mla
MEAT & LIVESTOCK AUSTRALIA

evaluationseries

3.4 Ensuring sustainability

Promoting responsible use of resources for a healthy environment

The industry impact

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

PROMISE

Demonstrate continuous improvement in environmental management, ensuring ongoing access to productive natural resources by earning the Australian red meat industry an international and local community reputation as a responsible environmental steward.

DEFINITIONS

ABCD land condition framework Classifies grazing land under four condition classes from good (A) to very poor (D).

Climate change Long-term trends in climate data that may be associated with human activity.

Climate variability Short- to medium-term (multi-week to decadal) variations in climate.

Drainage cover Groundcover along drainage lines.

HRZ High Rainfall Zone of southern Australia (annual rainfall greater than 600mm).

HSCW Hot Standard Carcase Weight

NRM Natural Resource Management

Perennial pastures Pastures, commonly deep-rooted, that provide year-round groundcover.

Piped water supplies A piped and reticulated stock watering system.

Soil testing Determines soil nutrient status, pH levels and other soil attributes.

Stock exclusion Selective restriction of stock movement, often to protect waterways, riparian land or other selected areas.

ToT Terms of trade (the ratio of the prices received to prices paid).

Water quality Water purity measure of sediment, chemical and pH amounts affected by management practices.

Water use and balance Measured by water budgets and cycles that monitor irrigation practices and explain deep drainage, regional or catchment water balance.

BACKGROUND

Meat & Livestock Australia (MLA) as service provider to the Australian red meat industry strives to build demand; improve access to global markets; increase performance, integrity and sustainability from 'paddock to plate'; and, by partnering with industry, build capability.

Remaining accountable to stakeholders and providing quantifiable returns on government and industry investment are central to demonstrating performance against these goals.

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

The framework provides independent estimates of the net benefits of MLA programs – including achievements relative to targets and industry benefits relative to a situation where the MLA program did not exist.

It also provides for interactions between the meat and livestock sectors and wider Australian economy, allowing national benefits to be measured. These benefits are not only economic, but also environmental and social, thereby supporting a rigorous triple bottom line evaluation of MLA initiatives.

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

Evaluations completed: 1.1 *Enhancing product integrity*; 1.2 *Maintaining and liberalising access to world meat markets*; 2.1 *Improving eating quality*; 2.2 *Enhancing the nutritional reputation of red meat*; 2.5/2.6 *Aggressive promotion in the market place (sheep)*; 3.1 *Increasing efficiency & productivity in production (beef/lamb)*; 3.3 *Market information*

Information in this brochure is based on the CIE reports *MLA's contribution to the environmental sustainability of the red meat industry – Measuring MLA's contribution to the change in natural resource management practices through adoption surveys* 2009 (A) and *MLA's contribution to the environmental sustainability of the red meat industry – A stocktake of surveys and programs* 2009 (B).

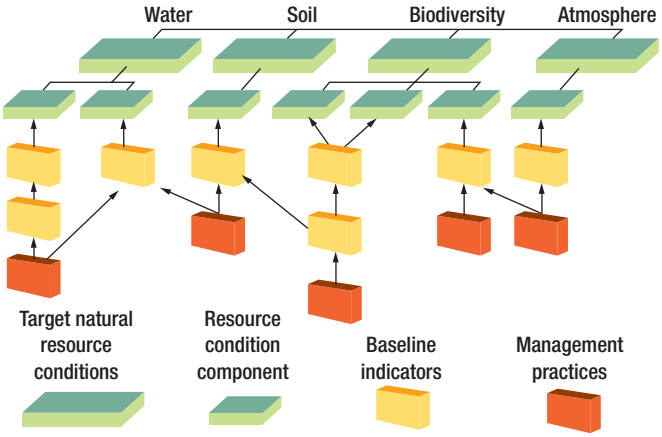
Where we started

The Australian Government National Landcare Program, during the 1990s, stimulated a growing awareness among farming communities that some agricultural practices were having environmental impacts. These impacts, including loss of biodiversity, diminishing water quality, reduced water availability, increased soil erosion, and contribution to climate change and salinity, were documented in baseline measures outlined in the 1999 National Land & Water Resources Audit (NLWRA)[1] and by the Bureau of Rural Sciences in 2001[2]. The red meat industry extends over almost half of the continent's land mass* – more land area than any agricultural sector and successful farmers know that their viability is dependent on access to productive natural resources. With consumer sensitivity increasing, the ability of industry to address its management of natural resources may determine its future 'right to farm' and ongoing market access. The MLA objective of ensuring sustainability aims to work with producers to improve environmental management and satisfy public expectations, while maintaining industry access to productive natural resources.

A strategic response

MLA worked with the CIE to modify the *Signposts for Agriculture Framework*[3], developed under the NLWRA, so that it better reflects the entire industry value chain, aligns industry issues, and identifies evidence that creates a conceptual link between the practices MLA promotes and natural resource conditions†: water, soil, biodiversity and atmosphere (see chart below). It includes time profiles for adoption of management practices and motivates thinking about how on-farm practice change contributes to positive environmental outcomes.

Mapping management practices promoted by MLA to *Signposts for Agriculture Framework*



[1] NLWRA 2001, National Land & Water Resources Audit – 1999

[2] Bureau of Rural Sciences 2001, *Environmental factors affecting Australia's livestock industries*, Australian Government DAFF

[3] NLWRA 2007, *Signposts for Agriculture Framework*, National Land & Water Resources Audit – 2007

* Grazing land accounts for 47% of Australia's total land area (Source: Australian Bureau of Statistics 2008, *Land Management and Farming in Australia*, 2007-08)

† Agreed to by the Research and Development Corporations NRM Working Group (2005)

Published by Meat & Livestock Australia Limited
ABN 39 081 678 364
February 2011
© Meat & Livestock Australia (2011)
ISBN 97817419138285471
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PROGRESS

Environmental management is now recognised as core business because over the past decade, MLA and the Australian Government have partnered to research and promote practices that support environmental sustainability.

PERFORMANCE

Co-investment by industry and the Australian Government in environmental sustainability has provided the red meat and livestock industry with the evidence, knowledge and capability to respond to key issues, mitigate future impacts on natural resource conditions, and inform policy setting and research priorities.

What we did

Since 1996, the Meat Research Corporation and its successors, MLA and the Australian Meat Processor Corporation (AMPC), have invested more than $30 million[++] (including $15 million in matching Australian Government contributions) to undertake research and development underpinning significant practice changes that have improved environmental and productivity outcomes across Australia's red meat industry value chain.

Community and government ▶See P4

Since 2003, MLA has collaborated with Australian Government bodies to ensure industry research and management practices are aligned with national initiatives to improve target natural resource conditions[1]. The NLWRA *Signposts* reporting framework has enabled MLA to demonstrate the industry's performance and to respond to public demands for evidence of environmental credentials. MLA has forged mutually beneficial partnerships that leverage the skills, experience and investments of natural resource management (NRM) groups across Australia and maximise environmental outcomes for the broader community.

Research ▶See P5

The research investment by MLA and its partners has gathered a weight of evidence to support practice change decisions that generate positive NRM outcomes at a broader scale. Pasture and grazing management decisions are critical to sustainable resource management. Research outputs are integrated into national extension programs such as: 'Making More From Sheep' and 'More Beef from Pastures'.

Practice change ▶See P6

MLA collaborated with producers through the Sustainable Grazing Systems program (SGS), the Grain & Graze mixed farming systems initiative (G&G)[*], EverGraze[†] and the Grazing Land Management program (GLM)[‡]. The SGS, G&G and Evergraze programs collectively account for about 60 per cent of all past investments and have helped bring about practice change by 8,000[2], 3,200[3] and 3,100[4] producer participants respectively.

In this brochure, MLA reports widespread practice change as evidence of contribution to improved environmental outcomes for the industry and the community. All of these changes also generate associated productivity gains that have already been accounted for in previous evaluations of on-farm R&D programs. The aggregate productivity benefit-cost ratio for the total investment in on-farm NRM programs[5] is 6.2 to 1.

Industry change ▶See P7

Independently verified time profiles of biannual adoption survey results (see charts, page seven) gauge the influence of MLA and its partners on management practice by comparing data points year-to-year against a 'without' investment baseline scenario. Changes in industry adoption of NRM practices[**] and improvements in environmental sustainability are linked to program outputs generated by MLA using the NRM reporting framework.

What we've achieved

The co-investment by industry and the Australian Government has provided the red meat and livestock industry with the evidence, knowledge and capability to promote widespread practice change that has improved environmental outcomes for industry and the community. The Council of Rural Research and Development Corporations' Chairs (CRRDCC) *Evaluation Report 2008*[6] recommended improved tools and techniques to capture and value social and environmental outcomes, particularly in priority government policy areas. The MLA NRM reporting framework, developed in 2008 with the support of the Caring for Our Country (CfOC) program, measures change in practices that improve target natural resource conditions. It is consistent with CfOC's Monitoring, Evaluation, Reporting and Improvement (MERI) model[7] and the CRRDCC Guidelines for Evaluation[8].

Impacts

An independent review by CIE[**] found that a reliable time profile of adoption data[§] had been consistently gathered and could measure change in six NRM practices since 1998:

1 Perennial pastures to minimise soil salinity
2 Permanent pastures to minimise soil erosion
3 Soil testing (pH, nutrient and salinity) for nutrient management
4 Grass cover preservation on drainage lines to improve water quality
5 Exclusion of stock from waterways to improve water quality
6 Piping stock water from bores to improve water availability.

These provide a basis for evaluation and indicate where further data should be collected for other practices.

Benefits

- Improved soil, water and biodiversity conditions
- Greater producer preparedness to respond to future issues
- Mitigation of future impacts on key natural resource conditions
- More informed industry policy and research agendas
- Reliable time profiles of adoption data are a valuable contribution to the CfOC MERI reporting framework

[1] NLWRA 2007, *Signposts for Agriculture Framework*, National Land & Water Resources Audit – 2007

[2] ABARE 2001, Sustainable Grazing Systems (SGS) survey report for MLA

[3] Agscan survey data in Price, Dr R. 2008, Grain & Graze Program Report (GAG.0400)

[4] Evergraze – HRZ.0251 Final report to MLA, June 2010

[5] Chudleigh, P. and Simpson, S. (2008), *Pooled Sample: Environment cluster, Measuring and communicating the value of R&D*, Prepared by Agtrans Research for MLA

[6] CCRDC 2008, *Measuring economic, environmental and social returns from Rural Research and Development Corporations' investment*, December 2008

[7] DEWHA/DAFF 2009, *NRM MERI Framework,* Australian Government

[8] Chudleigh, P; Simpson, S; Schofield, N 2007, *A methodology for evaluating return on investment from natural resource management research and development*, LWA

[++] MLA and AMPC investment only (nominal dollars)

[*] Grain & Graze was a co-investment with the Grains Research and Development Corporation (GRDC), Australian Wool Innovation Limited (AWI), LWA and regional Catchment Management Authorities (CMAs)

[†] EverGraze was conducted in partnership with AWI, the Future Farm Industries Cooperative Research Centre and regional CMAs

[‡] GLM was developed in northern Australia with the State DPIs and regional NRM groups

[**] CIE 2009 (A), *MLA's contribution to the environmental sustainability of the red meat industry – Measuring MLA's contribution to the change in natural resource management practices through adoption surveys*

[§] This data can be linked back to baseline measures for the indicators in the NLWRA 2001, National Land & Water Resources Audit – 1999

MLA has researched, developed and promoted management practices that:

- meet community expectations for environmental performance
- support government initiatives to improve environmental sustainability
- reduce the risk of regulation
- demonstrate environmental responsibility.

"Agricultural management practices can have a big impact on soils, water, biodiversity and the atmosphere. The Australian Government's Caring for our Country is keen to work with farmers and industry to encourage the adoption and monitoring of sustainable practices which deliver environmental benefits and improve profitability."

– Mr Ian Thompson, Executive Manager Sustainable Resource Management, Department of Agriculture, Fisheries and Forestry

Increased consumer concern

Consumer research conducted in 2010[1] revealed:

- 68 per cent have a higher level of concern for the environment
- 92 per cent try to make environmentally friendly purchasing decisions
- 4 per cent have reduced red meat consumption for environmental reasons.

Meeting community expectations

Successful producers know that managing the environment is critical to their business.

The red meat industry has responded to consumer concerns by undertaking research and development to improve on-farm practices that help producers proactively manage environmental risks. When demonstrating its environmental performance credentials, the industry also acknowledges that in the past, some grazing practices had detrimental effects on water, soil, biodiversity and the atmosphere.

Working with government

Under the NLWRA *Signposts for Agriculture Framework*[2], MLA has collaborated with the Government to exchange information and ensure industry research and management practices are aligned with national environmental sustainability priorities.

MLA's NRM reporting framework provides robust evaluation methodologies that enable the industry to communicate enhanced environmental outcomes and demonstrate environmental responsibility.

Demonstrating responsibility

MLA's NRM reporting framework uses linkages identified in the *Signpost for Agriculture – Beef Industry Profile* (2008)[3], which provide evidence that specific practices positively influence key indicators for improved environmental outcomes. It integrates practice change baseline data from the NLWRA (2001)[4] and practice change data from MLA and ABARE producer surveys in 2001, 2003 and 2005.

Reporting these changes facilitates community recognition of positive contributions to natural resource conditions, and supports development of future industry priorities and decisions.

Outputs

- New/refined management practices aligned with national priorities
- MLA NRM reporting framework and evaluation methodologies

Outcomes

- Increased confidence in practice change to improve NRM outcomes across the supply chain
- Greater research collaboration and coordination between industry and government
- Better industry policy-making and priority setting

Impacts

- Increased community recognition of positive change in environmental conditions
- Reduced risk of regulation
- Community and government satisfaction with industry environmental performance and reporting

"With a better understanding of stocking rates, we reset our stocking target to something we could work with long term — a more sustainable rate."

– Kylie Schooley
Rocky Springs, Munduberra, QLD

Pictured: Simon, Amelia and Kobi on the family property Rocky Springs near Munduberra.

Learning sustainable management practices from GLM courses

The Schooleys, of Rocky Springs, run 1,300-1,600 head of cattle targeted at the EU market and top end feeder steer market. Following the GLM course, Kylie Schooley says the family realised some changes needed to be made to their operation. "In 2001 we were in a massive drought and had to sell a lot of cattle," Mrs Schooley says. In response to knowledge gained, the Schooleys increased infrastructure on the property in the form of additional fencing and watering points — some associated with sowing improved pastures.

[1] Pollinate Green Pulse Consumer Research, 2010, MLA
[2] NLWRA 2007, *Signposts for Agriculture Framework*, National Land & Water Resources Audit – 2007
[3] NLWRA 2008, *Signpost for Agriculture – Beef Industry Profile*
[4] NLWRA 2001, National Land & Water Resources Audit – 1999

"The Wambiana grazing trial shows that good grazing management not only delivers clean water and a healthy environment, it is also a profitable way to manage grazing. This trial is having a major influence on many north Queensland beef producers."

– Dr Peter O'Reagain, Principal Scientist, Queensland Department of Employment, Economic Development and Innovation

Research supported by MLA and its industry partners has provided evidence to:

- investigate better management practices for the red meat industry
- motivate adoption of proven environmentally beneficial practices
- deliver spillover community NRM outcomes.

Evidence-based practice change

Research backed by MLA and industry partners provides evidence that supports the promotion and adoption of environmentally beneficial practices and efficiencies across the red meat value chain.

The research impact was assessed by monitoring producer awareness of environmental issues, recording industry participation at MLA-sponsored courses and events, and surveying adoption of practices with proven environmental benefits. Close alignment of research outputs with industry issues identified in 2001[1] significantly narrowed the gap between research and adoption, maximising the return on investment to both levy payers and the wider community. As more positive changes are realised, the evidence-based NRM reporting framework will continue to report successful practice change and delivery of large scale NRM outcomes.

Improving water use and quality in processing

Water consumption at the Swift Dinmore meat processing facility was up to 5.5 megalitres per day and the capacity of the wastewater treatment plant was stretched, compromising performance and compliance with Environmental Protection Authority (EPA) regulatory requirements. Swift staff based their 'Every Drop Counts' campaign on the eco-efficiency processing manual, produced by MLA[2] in collaboration with the Queensland Department of State Development and the Food and Meat Industries Taskforce, to reduce water consumption to 4.5 megalitres a day (an annual reduction of 184 megalitres – the equivalent of more than 70 Olympic swimming pools). This was achieved through eco-efficient measures supported by employee training and awareness, which significantly reduced water demand.

Improving biodiversity outcomes

MLA's long-term, high-risk commitment to biological weed control is a collaborative investment to address weed encroachment on regional biodiversity.

In temperate Australia, a lack of naturally occurring native control agents has seen thistles and Paterson's curse (*Echium plantagineum*) become dominant invasive weeds that are toxic to animals and compete with pasture plants. Distribution of bio-control agents utilises producer networks such as Landcare groups. Farmer surveys conducted in 1996 and 2005 in regions where bio-control agents were released confirmed "the weediness of Paterson's curse" had been reduced by 48 per cent and herbicide use by 38 per cent[3]. It is likely that these efforts have the potential to slash the $100 million-plus[4] annual government cost of noxious weed control with environmental outcomes including improved biodiversity as well as reductions in chemical use and fewer weeds.

Best practice grazing for soil and land condition

Grazing management decisions directly impact on soil, water and biodiversity. Recent research conducted by MLA in collaboration with the Tropical Savannas Cooperative Research Centre in Darwin has improved knowledge to reduce the environmental impacts of grazing land management in northern Australia through controlled grazing distribution, stocking rate management, wet season spelling and fire.

The GLM training initiative – developed from this research by MLA, state and territory primary industries departments in conjunction with regional NRM bodies – is enabling MLA to increase adoption of best-practice grazing management among GLM participants overseeing up to three million square kilometres of native pasture.

A GLM participant survey[5] indicated that by 2008:

- 74 per cent of respondents had a grazing management plan
- 64 per cent had changed grazing practices
- 67 per cent were using the ABCD land condition framework
- 36 per cent were using pasture yield assessment tools.

Outputs

- Evidence-based development of new/refined management practices and tools

Outcomes

- Greater producer confidence dealing with environmental issues
- Industry adoption of environmentally beneficial practices

Impacts

- Evidence-based NRM benefits for the community and industry

Banksia environmental awards 2008

Category Winner

MLA championed the *Biodiversity in the Grain & Graze Program* – a winner in the Prime Minister's Banksia Awards for excellence in the environment. It showed how producers could run profitable businesses and improve biodiversity outcomes.

[1] Bureau of Rural Sciences 2001, *Environmental factors affecting Australia's livestock industries*, Australian Government Department of Agriculture, Fisheries and Forestry

[2] MLA 2002, *Eco-Efficiency Manual for Meat Processing*, UNEP Working Group for Cleaner Production in the Food Industry

[3] CSIRO Entomology 2006, *The Biological Control of Paterson's Curse and Scotch Thistles: A long term investment by grazing industries, State and Federal governments*, Final Report of Project ECO10-D, March 2006

[4] 2004 CRC for Australian Weed Management, *The economic impact of weeds in Australia*, Technical Series no.8, March 2004

[5] Williams and Partners Consulting 2008, GLM Participant Survey 2008, Desert Channels Queensland Incorporated

MLA and partners have driven practice change to improve environmental sustainability through:

- extensive stakeholder engagement
- participatory action research methods
- direct producer involvement in project management.

"It is hoped these management changes will increase production of crops, pastures and animals while maintaining or enhancing biodiversity and the catchment resources which sustain them."

– Ken Baldry

Pictured: Charlie and Ken Baldry

Engagement drives change

Over the past decade, MLA has motivated practice change across the red meat supply chain by engaging and involving stakeholders in participatory action research methods and hands-on project management.

A performance management tool

Findings of a 1998 industry-commissioned study into the environmental performance of meat processing plants led to the widespread use of key performance indicators (KPIs) which are now used to guide environmental performance. A second review[1] of these KPIs conducted in 2003 reported a marked improvement in environmental management performance across the meat processing sector between 1998 and 2003. A third round of data is being collected for analysis during 2010.

Guidelines lead practice change

Government regulatory agencies with jurisdiction in the feedlot and processing sectors were involved in developing Industry Best Practice Guidelines (IBPGs) facilitated by the Australian Lot Feeders' Association (ALFA) and the Australian Meat Industry Council (AMIC). These guidelines will help to achieve the right balance between self-regulation and public accountability.

Australian agriculture's first quality assurance program, the National Feedlot Accreditation Scheme (NFAS), was introduced in 1995 and independently audits feedlots each year to ensure compliance with animal health and welfare, environmental and product integrity legislation. The key environmental component of NFAS is the National Beef Cattle Feedlot Environmental Code of Practice which sets out requirements relating to the location, design, construction and operation of a beef cattle feedlot. All feedlots accredited under the NFAS comply with these guidelines, which translates to adoption by 80 per cent of Australia's feedlot capacity.

Valuing the impact of practice change

MLA reports widespread practice change as evidence of contribution to improved environmental outcomes for the industry and the community. But the value of these public benefits are not as easy to estimate as the value of associated on-farm productivity gains. The aggregate productivity benefit-cost ratio for the total MLA investment in on-farm NRM programs[2] is 6.2:1[++].

[1] URS Australia Pty Ltd 2003, *Industry environmental performance review – Integrated meat processing plants* (Technical Report PRENV.033)

[2] Chudleigh, P. and Simpson, S. (2008), *Pooled Sample: Environment cluster*, Measuring and communicating the value of R&D, Prepared by Agtrans Research for MLA

[3] Agscan survey data in Price, Dr R. 2008, Grain & Graze Program Report (GAG.0400)

[4] ABARE 2001, Sustainable Grazing Systems (SGS) survey report for MLA

[5] Evergraze - HRZ.0251 Final report to MLA June 2010

* G&G was a co-investment with the GRDC, AWI, LWA and regional CMAs

** Producers adopted at least one G&G practice, or decided not to adopt a practice or to cease a practice after following G&G advice

† EverGraze was conducted in partnership with AWI, the Future Farm Industries Cooperative Research Centre and regional CMAs

++ 5 per cent discount rate over 25 years

Make a living, protect the environment

Ken Baldry runs a 3,400 hectare canola, wheat and pasture operation with his brother Charlie in the Murrumbidgee region. Mr Baldry was a prime lamb producer representative on the Grain & Graze management committee and believes Grain & Graze provides mixed farming enterprises in southern Australia with new 'whole-farm' knowledge, and the tools and capability to adopt management changes. He says the key difference is involvement of catchment managers, land managers and farmers, who are working together to improve the financial and environmental performance of Australia's mixed livestock and cropping farmers.

Grain & Graze facilitates catchment change

The industry focus on practice change targeting improved environmental outcomes was the focus of SGS in 1996. Its successful elements were incorporated into collaborations including G&G* and EverGraze†. G&G has been one of MLA's highest profile investments in NRM and was expected to speed-up achievement of the following targets by three years[3]:

- 24,000 farmers aware of G&G activities
- 15,000 farmers participating in G&G
- 6,800 farmers adopting desired changes attributed to G&G**.

G&G is on track to achieve 100 per cent of its original adoption targets by 2015 despite the slow start to the program and the concurrent drought period from 2002 to 2009.

Outputs

- Evidence-based farm management practices that contribute to NRM outcomes
- National Beef Cattle Feedlot Environmental Code of Practice
- KPIs specific to environmental performance for processing
- Industry Best Practice Guidelines for processing

Outcomes

- Changes to farm practices by about 8,000 producers in SGS[4]
- Changes to farm practices by about 3,200 producers in G&G[3]
- Changes to farm practices by about 3,100 producers in EverGraze[5]
- Increased adoption of improved practices in both processing and feedlot sectors
- Recognition of a conscious 'environmental stewardship' culture across the supply chain

Impacts

- Improved environmental sustainability
- Mitigation of future environmental risks

"It helped us think 'outside the box' and turned us into an effective discussion group."

– Mark Gubbins
Coolona, Chatsworth, Victoria

MLA and its industry partners have supported industry change to improve environmental sustainability through:

- the establishment of productive relationships that leverage skills, experience and financial backing of multiple groups
- collection of a time profile of practice change data that measures adoption of recommended practices and guides future investment in environmental R,D&E.

Fencing off riparian zones

The seven-kilometre stretch of the Hopkins River around Chatsworth in Western Victoria is coming back to life as an island of biodiversity. Back in 2002, Mark Gubbins fenced both sides of the river that runs through his beef and prime lamb producing property, Coolana, and direct seeded thousands of native trees and shrubs. Mr Gubbins, who has been chairman of Sustainable Grazing Systems (SGS) Central Western Victoria region, says involvement in the program had been "extremely rewarding".

Collaboration underpins change

MLA's collaboration with key state and federal agencies has contributed to the evolution of a more environmentally conscious industry culture. As natural resource management research and development priorities span many industries, MLA's position within the NRM sector is influenced by other R&D investors and collaborators including federal government programs, RDCs, research providers and cooperative research centres (CRCs) that have a major focus on NRM. By initiating and co-ordinating collaborative projects, MLA has established productive partnerships that leverage the skills, experience and funds of multiple NRM investor groups while delivering the greatest environmental outcomes for the wider community.

Adoption link to environmental improvements

Building a reliable time profile of practice change data to gauge adoption of program outputs has been a key challenge for MLA. To determine MLA's contribution to any estimated adoption profile, it is also necessary to construct a baseline for comparison of adoption rates and determine what proportion of any change in industry behaviour can be attributed to activities initiated by MLA and its partners.

An independent CIE review concluded that reliable time series data* had been collected to measure the impacts of six NRM practices. Some management practices are more relevant to particular areas, so adoption rates were analysed by geographical regions.

The review concluded that rates of practice change increased over time (see charts right) and that MLA and its partners made a significant contribution to this outcome.

MLA has initiated a producer Environmental Practices survey in 2010[1] to build on the previous survey results and provide baselines for monitoring future adoption of NRM practices arising from more recent research outputs.

[1] *A producer survey of environmental best practices,* Solutions Marketing and Research 2010

[2] CIE 2009 (A), *MLA's contribution to the environmental sustainability of the red meat industry – Measuring MLA's contribution to the change in natural resource management practices through adoption surveys*

* Changes in this adoption data over time can be linked by a weight of scientific evidence to environmental outcomes in the NLWRA *Signposts for Agriculture Framework* in order to demonstrate a positive contribution to target natural resource conditions

Chart A: Adoption of NRM practices and MLA/partners' contribution (ABARE high rainfall zone)

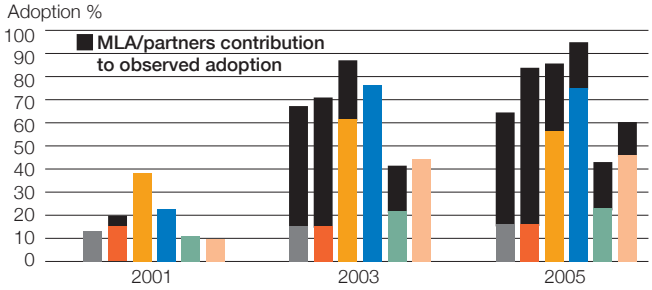
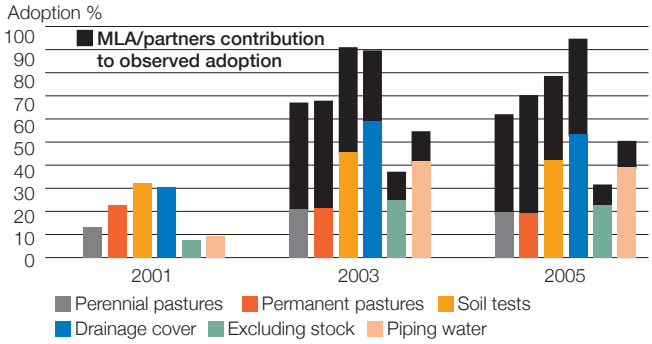


Chart B: Adoption of NRM practices and MLA/partners' contribution (ABARE wheat-sheep zone)



The black area of each bar represents the estimated contribution of MLA and its partners to adoption relative to the no investment baseline scenario (Farmers' ToT scenario – a stable indication of farmers' income which signifies producers' capacity to adopt NRM practices).[2]
Note: The high rainfall, pastoral and wheat–sheep zones together form the 'broadacre' regional classification defined by ABARE.

Data sources: ABARE 2008, 'Farmers' Terms of Trade Index', *Australian Commodity Statistics*, Table 17, p.17; ABARE 2000, *1998-99 Natural Resource Management Survey*; ABARE 2001, *Sustainable Grazing Systems (SGS) Survey*; Solutions Marketing and Research 2003, *Producer R&D Awareness and Adoption*; Axiom Research 2005, *LPI Awareness and Adoption*; CIE calculations

Outputs

- Productive relationships with multiple NRM investor groups (formal arrangements with more than 32 per cent of Australia's regional NRM groups)
- Industry leverage of skills, knowledge, funds and grassroots networks

Outcomes

- More effective use of industry investment to ensure sustainability through collaboration
- Achievement of a critical mass RD&E effort
- Increased industry adoption rates of practices known to improve target environmental resource conditions

Impacts

- Improving environmental outcomes for the wider community

Focusing on a sustainable future

Managing Climate Variability

With its origins in the 1992 National Drought Policy, the *Managing Climate Variability* (MCV) program was a collaborative initiative between a number of Rural Research and Development Corporations, including MLA, from 2002. MCV aims to improve Australia's capacity to make decisions and manage risks related to increasing climate variability.

MCV research has contributed to significant outputs including: AussieGRASS and other pasture prediction tools; Yield Prophet®, Whopper Cropper and related agronomy tools; the National Agricultural Monitoring System; extension services for climate risk management; and the SILO climate database.

Like most of MLA's work in NRM, it is difficult to attribute environmental benefits to investment in climate variability due to indirect associations between outputs and target outcomes. However, managing climate variability also influences practice change that directly impacts on the target resource conditions of soil and water resources which are critical to livestock production, and provides a strong foundation for adaptation to longer-term climate change.

Tracking industry progress using LCA

To generate robust metrics for tracking industry progress towards more sustainable environmental impacts, MLA has supported Life Cycle Assessment (LCA) studies for red meat supply chains.

LCA results published to date estimated that sheepmeat produces 7 to 8 kilograms of carbon dioxide equivalents (CO2-e) per kilogram Hot Standard Carcase Weight (HSCW), while beef values ranged from 8 to 11 kilograms CO2-e per kilogram HSCW[1]. Results for water showed that 18 to 540 litres of extracted water are used to produce a kilogram of red meat in southern Australia.[2] These figures, and results from other LCA studies underway, will provide a baseline to guide and monitor continuous improvement in the industry's environmental performance, but they should not be looked at in isolation from reported changes in other environmental indicators.

Demonstrating environmental credentials

MLA seeks to equip producers with the science, knowledge and capacity to respond to environmental challenges and opportunities with the support of a management and accreditation system.

A key strategic imperative for the industry is to develop, implement and verify a set of robust, credible standards for environmental stewardship.

This will help the red meat industry adapt to evolving market demands for environmental sustainability, respond to climate change and anticipate future developments to manage risk. It will empower the industry to demonstrate environmental integrity to markets and external stakeholders.

[1] Peters, GM; Rowley, HV; Wiedemann, SG; Tucker, RW; Short, MD and Schulz, MS 2010, 'Red meat production in Australia: Life cycle assessment and comparison with overseas studies', *Environmental Science & Technology*, vol. 44, no. 4, pp. 1327-1332.

[2] Peters, G; Wiedemann, S; Rowley, H; Tucker, R 2009, Life Cycle Assessment, *Accounting for water use in Australian red meat production*, UNSW

[3] LWA 2007, Investment Analysis for the *Managing Climate Variability* program, Agtrans Research and AGEC Consulting

[4] LWA 2006, *The Australian Natural Resource Management Knowledge System*

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Lessons learned

1. The promise of private productivity gain is the primary motivation for adoption and the consequent spillover of environmental benefits to the wider community.
2. Positive impacts of reducing greenhouse gases and biodiversity have been difficult to link directly to practice change as these linkages are complex and often lag over time.[3]
3. Practice change surveys are the best tool to ascertain MLA's impact on industry adoption. Continuing to improve survey design remains key to ensuring results reported are representative and attribution to MLA is feasible.
4. Better record keeping and reporting of past performance informs future targets. It will continue to improve the usefulness of investment analysis.
5. MLA is an effective coordinator of stakeholder group interaction necessary to achieve broad-scale practice change.
6. The NRM Collaboration Map[4] (below) shows some of the thousands of contributors to, and users of, NRM knowledge every day. State and federal agencies with overlapping responsibilities in the knowledge, policy and adoption areas are ideally positioned to coordinate industry monitoring and evaluation to demonstrate progress towards sustainable management of natural resources.

NRM Collaboration Map: roles and players (past and present) in the Australian broadacre NRM system

Knowledge Generation and Management

- Australian Greenhouse Office
- Australian Bureau of Statistics
- Geoscience Australia
- Universities
- Horticulture Australia
- Australian Wool Innovation
- Meat and Livestock Australia
- National Land and Water Resources Audit
- Dairy Australia
- Bureau of Rural Sciences
- GRDC
- Land and Water Australia
- Cooperative Research Centres
- CSIRO

- Community Landcare groups
- Regional NRM bodies
- Indigenous communities
- Commercial farmers
- Commercial Advisory Services
- Australian Govt NRM facilitators
- NGOs

- State NRM agencies
- State DPI agencies
- DAFF
- National Water Commission
- Department of Environment and Heritage
- Productivity Commission

Critical RD&E partners: overlap between the knowledge, policy and adoption domains of responsibility. This group is ideally positioned to coordinate monitoring and evaluation by all stakeholders.

Policy and Programmes

- Community Water Grants
- National Landcare Program
- Envirofund
- Caring for Our Country
- Natural Heritage Trust
- National Water Initiative
- National Action Plan for Salinity and Water Quality
- Coastcare
- Bushcare

Adoption

- Hobby farmers
- Indigenous Land Corporation
- Local governments
- Rural residential