

Grazing

Richard Price and Sue Ogilvy

1. Build on emerging demand for clean, healthy, ethical food to develop a premium market position for Australian livestock.
2. Support producers to market the benefits of eco-agriculture production and to make verifiable claims related to food quality and environmental performance.
3. Apply systems thinking and global perspective to Australia's role in sustainably feeding more people.
4. Improve landscape literacy in grazing and encourage local innovation.
5. Resolve the zero sum game between environment and livelihoods in agriculture.
6. Build on emerging corporate interest in natural capital and sustainable sourcing to relate environmental performance to the norms of business.
7. Develop objective measures of landscape function as a basis for payments for efficient farmer management of natural capital in the public as well as private interest.
8. Develop knowledge and tools to improve graziers' capacity to adaptively manage to land capability, seasonal conditions and natural capital stocks and flows.
9. Provide financial and professional development assistance to enable graziers to invest in increasing landscape function, soil fertility and perennial pastures.
10. Investigate claims of impaired nutritional quality associated with intensive grain feed-lotting of cattle and sheep.

Introduction

If the equivalent chapter of the first edition of this book elicited just one reaction, it was the resonance of the concept of sense of place, especially among the grazier readership. At least for those who formally responded, graziers could identify with the relationship drawn to aircraft pilots – always wanting to arrive home safely and so never intentionally placing the very vehicle for their livelihood at risk. 'We are still learning to fly; still landscape naïve,' wrote one in complete agreement with the author's claim that past land management mistakes had more to do with landscape naivety than wanton recklessness.

That was 5 years ago...

Five years is a short time in terms of the ecological and cultural trajectories in the management of grazing landscapes, but can be long enough to see changes in technological, social and political trajectories. These changes hold promise that knowledge might now be available to ensure our 'pilots' cannot only fly confidently, but land safely.

The dominant culture of graziers has always been to want to leave their land in better shape than they got it. Unfortunately, the ecological performance trends of grazing practices indicate continued biodiversity loss, soil acidification, erosion and weed infestation. Indeed, grazing's fuel reserves are running low and being contaminated.

Consider this: over the past 5 years, the terms of trade for graziers reliant on exports continued to be difficult and this period saw interruptions to trade contracts for live cattle export, following revelations of animal welfare issues. These combined to create a very low market price for livestock in 2012–13 which, on top of the failure of the spring rains, created extreme financial difficulties, with some graziers and pastoralists forced to sell cattle due to lack of feed. At the same time, agricultural inputs have continued to increase in cost, debt levels have become significant and indicators of rural wellbeing continue to show declining health compared with metropolitan populations. There has been a growing challenge to grazing's image and its social licence to operate. Community concerns have been expressed about food security, methane emissions from ruminants, animal welfare in feedlots, live export, use of chemicals (antibiotics and hormones) in meat production, biodiversity loss, contamination of soils with chemicals, erosion, compaction, invasive weeds and pest animals, water pollution and the nutritional quality of ruminant meats fed with grains.

The grazing industry is (of course) aware of these issues and, despite the difficult markets and seasonal conditions, has been responding. Since the first edition, industry, co-investing with government, has established several initiatives to mitigate, adapt to or forecast and understand impact projections of climate change (Fig. 18.1). These investments have been valued at approximately A\$134 million over 2008 to 2012 (Price 2012). Moreover, in a global report by The Economics of Ecosystems and Biodiversity (TEEB) group, acknowledgement is made of the efforts of the Australian cattle industry, suggesting that Australian grazing systems have the least exposure to natural capital (or ecosystems) risk compared with other national-scale grazing regions across the globe (Trucost 2013).

Further opportunity remains. A 2013 assessment of the biodiversity and land management literature relating to red meat production (Williams and Price 2013) showed that

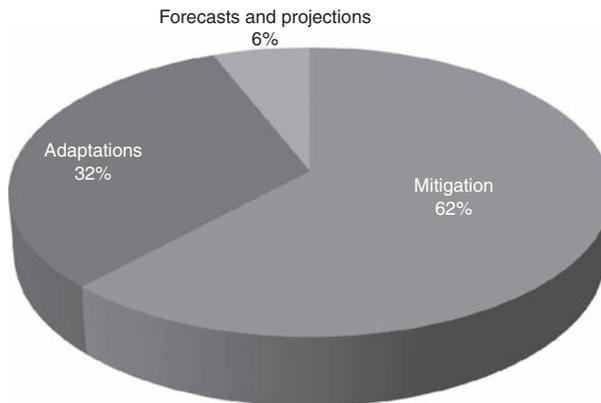


Fig. 18.1 Broad focus of investment: adaptation versus projections versus mitigation (livestock). (Source: Price 2012)

very few papers had been published on these topics since 2009, and that what has been published generally focuses on the negative impacts of grazing. During the same period, considerably more publications appeared concerning climate change, mostly at the bigger picture level than on the relationship to grazing management practice. And so, while we see increasing levels of investment in climate change adaptation, these appear to be pursued at the cost of investment in more practical and immediate solutions to environmental and social issues. The problem is, if we only pursue grazing issues through the lens of climate change, we may become blind to other ecological challenges facing grazing landscapes. Put another way, if it is a landing strip we are after and our lens is inadequate, all long flat stretches of tarmac start to look like runways; to hell with the oncoming cars!

Key issues

1. Build on emerging demand for clean, healthy, ethical food to develop a premium market position for Australian livestock

The path to significant growth in revenues for grazing appears to be unlikely to be found by striving for increased production volumes. Australia is not a low-cost, high-volume producer of beef compared with countries such as Argentina and Brazil (Port Jackson Partners 2012), and increased volume of livestock would require massive areas of rangeland and forest to be converted to grazing (Prasad and Langridge 2012). This will be difficult to accomplish due to existing community challenges based on grazing's current environmental and social performance.

Responses to some elements of the challenge to grazing's social licence to operate have been rapid and decisive. Highlights are responses to animal welfare issues in live export and operations of international abattoirs. But responses to issues related to animal welfare in feedlots, nutritional quality of ruminant meats fed with grains, biodiversity loss, contamination of soils with chemicals, erosion, compaction, pest animals, invasive weeds and water pollution, for example, have not yet allayed all public concerns. These phenomena are indicators that the relationships between graziers and citizens may be failing both parties.

Citizens are expressing concern that their needs for safe, healthy food for current and future generations are threatened by capability decline of farmers, soil and landscape degradation, and biodiversity loss. Graziers are concerned that their needs for a decent quality of life and provision for their retirement are threatened by citizens' unwillingness to pay a fair price for livestock goods and services. That both parties are dissatisfied with the relationship provides an opportunity to respond positively. Investment in appropriate knowledge and market structures to generate mutually satisfactory solutions may prove fruitful.

Growth in revenues and protection of the production base is possible though development of premium quality products with strong environmental and health attributes to serve the growing affluence of domestic and, in particular, Asian populations. Support for development of a premium market for livestock, with stronger environmental and human health credentials could also improve access to financial capital. Global developments in sustainable sourcing and management of natural capital increasingly recognise the materiality of natural and human capital (ACCA *et al.* 2012). Initiatives such as The Natural Capital Declaration (NCD) aim to assist corporations, in this case, the financial industry to understand, account for and manage these risks. The legendary pride in performance, adaptability and innovative capacity of Australian graziers, coupled with improved landscape literacy and innovation, could be transformed to provide a strong resource base well positioned to lead Australia into these premium markets.

2. Support producers to market the benefits of eco-agriculture production and to make verifiable claims related to food quality and environmental performance

Among graziers, we have seen growth in eco-agriculture practices, organic meat production, and the rise of farmers' markets and direct marketing. There is increased interest in improving soil and landscape health and increased acceptance of eco-agriculture techniques. Taking advantage of these trends, small groups of ecologically aware producers, such as those involved in Enviromeat and Eco Graze, have created grazing-specific certification systems and brands with environmental credentials in an attempt to gain a premium price for their product. Traditional agriculture is following this lead, with the Cattle Council of Australia establishing a quality assurance program (Pasturefed Cattle Assurance System – PCAS). Although PCAS presently focuses on operational practices that relate to limited animal welfare and human health issues, it could easily be built upon to deal with natural capital in the future.

Building on these trends and supporting producers to (i) market the benefits of these production methods, and (ii) make fair and verifiable claims related to food quality and environmental performance, may enable the creation of a market and knowledge base for livestock that co-generates environmental and social benefits.

3. Apply systems thinking and global perspective to Australia's role in sustainably feeding more people

The global population may well reach 9 billion by 2050, but without massive land clearing and diversion of water for irrigation (and perhaps even with this), Australia will only ever have the capacity to feed less than 1% of the projected world population and fewer than 2% of people living in Asia (Prasad and Langridge 2012). Reactive approaches to increasing production may result in an interim overshoot of food production and the potential for grazing landscapes to cross thresholds of ecological function (e.g. subsoil acidification or the loss of topsoil) from which recovery is difficult, if not impossible. The imperative for Australia, therefore, is to consider its place in global food production such that it doesn't contribute to an overshoot at the cost of our natural capital. This position is recognised in part by the Australian Government's policy white paper *Australia in the Asian Century*, which cautions that by aiming to become a regional food bowl to meet the rapidly growing demand associated with increasing wealth may place adverse pressures on our resources that will need to be countered (Australian Government 2012). Already many of the environmental and social problems being observed in agriculture stem from the increase in grain-feeding and feedlotting of cattle and sheep and the concentration of abattoirs and food retailers pursuing increased scale and volume-driven cost reductions. These production strategies have been successful in concentrating profits into fewer larger grains, abattoir and retail companies, making it strategically logical for large corporates to persuade policy makers of the urgent need to increase food production and bias research investment towards examination of agricultural intensification.

Australia's most strategically valuable contribution to global food security in a world experiencing increasingly difficult climatic conditions may be by developing, proving and sharing expertise in grazing management of perennial grasslands that rapidly increases the natural capital base of soil fertility and structure and increases resilience of food production systems (fitting our own oxygen mask before helping others). Research and

development of grazing knowledge, skills and systems that could increase production and improve environmental and human health are a priority. These would be an asset for Australia's domestic food security and economy and provide the basis for education and extension services to other countries. It would also differentiate Australia's role in supplying premium meat to global markets *vis-a-vis* the role of global competitors who might have a cost advantage.

4. Improve landscape literacy in grazing and encourage local innovation

The dominant mental model of ecology in agriculture is an input–output (productivist) archetype. It implicitly accepts as unavoidable the systemic decline of natural resources such as soils (e.g. through acidification), lime reserves (e.g. to correct acidification), biodiversity and phosphorus and nitrogen nutrient cycles and perpetuates the consumption of these key resources more quickly than they can be regenerated. It is largely silent on soil–plant–animal ecosystem functions and processes and is unable to examine the potential utility of them to be employed in grazing to avoid or reverse systemic declines.

Barriers to a more ecologically literate approach to grazing (landscape literacy) are culture, absence of imperative for change and the sheer complexity of the knowledge-development task, which overwhelms the traditional mental and mathematical models and tools of agricultural research and extension (Richards and Lawrence 2009; Richards *et al.* 2005, Wackernagel and Rees 1997).

Nothing triggers innovation more than diversity and interdisciplinary enquiry. Breakthroughs may result from integrating concepts from ecology, animal behaviour and epigenetics to eco-agricultural practices (Provenza *et al.* 2007). This is not to suggest that these alternative systems are in and of themselves the answer. Rather, interdisciplinary knowledge may reveal new phenomena, insights and prospective solutions from all systems – traditional and emerging – under comparison. Engagement of graziers in this broader approach to innovation will allow them to reconcile past experience and observations with these new theories to accelerate innovation.

5. Resolve the zero sum game between environment and livelihoods in agriculture

Grazing requires environmental resources such as pastures and soil fertility as the production base for livestock. Productivity rises and falls with the performance of these resources. Under the current productivist model, maintenance of pastures and soil fertility is significantly dependent on purchased inputs (e.g. seeds, fuel, lime and fertilisers). Here, terms of trade that significantly reduce revenues from production also affect maintenance of environmental assets; difficult financial conditions constrain graziers' incomes and force choice between finances for a sufficient livelihood and investment in inputs to restore pasture and soil fertility. This dependence ties livelihoods to environmental performance in a zero sum game. Under this paradigm, investment in environmental performance can only come in good financial conditions.

By generating and supplying demand for livestock that co-generates environmental and social outcomes, the first four key commitments would energise markets to their greatest potential to at least partly resolve the zero sum game. But there may still be requirements for market regulations and payments for environmental services to sever the zero sum gain to accelerate environmental and social improvement. Suggestions on how to do this follow in commitment 6.

6. Build on emerging corporate interest in natural capital and sustainable sourcing to relate environmental performance to the norms of business

In grazing, natural capital produces final goods (livestock) as well as intermediate goods such as healthy topsoil, biodiversity, clean water, clean air and resistance to weed invasion. It is in the public interest that minimum levels of ecosystem services are always preserved in grazing landscapes to avoid supply interruptions caused by irreversible crossing of thresholds of functionality. As with financial capital, where a larger earnings base produces more income, a healthier natural capital asset produces more goods and services more reliably.

Decisions made by investors or lenders to agriculture and by other participants along the supply chain, such as food wholesalers, processors and retailers, have a significant impact on the management practices in grazing. For example, the increase in feedlotting, with its attendant negative environmental and social externalities, is attributed to the requirement for a highly standardised meat product: feedlotting makes this more profitable. Lending and investment decisions, as well as supply chain influence in agriculture, currently fail to value or account for natural capital or manage risks associated with its decline.

Initiatives such as TEEB and The Natural Capital Declaration have formed to support corporations to recognise and adjust their influence on management of ecosystems, biodiversity and other forms of natural capital. To date they have been successful in qualification and quantification of exposure at global and country scales. But their information systems and methods are not yet able to assess or inform decisions made on the ground, at paddock scale. We know that decisions such as those related to fertility management, herbicide use, grazing pressure and recovery times are significant in increasing or decreasing environmental and financial performance in grazing. Accordingly, they have significant impact on biodiversity and natural capital risk over a large area of Australia's landmass.

Management of risk requires methods of assessment and motivation to use them. Investments in natural capital at the paddock scale could be expected to accumulate to the national and industry scale, providing significant private and public benefits. But these investments are currently restricted by the absence of clear returns on investment in natural capital and methods of monitoring and verification of delivery.

The concept of natural capital is one means of unifying many capacity-building strategies around the notion that landscape condition and production levels are not tradeable counterparts, whether in the short or long term. Connecting the micro (paddock)-scale decisions to macro-scale outcomes in natural capital and biodiversity in order to inform and motivate management actions to change trajectory would potentially unlock constructive investments in these important assets.

7. Develop objective measures of landscape function as a basis for payments for efficient farmer management of natural capital in the public as well as private interest

Graziers are currently paid only on sales of livestock and find it difficult to judge or realise the private return on investment from not converting natural capital assets such as soil-water and nutrients into livestock for sale. Attempts to pay landholders to produce or maintain natural capital assets have been constrained by the inability to value them and verify delivery.

The health and capacity of the natural capital asset in grazing can be judged using adaptation of methods proven in ecology. Ecological monitoring tools such as landscape function analysis (LFA) and VAST 2 are already being trialled for adaption to agriculture (under the Carbon Farming Initiative) and are proving practical (Ludwig *et al.* 1997; Tongway and Hindley 2004; Thackway 2012; Robinson *et al.* 2013). Objective measures of the health and capacity of the natural capital asset in grazing may be built into contracts with graziers to specify and ensure delivery of minimum levels of natural capital in grazing landscapes. Payments (much like the base pay for a sales executive) therefore might be made to graziers based on achievement of the minimum standard. The rest of their earning potential would be based on their ability to use highly performing landscapes to create high performance perennial grasslands and profitable livestock enterprises.

8. Develop knowledge and tools to improve graziers' capacity to adaptively manage to land capability, seasonal conditions and natural capital stocks and flows

Part of the management of natural capital in grazing enterprises is judgement of the carrying capacity of the landscape as it changes in response to weather (in particular rainfall). Monitoring for early indicators of trends in natural capital performance, and tools to model impacts of these on production decisions such as stocking rates, lack solid experiential data, and are complicated to use. These tools are further challenged in environments where transformative responses, as opposed to incremental ones, are required.

The notion of matching land use to land capability is not new, and though it has been adopted in a coarse sense among the different livestock industries, there is considerable room for improvement at finer scales, including paddock and sub-paddock scales. Knowing where livestock should be grazed is only a part of successfully matching land use and capability. Day-to-day management of livestock within a complex ecosystem is the challenge – from genetic selection to pasture management, stock movement, pasture and groundcover management, water distribution and nutrient application. The grazing industry should follow the grain industry's lead in investing in precision agriculture innovations that improve resource-use efficiency and resource protection. Precision agriculture rules also suggest that we redefine drought and start to manage at all times according to what is in the bank – in grazing terms, this means changing management regularly according to dryness (soil moisture) and what can grow at any point in time.

9. Provide financial and professional development assistance to enable graziers to invest in increasing landscape function, soil fertility and perennial pastures

Building the natural capital base for lower cost, more reliable production in the future may require major changes to on-farm management policy and action, including temporary de-stocking and possibly significant longer term reductions in stock numbers, and expensive changes to fencing and watering strategies. Those who have made such enterprise-wide transitions claim to have a lot more spare time and less work than before, due to reduced requirement for feeding and drenching and to managing animals that are much quieter and easier to handle. However, these transitions often require investment in fencing and watering and the associated debt cannot usually be supported in the short term.

On-farm infrastructure changes that help build natural capital need to be supported alongside investment in knowledge, skill development and mentoring. All public

investment must, however, be accompanied by objective performance measures to ensure delivery of the required outcome.

10. Investigate claims of impaired nutritional quality associated with intensive grain feedlotting of cattle and sheep

Chronic metabolic diseases such as obesity, diabetes and possibly also certain cancers are increasing in the Australian population. Many are related in some way to diet and lifestyle, but strategies to reduce their rate are not having the impact we desire. Without including consideration of chemicals such as growth promoters and antibiotics, there is local and international evidence to support community concerns that production methods such as grain feeding of ruminants changes the nutrient levels (omega 3; EPA DHA and micronutrients) in meat to levels and ratios that are 'smoking guns' for these metabolic diseases (Ponnampalam *et al.* 2006).

These claims should be fully investigated for Australian production conditions. If they are supported, it provides additional justification for investment in management of grazing not only to improve environmental returns but to avoid future costs associated with poor health. In this way, this key commitment strengthens the business case in support of the first and every other commitment listed above.

Conclusion

Not much has progressed over the past 5 years in improving the measurable environmental performance of grazing across Australia. But progress in concepts such as natural capital and citizens' awareness of environmental and social issues may have created the right conditions for more graziers to become truly landscape literate: to run businesses with an eye to all forms of capital including natural capital and to develop markets that will recognise the premium quality of Australian beef and its healthy, natural attributes.

In doing so, the grazing industry shouldn't simply see itself as an island of graziers competing against global rivals, but rather as global players exploiting wider market opportunities that exist to deliver all manner of products and services recognising the value of natural capital.

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