balance of tree and grass cover

Antimicrobial stewardship

Manage climate change risk

Health and safety of people in the industry

Contents

Remarks from the Red Meat Advisory Council Chair

A difficult time for many

The past year has been a challenging one for our industry: ongoing drought and other extreme weather events including flood and bushfire have hit many of our beef producing regions.

My thoughts are with the thousands of producers throughout the country who face difficult decisions every day. While these immediate challenges have understandably preoccupied industry in the past year, work has continued to shore up the longevity and long-term prosperity of our industry.

The Red Meat Advisory Council (RMAC) is now working with industry and external stakeholders to develop a new Meat Industry Strategic Plan (MISP) that will guide a profitable and sustainable industry to 2030 and beyond.

The MISP 2020-2030 will also include the findings of the Red Meat MoU Review that will ensure representation and governance best serves the industry.

Tackling evolving sustainability challenges

Demands from outside our industry to prove our care of people, animals and the environment have grown since the publication of last year's *Beef Sustainability Annual Update*.

The beef industry's goal to become carbon neutral by 2030 has launched countless productive conversations with partners. The importance of this target is even clearer following the release of the Intergovernmental Panel on Climate Change's (IPCC) special report on the impacts of global warming of 1.5°C above pre-industrial levels. We are ready to step up to the challenge. Last year, we joined the Australian Forest Products Association, Farmers for Climate Action and Greening Australia to launch the Climate Proofing Australia alliance to advocate for a whole-of-landscape approach to tackle climate change.

Deforestation continues to be a big issue both in Australia and overseas. Last year, WWF's *Living Planet Report* named Australia as the only developed country on its list of 11 global deforestation hotspots. And by the end of next year, many of our suppliers and customers will seek to have reduced or removed deforestation from their supply chain in line with the New York Declaration on Forests. The Australian Beef Sustainability Framework (the Framework) has been working collaboratively across the supply chain to address this challenge. Incredible progress has been made in measuring what matters and is captured in detail in this report.

A UN-backed report, released in May 2019, showed biodiversity loss is happening at rates unprecedented in human history. As managers of half of Australia's land, beef producers have a vital role in addressing this global challenge. Good practice means protecting and enhancing biodiversity by managing weeds, invasive species and fire while also producing food for the world.

The Australian Federal Government passed the *Modern Slavery Act*, calling for supply chain transparency. Human rights issues like modern slavery will be important topics to address as we review and update the Framework in 2020.

China's decision to restrict imports of recycling waste renewed political and public attention on both food and packaging waste. Australia's beef processors are leaders in turning waste-streams into value-streams to reduce waste. We have research underway to explore alternatives to plastic that won't have a perverse impact of increasing food waste.

Recently, a wave of protests by animal activists across the nation caught the public eye and threatened the safety of food workers through trespass and invasion. Animal welfare matters to the industry. However, the safety of our workers is of paramount importance. We welcome constructive discussions to continuously improve animal welfare that do not place our people in harm's way.

The rising cost of energy and political impasse on the topic has continued in the past year. The industry is taking action to use energy more efficiently and tap into renewables. The National Farmers' Federation has set the target of Australia's farm energy sources being 50% renewable by 2030.

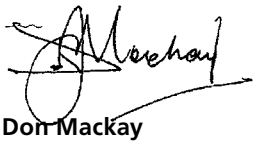
Beef has a significant role to play in feeding the world and combatting global food insecurity. To scale food production to meet the needs of 11.2 billion people by 2100 the industry must become more efficient and sustainable. Following publication of the EAT-Lancet report on the topic and the World Government Summit's *Agriculture 4.0* report, such conversations are critical and we welcome engagement. We believe that with extensive rangelands and limited arable land, Australia is extremely well suited for grazing livestock to provide a highly nutritious protein source to the world.

Progressing sustainability

These examples demonstrate that two years on from the Framework's launch the trends that motivated the industry to develop it have strengthened, and there continues to be a need for transparent reporting and commitment to continuous improvement.

The Framework is one of RMAC's flagship vehicles to tackle sustainability. Success means protecting our $65 billion turnover industry over the next 10 years, and bolstering an important part of the Australian economy, employment and national identity.

By looking at these issues as opportunities to work together, we can strengthen our industry and advance the value, reputation and sustainability of our 82,500 red meat businesses.



Don Mackay
Independent Chair, Red Meat Advisory Council

Remarks from the Sustainability Steering Group Chair

> We believe that with extensive rangelands and limited arable land, Australia is extremely well suited for grazing livestock to provide a highly nutritious protein source to the world.
>
> – Don Mackay

A year of progress

The Australian Beef Sustainability Framework's Sustainability Steering Group (SSG) has worked hard in the past year to fill the gaps to provide a fuller picture of how the industry is addressing sustainability issues. Any of these issues could impact our longevity and prosperity, if not appropriately managed and communicated.

We've continued to consult widely to understand which issues matter to industry and external stakeholders, including customers, investors, special interest groups, the community and governments.

We've also drawn on the technical knowledge of a wide range of experts to advise us on how to refine how we measure and report one of the Framework's six key priorities, the *balance of tree and grass cover*. This priority includes how vegetation is managed to benefit both production and environmental outcomes and reviewing these indicators has been the main focus for the Framework team in the past year.

We are proud that we have received support from a wide range of stakeholder groups on the new indicators and measures for the *balance of tree and grass cover*, but acknowledge that over time they can and will be strengthened. Details on these new indicators and how we developed them are on pages 23-31.

What's next for the Framework?

The Framework is an extremely valuable tool for our industry. It is a document and process that provides a base for discussions with customers around the world, financiers, governments and the public.

The challenge going forward is ensuring that everyone throughout the value chain – from producers, processors, transporters through to retailers – understands the Framework. More people in the industry are aware of the Framework now than a year ago, but we have a long way to go to have widespread awareness of changing community expectations and the role of the Framework.

We need to continue working to deepen the understanding across the value chain so that the Framework's role to support continuous improvement in beef businesses can be fully realised.

Launching off a strong foundation

The Framework team has worked hard to collect data and we are proud to present data across 83% of our indicators. This is a strong foundation, but the Framework still has huge potential to grow and support continuous improvement.

Reaching this potential will require a long-term effort. That's why the SSG has laid out its ambitious 10-step workplan for the next three years on pages 20-21. One of the crucial steps will be embarking on a process to develop targets across all 23 priorities. Like all other aspects of our Framework, we will consult and collaborate widely to develop these targets. It will take the Framework from a tool primarily to measure and report sustainable beef production, to directing change.

By setting targets, we can measure the industry's performance against them and show when industry is on track and where there is room to improve. It will help show trends over time and show our customers, consumers and other stakeholders both in Australia and overseas that the Australian beef industry is committed to continuous improvement in its care of people, animals and natural resources. Importantly it will also provide an invaluable tool to industry to ensure that the research, extension and adoption services we invest in are delivering the outcomes we need to ensure our customers continue to trust and enjoy our great product.

T. Herbert

Tess Herbert
Chair,
SSG for the Australian Beef Sustainability Framework

Our industry

The beef value chain

PRODUCTION

Farmers and graziers breed and raise beef cattle throughout Australia, with about half of the national herd in Queensland.[1]

About two-thirds of Australian cattle are grass-fed, spending their entire lives grazing on pastures. The remaining third are grain-fed, spending most of their lives grazing pastures before being fed on grain in feedlots.[2]

PROCESSING

Australia has around 300 abattoirs, with a 29,800-strong workforce.

Processors have strong policies and procedures relating to food safety, quality assurance, animal welfare, environmental and health and safety.[3]

The processing pathway includes stockyards, slaughter floor, chillers, boning room, packaging areas and freezers through to refrigerated shipping containers and trucks.

SALES (EXPORT)

Australia exports almost 70% of the beef it produces, making it the second largest exporter of beef in the world.

Live cattle are exported to countries that cannot produce sufficient beef to feed their populations, and require live cattle for religious or logistical reasons.[4]

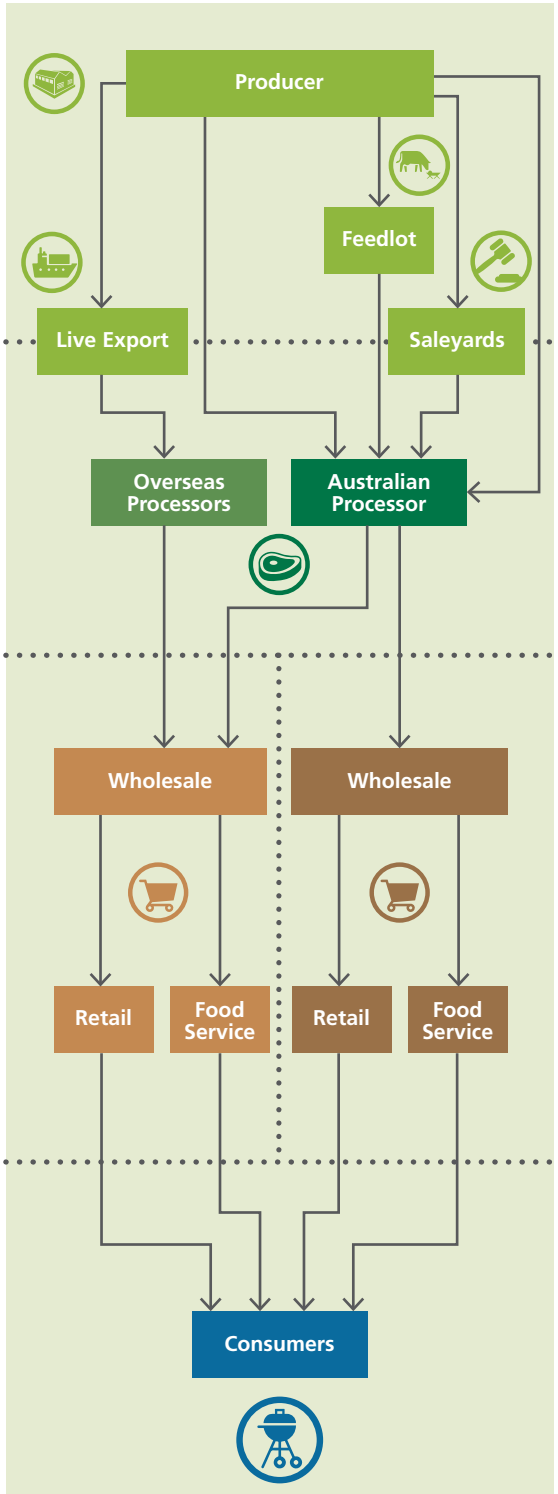
SALES (DOMESTIC)

Australians eat an average of 26kg/year of beef, making them one of the world's largest per capita consumers of beef.[5] Supermarkets are the top source for fresh meat in Australia, followed by specialty retailers such as butchers, farmers' markets and delicatessens.[6]

CONSUMPTION

Over the past two decades, total global consumption of beef has increased by 1% per year.[7] In 2017, beef accounted for 21% of total global meat consumption (excluding seafood).[8]

The industry promotes consumption in line with the Australian Dietary Guidelines which recommend 130g of lean and cooked red meat every other day. Lean red meat plays an important role in a healthy, balanced diet.[9]



Trends

UNPRECEDENTED DEMAND

Global demand for red meat is forecast to increase 1-2% per year with increasing global populations and growing incomes, especially in Asia.[10]

RISING ENERGY COSTS

Energy costs have increased significantly in Australia in the past decade and now represent a higher proportion of production costs for beef businesses.[11]

HEIGHTENED CONSUMER EXPECTATIONS

Consumers have higher expectations of products than ever before, with some reducing or avoiding red meat for perceived environmental, health or animal welfare concerns.[12]

INCREASING URBANISATION

Australia is highly urbanised with 71% of the population living in major cities, widening the regional-urban divide in terms of skills, labour and perspective.[13]

DISRUPTIVE TECHNOLOGY

Rapid technological advancement is disrupting beef businesses, creating opportunities to boost productivity as well as creating new competitors, including lab-grown proteins.

CLIMATE CHANGE

Climate change is expected to continue accelerating, exacerbating climate variability and adding to the risk and unpredictability of being a beef business.

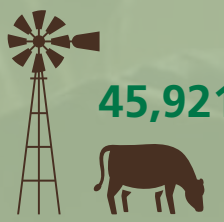
BIODIVERSITY LOSS

Much in the natural world upon which humans depend for food production, recreation and livelihood is at risk of being lost forever.

Our industry (continued)

Industry snapshot

PEOPLE IN THE INDUSTRY



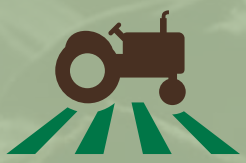
45,921

There were 45,921 agricultural businesses with cattle as at June 2018.[14]

438,100

In 2016-17, the Australian red meat and livestock industry directly employed just over 191,800 people, and 246,300 indirectly – a total of 438,100.[15]

90%



90% of meat and livestock industry employees live in rural and regional areas.[16]

HOW MUCH IS PRODUCED?

2.24m tonnes

In 2017-18, Australia produced 2.24 million tonnes carcase weight of beef and veal.[17]

34.5b meals

Enough beef produced to provide 34.5 billion meals that satisfy the recommended daily intake of red meat.[18]

HOW MUCH IS IT WORTH?

The gross value of Australian cattle production (including live cattle exports) in 2017-18 was $11.4 billion.[19]

$65 billion

Australia's red meat and livestock industry turnover was $65 billion in 2016–17.[20]

The red meat and livestock industry accounted for approximately 1.6% of Australia's GDP.[21]

The value of cattle contributed to 19% of Australia's $60.5 billion total farm value in 2017-18.[22]

Sector snapshots

PRODUCTION FIGURES

26.4m

The Australian cattle herd was 26.4 million head at 30 June 2018.[23]

2%

Australia has around 2% of the global cattle herd.[24]

$34.9 billion

Red meat and livestock production (producers and feedlots) accounted for 54% or $34.9 billion of overall red meat industry turnover in 2016-17.[25]

LIVE EXPORT

9,799

Responsible for 9,799 full-time equivalent employees.[26]

1.1m

1.1 million head of cattle exported on average between 2012-2017.[27]

$630m

$630 million of revenue a year returned direct to cattle farmers.[28]

FEEDLOT

4%

At any one time 4% of the herd is in a feedlot.[29]

2.8m

In 2017–18, 2.8 million grainfed cattle were marketed (feedlot turnoff) – representing 38% of all adult cattle processed.[30]

1.1m

The national quarterly average of cattle on feed was 1.1 million head in 2018 – 7% higher than the previous year.[31]

PROCESSING

$3.4b

Processing accounted for 18% or $3.4 billion of overall industry value add in 2016-17.[32]

29,800 jobs

In terms of direct employment in 2016-17, the processing sector delivered almost 29,800 jobs, many in regional communities.[33]

7.2m

7.2 million head of cattle processed in 2017.[34]

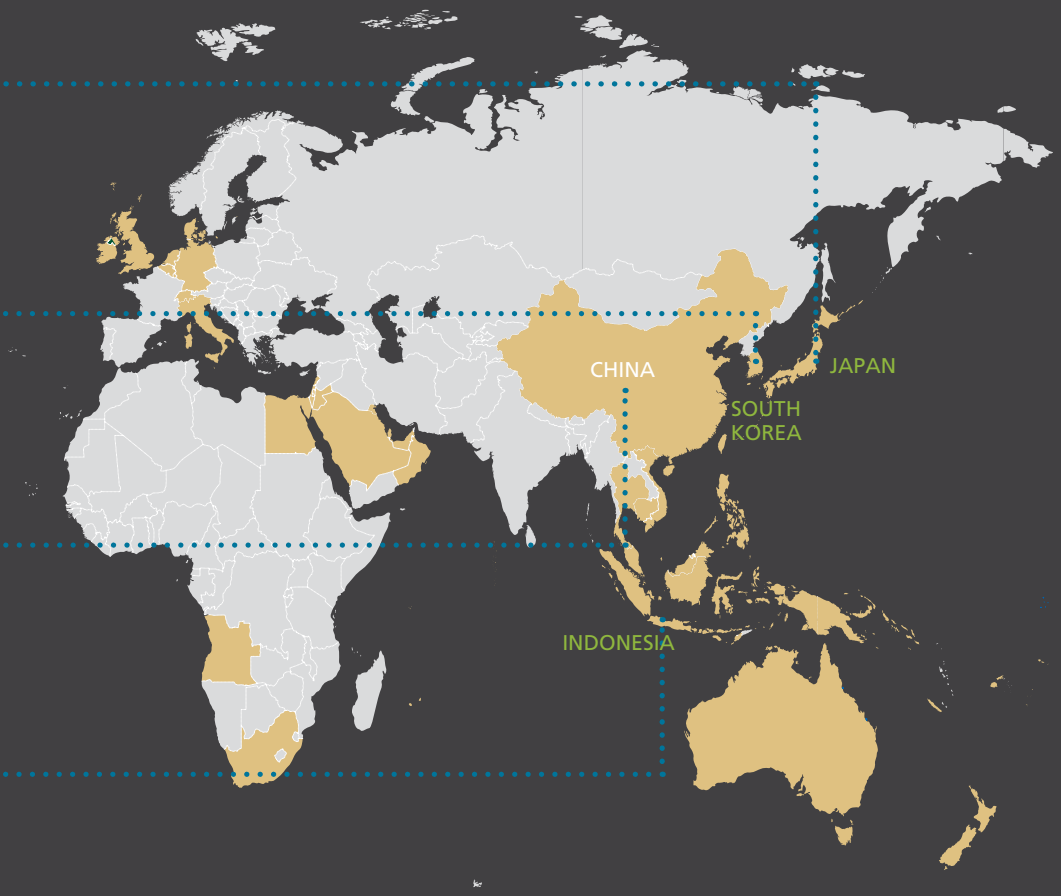
Our industry (continued)

Exporting to the world

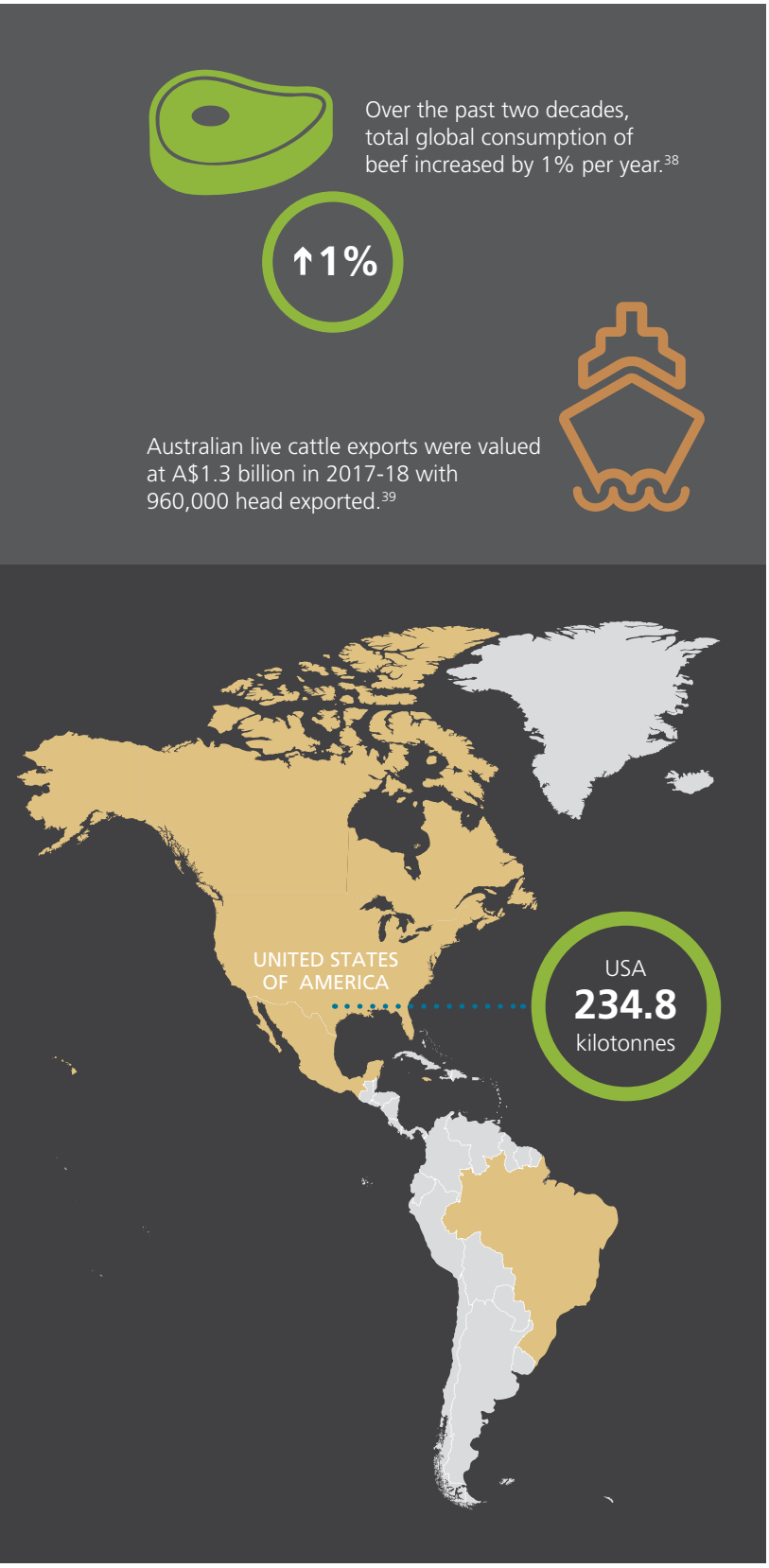
In 2017-18, Australia exported 71% of its total beef production, comprising 1.1 million tonnes of product to more than 78 countries.[35]

Australia was the second largest beef exporter in 2018 after Brazil.[36]

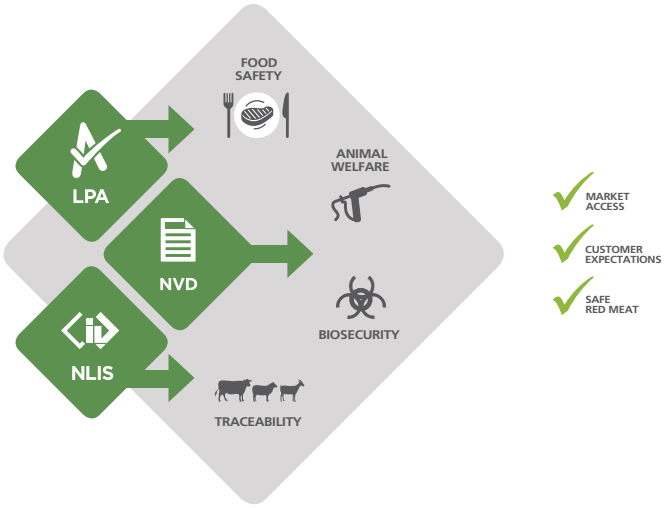
The value of total beef exports in 2017-18 was A$8 billion.[37]



Australian beef can be found across the world, exporting to more than 100 countries. These figures show the volume of Australian beef shipped to these countries. In 2017-18, Japan continued to to be Australia's top beef market by shipping weight.[40]



Integrity systems



Australian beef enjoys market access to more than 100 countries due to consistent quality and strong systems that guarantee its integrity. Australia's integrity systems lead the world in food safety measures, quality assurance and traceability from paddock to plate.

The three central elements of the red meat integrity system are:

- National Livestock Identification System (NLIS)
- Livestock Production Assurance program (LPA)
- LPA National Vendor Declaration (LPA NVD)

NLIS enhances Australia's ability to track livestock during disease and food safety incidents. It provides information through identification and traceability of livestock that underpins market access for Australian red meat globally.

LPA is an independently audited, on-farm assurance program covering food safety, animal welfare and biosecurity. It provides evidence of livestock history and on-farm practices when transferring livestock through the value chain.

Producers declare this information on LPA NVDs which are required for any movement of stock to processors, saleyards or between properties.

The Australian Beef Sustainability Framework

Our vision

A thriving Australian beef industry that strives to continuously improve the wellbeing of people, animals and the environment.

How do we define sustainability?

Sustainability is the production of beef in a manner that is socially, environmentally and economically responsible. We do this through the care of natural resources, people and the community, the health and welfare of animals, and the drive for continuous improvement.

The Framework has four themes which are shown below. To capture their detail and complexity, these four themes have been broken into 10 different priority areas that stakeholders identified, across which 23 priorities sit.

ANIMAL WELFARE

The wellbeing and health of animals is paramount for farmers and the broader beef industry. The industry invests in research, development and adoption programs to ensure high standards of animal welfare and continuous improvement.

In addition, good animal welfare is a legal requirement in Australia and cruelty to animals is a criminal offence.

The animal welfare theme of the Framework was developed with the five freedoms and, the more recent, five domains of animal welfare in mind.

1 ENHANCE ANIMAL WELLBEING

- **1.1** Competent livestock handling
- **1.2** Safe livestock transport
- **1.3** Animal husbandry techniques*
- **1.4** Humane processing

2 PROMOTE ANIMAL HEALTH

- **2.1** Maintain healthy livestock
- **2.2** Minimise biosecurity risk

ECONOMIC RESILIENCE

Australia is one of the world's largest exporters and most efficient producers of beef. However, farmer profits tend to be low, affecting their ability to withstand unexpected shocks such as drought.

The Framework seeks to strengthen industry resilience by reducing costs for the industry, which are higher than our major global competitors, and boosting productivity.

As global demand increases, expanding the industry's access to global markets will also help support more profitable, and more resilient, beef businesses.

3 ENHANCE PROFITABILITY AND PRODUCTIVITY

- **3.1** Profitability across value chain*
- **3.2** Farm, feedlot and processor productivity and cost of production

4 OPTIMISE MARKET

- **4.1** Barriers to trade
- **4.2** Product integrity

*Six key priorities selected by the Consultative Committee and Steering Group. Read more about the six key priorities on page XX

ENVIRONMENTAL STEWARDSHIP

As a major land user, the beef industry has an impact on the environment and is particularly exposed to environmental risks such as climate variability.

Without a healthy natural environment, including soil, water, air and a thriving natural ecosystem, the industry is unable to prosper. The beef value chain is committed to ensuring that any environmental impact is minimised.

The Framework also highlights the need for the industry to adapt to the changing environment.

5 IMPROVE LAND MANAGEMENT PRACTICE

5.1 Minimise nutrient and sediment loss

5.2 Balance of tree and grass cover*

6 MITIGATE AND MANAGE CLIMATE CHANGE

6.1 Manage climate change risk*

6.2 Climate change adaptation and preparedness

6.3 Efficient use of water

7 MINIMISE WASTE

7.1 Solid waste to landfill from processing

PEOPLE AND THE COMMUNITY

A safe, healthy and capable workforce, together with prosperous and resilient regional communities, is essential to the sustainability of the industry.

In Australia well-enforced laws and regulations govern human rights and fair work. As such the Framework strives for a safe and healthy workforce that can continue to grow with greater access to skills and labour.

The industry also supports the community by providing safe and nutritious beef.

8 PRODUCE NUTRITIOUS AND SAFE FOOD

8.1 Beef is eaten as part of a healthy balanced diet

8.2 Food safety

8.3 Antimicrobial stewardship*

9 BUILD WORKPLACE CAPACITY

9.1 Education and training

9.2 Diversity in the workforce

10 ENSURE HEALTH, SAFETY AND WELLBEING OF PEOPLE IN THE INDUSTRY

10.1 Health and safety of people in industry*

10.2 Wellbeing of people in the industry

The Australian Beef Sustainability Framework (continued)

Framework principles

For more information visit **www.sustainableaustralianbeef.com.au/governance-principles**

How industry is using the Framework

The Framework supports the strategy outlined in the *Meat Industry Strategic Plan 2020* to deliver for the longevity and prosperity of our people, our livestock and the communities we serve.

The Framework is used to:

- Advise industry investment for continuous improvement in areas most important to our customers and other stakeholders
- Help protect and grow access to investment and finance by providing evidence of performance and a clear path to continuous improvement
- Foster constructive relationships with stakeholders to work collaboratively on continuous improvement
- Promote our industry to the community and customers.

The Framework does not:

- Establish or endorse measurement systems at an individual business level
- Provide an accreditation or certification system
- Endorse prescriptive management practices
- Create paperwork for individual businesses – existing data is used where available.

Live export industry collaborates with Framework

The live export industry has been facing a loss of community trust following the Awassi Express animal welfare crisis in April 2018, in the sheep industry. The Australian Livestock Exporters' Council (ALEC) recognises that trust is imperative to any industry's success. And that trust is something that needs to be built and protected vigilantly.

That is why the live export industry is continuing to invest in better animal welfare – not just to tackle diminishing public trust but because it's the right thing to do. This action supports a theme of the Framework: animal welfare.

These steps included:

- Developing shipboard animal welfare measures beyond mortality rate, which will be used in Framework reporting;
- Introducing dehumidification controls and testing on vessels;
- Investing in training and infrastructure in markets to mitigate impact of stress;
- Advocating for an Inspector General of Live Animal Exports, which has now been legislated by the Government;
- Increasing space allocation for livestock on voyages;
- Imposing a voluntary moratorium on live sheep shipments to the Middle East between June and August at the height of the northern hemisphere summer;
- Progressing with the development of the Livestock Global Assurance Program;
- Introducing a mandatory Code of Conduct applicable to all ALEC members with severe penalties including suspension of membership for exporters who breach the code and bring the industry into disrepute; and
- Development and endorsement of an ethics committee independent of the ALEC board.

A collaboration of exporters, importers, industry bodies and producers has been established to show the care given to sheep throughout the live export process. It is called the Sheep Collective, and a Cattle Collective is set to follow.

Examples of companies utilising the Framework

The Framework was established as a whole-of-industry reporting tool, to define sustainable beef production and track the industry's performance. Companies can use the Framework to inform their own sustainability activities outside of the Framework process. Below are testimonials of companies that are utilising the Framework in this way.

McDonald's Australia

"McDonald's Australia and the MLA have partnered to develop a tool to enable McDonald's and others to demonstrate performance in line with the Australian Beef Sustainability Framework.

The program will facilitate measurement, verification and alignment of reporting systems as a foundation for the communication to consumers about the sustainability of the beef they are purchasing. The tool will also enable feedback to producers on their performance and enable them to benchmark against others. While the project team are using the Framework to guide development of the tool, the Framework is not involved in the pilot.

Greenham

"Greenham brands are exported to 25 countries and whilst we make many claims in the 'natural beef' space, labelling our flagship Cape Grim Beef brand as 'sustainable' is crucial to building further consumer trust and loyalty. Using the Australian Beef Sustainability Framework to support this sustainability claim and commitment to responsible consumption and production, our existing programs and certifications demonstrate Cape Grim Beef's focus on animal welfare and environmental stewardship in our region.

NAPCO

"NAPCO is working with its major investors to develop a robust approach to sustainability reporting. We have used and engaged with the Framework as a blueprint for this approach. The Framework has collaborated with key stakeholders to identify the key areas on which we, as a beef producing company, need to report. This gives us confidence that our sustainability reporting will meet the expectations of investors, customers and the community.

OBE Organic

"Farmer-owned organic beef marketing company OBE Organic reviews its FLOURISH sustainability program annually and uses the Australian Beef Sustainability Framework as one of its references to ensure completeness and consistency.

In the coming years, raising awareness of the Framework across the value chain will assist in highlighting consumer and community areas of focus. Tools will continue to be developed and refined to enable businesses in the beef value chain to demonstrate their performance against these priorities.

Progressing the Framework

In the past year, work has continued to refine indicators and gather data to improve how the Framework reports on the sustainability of the Australian beef industry. The Framework team has continued to widely consult industry and external stakeholders. The team has also worked to promote the Framework to industry, customers, investors, government and regulators, and other stakeholders. The key efforts to progress the Framework are reported in this section of the 2019 Annual Update.

Sustainability Steering Group

The Red Meat Advisory Council (RMAC) appoints an independent, grassroots group, representative of the beef value chain, to progress the Framework on behalf of industry. This group is called the Sustainability Steering Group (SSG).

RMAC appointed the first SSG in 2016 to develop the Framework. The second SSG continued consultation, the collection of data, refinement of indicators (including the establishment of the first Expert Working Group) and industry priorities, and publication of the first report.

The third and current SSG was appointed in December 2018. Key activities for the current SSG are outlined on pages 20-21.

Members of the Sustainability Steering Group

Tess Herbert is the Chair of the SSG. Tess and husband Andrew own and operate two feedlots in NSW with a combined 12,500-head capacity, as well as a mixed farming operation. Tess also sits on the Central Tablelands Local Land Services board and is a former President of the Australian Lot Feeders' Association.

Carl Duncan is Group Manager Resource Efficiency at Teys Australia, where his key responsibilities include providing strategic advice on energy, water and GHG emissions; seeking opportunities to improve resource efficiency; and leadership and capacity building around resource management. An electrical engineer by trade, Carl's core objective is to support Australian business become more profitable while improving environmental performance.

Greg Campbell worked at S. Kidman & Co for 24 years – starting as the Landcare Manager before being CEO and MD from 2001 to 2017. Greg has a strong interest in production – both landscape and cattle management. He is now semi-retired and spending more time on his family's cattle properties in the Mount Isa-Cloncurry region of Queensland.

Melinee Leather and husband Robert own and operate Barfield Station in the Banana region of Queensland. Barfield is a certified organic, PCAS, and EU property. The family also runs a sustainable timber harvesting business and cattle breeding operation at Four Mile. Melinee was previously Chair of the Cattle Council of Australia Animal Health & Welfare & Biosecurity Committee

Dr Michael Maxwell has more than 20 years' experience as a consultant and lawyer, focused on regulatory issues, international risk management, corporate culture, governance and product liability issues, including how these apply to the live export industry. His scientific research background in pharmacology and toxicology complements his legal skills.

Kim McDougall is General Manager for Livestock at Harvest Road Beef, so is responsible for all livestock procurement for WA's largest export beef processor as well as management of the beef operations as part of the Forrest family's Minderoo Station properties in the Pilbara region.

Stephen Moore is General Manager Corporate and Commercial at North Australian Pastoral Company (NAPCO), where he has direct accountability for people and culture, human resources, workplace health and safety, corporate affairs and communication. Stephen joined the NAPCO team after hanging up his boots on a lauded rugby career, playing Super Rugby for the Brumbies and Queensland Reds and winning 129 caps for Australia internationally, including as captain.

Trevor Moore is Group Systems and Compliance Manager at the Northern Co-operative Meat Company (NCMC), the largest co-operative meat company in Australia with over 800 members and nearly 1,000 employees at both the beef and pork abattoirs in northern NSW. Trevor is responsible for the environmental sustainability of both abattoirs and the business' farm.

Jenny O'Sullivan and husband Paul run a cattle and sheep farm in Victoria's South Gippsland region. They sell cattle to Coles, grass finishers or Gippsland Natural. Gippsland Natural is a producer-owned operation that Jenny helped establish and chaired for seven years. Jenny also operates Gippsland Food Adventures and is Chair of the South East Victoria and Tasmania Regional Committee of the Southern Australia Meat Research Council (SAMRC).

Bryce Camm, Jim Cudmore, Tony Hegarty and Susan McDonald were also members of the SSG in the past year and stepped down to pursue other leadership positions within or outside of the industry.

Overview of events

Sustainability Steering Group members and the Framework project manager give presentations on the Framework at events to help raise awareness and understanding of it with industry and external groups. In the past year, these events included:

Beef Australia: The *2018 Australian Beef Annual Update* was launched in May 2018 to a capacity crowd at the triennial Beef Australia event at Rockhampton, Queensland. Mark Furner MP opened the event. SSG Chair Bryce Camm, SSG member Susan McDonald and Don Mackay, Independent Chair of the RMAC, represented the Framework. Lachlan Monsbourgh, Head of Sustainable Business Development at Rabobank Australia, and Andrew Brazier, Director Beef – Worldwide Supply Chain at McDonald's, spoke in support of the Framework and how taking action on sustainability mattered in commercial settings.

JBS Great Southern Producer Forum: Pip Band, Program Manager, presented consumer insights, the sustainability strategy and Framework to more than 300 producers in Melbourne in late August 2018.

Agforce regional events: More than 400 producers were reached at a number of AgForce events across Queensland.

Global Conference on Sustainable Beef: Pip Band, program manager, and SSG member Tony Hegarty attended the event hosted by the Global Roundtable for Sustainable Beef in October 2018 in Kilkenny, Ireland. Tony presented on the progress the Australian beef industry is making to be sustainable and Pip highlighted the approach to engaging community and industry.

Red Meat 2018: ABC National Regional Affairs Reporter Anna Henderson guided a wide-ranging and insightful discussion on the big opportunities and challenges facing industry under the topic: *What can we do to support a thriving red meat industry to 2030 and beyond?* A panel of six industry leaders and external stakeholders tackled the discussion during the Industry Sustainability Forum at Red Meat 2018, in Canberra on 21 November 2018. The panellists were:

- Don Mackay (RMAC Independent Chair),
- Bryce Camm (Outgoing SSG Chair, ALFA President),
- Jamie Heinrich (Board Member, Sheep Producers Australia),
- Mark Inglis (Farm Assurance & Supply Chain Manager Livestock, JBS Swift Australia),
- Susie Craig (Sustainable Supply & Quality Manager, McDonald's Australia), and
- Stephanie Russo (Natural Capital Manager, NAB).

COP24: The 24th Conference of the Parties to the United Nations Framework Convention on Climate Change was held in Katowice, Poland, in December. Pip Band, project manager, attended to observe the discussions on behalf of MLA, invited by the Department of Foreign Affairs & Trade. Pip also met key stakeholders and spoke on two panel sessions at side-events. The first was in the Koronovia Pavillion that was organised in part by the NZ Government and the second was in the WWF pavilion on the value of savannahs.

ABARES Outlook 2019: SSG Chair Tess Herbert was a panellist on the session 'Making NRM pay', hosted by ABC Rural journalist Warwick Long. Other panellists were James Bentley of NAB, David Marsh of Mid Lachlan Landcare, and James Madden of Flinders + Co. Tess said the key to unlocking NRM's value for the beef industry was providing proof to customers, consumers, investors and other stakeholders that farmers' management of natural resources is continuously improving. The Australian Bureau of Agricultural and Resource Economics and Sciences' (ABARES) annual conference, Outlook, was held in Canberra in March 2019.

2019 Global Food Forum: SSG member Stephen Moore spoke on a panel discussion on the topic '*Agriculture's megatrends: climate change, sustainability and carbon footprints*' in March 2019 in Sydney.

Other events: SSG member Jenny O'Sullivan presented at a Livestock Productivity Partnership meeting and Pip Band, project manager, spoke at trade shows, global customer delegations, NRM and environment workshops, and producer events.

Progressing the Framework (continued)

Planning for progress

To continue progressing the Framework and striving towards a more sustainable industry, the SSG has developed a 10-step workplan. This workplan covers a three-year period from 2019 to 2021.

10-STEP SSG WORKPLAN FOR 2019-21

STEP 1

Outputs from deep dives into two key priorities

Part of the Framework's mandate is improving the credibility of its indicators and measures. In 2018-19, the SSG oversaw a thorough examination, or deep dive, into the *balance of tree and grass cover* priority. The SSG identified that vegetation measures were a critical gap, so they established an expert panel to help develop evidence-based indicators.

To be a vehicle for continuous improvement, the Framework must also continue improving. It is not practical for the SSG to do a deep dive on all the priorities at once, its members will concentrate on two more key priorities in the next three years. They will identify gaps and take action to address them.

STEP 2

Data for more Framework indicators

The Framework is a constantly evolving tool. It must reflect improvements in the industry's ability to collect data and develop indicators.

The SSG will keep working to collect more data; increase the number of indicators against which it reports; and improve the integrity and credibility of data being used.

STEP 3

A review of key material risks

A materiality matrix was developed in 2016 following a review of material risks based on the GRI content principles and AA1000 AccountAbility Assurance Standard. This work informed the priorities in the Framework.

Since 2016, a lot has changed in the beef industry, and in the world. Reviewing the material sustainability risks is crucial to ensuring the Framework stays up-to-date and on the front foot. The SSG will oversee this body of work in 2020.

STEP 4

Targets for all Framework priorities

Since the Framework's launch in 2017, work has focused on consolidating its foundation. This work has included reporting more data: from presenting data for 50% of indicators in 2017 to 83% in this report. RMAC sees setting targets as a natural progression and has directed the SSG to lead the process of target setting in order to take the Framework from a scorecard to a stronger commitment to sustainable improvement.

The Framework's mandate is to help guide industry action on sustainability. Targets will provide a tangible pathway for industry to meet consumer and community expectations. Progress against targets will provide proof of our continuous improvement to stakeholders. The SSG will consult widely and collaborate to set targets. This activity will focus on the six key priorities first.

STEP 5

A map of how the SDGs align to Framework priorities

The UN Sustainable Development Goals (SDGs) represent the world's plan for action on sustainability. When the Framework was released, work was done to show which SDGs the Framework addressed.

The SSG seeks to take another step and show how the SDGs and their targets map across the Framework's 23 priorities. The aim is to translate the Framework to a common, global language understood by business leaders and governments to build trust and support collaboration.

STEP 6

Enhanced engagement with industry groups

In 2018, the Framework team engaged industry groups through presentations, briefings, reports and meetings. Industry ownership and support for the Framework is important to its progression.

The SSG will continue to closely engage these industry groups. Progressing the Framework priorities requires coordinated industry effort. Consistently involving industry stakeholders and expanding how we engage them will be key to the Framework's success.

STEP 7

Half-yearly Consultative Committee forums

The Consultative Committee serves as a reference group for the Framework. Consulting with the group has provided valuable insight and perspective into the activities and expectations of our non-industry stakeholders. Their input was used to help determine the six key priorities.

The SSG will continue holding Consultative Committee forums twice a year to share knowledge, seek collaborative opportunities and learn from diverse perspectives.

STEP 8

Engagements with key stakeholders

The SSG interacts with a variety of stakeholders such as government, corporates, grassroots producers, NGOs and financial institutions. In the past year, the SSG has unlocked opportunities by engaging these groups, using the Framework to guide sustainable practice.

The SSG will continue this active engagement with key stakeholders. Grassroots producers and financial institutions will be a focus.

STEP 9

Annual Sustainability Reports

The first Annual Update was published in 2018, reporting against the Framework's 23 priorities and filling data gaps.

Now that Framework's data foundation has been established, the SSG hopes to show trends over time. The SSG will keep reporting annual progress against the indicators. With the addition of targets, the SSG hopes these reports will become an even more powerful story of progress and commitment to continuous improvement.

STEP 10

Advocacy in media and at events

Building industry and key stakeholder awareness and buy-in to the Framework is an important part of effecting industry-wide change. In 2018, SSG members were advocates for the Framework in the media and at significant industry events like Beef Australia.

The SSG will continue spreading the word to industry and external audiences to grow awareness of the Framework and the efforts to create a more sustainable beef industry.

Engaging our stakeholders

Consultative Committee

The Consultative Committee serves as an invaluable reference group for the Framework. It includes representatives from Australian retailers, banks, investors, special interest groups, NGOS, agribusiness, researchers, government, policy organisations and industry groups.

The establishment of the Consultative Committee recognises those within and outside of the industry must work together for the Framework to be valuable, relevant and robust.

The commitment made to the Consultative Committee is that all views are listened to and considered, with clear reporting of why or why not suggestions were actioned. See page 22 for more information.

In addition to domestic stakeholders engaged through the Consultative Committee, there has been increased interest from overseas customers and other stakeholders in the last year. Framework representatives have presented in Ireland, Japan, United Kingdom and Poland and information has been shared in key exports markets, including Europe, USA, Middle East and Asia.

The Consultative Committee meets twice a year to:

- Share information and insights about emerging trends, issues and opportunities for sustainable food production
- Identify emerging issues and opportunities for industry
- Confirm the priority areas of sustainable beef production for reporting progress to stakeholders and the wider community
- Enable the SSG (and therefore, industry) to better anticipate emerging focus areas for customers and other stakeholders
- Provide the SSG with more information to better implement the Framework.

For example, in the past two Consultative Committee forums (August 2018 and February 2019) stakeholders have provided feedback to the SSG on the proposed indicators on the *balance of tree and grass cover.*

For more on the Consultative Committee, including the forums' agendas, presentations, attendees and workshop reports, visit: **www.sustainableaustralianbeef.com.au/consultative-committee**

Progressing the Framework (continued)

Organisations and companies represented

CONSULTATIVE COMMITTEE

INDUSTRY ORGANISATIONS

AGFORCE
Australian Livestock Exporters' Council ALEC
ALFA Australian Lot Feeders' Association
ALMA Australian Lamb Processors Association
AMIC
AMPC Australian Meat Processor Corporation
Australian Dairy Sustainability Framework
Cattle Council of Australia
Dairy Australia
mla Meat & Livestock Australia
NSW Farmers
RMAC

BEEF BUSINESS

AACo The Art of Australian Beef
Greenham
Gundamain Feedlot
JBS
John Dee
NAP
NCMC
Teys

FINANCIAL INSTITUTIONS AND AGRIBUSINESS

ANZ
Elders
nab
Rabobank
Westpac

CUSTOMERS

AgriFoods Global Pty Limited
coles
Keystone
McDonald's
BSI
Woolworths

SPECIAL INTEREST GROUPS AND NGOS

animalhealth Australia
AVA Australian Veterinary Association
desert channels Queensland
FCA Farmers for Climate Action
Future Farmers Network
NRM Regions Australia
RSPCA
The Wilderness Society
WWF
Youth Food Movement Australia

RESEARCH AND ACADEMIA

Australian National University
ClimateWorks Australia

GOVERNMENT AND REGULATORS

Australian Government Department of Agriculture and Water Resources
PrimeSafe

Refining indicators for the balance of tree and grass cover

Why it matters

Tree and grass cover impact both the environment and production. This vegetation is critical for storing carbon and preserving biodiversity and soil health. This plant life also plays a significant role in productivity, affecting profitability and the livelihood of people and communities in the industry. Balancing these sustainability issues has been a challenge for the Framework.

The topic is incredibly complicated and of increasing interest to stakeholders through the value chain. Landholders in Queensland are concerned that laws would impact their ability to manage areas of regrowth and woody thickening which has negative consequences for production and, in many areas, also the environment.

Deforestation is a hot topic, with Australia singled out as the only developed country identified as a 'deforestation hotspot' by the *WWF Living Forests* report.[41] The New York Declaration on Forests' goal to halve global deforestation by 2020 has motivated public commitments from beef customers.[42] McDonald's, the largest single customer of Australian beef, has committed to eliminate deforestation from its beef supply chain by 2020.[43] Fourteen of the industry's largest global retail customers have also made a similar public commitment to eliminate deforestation from their supply chains as a member of the Consumer Goods Forum.[44]

In response to our stakeholders, the Framework has spent the past year focusing on developing evidence-based and practical measures for the *balance of tree and grass cover.* In doing so, the Framework has chosen to tackle what is likely the most challenging of the six key priorities to add certainty, clarity and credibility to the conversation.

Getting experts' opinions

To help tackle this priority, the SSG convened the first multi-disciplinary Expert Working Group (EWG) in June 2018 to review, refine and propose indicators for *the balance of tree and grass cover.*

The EWG included thought-leaders across the fields of ecology, remote sensing, biodiversity, conservation, animal productivity, and grasslands. These technical experts provided advice to the SSG on robust, credible and practical indicators and measures for the key priority area.

The experts provided diverse perspectives to the SSG from their different disciplines. Balancing these perspectives was one of the challenges in refining the indicators. Additionally, the vast regional differences in climate and ecosystems presents a challenge of how to develop national measures that are also regionally meaningful and able to be used to drive change on the ground in the coming years.

Expert Working Group members

Name	Organisation
Dr. Steven Bray	QLD Department of Agriculture and Fisheries
Dr. Bill Burrows	Former QLD Department of Agriculture and Fisheries principal scientist
Dr. Robyn Cowley	Northern Territory Department of Primary Industries and Resources
Dr. Thomas Davison	Livestock Productivity Partnership
Dr. Teresa Eyre	Queensland Herbarium
Dr. Lachlan Ingram	University of Sydney
Dr. John Leys	NSW Department of Environment
Prof. David Lindenmayer AO	Australian National University
Prof. Jeremy Russell-Smith	Charles Darwin University
Dr. Peter Scarth	University of Queensland
Phil Tickle	Cibo Labs

Refining indicators for the balance of tree and grass cover (continued)

Principles for refining indicators

1	The focus for the Expert Working Group is to develop indicators for balance of tree and grass cover. However, **consideration needs to be given to the interconnectedness of indicators across the Framework themes** (economic, social, environment and animal welfare).
2	Indicators and measures should be designed with the objective to **improve the enviromental basis** (soil, water, vegetation and fauna) **without negatively impacting productivity**.
3	The wide variation in geoclimatic and biological conditions across Australia requires **a regional approach to indicator development that can be aggregated to a national report**.
4	Measures for assessing industry performance against the indicators **must be assessable with minimum resource expenditure**. Remote sensing is preferred, however ground-truthing will be required in the development and ongoing evolution of the indicators.
5	Indicators will continue to **evolve over time**. They will not be perfect at the start, but need to be established in a way that enables outcomes and trends to be tracked over time.

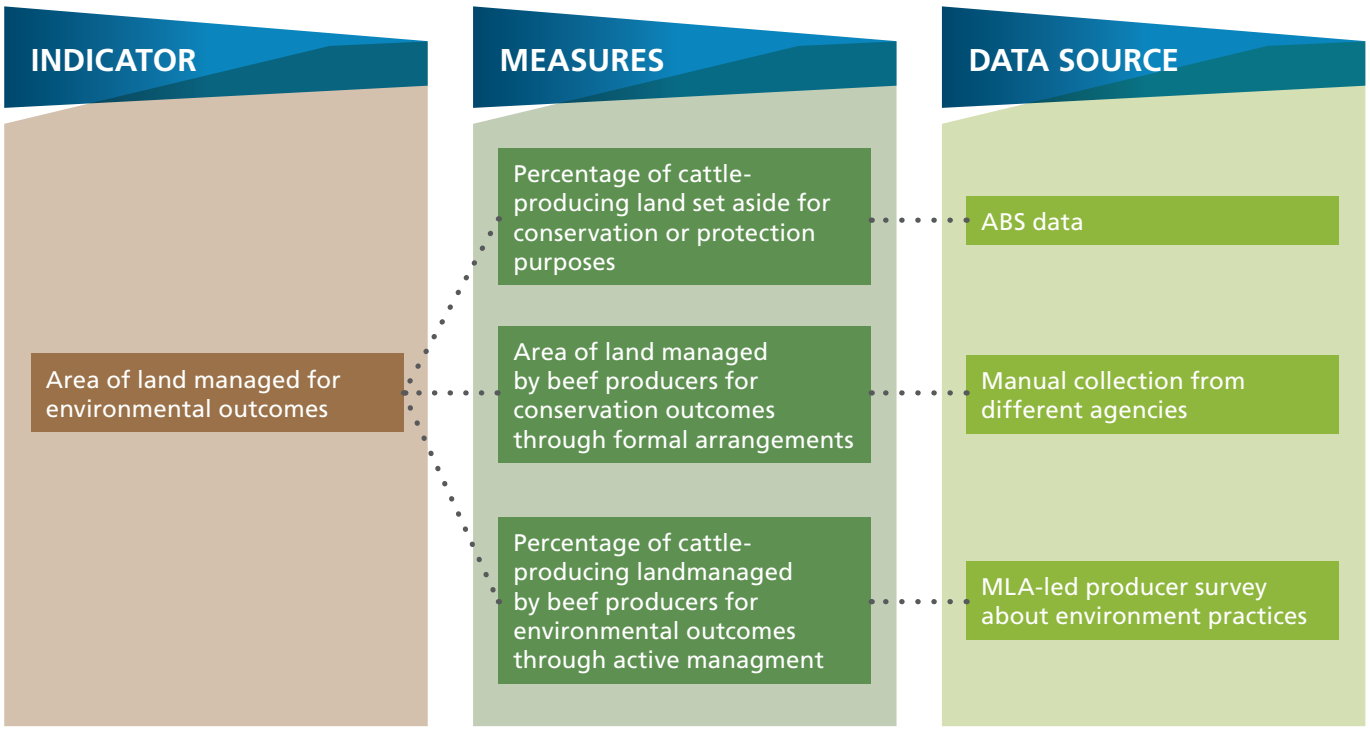
Developing the indicators and measures

The experts provided invaluable technical advice to the SSG on the *balance of tree and grass cover*. The SSG also sought perspectives from key stakeholders:

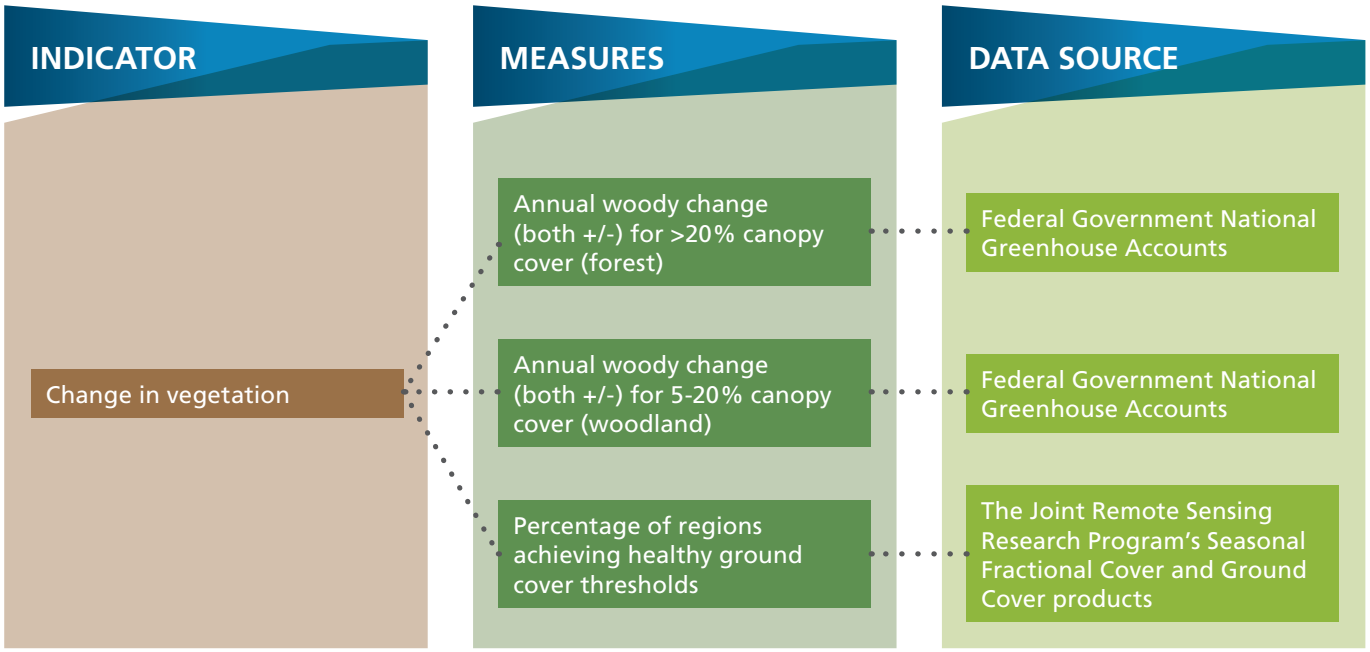
- Peak industry councils and state farming organisations
- Environmental groups and NGOs
- State environmental departments
- Industry and external stakeholders who are members of the Consultative Committee

Over multiple sessions, the EWG provided advice to the SSG. Based on this advice, the SSG developed indicators and measures which it tested with an array of stakeholders. This collaborative and consultative process went on over the course of the year until there was reasonable satisfaction from the experts, stakeholders and the SSG. The final indicators and measures were decided in March 2019. As with the entire Framework the indicators will continue to be refined and improved as data collection and science advances.

Indicator 5.2a:



Indicator 5.2b:



Refining indicators for the balance of tree and grass cover (continued)

Measuring change in vegetation across Australia

The challenges of measuring indicator 5.2b

Given the vast, complex and constantly changing landscape in Australia, developing measures for indicator 5.2b *Change in vegetation* was a particular challenge from both a technical and stakeholder perspective.

After a year of consultation and expert advice the *balance of tree and grass cover* indicators were agreed, while also acknowledging the need for indicators to remain flexible to improve with emergent technologies and to meet regional needs.

Disruptive advances in satellite technologies are enabling every property in Australia to be imaged on a weekly basis, and over three decades of satellite imagery is readily available for the continent. The Framework is capitalising on these developments through collaboration with government agencies and private sector companies at the forefront of the technology. The aim is to ensure every producer has equal access to key data being compiled by government agencies on their properties; access to the latest publicly available satellite data; and most importantly, the tools to bring the information together to support on-ground and strategic management decisions for individual producers and the broader industry.

In developing the *balance of tree and grass cover* measures we have been guided by a few key principles aimed at delivering an operational platform that is practical, credible, regionally relevant and contextual.

1. The method of measurement has to be **practical** so national data could be collected every year using objective, repeatable and cost-effective approaches.
2. The data being used has to have a high level of integrity to ensure the indicators remained relevant and **credible**.
3. It is important that any measures for indicator 5.2b should capture the considerable **regional** differences in vegetation change, leaving regional reporting an option in the future.
4. Any changes in vegetation need to be placed in the **context** of its time and place with respect to climate, ecology and other factors.

The solution – how the methodology developed

Leveraging existing data sets

For several decades, state and federal agencies have been analysing earth observation satellite data across the continent to monitor vegetation and land use change since around 1990. These programs are outlined on the Framework website. Government and science organisations have been able to use this information for regulatory, planning, policy development, international reporting and on-going research, however it has been difficult, if not impossible, for most individual producers to access and use this information.

In investigating practical and credible solutions to this challenge, the expert panel looked at existing programs, data and methodologies. The expert panel advised that several government and research programs are currently monitoring vegetation change using remote sensing at state and national levels to meet a range of needs, however, no single program met the full requirements of the Framework.

Given the objectives and benefits of a nationally consistent approach, it was agreed that two primary data streams were best suited to report against the agreed Framework indicators.

These were:

1. The National Greenhouse Accounts National Forest and Sparse Woody Vegetation data[45]
2. The Joint Remote Sensing Research Program (JRSRP) Seasonal Fractional Cover and Ground Cover products available through TERN AusCover[46]

To fully utilise existing information, and to meet our objectives on behalf of the industry, Cibo Labs was engaged to put an entirely new analytic framework in place. This involved the development of a data analysis environment to:

- Integrate 30 years of satellite data identifying trends in woody vegetation and ground cover. Around 12 billion individual satellite pixels across the continent were analysed for each time period, requiring enormous high-performance computing resources and contemporary data science techniques.
- Analyse trends specifically relating to grazing regions and the continent
- Analyse trends for every rural grazing property
- Enable the seamless aggregation of data for on-going reporting in relation to Natural Resource Management (NRM) regions, Local Government, ABS and ABARES farm surveys, ecological regions, and project-specific reporting.

Where are Australia's beef producers?

National statistics produced by the Australian Bureau of Statistics suggest there are 47,000 farms producing beef. This information doesn't however provide detail on exactly where these farms are located for the purposes of analysing trends in vegetation and production to isolate the data for beef enterprises.

At the present time, Australian governments and industry have several mechanisms for collecting information on land use, and the ABS and ABARES *Farm Surveys*, however, these processes do not allow the specific commodities being produced by rural holdings to be identified. For the first national analysis we have therefore relied on the 2018 national land use dataset provided by ABARES on a 50m grid.

The map below provides an overview of the location of specific land uses where beef cattle grazing may occur covering an area of about 5.5 million km^2 or 70% of the continent.

Refining indicators for the balance of tree and grass cover (continued)

To overcome many of the limitations of existing national reporting systems, the Framework has developed a new rural properties database. This was developed for MLA in partnership with Cibo Labs and PSMA Australia (See Figure 1 below). PSMA's CadLite dataset provides a spatial representation of millions of legal land parcels across Australia. CadLite draws on state and territory data to provide a seamless national database of cadastral boundaries, excluding easements and road drainage easements, and identifies the relationships that exist between a property and a cadastral parcel.

Using the national land use data in combination with the CadLite data we have identified some 550,000 individual rural freehold and leasehold properties greater than 10ha which may have grazing (see insets in Figure 1.). Critically, these property boundaries are based on publicly accessible information, but do not hold any personal or business information.

The information presented here has been compiled for every rural property over 10ha in Australia, while preserving individual property privacy. This approach has the potential to be strengthened, enabling landholders to opt-in for the dual benefit of making on-farm decisions and to demonstrate environmental performance.

The results – national trends in tree and grass

Through the work of Cibo Labs and advice of the expert panel, the Framework now has a national measure of vegetation change spanning 30 years across every rural property (greater than 10ha) and all 56 NRM regions for the beef industry – the first time this has been done in Australia. All 56 regions can be viewed on the Framework website and interactive time series maps are under development.

The results of the remote sensing analysis shows the complexity of change in space and time across Australia's vast landscape. Changes need to be understood in the context of factors like drought, fire, ecosystems and the variety of human activities. Vegetation changes mean very different things in different areas. While there is a need to report at a national level for the Framework, readers should note that the story of change is so complex that summarising it into one number cannot capture the full meaning of that change and carries risk in losing the important regional context. Readers are encouraged to view the full data on the Framework website.

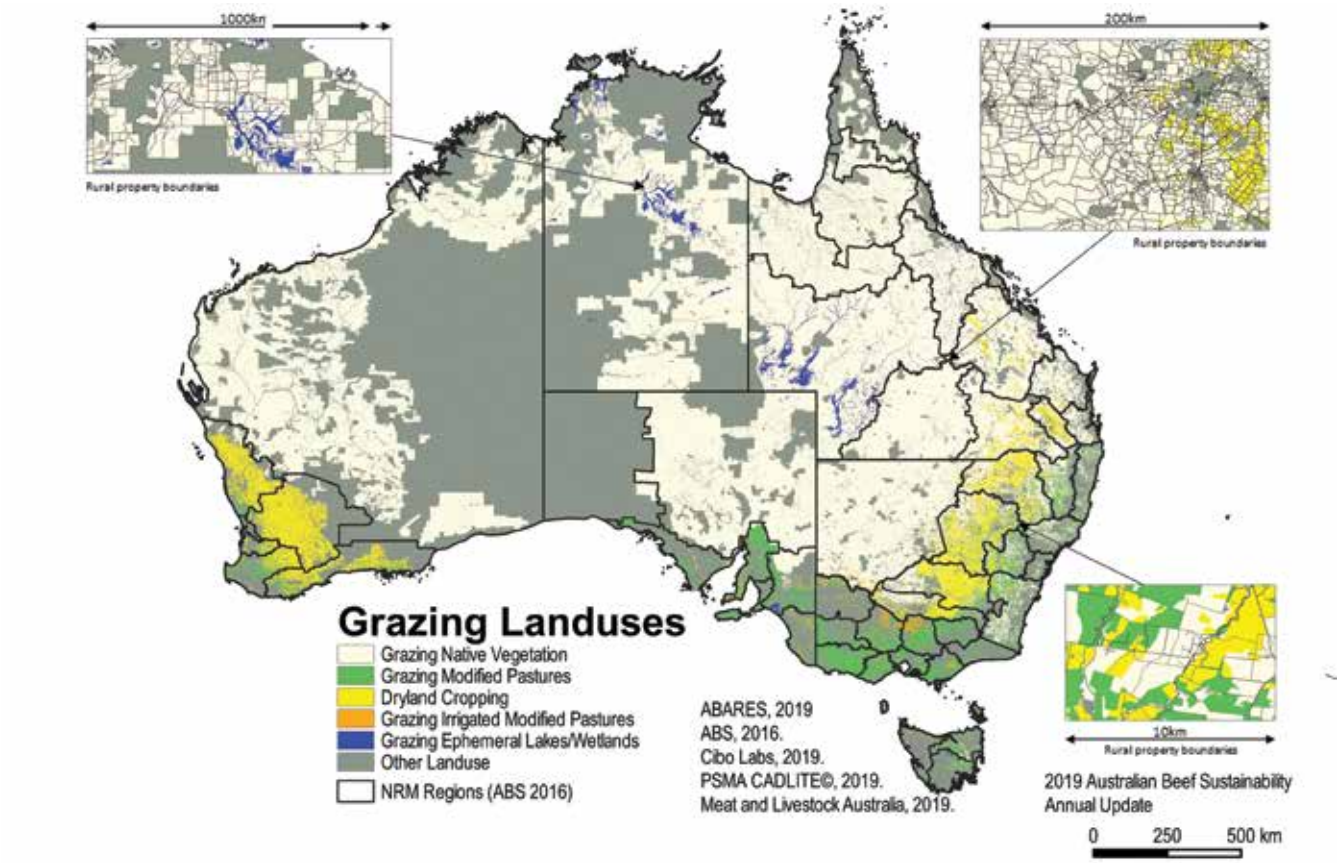


Figure 1: Potential grazing land uses (ABARES 2018). Insets are examples of the individual rural property boundaries which have been compiled for the Framework. There are approximately 550,000 rural properties greater than 10ha with the grazing land use zone. NRM Regions are also shown.

These new *balance of tree and grass cover* measures:

- Allow the Framework to annually track and measure the impact the beef industry is having on vegetation across the nation
- Support the industry to drive improvement in environmental practices and celebrate successes of good farm management
- Provide a tool for producers to use for improving on-farm productivity and land management
- Create a science-based measure of vegetation, separating fact from fiction in ongoing debates and for policymakers.

Forests and woody vegetation

Figure 3 summarises the cumulative changes in woody vegetation that have occurred between 1988 and 2017 at a national scale.

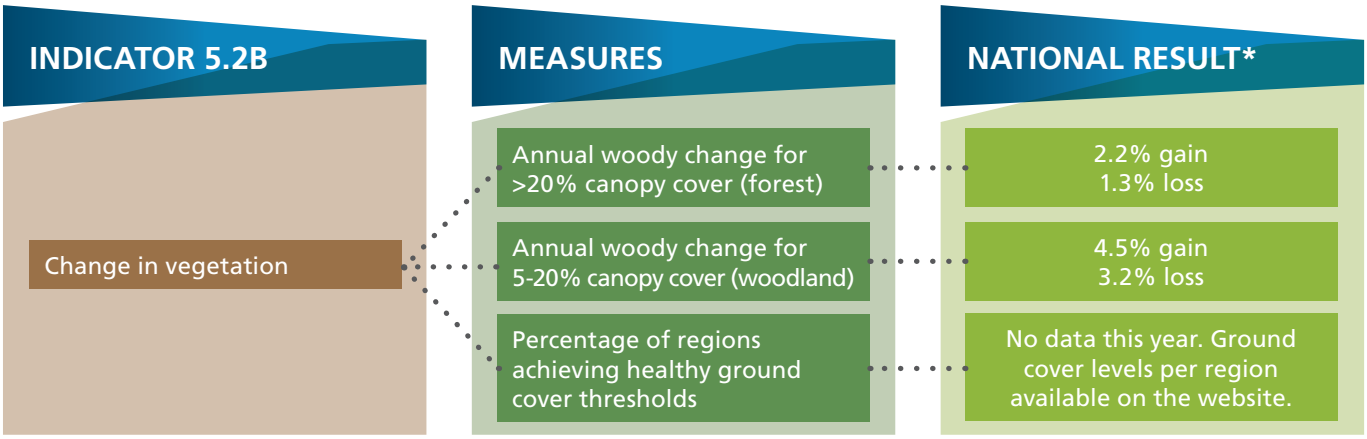


Figure 2: Aggregated indicator 5.2b results from the analysis. Gains relate to the percentage of forest or woodland extent gained due to conversion from non-woody to woody vegetation. Losses relate to the percentage of forest or woodland extent lost due to conversion from woody to non-woody vegetation. Ground cover levels per region available on ***www.sustainableaustralianbeef.com.au/vegetation-trends*** **National result is aggregated, consequently these results must be read considering that there are significant regional differences and context not captured.*

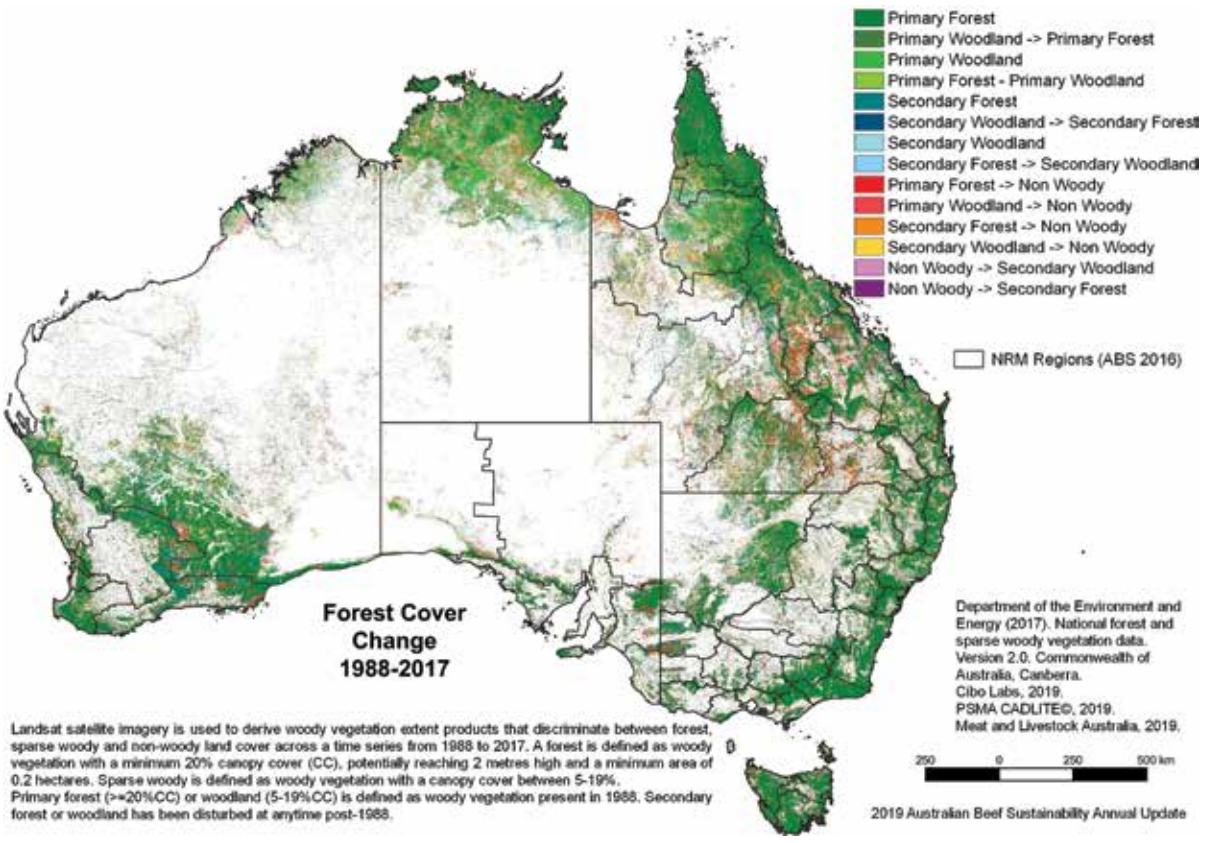


Figure 3. Australian forest cover change, 1988-2017. There is no baseline information on the age or condition of forests in 1988. An assumption has been made that all forests in 1988 were 'primary forest'. Consequently, it's likely that this image overestimates the amount of primary forest.

Refining indicators for the balance of tree and grass cover (continued)

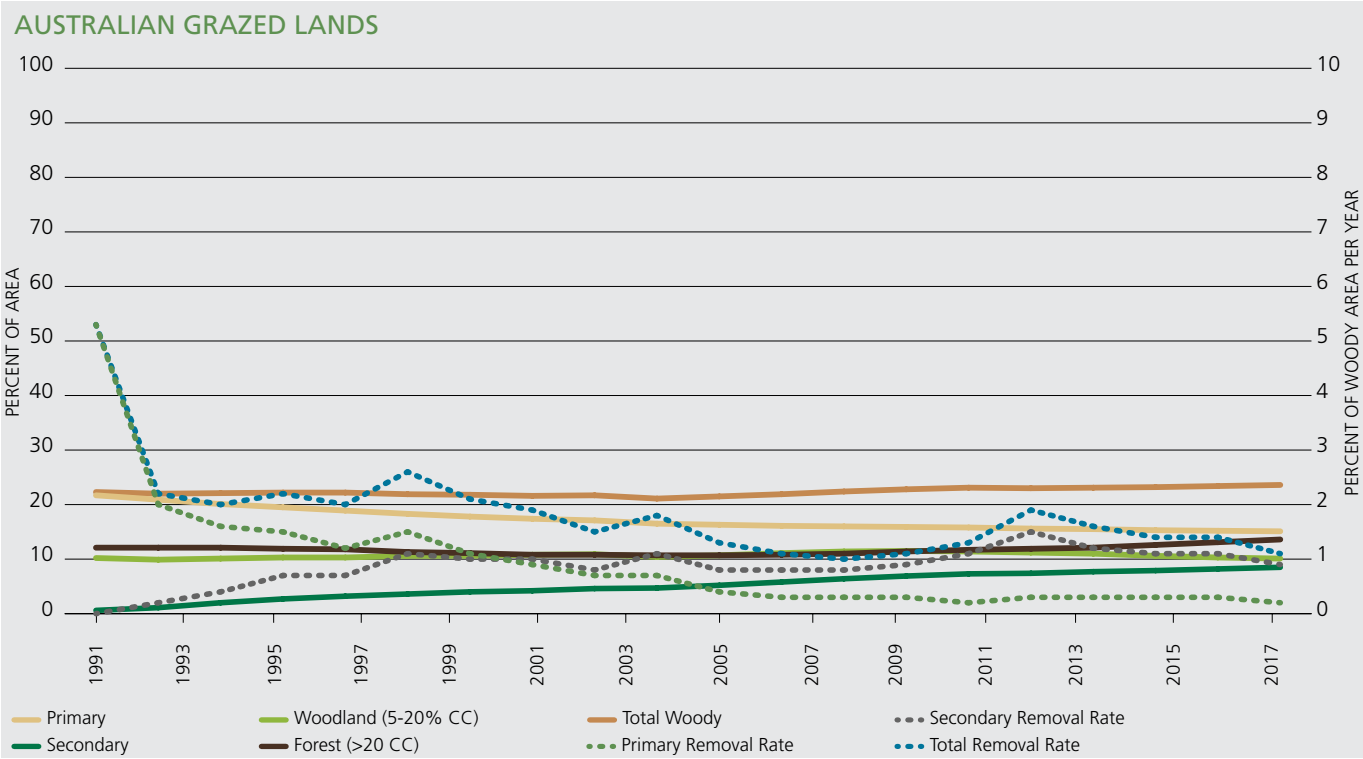
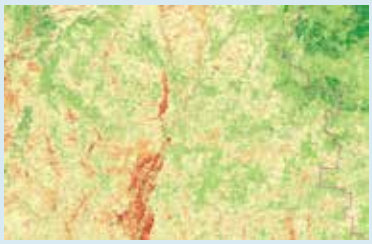


Figure 4. Forest cover change on grazed lands, 1988/91-2016/17. The data shown is the result of the work done by the Framework and Cibo Labs to measure tree and grass cover across Australia.

DEFINITIONS	
Forest:	Woody vegetation with >20% canopy cover reaching 2m high with a minimum area of 0.2 hectares
Woodland:	Woody vegetation with 5-20% tree canopy cover
Ground cover:	Non-woody vegetation, such as grassland
Primary woody:	Primary woody refers to forest or woodland present in 1988. Primary forest or woodland refers to forest or woodland present in 1988, respectively
Woody vegetation:	A plant that produces wood as its structural tissue and has woody stems, such as trees
Non-woody vegetation:	Plants that do not form a woody stem such as grass
Regrowth:	Native vegetation recurring on an area of land that has been previously cleared

What the data is telling us is outlined in Figure 4 above which presents the overall trends in forests and woodlands. At the national level the area of forest and woodlands is increasing, and the conversion (removal) of primary forest to other land uses has declined by more than 90 percent from 1990 levels. In net terms, clearing of primary forest (pre 1988) has declined significantly and forests are regenerating at a greater rate than clearing of secondary forests is occurring. Regionally, the majority of vegetation management is associated with clearing of regrowth, managing fire and fence lines and for fodder harvesting during periods of drought. These trends can be better understood through the regional case studies outlined on the Framework website on **www.sustainableaustralianbeef.com.au/vegetation-trends**.

REGION	ARMIDALE	CHARLEVILLE	EMERALD
Commentary	In the Northern Tablelands NRM region (50x35km). Very little vegetation removal has occurred over the last 30 years. There is an increase in woody vegetation and in forest density with some removal of regrowth. Seasonal ground cover levels are generally exceeding 70% over more than 90% of the region.	In the South West QLD region (350x250km). There are been an increase in the extent and density of Mulga forests. Most vegetation removal and fodder harvesting has occurred in secondary regrowth with some primary forest removal. Ground cover levels have been in decline with more than 10% of the region below 50%.	Straddling the Fitzroy and Dry Tropics NRM regions (400x275km). Over the last 10 years most of the vegetation removal has been associated with regrowth forest, with some primary forest removal. There has been a net increase in the area and density of forest. Ground cover levels at the end of the dry season are declining below 70% over 10% of the region.
Forest cover change, 2008-2017			
Ground cover, Spring 2018			

Overall Australia's grazed agricultural lands are increasing in woody vegetation cover in terms of both extent and density at a greater rate than clearing of secondary forests. The conversion of primary forest to other land uses has also declined by more than 90% from 1990 levels. Over the past five years, those regions identified to have removed more than 5% of primary forest (1% per year) can largely be attributed to forestry harvesting (pre-1988 plantings on private land) in the southern regions and cyclones and fire damage in the northern regions. Further work is required to separate natural disturbance from clearing events.

Generally, despite drought conditions over the past five years across eastern Australia, 50-75% of most regions are maintaining minimum ground cover levels. However, many extensive grazing areas in semi-arid and temperate regions are seeing a lack of improvement in ground cover levels across up to 10% of most regions and 25% of some NRM regions.

Using the information compiled for the Framework, producers will be able to compare their tree cover and ground cover levels to relevant regional benchmarks aimed at increasing cover in erosion prone landscapes and improving both soil health and productivity.

On the Framework website trends in woody vegetation, both total and primary, are outlined. What these regional breakdowns show is that there are a very small number of properties that have removed large areas of vegetation; and very few that have removed primary vegetation.

These trends are available on **www.sustainableaustralianbeef.com.au/vegetation-trends**

There have been small areas of woody vegetation cleared across larger groups of properties for reasons such as managing regrowth, managing fire and fence lines, and for fodder harvesting in periods of drought. As technology improves enabling federal vegetation reporting, the Framework aims to report clearing for different purposes.

Six key priorities

At the first Consultative Committee meeting held in August 2017, industry stakeholders were asked which of the 23 Framework priorities industry should focus.

The Consultative Committee members selected five priorities: animal husbandry techniques, profitability across value chain, balance of tree and grass cover, antimicrobial stewardship and manage climate change risk.

The SSG endorsed these five key priorities and added one more: health and safety of people in industry.

While work continues for all other priority areas, Framework activities are focussed on progressing these six key priorities.

Since early 2018, the Framework's team has concentrated on progressing the *balance of tree and grass cover*. This has included appointing an Expert Working Group to provide advice on credible, practical and robust indicators and measures for this priority. See more about the new indicators on pages 23-31.

ANIMAL HUSBANDRY TECHNIQUES

These techniques include castration, horn removal (dehorning), branding and ear marking. This priority looks at alternatives to aversive practices (e.g. breeding selection for the polled gene) and practical administration of pain relief before carrying out necessary husbandry procedures.

PROFITABILITY ACROSS VALUE CHAIN

To be economically sustainable, the industry must generate a positive rate of return over the long-term on all capital used in cattle raising and beef production. Currently this priority looks at only farm business profit due to data limitations.

BALANCE OF TREE AND GRASS COVER

Beef production is considered compatible with well-managed landscapes. This priority looks at industry's care of natural resources and biodiversity, by measuring area of land managed for environmental outcomes and changes in vegetation.

ANTIMICROBIAL STEWARDSHIP

Maintaining the efficacy of antimicrobials so that infections in humans and animals remain treatable is of critical importance. This priority looks at industry use of antibiotics and surveillance programs to detect resistance to them.

MANAGE CLIMATE CHANGE RISK

Greenhouse gases are emitted along the beef value chain, including methane produced through cattle's natural digestion. This priority looks at carbon dioxide equivalent emitted when raising and processing beef, as well as carbon capture and sequestration.

HEALTH AND SAFETY OF PEOPLE IN INDUSTRY

Working environments through the beef value chain, especially on-farm, expose employees and contractors to risk. This priority looks at notifiable fatalities, however industry recognises further investigation of injuries could highlight risk factors and improve work safety.

Animal husbandry techniques

Definition	These techniques include castration, horn removal (dehorning), branding and ear marking. This priority looks at alternatives to aversive practices (e.g. breeding selection for the polled gene) and practical administration of pain relief before carrying out necessary husbandry procedures.		
Indicators	**1.3a The percentage of the national cattle herd with poll gene.**	86%	↑
	1.3b Percentage of industry reguarly using pain relief when undertaking husbandry practices.	15%	↑

Context

The Australian beef industry is strongly committed to best practice animal welfare and wellbeing.

Consumers and the community have ever-increasing expectations around animal welfare. The beef industry recognises the need to continuously improve on its animal welfare practices not only to meet these expectations, but to provide the best possible care for its animals. Not only is it the right thing to do, but it also ensures the best quality meat is produced.

Good animal welfare is a legal requirement and any cruelty to animals is a criminal offence. For the industry, these legal standards are a minimum bar that we seek to exceed through ongoing efforts in research, development and adoption.

Beef producers are guided by the *Australian Animal Welfare Standards and Guidelines*, which recommend the appropriate animal husbandry techniques that deliver better welfare outcomes for the animal.[47]

Discussions with our stakeholders identified animal husbandry techniques as a priority for industry focus under the Framework's animal welfare theme. This priority focuses on aversive techniques including castration, horn removal, branding and ear marking. The industry aims to find alternatives to invasive practices (e.g. through genetic selection) and rapidly increase the use of pain management as part of carrying out necessary husbandry procedures.

The industry takes responsibility for ensuring our approach is collaborative and inclusive. While producer consultation remains critical for setting investment priorities, industry is committed to partnerships with researchers and welfare experts to capitalise on cross-sectoral synergies and opportunities for collaboration.

MLA remains an active foundational member of the National Biosecurity Research Development and Extension Strategy (NABRDES) and the National Animal Welfare Research Development and Extension Strategy (NAWRDES). MLA also works closely with other cross-industry initiatives and groups such as the Centre for Invasive Species Solutions (CISS) and Animal Health Australia (AHA) and collaborates directly with other research corporations and industry bodies.

Animal husbandry procedure	What it means	Why it's carried out
Castration	Removal of the testicles from male cattle.	Results in male animals that are less aggressive and less likely to fight, reducing the risk of cattle injury and making them safer to handle. It also reduces wandering in male animals.
Dehorning	Removal of horns from young cattle.	Dehorned livestock are less likely to hurt themselves, other livestock and human handlers. The industry has selectively bred out horns in 86% of the herd.
Branding	Placing a permanent mark on the hide of cattle.	Identifies ownership of cattle. In some states and territories it is a legal requirement that cattle must be branded prior to sale.
Ear tagging	Placing a National Livestock Identification System tag (and possibly a property identification tag) in the ear of cattle.	Ensures lifetime traceability of cattle from farms, feedlots, saleyards to processing plants.

Animal husbandry techniques (continued)

Industry position

The Australian beef industry:

- Recognises the five domains or five freedoms of animal welfare as our true north when setting best practice
- Aspires towards zero fear, zero harm of livestock within our care
- Recognises that Australian law and other industry standards are the minimum compared with best practice
- Supports the continuous improvement of animal welfare based on science
- Does not condone cruelty to livestock within our care
- Supports the use of pain relief for invasive procedures and aspires to achieve a usage target of 100% by 2025
- Supports and invests in alternatives to invasive animal procedures
- Recognises that until suitable and effective arrangements are available, the industry supports practices as identified in the *Standards and Guidelines for Cattle*
- Supports the promotion of the benefits of pain relief to producers, decision makers and the community

What the data is telling us

The percentage of beef producers regularly using pain relief when undertaking husbandry practices is reported as 15% this year. This figure is from a 2019 producer survey, in which respondents were asked how frequently they use pain relief to manage pain for a range of husbandry practices. The respondents made up a sample reflective of Australia's different beef producing regions and herd sizes.

The results included:

- 15% of respondents said they **always** use pain relief for husbandry practices
- 5% of respondents said they **occasionally** use pain relief for husbandry practices
- 5% of respondents have **trialled** pain relief

Self-assessment through surveys is currently the best measurement available. The industry recognises that self-assessment is not an ideal measure. Alternative measures were explored such as pain relief drug sales, but it is not possible to split out their use by species. The SSG is confident that the figure of 15% is not an over-representation and is comfortable to use the available data set for this update.

The percentage of producers selecting for poll gene has also increased, to an estimated 86% of the national herd being polled. In last year's report, this was reported based on a producer survey. This year, data is courtesy of the Australian Genetics and Breeding Unit at the University of New England (AGBU), the Australian Registered Cattle Breeders Association (ACBAR) and Neogen Australasia.

It should be noted that naturally polled breeds (without horns) are excluded from this sample, and that tropical breeds found in the north have a higher percentage of horned animals but the numbers analysed underestimate their share of the national herd.

Snapshot of activity

MLA leads the industry's on-farm welfare program that encompasses research, development, adoption, engagement and communication activities. For animal husbandry, MLA has been focusing its efforts on three areas:

- Replacing invasive procedures with non-invasive ones
- Increasing the use of pain relief during husbandry procedures
- Improving methods for measuring animal welfare on farm

Replacing invasive procedures

The preferred strategy for best animal welfare outcomes is to find alternatives to aversive procedures with stress-free, non-invasive procedures. This replacement strategy has been carried out by the industry through the breeding of polled (hornless) cattle which removes the need to dehorn livestock. Now 86% of cattle are polled. Effort is ongoing to increase these numbers across the industry.

MLA continues to invest in genetic research to improve the identification and breeding of polled cattle. Genetic tools have recently been made available to support breeders in selecting for the gene.

Increasing the use of pain relief during husbandry procedures

Pain relief options for beef cattle have been commercially available for two years in Australia. The principal products available are topical (Tri-Solfen), oral (Buccalgesic) and injectable (Metacam) anaesthetics.

There are many industry projects to increase the use of pain relief. They include a research project into better pain relief solutions, funded through the MLA Donor Company with matching funds from the University of Sydney and 4 Seasons. This project is investigating options for easier administrations of analgesics, the development of long-acting analgesics, and the extension of existing pain relief solutions to other livestock conditions and procedures.

Improving methods for measuring animal welfare on farm

There has been significant investment and focus on better understanding what good welfare is, how it is achieved and how to measure it. A way to objectively measure an animal's welfare, based on physiological and behavioural parameters, is essential. Tools and technology that allow producers to record welfare will support better outcomes on-farm.

MLA has invested in research projects with the University of Adelaide, SARDI, CSIRO, NSW DPI, the University of Melbourne, the University of Sydney, Allflex and the Consolidated Pastoral Company to develop objective animal welfare measures, practical ways of measuring animal welfare on-farm and tools to measure welfare in real-time.

CASE STUDY

Pain relief a win-win-win

"I am passionate about promoting pain relief in the industry," said Howard Smith, beef producer and past president of the Cattle Council of Australia. "There's no downside – it's a win for animals, for farm businesses and for industry."

Howard is a strong advocate for Tri-Solfen – a pain-relief and wound-healing treatment suitable for use in routine animal husbandry procedures.

In partnership with his three brothers, Howard runs about 6000 Brahman cross and Angus cattle over four properties near Rolleston in Queensland's central highlands. The farm business began using Tri-Solfen in mid-2018 for disbudding and dehorning, when it was approved by Australian Pesticides and Veterinary Medicines Authority for this purpose. They also routinely use it in castration, and have treated around 2000 animals with the product so far.

"We recognised a significant difference in the animals' behaviour as soon as we started using it," said Howard.

"The calves were a lot calmer and went back to their mothers immediately after the procedures – a sign of reduced stress.

"There was also much less blood loss, which is good for both the animals and the handlers.

"And the business overall benefits, because good animal welfare and good production go hand in hand. The cost is not prohibitive, and the advantages far outweigh the costs."

Given his former representative role, Howard is well aware of the need to ensure that animal welfare is a priority for the industry.

"Using pain relief also provides insurance for the industry," he said.

"We need to be constantly improving our animal welfare performance to meet community expectations. Industry needs to take advantage of new tools and products which support this."

The *Australian Animal Welfare Standards and Guidelines for Cattle* state that castration, dehorning and spaying are done only when necessary and in a manner that minimises the risk to the welfare of cattle, particularly pain and distress (objective 6).

"When we have products readily available that help us meet this objective, there's really no reason not to use them. Ignorance is not an excuse anymore."

Human trials of Tri-Solfen have recently begun in the UK.

"That just shows how effective it is," said Howard. "Bring it on."

Profitability across value chain

Definition	To be economically sustainable, the industry must generate a positive rate of return over the long-term on all capital used in cattle raising and beef production. Currently this priority looks at only farm business profit due to data limitations.		
Indicators	**3.1a Rate of return to total capital for beef farms** Rolling 5-year average for 2014-2018 covering specialist beef producers.	All: 4.4% Top 25%: 8.2%	↑

Context

All sectors along the beef value chain operate in an interdependent system with the share of profit moving between them. There are significant external factors that contribute to profitability including seasonal conditions, the value of the Australian dollar, and global competition and demand.

A persistent focus on increasing productivity and profitability across the industry will raise whole-of-industry competitiveness, assist long-term sustainability and help offset the ongoing cost-price squeeze.

On-farm profitability across much of the country remains a challenge in 2019. Extreme weather events, such as drought and the Queensland floods are having a significant impact on farmers' ability to turn a profit and will also have longer term impacts on the processing sector.

Deriving income solely from grazing cattle is becoming less practical for smaller enterprises and in some regions of Australia. A significant number of producers are supplementing farm income with off-farm earnings. Many cattle producers also earn income from producing other commodities on their farm. These factors make it difficult for the Framework to measure on-farm profitability specifically for beef.

Feedlots are facing their own profitability challenges. The drought is having a considerable impact on the availability and cost of feed and water. Rising energy prices have increased cost pressure and have also affected the profitability of the feedlot sector.

In beef processing, Australia is at a significant price disadvantage to major global competitors due to high labour, regulatory and energy costs. This creates challenges for the whole value chain to compete on price in global markets. Australian beef is positioned as a premium, high-quality product but is meeting increasing competition from other countries which are leveraging their lower cost structure to make gains in our key global markets.

More broadly, significant challenges to improving productivity occur because of environmental extremes including floods, heat waves and drought.

Industry has three goals: to increase business revenue by selling more high quality beef, cutting production costs through efficient management systems and practices, and increasing the price for beef through good marketing, and by opening and maintaining markets.. Major boosts in knowledge have been achieved through investments in programs like BREEDPLAN and the CashCow project; as well as research, development and extension work related to animal genetics and nutrition.

Improving profitability across the whole beef value chain requires encouraging adoption of best practice and continuing research and development.

Driving adoption across the extensive farm sector is one of the greatest challenges to increasing industry-wide profitability. This is why it is critical that the tools and technologies developed are timely, accurate and relevant.

In feedlots and processing, new technologies and processes are generally adopted faster than on farm, but the high level of cost for investment in new infrastructure is a barrier for these low-margin businesses.

Industry position

At an industry level RMAC supports investment, policy settings and practices that foster a prosperous and profitable industry.

The next Meat Industry Strategic Plan (MISP) will outline the industry's position for a profitable future. It will be released in late 2019. The current MISP seeks to unlock $7 billion for the industry's bottom line by 2030. On the flip side, it aims to protect the industry from losing $6 billion.[48]

What the data is telling us

This indicator has been renamed from 'Farm business profit at full equity' to 'Rate of return to total capital for beef farms' to more accurately describe what is being measured. Data this year is still comparable to last year.

A key challenge for reporting on-farm profitability is that not all beef producers view profit as a main motivator. Some producers are motivated by their values and beliefs about farming, or the lifestyle. A percentage of the cattle industry are part-time 'hobby farmers' and not necessarily focused on profit. These factors can influence the data. For these reasons, the Framework reports on rate of return for both the industry average and the top 25% of producers.

The industry 5-year rolling average figure for rate of return was 4.4%, with the top quartile sitting at 8.2% for 2017-18. Beef farms saw an increase of 1.0% on their rate of return compared to the previous year. The top quartile saw a bigger rise of 1.5%, see Chart 1.

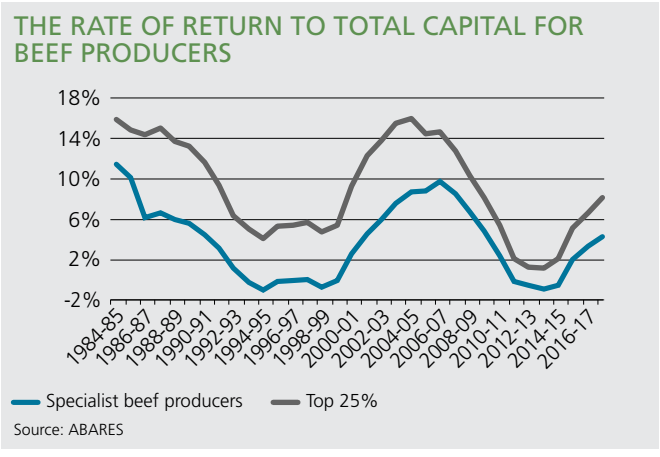


Chart 1: The rolling 5-year average rate of return to total capital including capital appreciation for all producers specialised in beef, and the top 25% performers.

The average farm cash income varies greatly between northern and southern Australia, and by scale of operation.

The average farm cash income prior to 2015-16 saw year-on-year increases to around $204,000 per farm, underpinned by high livestock prices and above-average crop production.

In recent years, drought across eastern Australia has been the dominant influence on farm financial performance. Crop production has been well below average, contributing to higher prices for fodder and feed-grains across the country. The drought has also reduced the availability of pasture on livestock farms, increasing expenditure on feed.

Farm cash income is higher in Queensland due to larger property sizes, scaling up figures.

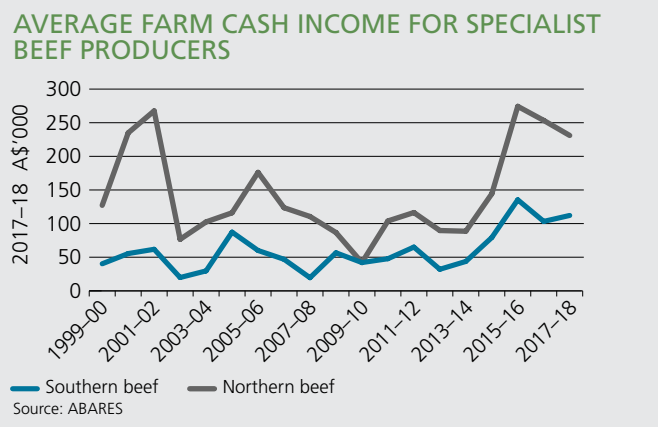


Chart 2: Average farm cash income for beef farms.

On-farm cost of production has also been increasing showing a marked difference with international competitors. Compared to the US – Australia's primary global competitor – the on-farm cost to produce beef in Australia is 1.4 times more expensive, see Chart 3. There is wider variation in Australian beef systems where there is a diverse mix of hobby, family and corporate producers, and intensive and extensive farming. In comparison, US systems have a much higher proportion of commercial feedlots, which results in less cost variation.

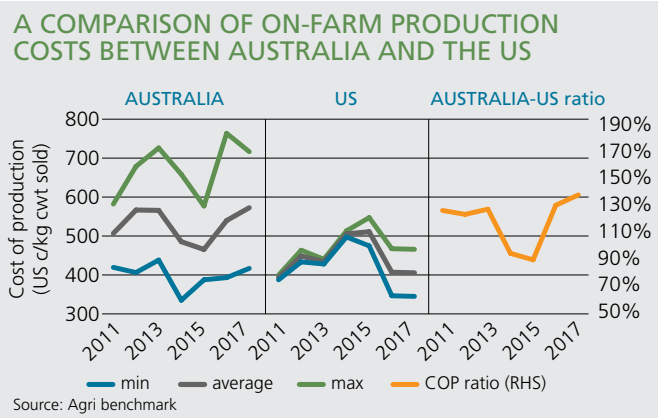


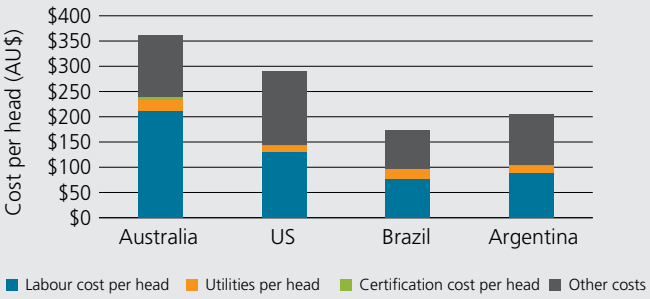
Chart 3: A comparison of on-farm production costs between Australia and the US. Australia is 1.4 times more expensive.

Profitability across value chain (continued)

These high costs are also reflected in the processing sector. This year, an AMPC-led study into 2015-16 processing costs showed that Australia's cost of beef processing is significantly higher than other countries.[49] It is 24% more expensive to process cattle in Australia than the US, over twice as expensive compared to Brazil and 75% more expensive than Argentina. This disparity has a large impact on the global competitiveness of Australian beef.

OPERATING COST STRUCTURE FOR BEEF PROCESSORS

Comparison between key international competitors



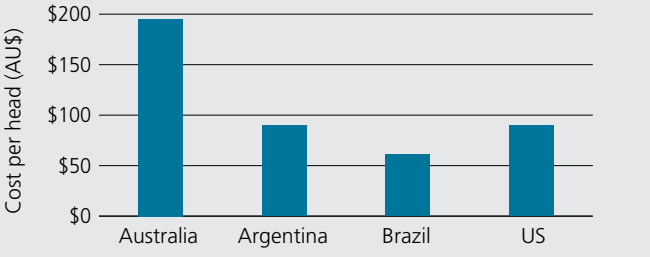
Source: AMPC

Chart 4: The average cost of processing cattle per head in Australia compared to three other beef-exporting countries. Other costs include transport, packaging and maintenance.

It is estimated that 54% of these processing costs are attributable to regulation – much higher than competitor countries. This regulatory burden is 2.2 times higher than both the US and Argentina, and 3.2 times higher than Brazil.

COST OF REGULATION FOR BEEF PROCESSORS

Comparison between key international competitors



Source: AMPC

Chart 5: The average cost of regulation for beef processors per cattle head processed in Australia compared to three other beef-exporting countries.

Snapshot of activity

Organisations that deliver programs focused on improving profitability include state and federal agricultural departments, private consultants and industry service providers including MLA, LiveCorp and the Australian Meat Processor Corporation (AMPC).

Major profitability programs are focused on:

- Reducing the cost of production through the feedbase program
- Unlocking productivity and profitability benefits from genetics
- Driving adoption of research and best practice
- Producing a premium product that meets consumer expectations
- Innovating in precision livestock management

Reducing the cost of production through the feedbase program

The livestock industry depends on the feedbase, such as pastures and grain, which itself relies on soil, water and nutrient resources. Management of these resources and the feedbase is critical to generating income in the short and long term. The challenge for the industry is delivering to market specifications while maintaining the underpinning resources. The increasing variability of climate is making this even more challenging.

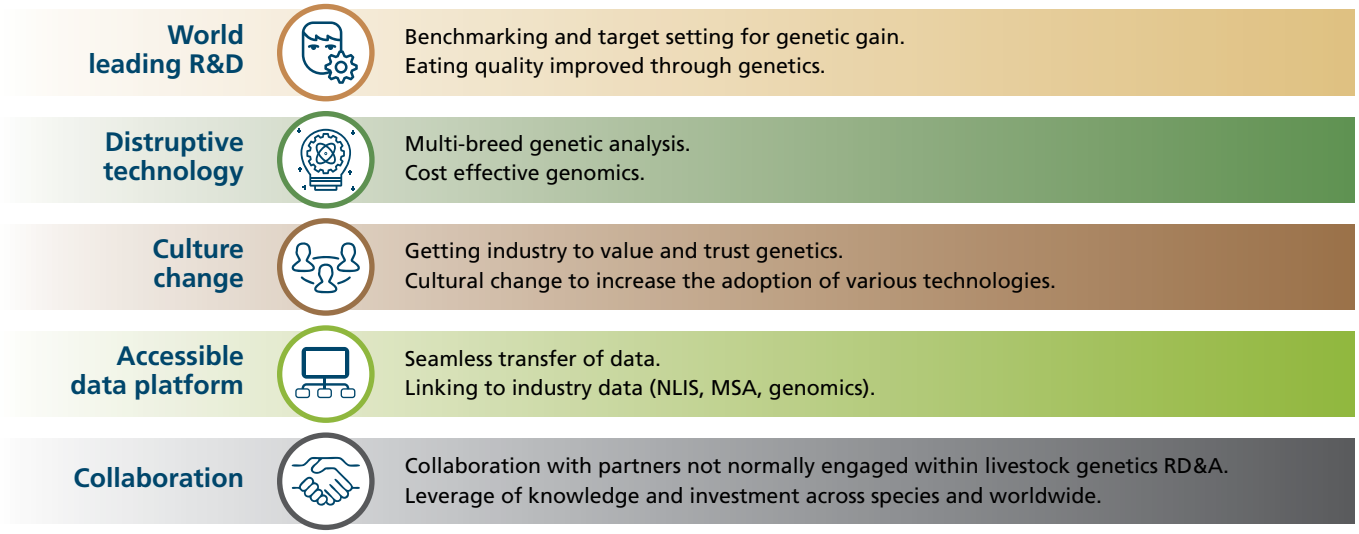
MLA's feedbase program is focused on:

- Contributing to reducing cost of production ($/kg live weight) by 1.5% in real terms by 2020. This will occur through a range of new pastures and legumes, improved seasonal forecasting, options for climate-adapted grazing systems and producers with new knowledge options
- Reducing cost of managing feral animals and weeds by $50m
- Improving total factor productivity (TFP) by 1.75% for southern beef and 0.5% for northern beef. The definition of TFP can be found on page 61.
- Improving overall business performance by >5%

Unlocking productivity and profitability benefits from genetics

Improving genetics is a critical pathway to improved productivity and profitability. The beef industry continues to maintain BREEDPLAN – a system of genetically evaluating cattle across a range of traits such as fertility and weight gain. In evaluating cattle, the system calculates Estimated Breeding Values (EBVs) for an animal, which are used by breeders and buyers to make decisions. A joint venture between NSW Department of Primary Industries and the University of New England, with MLA funding, continuously improves BREEDPLAN.

NATIONAL LIVESTOCK GENETICS CONSORTIUM



In 2017, BREEDPLAN released 'single-step genetic analyses' for the Brahman and Hereford breeds. These analyses tie genomic information with performance records to better calculate EBVs. Single-step analyses have been released for Brahman, Hereford, Angus and Wagyu breeds, with Santa Gertrudis expected soon.

A National Livestock Genetics Consortium has been established with the objective that by 2022, it can deliver more than $400 million in industry improvements through doubling the rate of annual genetic gain in commercial livestock.

Driving adoption of research and best practice

Withdrawal of state governments from extension or adoption services in most Australian jurisdictions has dramatically changed the way research and development is delivered to producers. Today's environment demands new commercial business models that deliver adoption services, and support red meat producers' decision making.

Profitable Grazing Systems (PGS) is MLA's flagship producer adoption program that aims to increase on-farm productivity and profitability through positive on-farm practice change. The adoption program comprises of a tiered learning structure, which allows producers to enter and exit the system as required. The program also focuses on upskilling consultants and other trusted advisors in the sector. The pilot saw 130 producers and 96 businesses participate, and achieved an increase of participant knowledge, attitude, skills and aspirations from 46% to 76%.

Lotfeeding remains an integral part of the beef industry, supporting a consistent supply of quality product for an expanding population. Priorities include the development of tools to increase productivity and reduce costs, through automation and remote monitoring technologies of routine feedlot processes and genetic pursuit of feed efficient animals.

The feedlot sector delivers adoption through its industry body, Australian Lot Feeders' Association (ALFA). In 2018-2019 significant investments have been made by ALFA in automation, designed to improve profitability and productivity of the sector.

The testing of a prototype bunk scanner has demonstrated better-than-human accuracy in predicting feed remaining in bunks. Better predictions mean increased feed utilisation and less wastage.

This bunk scanner has inspired research into an auto-feed delivery prototype which can be fitted onto existing feed trucks. This prototype has achieved better feed distribution, carcase gains and efficiencies.

National Meat Industry Training Council

The Australian Meat Processing Corporation (AMPC) continues to support and work closely with the National Meat Industry Training Council (MINTRAC) on various activities, including the extension of AMPC project outputs. Extension activities are critical to the effective uptake of RD&E investments in the industry, contributing to AMPC's strong track record of facilitating processor adoption of RD&E and other AMPC-funded outputs.

Profitability across value chain (continued)

Producing a premium product that meets consumer expectations

Meat Standards Australia (MSA) is an independent eating quality standard developed in Australia more than 20 years ago. MSA continues to enjoy strong uptake throughout the supply chain. During 2017–18, the MSA beef program returned an additional $152m in farmgate returns despite tighter supplies due to reduced slaughter numbers.[50]

Nationally, 46% of adult cattle slaughtered were graded for MSA. Feedback from MSA is now flowing back to producers to inform their on-farm decisions and realise additional profit.[51]

Innovating in the precision livestock management space

Precision livestock management (PLM) optimises the contribution of each animal through technologies that allow monitoring and controlling of livestock in real-time, and remotely. PLM provides management opportunities for producers to maximise their productivity, profitability and sustainability. There is a crossover in the PLM program of work between the beef productivity and the feedbase portfolios. Projects using internet of things (IoT) at the same time as focusing on connectivity are exploring the use of existing technologies including walk over weighing to chart the reproductive status of cows and feed budgeting.

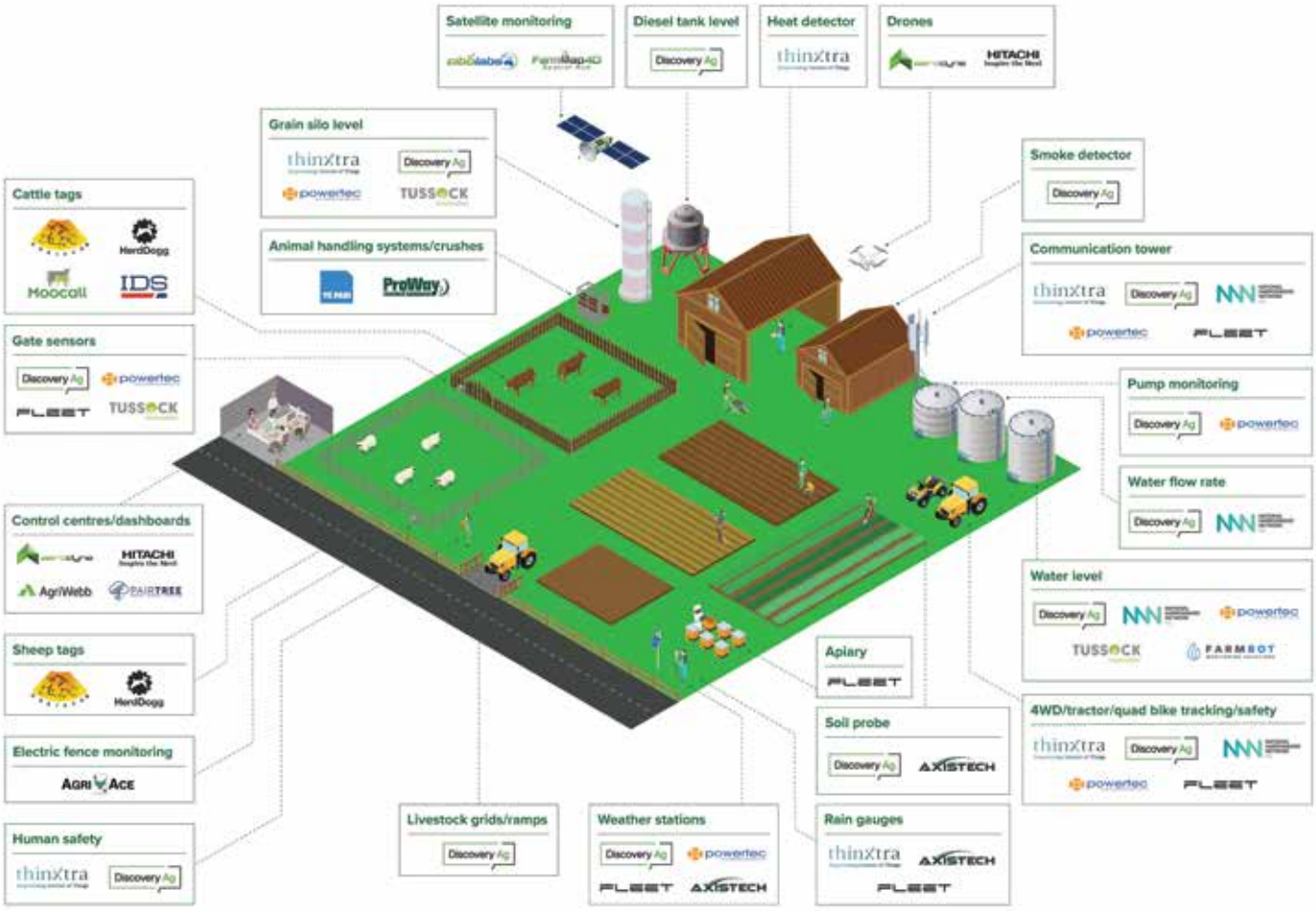


Figure 6: Stocktake of IoT, PLM and other digital solutions at Carwoola Pastoral Company. These solutions were developed as part of a joint project with MLA to deploy IoT, PLM and other digital technologies.

CASE STUDY

Planning for growth

Waverley Station's King Island operations manager Jamie Roebuck oversees 10,000ha, 8,000 Angus breeders and 12 staff across four farms on King Island for the family-run company, which also has properties in NSW.

His business plan is founded on three principles:

- Focus on the 'low-hanging fruit' of soil fertility and grazing management
- Invest heavily in staff training
- Match production systems to pasture supply

According to Jamie, "if you start with the basics and get the profit drivers right, the rest will start to fall into place."

Jamie and his team focus on being flexible and responsive. A 2018 decision to turn stock off earlier and lighter was motivated by knowledge gained from the MLA-supported Pasture Principles program and supported by business analysis conducted with John Francis of Holmes and Sackett.

"Analysing our business and assessing profit drivers showed us we could better match our production systems to our environment by turning stock off earlier to relieve grazing pressure through winter and increase kilos of beef produced per hectare annually," said Jamie.

"The Pasture Principles program completely changed how we manage our grass to match animal nutrition requirements to feed supply."

Pasture management

Soil and rainfall vary across King Island, from lighter breeding country with 850mm rainfall in the north to heavier finishing country with 1,000mm rainfall in the south.

Stocking rates range from 22 DSE/ha for breeders to 18 DSE/ha for young cattle.

Pasture management changes included increasing mob size to extend the grazing rotation from 30 to 60 days during winter, giving ryegrass-clover pastures more time to rest and recover (rotation length decreases as it warms up to match rotation periods to leaf emergence rates).

Jamie hopes the amended grazing management will support 15-20% more breeders.

Productivity boosts

Grazing management is supported by an autumn nitrogen-based fertiliser program to build the winter feed wedge. This is supplemented by strategic urea application to bridge feed deficits, whilst extensive soil testing helps manage applications.

Investing in people

A labour-intensive enterprise and the challenge of attracting and retaining skilled staff in a remote rural community means people are just as important as pastures.

"No business can be sustainable without profit, and at our scale it's not possible without people," Jamie said.

"My biggest driver is profit and my biggest consideration in achieving that is the impact on the team. I believe the more you invest in your staff, the more they give back. I enrolled all our staff on the island in the Pasture Principles program, and by having everyone 'on board' it's been easier to implement the changes to our grazing."

Strategies to increase labour efficiency include simple repeatable systems, technologies such as farm-management software and electronic data collection, and infrastructure such as laneways and well-designed yards.

The joining and heifer management strategy has been adapted to a strict six-week joining period, but calving spread over eight weeks, as heifers are joined two weeks earlier than cows to give first-calf breeders time to get back into calf the following year.

Balance of tree and grass cover

Definition	Beef production is considered compatible with well-managed landscapes. This priority looks at industry's care of natural resources and biodiversity, by measuring area of land managed for environmental outcomes and changes in vegetation.		
Indicators	**5.2a Area of land managed for environmental outcomes**	1.35% of cattle-producing land set aside for conservation or protection purposes.	■
		Land managed by beef producers for conservation outcomes through formal arrangements	—
		52% of cattle-producing land managed by beef producers for environmental outcomes through active management	■
	5.2b Change in vegetation	2.2% National Forest cover gain	■
		1.3% National forest cover loss	■
		4.5% National woodland cover gain	■
		3.2% National woodland cover loss	■
		Percentage of regions achieving healthy ground cover thresholds	—

Context

In Australia, beef is produced from land that is often unable to support other food production. Looking at Australia's landmass, 45% is used for grazing on natural vegetation with 9% used for grazing on modified pastures.[52] As the largest steward of the Australian landscape, the beef industry has an important role in maintaining, protecting and enhancing the land. As a food producer, managing the land productively and sustainably is critical to feeding a growing world population. Overwhelmingly, positive production and environmental outcomes are aligned. In some areas production and environment need to be managed independently, but generally grazing can be undertaken in the natural environment, assisting the cycling of nutrients through the system and providing other environmental benefits.

The 2019 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services report identified a huge global risk of biodiversity loss.[53] The report identified global beef production as a risk factor. Specifically in Australia, well-managed beef production systems are sustainably integrated with biodiverse ecosystems. This differs from some other systems and agriculture sectors that operate in artificial mono-culture ecosystems. Improving management across Australia is an opportunity to stem global biodiversity loss.

Many of our stakeholders have strong interests around this priority. Inside the industry, producers in Queensland are challenged with onerous regulation with new vegetation laws. These laws make it challenging for producers in parts of Queensland who, due to the climate, face the challenge of significant tree regrowth or thickening on certain soil types that negatively impact pasture production; and can also have negative environmental impacts with soil run-off due to lack of ground cover. Outside the industry, deforestation is a key customer and investor focus area due to the approaching global deforestation targets in the New York Declaration on Forests and the Sustainable Development Goals.[54]

At least 14 of Australian beef's biggest customers, including McDonald's, are committed to reducing, and in some cases eliminating, deforestation in their beef supply chains.[55] Through the Framework process, industry has been working closely with key customers and stakeholders in this area.

Vegetation change is an extremely complex issue in Australia. Negative environmental impacts are attributable to clearing as well as regrowth and encroachment in some northern regions. There are competing sustainability priorities at play and land use needs to be considered as a balance of food production and environmental benefits.

In response to this contentious issue, the Framework convened the first multi-disciplinary Expert Working Group in June 2018 to develop practical and evidence-based measures for this priority. Details on this can be seen on pages 23-31.

From the industry's perspective, balancing tree and grass cover in a sustainable way is critical for the short and long-term viability of beef production. Ultimately, farmers need healthy soils, water and pastures to provide a feedbase and hydration for the animals in their care. Good grazing and natural resource management on-farm leads to positive outcomes for both business and environment.

Caring for the land is becoming more difficult for farmers. Climate is becoming more variable, and extreme weather events more frequent. In addition, changing regulations and market requirements as well as community concerns demand that livestock producers be ever more adaptable and agile in this dynamic landscape.

The red meat industry's long-term prosperity requires taking a proactive and precautionary approach to environmental sustainability. A reactive approach that only deals with the symptoms of resource degradation will not be enough to ensure the industry's longevity.

Definition of deforestation: The direct human-induced conversion of forested land to non-forested land. This conversion means long-term or permanent change of a natural ecosystem to another land use. Conversion leads to profound change in the ecosystem's species composition, structure or function.

Definition of regrowth: Native vegetation recurring on an area of land that has been previously cleared.

Industry position

The industry believes well-managed landscapes and livestock production are not mutually exclusive when looking at the whole farm system. In many landscapes, cattle can be grazed across the property, while others require a mosaic style of management where some areas are protected to preserve the ecological value on the farm, while other areas are used for production.

The industry is committed to:

- Responsibly managing vegetation within the landscapes that it operates for the dual benefits of food production and ecosystem services
- At a minimum, abiding by all federal and state laws to protect and enhance areas of high conservation value
- Managing landscapes in a manner that is regionally appropriate with consideration to farm planning with an appropriate balance of tree and grass for:
  - Grazing livestock
  - Conserving and where possible enhancing biodiversity
  - Focussing on maintaining ground cover to prevent soil run-off into waterways
  - Actively managing re-growth to protect existing pastures and grasslands
  - Actively managing vegetation when required for fire breaks, weed and pest control

What the data is telling us

As outlined on pages 23-31, the Framework has spent a year working with an expert advisory group and consulting stakeholders and six months working with Cibo Labs to develop the nation's first measures for vegetation change for the beef industry. Following advice from stakeholders, this data looks at both vegetation loss and gain across regions. This has been an incredibly complicated exercise and while the Framework reports at a national level, this can be very misleading if the regional context is not considered. For this reason the Framework has outlined trends across the 56 NRM regions on the website.

A key challenge at looking at national data and trends in Australian vegetation is the constant movement between vegetation classes, especially in northern regions. For example, a decrease in forest can be a decrease in density or a loss in forest. Current technology does not allow for distinction between the two. For this reason, in addition to what has been reported in the Framework tables on page 64, below is an additional class for 'woody' which combines both forest and woodlands. Due to the continual two-way transition between forest and woodland, the loss and gains in sub-categories won't always equal the total woody change.

Looking at ground cover trends at a national level without agreed regional thresholds is misleading and not overly useful. As such over the next 12 months the Framework will work with NRM regions to establish regional baselines and enable reporting in future of the percentage of regions achieving ground cover threshold levels. Ground cover levels are highly dynamic and vary across the landscape. These levels also vary considerably depending on seasonal conditions. A comprehensive regional breakdown of ground cover levels can be viewed on **www.sustainableaustralianbeef.com.au/vegetation-trends**.

National changes in woody vegetation classes over time (see website for regional breakdowns)

What's being measured?	Measure	2016/17	10-year annual averages (2008-2017)
Measuring woody gains (conversion of non-woody to woody vegetation)	National woody (forest and woodland) cover gain	3.3%	4.0%
	National forest cover gain	2.2%	1.8%
	National woodland cover gain	4.5%	6.0%
Measuring woody losses (conversion of woody vegetation to non-woody)	National woody (forest and woodland) cover loss	2.1%	2,6%
	National forest cover loss	1.3%	1.4%
	National woodland cover loss	3.2%	3.9%
Measuring net change in total woody extents	National woody (forest and woodland) cover extent	+0.9%	+1.1%
	National forest cover extent	+3.3%	+2.4%
	National woodland cover extent	-2.0%	-0.3%

For example, the 2016/17 3.3% national forest cover gain means that from 2016 to 2017, the conversion of non-woody to forest was responsible for a 2.2% gain in forest extent. Conversely, the 1.3% national forest loss figure means that from 2016 to 2017, 1.3% of the forest extent was converted to non-woody. The net change in extent is shown in the third section of this table.

Balance of tree and grass cover (continued)

Snapshot of activity

MLA's environmental sustainability and feedbase programs both create opportunities for producers to efficiently and effectively manage soil health, weeds, invasive animals, water, methane emissions, biodiversity and climate variability. This includes researching, designing and demonstrating new grazing systems that manage ground cover, encourage retention of desirable species, new species (grasses, legumes), exploring climate adaptation actions, and plants suited to hotter and drier future climates. Some of the major initiatives to tackle this key priority include:

Weed and pest management programs

Pest animals (rabbits, kangaroos and pigs) and weeds impact on feedbase production and ecosystems. Work at a large scale across multiple organisations (public and private) is required for adoption of best management practices, and in turn the reduction of pest and weed populations.

Collaboration with NRM Regions Australia

There are 56 NRM regional organisations across Australia that act as delivery agents under the regional stream of the National Landcare Program.

NRM groups have a focus on:

- Loss of vegetation
- Soil degradation
- Pests and weeds
- Changes in water and water flows
- Changes in fire regimes

Sustainable agriculture.MLA is working with NRM Australia to share satellite data on vegetation trends. The groups are exploring future opportunities to partner on delivering positive environmental and production outcomes.

Measuring what matters through real farm data

A project with the ANU Sustainable Farm Institute has been established to demonstrate the practicality of populating the Framework with environment indicators based on real farm data. This data will test the robustness of remotely sensed measures through ground-truthing.

Completing this project will enable the trialling of the Framework measures within south-east Australia. If this trial is successful, the measures will be scaled to a national level. The project will provide recommendations on the suitability of indicators within the Framework, and propose alternative measures where appropriate.

Best Management Practice programs

A case study on Queensland's Grazing BMP program was showcased in last year's report. The program was initially established to focus on reducing soil and nutrient run-off to the Great Barrier Reef. In 2019, data from this program was deleted due to a change in legislation that resulted in concerns for landholders' privacy.

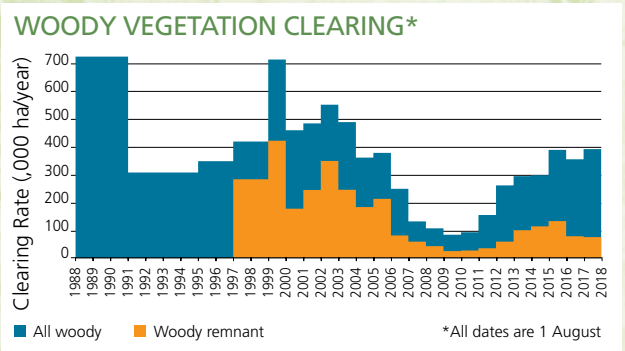
The previous BMP tool used a practice change approach. There are a number of other approaches being explored for a national tool to enable producers and beef customers to measure and demonstrate their progress with beef sustainability. As the tool will be linked to practice change pathways, users will be able to continuously improve on their performance.

A detailed look at vegetation trends in Queensland

The Statewide Landcover and Trees Study (SLATS) is the most advanced vegetation monitoring system in Australia. SLATS detects changes in woody vegetation by comparing Landsat satellite imagery captured approximately one year apart. Currently, SLATS only reports publicly on removal of vegetation, but is moving to also report vegetation increase, as has been captured in the national approach in this report.

Data from SLATS shows that while total clearing has not decreased since 2015, the clearing of remnant vegetation has decreased significantly by 44% below 2015 levels.

The Framework has been working to measure national vegetation change, provided in detail on pages 23-31.



Trends in vegetation decline since 1998 in Queensland. Woody remnant was reported separately from 1997.

Table 1: Annualised clearing rates by woody vegetation type.

Time period	Non-remnant cleared (ha)	Remnant cleared (ha)
2015–16	257,000	132,000
2016–17	278,000	78,000
2017–18	318,000	74,000

CASE STUDY

Conservation partnership to preserve native flora and fauna

Cattle and conservation are not mutually exclusive – far from it, according to Julian Burt, owner of Bullo River Station in the East Kimberley, and the two must work hand in hand.

"The cattle operation is only viable with healthy land," he said.

Julian and his wife Alexandra took over the half-million acre property in 2017 and now run a 4000 strong Brahman-cross herd. Together with the cattle, the property supports a stunning variety of local fauna including wallabies, dingoes, wild buffalo, native and migratory birds, fish and crocodiles.

"When we first took over the station there was a lot to do," said Julian.

"There were large areas of the property where weeds had become a real problem, choking the native habitat and reducing grazing areas."

"There were also a lot of clean skin cattle in the back country and so we first had to understand exactly what we were dealing with. We had surveys done of weeds and pests, and worked on several major musters to bring in the feral cattle and reduce their numbers."

To tackle the daunting task, the Burts entered into a partnership with the Australian Wildlife Conservancy (AWC) to assist with managing Bullo River's natural resources. AWC will deliver a range of land management programs on the property under a ten-year, periodically-reviewed contract. Programs will cover fire, weeds, feral animals and wildlife.

"We had been supporters of AWC for many years before we purchased Bullo River Station. We were always impressed with their pragmatic, partnership approach and believed they would be the right fit to not only rehabilitate and protect the native flora and fauna, but also to understand and value the cattle station operation," said Julian.

Together they have identified a special management zone as the key areas of habitat and degraded land to be rehabilitated and protected over the long term.

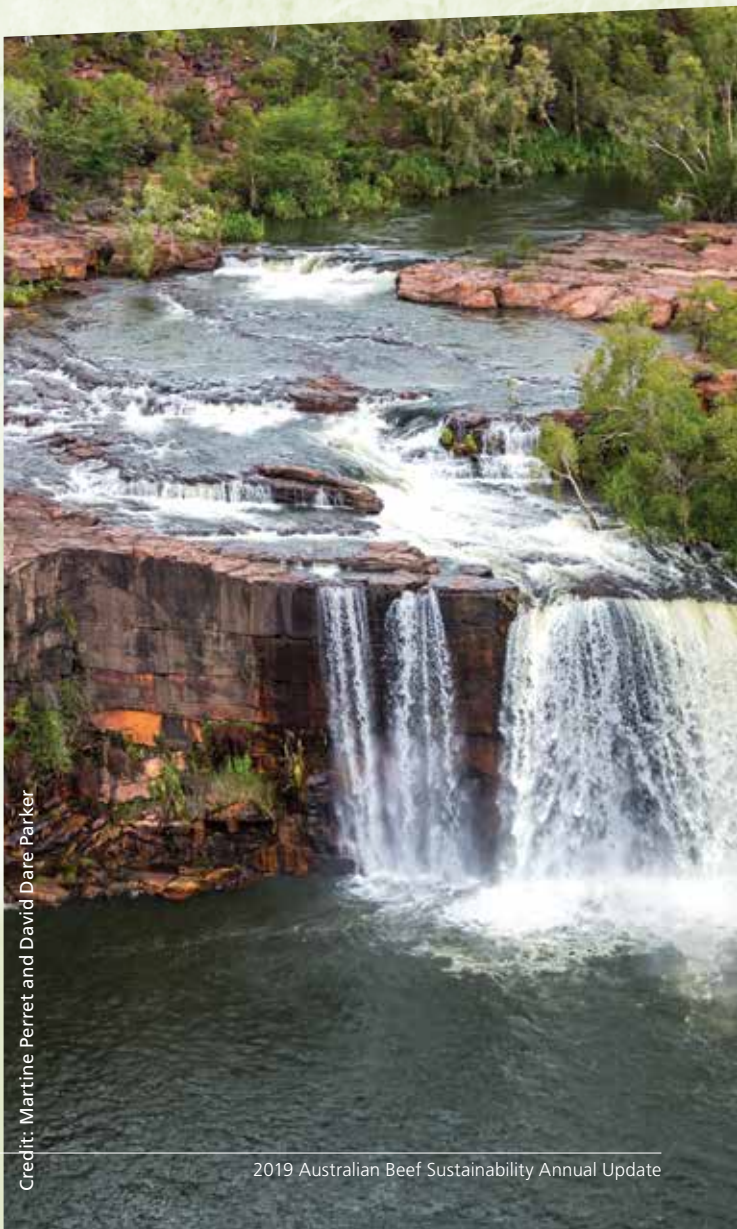
"This does not mean that we won't be running cattle in those areas," said Julian.

"High-risk and high-value areas may be fenced off over time and some areas already have been. As the environmental surveys continue to provide us with a better understanding of what we have on the site, decisions will be made about how to best manage those areas."

The Burts take a holistic approach to farming, embracing sustainable practice across the board.

"In addition to destocking, we have made significant investments in additional watering points and fencing which better control the movement of cattle whilst grazing, and hence reduce the overall impact on the environment.

"We also continue to review the latest research on herd genetics and nutrition to identify characteristics that do well on our land."



Credit: Martine Perret and David Dare Parker

Managing climate change risk

Definition	Greenhouse gases are emitted along the beef value chain, including methane produced through cattle's natural digestion. This priority looks at carbon dioxide equivalent emitted when raising and processing beef, as well as carbon capture and sequestration.		
Indicators	**6.1a kg CO_2e emitted per kg liveweight when raising beef.**	12.6kg CO_2e kg LW	↓
	6.1b kg CO_2e emitted per tonne Hot Standard Carcass Weight (HSCW) when processing beef.	432kg per tonne HSCW	–
	6.1c Carbon captured and re-used in processing.	6.6% of energy use	–
	6.1d Carbon sequestration.	No data for 2019	–
	6.1e Percentage total CO_2e reduced by the beef industry from a 2005 baseline.	55.7%	↑

Context

Australia has committed to the global Paris Agreement to pursue efforts to keep global warming below 1.5°C above pre-industrial levels along with 175 other member states.[56]

More frequent extreme weather events and increasing climate variability have a serious effect on production and livelihoods. Managing and adapting to these new conditions across all sectors is vital to long-term industry prosperity.

Like all industries, there is a responsibility to focus on how to minimise sector emissions. The Australian beef and sheep industries contribute around 10% of Australia's total greenhouse gas (GHG) emissions and about two-thirds of these emissions come from cattle.[57]

Methane stemming from cattle's natural digestion process is the beef industry's main emission. Ruminant animals, like cattle, have a unique digestion system that enables them to convert the grasses and shrubs they consume in mostly non-arable areas into valuable protein and vitamins for human consumption, plus various non-edible products. In Australia, this means we are able to graze cattle on rangelands and savannahs where other food production systems like cropping are not viable. The cattle grazing industry facilitates employment and economic stability in Australia's vast rural areas.

In addition to methane emitted by cattle, beef production also emits GHGs through:

- Meat processing
- Loss of soil carbon in overgrazed pastures
- Savannah burning conducted to manage woody weeds and promote pasture quality
- Clearing of primary forests
- Nitrous oxide from manure in feedlots
- Application of nitrogen fertilisers to pastures and to grow grain
- Upstream inputs such as chemicals and diesel

The beef industry plays a significant part in offsetting national emissions by sequestering carbon in soils and vegetation.

Agriculture has contributed more to reducing GHG emissions than any other sector in the Australian economy since 1990.

Industry position

In 2017 the Australian red meat industry set an ambitious target to be carbon neutral by 2030.[58]

The target to be carbon neutral by 2030 (CN30) is a clear message to our global consumers that the Australian red meat industry is serious about addressing GHG emissions.

There is a huge opportunity for the Australian industry to make a real difference in mitigating climate change through increasing carbon storage in the natural landscapes where we operate and reducing emissions, while at the same time improving productivity and deriving new revenue streams through carbon farming.

CN30 will make a demonstrable contribution to reducing emissions from the Australian agriculture sector. It will showcase the red meat industry as a global leader in carbon farming innovation, economic development and environmental stewardship. CN30 will give Australian red meat a marketing edge on the global stage.

The industry supports a transition to a carbon neutral industry and is focused on ensuring the policy support and incentives are in place to enable adoption of existing technologies and further research to deliver on this ambitious target.

What the data is telling us

A new indicator has been added to the 2019 Annual Update to publicly track the industry's CN30 (Carbon Neutral by 2030) initiative. Since the baseline year of 2005, the industry has reduced absolute emissions by 55.7% (for the most recent reporting period of 2016) largely through a focus on improving productivity and vegetation management practices. This figure was calculated by CSIRO from datasets contained in the Australian National Inventory Report in the agriculture and land use change categories, relating to beef production. The most recent available data from 2016 is prior to the industry

setting the CN30 target in 2017 but demonstrates significant GHG emissions reduction is possible. With industry, policy and research focus Australia can be the first country in the world to have a carbon neutral beef production system.

In order to also track emissions intensity, the Framework reports using Life Cycle Assessments (LCA), which are regarded as the most useful environmental measures for products. LCAs are a costly and time-consuming activity and MLA undertakes an update to the LCA every five years. The most recent five-year period is from 2010-2015 and was completed in 2019. LCAs capture all emissions sources related to beef production, beyond the scope of the current National Inventory reporting.

The 2019 LCA completed by Wiedemann et al showed an 8.3% decline in GHG emissions intensity in the past five years (excluding emissions related to land use and land use change) and a 20% reduction over the past 35 years. The data reported in the Framework shows that it now takes 12.6kg of carbon dioxide equivalents to produce a kilogram of beef pre-processing.

Improvements in efficiency are from a relentless focus on productivity by the industry. For example, in the past five years, carcase weights have increased 10% driving an increase in beef production per cow joined. Growth rates in young cattle were estimated to have increased 19% in the past five years principally in response to higher proportions of cattle fed in feedlots, and a 5% increase in days on feed since 2010, together with improved performance of the grazing herd.

These figures are based on globally agreed intensity and lifespan measures from the Intergovernmental Panel on Climate Change (IPCC) which currently calculate methane at 34 times carbon dioxide. There is a current debate about beef industry's contribution to global greenhouse gas emissions, compared to other emitting industries, including fossil fuels. For the purpose of this report, current agreed accounting is used.

Snapshot of activity

The CN30 initiative is a significant collaborative effort across industry and the research community. MLA leads work on research, adoption and commercialisation. The efforts of the red meat industry will contribute significantly to state and federal government carbon emission reduction targets.

The 2030 target was set following industry-funded research undertaken by CSIRO in 2017 which confirmed that carbon neutrality was possible in the Australian production system.[59] In addition, the project identified the most promising pathways to achieving carbon neutrality by 2030.

In response to these research findings, MLA has closely investigated these pathways considering likelihood of industry adoption, commercialisation opportunities of technology and gaps in research that require further investment.

The pathways identified were informed by two previous collaborative research programs:

- Reducing Emissions from Livestock Research Program (RELRP) that ran between 2009–12 and developed knowledge and technologies on methane emissions to enable producers to reduce livestock emissions while maintaining or improving livestock productivity.
- National Livestock Methane Program (NLMP), that was undertaken in 2012–16 and built on the outcomes from the previous RELRP program. Outcomes from this program are featured in the publication *More meat, milk and wool: less methane*.[60]

A CN30 plan has been developed to take the next critical step to ensure the successful implementation of the technology identified within these earlier programs.

CN30 is not only an emissions-based target. The aim is to unlock $300m a year for the Australian red meat industry by optimising the carbon cycle to improve drought resilience, farm-gate profitability, and reducing greenhouse gas emissions. The CN30 initiative builds

CN30 IMPLEMENTATION PLAN

Implement now

Productivity improvements:
- Animal genetics
- Feedbase – pastures & legumes
- Soil health

Balance of vegetation
- Shelterbelts for animal productivity & carbon capture
- Retaining remnant vegetation
- Revegetating where it makes sense to do so

Emissions Reduction Fund methods
- Savannah fire management
- Herd management
- Soil carbon
- Vegetation management

To commercialise

- Feed additives – e.g. Red Asparagopsis seaweed in partnership with CSIRO
- Legumes – e.g. Desmanthus

Further R&D

- Measuring GHG emissions on-farm
- Soil carbon sequestration & measurement
- Methane inhibiting compounds
- New pastures/ legumes
- Optimising balance of tree & grass cover
- New ERF methodologies

Develop markets

- Valuing ecosystems services to increase investment in sustainable agricultural enterprises.
- Verification of red meat products as carbon neutral

Managing climate change risk (continued)

on decades of legume, animal and economic research that has underpinned Australia's red meat production systems. An integrated plan has been developed to implement carbon farming technologies to increase resource use efficiency for profitable livestock production and reduce environmental impacts.

Extension & adoption

Some practices are well known and can be implemented now. Improving animal genetics, feedbase management and herd management can reduce GHG emissions per unit of meat production. Carbon can also be sequestered into soils using pastures and legumes. Driving adoption of these well-known practices is a critical body of work and the emphasis is on supported learning approaches and demonstration sites. There is a strong commercial driver for uptake as these practices lead to the immediate business benefits of improved productivity and open new revenue streams to producers through the Emissions Reduction Fund (ERF) and voluntary carbon markets. Work is underway on how to capture changes made by landholders and feedlots through an evolution of the National GHG Inventory to improve accuracy as well as the representation of the red meat industry, and enable progress reporting under the CN30 initiative.

GHG emissions avoidance

Methane production in the rumen can be inhibited by bioactive additives. This is the most promising pathway to significantly reduce or eliminate methane emissions. MLA is focused on working with existing research partners such as CSIRO and James Cook University, as well as establishing new partnerships to further develop bioactive additives, such as Red Asparagopsis seaweed which has been shown to virtually eliminate methane emissions from livestock. However, key barriers to overcome include developing a consistent and affordable supply and a delivery mechanism for intensive and extensive animal feeding systems. CSIRO is leading commercialisation efforts for Red Asparagopsis seaweed.

Storing carbon

Sequestering or storing carbon in vegetation is well understood. In Australia, landholders can be remunerated through the ERF that now has numerous ways for the beef industry to access the Fund. The beef industry is the largest beneficiary of the Fund to date with over $1.66b returned to landholders for storing or avoiding carbon through their operations.[61] Australia now has a soil carbon method that meets the requirements of the Paris Agreement. The first credits were issued and sold in March 2019. While the ERF methods present an opportunity for landholders, the measurement and administration requirements present a significant barrier to entry. An increase in the carbon price may motivate producers to overcome these barriers. There are many other opportunities for landholders to benefit from storing carbon such as selling carbon credits through voluntary schemes. Companies, like airlines or miners, buy these credits to offset emissions.

Developing markets

New markets need to be developed to incentivise beef businesses to take further action on carbon. These incentives need to support carbon reduction as well as natural resource improvement. Government or voluntary schemes could put a value on the ecosystem services that farmers provide to stimulate even more action. There is also an opportunity to sell carbon neutral beef at a premium, however the technology to trace and verify this across the supply chain needs to be developed.

Integrated management systems

Research outputs will be integrated with farming systems models and decision support tools to evaluate new management interventions (novel shrubs, legumes, pastures, supplements, mixed farming, cropping, woody vegetation, forestry) and technologies to optimise productivity and profitability whilst minimising GHG emissions.

Advanced digital technology will be used to link remote sensing to simulation models to measure and monitor how pasture, soil carbon and water use efficiency respond to changed management. New generation remote sensing products will increase the understanding and recognition of management-induced improvements in land condition. Key enabling technology such as blockchain will be explored as a means to underpin carbon projects on farm, and overcome the cost of carbon credit measurement and validation which is a financial barrier to participation in the carbon markets under some methods at this point in time.

Offsets

Offsets will be investigated in the short term but ultimately the industry aims to balance carbon in the landscapes in which it operates. In 2018, some operators have begun to claim carbon neutrality and, in the short term, have used offsets to achieve this.

Policy

Industry policy groups have been focused on ensuring state and federal policy settings and funding can enable the industry to deliver on our ambitious 2030 target. RMAC has partnered with Greening Australia, the Australian Forest Products Association and Farmers for Climate Action to form an advocacy alliance – Climate Proofing Australia.[62] This new alliance advocates for clear and stable policy underpinned by objective science-based evidence that aligns with the CN30 pathways and enables large-scale investment in sustainable development.

CASE STUDY

Australian supplier sets the carbon standard

Australian meat supplier Flinders + Co is the first company of its kind in the world to become 100% carbon neutral.

Offsetting all carbon emissions not only from the business but from every kilogram of meat sold, Flinders + Co is providing a product that customers like Melbourne's Vue de Monde and Stokehouse restaurants can proudly label 'carbon neutral'.

Carbon neutrality means removing as much carbon from the atmosphere as is being added, achieving a net zero carbon footprint. Flinders + Co managing director James Madden (pictured below with his father David) said the significance of their achievement stretches further than being part of the company strategy.

"Our original intention was to make our Melbourne business carbon neutral, which just covered our warehousing, storage and distribution," James said.

"But the Carbon Reduction Institute came to us and said we think there is the potential to take this through your entire supply chain. And that was a scary prospect at first, but the more I thought about it, I really wanted to demonstrate to anyone along the supply chain – from producers to processors – that it's possible no matter what business you're in… so we took it on."

The Carbon Reduction Institute analysed the Flinders + Co (formerly Flinders Island Meat) business to determine the total carbon footprint (in tonnes) where emissions could be reduced or offset to reach net zero. This was a whole-of-supply-chain analysis, including beef, lamb, chicken and pork.

Flinders + Co then switched to renewable energies and began supporting carbon offset projects. One such project is the Kenyan "Lifestraw" project which distributes water purification units to locals, enabling them to access clean water without burning fossil fuels to get it. Within Flinders + Co's own supply chain, meat processor Greenham Tasmania has converted its steam boiler to burn daisy flower by-products (pyrethrum) rather than coal, and pork supplier Rivalea is harvesting the methane emitted from pig manure to power the factory's electricity.

Flinders + Co is committed to reducing its use of non-recyclable plastic and single-use cardboard for packaging and transportation.

Eventually, Flinders + Co would like to be able to send price signals down its supply chain.

"To be in a position that allows you to send those price signals, you need to have a price advantage," James said.

"I think consumers of today like to know where their food is coming from and the impact that it's having. The aim is to have consumers saying 'yes, we prefer a supplier who has this accreditation and at times we'll be happy to pay a premium for this product.'"

"Once that relationship is established, then we might be able to say to suppliers, if you can deliver us a product that's already carbon neutral and we don't need to offset then we'll pay you a bonus because we're not having to offset it ourselves."

Following consultation with suppliers, Flinders + Co hopes to implement a premium by the end of this year or next year.

James has already begun talks with a number of suppliers about distributing their carbon neutral product. These partnerships would mean paying a premium, with the advantage being that Flinders + Co would not need to offset the product themselves.

While the ideals behind the project were important to James, the decision to go carbon neutral made business sense.

"When I was working out the return on investment, I determined that for every dollar spent on carbon neutrality, I wanted to get an extra $100 in revenue," James said.

The project forms one part of Flinders + Co's "Cultivate a better food world" vision. While proud of the world-first positioning, James will be proudest when the rest of the industry is in the same boat.

"One of the best moments of the project was when we approached a supplier for support, and they said we're only going to contribute a little bit to your offsets, because your project has actually inspired us to go carbon neutral ourselves."

"In some ways I wish we weren't the first… but the aim is to demonstrate to everyone that it's really not hard.

"I think the world will pay a premium for it because no one else is doing it… it's that simple."

Antimicrobial stewardship

Definition	Maintaining the efficacy of antimicrobials so that infections in humans and animals remain treatable is of critical importance. This priority looks at industry use of antibiotics and surveillance programs to detect resistance to them.	
Indicators	**8.3a The percentage of cattle covered by an antibiotic stewardship plan.**	39% ■
	8.3b Antimicrobial surveillance program.	No data for 2019 —

Context

Antimicrobial stewardship is quickly becoming one of the most prevalent discussions surrounding animal health. Preserving the effectiveness of antimicrobials to protect human and animal health by promoting responsible antimicrobial use is at the very core of strong stewardship. Continuous improvement of industry practices is fundamental to the ongoing success of the Australian red meat sector to demonstrate our ongoing leadership and commitment to animal and human health.

Just like people, when an animal's immune system is overwhelmed by pathogenic agents, such as bacteria, they become ill. When this occurs, a vet can prescribe medicine to treat the infection and aid the immune system to heal the animal. Antimicrobials are one of a number of tools available to farmers and feedlot managers to help ensure the health and welfare of animals in their care. The term 'antimicrobial' refers to medicines that act to selectively kill or inhibit the growth of microorganisms, such as bacteria. Antibiotics are a group of antimicrobials used against bacteria. Antimicrobials generally rely on a functional immune system to work effectively.

Antimicrobial resistance (AMR) occurs when the bacteria causing people or livestock to be ill is resistant to antimicrobial treatment. This can be caused by overuse or inappropriate use of antimicrobials and can also occur naturally. Concerns about AMR, coupled with fewer new antimicrobial technologies being discovered, means action is needed to protect the effectiveness of antimicrobials currently available.

Antimicrobial resistance has become a concern for both medical and livestock policymakers, medical professionals, veterinarians, producers and the general community.

The Australian Pesticides and Veterinary Medicines Authority (APVMA) has maintained a cautious approach to the registration of antimicrobial agents for use in livestock in Australia. This has resulted in a limited number of antimicrobials available for use in beef cattle. Australia is a world leader in minimising antibiotic use in farm animals.[63] Despite this, it remains essential to ensure that antimicrobials continue to be preserved for future use.

The Australian Government released the first *National Antimicrobial Resistance Strategy 2015-2019* in June 2015.[64] The livestock sector played an important role in its development and continues to play an important role in achieving the strategy's vision. The next national AMR strategy is expected to be released this year.

The Australian industry is also involved in the ad hoc Codex Intergovernmental Task Force on Antimicrobial Resistance.[65]

Vision set out by Australia's National Antimicrobial Resistance Strategy

A society in which antimicrobials are recognised and managed as a valuable shared resource, maintaining their efficacy so that infections in humans and animals remain treatable and communities continue to benefit from the advances that antimicrobials enable.

Objectives of the Codex Intergovernmental Task Force on Antimicrobial Resistance

To develop science-based guidance on the management of foodborne antimicrobial resistance, taking full account of the WHO Global Action Plan on Antimicrobial Resistance, in particular objectives 3 and 4, the work and standards of relevant international organizations, such as FAO, WHO and OIE, and the One-Health approach, to ensure that Members have the necessary guidance to enable coherent management of antimicrobial resistance along the food chain.

Industry position

The appropriate use of antimicrobials is a shared responsibility between the veterinarian and the farm or feedlot. Vets are responsible for prescribing antimicrobials compliant with regulations. Farmers and lot feeders reduce the need for antibiotics by protecting animal health. They are also responsible for using antibiotics appropriately in accordance with vet instructions. Both veterinarians and beef businesses play a critical role in lowering the likelihood of AMR developing.

This approach promotes the improved management of livestock to reduce the likelihood of immune system failure, but importantly recognises the importance of utilising the most effective antimicrobial agents available to treat livestock.

The industry supports all feedlots to report on their antimicrobial use from 2020. There is currently work underway to understand the on-farm use.

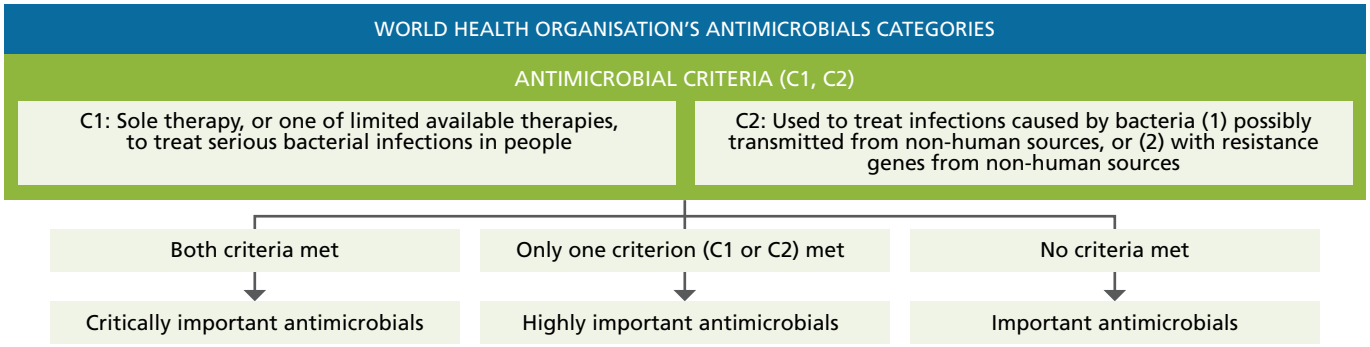
What the data is telling us

A survey undertaken in 2013 demonstrated a very low prevalence of antimicrobial resistance (AMR) in bacteria in Australian cattle production systems.

Previous AMR testing did not identify any resistance in *critically important* or *highly important* antimicrobials such as tigecycline, daptomycin, vancomycin, third-generation cephalosporins and linezolid. However, resistance was identified for *important* antimicrobials. These antimicrobial categories are explained in the figure below.

This research found that the cattle industry's low levels of antimicrobial resistance can be attributed to comprehensive controls around antimicrobial use enforced by the industry. Nevertheless, continued monitoring of the effects of all antimicrobial use is required to support Australia's reputation as a supplier of safe and healthy food.

In 2018 the Australian Lot Feeders' Association voluntarily established *Antimicrobial Stewardship Guidelines*.[66] Despite the guidelines being optional, in just 12 months 39% of the industry have antibiotic stewardship plans in place. This has been verified through 300 independent audits. These audits also showed a 72% awareness of the guidelines amongst feedlots.



Antimicrobial stewardship (continued)

Snapshot of activity

Activity to tackle antimicrobial resistance can be found across the value chain. Producers and feedlots are taking action to steward antimicrobials with the support of regulators and the veterinarian community.

Livestock Production Assurance program

The Livestock Production Assurance (LPA) program is the Australian livestock industry's voluntary on-farm assurance program covering food safety, animal welfare and biosecurity. It provides evidence of livestock history and on-farm practices when transferring livestock through the value chain. An LPA National Vendor Declaration (NVD) is industry best practice for all livestock movements, including property to property, through saleyards, direct to feedlots and to processors. Every NVD signifies that cattle within a consignment are not within a withholding period or export slaughter intervals as set by APVMA or SAFEMEAT, following treatment with any veterinary drug or chemical.

World-class accreditation and assurance programs

The National Feedlot Accreditation Scheme (NFAS) is an independently audited (by AUS-MEAT Limited) industry assurance scheme that underpins the quality, safety and integrity of grainfed beef. The scheme supports correct antimicrobial use through documented procedures for livestock identification, biosecurity, chemical storage, inventory management, labelling, administration to animals and export slaughter interval and withholding period compliance. Beef labelled under the GF (Grainfed) or GFYG (Grainfed Young Beef) or GFF (Grainfed Finished) ciphers must have been sourced from an NFAS-accredited feedlot with appropriate delivery documentation.

Antimicrobial Stewardship Guidelines

The Australian Lot Feeders' Association (ALFA) took the lead in 2018 and joined with MLA to develop Antimicrobial Stewardship Guidelines for the feedlot industry. This tool will assist in arming feedlot managers with practical information on best practice stewardship of antimicrobials. These guidelines set out a framework for antimicrobial stewardship practice in feedlots known as the 5Rs - Responsibility, Reduce, Replace, Refine and Review.

The Australian feedlot sector is seen as a low user of antimicrobials in the context of intensive animal industries. Maintaining this position is essential to preserving not only human and animal health, but also consumer confidence in our sector. ALFA has been overwhelmed with the number of feedlots that have voluntarily adopted stewardship plans with the support of their vets. It demonstrates the industry's recognition of the importance antimicrobial stewardship plays in today's world.

The Antimicrobial Stewardship Guidelines complement the well-established bodies and systems that service the feedlot industry to ensure the integrity of grainfed beef.

Dedicated veterinarians

The feedlot industry is serviced by a dedicated group of registered veterinarians. These highly trained individuals make regular visits to feedlots to assess beef cattle health and welfare. All scheduled antimicrobials used in feedlots are prescribed by veterinarians. The antimicrobial will be labelled by the veterinarian in addition to the manufacturer's label and information insert, which contains directions for use, storage, precautions, restraints, withholding periods, disposal and other important information.

① **Good Stewardship Practice (GSP)** – embedded thinking and action to improve antimicrobial use and reduce antimicrobial resistance selection and impact.

② **Responsibility**: high level commitment with everybody taking and sharing responsibility for antimicrobial use.

③ The 3Rs of responsible use: **Reduce** use, **Refine** use and **Replace** use – wherever possible.

④ **Review** current antimicrobial use and infection control practices, **develop** objectives to improve current practice, **implement** the stewardship plan, **review** and measure.

⑤ Every cycle of **5R antimicrobial stewardship** leads to best practice in infection prevention & control and antimicrobial use.

The 5R principles of antimicrobial stewardship that are outlined in ALFA's Antimicrobial Stewardship Guideline. The 5Rs are - Responsibility, Reduce, Replace, Refine and Review.

Surveillance project

In 2013, a survey demonstrated the low prevalence of antimicrobial resistance (AMR) in bacteria in Australian cattle production systems.[67] An update of this surveillance project is currently underway with samples being collected across Australia, and will be completed in 2020. Reporting will become progressively available from mid-2019. The results will be compared to see if there have been any changes from the result of the 2013 survey and to inform the design of future surveillance.

Trusted traceability systems

The National Livestock Identification System (NLIS) ensures traceability of cattle throughout their lives, and can be used to identify other livestock they may have come into contact with. This includes when an animal arrives at, and is dispatched from, a feedlot. This program is critical to maintaining identity and antimicrobial treatment records on individuals in the feedlot, ensuring correct administration of antimicrobials and that export slaughter intervals and withholding period requirements are met.

Prudent regulation and oversight

The Australian Pesticides and Veterinary Medicines Authority (APVMA) approves all antimicrobials for use in beef cattle. All antimicrobials undergo a rigorous pre-approval process under which the safety to animals, humans and environment is assessed, and residues in edible beef products are monitored. The APVMA publishes withholding periods for all antimicrobials and maintains a list of export slaughter intervals for products used in cattle.

The National Residue Survey (NRS) conducted by the Department of Agriculture and Water Resources randomly samples beef products at Australian abattoirs for antimicrobial residues. Over the last decade, compliance in the cattle program has been high (99.9–100%).[68]

CASE STUDY

Supporting industry uptake

In 2018, the Australian Lot Feeders' Association (ALFA) joined with MLA to launch the *Antimicrobial stewardship guidelines for the Australian cattle feedlot industry*. The guidelines provide an industry-specific framework for the appropriate use of antimicrobials to reduce the risk of antimicrobial resistance and maintain access to these important animal health tools.

"We are very proud to initiate our goal of continual improvement in antimicrobial stewardship," said Tony Batterham, ALFA Councillor and Feedlot Veterinarian.

"Awareness of the guidelines is high, with a third of feedlots already having implemented Stewardship Plans. The next step is embedding them into practice."

To support industry understanding of antimicrobial stewardship and increase uptake of the guidelines, ALFA has delivered a series of extension activities in recent months.

A series of seven animal health and welfare workshops held around the country in March 2019 contained a session on antimicrobial stewardship. A two-part webinar was held in March and April to introduce the guidelines and provide lot feeders and associated industry professionals with practical information on antimicrobial resistance. The webinar was well supported with more than 100 people participating.

In May, an online learning module was launched which covers key aspects of antimicrobial stewardship including diagnosis, appropriate use and post-mortem inspection.

"Our industry is supported by highly skilled veterinarians and nutritionists, utilising this expertise to build capacity and understanding of strong stewardship practices is fundamental to the ongoing success and adoption of the guidelines," said Tony.

"The guidelines will help demonstrate our industry's commitment to best practice management use of antimicrobials and align with national and international initiatives to preserve the effectiveness of antimicrobials for people and animals," said Tony.

Kerwee Feedlot located on Queensland's Darling Downs already has a strong philosophy of antimicrobial stewardship, according to Steve Martin, General Manager of Operations.

Tony emphasised that the lot feeding industry is actively supporting a number of Research and Development activities aimed at advancing our objective and scientific, understanding of the current status of antimicrobial resistance in grain fed production systems and the greater supply chain. "It is important that ongoing initiatives and activities in the industry regarding antimicrobial stewardship are evidence-based and constantly reviewed" he said.

Kerwee used the tools supplied through the guidelines and the industry training to structure and guide implementation of the management plan, with the assistance of their vet. Developing the plan took less than a day. Following an internal audit against the plan, current practices were confirmed to be suitable with no changes required.

"We had staff attend the webinar and the workshops as ensuring the team can execute the plan in day-to-day operations is fundamental to the plan's success," said Steve.

"Participating in these training opportunities is in line with our company philosophy in supporting best practice antimicrobial use and ensures that as a business we continue to operate in line with industry expectations.

"Customers are also demanding verification of best practice. Having a structured plan in place allows us to monitor welfare of livestock over time and contributes to the sustainability of the business long term."

Antimicrobial stewardship is a shared responsibility, according to Steve.

"The entire supply chain should be striving for best practice antimicrobial use. Since implementing our AMS plan it has become more important that we promote best practice up and down the supply chain to ensure the ongoing success of this initiative."

Health and safety of people in the industry

Definition	Working environments through the beef value chain, especially on-farm, expose employees and contractors to risk. This priority looks at notifiable fatalities, however industry recognises further investigation of injuries could highlight risk factors and improve work safety.	
Indicators	**10.1a Notifiable fatalities.**	Farm: 2 Feedlots: 0 Processing: 1

Context

Providing healthy and safe workplaces is essential. Within the Australian beef industry, work health safety procedures, practices and incident rates differ significantly by sector.

The processing sector has well-established procedures, systems and practices in relation to work health safety. Despite this, it is a dangerous industry with saws, blades and heavy lifting required and as such injury in red meat processing is higher than other manufacturing sectors.[69] The high risk of injury is reflected in worker compensation industry rates which are amongst the highest in the nation.[70]

Wherever there is handling of cattle there is a risk of worker injury. For feedlots, work health safety is managed within the National Feedlot Accreditation Scheme. For livestock transporters, the Australian Trucking Association's TruckSafe scheme sets out standards for driver health and safety.

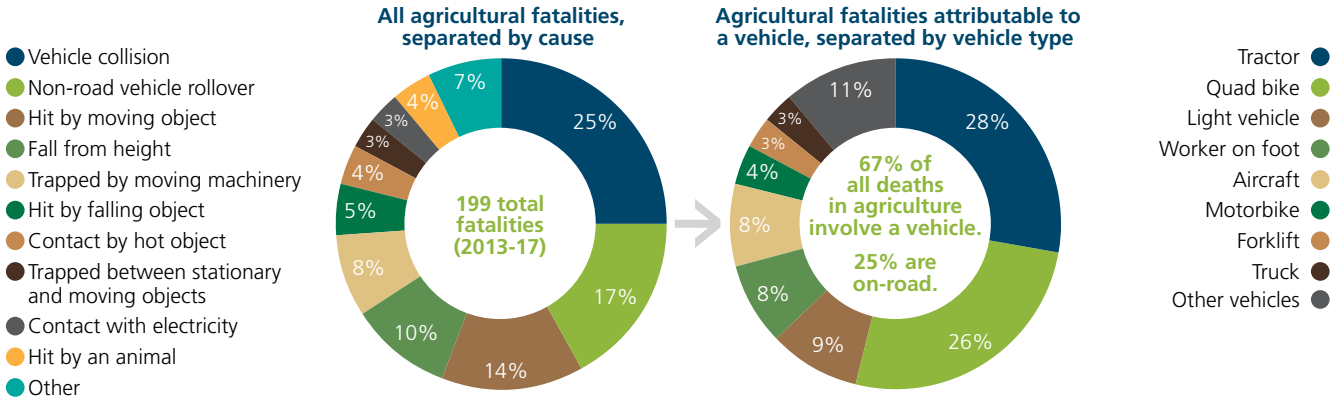
Beef producers face the highest level of risk to life across the industry. Agriculture has a higher fatality rate than the national average for all industries – with cattle, sheep and grain farming seeing the highest number of fatalities in agriculture.[71] SafeWork has identified agriculture as a priority industry in its *Work Health and Safety Strategy 2012-2022*.[72] While agriculture's fatality rate has been falling since 2003, it is still falling nearly two times slower than the national rate.[73]

Farms are unique business environments with farmers often self-employed and working alone with a variety of hazards such as plant, vehicles, chemicals, noise, sun exposure and animals. This context means farmers face a high level of health and safety risk with limited opportunities to share practices and get help should an incident occur. Additionally, farms are often both workplaces and residences, which can leave family members exposed to hazards.

Agricultural fatalities 2013-2017

Source: Safe Work Australia

The figures shown below are across the whole of agriculture and not specific to the beef industry. The breakdown is an indicator of the many risks beef producers face - particularly vehicle-related risks.



Health and safety of people in the industry (continued)

Industry position

The Australian red meat and livestock industry prioritises the wellbeing of people and has a zero-harm policy for any individuals within the supply chain.

The industry is supportive of policies that incentivise businesses across the supply chain to improve work health and safety.

What the data is telling us

Data included in the Framework is the most recent available from Safe Work Australia's Traumatic Injury Fatalities database.

In 2017, three fatalities were recorded for the beef industry. Two of these fatalities were recorded on farm and one in processing.

Last year's Annual Update reported nine fatalities for 2016, however these were for the whole agricultural industry. This year, the industry has collaborated with Safe Work to break the figures down specifically for beef. As such, it is not possible to compare fatalities from the past two years.

The beef industry is taking on a cross-agricultural approach and seeks to develop more lead indicators for work health safety.

Snapshot of activity

The considerable differences in the risks between sectors requires a tailored approach to tackling health and safety.

On farm

Following the end of the Primary Industries Health and Safety Partnership in 2017, the industry has taken the lead to renew the focus on workplace health and safety. Research and Development Corporations (RDC) including AgriFutures, Dairy Australia and MLA have partnered to form a new Rural Safety and Health Alliance (RSHA). The partnership will invest in practical extension solutions to reduce death, injury and illness in farming and fishing. Identifying and targeting different barriers and enablers for work health safety will be the focus of the alliance which is in the process of shaping its strategy.

This RDC alliance will complement the well-established activities of state-based bodies including:

- Farmsafe Queensland
- Farmsafe NSW
- Farmsafe Victoria
- Farmsafe South Australia
- Safe Farms WA
- Farmsafe Tasmania

These state bodies are coordinated under Farmsafe Australia, an umbrella entity for agricultural health and safety agencies. These groups deliver workshops, tools and resources to farmers to inform and drive uptake of safe workplace practices. The FarmSafe Australia Safety Induction Tool is an easy to use online guide that can be used by farm managers to induct and train new workers in farm safety.

In addition, the National Farmers' Federation works in partnership with SafeWork Australia to develop videos that showcase best practice in health and safety on the farm.

Specifically for cattle properties, MLA has created a series of online manuals that offer practical resources such as comprehensive and easy-to-follow checklists, templates and guidelines that help producers plan and implement on-farm health and safety initiatives.

In many cases, we are aware of what practices and procedures work, but adoption is not achieved. A greater understanding is required of the social barriers to farm safety, which will allow delivery groups to better drive uptake of safe on-farm practices and embed a health and safety culture on the farm.

Feedlot

Safe working environments and safety being the responsibility of all staff are tenets of the feedlot sector.

The National Feedlot Accreditation Scheme (NFAS) requires feedlots to ensure that "staff are adequately trained to ensure they have the appropriate skills and knowledge to competently perform the duties required of them by the NFAS Standards".

In July 2019, the Australian Lot Feeders' Association will conduct a series of workshops for feedlots in which participants will learn to promote effective team communication, which is vital to keeping everyone safe in environments filled with rapid change. The one-day workshop is designed for all personnel but has been tailored specifically for feedlot staff, with practical references to their on-site work environment.

Processing

Processors and the wider industry make significant investments in continuously improving health and safety in the sector.

At an individual company level, it is a legal requirement to provide safe workplaces and report any incidents. Processors invest in their own OH&S programs to reduce the inherent risks of processing meat.

At an industry level, the Australian Meat Industry Council (AMIC) maintains a substantial body of health and safety resources. Members can access guidelines, publications, risk management guides, injury management procedures, training videos, and tutorial guides to assist processors in work health safety programs.

AMIC is undertaking a project with Deakin University to more accurately understand the causes of injury and calculate lost time from injuries. The project's first research phase confirmed the rate of injury in the meat industry remains higher than for other industries. Body stressing and being hit by moving objects were identified as the most common mechanisms for injury. The research findings will be used in the project's next phase to develop a prevention and intervention strategy to reduce the incidence and severity of injury in the meat industry.

CASE STUDY

Digital tool optimises on-farm health and safety

In Australia, agriculture has the highest fatality rate and incidence of serious injury of any industry. In 2017, family-owned, semi-corporate cattle business Palgrove worked with beef production and marketing company OBE Organic and specialist training organisation Olive Learning to address the need for improved safety protocols and understanding by creating an online induction course, the Online Rural Property Induction, for new livestock staff.

For 40 years, Palgrove has followed a tradition of innovation. The company pioneered the development of the Charolais cattle breed in Australia and, more recently, the introduction of the Ultrablack breed.

Originally developed exclusively for Palgrove properties in 2017, Olive Learning has since adapted the induction course to suit a breadth of farms and rural properties across Australia. The course covers industry-wide safety standards and the risks that inform these standards, including hazards when working with livestock, use of machinery and bikes, fatigue, dehydration and handling of chemicals.

The principles of Palgrove's digital training initiative align with a key Australian Beef Sustainability Framework priority: health and safety of people in industry. The Framework seeks to foster innovative ideas, like Palgrove's, that promote the wellbeing and safety of all workers in the beef industry, to minimise incidences of on-farm injury or fatality.

The Online Rural Property Induction has been peer reviewed to ensure its applicability to the broader industry, with content updated annually to ensure ongoing relevance to Australian farm workers.

Prue Bondfield, Palgrove General Manager, said the company reassessed its induction processes 18 months ago in a bid to synchronise its procedures across its QLD and NSW locations.

"At any one time, we can be assured that our managers provide the same level of training to new staff at each of our locations. We rely on our property managers to make sure inductions are completed properly, so the online course ensures that every new staff member has access to the same information. We looked at the horticultural industry and how they train their workforce and found that visual education overcame issues such as language, so adapted this to solve our multi-location challenges," Prue said.

"We thought a simple video could be used as a baseline, so that all staff learn basic standard safety practices . We worked with Olive Learning, to create our online course, which includes a 10-minute questionnaire, which then provided staff with a certificate from the 'Palgrove Academy'.

"In addition, we've got a whole toolbox of information and policies that sits above the induction and is used to inform anyone from head office to station hands."

Palgrove's digital product is continually being improved with new modules and specialisations. Prue is currently working with management staff to create smaller farm safety YouTube videos, which cater specifically to each property and their varying environments and issues.

"A YouTube visual allows people to go back and refresh their knowledge when they need to," Prue said. "We'll be scheduling in time for employees to watch the videos for their property twice a year."

"We know that if an issue or incident occurs more than once on a property then something needs to be adjusted, so that's when we'd look at creating a YouTube video."

"We've been really involved in trying to find out more from organisations and government, such as the QLD government and Farm Safe. We were keen to learn 'what can go wrong' and hopefully prevent incidents rather than just accept that they are just part of working in our industry. As we expand the business, you can lose that connect with the employees. What we're trying to do is develop a culture of safety, rather than just compliance. In other words, when you work at Palgrove, this is how we do things."

The Online Rural Property Induction is now a commercially available and much sought-after educational tool for workers embarking on careers in livestock.

"[The induction course is] only about working with beef cattle. It is now available to any employer and it's a low-cost way to make sure that every employee on your property has had the same introduction to on farm safety. It's available through AgForce or directly through Olive Learning. [The Academy] also provides an official record of staff completion of the course."

Prue said there has been a noticeable shift in attitude to safety since the introduction of the online course, which has helped workers to understand that both employers and staff have a role to play in farm safety.

The Framework Scorecard

ANIMAL WELFARE

Indicator	Data	Trends	Explanation
PRIORITY AREA 1: ENHANCE ANIMAL WELLBEING			
PRIORITY 1.1: COMPETENT LIVESTOCK HANDLING			
1.1a The percentage awareness of the Australian Animal Welfare Standards for Cattle. These Standards were agreed by state and territory governments in 2016 and are being regulated into law by most jurisdictions. This indicator looks at the percentage of producers demonstrating awareness through an audit process.	42.6%[74]	■	**Last year's Update reported a figure of 56% for 2016.** Last year, data was sourced from self-reporting surveys. In this report, more robust data has been collected from independent LPA animal welfare audits following the introduction of the animal welfare module for LPA and an auditing process for re-accreditation. The re-accreditation process is only in year one of three and as such this percentage is likely an under representation of producer awareness. Industry is considering an indicator that goes beyond awareness for future reports. Due to the significant change in data source this year, from survey to audits, we have marked this figure as a new baseline for this indicator.
1.1b The percentage compliance with National Feedlot Accreditation Scheme (NFAS) Animal Welfare requirements. NFAS is an independently audited quality assurance scheme that was initiated by the feedlot industry and is managed by the Feedlot Industry Accreditation Committee.	97.15%[75]	↑	**Last year's Update reported a figure of 96.24% for 2016.** Compliance has increased by 0.91% in the previous reporting period. Data is collected from independent NFAS audits. There were 386 audits conducted in 2018 with 11 nonconformances raised against element 3.4 Animal Welfare, the majority of which were raised because there were no 'appropriate systems in place to investigate, manage and record any incidents of animal cruelty'. This figure covers 2.9 million cattle through feedlots in 2018 to align with 2018 NFAS data.
1.1c Percentage awareness of the Australian Model Code of Practice for Livestock Saleyards and Lairages. People who handle livestock in saleyards and lairages should be familiar with this guide, which will help them meet required standards.	No data for 2019	—	**Last year's Update did not report a figure for this indicator.** No data is available for this indicator. The saleyards sector will work with the Framework to develop this indicator. This did not occur in 2018.
PRIORITY 1.2: SAFE LIVESTOCK TRANSPORT			
1.2a Number of powered vehicles and trailing equipment which operate under TruckSafe Animal Welfare. TruckSafe is an independently-audited quality assurance program for the Australian livestock transport industry. It has a voluntary animal welfare module which is used for this indicator. The module adheres to ALTRA's National Animal Welfare Policy.	Powered vehicles: 576 Trailing equipment: 1727[76]	↑	**Last year's Update reported 474 powered vehicles and 1278 trailing equipment under TruckSafe for 2017.** This indicator has been reworded from 'The number of trucks, trailers and crates operating under TruckCare' as the program's name has changed to TruckSafe. Additionally, this indicator has been reworded to report on 'powered vehicles and trailing equipment' to align with TruckSafe's language. While language has changed, the data is still comparable to 2018, showing an increase of 102 powered vehicles and 449 trailing equipment under TruckSafe in the last year. Being transported by a TruckSafe truck is not an outcomes measure and in time it is expected that outcomes measures will replace this indicator.

*The trend symbols show improvement and decline in indicators. However they provide no indication of the **extent** of improvement or decline, and must be read in context of the explanation given.*

74 LPA audit outcomes since 1 Jan 2018-Apr 2019
75 ALFA-NFAS audit outcomes between 1 Jan – 31 Dec 2018
76 2018, ATA

↑↓ Improvement on previous year ↓↑ Decline from previous year — No data available, or data not updated this year

~ No or minimal change on previous year ■ New baseline this year Key priority

ANIMAL WELFARE

Indicator	Data	Trends	Explanation
PRIORITY 1.2: SAFE LIVESTOCK TRANSPORT			
1.2b The number of reportable incidents of shipboard mortalities ASEL has a specific definition for a reportable incident. For journeys under 10 days, a 0.5% mortality rate is a reportable incident. For journeys over 10 days, a 1% mortality rate is a reportable incident.	0.14%[77]	~	**Last year's Update reported a figure of 0.10% for 2017.** The indicator has been slightly reworded from 'The number of reported incidents of shipboard mortality incidents' to reflect how the data is reported by the DAWR. There has been a minimal change, with mortalities rising in the past year by 0.04%. Recognising that mortalities is a limited indicator, the live export industry is developing measures of animal welfare on transport which may be used in future reports when completed.
KEY PRIORITY 1.3: ANIMAL HUSBANDRY TECHNIQUES			
1.3a The percentage of the national cattle herd with poll gene. Polled cattle naturally do not have horns. Selective breeding of the poll gene will eradicate the need for dehorning, leading to better animal welfare and work safety outcomes.	86%[78]	↑	**Last year's Update reported 51% polled cows and 71% polled bulls for 2016.** In 2019 this data was provided across the entire herd, rather than for bulls/cows. As a result, the data is not directly comparable. However a clear increase in polled cattle can be deduced. It should be noted that tropical breeds have a higher percentage of horned animals, but the numbers analysed underestimate their share of the national herd.
1.3b Percentage of industry reguarly using pain relief when undertaking husbandry practices. These procedures could include castration, dehorning and branding. Pain relief includes topical, oral or injectable analgesics.	15%[79]	↑	**Last year's Update reported a figure of 4% for 2016.** Indicator reworded in 2019 to ensure clarity that indicator is a reflection of producers who use pain relief reguarly for husbandry practices such as dehorning, castration and debudding. The data from the 2019 Producer Sustainability Survey represents a statistically relevant sample of both herd size and geographic spread. Attempts were made to obtain sales data for pain relief products, however this data is commercially sensitive, non species-specific and not usage-based.
PRIORITY 1.4: HUMANE PROCESSING			
1.4a The percentage of cattle slaughtered through an establishment accredited under the Australian Livestock Processing Industry Animal Welfare Certification System (AAWCS). The AAWCS is an independently audited certification program used by Australian livestock processors to demonstrate compliance with the industry best practice animal welfare standards.	82%[80]	↓	**Last year's Update reported a figure of 84% for 2017.** Based on AUS-MEAT audits of AAWCS in 2018 extrapolated for beef processing establishments using MLA and ABS data to indicate number of cattle. The National Livestock Reporting Service receives contributions from 58 of the 74 AAWCS accredited plants, which represents 82% of the national ABS total slaughter figures.

*The trend symbols show improvement and decline in indicators. However they provide no indication of the **extent** of improvement or decline, and must be read in context of the explanation given.*

77 2018, http://www.agriculture.gov.au/export/controlled-goods/live-animals/live-animal-export-statistics/reports-to-parliament
78 2018, AGBU, ARCBA and Neogen Australia
79 2019 Producer Sustainability Survey
80 AMIC

The Framework Scorecard (continued)

ANIMAL WELFARE

Indicator	Data	Trends	Explanation
PRIORITY AREA 2: PROMOTE ANIMAL HEALTH			
PRIORITY 1.4: HUMANE PROCESSING			
1.4b The percentage compliance with Exporter Supply Chain Assurance System (ESCAS). ESCAS is an Australian Government regulatory program based on four principles: animal welfare, control through the supply chain, traceability through the supply chain, and independent auditing.	99.34%[81]	↑	**Last year's Update reported a figure of 90.65%.** ESCAS is a regulatory requirement. The Department of Agriculture and Water Resources does not strictly measure compliance with ESCAS. In order to develop an indicator for compliance rates for consignments export data and non-compliance data were analysed. Current figures indicate there were 457 consignments of cattle exported in 2018 which represented 1.1m head[82]. A review of performance reports shows that approximately 988 cattle were involved in 3 cattle-related noncompliance's in 2018[83] and industry is working to continuously improve compliance.
PRIORITY 2.1: MAINTAIN HEALTHY LIVESTOCK			
2.1a Vaccination rates for clostridial diseases. Clostridial diseases are caused by bacteria that are widespread in the environment and are normally found in soil and faeces. They can survive in the environment for very long periods so vaccination is required for good animal health.	82%[84]	↑	**Last year's Update reported a figure of 71% for 2016.** This indicator has risen by 11% since the previous reporting period. This measure is from the 2019 Producer Sustainability Survey and looks at vaccination for clostridial diseases (eg: tetanus, malignant oedema, enterotoxaemia, black disease and blackleg, leptospirosis etc). In many areas these diseases present such a low risk of occurrence therefore vaccination isn't required. Attempts were made to obtain sales data for vaccination products, however this data is commercially sensitive, non species-specific and not usage-based.
PRIORITY 2.2: MINIMISE BIOSECURITY RISK			
2.2a The percentage of national cattle herd covered by a documented biosecurity plan. A documented plan that outlines the simple, everyday biosecurity practices to protect the health of livestock, limit production losses and help maintain market access for Australia's beef producers.	25%[85]	■	**Last year's Update did not report a figure for this indicator.** This is based on LPA re-accreditation figures from Jan 2018-Apr 2019 noting that LPA re-accreditation is based on a three-year cycle and this data represents only part of the cycle. In re-accrediting, producers must indicate if they have a documented biosecurity plan. The wording has been changed from 'The percentage of the national cattle herd covered by a documented biosecurity plan' as the LPA reaccreditation is only half way through its three-year cycle so only a small number of producers have been audited. This also better reflects the fact that biosecurity is a property-wide consideration rather than specifically a cattle consideration.
2.2b Australia continues to be declared free from exotic diseases by World Organisation for Animal Health (OIE). Australia aims to continue being officially recognised as free from exotic diseases in cattle. Exotic diseases include foot and mouth disease, BSE, CBPP and Rinderpest.	100%[86]	~	**Last year's Update reported a figure of 100% for 2017.** The industry works hard in partnership with the federal government to keep Australia free of exotic diseases. In the past, combined focus eradicated the diseases brucellosis and tuberculosis for the Australian herd.

81 DAWR and http://www.agriculture.gov.au/export/controlled-goods/live-animals/livestock/regulatory-framework/compliance-investigations/investigations-regulatory-compliance/
82 2018, DAWR
83 2018, http://www.agriculture.gov.au/export/controlled-goods/live-animals/livestock/regulatory-framework/compliance-investigations/investigationsregulatory-compliance/
84 2019 Producer Sustainability Survey
85 Integrity Systems Company – LPA re-accreditation figures from Jan 2018-Apr 2019
86 2018, OIE

↑↓ Improvement on previous year ↓↑ Decline from previous year — No data available, or data not updated this year

~ No or minimal change on previous year ■ New baseline this year Key priority

ECONOMIC RESILIENCE

Indicator	Data	Trends	Explanation
PRIORITY AREA 3: ENHANCE PROFITABILITY AND PRODUCTIVITY			
KEY PRIORITY 3.1: PROFITABILITY ACROSS VALUE CHAIN			
3.1a Rate of return to total capital for beef farms A five-year rolling average of beef specialist farms rate of return, used as an indicator of profitability across the producer sector.	All: 4.4% Top 25%: 8.2%[87]	↑	**Last year's Update reported a figure of 3.1% for all farms and 6.4% for the top quartile for FY2016-17. This has since been updated by ABARES to 3.4% and 6.7% respectively.** This indicator has been renamed from 'Farm business profit at full equity' to more accurately describe what is being measured and align with the ABARES wording. Data this year is still comparable to last year. This measure includes capital appreciation as a lot of wealth is generated through land value appreciation. Beef farms saw an increase of 1.0% rate of return in the last year. The top quartile saw a bigger rise of 1.5%. This top quartile has been featured to highlight the significant profit differences between the top performers and the mean.
PRIORITY 3.2: FARM, FEEDLOT AND PROCESSOR PRODUCTIVITY AND COST OF PRODUCTION			
3.2a Total factor productivity (TFP) This is the ratio of a market outputs index to a market inputs index, expressed as a five-year rolling average. This is an indicator of productivity across the producer sector.	National: 125.9[88]	↓	**Last year's Update reported a figure of 137.2 for FY2016-17. This has been updated by ABARES to 128.9.** This indicator has been renamed from 'Total farm productivity' to more accurately describe what is being measured and align with ABARES wording. Data this year is comparable to last year. TFP is an index where 100 points represents the 1981-1985 baseline. A national TFP of 125.9 shows a 25.9% increase on this baseline. Producer productivity has dropped 3.0 points over the last year.
3.2b Cost of beef produced on Australian farms Cost of beef produced on Australian farms. Cost of production impacts farm profitability, global competitiveness, and can influence farm debt.	US$572.60 c/kg cwt[89]	↑	**Last year's Update reported a comparable figure of US$539.70 c/kg cwt for 2016.** Last year, this was expressed as a ratio to US costs. This year we've provided the average cost of production (COP) as a more accurate measure of costs. Currently, a five-year rolling average can't be reported as Australian data only goes back to 2011, but this will be explored in future. This year's report shows a increase of US$32.90 c increase to last year's reported US$539.70 c/kg cwt. For this year's measure, a new group of farms were added to the measurement. An AU:US COP ratio of 1.2 was featured in last year's report but including these new farms, this figure should be amended to 1.3. As a result, the COP ratio between AU:US has risen from 1.3 to 1.4, highlighting Australia's high COP compared to a key competitor.

*The trend symbols show improvement and decline in indicators. However they provide no indication of the **extent** of improvement or decline, and must be read in context of the explanation given.*

87 2014-2018 average, ABARES
88 2017-18, ABARES
89 2017, agri benchmark

The Framework Scorecard (continued)

ECONOMIC RESILIENCE

Indicator	Data	Trends	Explanation
PRIORITY AREA 3: ENHANCE PROFITABILITY AND PRODUCTIVITY			
PRIORITY 3.2: FARM, FEEDLOT AND PROCESSOR PRODUCTIVITY AND COST OF PRODUCTION			
3.2c Average cost of cattle processing per head. The operating cost structure of red meat processors can be split into labour, utilities and certification costs. Costs are critical to processor profitability, and the competitiveness of Australian product in the global market.	$360.62 per head[90]	■	**Last year's Update did not report a figure for this indicator.** No data was published last year due to commercial confidentiality. This year, data has been sourced an AMPC-led study into 2015-16 processing costs. Australia's cost of processing is considerably higher than other countries – it is 24% higher than the US and over twice the cost of Brazil. It is estimated that more than 54% of costs stem from regulation – a regulatory burden twice that of US and three times that of Brazil.
PRIORITY AREA 4: OPTIMISE MARKET			
PRIORITY 4.1: BARRIERS TO TRADE			
4.1a Market Access Index. A Market Access Index has been developed using tariffs faced in each major beef import market and the tariff equivalents of quotas and major disease related trade restrictions. The index for Australia has been compared to that of other major beef exporters. Lower values of the Index indicate more favourable market access conditions.	22.3[91]	–	**Last year's Update used the same figure.** The value of the index in 2017 for Australia is 22.3 and for other major beef exporters, 57.5, indicating very high levels of market access for Australia compared to other suppliers. Over the preceeding five years the value of the market access index has improved by almost 20% for Australia. This work is not updated annually, so the same data is presented as last year.
4.1b Costs of technical trade barriers. Technical trade barriers, such as the use of import permit restrictions or delays, failure to grant exporter clearance or spurious phytosanitary regulations represent significant costs to the industry.	$2b per annum 2017, MLA estimate	–	**Last year's Update used the same figure.** It is estimated that technical trade barriers cost the Australian industry $2b. This work is not updated annually, so the same data is presented as last year.
PRIORITY 4.2: PRODUCT INTEGRITY			
4.2a The percentage of consumers nationally that consider Australian beef safe, tasty and of a consistent quality. Market access ultimately relies on consumers desire to purchase Australian beef.	Safe: 59%, Tasty: 60%, Consistently high quality: 47%[92]	↓	**Last year's Update reported a figure of Safe: 60%, Tasty: 60%, and Consistently: high quality 47%.** Data from MLA's domestic market tracking is used for this indicator. This data is not available for all export regions. Over the last year, there has been a 1% drop in the percentage of consumers who consider Australian beef safe.
4.2b Comprehensive integrity systems (which ensure that market access is maintained). Measure to include information on the percent of the national herd covered by LPA, the percent of feedlots covered by the NFAS, the percent of processing establishments accredited under AUS-MEAT and the percent of saleyards covered by the National Saleyard Quality Assurance program.	No data for 2019	–	**Last year's Update did not report a figure for this indicator.** The development of this indicator requires different data systems to be aligned. This is being explored as part of the digital value chain program being led by MLA.

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90 SG Heilbron Economic and Policy Consulting (2018). Analysis of Regulatory and related costs in red meat process. Project code: 2017-2062. Australian Meat Processor Corporation.
91 Barnard & Quirke, Report prepared to develop a Market Access indicator, 2017
92 MLA's AU equity tracker (2018).

↑↓ Improvement on previous year ↓↑ Decline from previous year — No data available, or data not updated this year

~ No or minimal change on previous year ■ New baseline this year Key priority

ENVIRONMENTAL STEWARDSHIP

Indicator	Data	Trends	Explanation
PRIORITY AREA 5: IMPROVE LAND MANAGEMENT PRACTICES			
PRIORITY 5.1: MINIMISE NUTRIENT AND SEDIMENT LOSS			
5.1a Number of days per year soil covered by vegetation. Any ground cover, whether it be native vegetation, pastures or even weeds will protect waterways from run-off and soil erosion.	No data for 2019	—	**Last year's Update did not report a figure for this indicator.** Measuring this across Australia is difficult from a technical and practical standpoint and no current agreed methodology exists.
5.1b Soil health. Healthy soil stores water and nutrients. It can help protect against drought, acting as a resevoir during dry periods. Soil health can be impacted by erosion and chemicals.	No data for 2019	—	**Last year's Update did not report a figure for this indicator.** Measuring this across Australia is difficult from a technical and practical standpoint and no current agreed methodology exists.
5.1c Water quality. Poor water quality has a negative impact on public health, ecosystem health, recreation, farming and other activities. Water quality can be impacted by sediment run-off and erosion.	No data for 2019	—	**Last year's Update did not report a figure for this indicator.** Measuring this across Australia is difficult from a technical and practical standpoint and no current agreed methodology exists. Proxy measures include ground cover, which is captured in 5.2a.
KEY PRIORITY 5.2: BALANCE OF TREE AND GRASS COVER			
5.2a Area of land managed for environmental outcomes Land can be publicly or privately managed for environmental outcomes such as through good active management, formal environment agreements or protected land.	1.35% of cattle-producing land set aside for conservation or protection purposes[93]	■	**Last year's Update did not report a figure for this indicator.** This represents 3,986,406 ha of cattle-producing land set aside for conservation or protection purposes. This includes reserves, parks, heritage sites and indigenous protected areas.
	Land managed by beef producers for conservation outcomes through formal arrangements	—	**Last year's Update did not report a figure for this indicator and no data is available in this year's report.** An appropriate methodology is being developed to collect data related to formal arrangements. Work continues on collecting this data, but a figure has not been arrived at in time for this report.
	52% of cattle-producing land managed by beef producers for environmental outcomes through active management[94]	■	**Last year's Update did not report a figure for this indicator.** This represents 300,838,832ha where on-farm management activities contribute to positive environmental outcomes. The measured activities align with the sustainability recommendations from government agencies, regional NRM organisations and other environment groups including Landcare and WWF. This figure is extrapolated from survey figures, based on the percentage of land respondents actively manage environmentally. This figure should be considered in light of this methodology.

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93 2015-16, ABS Land management and Farming in Australia

94 2019 Producer Sustainability Survey; 2016-17, ABS Land Management and Farming in Australia; ABARES Farm survey and analysis - Beef Farms

The Framework Scorecard (continued)

ENVIRONMENTAL STEWARDSHIP

Indicator	Data	Trends	Explanation
PRIORITY AREA 5: IMPROVE LAND MANAGEMENT PRACTICES			
KEY PRIORITY 5.2: BALANCE OF TREE AND GRASS COVER			
5.2b Change in vegetation[95] Changes in the balance of vegetation in a landscape can have negative impact of both ecosystems and production. Vegetation includes woody and non-woody types (e.g. trees and grass).	2.2% National Forest cover gain 1.3% National forest cover loss 4.5% National woodland cover gain 3.2% National woodland cover loss	■	**Last year's Update did not report a figure for this indicator.** These figures have been newly developed for this report and represent a new baseline. As an example of what this shows: a 2.2% national forest cover gain means that from 2016 to 2017, the conversion of non-woody to forest was responsible for a 2.2% gain in forest extent. Conversely, a 1.3% national forest cover loss means that from 2016 to 2017, 1.3% of the forest extent was converted to non-woody. To put this into perspective, the net change in national woody (forest and woodland) cover extent is +0.9%. At this stage, without regionality and context these figures are difficult to interpret and determine improvement or decline. As a result, the Framework is going to set targets for the 56 NRM regions for forest and woodland gains and losses. This will likely affect how these measures are reported next year.
	Percentage of regions achieving healthy ground cover thresholds	—	**Last year's Update did not report a figure for this indicator and no data is available in this year's report.** 56 NRM regions ground cover over 30 years is reported on the Framework website. In the next year the Framework will work with NRM regions to develop a national indicator for the percentage of NRM region achieving seasonal ground cover levels. This initially requires thresholds to be set per region. A regional breakdown of ground cover levels is available on www.sustainableaustralianbeef.com.au/vegetation-trends
PRIORITY AREA 6: MITIGATE AND MANAGE CLIMATE CHANGE			
KEY PRIORITY 6.1: MANAGE CLIMATE CHANGE RISK			
6.1a kg CO_2e emitted per kg liveweight when raising beef. The majority of greenhouse gas emissions in beef production can be attributed to methane produced as a by-product of a cow's digestive process.	12.6kg CO_2e kg LW[96]	↓	**Last year's Update reported a figure of 13.1kg CO_2e/kg LW for 2017** This represents a 8.3% decline in GHG emission intensity (excluding from land use change) in the last five years and a 20% decline in emissions intensity over 35 years to 2015. Life Cycle Assessments (LCA) data was used as a source. LCAs are a globally accepted environmental measure that attributes all emissions associated with grazing, feedlotting and associated activities of cattle production up until the point of processing.
6.1b kg CO_2e emitted per tonne Hot Standard Carcass Weight (HSCW) when processing beef. Processing plants produce greenhouse gasses from energy use and waste treatment.	432kg per tonne HSCW[97]	—	**Last year's Update used the same figure.** Data has not been updated from last year's report as the data source is only updated every five years. An update is expected in 2020.
6.1c Carbon captured and re-used in processing. Methane and other gases can be captured during wastewater treatment to create biogas that is then used in the facility reducing the use of natural gas.	6.6% of energy use[98]	—	**Last year's Update used the same figure.** Data has not been updated from last year's report as the data source is only updated every five years. An update is expected in 2020.

95 See pages 23-31 in this report.
96 2019, S.G. Wiedemann et al
97 2015, AMPC Environment Performance Review: Red Meat Processing Sector, 2015
98 2015, AMPC Environment Performance Review: Red Meat Processing Sector, 2015

↑↓ Improvement on previous year ↓↑ Decline from previous year — No data available, or data not updated this year

~ No or minimal change on previous year ■ New baseline this year Key priority

ENVIRONMENTAL STEWARDSHIP

Indicator	Data	Trends	Explanation
PRIORITY AREA 6: MITIGATE AND MANAGE CLIMATE CHANGE			
KEY PRIORITY 6.1: MANAGE CLIMATE CHANGE RISK			
6.1d Carbon sequestration. The cattle industry is able to sequester carbon through effectively managing the integration of soil, water and plant assets assists in reducing CO_2 emissions, increases CO_2 draw down from the atmosphere and increases soil organic carbon levels, thus improving on-farm productivity.	No data for 2019	—	**Last year's Update did not report a figure for this indicator.** Currently there is no widely agreed methodology to measure carbon sequestration across the beef industry. Measures will be developed for future reports as part of the CN30 project.
6.1e Percentage total CO_2e reduced by the beef industry from a 2005 baseline The industry set a goal to be carbon neutral by 2030. This measure of absolute industry emissions tracks the beef industry's progress towards carbon neutrality and includes direct and emissions from Land Use Change.	55.7%[99]	↑	**This is a new indicator to track the CN30 target. Since the 2005 baseline to 2016, there has been a 55.7% reduction of absolute carbon emissions by the beef industry.** This is a total reduction of 56.65Mt CO2e since the 2005 baseline (101.79Mt CO2e). This includes emissions from beef and land-use-related emissions. As accounting changes, year-on-year figures are retrospectively changed which makes showing year-on-year figures difficult. As a result, a percentage reduction on the baseline is being reported.
PRIORITY 6.2: CLIMATE CHANGE ADAPTATION AND PREPAREDNESS			
6.2a Producer confidence in having the information, tools, technologies and resources (both business and biophysical) to be able to adapt to change over time. A changing and unpredictable climate has a direct impact on agricultural industries. Individual businesses ability to adapt and respond to incidents is essential.	Farms: 4.87 Feedlots: 4.93[100]	■	**Last year's Update did not report a figure for this indicator.** This year a figure has been provided about farm and feedlot confidence in the future in lieu of data more closely aligned to climate adaptation. This is a combined mean score (between 1-7) of respondent's confidence in achieving what they want, meeting business objectives, making the right decision about farm management, handling changing market conditions, coping well with difficult conditions, maintaining and improving the health of their farm and feeling they have adequate skills and education - for the next few years. These figures indicate that producers and lot feeders are only moderately confident in achieving farm management outcomes in the next few years.
PRIORITY 6.3: EFFICIENT USE OF WATER			
6.3a Litres of water used per kg liveweight for raising cattle. The majority of water used in beef production is consumed by cattle as drinking water.	486 litres per kg LW[101]	↓	**Last year's Update reported a figure of 515 litres per kg LW for 2017.** Life Cycle Assessments (LCA) data was used as a source. LCAs are a globally accepted environmental measure that attributes all emissions associated with grazing, feedlotting and associated activities of cattle production up until the point of processing. Total fresh water consumption was found to decline 14% in the most recent five-year period and was 68% lower than the five years to 1985.

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99 CSIRO
100 Regional Wellbeing Survey 2018, University of Canberra
101 2019, S.G. Wiedemann et al

The Framework Scorecard (continued)

PEOPLE AND THE COMMUNITY

Indicator	Data	Trends	Explanation
PRIORITY AREA 6: MITIGATE AND MANAGE CLIMATE CHANGE			
PRIORITY 6.3: EFFICIENT USE OF WATER			
6.3b Kilolitres water used per tonne Hot Standard Carcass Weight (HSCW) when processing beef. In processing, water is primarily used to ensure food safety and hygiene during operations. Improving the efficiency of water use without comprising food safety and hygiene is critical to this priority.	8.6 KL per tonne HSCW[102]	—	**Last year's Update used the same figure.** Data has not been updated from last year's report as the data source is only updated every five years. An update is expected in 2020.
PRIORITY AREA 7: MINIMISE WASTE			
PRIORITY 7.1: SOLID WASTE TO LANDFILL FROM PROCESSING			
7.1a Kilograms of solid waste per tonne Hot Standard Carcass Weight (HSCW) when processing beef. The majority of waste solids generated are organic in nature and recycled.	5.9 kg per tonne HSCW[103]	—	**Last year's Update used the same figure.** Data has not been updated from last year's report as the data source is only updated every five years. An update is expected in 2020.
PRIORITY AREA 8: PRODUCE NUTRITIOUS AND SAFE FOOD			
PRIORITY 8.1: BEEF IS EATEN AS PART OF A HEALTHY BALANCED DIET			
8.1a The percentage of consumers in Australia who consider beef part of a healthy balanced diet. The Australian Dietary Guidelines recommend 65g/day cooked fresh red meat, which includes beef.	54%[104]	↓	**Last year's Update reported a figure of 58% for 2017.** Measurement is limited to the Australian market due to access of data. This represents a slight decrease of 4%.
PRIORITY 8.2: FOOD SAFETY			
8.2a The percentage of exported raw beef product rejected for food safety reasons	0.0024% US (2018) 0% Japan (2017)[105]	↑	**Last year's Update reported a figure of 0.00084% for the US (2017).** This indicator has been reworded from 'The number of food safety incidents related to raw beef'. The previous wording incorrectly implied that human health had been affected. This indicator only looks at raw beef that has been rejected from a market for food safety reasons before it has reached consumers. This indicator only looks at raw beef, because the Australian beef industry cannot control the product beyond this. Data is only available for the US and Japan. Over the past year, there was an increase of 0.00156% in rejections in exports to the US. Despite this increase, this figure remains extremely low - recognising that Australia is a world leader in food safety. There are challenges with collecting timely and comparable data across different markets. The Framework is continuing to improve its data collection. For now, markets have been reported separately.
KEY PRIORITY 8.3: ANTIMICROBIAL STEWARDSHIP			
8.3a The percentage of cattle covered by an antibiotic stewardship plan. A documented plan that outlines practices to ensure responsible use of antibiotics for treating cattle for health reasons.	39%[106]	■	**Last year's Update did not report a figure for this indicator.** Last year, no data was available. Since the previous report, the feedlot industry has independently audited feedlots for antibiotic stewardship plans. 300 audits were completed in the reporting period showing that 118 feedlots have voluntarily implemented an antibiotic stewardship plan in their enterprise.

102 2015, AMPC Environment Performance Review: Red Meat Processing Sector, 2015
103 2015, AMPC Environment Performance Review: Red Meat Processing Sector, 2015
104 Milward Brown Quarterly Consumer tracking Q1, 2019
105 Objective measures of Australian beef meat safety and suitability, updated March 2019
106 ALFA – based on NFAS Audits undertaken between Jul 2018-Mar 2019

↑↓ Improvement on previous year ↓↑ Decline from previous year — No data available, or data not updated this year

~ No or minimal change on previous year ■ New baseline this year Key priority

PEOPLE AND THE COMMUNITY

Indicator	Data	Trends	Explanation
PRIORITY AREA 8: PRODUCE NUTRITIOUS AND SAFE FOOD			
KEY PRIORITY 8.3: ANTIMICROBIAL STEWARDSHIP			
8.3b Antimicrobial surveillance program. Robust surveillance is important to understand and respond to antimicrobial resistance patterns and drivers.	No data for 2019	—	**Last year's Update did not report a figure for this indicator.** The Australian beef industry is contributing to the development of a national antimicrobial surveillance program. Once this program is developed, a measure will be developed for the beef industry specifically for inclusion in the Framework.
PRIORITY AREA 9: BUILD WORKFORCE CAPACITY			
PRIORITY 9.1: EDUCATION AND TRAINING			
9.1a Number of traineeships and apprenticeships enrolled and completed. Education is for the industry to continue building a skilled and well-rounded labour force.	**Commenced** Farm: 320 Feedlot: 18 Processing: 374 **Completed** Farm: 203 Feedlot: 3 Processing: 203[107]	↑	**Last year's Update reported a figure of 333 farm, 10 feedlot and 273 processing traineeships and apprenticeships commenced for 2016. In addition, 164 on farm, 1 feedlot and 202 processing completed traineeships and apprenticeships was reported for 2016.** This represents an increase of 96 total traineeships and apprenticeships commenced since the last reporting period. And an increase of 42 traineeships and apprenticeships completed. There are limitations with the accuracy of the available data for this indicator. Meat processing figures include all meat except poultry, not just beef. It is not possible to do separate out how many of them work in processing cattle so the figures here have been deduced are based on percentages of cattle processed according to ABS.
9.1b On-the-job training completed.	No data for 2019	—	**Last year's Update did not report a figure for this indicator.** An indicator is to be developed, recognising the difficulty in capturing this data from across the industry. It is expected data will exist in corporate farm operations, feedlots and processing but will be difficult to capture for family farms.
9.1c Percentage of industry participants with a higher education qualification. Education is for the industry to continue building a skilled and well-rounded labour force.	Feedlots: 22% Farms: 20%[108]	↑	**Last year's Update reported a figure of 17% for farms. No figure for feedlots was previously reported.** The farm figures are not directly comparable as the data source has changed - however at face value there has been a 3 point point increase. Data was taken from the ABS Census.
9.2a The percentage of women and men in the workforce.	**Farms:** Female: 40.1% Male: 71.3% **Feedlots:** Female: 25.9% Male: 74.1% **Processing:** Female: 24.7% Male: 75.3%[109]	↑	**Last year's Update reported female figures of 39.5% on farm, 20.0% in feedlots and 25.2% in processing for the previous period.** This year's report shows an increase the percentage of women by 0.6% on farms, 5.9% in feedlots and 0.5% in processing. There are limitations with the accuracy of data for this indicator. Meat processing includes all meat except poultry, not just beef. It is not possible to separate out beef processing, so figures are deduced from the percentage of cattle processed according to ABS.

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107 National Centre for Vocational Education Research VOCSTAT database, Jan-Dec 2017
108 ABS Census of Population and Housing 2016
109 Gender Equality Agency, April 2017 - March 2018

The Framework Scorecard (continued)

PEOPLE AND THE COMMUNITY

Indicator	Data	Trends	Explanation
PRIORITY AREA 9: BUILD WORKFORCE CAPACITY			
PRIORITY 9.2: DIVERSITY IN THE WORKFORCE			
9.2b The age breakdown of the workforce.	**Farms:** <18: 1% 18-24: 6% 25-34 9% 35-44: 11% 45-54: 18% 55-64: 23% 65+: 32% **Feedlots** <18: 1% 18-25: 16% 25-34: 24% 35-44: 19% 45-54: 18% 55-64: 17% 65+:5%[110]	■	**Last year's Update did not report a figure for this indicator.** Data has been taken from the ABS Census in 2016. Based on this data, farms have an aging population while feedlots have a more diverse age demographic.
9.2c The percentage Indigenous representation in the workforce.	**Feedlots:** 1.6% **Farms:** 3.2%[111]	■	**Last year's Update did not report a figure for this indicator.** Data derives from the 2016 ABS Census. Based on the 2016 census data, 3.3% of the Australian population are Indigenous.
PRIORITY AREA 10: ENSURE HEALTH, SAFETY AND WELLBEING OF PEOPLE IN THE INDUSTRY			
KEY PRIORITY 10.1: HEALTH AND SAFETY OF PEOPLE IN THE INDUSTRY			
10.1a Notifiable fatalities.	Farm: 2 Feedlots: 0 Processing: 1[112]	■	**Last year's Update reported a figure of 9 on-farm fatalities.** It should be noted that last year's figure included all agriculture while this year's figure is specialised to beef. Using ANZSIC codes, Safe Work Australia has provided the following data for 2017 (0142 – Beef Cattle Farming (Specialised), 0143 – Beef Cattle Feedlot (Specialised) and 1111- Meat Processing, noting that meat processing ANZSIC codes include all meat except poultry).
PRIORITY 10.2: WELLBEING OF PEOPLE IN THE INDUSTRY			
10.2a General Life Satisfaction (GLS) Index.	Farms: 76.1 Feedlots: 75.7[113]	■	**Last year's Update did not report a figure for this indicator.** This index measures life satisfaction on a scale of 0-100. The figures shown are based on the mean score for feedlots and farms. A low score is less than 65 while a high score is 85 or higher. These feedlot and farm figures indicate that producers and lot feeders are, in general, satisfied with their lives. Australia's average score is 73. A Personal Wellbeing Index from the same source showed a figure of 76.44 for farms and 75.15 for feedlots. The SSG will consider whether this wellbeing index should be added as a separate indicator.

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110 2016 ABS Census of Population and Housing
111 2016 ABS Census of Population and Housing
112 Safe Work Australia's Traumatic Injury Fatalities Database, 2017
113 2018 Regional Wellbeing Survey, University of Canberra

Background to the Framework

History of the Framework

In response to changing consumer and community expectations, the beef industry sought to tackle its sustainability footprint. The industry launched a series of information-gathering projects, consultation and technical reviews between 2011 and 2016.

In 2016, a materiality review was completed which identified the key sustainability issues that the industry was facing. In the same year, a Sustainability Steering Group (SSG) was formed to lead the development of the Australian Beef Sustainability Framework.

The first SSG designed the Framework through a collaborative process between industry and external stakeholders, and the public. Following extensive industry, external and public consultation where over 40 face-to-face consultations were undertaken, the Framework was officially launched in April 2017.

A second SSG was appointed to extend the Framework beyond its launch by laying the foundations for implementation. This SSG decided on the six key priorities, refined the balance of tree and grass cover indicators, established the Consultative Committee, conducted an activity stocktake across the key priorities, and published the Framework's first Annual Update.

At the start of 2019, a third SSG was formed to drive industry implementation.

For more information on the history of the Framework, visit **www.sustainableaustralianbeef.com.au/history-of-framework**

Since the Framework's launch:

2011-2015

Initial steps

- Initial materiality review completed in 2011 using AA1000 methodology
- Industry and external stakeholders consulted
- Data systems review conducted
- Social licence review undertaken

2016-2017

Designing the Framework

- First SSG formed to lead development of the Framework
- Face-to-face consultation with industry and external stakeholders
- Call for detailed written input from all stakeholders
- Public consultation conducted through online engagement platform
- Framework officially launched in April 2017

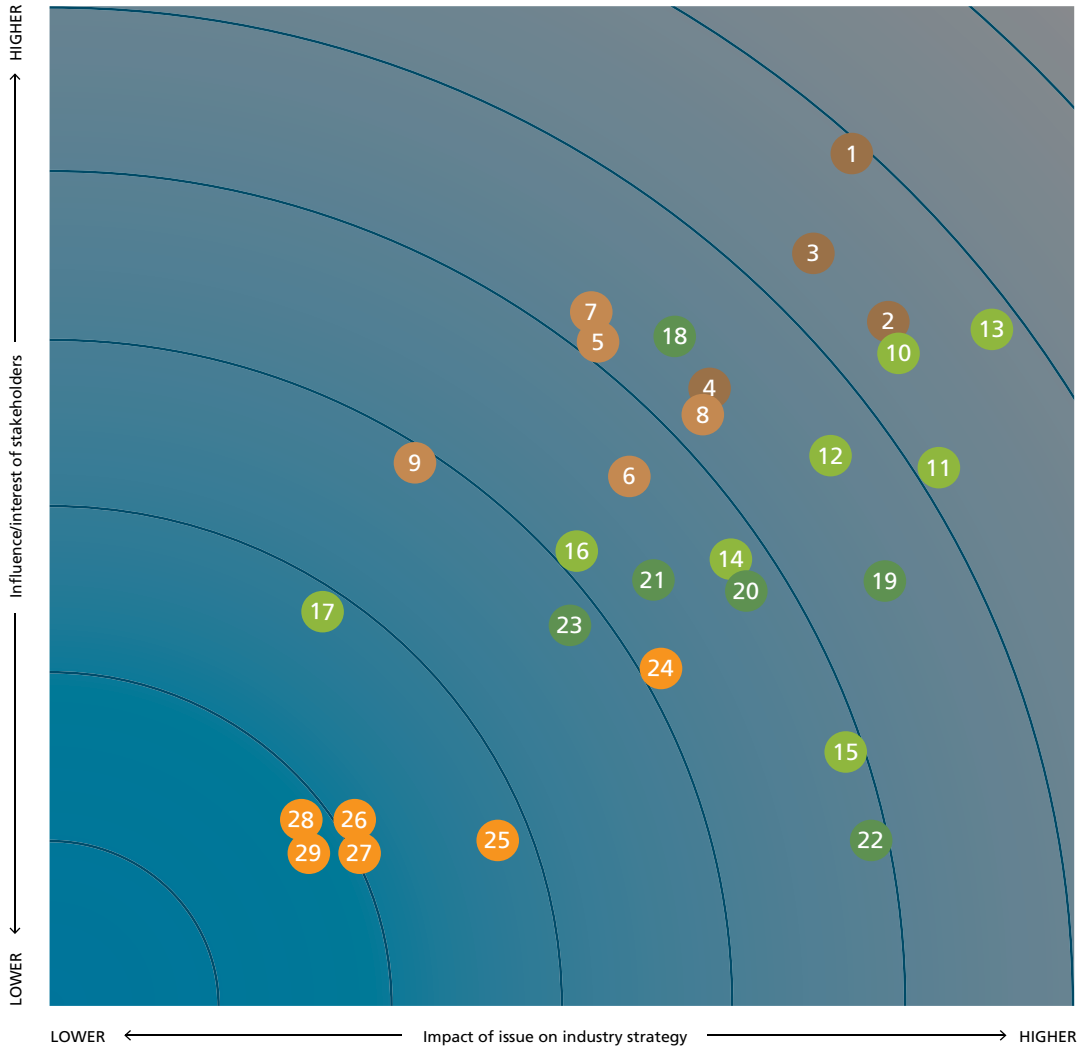
2017-2019

Laying the foundations

- Second SSG formed to lay the foundation for Framework implementation
- Consultative Committee established
- Six key priorities decided
- Activity stocktake conducted
- Expert Working Group on tree and grass cover created
- First Annual Update published
- The balance of tree and grass cover indicators finalised with expert and stakeholder input

Background to the Framework (continued)

MATERIALITY MATRIX 2016



ANIMAL WELFARE

1. Livestock health and welfare
2. Animal husbandry
3. Transport
4. Biosecurity

ECONOMIC RESILIENCE

5. Market Access
6. Profitability
7. Product integrity
8. Productivity
9. Economic contribution to the GDP

ENVIRONMENTAL STEWARDSHIP

10. Water
11. Waste
12. Biodiversity
13. Emissions
14. Deforestation
15. Climate change
16. Ground cover
17. Sequestration

PEOPLE & THE COMMUNITY

18. Nutrition
19. Work health and safety
20. Capacity building
21. Social impact
22. Treatment of people in the industry
23. Diversity

OTHER

24. Industry transparency
25. Regulatory changes
26. Image of primary producer
27. Weed and pest control
28. Longevity
29. Annual health plans;
    Market building;
    Systems to track performance;
    Holistic stewardship

Governance

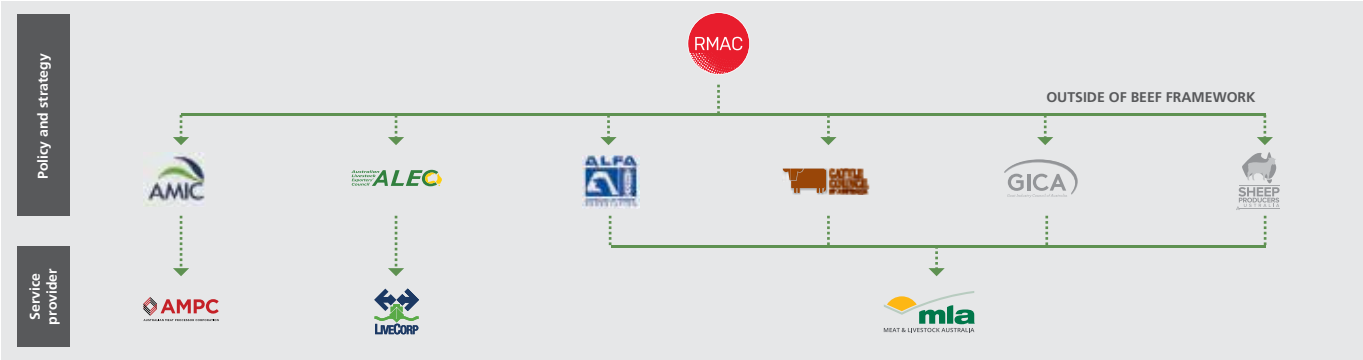
The Framework is an initiative of the Red Meat Advisory Council (RMAC). RMAC has appointed an industry-representative, grassroots Sustainability Steering Group (SSG) to lead the Framework.

Approve	RMAC		Ongoing measurement
Direct	Sustainability Steering Group		
Consult	Consultative Committee	Technical experts	
Support *Deliver research, development, extension and secretarial support*	Industry service companies (MLA, AMPC and Live Corp)		
Adopt best practice	Producers, processors, feedlots, transport		

Funding and resourcing

The Australian Beef Sustainability Framework is an industry-led project managed by an RMAC-delegated SSG. Day-to-day management and funding are provided through industry service company MLA and funded through levy funds from the grass-fed, feedlot and processor levies. AMPC and LiveCorp as the industry service companies for processing and live export, retrospectively manage related projects and activities that are captured in the Framework.

AUSTRALIAN RED MEAT INDUSTRY STRUCTURE



Background to the Framework (continued)

Alignment with the UN Sustainable Development Goals

The 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) represent the world's plan of action for social inclusion, environmental sustainability and economic development.

By aligning to the SDGs, the Australian beef industry can show how it is contributing to sustainability in a global context. Communities, investors and other stakeholders increasingly expect industries to prove their sustainability, with consequences including regulatory and market access landscape. Aligning with the SDGs helps the industry meet these changing expectations.

There is strong international commitment to the SDGs, with 193 countries, including Australia and our major trading partners, adopting them. Major businesses are also supporting and, in some cases, aligning to and reporting against the SDGs. They have become a shared language that people around the world can use to talk about sustainability.

Highlighted below are the SDGs which are addressed by the Australian Beef Sustainability Framework.

More information about mapping of the SDGs to the Framework priorities is available on our website at **www.sustainableaustralianbeef.com.au/aligning-with-the-un-sustainable-development-goals**

Glossary

AAWCS
Australian Livestock Processing Industry Animal Welfare Certification System. An independently audited certification program used by Australian livestock processors to demonstrate compliance with the industry best practice animal welfare standards.

ABARES
Australian Bureau of Agricultural and Resource Economics.

ABS
Australian Bureau of Statistics

ALFA
Australian Lot Feeders' Association. The peak national body for the Australian cattle feedlot industry.

ALRTA
Australian Livestock and Rural Transporters' Association. Representative body of road transport companies which works with governments at all levels, industry groups, community organisations, regulators and the media to ensure that rural trucking is protected and promoted as a sustainable, responsible and safe contributor to rural and regional Australia and our primary industries.

AMIC
Australian Meat Industry Council. The peak council that represents retailers, processors, exporters and smallgoods manufacturers in the post-farm-gate meat industry.

AMPC
Australian Meat Processing Corporation. The Rural Research and Development Corporation that supports the red meat processing industry throughout Australia. AMPC's mandate is to provide research, development and extension services that improve the sustainability and efficiency of the sector.

APVMA
Australian Pesticides and Veterinary Medicines Authority. An Australian Government statutory agency responsible for the management and regulation of all agricultural and veterinary chemical products in Australia.

AMR
Antimicrobial resistance. The ability of a microbe to resist the effects of medication that once could successfully treat the microbe. Microbes include bacteria, viruses and other microscopic organisms.

ASEL
Australian Standards for the Export of Livestock. Sets out standards for the sourcing of export livestock, their management in registered premises, loading onto a vessel, management onboard a vessel and air transport.

ATA
Australian Trucking Association. ATA is the peak body that represents trucking operators including major logistics companies and transport industry associations.

AUS-MEAT
A not-for-profit industry owned company that manages red meat trade descriptions and processor standards, including training and independent auditing.

b
Billion.

BIOACTIVE ADDITIVE
Living microbes added to feed that influence the digestive process, such as by reducing methane emissions from cattle.

BMP
Best Management Practice.

BOTGC
Balance of tree and grass cover. One of the six key priorities of the Framework.

BREEDPLAN
A genetic evaluation system for beef cattle.

BSE
Bovine spongiform encephalopathy, commonly known as mad cow disease.

CANOPY COVER
The fraction of ground area covered by the vertical projection of tree crown perimeters.

CARBON SEQUESTRATION
A process of capturing and storing atmospheric carbon dioxide which has the potential to mitigate climate change.

CARCASE
The body of an animal after being dressed (removal of head, feet, hide and internal organs)

CBPP
Contagious Bovine Pleuropneumonia, a highly contagious infectious disease of cattle that attacks the lungs and thoracic membrane with a high mortality rate.

CN30
Initiative and target relating to the red meat industry becoming carbon neutral by 2030.

CO_2-e
Carbon dioxide equivalent, a standard unit for measuring greenhouse gas emissions.

DAWR
Department of Agriculture and Water Resources.

Glossary (continued)

DSE
Dry sheep equivalent. A standard unit to compare the feed requirements of difference classes of livestock or to assess the carrying capacity and potential productivity of a given farm area. The unit represents the amount of feed required by a two-year-old, 45kg Merino sheep to maintain its weight. One DSE is equivalent to 7.60 megajoules per day.

ESCAS
Exporter Supply Chain Assurance System. An Australian Government regulatory program based on four principles: animal welfare, control through the supply chain, traceability through the supply chain and independent auditing.

EWG
Export Working Group. Established to develop indicators and measures for the balance of tree and grass cover key priority in the Framework.

FAO
Food and Agriculture Organisation of the United Nations. An organisation that leads international efforts to defeat hunger.

FIVE DOMAINS OF ANIMAL WELFARE
The Five Domains of Animal Welfare that extend on the Five Freedoms (see below) to support the evolved understanding of animal welfare as the state of an animal in relation to its ability to cope with its own environment, not just free from cruelty.

FIVE FREEDOMS OF ANIMAL WELFARE
The Five Freedoms were created by the UK Farm Animal Welfare Council and provide a base from which to consider the welfare of an animal.

GHG
Greenhouse gas.

GLS
Global Life Satisfaction. Quantifies a person's subjective wellbeing in a 'global' sense, which is to say the whole of someone's wellbeing rather than any specific aspect of it.

GRI
Global Reporting Initiative, an international independent standards organisation that helps businesses communicate their sustainability impacts and is a global standard for sustainability reporting.

ha
Hectare.

HSCW
Hot Standard Carcase Weight. Used to describe the weight of an animal, particularly when the animal is sold directly from a farm to an abattoir.

Kg
Kilogram.

KL
Kilolitre.

L
Litre.

LCA
Life Cycle Assessment. A technique to assess environmental impacts associated with a product across a supply chain.

LW
Liveweight. The weight of a live animal.

LOTFEEDING
The process of feeding cattle on grain in a feedlot, where cattle are fed a high-protein grain-based diet to reach exact market specifications before being supplied to processors.

LPA
Livestock Production Assurance. The Australian livestock industry's on-farm assurance program covering food safety, animal welfare and biosecurity. It provides evidence of livestock history and on-farm practices when transferring livestock through the value chain.

LPA NVD
LPA National Vendor Declarations. A form that documents the movement of livestock when they are bought, sold or moved off a property. This form accompanies all such movements.

m
Million or metre.

MATERIAL ISSUE
Relates to materiality. Material issues are those with a direct or indirect impact on an organisation's ability to create, preserve or erode economic, environmental and social value for itself, its stakeholders and society at large.

MISP
Meat Industry Strategic Plan. Developed by the Australian red meat industry to drive coordinated action and unlock value for the industry.

MLA
Meat & Livestock Australia. A producer-owned industry service provider that provides marketing and research and development services to cattle, sheep and goat industries.

MoU
Memorandum of Understanding. The Red Meat MoU was put in place 20 years ago to define the roles, responsibilities and funding of Australia's red meat industry bodies.

MSA
Meat Standards Australia. A grading system for meat that has met strict eating quality criteria.

NATIONAL INVENTORY ACCOUNTS
Published by the Department of Environment and Energy, the Accounts track national greenhouse gas emissions from 1990 onwards across Australia.

NFAS
National Feedlot Accreditation Scheme. An independently audited quality assurance scheme initiated by ALFA that includes quality assurance, welfare and other components.

NGO
Non-governmental organisation.

NLIS
National Livestock Identification System. Australia's system for the identification and traceability of cattle, sheep and goat.

NON-WOODY VEGETATION
Plants that do not form a woody stem such as grass.

NRM
Natural resource management. This refers to the protection and improvement of environmental assets such as soils, water, vegetation and biodiversity.

NSW
NSW is an abbreviation for New South Wales, a state on the east coast of Australia.

OH&S
Occupational health and safety. A field concerned with the safety, health and welfare of people at work.

OIE
World Organisation for Animal Health. An intergovernmental organisation coordinating, supporting and promoting animal disease control.

PARIS AGREEMENT
An international agreement under the United Nations Framework Convention on Climate Change dealing with the mitigation of greenhouse gas emissions, adaptation to climate change, and climate change related finance. The Paris Agreement commits members to the long-term goal to keep the increase in global average temperatures to well below 2°C above pre-industrial levels, and to limit the increase to 1.5°C.

POLLED LIVESTOCK
Livestock, including cows and bulls, born without horns due to the poll gene that can be selectively bred for.

RD&A
Research, development and adoption.

RDC
Research Development Corporation. These are the main way the Australian government and primary producers co-invest in R&D for industry and community benefits. These include LiveCorp, AMPC and MLA.

REMNANT VEGETATION
Native vegetation that is in its undisturbed state or that could return to such a state within five years of sympathetic management.

Specifically vegetation that is either undisturbed, or that forms more than 50% of the undisturbed predominant canopy; and averaging more than 70% of the vegetation's undisturbed height; and composed of species characteristic of the vegetation's undisturbed predominant canopy.

RMAC
Red Meat Advisory Council. A network of producers, lot feeders, manufacturers, retailers and livestock exporters that represent Australian beef, goatmeat and sheepmeat businesses from gate to plate.

SAFEMEAT
A partnership between the red meat industry and the state and federal governments of Australia. The partnership strives to ensure red meat products achieve the highest standards of safety and hygiene from the farm to the consumer.

SFO
State Farming Organisations. Organisations that represent farmers within a state, such as AgForce, NSW Farmers and the Victorian Farmers Federation.

SLATS
Statewide Landcover and Trees Study. A Queensland initiative too monitor woody vegetation clearing in the state using satellite imagery.

SSG
Sustainability Steering Group. An independent group comprising of members across the beef value chain who direct the implementation of the Framework.

TruckSafe
An independently audited accreditation scheme for the truck operators that ensures quality, safety and best practice. TruckSafe includes an animal welfare module.

WHO
World Health Organisation. A UN agency that is concerned with international public health and directs international health initiatives and leads partners in global health responses.

WOODY VEGETATION
Plants that produce wood as their structural tissue and have woody stems, such as trees.

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Graphic recorder Sarah Firth drew this during a panel discussion at Red Meat 2018 which addressed the topic, "What can we do to support a thriving beef industry to 2030 and beyond?" The graphic has captured key points that the panellists identified as important for the industry to tackle now and in the future.

Australian Beef Sustainability Framework

RMAC

Australian Beef Sustainability Framework

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