



Australia's agricultural future: the social and political context

Report to the Australian Council of Learned Academies
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EXECUTIVE SUMMARY

Agriculture has long been central to narratives about Australian identity and prosperity; the wellbeing of farmers seen as crucial to the wellbeing of all. Paradoxically, agriculture has also long been subject fears of social and economic crises undermining the ability of farmers to maintain productivity growth and to care for rural environments and communities. As we face the challenges of the 21st Century we must ask what we expect of agriculture and how we will support Australian farmers to deliver on these expectations.

This report examines:

- Social and economic stressors in the Australian farm sector with the potential to undermine human capital and, in turn, agricultural productivity.
- The politics of food and agriculture both within, and outside, the formal political sphere. This involves consideration of both national and global politics, on the one hand, and of the micro-politics of consumption and the vertical coordination of agricultural value chains, on the other.
- Possible futures and the infrastructure, technology, farm business models and governance systems required to envision and realize positive futures.

SOCIAL AND ECONOMIC STRESSORS

The agricultural and rural sectors face a number of inter-related social and economic stressors including depopulation of rural areas, declining participation in agricultural education, low levels of entry into farming as an occupation (particularly by young women), low incomes and poor rates of return for the majority of farm businesses, and comparatively poor health outcomes for farmers and other rural residents including mental health and suicide.

As many as 75 per cent of Australian farm businesses do not generate sufficient returns to meet both personal needs and business growth. In considering the future of agriculture, this raises at least two questions. First, will social and economic stressors undermine the human capital base of Australian agriculture and, ultimately, its productivity and viability? Second, will these stressors undermine the social license of agriculture or the legitimacy of agricultural policy?

In the short-term, farm businesses will predominantly be managed by older farmers while labour shortages are filled through casual employment, increasingly, of international labour migrants. Over the longer-term, it is plausible that Australia will become a net importer of management expertise and capital.

A major variation on these trends is found in the rising share of the Australian landmass subject to various forms of collective Indigenous tenure. Much of this land is remote and of marginal agricultural value. However, there is considerable potential to manage Indigenous landholdings for cultural and environmental values while developing viable agricultural enterprises and supporting Aboriginal and Torres Strait Islander peoples' aspirations to live on and care for customary lands.

Agricultural business viability is essential but not sufficient to address the social issues identified in this report. Indeed strategies aimed at addressing business viability may amplify rather than ameliorate social issues. Transformative technologies that reduce labour demand, for example, may simultaneously reduce employment opportunities and deepen the isolation experienced by many working in agriculture.

Increased retail prices are also not a solution. For a number of reasons, the farm-gate price of food and fibre is a small proportion of what consumers eventually pay. A sizable minority of Australians

struggle to afford a sufficient or balanced diet. Should food prices rise faster than incomes, or general economic conditions deteriorate, this number will grow.

Alternatively, Australia could transition from the existing model of predominantly family-run small-to-medium sized farm businesses to a corporate model with higher levels of foreign ownership. This could provide more entry pathways into agricultural careers and provide an injection of technology and investment capital. There is limited evidence to date, however, that foreign-owned or other corporate farms are any more productive than large family-owned farms.

THE CHANGING POLITICAL CONTEXT

It is widely believed that urban Australians are unsympathetic to the challenges facing the nation's farmers. Survey results suggest this is not the case. Recent controversies over extractive industries suggest the broader Australian community also regards agricultural lands as assets warranting preservation. Overall, it appears that urban Australians are sympathetic to farmers but increasingly concerned about issues related to food safety, environmental sustainability and animal welfare.

This raises the potential for strategies to address farm business viability also to have undesirable market impacts as evident, for example, in resistance among consumers to genetically engineered and other products perceived as 'unnatural' or 'industrialised', as well as through 'boycotts' and other campaigns against products perceived as unsafe, unsustainable and/or cruel.

Political threats to agriculture can thus arise from outside the formal political sphere. Vertical coordination of supply chains places retailers at particular risk of reputational damage with potential for long-term economic consequences. Retailers manage these risks through standards-based regulatory frameworks that are, particularly in overseas markets, expanding beyond cosmetic and safety attributes of products to include social and environmental criteria.

Research and development aimed at increasing agricultural production can also either amplify or attenuate consumer and buyer concerns. Dealing with concerns that are already causing Australian agricultural market damage should be a high priority.

Neither conventional politics nor education and PR are sufficient to address reputational threats. In no small way, the future prosperity of Australian agriculture will depend on its ability not simply to manage threats but to proactively engage with and exceed buyer and consumer expectations. Some businesses will be able to exploit markets for products with specific environmental, cultural or quality claims. Others will find that exceeding expectations is simply a baseline requirement of secure market access.

While global growth in population and living standards may suggest boom times ahead for food producers, evidence to date suggests that access to these markets will depend heavily on being able to meet high safety and quality expectations. Demand-responsive production will require more than expanding output and hoping for the best.

Australian agriculture is well placed to capitalize on the shift of economic and political influence to Asia. However, geopolitical instability represents a major risk to the existing system of multilateral and bilateral trade agreements that facilitate access to international markets. Geopolitical instability may appear unlikely in the short-to-medium term. Nonetheless, several sources of tension including political aspirations, natural disasters, persistent inequality, cascading economic crises etc. could interact to disrupt the environment for trade.

ENVISIONING AND REALIZING POSITIVE FUTURES

High levels of income volatility and climatic variability have long characterised Australian agriculture and encouraged the development of management practices and business structures that allow for a degree of spatial and temporal flexibility (e.g. opportunity cropping and cooperative arrangements). Such flexibility will be increasingly important as climatic variability increases in coming decades.

The polarised politics of climate change have not served Australian agriculture well in preparing for the challenges of global environmental change. The potential for ‘policy shocks’ associated with global efforts to mitigate greenhouse gas emissions should not be underestimated and could exceed, in the short-term, shocks associated with global environmental change. Policy changes in either the formal or informal political spheres could result in increases in the cost of fuel and other inputs and/or discrimination against produce seen as greenhouse gas intensive.

At the same time, climate policy offers opportunities to diversify income streams through payments for ecosystem service provision (in this case, carbon sequestration). There has been some experimentation in Australia with payments for biodiversity conservation that similarly recast farmers as producers of a range of economic, environmental and social goods in addition to agricultural commodities. In some cases, there are production co-benefits from environmental conservation and/or risks of providing perverse incentives not to undertake voluntary conservation action. However, in other cases there are not and arguments can be made for financial assistance.

Reconsideration of drought policy could also offer opportunities to focus public support for agriculture on maintenance of critical ecosystem functions rather than on production or income support.

Review and reform of pastoral lease conditions offers possibilities to reflect on and clarify the ‘duty of care’ expected of landholders. Such clarification should, however, be extended to all land tenures and embedded within participatory, flexible and robust governance arrangements. Specific governance mechanisms that can be harmonized and developed further include:

- Verifiable standards for the demonstration of care for people, environments and livestock.
- Collaborative resource planning and management arrangements.
- Clarification of property rights and responsibilities across multiple tenure types including Indigenous lands, leasehold lands and freehold.

While low rainfall environments such as rangelands are often regarded as marginal for agriculture they require active management to maintain their ecological and cultural values. Further, rangelands provide numerous opportunities for environmental, cultural and economic co-benefits through low external input grazing enterprises interspersed, where soil and water resources allow, with a mosaic of more intensive crop and pasture production.

Table 1 summarizes social and political trends and issues currently evident in the Australian agricultural sector. From these trends and issues, Table 1 extrapolates likely short-to-medium and long-term consequences. It also speculates as to alternatives – as to how things could be different. The intent here is not to predict the future but to inform thinking and debate about how that future might be shaped in socially desirable ways.

Table 1 Summary of key social and political trends shaping the future of Australian agriculture

Current trends and issues	Immediate consequences	Short to medium-term implications and possibilities	Long-term implications and possibilities	Alternative trajectories
Concentration of farm sector	Depopulation and aging of inland Australia	Widening gap between need for social and health services by remaining residents and availability of services	Widening health gap between rural and urban Australians	Cooperative and other business models increase economies of scale
		Reduced viability of non-agricultural rural businesses and thus opportunities for off-farm employment and income	Collapse of non-agricultural economy in rural areas unsuitable for tourism or residential development	Productivity enhancement achieved through sustainable intensification of land use rather than expansion of landholdings
		Declining support base for traditional rural political parties	Diminished political support for agricultural policies inconsistent with views of urban electorate	Diversification of non-agricultural business and employment opportunities including professional services
	Reduced amenity and services in rural areas	Reduced quality of life for remaining residents	Acceleration of depopulation and associated trends	Convergence of support for social, cultural and environmental values of agricultural landscapes
	Reduced recruitment of young farmers and farm workers, including disproportionate impact on recruitment of women to farming	Increasing dependence on international labour migration to supply temporary workers	Increasing dependence on international labour migration to supply management expertise	Acceleration of return migration and associated transfer of skills and capital
				Growing employment in management and professional services provides training and experience

Low and volatile farm incomes for much of sector	Lack of investment capital and pressure for concentration	Failure to invest in productivity enhancing and/or resource conserving technology	Corporatization and increased reliance on foreign capital	Increased economies of scale provide platform for more investment including through joint ventures with off-farm investors
	Contribution to comparatively poor health and wellbeing status of farm and rural residents	As above	As above	Improved incomes and income stability reduce health gap between rural and urban, and Indigenous and non-Indigenous, Australians
Expansion of Indigenous landholdings	Aspiration of many Aboriginal and Torres Strait Islander Australians to live on, care for, and derive livelihoods from traditional lands	Slow expansion of Indigenous agricultural enterprises	Development of more economically viable agricultural enterprises on Indigenous land	Better integration of natural resource management activities across Indigenous and other landholdings to deliver ecosystem services at landscape scale
		Continued interest in Indigenous Ranger and other conservation programs	Improved land condition	
Reduced public-sector research and development	Narrowing of research focus and avoidance of cross-sectoral and high risk 'blue sky' research	Slowing rate of productivity growth	Decline in absolute levels of productivity due to climate impacts	Cross-sectoral research supports increased productivity, land use intensification and enhancement of ecosystem processes
		Missed opportunities for transformational research	Reduced capacity to adapt to high levels of environmental change	Climate resilience and adaptability enhanced
		Missed opportunities to address social and environmental concerns	Reduced market access	Market access enhanced

Consumer resistance to agricultural products perceived as unnatural, unsustainable and/or cruel	'Buycotts' and campaigns to ban controversial technologies and practices	Processor and retailer preference for products produced using alternative practices	Loss of Australia's reputation for 'clean and green' agriculture	Australian produce perceived as natural and sustainable
		Government intervention to ban practices	Reorientation of global supply chains, bypassing Australia	Reorientation of global supply chains to include Australia
	Growth in 'alternative' food markets including certified organic produce, farmers' markets, community supported agriculture etc.	Diversification of market opportunities for those producers capable of supplying them	Mainstreaming of 'alternative' produce through involvement of more and larger producers, agribusiness firms and retailers	Synergies between so-called 'conventional' and 'alternative' production systems improve consumer acceptance of new technologies
		Short supply chains increasing producer-consumer contact	Short supply chains provide viable livelihood option for more members of small farm sector	
Vertical coordination of supply chains	Highly concentrated retail sector	Concern over impact of retail concentration on farm-gate prices	Retail-coordinated supply chains achieve economies of scale by favouring large suppliers	Diversification of retail outlets ranging from competing large format supermarkets to direct farmer-consumer relationships
	Reduced importance of spot/wholesale markets to large retailers	Spot/wholesale markets become repositories for produce surplus to major supply chains and/or not certified as compliant with quality standards	Bifurcation of 'food system' into high and low value segments based on level of quality assurance and compliance with buyer expectations	Diversification of retail outlets accompanied by diversification of supply chains

	Dependence on quality standards to manage risk	Extension of standards to incorporate more types of risk including reputational risks associated with social and environmental issues	Exclusion of small producers unable to afford costs of certification and/or of changed management practices	Standards harmonized to reduce costs More stable and secure income streams for those farmers able to pre-empt concerns and meet market demands
	Increased foreign ownership of processing facilities	Vulnerability of producers to offshoring of processing facilities and reorientation of supply network		Increased investment and more competitive value chains
Politics of global environmental change	Opportunities to secure payments for ecosystem services (carbon sequestration)	Increased scrutiny of greenhouse gas emissions from agriculture	Trade restrictions and/or imposition of best-practice standards Rising fuel and input costs Imposition of taxes or other pricing mechanisms of GHG emissions from agriculture Systemic change in enterprise mixes and relocation of people and infrastructure	Use of precision agriculture, ICT, biotechnologies and robotics to maximize input-use efficiency in intensive production systems Where this is not possible or viable, re-extensification of agriculture Substitution wherever possible of fossil fuel derived inputs with cultural practices, biologically derived inputs etc. Improved market access for demonstrably 'climate friendly' produce.

Geopolitical and economic transitions	Rising economic and political influence of Asia New aspirants to regional leadership in Asia, South America and Africa	Increased consumption and trade in the Asia Pacific	Shift of demand to quality, higher-value products by new middle classes	Global political instability and increased use of trade for political leverage National food security concerns lead to reversal of liberalization and reassertion of trade barriers to protect domestic production
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1. INTRODUCTION: THE FUTURE OF AUSTRALIAN AGRICULTURE

The future of agriculture is an issue in which all of us have a stake. Agricultural businesses occupy over half the Australian landmass. The activities they undertake and the commodities they produce are not like any business activity or any commodity – in many ways, they are the very ‘stuff of life’. Agriculture is critical to the vitality, culture and wellbeing of rural communities and, indeed, contributes more to the economic vitality of Australia as a whole than many appreciate. Through active management of Australian landscapes farms contribute to the maintenance of environmental values and the delivery of ecosystem services at a continental scale. Just as importantly, poorly managed farms have the ability to degrade essential environmental values and services.

The food Australian farms produce must, of course, be good to eat. It must be safe, affordable and meet peoples’ nutritional needs. But food must also be ‘good to think’. More than any other commodity, including fibre, food must bridge subjective experiences, hopes and fears, cultural uses and expectations, lay and professional expertise, and more. While everything we consume is imbued with meaning, food is one of the few commodities we ingest.

Given the centrality of food and fibre to our health, culture, economy and environment an Australia without agriculture is virtually unthinkable. Yet for decades a sense of crisis has pervaded rural Australia as declining terms of trade, severe drought, and other challenges have seen thousands of farmers walk off the land. Anxiety over structural adjustment has often overshadowed the many achievements of Australia’s farmers and the people who work with them, not to mention the opportunities. As an export-oriented industry, Australian agriculture ought to be extremely well placed to capitalize in coming decades on population and income growth in the Asia Pacific region. The seeds ought to have been sown for something of a new golden age for Australian agriculture.

The obvious question then is what could get in the way? All the obvious answers are relevant – drought, floods, pests and disease, etc. The particular interest here though is with those answers that reflect the social basis and politics of agriculture.

It should be no great surprise that agriculture and agricultural commodities attract considerable political attention. When Australian farmers grapple with issues such as animal welfare, food safety or environmental sustainability they grapple with public issues about which a wide cross-section of citizens, businesses and governments, both at home and abroad, have strong views. The politics of food and agriculture – a politics that extends well beyond the formal political sphere – represents both a threat and an opportunity for Australian agriculture. While controversy over production methods and technological innovations can disrupt markets and impose heavy opportunity costs, few industries can boast such an interested and passionate consumer base.

As with any public issue, debate over the future of agriculture raises the possibilities both of enhancing understanding and collaboration, on the one hand, and of intensifying antagonism and conflict, on the other. While it is generally not possible to reconcile all the values and aspirations stakeholders bring to complex public issues, more informed debate has the potential to reduce conflict and inaction associated with misinformation, mistrust, and inadequate strategic foresight.

This report thus identifies and discusses a number of trends and issues likely to impact the future of Australian agriculture. The purpose is not to predict the future but to inform it; to examine the potential short and long-term implications of existing social and political trends and to ask what these might mean for agriculture, how they might play out differently, and how we might respond to ensure, as far as possible, positive outcomes.

1.1 TERMS OF REFERENCE

This report is one of three commissioned by the Australian Council of Learned Academies (ACOLA) to inform the *Australia's Agricultural Future Project*. It takes an explicitly social and political perspective in complement to the other two reports' foci on scientific and technological perspectives.

The aim of this work, as set out in the Terms of Reference, is 'to provide a bold insight into the future of Australia's agriculture'. This, the Terms of Reference recognise, requires careful questioning of conventional wisdom and a degree of 'well-informed speculation'. Thus, the requirement is to:

- Provide a high-level analysis of key emerging issues to area of scope over the next 10, 20 and 30 years.
- Identify areas already well covered by existing literature and focus attention to areas that are less established.
- Focus on emerging issues and ideas that are not highly visible – what issues have not broken into the broader consciousness yet, but are likely to be highly significant?
- Identify what issues are missing from the debate. Include relevant issues that are showing up through early signals but are not necessarily based on overwhelming detailed evidence yet.
- Distinguish between what is evidence based and defensible, and what is more speculative/opinion based, and why. Aim to produce an appropriate mix of 'bold ideas' and 'broad evidence of emerging themes'.
- In shaping your response, take into account the concepts in the background paper and the degree to which these have a basis in reality, their relative importance, and whether they impede the future potential of these industries (through their effect on politics and policy in this area).

1.2 KEY CONCEPTS AND APPROACH TO THIS REPORT

For the sake of clarity, this section will provide a brief overview of some of the key concepts used throughout this report. Forecasting potential social and political futures for agriculture requires us to do more than extrapolate social indicators and describe existing political controversies (although both these activities are important). Forecasting potential futures requires us to understand how people make sense of the future and the strategies they are likely to use to ensure their own aspirations for the future are met.

To explore how people make sense of the future this report will use the concept of *policy narratives*. Overarching policy narratives communicate the big ideas and key social values governments and other stakeholders attempt to operationalize in their day-to-day policy and decision-making (see Hampton 2009; Kaplan 1986). Policy narratives help to:

1. Make sense of the myriad needs and issues societies confront.
2. Facilitate the coordination of activity among multiple independent or semi-independent agencies and organizations.
3. Identify workable policies and programs.
4. Maintain trust in governments and government agencies to do ‘the right thing’, even when the detail of policies and programs appears somewhat opaque.
5. Maintain support for policies and programs, even where there are uncertain and/or negative impacts for some stakeholders.

Policy narratives can be regarded as ‘necessary simplifications’. They must be broad enough to accommodate a wide array of specific policies and programs, and they must be flexible enough that an equally wide array of stakeholders can pick them up and apply them. As simplifications, it does follow that policy narratives are subject to risks of myth-making and interest group capture. In other words, policy settings may be maintained despite limited evidence they are achieving their objectives because the overarching narrative tells us they are ‘correct’. And policy settings may be maintained despite strong evidence their benefits have been concentrated among a small number of (perhaps unintended) stakeholders.

Despite these risks, the conceptual frameworks provided by policy narratives help to support democratic deliberation over key social values and aspirations, the appropriateness and efficacy of different policy tools, and so on. In turn, genuinely democratic deliberation helps to mitigate the risks of myth-making and interest group capture by exposing policies and programs to widespread scrutiny and debate.

Closely connected to the successful deployment of policy narratives is the idea of *legitimacy*. Legitimacy refers to general acceptance among citizens that institutions and/or initiatives are right and proper (Schaar 1984). Legitimacy may thus be conferred on an institution but not on a particular policy, program or decision (or vice versa). Further, acceptance of decisions may rest as much on peoples’ belief that those decisions have been taken in good faith and through an appropriate process, as it does on peoples’ belief that a technically sound decision has been reached. Where there is a deficit of legitimacy, not surprisingly, there is likely to be a surfeit of conflict and non-compliance. The increasingly popular term ‘social license’ applies similar thinking to the corporate sphere. In the resources sector, in particular, social license is used to capture the idea that companies must go beyond regulatory compliance and gain broad societal acceptance of their activities if they are to avoid costly conflicts and project delays (Gunningham et al. 2004; Prno and Slocombe 2012).

Putting these concepts together, this report is concerned with how policy narratives relevant to Australian agriculture attempt to represent the future and secure legitimacy for particular courses of action. It will be argued in following sections that conflict around several of the issues that will shape the future of Australian agriculture is as much about the legitimacy of decision-making processes as it is about their outcomes.

Finally, it is important to say something in this section about *foresight*. Methodologies for engaging with the future such as strategic foresight analysis are very much, at present, in vogue. Following Habegger (2010), it is suggested here that regardless of the methodology used, strategic foresight serves two complementary purposes: first, informing public policy and decision-making through the systematic collation of information about relevant trends and developments; and second, stimulating deliberation and learning among policy-makers and other stakeholders and thus contributing to common visions for the future of public policy.

Critically, strategic foresight is not analogous to making predictions about the future. Threats are signalled in order to help avoid them. Risks are assessed so they can be managed. Opportunities are identified to see where they can be aligned with common goals. In sum, the role of foresight is not to predict the future but *to help make it*. By identifying, in this report, issues and trends likely to impact the future of Australian agriculture the primary purpose is thereby to encourage open dialogue over these matters and how best we might respond.

2. BACKGROUND: 200+ YEARS OF AGRICULTURAL POLICY NARRATIVES

In addressing its Terms of Reference this report will begin by looking backwards. The intent is not to provide a detailed analysis of past policies and programs but to draw out the major narrative themes which have historically, and which continue, to guide agricultural policy in Australia.

In their 1992 book, Neil Barr and John Cary insightfully described Australian agriculture as a 200 year search for sustainable land use. In other works, confronting the realities of land and water degradation caused by agriculture has, at times, been a powerful stimulant to change. Dust storms blanketing Australian cities in the 1930s helped catalyse the formation of state soil conservation agencies while rapidly expanding dryland salinity was a key factor in the development of Landcare in the 1980s and 90s. The key point here, according to Barr and Cary (1992), is that there is no simple end-point in the search for sustainability. The need to innovate and adapt in the face of emerging challenges and opportunities never goes away. It is easy to look at the social, economic and environmental issues currently confronting the agricultural sector and forget the determination with which people have tackled equally serious issues in the past.

It is also easy to stereotype farmers as inherently conservative towards change. While it is true that Australian farmers' place a lot of store in their professional identities as skilled producers of high quality commodities, they also talk passionately about the importance of leaving land in better condition than they found it, of being custodians of natural resources for future generations, and of their concerns for the long-term wellbeing of their families and communities. This points towards a broad view of agriculture as something undertaken as much to support families and communities and to care for rural landscapes as it is to produce economic value.

It also, critically, points towards a view of agriculture that is oriented as much towards the future as it is towards tradition.

Key policy narratives about agriculture and its place in Australian communities and landscapes have tended, over the years, to a narrower view. Australian governments have been criticized many times over the years for treating agricultural production and marketing programs as de facto rural policy; that is, for assuming that as long as agriculture remained strong and profitable other social and economic issues affecting rural communities would take care of themselves. This report is not concerned with whether these criticisms are justified. The point is that in the search for narratives with which to inform and maintain political support for agricultural policy, Australian agriculture's social context has been treated as secondary to production and profitability.

Historian Don Aitken (1985) coined the term 'Countrymindedness' to describe the ideological foundations of agricultural policy and support for distinctly rural political parties from the 1920s to 1970s. Countrymindedness reflects the proposition that only primary producers contribute directly to the nation's wealth and it is therefore in the interests of all Australians that policy improves the position of primary industries. Further, as farming and other rural pursuits bring out the best in people and help to define the national character, more people should be encouraged to settle in the bush. The future prosperity and security of the entire nation are seen to depend, from this perspective, on a productive and growing family farm sector. Policy thus concentrated on redistribution of land to family farmers, intensification of landuse, protection from imports, voluntary participation in soil and water conservation, and so on.

But by the 1980s countrymindedness and the political parties that espoused it faced what looked to be potentially fatal threats (Aitken 1985; Green 2001). Demographic change meant more Australians lived in cities and fewer had family or business ties to the bush. The contribution of agriculture to

Australia's gross domestic product was shrinking and tightening international commodity markets left agriculture and rural communities in what seemed to be perpetual states of financial crisis. By the mid-1980s, it was apparent that Australian governments were no longer willing to support agriculture through trade protection, quota systems, statutory marketing arrangements or other means of sharing risk. Agriculture, like other sectors of the Australian economy, was to stand on its own feet, as were individual farmers. According to the new narratives dominating public policy, direct exposure to market signals would encourage businesses to exercise entrepreneurialism and self-help, positioning them to take advantage of the brave new world of globally liberalized trade.

Deregulation and trade liberalization have, of course, been contested. The electoral success enjoyed in the late 1990s by Pauline Hanson's One Nation party can, in large part, be explained by the appeal of protectionist and anti-immigration policies to voters in outer metropolitan and rural electorates – voters who had struggled to see the benefits of economic restructuring (Lockie 2000). But while populist politicians have come and gone, the mainstream political parties – along with key agricultural lobby groups such as the National Farmers' Federation – have maintained strong support for the liberalization agenda. In fact, narratives of market reform have expanded to subsume matters that may not, at first glance, appear to be primarily economic.

By the mid-1980s, for example, it was also apparent that while decades of action to address soil erosion and other land degradation issues had met with some success new degradation issues such as dryland salinity were undermining the productivity of thousands of hectares of farmland. In addition, recognition by the High Court and Australian Government of native title, calls for more inclusive rural policy by the rapidly growing rural women's movement, and growing awareness of issues such as suicide and domestic violence in rural communities required new narratives to guide policy and programs.

Drawing potentially competing imperatives together, the National Landcare Program (NLP) was a masterstroke of discursive accommodation (Lockie 2006). Initiated in 1989, Landcare offered a way to reconcile free trade, business profitability and private property rights with environmental protection and community-building. The NLP encouraged farmers and other rural residents to come together via community Landcare groups to share knowledge and resources, coordinate activity, undertake catchment and farm planning, and generally apply a coordinated self-help model to local environmental problems. For over two decades, the NLP maintained strong bipartisan political support and high levels of involvement in rural areas. But as much as the NLP and community Landcare groups achieved, the problems of land and water degradation never entirely went away. In 2014, its 25th anniversary year, the NLP experienced for the first time a substantial reduction in government funding.¹

If there has been one domain of agricultural policy that Australian governments have particularly struggled to accommodate within the market reform narrative it has been that of drought. The Hawke-Keating Labor Government first attempted to institutionalize the idea that climatic variability – including periods of below median rainfall – was a natural feature of Australian environments; a feature that farmers should be aware of and plan for as part of their normal, day-to-day business

¹ Reduced funding in 2014 was not the first substantive change to the National Landcare Program. Through its life the NLP suffered from a perception that Landcare was 'good for raising awareness' but not for stimulating enough 'work on the ground'. Evaluations demonstrating that investment in Landcare led both to substantial private co-investment and to extensive environmental works did little to challenge this perception (or myth). Responses over the years included the development of regional natural resource management institutions tasked with prioritising funding, payment of financial incentives to individual landholders, and imposition of tighter requirements for delivery of measurable outcomes (see Morrison et al. 2010; Robins and Kanowski 2011; Tennent and Lockie 2013).

management. Training was made available in natural resource planning and financial management but farmers deemed incapable of managing ‘normal’ climatic risks were encouraged to leave the sector through changes to the Rural Adjustment Scheme (Higgins and Lockie 2002).

But what is a ‘normal’ climatic risk? Every government since Hawke-Keating has reaffirmed the commitment to self-reliance but maintained ‘exceptional circumstances’ provisions that enable various forms of financial assistance to be extended. While narratives of market reform have wide support among farmers when it comes to areas like export policy, that support becomes more uneven when confronted with climatic variability.

Seeking to inform the next wave of agricultural policy reform Australian governments have promoted a range of ideas – the ‘Supermarket to Asia’ and the ‘Northern Food Bowl’ being just two examples. On 20 October 2014, the Australian Government released the *Agricultural Competitiveness Green Paper*.² Issues identified in the paper include diminishing farm gate returns, regulatory impositions, natural resource management, declining participation in agricultural education, the market opportunities afforded by economic growth in Asia, drought and infrastructure.

Importantly, the *Green Paper* states that the primary aim of Government policy is to increase farm gate returns. Increased returns, it asserts, will ensure a sustainable and competitive agriculture sector capable of attracting investment, earning export income, supporting regional communities, providing higher quality jobs and strengthening the national economy. Nine principles are identified to guide future policy development. These include:

1. Increase returns at the farm gate—by reducing costs and unnecessary barriers to productivity and profitability.
2. Keep families as the cornerstone of farming—by establishing career paths based on financial stability, training and succession options.
3. Build the infrastructure of the 21st century—to improve transport and communications linkages to domestic and international markets.
4. Create well-paying jobs in agriculture, including in the downstream sectors of food manufacturing, food retailing and hotels and restaurants.
5. Reduce unnecessary regulation at all levels of government—to give greater ownership and rights to farmers.
6. Promote access to key export markets.
7. Focus on Australia’s competitive advantages so we are prepared to realize the food demand of the growing middle class in our region.
8. Support strong and vibrant regional communities.
9. Maintain access for all Australians to high-quality and affordable fresh food.

The wisdom of these principles will not be discussed in detail here. Nevertheless, several points bear noting.

First, there is a striking degree of overlap between the issues and principles identified in the *Agricultural Competitiveness Green Paper* and a succession of discussion papers and reports issued to or by the Australian Government over recent decades. Table 2 summarizes several such documents released since 1997. Consistent themes include farm productivity and competitiveness,

² The *Green Paper* reflects both an attempt to summarize relevant issues and opportunities from almost 700 submissions on the health and future of agriculture in Australia and the Government’s own thinking on these issues. Following more consultation, this will inform a White Paper setting out, in theory, more specific proposals for government policy reform.

the need to increase research and development expenditure, labour and skills shortages, the costs of natural resource degradation, how best to deal with climatic variability, the growing influence of consumer demands and expectations in Australia and the broader region, and so on. These themes are echoed in advocacy documents released by mainstream farm lobby groups such as the National Farmers' Federation.³

Second, the *Green Paper* focuses explicitly on the needs of agriculture and, more specifically, the needs of family farmers. Expectations that might be placed by the wider community on agriculture are largely ignored or are treated as barriers to be overcome. For example, consumers, according to the *Green Paper*, need to be educated on the importance of agriculture and the 'realities' of farming. Consumer preferences are treated not as an opportunity for savvy operators to increase market share but as a hindrance to farmers who themselves know best what they should be producing and how they should be producing it. This represents a break with the *Australian Agriculture and Food Sector Stocktake* (DAFF 2001) which, nearly a decade earlier, had identified changing consumer tastes and demands as one of the primary challenges facing Australian agriculture and the *National Food Plan White Paper*, released in 2013 (DAFF 2013a), which explicitly recognized the importance of maintaining a 'license to operate' in contemporary markets. Even the mostly private sector consortium behind the *Blueprint for Australian agriculture, 2013-2020* recognized that public scrutiny of farmers and other food sector participants can play a role in reconnecting consumers and agriculture (Sefton and Associates 2013).⁴

Third, the *Green Paper* places particular emphasis on the profitability and competitiveness of *family farmers*. There is an explicit assumption that family farm profitability ensures sustainable use of natural resources and creates the conditions for vibrant regional communities. Clear endorsement is provided for the foundational tenets of countrymindedness but, in contrast with the early 20th Century when the enemies of family farming were seen to be foreign competitors and organized labour, the enemies of today are represented as government regulation and urban consumers.

The overarching policy narrative evident in the *Agricultural Competitiveness Green Paper* and other recent documents maintains the core late 20th Century ideals of trade liberalization and deregulation while: (1) promising to colonize new market and production frontiers; and (2) maintaining the early 20th Century idea that getting the economic and market conditions 'right' for family farming is both good for rural communities and environments and fundamentally in the wider national interest. Thus, through every major era of agricultural policy in Australia, social and environmental wellbeing has been seen largely as a subset of economic growth.

The question for this report is not whether criticism of the narratives that have guided agricultural policy in Australia, to date, is justified but whether new narratives and policy approaches are required to deal with future social and political issues? Already, the report will argue, new narratives and policy approaches are being forced upon us.

³ Prior to the 2013 Federal election the National Farmers' Federation released a detailed set of priorities for agriculture under the themes of growing Australian agriculture, investing in research and extension, increasing competitiveness and profitability, building a stronger workforce and balancing agriculture and the environment (NFF 2013).

⁴ *The Blueprint for agriculture, 2013-2020* was produced by a consortium of partners led by the National Farmers' Federation and including Westpac, Woolworths, the Department of Agriculture, Fisheries and Forestry, and others. Major themes addressed in the *Blueprint* include innovation and research, development and extension; competitiveness; trade and market access; people in agriculture; agriculture in society (e.g. the importance of recognizing public concerns about animal welfare, sustainability, biotechnology, food safety, affordability etc.); natural resources; and transformational issues such as climate change and technological development.

Table 2 A selection of reports to and by the Australian Government on agricultural policy

Year	Title and focus	Source	Major themes
2014	<i>Agricultural Competitiveness Green Paper</i> Discussion of options for achieving a better return at the farm gate to ensure a sustainable and competitive Australian agriculture sector.	Department of Prime Minister and Cabinet	Transport and communications infrastructure Deregulation and inter-government coordination Competition and regulation Finance, business structures and taxation Responsible foreign investment Education, skills and training, and labour Drought resilience, risk management and support Water infrastructure and sustainable and productive use of natural resources Productivity research, development and extension Biosecurity International market access
2013	<i>National Food Plan White Paper</i> Integration of government policy relevant to food export growth and competitiveness, industry viability and contribution to regional development, domestic and international food security, and sustainability.	Department of Agriculture, Fisheries and Forestry	Increasing productivity and value of production Regional food trade and investment Innovation to capture Asian region Workforce skills base Biosecurity and food safety systems Participation in the digital economy Food security Helping farmers in developing countries Sustainable food production Reduced food waste
2010	<i>Australia and Food Security in a Changing World</i> Expert assessment of food security risks, opportunities and challenges relevant to Australia and potential government responses including R&D and policy coordination	Prime Minister's Science, Engineering and Innovation Council	Land use planning and availability of arable land Increasing productivity and impact on energy usage Impact of energy policy changes domestically and globally Biophysical constraints The food value chain Food production, imports, exports and processing Waste reduction R&D investment Capacity constraints

2008	<i>An Assessment of the Impact Of Climate Change on the Nature and Frequency of Exceptional Climatic Events</i>	CSIRO and Bureau of Meteorology	<p>Temperature: Exceptionally hot years are likely to occur every 1-2 years, on average, over the period 2010-2040.</p> <p>Rainfall and soil moisture: exceptional circumstances declarations likely to be triggered two to four times as often and over double to quadruple area. Many areas of Australia are being drought declared in more than 5% of years.</p>
	Assessment of likely changes in the nature and frequency of exceptional climatic events		
2005	<i>Australian Agriculture and Food Sector: Stocktake and Future Directions for Policy and Programs</i>	Department of Agriculture, Fisheries and Forestry	<p>Marketing challenges and consumer tastes</p> <p>International trading environment</p> <p>Biosecurity</p> <p>Supply chain dynamics</p> <p>Infrastructure in the agriculture and food sector</p> <p>Management skills and labour supply</p> <p>Innovation and R&D</p> <p>Community perceptions of farming</p> <p>Sustainable management of resources</p> <p>Adapting to climate change</p>
	Identification of major issues and challenges for Australian agriculture and potential government responses		
2003	<i>Review of the National Landcare Program</i>	Department of Agriculture, Fisheries and Forestry	<p>Knowledge and awareness</p> <p>Changes in natural resource condition</p> <p>Effectiveness of institutional arrangements</p> <p>Private investment in sustainable resource management</p> <p>Consumer and public expectations of agriculture</p> <p>Regionalization</p>
	Assessment of the NLP's effectiveness, appropriateness, efficiency and possible future directions.		
1998	<i>A Full Repairing Lease: Inquiry Into Ecologically Sustainable Land Management</i>	Industry Commission	<p>Recasting regulatory regime to ensure resource owners and managers take into account the environmental impacts of their decisions</p> <p>Introduction of a mandatory duty of care and a unifying statute for the environment, with voluntary standard</p> <p>Creating or improving markets for key natural resources.</p> <p>Encouraging conservation on private land.</p>
	Review of roles and contributions of governments, landholders and others for sustainable land use and options for more effective regulatory, taxation and institutional arrangements.		

3. CRISIS OR RENEWAL? THE CHANGING FACE OF AUSTRALIAN AGRICULTURE

In 1990, Lawrence and Williams coined the term ‘dynamics of decline’ to describe what they saw as a fundamental structural feature of Australian agriculture. Competing in oversupplied international markets without a protective curtain of import barriers, Australian farmers pursued the individually rational strategy of increasing their output and productivity by increasing landholdings and substituting labour with capital and other inputs. With farmers all over the world doing much the same thing (many with production and export subsidies to support them), the race was on to secure growing market share while staying ahead of ever diminishing terms of trade (the cost-price squeeze). No matter how well Australian farmers did this, Lawrence and Williams (1990) pointed out, employment in agriculture would shrink, the viability of rural settlements and services would be undermined, and business operators would suffer the stress of constantly shrinking margins. Government policy, at the time, was to accelerate processes of structural adjustment and assist unviable farm operators to exit the industry with a semblance of financial security and dignity. So what has happened since then?

3.1 CHANGING PRODUCTION PATTERNS IN AUSTRALIAN AGRICULTURE

Over 90 per cent of the fresh food on Australian tables today is grown and produced by Australian farmers. In addition, Australian farmers produce enough food to feed 40 million people living beyond our borders. Farm and fish production was worth over \$42.5 billion in 2011-12. Meat production had the highest value in the farm and fish food production sector (32%). With almost 29 million cattle in Australia, the beef industry is Australia’s largest commercial agricultural activity, followed by sheep for wool and meat. Over recent years, the number of chickens for meat has steadily grown, most of it for domestic use (AIWH 2012). Meat production is closely followed by grains and oilseeds (31%), with wheat, coarse grains and pulses being most significant contributors. Vegetable and fruit industries follow (18%), with potatoes and tomatoes and oranges, apples and bananas, the main crops produced (DAFF 2013b).

An examination of output growth rates and changes in farm numbers by industry since the mid-1980s reveals considerable diversity across the agricultural sector (Productivity Commission 2005). Three broad groups can be identified:

1. Slow or negative growth (e.g. pigs, eggs and sheep).
2. Average growth (e.g. beef, grains, fruit and nuts, vegetables and sugar).
3. High growth (e.g. poultry, grapes, cotton, nurseries and dairy).

With the exception of dairy, high growth industries also recorded increases in farm numbers. Other production trends identified by the Productivity Commission (2005) include:

- *Concentration*: farm numbers have declined with production concentrating on larger farms. This will be discussed in more detail in Section 3.1.2.
- *Intensification*: this is reflected both in a structural shift to enterprises dependent on more intensive production systems (e.g. poultry, grapes, cotton and nurseries) and in the application of more intensive production techniques to existing enterprises (i.e. increased use of feed, chemicals and irrigation).
- *Vertical coordination*: farms are developing more direct relationships with their customers and thus supplying integrated food and fibre supply chains rather than traditional auction markets. An increasing proportion of agricultural output is now, for example, supplied to processors or major retailers under comprehensive pre-arranged contracts.

The extent and nature of vertical coordination varies across industries. The Productivity Commission (2005) notes that integrated supply chains create possibilities for more demand-responsive production and output diversification. Australian farmers now produce a wider range of commodities and a greater number of varieties and breeds of crops and livestock to cater for different markets. Integration also, however, changes the social and political dynamics of supply chains in important ways, a point that will be taken up in more detail in Section 3.3.5.

3.2 CONCENTRATION WITHIN THE AUSTRALIAN FARM SECTOR

Australian farm businesses continue to get larger and fewer in number. The 2010-11 Agricultural Census found that of 135,447 businesses with agricultural activity, 120,806 reported agriculture as their main business activity (ABS 2013a). The 2005-06 Agricultural Census, by contrast, recorded 154,472 businesses with agricultural activity and 137,968 for which agriculture was the primary activity (ABS 2007). Over a period of only five years, 12 per cent of Australian farm businesses were shut down.

Longer term, the trends are much the same. Barr (2014) reports that between 1981 and 2011 the number of commercial farms⁵ fell by 51 per cent overall and by as much as 70 per cent in the dairy industry. The number of beef operations, meanwhile, remained relatively stable. Between 1981 and 2001, amalgamation of landholdings saw average farm size increase by 23 per cent from 2720 to 3340 hectares (Productivity Commission 2005).

At the same time, the number and area covered by sub-commercial farms – those too small to be counted in official statistics – has also grown (Hooper et al. 2002).⁶

Facing declining terms of trade – about 25 per cent from 1981-82 to 2007-08 (PMSEIC 2010a) – farmers main options are to increase labour productivity through investments in land, machinery etc., to increase agricultural productivity through investments in technology and other inputs, and/or to turn to off-farm work. With large farms generally providing better rates of return on investment the logic of combining land acquisition and resource-use intensification becomes clear, as does the logic of downscaling and turning to off-farm work for those without the resources to grow. The Productivity Commission (2005) estimated that return on investment for the smallest one third of farms was negative three per cent, for the middle third less than one per cent, and for the largest third just under three per cent.

Importantly, at all farm scales there is evidence that it is the most efficient and profitable farmers who are expanding while less profitable enterprises are selling land (Hooper et al. 2002). Despite this, many farm businesses continue to struggle.

It is important to note that reductions in the number of agricultural businesses do not always result from amalgamation of landholdings into larger businesses, preserving the same total area under agricultural production or enhancing productivity. Between 2005-06 and 2012-13 the area of Australian farms fell from 434.9 million hectares to 396.6 million hectares – a loss of almost nine per

⁵ Establishments with an Estimated Value of Agricultural Operations (EVAO) greater than \$50,000 using 2006 values.

⁶ Hooper et al. (2002) reported that in 2000 there were 33,674 establishments with some agricultural activities but less than \$22,500 and more than \$5000 EVAO. These establishments contributed less than 5 per cent of total agricultural output but utilized 16.6 million hectares of land.

cent (ABS 2007, 2014).⁷ It is true that the total area under annual crops, in particular, fluctuates yearly in response to seasonal conditions. However, landholding fragmentation and retirement from productive use is also impacted by urbanization and demographic change. Landholding fragmentation is particularly obvious in peri-urban areas (Barr 2014). Many smaller farms are operated by 'lifestyle farmers' and many are to be found on the fringes of metropolitan and regional centres (Productivity Commission 2005). An increasing number, further, of older farmers are choosing to operate smaller farms. Beef production, for example, is a common lifestyle choice for retiring dairy farmers due to its lower labour demands.

3.3 TENURE REGIMES

While the majority of Australian farms are managed by owner operators, freehold title is not the only tenure regime. Geoscience Australia (2014) estimates that around 63 per cent of Australian land is held privately (21% as freehold and 42% as leasehold). Another 23 per cent are public lands (including conservation, forestry and mining reserves, defence land etc.) and about 14 per cent are Indigenous lands (9.5% as freehold, 2% leasehold and 2.5% reserves). Privately held leaseholds are chiefly pastoral leases; that is, areas of crown land leased for the limited purpose of grazing of stock (cattle, sheep, goats and horses), and ancillary activities.

Pastoral leases are concentrated in arid and semi-arid regions and tropical savannahs (Productivity Commission 2002). They offer a more limited property right than that associated with freehold land and are highly prescriptive about the activities that can, and can not, be undertaken by the leaseholder. Such conditions are broadly similar across Australian jurisdictions, requiring leaseholders not only to limit agricultural operations to livestock grazing and associated activities but to ensure such activities are their main source of income.

Pastoral leases offer governments a degree of flexibility in the ways they seek to influence land management. Policy objectives relevant to leases have thus shifted over time from promoting expansion of the agricultural frontier and closer settlement to sustainable use of rangelands and recognition of continuing native title interests (Productivity Commission 2002). While such flexibility is attractive to governments, pastoral leases are also commonly criticized for limiting opportunities to diversify into non-pastoral businesses and land-uses (including conservation) and for providing limited incentive to invest in natural resource management.

The Productivity Commission (2002) also identified the high cost of administering pastoral leases and recommended more comprehensive review of the net public benefits of this expenditure. Importantly, however, it stopped short of recommending conversion of leasehold lands to freehold and instead suggested less prescriptive conditions that would allow more flexibility to leaseholders to diversify their businesses and land-uses. A more recent report by James Cook University and the CSIRO recommended similarly that lease conditions in northern Australia be clarified, simplified, and linked to improved development approval and landscape-scale planning practices (Dale et al. 2013).

Multiple reviews of pastoral lease arrangements across the states and territories over the years have amplified the sense of complexity and uncertainty associated with this form of tenure. At the time of writing, for example, Western Australia was in the process of renewing pastoral leases – all of which

⁷ These figures represent the total area of landholdings controlled by agricultural businesses, not the total area used for agricultural production. In 2005-06, approximately 19.8 million hectares were used for non-productive purposes (e.g. remnant vegetation, natural resource conservation, housing and sheds, etc.) or had no reported use. In 2012-13, 15.6 million hectares were not used for agricultural production including 7.2 million hectares dedicated to conservation.

expire in 2015 – on much the same conditions as existing leases.⁸ This was despite contemporaneous processes of review including: (1) the Rangelands Reform Program which may lead to a diversification of tenure options (DRDLWA WA 2011); and (2) an assessment by the WA Department of Agriculture and Food of the biophysical capability of all WA's pastoral leases which has already determined some of these leases to be unviable.

Freehold land title is also, of course, accompanied by conditions and restrictions on use. No form of tenure provides landholders a license to do whatever they like, regardless of the consequences. It is implicit in freehold title, Reeve (2001) argues, that while farmers have a right to manage their assets largely as they see fit they do not have a right to degrade natural resources as doing so is likely to interfere both with the ability of other landholders to enjoy their own property rights and with the wider public interest. The responsibility, or 'duty of care', which accompanies freehold title is thus reflected in multiple legislative conditions regulating management of vegetation, access to water, ownership of mineral and energy resources, animal health and welfare, weed and pest control, chemical use and storage, and so on.

Importantly, landholders' duty of care extends beyond regulatory prohibitions on specific actions. Programs based on education, voluntary action and the provision of technical assistance are generally seen as more flexible and cost-effective than proscriptive regulation and less likely to be perceived as a threat to private property rights. Governments enacting such programs have avoided, however, spelling out just what is expected of landholders (Industry Commission 1998). Section 4.3 will thus return to this question through consideration of processes appropriate for developing clear expectations of all land managers for the sustainable use of natural resources.

3.4 FOREIGN OWNERSHIP

Concentration of agricultural landholdings has raised questions within the sector about the extent and implications of corporatization, in general, and foreign ownership, in particular. This is not so much an expression of xenophobia or parochialism as a reflection of international debate over the implications of new patterns of foreign land acquisition. While proponents of foreign investment point to opportunities to address chronic underinvestment and promote technology transfer, critics claim such investment could be undermining poor countries' capacity to provide for their own food security. A lack of transparency around land deals in many jurisdictions contributes to scepticism that any benefits either have or will be experienced by local people (Lisk 2013). These debates have spilled over into calls for tighter scrutiny of foreign ownership of Australian land.

Foreign ownership or leasing of agricultural land has been around for a long time. Indeed, by the 1980s, foreign ownership was actually in decline internationally as investors shifted their focus to other links in the agricultural value chain such as the provision of inputs or the processing, shipment and/or retail of outputs (Mann 2010). Coordinating agriculture, in short, was more profitable than doing it (see Section 3.3.5). The global food and financial crises of 2007-2008, however, arrested this trend and brought new kinds of investor into the market for foreign land acquisitions (Mann 2010). Public investors, such as state-owned enterprises and sovereign wealth funds from comparatively wealthy countries in Asia and the Middle East, began acquiring large tracts of land elsewhere with a view to enhancing their own food, water and energy security. Private investors, meanwhile, such as

⁸ Some formerly pastoral lands have been excluded from lease renewals for the purposes of conservation, recreation, tourism, protection of Aboriginal sites, and expansion of existing towns. For example, pastoral leases bordering the Ningaloo Marine Park in the Shires of Exmouth and Carnarvon will be set back approximately two kilometres from the coast when they are renewed after 1 July 2015.

equity funds and investment banks, sought to diversify their portfolios and began looking to food and agriculture as likely growth sectors.

Based on survey data,⁹ the Australian Bureau of Statistics estimates that in 2010 one per cent of Australian farm businesses were wholly or partly foreign owned and 11.3 per cent of Australian agricultural land was wholly or partly foreign owned (with around half of the latter in majority Australian ownership) (see Moir 2011). This compared with 5.9 per cent of agricultural land wholly or partly foreign owned in 1984. Further, in 2010, nine per cent of water entitlements were wholly or partly foreign owned.

A follow-up study undertaken by the Australian Bureau of Agricultural and Resource Economics and Sciences concludes that foreign investment boosts agricultural production and incomes, thus contributing to both domestic and international food security (Moir 2011). Apart, however, from the role that fresh migrants and foreign capital played in the establishment of new agricultural industries in Australia (something of an inevitability in a settler economy), no evidence is presented to substantiate assertions that contemporary foreign owned farms are more productive or innovative than their neighbours. In fact, foreign owned land appears to be concentrated: (1) in the land-extensive grazing and cropping industries; and (2) in the rangeland dominated states of Queensland, South Australia and the Northern Territory. Partly, this is a reflection of the expansion of mining in rural Australia and the purchase of land for future mining activities and, partly, it is a reflection of the tradition initiated with the Australian Agricultural Company in 1824 of foreign investment in vast outback cattle properties.

Foreign investment in downstream agribusiness appears to be considerably higher than in production agriculture, lending more credence to arguments such investment may have led to productivity gains and/or improved export market access for some supply chains.¹⁰ Whether productivity has improved across the entire food and fibre processing sector in Australia as a consequence of foreign investment is a question that needs answering.

Survey data as cited above potentially underestimate the scale of foreign investment in Australian agriculture and provide limited insight into acquisition trends. The Australian Government has consequently committed to implementation of a national register of foreign ownership of agricultural land. The *Agricultural Competitiveness Green Paper* reiterates this commitment and proposes to improve the capacity of the Foreign Investment Review Board to scrutinize agricultural investment proposals while simultaneously tasking Austrade with attracting more foreign investors. KPMG and The University of Sydney China Studies Centre (2013) suggest that, to date, there has been little change in the sources of foreign investment in the Australian food sector (i.e. the US, UK and Japan) but that Chinese interest, while nascent, is dominated by fully private firms driven by commercial goals.

In sum, the scale of foreign ownership of Australian agricultural land is uncertain although it appears, at the current time, to be increasing. The impacts of foreign ownership on technology transfer, skills development, investment in infrastructure etc. are largely unknown, as are the impacts on rural labour markets and communities.

⁹ 12,000 enterprises with Estimated Value of Agricultural Operations (EVAO) of \$5000 or more participated in this survey. Although the sample size was undoubtedly large, the inclusion of sub-commercial 'hobby' or 'lifestyle' farms and failure to ask questions about the value of production have led to questions over whether survey results are potentially misleading (e.g. Federal Coalition 2012).

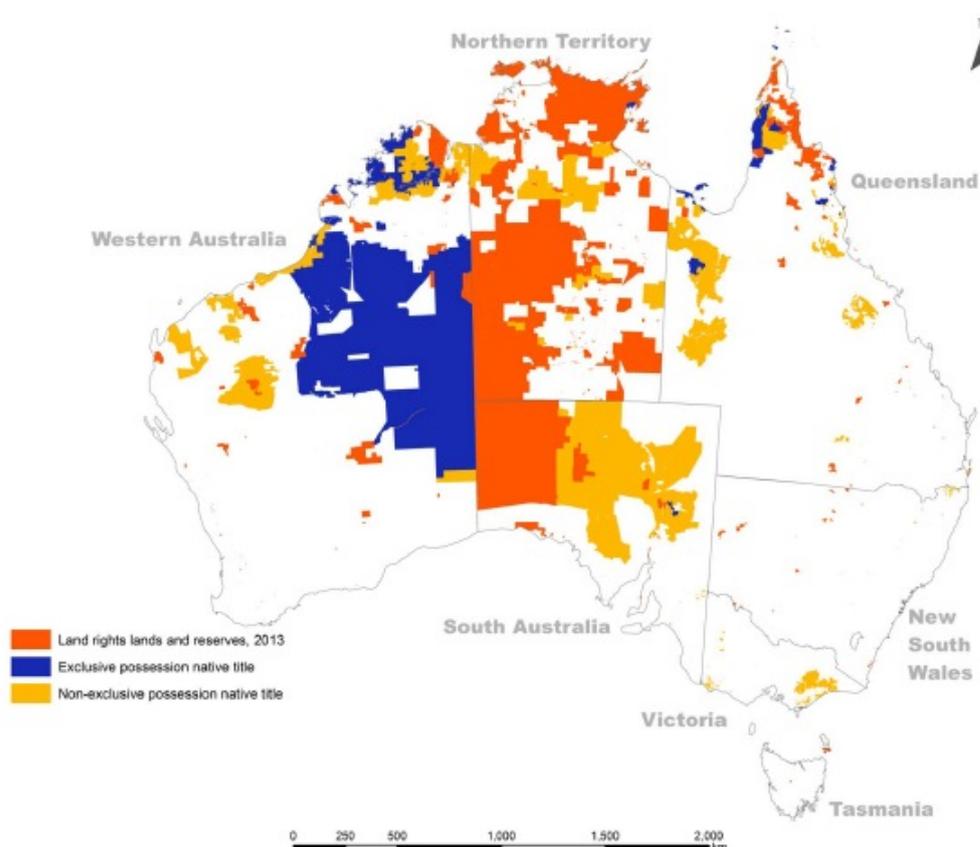
¹⁰ It was estimated that, in 2010, 60 per cent of sugar milling, 40 per cent of red meat processing and 50 per cent of milk processing enterprises were controlled by foreign businesses (Moir 2011).

3.5 ABORIGINAL LAND AND ASPIRATIONS

A significant share of the Australian continent is under one form or another of Indigenous title and this share is rising as long drawn out processes of native title resolution come to an end. Moreover, many Aboriginal and Torres Strait Islander Australians aspire to live on their lands and to develop viable business and employment opportunities.

The Northern Australia Beef Strategy Indigenous Pastoral Project estimates that Indigenous landholdings currently occupy in the vicinity of 15 per cent of the land area of Western Australia; 50 per cent of the land area of the Northern Territory; and 3.4 per cent of the land area of Queensland (McClelland Rural Services 2014). Figure 1 illustrates something of the diversity of tenure types relevant to Aboriginal and Torres Strait Islander Australians and the potential for these to overlap with other tenures. It also demonstrates the strong correlation between Aboriginal tenure and the difficult production environments of Australia's rangelands. Figure 2 illustrates other interests that Aboriginal and Torres Strait Islander Australians have in land including unresolved native title claims and lands on which Indigenous land use agreements have been reached.

Figure 1 Indigenous lands, Australia, by three broad tenure categories (Altman and Markham 2013)

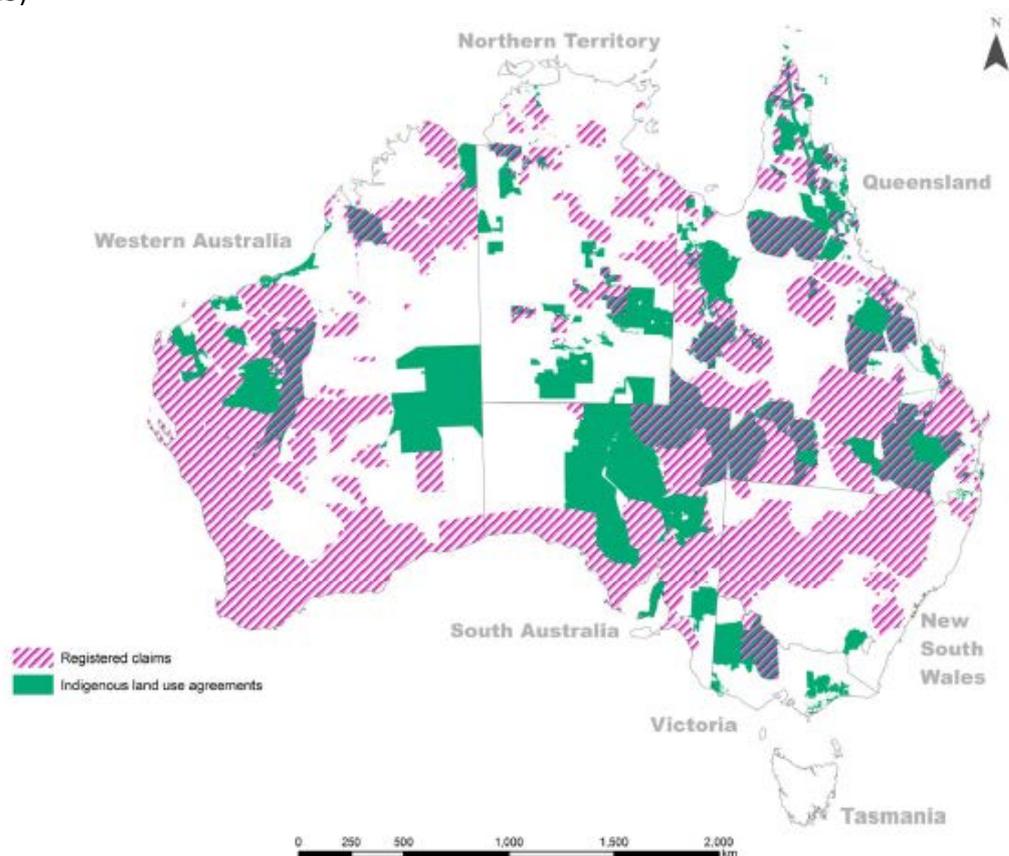


Only a portion of Indigenous land, of course, is in agricultural use. For example, Indigenous landholdings excluding freehold in Western Australia currently cover some 37 million hectares. Of this, something in the range of 5.5 million hectares supports 70 or so agricultural properties ranging from small scale agriculture to large pastoral leaseholds (WADAF 2014). Indigenous pastoral lands across northern Australia are characterized by:

- A limited number of properties with large herds and sustainable operations.
- A number of properties which are sub-leased or lying idle.
- Market constraints including long distances to domestic markets.
- Difficulty sourcing credit to finance cattle for herd establishment and/or expansion.
- High staff turnover and/or reliance on contractors (McClelland Rural Services 2014).

Successful examples of Indigenous agricultural enterprises, of which there are a number, need to be scaled up both to underpin the livelihoods of Aboriginal and Torres Strait Islander people and to develop critical mass of agricultural enterprises and output in localities including northern Australia. The concentration of Aboriginal land in the rangelands certainly presents challenges for business development but, at the same time, this concentration creates opportunities for the active management of landscapes in order to protect cultural and environmental values and for the delivery of ecosystem services (see Altman and Jackson 2014).

Figure 2 Registered native title claims and Indigenous land use agreements (Altman and Markham 2013)



3.6 EMPLOYMENT IN AGRICULTURE

As noted above, the distribution of farm size in Australia is increasingly bipolar with a small number of large scale commercial businesses producing the majority of agricultural output while small-scale farms – which make up an overwhelming majority of agricultural businesses – account for a small proportion of output. Compared to other sectors of the economy, agriculture has a high proportion of self-employed, family and casual workers. Almost 20 per cent of total agricultural employment are self-identified casual workers, which is similar to the service sector but significantly higher than mining or manufacturing (Productivity Commission 2005). The seasonal nature of agricultural work, such as harvesting, pruning or shearing, has been put forward as the main reason for such a high casual employment rate.

Around 270,400 people were employed in agriculture and fisheries in 2012-13; a decline of approximately 6 per cent on the previous year and 20 per cent over the decade since 2002-03 (DA 2013). These workers comprised around 3 per cent of the total national workforce (DEEWR 2011). Within agriculture, the largest contributors to employment are the sheep, beef cattle and grain farming sectors (DA 2013). These are the same sectors in which job losses due to productivity improvement have been most acute.

While overall employment in agriculture has declined, some sectors have recorded gains. The largest growth was recorded in the dairy cattle sector (up by 54.6% despite a significant decrease in the number of dairy farms) followed by poultry farming (up 25.9%). The former Department of Education, Employment and Workplace relations projected modest employment growth of 0.3 per cent per annum (or 5,500 jobs) over the years to 2016-17 (DEEWR 2011). Employment in occupations relating to livestock farming are expected to grow driven, in part, by increased demand for protein-rich foods from growing Asian middle classes (Sefton and Associates 2013). Broadacre farming, on the other hand, is expected to continue the trend of reduced employment due to productivity, innovation and technology efficiencies.

More than half (56%) of farmers are self-employed owner managers (ABS 2012), 72 per cent are male¹¹ and a great majority, 89 per cent, were born in Australia. The average farmer is 52 years old and over the last 30 years the median age of farmers has increased by nine years (ABS 2012). While the aging of farmers raises concerns among many, it does bear noting that the median age of Australians overall increased by eight years of the same period (from 29.6 years in 1981 to 37 years old in 2011 (ABS 2013b)). Structural ageing of farm owners is consistent not only with the Australian population as a whole but also with the farm sectors of most developed countries. In fact, farmers from the UK, US and Japan are, on average, three, five and 15 years older than their Australian peers (Barr 2014).

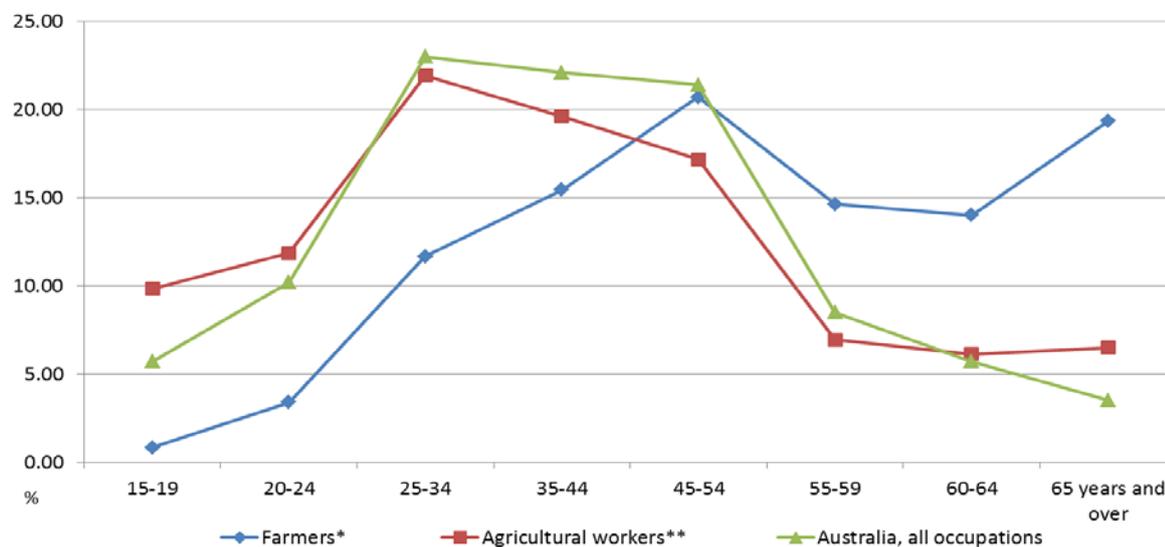
The aging of farmers is also offset, to some degree, in the total agricultural workforce by a very different age profile among farm employees. As Figure 1 shows, farm workers are predominantly young although this raises the a very obvious question about whether their involvement in agricultural employment opens opportunities for career progression including as owner operators.

Business exit and entry rates in agriculture are lower than for other businesses – approximately 11 per cent as compared with an average of 19 per cent across other industries (Productivity Commission 2009). However, between 1976 and 2011, new farmers entered agriculture at only half the rate others left (Barr 2014). Thus, while exits were concentrated in the age groups over 60 and

¹¹ This figure arguably obscures the contribution of women and other family members to agricultural businesses in which they often work significant hours by not defining as ‘farmers’ those who do not identify agriculture as their primary occupation.

entries among farmers in their late twenties and early thirties, the number of farmers under 35 still fell 75 per cent over the period.

Figure 3 Farmers and agricultural workers, percentages by age group¹²



* averages for livestock, crop and mixed farms; ** averages for farm workers (livestock, crop and mixed farms) and off-farm agricultural workers (machinery operators, packers and food processing workers)

Farm aggregation, according to Barr (2014), explains 68 per cent of the decline in the number of young farmers. Other factors include workforce restructuring (9%), later farming retirement and changes in partnering behaviour (10%), and the declining attractiveness of farming to potential young entrants (14%). Competition for land by older 'lifestyle' farmers who are less dependent on income from agriculture has also increased since the 1990s. A study of 1300 Victorian farmers by Wilkinson et al (2011) found a significant enough negative relationship between age and farm scale to suggest that later-life entry into farming via 'lifestyle blocks' might be shifting the demographic profile of Australian farmers agriculture and rural communities.

Notably, changes in partnering behaviour have had a disproportionate impact on the number of young women entering farming. With marriage into farming households still the most common route into agriculture for women, later marriages are increasing the likelihood that such women take with them established career paths and do not list agriculture as their main occupation (Barr 2014). This trend has the potential to make women's contributions to agriculture and rural communities less visible and thus to undermine the work of Australian Women in Agriculture and other groups in raising awareness of farm women's roles and needs (see for example RIRDC 2009). The extent and nature of farm women's contribution to agriculture is further obscured by the need to many farm households to sustain themselves financially through off-farm work, some 80 per cent of which is undertaken by women (Alston 2012).

¹² Data obtained from the Job Outlook, an Australian Government initiative, web site; Industry: Agriculture, Forestry, Fishing; data sourced from ABS Labour Force Survey, Department of Employment trend data to November 2013; and the ABS Labour Force Survey, annual average 2013.

Rural labour markets more generally are characterized by several trends both influenced by, and with implications for, agriculture. These include:

1. Rural depopulation and competition from other industries limits the availability of casual labour required for seasonal work in many agricultural industries. Reflecting global trends, this has stimulated increasing reliance on international labour migration as a source of temporary labour (Argent and Tonts 2013).
2. Migration to high amenity rural areas is associated with population growth and employment opportunities in service, hospitality and tourism industries (Argent et al. 2014). The small farm sector while arguably bad for agricultural productivity may be positive, if managed appropriately, for rural community vitality. Also, notably, the small farm sector presents fewer barriers to entry and has proven attractive to new farmers from non-Australian backgrounds.
3. Migration to mining centres can also lead to population growth and the expansion of other employment opportunities. However, the phenomena of fly-in/fly-out (FIFO) and drive-in/drive-out (DIDO) workforces limited this somewhat during the most recent phase of expansion in the mining sector.

To ensure sufficient numbers of casual workers during seasons of highest demand, Australian government has for a number of years enabled mechanisms that supplement Australian workforce with the overseas seasonal casual workers. Leith and Davidson (2013) explored Working Holiday Visa initiatives, providing incentives for visiting backpackers from selected countries to work in agriculture, and the Seasonal Worker Program, which allows Australian employers in the horticulture industry to employ workers from eight Pacific island countries and Timor-Leste. The study found that seasonal workers were, on average, significantly more efficient than working holiday makers. However, no conclusions were made about the impact of these two labour sources on farm profitability or social conditions.

Food and beverage manufacturing has experienced some employment growth over the last decade. The industry is estimated to have employed 214,000 people in 2012-13 – slightly fewer than in 2011-12 but about seven per cent higher than in 2002-03 (DA 2013). While most food and beverage manufacturing jobs are located in major cities, inner regional centres captured more growth between 1996 and 2006 than either metropolitan or outer regional and remote areas (DAFF 2009). With 40 per cent or more of food processing occurring in rural and regional areas, these jobs are especially important to the social fabric of non-metropolitan Australia (PMSEIC 2010a).

Another increasing trend in Australian agriculture is a number and prevalence of farms operated by 'Culturally and Linguistically Diverse' (CALD) persons (Australian residents of non-Australian origin), and the recognition of their role in Australia's agriculture is also increasing. It is estimated that 6.7 per cent of all persons employed in agriculture, fisheries and forestry industries in Australia are CALD persons (Kancans et al. 2010). The highest representation of CALD persons is in vegetable growing (29% of total persons employed), fruit and nut tree growing (17%) and poultry farming (14%); with the lowest contribution in beef cattle and grain farming (2%). It is estimated that market gardens managed by CALD persons supply some 90 per cent of Sydney's perishable vegetables.

3.7 FARM AND RURAL POVERTY

It would be logical to infer from the large number of Australian farms generating relatively modest financial receipts and returns on investment that a reasonable proportion of their operators may be living in poverty, while others earn most of their income off-farm. Farm poverty has long been a

focus of policy concern in Australia and a range of measures used to address it (Botterill 2002). However, the 'low income' problem on Australian farms has generally not been accompanied by systematic attempts to define and measure farm poverty nor to compare the circumstances and assistance provided to farm households with the circumstances and assistance provided to other Australians. As Botterill (2007) argues, this suggests a political commitment to farm welfare more informed by the precepts of country-mindedness than a commitment to equity.

Nevertheless, low farm incomes do have major implications both for social welfare and for business viability and productivity. Barr (2014) estimates that to provide a median Australian family disposable income of \$74,000 and fund the business growth required to maintain that income (approximately 3%), Australian farm businesses need to generate receipts of at least \$400,000 annually pre tax. This target is achieved by only about 25 per cent of Australian farms. Moreover, this largest 25 per cent of farms are producing 70 per cent of the value of farm output. Larger businesses are also, arguably, better placed to cope with year-on-year volatility in income which is marked across all major agricultural industries (DAFF 2005).

While Australia has no official poverty line, if we follow the OECD practice of setting a relative poverty line at 50 per cent of median income then over half of Australia's farm households are at risk of poverty and/or of running down capital in the absence of off-farm income.¹³ Thus it is not surprising that farms with receipts of less than \$100,000 per annum derive 80 to 90 per cent of their income off-farm while farms with receipts of \$100,000 to \$100,000 derive around half their income off-farm (Barr 2014).

Better data are available on the relative experience of poverty by rural Australians more generally. According to the National Rural Health Alliance and ACOSS (2013), poverty is slightly worse in rural, regional and remote areas (13.1%) than in capital cities (12.6%). However, a number of economic indicators associated with poverty become progressively worse as we move from major cities, to regional, and then to remote areas. These include the percentages of low income and jobless families with children; single parent payment beneficiaries; disability support pensioners; long term unemployment beneficiaries; and unskilled and semi-skilled workers.

Further, on average it costs rural residents five-times as much to access essential services as it does metropolitan residents; the biggest access cost disadvantages being for hospitals, residential care services, secondary schools, TAFE colleges and universities (NIER 2009; see also McLachlan et al. 2013).

3.8 HEALTH AND WELLBEING ON THE FARM

As Barr (2014) points out, structural aging in the agriculture sector has the potentially paradoxical impacts of undermining the viability of human services due to rural depopulation while increasing the needs of those left behind for healthcare. Inadequate human services, moreover, are likely to have negative implications for productivity.

Recent studies have found male farmers to be at greater risk than the general Australian male population of a number of diseases. Death rates among male farmers and farm managers age 25-74 years (for the period of 1999-2002) were 33 per cent higher than those of the general male population the same age. More specifically, death rates for male farmers and farm managers in this

¹³ This assumes, following Barr (2014), that \$400,000 gross receipts are required to generate the median Australian household income of \$74,000. The relative poverty line is thus set at \$200,000 gross receipts in the absence of off-farm income.

cohort were 136.7 per cent higher for prostate cancer; 79.5 per cent higher for haemopoietic and lymphatic systems diseases; 58.7 per cent higher for skin cancer; 40.8 per cent higher for cardiovascular disease; and 38.5 per cent higher for cancers of the colon and rectum. For the same age category, death rates were also higher for all categories of injury including road transport accidents (209%); other non-intentional injuries (19.5%); and suicide (20.5%) (Depczynski and Fragar 2014).

Less data are available that address the relative health of female farmers (Depczynski and Fragar 2014). However, it is worth noting that rural Australians, in general, have poorer health than their urban counterparts. According to the Australian Bureau of Statistics (2011), people in rural areas have a life expectancy four years lower than those in major cities. Outside of major cities, obesity levels increase along with risky health behaviours such as smoking and alcohol misuse. High-risk alcohol consumption is linked to additional risks including alcohol-related violence, chronic health conditions and drink driving. Alcohol-related vehicle fatalities are seven times higher in rural than in urban areas while all road traffic related fatalities in rural areas are four times the national rate (Czech et al. 2010).

Most indicators of mental health vary little across rural and urban Australia (e.g. NSW Department of Health 2007; Page and Fragar 2002). Some speculate that lack of services and a culture of self-reliance may lead to under-reporting of psychological stress and mental health symptoms (McKay et al. 2012). This possibility is lent some credence by the one indicator of mental health which does consistently stand out; that of elevated rates of male suicide in rural and in remote areas (Alston 2012; Cheung et al. 2012).

Kennedy et al.'s (2014) review of research concerning suicide and accidental death in Australia's rural farming communities suggests that the cascading impacts of declining population density in many farming communities, business and social service (e.g. bank, healthcare etc.) closures, reduced employment opportunities and increased poverty all contribute to suicide risk. Comparatively poor access to mental health services, reluctance to access those services which are available, undiagnosed mental health conditions, unrelenting work demands, financial stress, drought and other climatic challenges, and ready access to firearms are all believed to play a role in rural male suicide (Alston 2012; Kennedy et al. 2014; McKay et al. 2012; NRHA 2009). In fact, up to 75 per cent of male suicides in rural Australia involve firearms (NRHA 2009).

4. SOCIAL AND POLITICAL CHALLENGES AND OPPORTUNITIES FOR AUSTRALIAN AGRICULTURE

This section addresses what may, at first, appear to be conflicting trends. At a macro-level, rural Australia and its agricultural industries are continuing to lose people, both to larger regional and metropolitan cities and to competing industries. At the same time, there is an unevenness to this movement of people. Not all rural locales are shedding people. Areas with high amenity value and prospects for tourism are obvious magnets but so too, for Aboriginal and Torres Strait Islander Australians, are traditional lands. Support within the wider community for farmers where conflict has arisen with extractive industries suggests not only that urban Australians continue to hold farmers in high regard but that agricultural landscapes are themselves seen as valuable national assets. This is suggestive of more opportunities to integrate on-farm natural resource management with other conservation goals at the landscape scale.

4.1 THE POLITICS OF AGRICULTURE AND RURAL LANDSCAPES

4.1.1 *Domestic political support for agriculture*

Over the course of the 20th Century, the share of the Australian population residing in rural areas and/or working in agriculture declined dramatically. The number of people living in centres of less than 3,000 total population decreased from 48.5 per cent in 1906 to 18 per cent in 1996, while the number of people living in centres of less than 10,000 decreased from 55 to 24 per cent over the same period (ABS 2000b). At the same time, the relative economic importance of agriculture declined. In the first half of the 20th Century, agriculture accounted for around a quarter of Australia's output and between 70 and 80 per cent of exports. By the 1960s, agriculture's contribution to GDP had fallen to around 14 per cent and by the 1980s to six per cent; since then ranging between four and six per cent. Similarly, by the 1960s, agriculture contributed around two thirds of total exports declining to just over one fifth in 2003-04.¹⁴

Agricultural politics has long reflected an anxiety that urban consumers and voters no longer understand or value agriculture, that the needs and struggles of farmers are ignored, and that continuing concentration of population growth in metropolitan centres will only amplify these problems. The fact that continuing metropolitan concentration is associated with migration-led population growth, aging and changing food fashions seems only to amplify this anxiety. Food, we are constantly hearing, is too cheap and consumers don't care.

It makes intuitive sense that urban Australians with no personal history of interaction with farmers or financial dependence on associated industries may be naïve to many facets of rural life. However, it does not follow that infrequent personal interaction with rural Australians leads necessarily to lack of interest or empathy. In fact, a 2009 ANU Poll found that 26 per cent of all Australian adults still had family members living on farms and 51 per cent still had family members living in rural towns (McAllister 2009). Many more had friends living on farms or in rural towns and the vast majority believed that Australian farms produce safe and sustainable food while caring for animal welfare. Importantly, 98 per cent believed agricultural production important to Australia's future rural areas and 60 per cent believed that governments should provide more financial assistance. In concrete

¹⁴ While falling in relative terms, agricultural output and exports have grown in real terms. In fact, agricultural output more than doubled in the 40 years leading up to 2003-04 with productivity growth twice that of Australia's market sector as a whole. Agricultural exports tripled in value in the 30 years leading up to 2003-05, increasing at a trend annual rate of 3.5 per cent a year (Productivity Commission 2005).

terms, this explains the acceptability among the majority of Australian voters for various forms of farm income support during drought declarations (Botterill 2007).

In short, Australian agriculture does not suffer from a lack of political support. However, it would be naïve to assume that political support for agriculture necessarily means political support for specific policies favoured by farmers and/or farm lobby groups. In fact, the symbolic and material importance of food makes it rather more likely that consumers and civil society groups will take strong positions – regardless of what farmers think – on matters pertaining to the food supply.

4.1.2 Competing industries

In the nine years to November 2013, employment in the minerals Industry increased by some 150,000 jobs (Minerals Council 2014). The biggest gains in employment during this period occurred not directly in mining but in the services sector, which has created jobs for around 1.5 million people (Banks 2011). While geographical proximity creates competition for labour between agriculture and mining, both face challenges in attracting and retaining people in regional areas (NFF 2008). One of the key differences between the sectors is their respective abilities to respond to this challenge, with miners better able than farmers and other smaller businesses to utilize fly-in/fly-out models and offer above average remuneration packages.

Competition between mining and agriculture is not restricted to labour but extends to issues of land and water utilization and landscape fragmentation, reducing agricultural productivity and increasing farm costs. Dominance of subsurface rights in Australian policy disadvantages surface rights-holders and weakens their bargaining position (Chen and Randall 2013). In regions with active or potential coal seam gas (CSG) operations, groups have formed to express concerns about the potential impacts of a weakened agriculture on rural and community ways of life (for example, Lock the Gate Alliance). In areas of particularly productive agricultural land, such as the Darling Downs and Liverpool Plains, conflicts between agriculture and mining take on, according to these groups, a larger importance in preserving the very best Australian farmland in the national interest (Chen and Randall 2013; Dart, 2011).

The short-term economic benefits of extractive industry are generally orders of magnitude greater than the comparative economic benefits of agriculture. Using the Darling Downs as an example, however, Chen and Randall (2013) show that under some plausible scenarios the long-term economic net benefits from agriculture exceed those of CSG extraction and/or mixed use (i.e. agriculture and CSG coexistence). In addition, while the obvious benefits of CSG development come in the first few decades, there follows a potentially long period of undefined and little understood costs arising from agricultural and environmental degradation.

CSG has generated sufficient concern to trigger several legislative responses by Australian state and territory governments. The Queensland Regional Planning Interests Act 2014, for example, ‘seeks to strike an appropriate balance between protecting priority land uses and delivering a diverse and prosperous economic future for our regions’ by managing the impacts of resource activities on areas of regional interest and managing the coexistence of resource activities and other activities such as highly productive agricultural activities. The Act is to achieve this by protecting living areas in regional communities; high-quality agricultural areas from dislocation; strategic cropping land; and regionally important environmental areas.

Whether legislative responses will provide meaningful protection for ‘high quality’ or ‘strategic’ agricultural lands remains to be seen. The potential slipperiness of these concepts needs first to be

addressed. Perhaps, however, the immediate lesson to be drawn here is that while historically agricultural interests have largely been subservient to extractive industries, there is growing political momentum within the broader Australian community to regard agricultural lands as assets warranting preservation in their own right.

4.1.3 The multifaceted meanings of rural space

Farmers understandably place a high on the use of rural space for agriculture – a healthy landscape is a productive landscape. Clearly, however, both farmers and other members of the community ascribe additional values to rural space. It has already been noted, above, that Indigenous landholders manage land for a range of cultural and environmental values in addition to the economic values associated with agriculture and pastoralism. Indeed, all farmers must manage to conserve some environmental values or face the production-limiting costs of natural resource degradation.

The importance of rural areas and agricultural enterprises in the production of non-consumptive and non-market social and environmental values is gaining increasing recognition. In agriculturally marginal regions, according to Holmes (2010), recognition of the multiple values of rural landscapes is driven, in part, by lack of success in pursuing solely ‘productivist’ goals. The aesthetic qualities of rural landscapes create, for some, possibilities to diversify into farm-based tourism (Jackson et al. 2011). Increasingly though, the agricultural sector is developing not just a general tourism product, but is also organising special interest, technical tours for overseas farmers and public education tours and activities, with incorporation of product sampling and purchase from the production source (Pearce 2013).

A series of recent studies have demonstrated that a majority of Australians place higher value on the wellbeing of important ecosystems than they do on use values including economic production and access for recreation (see Esparon et al. in press; Holmes 2010; Jackson et al. 2011; Larson et al. 2013; Larson et al. 2014). The implications of this for protected areas such as National Parks are relatively obvious. The implications for rural and agricultural landscapes are less obvious but warrant exploration.

Environmental values such as biodiversity are not, of course, restricted to protected areas. On the surface, therefore, it would appear that much could be gained for ecosystem conservation by encouraging farmers and other land users to build conservation into their everyday enterprise management, particularly if ways can be found to make such conservation pay. Complicating this though, natural resource managers such as farmers are both producers and consumers of the ecosystem services they protect (Power 2010). The same is also true, in many cases, of cultural and heritage values. So where does the balance of public and private interest lie?

In one study of farms across northern Queensland and the Northern Territory (Daly River), Stoeckl et al. (2015) found little to no evidence of competition between market and non-market objectives (or private and public benefits) on rural properties. Several conservation activities including weed control and fencing benefited both the environment and the productivity of the farms, thus incurring opportunity benefits. Moreover, Stoeckl et al. found that some properties with a livestock only focus were relatively ‘inefficient’ in the sense that they created less conservation-type outputs but did not in return create more market outputs than properties without such a focus. Stoeckl et al. conclude that, in northern regions at least, policies which would actively engage land managers in conservation, reinforce positive attitudes and promote the diversification of agricultural activities beyond livestock only, may be able to achieve conservation objectives at little to no true economic

cost. Many other studies show similar co-benefits for production arising from conservation activity (e.g. Adams et al. 2014; Acharya 2006; Delmotte et al. 2011; Moore and Hunt 2012).

In other situations the balance of market and non-market, private and public values will be different and comparatively greater incentives for conservation may be warranted.

4.2 THE POLITICS OF FOOD: CHANGING TASTES, FOOD SYSTEMS AND GOVERNANCE REGIMES

This section shifts focus from agriculture and rural Australia to relevant trends in the broader Australian and global communities. It illustrates, in doing so, the deeply social and political nature of food and other agricultural commodities. As we have already seen, domestic political support for agriculture does not mean consumers automatically support specific policies on agriculture or food. Quite the contrary, the importance of agriculture and food makes for a complex political landscape involving multiple actors and organizations. Governance regimes for food and agriculture have adapted to reflect this complexity and maintain market stability. At the same time, complexity and interdependence introduces additional risks that must themselves be managed.

4.2.1 *Changing consumption patterns*

It makes intuitive sense that demographic change and exposure to other cultures through travel and media might profoundly reshape tastes and diets within Australia. The idea of demand-responsive production also raises the question as to how demand is actually shifting. Data on domestic consumption of commodity groups offer limited insight into this question. We know that per capita red meat consumption peaked in the late 1970s and that pork and chicken meat consumption have since risen (MLA 2011). We also know that consumption of seafood, fresh fruit and vegetable, and beverages such as wine and carbonated softdrinks have increased, while egg and dairy consumption has stayed relatively stable (ABS 2000a). In all likelihood, there has been more change within each of these broad categories than there has been between them.

We also know that much has changed in the ways Australians procure and consume the products of agriculture. Compared with the early 20th Century, Australians eat more meals outside their homes, more pre-prepared and convenience foods, and they purchase more of their food from a small number of very large retailers (AIHW 2012). At the same time, markets for various forms of artisan, locally grown, certified organic and/or other niche products have exhibited strong growth.

Data on international consumption of food commodities suggests stronger trends. Between 1999 and 2009, for example, the largest proportional increases in consumption were for tree nuts (54%), vegetables (31%), fruit (excluding wine grapes) (21%), seafood (17%), alcoholic beverages (14%), vegetable oil (14%) and meat and milk consumption (both 11%) (DAFF 2013b).

Changing international consumption patterns are not necessarily mirrored directly in Australian exports in the short-term due to the range of factors (from trade politics to local seasonal conditions) that might influence what is imported into a foreign market at any one time.¹⁵ The

¹⁵ Both farm production and the food and beverage processing industry contribute to Australian agricultural exports which, over the 30 years to 2011-12, grew from \$8.2 billion to over \$30 billion (DAFF 2013b). Half of Australia's food exports in 2011-12 went to Asia with Japan the largest importer (at around \$4.5 billion). However, other ASEAN countries have increased their imports from Australia (Indonesia from \$1.5 billion in 2006 to \$2.2 billion in 2012; and China from \$0.6 billion to \$2.1 billion over the same period). On the other hand, some traditionally large importers such as the US and UK have become less important (declining from \$3

fastest growing exports for Australia in the five years to 2011 were grains (also the highest value, growing from \$4.3 billion to \$8.8 billion), oilseeds (\$0.4 billion to \$1.5 billion) and cereals/baking products (\$0.4 billion to \$1.2 billion). Overall, minimally transformed products (such as grains and seeds) doubled from \$6.7 to \$12.5 billion. Substantially transformed products (meat and dairy) were the largest components of exports at \$17.6 billion but there was little change in value over the five years to 2011. The alcoholic beverages export industry, often perceived as growing due to its increasingly good results in China, has in fact contracted, from \$3.1 billion in 2005 (of which \$2.7 billion was wine) to \$2.4 billion in 2011 (of which \$1.9 billion was wine) (DAFF 2013b).

Asian agrifood demand is expected to double by 2050 (Williams 2014). Growth opportunities for Australia's food industry in supplying safe, premium meat, dairy, wine, vegetable and processed, branded product to China's growing middle class have been described as 'tremendous' (KPMG and The University of Sydney China Studies Centre 2013). An estimated 300 million people in middle class households – projected to double in the next 10 years – are rapidly developing westernized consumption habits and diets. The value of red meat imports is expected to grow from a current \$3 billion to \$150 billion by 2050.

There is clearly a major opportunity here but, again, demand-responsive production requires more than simply expanding output and hoping for the best. Australian producers and exporters need to better understand Chinese middle class consumer demands. For example, KPMG and The University of Sydney China Studies Centre (2013) estimate that per capita consumption of meat in China will grow from 47 kg per capita in 2012 to 54 kg per capita in 2022. However, they also expect pork to account for 66 per cent of this additional consumption and chicken to be the fastest growing meat category. To date, however, there are no strong exporters of either of these meats from Australia to China.

At the same time, Chinese consumers are increasingly concerned about the safety of their food. As levels of trust in certain Chinese foods are low there is a preference among some for imported food. The opportunity here is clear. But with a significant shift underway from government-driven policy for food security to market-driven requirements for premium, safe food, the need also is clear to satisfy the requirements of other supply chain actors to assure food safety and quality (see Section 3.3.5). As of today, wool and cotton remain the highest value exports from Australia to China.

4.2.2 Food affordability and public health

Claims that food is 'cheap' or 'underpriced' are generally based on the perception that farm gate prices are inadequate to allow farmers either a reasonable return on investment or the ability to invest adequately in environmental protection. Rarely do such claims consider household food expenditures or levels of hunger and food insecurity.

In 2009-10, Australian households spent on average 17 per cent of their disposable (after tax) income on food and non-alcoholic beverages (ABS 2011). This compared with expenditure of 18 per cent on housing and 16 per cent on transport. Not surprisingly, less affluent households spent a greater share of their income on food (19% for the lowest quintile) and 3.2 per cent reported actually going without meals altogether as a consequence of financial stress (6.9% for the lowest quintile).

billion and \$1.2 billion in 2006 to \$2.2 billion and \$0.6 billion in 2012 for the US and UK, respectively) (DAFF 2013b).

While care needs to be taken comparing expenditure on food across national borders due to differences in the ways data are collected and analyzed, it is worth noting that both the UK and US report considerably lower average expenditure. In 2013, UK households spent an average of 11.4 per cent of their income on food, rising to 16.5 per cent for households in the lowest income quintile (DEFRA 2014). In 2012, US households spent on average 11 per cent of disposable personal income on food (ERS 2014).

The bigger question is what this means for consumers. Inequalities in income distribution and food availability are likely to have more influence on levels of food insecurity within countries than average rates of expenditure at the national level. The Rome Declaration on World Food Security states that:

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO 1996).

In other words, food should be available, affordable, nutritionally adequate, culturally acceptable, and people should know how to use it. The most widely cited data on household food security in Australia come from the 2004/05 ABS National Health Survey (ABS 2006). This survey found that approximately 5 per cent of households ran out of food and did not have money to buy more at least once in the 12 months leading up to the survey.

A more recent survey undertaken by ANU Poll in 2011 reported that 13–16 per cent of Australian households were classifiable as food insecure on the basis that they could not afford to eat balanced meals or worried that food would run out before they had money to purchase more. Four to eight per cent were classifiable as severely food insecure on the basis that they had been forced to source emergency food assistance from a charity, food bank, soup kitchen or some other source or they had run out of food and did not have money to purchase more (Lockie and Pietsch 2012).

The OECD reports, similarly, that 10 per cent of Australians in 2011–12 recounted not having enough money in the preceding 12 months to buy food needed by themselves or their families (OECD 2014). Table 3 demonstrates that this was slightly lower than the OECD average of 13.2 per cent. It could be argued that as an indicator of food insecurity in developed economies the OECD average is inflated by the inclusion of countries (such as Greece and the US) that were affected particularly harshly by the global financial crisis (GFC) and ensuing austerity measures, and other countries (such as Mexico and Turkey) that are more accurately described as transitional. Certainly, if these countries are treated as outliers, Australia's performance looks comparatively worse.

However, rather than treating the experiences of OECD countries affected particularly harshly by the GFC as outliers, we should look to them for insight into how rapidly the food security situation can deteriorate even in the developed world.

As noted above, inequities related both to income and to food availability and costs influence within-country distributions of food insecurity. Ramsey et al. (2011), for example, found 25 per cent of households in disadvantaged Brisbane suburbs experienced some level of food insecurity. After controlling for income, gender and age, Ramsey et al. also found these households to experience poorer general health, increased healthcare utilization and higher rates of depression (see also Temple 2006). Ward et al. (2013) found that, for Adelaide residents, the relative cost of a 'healthy food basket' rose from 10 per cent of average household income for a family of four (two adults and two children) living in high SES suburbs to 30 per cent for a family of four living in low SES suburbs.

The absolute cost of a 'healthy food basket' did not, however, vary significantly between high and low SES suburbs.

Table 3 Respondents reporting not having enough money in the last 12 months to buy food needed by self or family, OECD countries only, Gallop World Poll (OECD 2014) *

	2006-07	2011-12
Mexico	31.9	38.3
Turkey	26.6	32.7
Hungary	17.4	30.6
Chile	27.6	27.8
Estonia	16.2	23.4
United States	13.4	21.1
Poland	23.4	18.4
Greece	8.9	17.9
New Zealand	10.3	17.2
Korea	13.7	16.7
Slovak Republic	10.2	14.7
OECD AVERAGE	11.2	13.2
Italy	9.5	13.2
Czech Republic	15.2	12.7
Spain	10.0	11.8
Canada	8.2	11.5
Slovenia	8.2	10.9
Portugal	10.5	10.2
France	11.5	10.0
AUSTRALIA	8.8	10.0
Iceland	8.9	9.5
Israel	13.1	9.3
Ireland	4.2	9.0
Finland	4.6	8.4
United Kingdom	9.8	8.1
Belgium	6.2	7.9
Norway	5.7	7.0
Sweden	7.1	6.2
Denmark	7.4	6.0
Netherlands	5.7	5.9
Luxembourg	3.2	5.7
Austria	3.2	4.8
Germany	6.9	4.6
Japan	7.2	4.5
Switzerland	6.1	4.1

* 2008 data are reported for Iceland, Luxembourg and China instead of 2006-07, and 2009 data are reported for Switzerland instead of 2011-12.

Variance in food availability and costs in Australia is mostly determined by remoteness. Differences in retail prices charged by the major supermarket chains are only of the order of one to four per cent both between states and between metropolitan and regional areas (ACCC 2008). Remote and very

remote areas, however, not serviced by the major supermarket chains pay premiums for healthy foods such as fresh fruit and vegetables of up to a third (ACCC 2008; AIHW 2012).¹⁶

While survey results cannot be compared directly due to differences in question wording and standard margins of error, what we can be sure of is that a considerable number of Australians struggle with the cost of food and this number may be increasing. If we take the nutritional aspect of food security seriously, the numbers increase further. Several studies demonstrate that food baskets consistent with recommended dietary guidelines are significantly more expensive than more typical baskets (see for example Barosh et al. 2014; Ward et al. 2013), making food affordability an issue with significant public health implications. The challenge would therefore appear to be finding ways to ensure both that farmers have opportunities for financial security and that consumers have opportunities to access affordable, healthy food.

4.2.3 *Contesting agriculture and food trade*

Policy documents concerning Australian agriculture typically make reference to Australia's reputation for clean, green and safe produce.¹⁷ There is no doubt that Australian agricultural produce is perceived in both domestic and international markets as being relatively clean, green and safe (McAllister 2009). Nevertheless, controversies around agriculture and food trade have significant potential to disrupt markets and livelihoods. Pre-empting the concerns that trigger controversy, by contrast, has potential to create new market and livelihood opportunities.

Negative sanctions or campaigns have been initiated against Australian produce over the years by a range of actors including foreign governments, private buyers, and social or consumer movement organizations. Regardless of what one might think about the motivation for or veracity of these sanctions and campaigns they have imposed, at times, substantial costs. Animal welfare issues including live animal exports and sheep mulesing have possibly been the most visible foci of conflict. Indeed, northern cattle producers are currently taking the Federal Government to court in an attempt to recoup losses stemming from the temporary ban placed on live exports to Indonesia in 2011. It is important to note, however, that disputes with other governments over biosecurity and access to the Australian market, the detection of chemical residues in Australian produce, and the use of genetically-modified organisms in agriculture have all attracted attention and affected markets for Australian produce at one time or another.

In contrast with negative sanctions and campaigns, market opportunities have grown for products that demonstrably meets consumer demands for healthy, sustainable and/or socially responsible produce.¹⁸ The international market for certified organic produce, for example, was estimated at US\$59 billion in 2010 and the size of the Australian market at close to \$1.3 billion in 2012 with expected growth in coming years of 10 to 15 per cent per annum (Monk et al. 2012). While coming off a small base, the high rates of growth in the certified organic market have attracted the interest of numerous mainstream food processors and retailers with Coles, Woolworths and ALDI all launching own-brand organic lines in recent years. Consumption is also increasingly mainstream with

¹⁶ These premiums are averaged across remote locales in the states and territories for which they are reported. Individual remote and very remote settlements may pay considerably more.

¹⁷ The *Agricultural Competitiveness Green Paper*, for example, notes the importance of strict biosecurity in maintaining Australia's clean, green and safe image. The *Blueprint for Australian Agriculture 2013–2020*, PSEIC report on *Australian and Food Security in a Changing World*, and *National Food Plan White Paper* all make similar points.

¹⁸ This is also relevant to imports. For example, the Fairtrade market in Australia is estimated to have grown more than 200 per cent in the last few years to \$271 million in 2013 (Fairtrade International 2013).

around two thirds of Australian consumers at least occasionally purchasing organic food (Monk et al. 2012). Despite the price premiums associated with certified organic food, there is almost no relationship between organic consumption and income.¹⁹

Understanding civil society activism around food and agriculture – whether this is expressed through dissent or through demand for organic and other ‘green’ products – requires understanding both of the unique nature of food as a commodity and of wider social trends. The CSIRO’s *Our Future World* project identifies a fundamental shift in consumer expectations as one of six global megatrends that will change the way we live (Hajkowicz et al. 2012). Key elements of this shift include increased demand for experiences relative to demand for products, for personalized products and services rather than mass produced, and for ethical and moral certification of services and products. The relevance of these demands to food and agriculture means they will also, inevitably, change the way we produce.

4.2.4 Vertical coordination and transparency

As noted in Section 3.1, the Australian agrifood sector is marked by increasing levels of vertical coordination. This raises the question of who then is responsible for coordination. Noting that retail now accounts for just under half the total economic value of the Australian agrifood sector, the very obvious answer would seem to be retailers.²⁰

Concern among Australian consumers and politicians had led to several inquiries over the last ten years into concentration and competition in the food supply chain. Between them, Coles and Woolworths account for approximately 50 per cent of fresh food sales (including fruit, vegetables and meat) and 70 per cent of packaged grocery sales. Some 70–80 per cent of their fresh fruit and vegetables are sourced directly from growers, bypassing traditional wholesale markets (ACCC 2008). In short, the overwhelming market dominance of these two retail chains, their increasing preference to stock and promote own-brand products, and the relatively small share of the final price paid by consumers finding its way back to producers, all feed concerns that retailers are increasing their influence and profitability at the expense of farmers, processors, distributors and consumers.

The Australian Competition and Consumer Commission (ACCC) found in 2008 that grocery retailing was ‘workably competitive’ despite high levels of concentration. The average retail margin reported by Coles in 2010-11 (3.6%) was only marginally higher than the average margin for major overseas supermarket chains (3.1%) although Woolworths’ margins were higher at 7.4 per cent (DAFF 2013b).

While the ACCC (2008) notes that the current supermarket retail landscape in Australia is marked by heavy discounting as major chains compete largely on price (relying on volume for profitability), it is notable that the more heavily populated supermarket sectors of other developed countries has led to a diversification of business strategies. A number of European supermarkets, for example, were much earlier adopters of certified organic product lines as they sought to differentiate themselves on the basis of quality.

¹⁹ Numerous studies have demonstrated that the most consistent predictors of certified organic food consumption are gender (women being more likely to purchase organic) and caring responsibilities (purchasing and preparing food for others) (Lockie et al. 2006).

²⁰ In 2012-13 the food value chain in Australia comprised \$42.8 billion in farm and fish production, \$84.9 billion in food and beverage processing and \$141.4 billion in retail food sales. Food exports had a value of \$31.8 billion and food imports \$11.6 billion (DA 2014).

Both in Australia and in other developed economies the rising prominence of retailers has been associated with pressure on supermarkets to take more responsibility for assuring the safety and sustainability of the food supply. This pressure has come from multiple directions: the need, as noted in the previous paragraph, to compete with other retailers for customers; the increasing importance to retailers of own-brand products and the consequent risk that they will be blamed for food safety, contamination, and other problems in the supply chain; and directly from governments.

The UK, for example, legislated in 1990 to establish monetary and custodial penalties for acts that render food injurious to health or mislead consumers.²¹ The most important defence under the UK Food Safety Act 1990 is 'due diligence'. This requires businesses to demonstrate that on the balance of probabilities they took 'all reasonable care' to avoid committing an offence (Food Standards Agency 2009). While establishing the parameters of 'all reasonable care' is a matter for the courts, as in other domains of risk regulation such care is generally established through standards and codes of conduct. Standards set out what is 'reasonably practicable' to reduce and manage risks associated with well-established activities (e.g. Standards Australia 2004). While governments, including Australia, may legislate specifically to impose risk assessment systems such as HACCP (Hazard Analysis Critical Control Point) in 'high risk' food sectors, their adoption has, in fact, become essentially obligatory for highly exposed businesses such as supermarkets seeking to reduce their legal liability for food safety breaches (Lockie et al. 2013).

Supermarkets have consequently become more and more proactive over the last decade or so in defining and stipulating standards for other supply chain actors, including farmers (Lockie et al. 2013). There is probably very little food in the major Australian supermarkets today that has not been produced under some sort of quality assurance standard, whether domestic (e.g. Freshcare, Woolworths Quality Assurance and Coles Supermarket Supplier Management Program) or international (e.g. GLOBALG.A.P.).

There are two key features of these standards that stand out for the purposes of this report:

1. The increasing requirements for transparency that standards impose on all businesses involved in the food value chain. Such transparency is not necessarily, however, two-way. It is better described as the transparency of producers and processors to retailers, generally on retailers' terms. Producers and processors often end up certified to multiple standards in order to access multiple markets with a commensurate increase in compliance and audit costs. Except where retailers make specific product claims (e.g. certified organic) standards may also not be visible to consumers.
2. The notion of quality embedded in standards is expanding over time from the cosmetic attributes and safety of foods to include criteria related to environmental sustainability and social responsibility. Where retailers perceive a reputational risk in the environmental and social domains they have demonstrated a willingness (international retailers in particular) to require producers to manage this risk.

One of the enduring questions about 'green consumption' is whether demand expressed through social movement organizations and consumer surveys for more sustainable products actually leads to widespread changes in purchasing behaviour (as opposed to the development of lucrative niche markets). The incorporation of social and environmental criteria in food standards shifts this from a

²¹ European food safety legislation is of particular relevance due to trends initiated by European retailers to: (1) harmonize retailer-led private standards across firms and jurisdictions leading to the establishment of GLOBALG.A.P.; and (2) expand the requirements of private standards beyond food safety to include environmental and social performance.

question about individual consumer attitudes and behaviour to a question about supply chains and the ways they either hinder or facilitate changes in consumption practice.

The opportunity to engage in 'choice editing' – that is, removing the worst performing products against social and environmental criteria from shelves and making more responsible choices convenient and affordable – has been embraced by several European retail chains (Dixon and Banwell 2011; Gunn and Mont 2014). This shifts 'the field of choice for mainstream consumers' and assures them 'the issues they care about are being dealt with upstream' (SCR 2006: 2).

Retailers may, of course, suffer their own version of the attitude-behaviour gap, professing corporate responsibility while prioritising short-term profitability and growth (Gunn and Mont 2014). But there are good reasons to suggest that retailer commitment to choice editing in relation to food and natural fibres is more likely to grow than diminish.

- Consumer and social movement organizations have historically been most successful in promoting changed production and consumption practices where issues have emotional resonance; for example, in relation to personal health and animal welfare. Businesses able to anticipate and respond to changes in demand stimulated by campaigns, food safety scares etc. have become market leaders (SCR 2006).
- Ideas like sustainability have become enmeshed, in many consumers' minds, with broader notions of quality and benefit, therefore, from broader interest in food culture (Lockie et al. 2006; SCR 2006).
- As with food safety standards, key drivers for choice editing include pragmatic responses to the threats of reputational damage and loss of trust, legal liabilities and government regulation (Gunn and Mont 2014).
- Conversely, choice editing offers retailers opportunities to project a positive brand image, protect the long-term viability of supply chains and assure their own employees and shareholders that they are 'doing the right thing' (Gunn and Mont 2014).

To date, large format retailers such as supermarkets have lower rates of penetration in Asia (Hamshere et al. 2014). However, this situation is changing rapidly as income growth, urbanization, foreign direct investment, demand for novel foods and concerns over food safety create favourable conditions for change. More than half the world's top 50 retailers, for example, are actively pursuing a share of the 24 per cent per annum growth in supermarket food sales experienced in China between 2003 and 2010 (Hamshere et al. 2014). Similarly rapid growth has been evident in India, Indonesia and elsewhere. Both international and local supermarket changes operating in Asia are following the pattern (albeit with unique local characteristics) of bypassing wholesale markets in favour of direct relationships with preferred suppliers capable of compliance with quality standards (Reardon 2011). Given pressure to harmonize standards internationally it is likely that retailers operating in Asia will expand quality requirements to address social and environmental concerns (Lockie et al. 2013).

Just as controversy over the politics of food represents a general threat (and opportunity) for Australian producers, retail concentration and vertical coordination of food value chains has created conditions which have favoured a standards-based approach to the management of such threats. Producers who are not able to help other supply chain actors manage risk through adherence to recognized and verifiable standards are likely to find they have limited options to market their produce.

4.3 THE POLITICS OF GLOBAL RISK

That the world is changing and that these changes present both risks and opportunities for agriculture is obvious. The World Economic Forum undertakes a regular stocktake of risks to global stability. Its most recent report identifies the ten most likely global risks for the coming decade as well as those risks that, if experienced, would have the greatest impact. As Table 4 shows, these risks are simultaneously economic, environmental, political, societal and technological. The question for this report is not how each risk may or may not impact Australian agriculture in isolation but how governments and other actors, including trading partners, are likely to respond to this risk landscape. In other words, this report is less concerned with the probability of an adverse event than with how the possibility of such events are pre-empted and managed. This section will examine in more detail, therefore, the politics of global environmental change and the politics of trade.

Table 4 Top global risks 2015–20125 (WEF 2015)

Top 10 risks in terms of likelihood	Top ten risks in terms of impact
1. Interstate conflict	1. Water crises
2. Extreme weather events	2. Spread of infectious diseases
3. Failure of national governments	3. Weapons of mass destruction
4. State collapse or crisis	4. Interstate conflict
5. Unemployment or underemployment	5. Failure of climate change adaptation
6. Natural catastrophes	6. Energy price shock
7. Failure of climate-change adaptation	7. Critical information infrastructure breakdown
8. Water crises	8. Fiscal crisis
9. Data fraud or theft	9. Unemployment or underemployment
10. Cyber attacks	10. Biodiversity loss and ecosystem collapse

4.3.1 Global environmental change

Global environmental change will almost certainly prove a major disruptive force for Australian agriculture. Some studies suggest that existing strategies for the management of climatic variability within Australian agriculture²² may be largely sufficient to help farmers adapt to low levels of climate change over the next decade or so (i.e. less than 2° C of warming) (Howden et al. 2007; Stokes et al. 2008). Beyond this, fundamental shifts in land use will be required ranging from the development of more intensive agricultural systems where conditions allow to greater prioritization of conservation goals elsewhere and retirement of some lands from agricultural use (Rickards and Howden 2012). Incremental adaptation risks further embedding production systems that will not be sustainable in the long term. However, transformational adaptation also entails risk and requires substantial R&D support (Meinke et al. 2009; PMSEIC 2010b).

According to Gunasekera et al. (2007), Australian production of wheat, beef, dairy and sugar could decline 9–10 per cent by 2030 and 13–19 per cent by 2050 relative to the *reference case*; that is, the

²² These include changes to the timing or location of cropping activities, shifting to varieties or species with increased heat and drought tolerance, water harvesting and conservation, integrated pest management, enterprise diversification and climate forecasting (Howden et al. 2007).

level at which production would be in the absence of climate change impacts.²³ Allowing for productivity-enhancing innovations that would have stimulated upward movement in production in the absence of climate change, the likely scenario becomes one in which productivity either continues to grow, but at a slower rate, or stagnates. Either way, Gunasekera et al. (2007) argue, there is a proportionally higher impact on exports from Australia which they estimate could decline 11–63 per cent by 2030 and 15–79 per cent by 2050 as year-on-year variability in output increases.

The polarized politics of climate change have not served Australian agriculture well in preparing for the challenges of global environmental change.²⁴ Certainly, Australian governments have demonstrated a willingness to enable soil carbon sequestration to be used as an offset for greenhouse gas emissions elsewhere in the economy (first under the Carbon Farming Initiative and currently under the Emissions Reduction Fund) and thus to create an income stream for participating farmers (van Oosterzee et al. 2014). This builds on other experiments in the payment for ecosystem services provided by Australian farmers, most of which have focussed on endemic biodiversity through preservation of relatively intact vegetation communities on private farmland. Ranger programs have sought to provide a somewhat wider range of ecosystem services including pest control and biosecurity on Indigenous lands. Payments for ecosystem service provision may be particularly useful in situations where conservation activity does not provide production co-benefits (see Section 3.2.5) and in remote locations where distance to market is an impediment to agricultural commodity production (Garnett and Sithole 2007; Taylor et al. 2011).

However, Australian governments have not invested significantly in R&D to support transformational adaptation and nor have policies been developed that address agriculture's status as a source of greenhouse gas emissions (PMSEIC 2010a). It is estimated that agriculture accounts for approximately 14 per cent of Australia's emissions (Head et al. 2014) and that the gross level of direct emissions from agriculture has changed little since 1990 while emissions from deforestation have declined over 60 per cent (PMSEIC 2010a).

One of the reasons agriculture has been omitted from greenhouse gas mitigation policy is the considerable technical challenge involved in monitoring emissions across the sector. This situation is not likely to change soon. Nevertheless, both global environmental change and policies for its mitigation – at home and abroad – will have major implications for Australian agriculture. These include:

- First, global efforts to reduce fossil fuel use could result in dramatically increased input and transport costs. They could also result in trade barriers being used as retaliatory measures against countries not being seen to do enough to mitigate emissions.
- Second, even in the absence of direct measures of on-farm greenhouse gas emissions, buyers may start to impose requirements for 'best practice' in their reduction or minimization. Compliance with verifiable standards for emissions management could become a minimum requirement of access to some markets.
- Third, an increased need to import food as Australia's population grows will weaken the agricultural sector's negotiating position on issues such as quarantine and place further pressure on farmers to demonstrate best environmental practice.

²³ This compares with reductions wheat, beef, dairy and sugar production globally of 2–6 per cent by 2030 and 5–11 per cent by 2050 relative to the reference case.

²⁴ The *Blueprint for Australian Agriculture, 2013–2020* acknowledges the contentious politics of climate change but argues that impacts are already evident and early investment in adaptation is required to reduce costs. However, the topic is very nearly avoided altogether in the *Agricultural Competitiveness Green Paper, 2014*.

4.3.2 Trade politics in a shifting geopolitical landscape

The export oriented nature of Australian agriculture leads to a high level of dependence on favourable trading conditions. Australian governments have been particularly activist, consequently, in the negotiation of trade agreements that establish rules for international trade and for the resolution of disputes between signatories to those agreements.²⁵ The detail of these agreements – institutionalized at the multilateral level in the World Trade Organization – are less important here than the shifting balances of power in the world order that lend trade arrangements their stability and legitimacy.²⁶

The most important geopolitical transition currently evident at the global level is the political and economic shift to the East. To date, this has favoured Australia by providing new trade opportunities. Indeed, Australia has been self-consciously strengthening political and economic relationships in Asia since the 1970s when the UK joined the then European Economic Community. Australia went on to play a leadership role in establishment of the Asia Pacific Economic Cooperation (APEC) forum in 1989 to promote trade liberalization and economic integration in the region (www.apec.org) and has gone on to negotiate free trade agreements with China, Japan, Korea, Malaysia, Thailand, Singapore and ASEAN (www.dfat.gov.au/fta). Asia now accounts for well over half Australia's agricultural exports (Sefton and Associates 2013) and strong income growth in the region should see demand continue to rise.

Globalization is often held to act as a force for peace on the basis that economic freedom, market integration and the diffusion of prosperity promote shared interests, democratization, cosmopolitanism and, ultimately, the avoidance of military conflict (Weede 2004). Beyond these general incentives to cooperation, multilateral institutional arrangements as described above help sovereign states to settle disputes over trade and investment peacefully. These, along with bilateral agreements, provide grounds for optimism that favourable geopolitical conditions for Australian agricultural exports will be maintained for the foreseeable future. However, the potential magnitude of disruption to trade should geopolitical circumstances deteriorate make this a sphere of considerable risk.

A foresight exercise undertaken recently by Shell (2014) deals with the potential for geopolitical instability by juxtaposing two scenarios, one in which the existing international order, including multilateral institutions, is largely maintained and one in which a less hierarchical order emerges involving more countries and new political and economic institutions. While the first scenario promises more stability the second promises more growth.

Several relevant sources of potential tension in the emerging world order can readily be identified:

- *Aspiring superpowers*: while China is the most visible long-term rival to US hegemony at a global level, India, Brazil and others are also seeking to translate economic growth into regional and international authority. Both the EU and Japan remain among the world's largest

²⁵ Australia, for example, been involved in a number of trade disputes involving agricultural commodities. These include several disputes concerning Australia's use of phytosanitary standards to restrict importation of fruit (Lockie 2003).

²⁶ The potential for geopolitics to disrupt trade was amply illustrated when, in 2014, Russia issued a year long ban on imports of beef, pork, fruit, vegetables, poultry, fish and dairy products from the EU, US, Australia, Canada and Norway in retaliation to economic sanctions imposed on Russia over allegations of Russian military intervention in Ukraine. This will have an immediate impact on the \$400 million export market for Australian produce (primarily beef and dairy products) and long term impacts as Russia develops new supply lines to other countries (Bettles et al. 2014).

economies and seek to exert their own influence, as does Russia. Each of these aspirants to regional and global leadership bring unique values, political cultures and perceptions of self-interest. Economic interdependence may act as an incentive among existing and aspirant superpowers to cooperate – as illustrated by recent bilateral negotiations between the US and China on climate change mitigation. However, the potential of geopolitical rivalries to stymie constructive engagement and/or to escalate into more overt conflict can not be discounted.

- *Natural disasters and climate shocks*: extreme weather and other natural disasters such as volcanic eruptions have direct implications for agriculture and food security. Most of the time, and in most parts of the world, existing trade arrangements offer effective mechanisms for moving food to where it is needed in response to fluctuations in production. However, periodic periods of crisis illustrate the potential when multiple sources of stress coalesce to challenge the adequacy of a trade-based approach to food security. By itself, for example, drought in Australia would not normally have global food security implications and yet, in concert with a range of other factors, Australia's millennium drought helped to precipitate the 2007-2008 crisis and the food riots that followed.²⁷ The prospect of more frequent and intense extreme weather events arising from global climate change underscores the importance of being able to move food across political borders quickly and efficiently. At the same time, the prospect of more extreme events suggests that challenges to the adequacy and legitimacy of trade-based approaches to food security may grow.
- *Economic instability*: the food and financial crises of 2007-2008 illustrated the potential, once instability does appear in key economies and sectors, for this to ripple through the global economy with far-reaching and often expected consequences. Post-crisis, we have seen no fundamental change to key institutions and agreements for managing trade and investment but we have seen a resurgence of populist politics on both the left and right in a number of countries. The political legitimacy of the existing economic order cannot be taken for granted.
- *Re-assertion of national interests*: the food and financial crises of 2007-2008 also illustrated the potential for global instability to encourage individual governments to respond by prioritising domestic political imperatives. Several governments, for example, placed restrictions on the export of grains – ostensibly in order to preserve national food security – despite no domestic food shortages and evidence these restrictions were in fact deepening the crisis (Headey 2010).²⁸
- *Energy transitions*: oil and gas have been implicated in numerous economic, political and food security crises. While major powers such as the US and EU have taken steps to improve domestic energy security the global economy remains tightly coupled to oil and gas extracted from the politically volatile Middle East, Africa and former Soviet Union (Correljé and van der Lind 2006). Attempts to decarbonize the energy system in order to reduce greenhouse gas emissions would have secondary benefits in terms of addressing this dependence (Bradshaw 2010). However, this is a long-term project and conflict in oil and gas production centres is likely to remain a source of vulnerability in the global economy for some time.

²⁷ Drought in Australia and elsewhere, the diversion of grains into biofuel production, rising oil prices, low grain stocks, depreciation of the US dollar, financial speculation and the imposition of export restrictions have all been identified as credible causal factors in the rapid escalation of food prices witnessed in 2007-2008 (Headey 2010). During this period, the nominal international price of wheat and maize doubled and the price of rice more than tripled over 2006 prices. At issue, therefore, was not food availability per se but its affordability. Other factors, such as under-investment in production research and slowing yield growth may have had some influence but are more likely to contribute to longer-term price trends.

²⁸ Article 11 of the General Agreement on Tariffs and Trade does allow countries to temporarily restrict exports in order to relieve domestic shortages of food, or to ensure compliance with relevant international standards or regulations. When export restrictions are imposed, Article 12 of the Agriculture Agreement requires consideration be given to food security impacts in importing countries. Only developing countries which are net importers of the foodstuffs concerned are exempt (www.wto.org).

- *Persistent inequality*: the Asia Pacific region in which Australian agricultural trade is now concentrated has outperformed much of the world over the last two decades on poverty alleviation. Using the conventional poverty line of US\$1.25/person/day the rate of extreme poverty in Asia Pacific declined from 54.7 per cent in 1990 to 20.7 per cent in 2010 (ADB 2014). This appears consistent with growing per capita incomes. However, income inequality also rose through much of the region, blunting poverty alleviation efforts (ADB 2012). Further, taking into account regionally specific living costs as well as the impacts of food price volatility and natural disasters results, according to the Asian Development Bank (2014), in a more realistic estimate of the rate of extreme poverty in 2010 of 49.5 per cent. While the ADB (2012) is confident extreme poverty in the region will continue to decline it identifies income inequality as a barrier to economic growth and threat to social cohesion (see also WEF 2015).

Geopolitical stability is never guaranteed. Global economic interdependence encourages political stability but, at the same time, introduces new risks associated with the potential for adverse economic and natural events to interact in perhaps unexpected ways. Even in the absence of major geopolitical crisis, these may have major implications for Australian agricultural exports.

5. ASSEMBLING THE FUTURE: RE-THINKING AUSTRALIAN AGRICULTURE?

For decades, Australian farmers have relied on innovation both to drive the productivity growth necessary to stay in business and to deal with land and water degradation where it has threatened that productivity. Over coming decades, global population growth and rising living standards will create rising demand and new opportunities for those producers able to cope with heightened levels of climatic variability and associated changes in ecosystems. Achieving the transformations necessary to capitalize on these opportunities will require as much focus on landscape-scale ecological processes and farm level agro-ecologies as on discrete production practices and technologies.

While no single infrastructure project or technological innovation will revolutionize Australian agriculture, the need for investment is clear. At the same time, the constant flow of reports and plans on the future of Australian agriculture illustrates how important it is to develop policy narratives that draw together and make sense of multiple challenges and opportunities. Failure to reach a degree of social and political consensus around these narratives will undermine the legitimacy of policies and programs (public and private) and opens space for counter-narratives of agriculture as exploitative and cruel. Narratives which fail to encourage foresight meanwhile are likely to be undermined by long-term irrelevance and ineffectiveness.

The fundamental premise underlying this section is that guiding narratives on Australian agriculture must explicitly embrace those issues with potential to damage, or enhance, the legitimacy or social license of agriculture. It proposes the articulation of policy narratives for Australian agriculture that embody clear understandings of farmers' duty of care to protect social and environmental values, robust and participatory processes for development of appropriate standards and management expectations, and appreciation of the full diversity of people and businesses involved in agricultural production including Indigenous landholders. By design, these proposals avoid reinventing the wheel and instead build on and reinforce existing narratives, institutional arrangements, and policy initiatives with which Australian farmers, governments and others already have experience.

In considering how policy narratives on Australian agriculture ought to be reconsidered or reoriented this section asks: What might future Australian farms look like? What can we expect of Australian farmers? And how can we make fair and robust decisions about the use of natural resources, the deployment of new technologies, and so on?

5.1 INFRASTRUCTURE AND THE AGRICULTURAL FRONTIER

The prospect of pushing the agricultural 'frontier', of 'opening' new lands and realising the economic potential of 'undeveloped' water resources has a longstanding allure for Australian governments and agri-politicians. Nowhere is this more evident than in northern Australia (an area covering roughly a third of the Australian landmass but only a fraction of its population), for which plans and reports on development are produced with almost the same regularity as those for Australian agriculture more generally.

This sort of 'frontier-talk' suggests big gains to Australia from infrastructure investment in the north. Agricultural output will be dramatically increased. New export markets to the booming economies of our Asian neighbours will emerge. Fluctuations in agricultural output and food supply will be easier to manage. Less pressure will be placed on the already stressed Murray-Darling Basin to remain the country's food bowl. Frontier-talk also promises to resolve the social and economic challenges of

existing northern residents while paradoxically devaluing their historical and existing efforts to run businesses, secure livelihoods and manage landscapes.

It is important to note that frontier-talk is not restricted to the north. While the promise of a step change in economic output from northern development attracts considerable political attention there are numerous proposals across Australia to build or upgrade infrastructure in order to facilitate the intensification of agricultural production.

Further, climatic shifts associated with global environmental change will necessitate a range of adaptation actions across Australia including land use change. The net result will be a significant relocation over time of people and agricultural activities. This will, in turn, have major implications for infrastructure siting, maintenance etc. Difficult decisions will have to be taken over where the roads, rail links, storage facilities, processing plants and so on of the future will be located.

The political and social implications of northern development and its historical failures have, therefore, a wider importance. As Carson et al. (2009) note, most large development projects in the north have either failed outright or been scaled back as they have fallen short of their objectives. Relative isolation, extreme and often unpredictable weather, widespread low soil fertility, etc. all create challenges for agriculture in the north (Australian Government 2014; Stafford Smith 2008; Stafford Smith and Huigen 2009).

However, project failure in the north has not simply been a consequence of the biophysical challenges of tropical agriculture. Project failure has arisen from political failures; in particular, failure to consider carefully the questions of what is meant by 'development' and who it is intended to benefit. Governments have invested, according to Taylor et al. (2011), in 'showy projects' in or around isolated enclaves of activity with benefits captured, for the most part, by a small elite, many of whom have been temporary residents or outsiders. If the aim is to promote more inclusive economic development for existing residents, including Indigenous residents, then reconsideration is required of how economic development is envisioned.

The Northern Australia Land and Water Taskforce (2009) found that the soil and water resources of northern Australia are most suited to a mosaic pattern of intensification with irrigated agriculture practiced on a small-scale across dispersed locations, with pastoralism and conservation the focus of management between these locations.²⁹ A high level of conservation of land and water resources was found to be crucial to sustainable agriculture in the north. While some observers might see this as a limitation, the Taskforce saw it as a situation in which Aboriginal landholders have a comparative advantage in providing a mix of commercial, cultural and ecosystem services. A more expansive understanding of 'development' thus raises possibilities to improve the livelihoods and wellbeing of existing landholders and other residents while simultaneously providing much-needed active management of the rangeland environments that dominate northern Australia.

Over time, other parts of Australia that are currently highly productive will become more marginal for agriculture. Such areas will, similarly, need to be managed to prioritize conservation of resources as well as spatial and temporal flexibility in the pursuit of agriculture. Questions will need to be

²⁹ The Taskforce estimated that soil and ground water resources were sufficient to expand irrigation by 100 to 200 per cent or 20,000 to 40,000 hectares (NALWT 2009). The Taskforce argued against dam development on the basis that rainfall is concentrated on the coast where topographic features are not favourable for large water storages. By contrast, an assessment of water resources in the Flinders and Gilbert catchments of Cape York identified opportunities for water storage sufficient to irrigate up to another 40,000 hectares (CSIRO 2013a, 2013b). Notably, however, the assessment recommended a mix of in-stream and farm-based water storage and, for the Flinders in particular, a mosaic pattern of irrigation development.

asked concerning whether existing infrastructure is supportive of, and economically viable as a consequence of, such flexibility.

5.2 TRANSFORMATIVE TECHNOLOGY AND THE NEXT AGRICULTURAL REVOLUTION(S)

The fact that productivity growth in agriculture generally outstrips the rest of the Australian economy by a factor of two should be sufficient to put paid to stereotypes of farmers as inherently resistant to change. Given the risks involved in innovation it would be more accurate to describe Australian farmers as appropriately cautious, but enthusiastic nevertheless, about the adoption of new technologies. The *Agricultural Competitiveness Green Paper* suggests that the the Australian Government too believes that innovation supported by research, development and extension is critical to maintaining comparative advantage (DPMC 2014). The *Green Paper* identifies cross-sectoral and transformational research as particular gaps in the agricultural R&D sector but has nothing specific to say about what transformational research is or how it should be developed.

Reflecting the core concern of this report with the social and political context of agriculture, the question for this section is not what specific areas of innovation ought to be the focus of research and development. Rather, the question is what we can learn about the social and political dynamics of technological change that ought to be considered in shaping the agenda for research and innovation. In relation to this question, two issues stand out. First, technological change focused on improving labour productivity can have perverse social consequences for rural communities. Second, technological change that disrupts peoples' perceptions about what is 'pure' or 'natural' about foods will struggle for acceptance if simply imposed upon consumers.

Reducing the labour required to undertake all manner of activities on-farm has been a core strategy for dealing with declining terms of trade in agriculture. Reducing labour requirements – or reducing the cost of labour through seasonal overseas worker programs and more 'flexible' award conditions – continues to be raised as a solution to the internationally high cost of labour in Australia (DPMC 2014). Such a strategy makes absolute sense for businesses seeking to maintain their viability, but it also contributes to the shortages of skilled labour that businesses also struggle with, the declining participation of young Australians in agricultural education, the diminished social vitality of many rural areas, and the isolation that contributes to elevated male suicide rates (Section 3.1.4).

Depopulation of rural areas is a consequence of declining relative opportunity and amenity, not of diminishing interest among mainstream Australians in the production of food and fibre. Governments and industry organizations recognize that environmental management, animal welfare, food safety, biosecurity and traceability, are all of significant concern for the Australian community (e.g. Commonwealth of Australia 2013). Yet there is a strong tendency when people express concern about agricultural practices to reverse the maxim that 'the customer is always right' and to treat consumer preferences as a barrier to be overcome. This tendency is not universal – as illustrated by the Commonwealth Government's response in 2011 to animal welfare concerns associated with live exports – but is manifest nevertheless in two principal ways.

First, inadequate attention is paid to addressing concerns within existing production systems, particularly those concerning animal welfare (see also Turnour et al. 2013). Mulesing merino lambs to reduce the incidence of blowfly strike offers a useful example. Individual producers may indeed feel that mulesing offers the only practicable way to reduce their flock's susceptibility to flystrike. Given, however, that other methods such as breeding to reduce skinfolds are well understood, the question needs to be asked as to why at a national or industry level more progress has not been

made to offer producers workable alternatives. The reputational damage from controversy over mulesing has doubtlessly imposed heavy costs on Australian woolgrowers and processors.

Second, consumers' concerns with novel production systems are seen as secondary to the interests of producers. Here, genetic engineering offers a prime example. Leaving aside questions of whether GE food is safe, it is clear that most consumers would rather not eat it and do not trust the claims of GE proponents. No amount of criticizing consumers for being irrational, throwing stones at civil society groups opposed to GE, clouding the issue by arguing GE is just one of many biotechnologies, or claiming GE offers the only realistic prospect to attain world food security is likely to increase public acceptance of genetic engineering. In fact, the reverse is very likely true.³⁰

Given the complexity of agricultural systems it is unlikely that one technology holds the key to transformative change. Genetic improvement (using novel and traditional techniques) is required alongside improvement in information and communication technologies and alongside improved understanding of the landscape-scale ecological and hydrological processes in which agriculture is situated. Each of these components needs to be drawn together in determining ways to optimize agricultural output without resorting to exploitative production methods (McKenzie and Williams 2014; Price and Ogilvy 2014).

Addressing the UN Climate Summit in September 2014, Director-General of the Food and Agriculture Organization of the United Nations, José Graziano da Silva, argued that meeting the challenges of both food security and climate change required the integration of agro-ecology (that is, the application of ecological concepts and principles to agriculture) with technologies such as genetic engineering.³¹ Further, he argued, we need to be guided scientifically in this enterprise and not lost 'in passionate ideological discussions'.

Lest such a proposition be regarded as romantic or impractical, it is worth remembering that farmers planting crops genetically modified to express proteins toxic to *Helicoverpa* larvae are required under licensing agreements to implement Integrated Pest Management (IPM) systems designed to slow the build-up of resistance to these toxins in target species. IPM systems utilize a range of practices to monitor and prevent pest infestations with a minimum of control actions, thus reducing the use but increasing the effectiveness of pesticide applications. IPM is as applicable, therefore, to organic or low external input farming systems as it is to so-called conventional systems.³² Yet evaluations of the impact of GM crops on chemical use, productivity and profitability typically attribute positive impacts solely to the utilization of GM varieties as opposed to the integration of these varieties in modified farming systems (e.g. Klümper and Qaim 2014). Interestingly, yield gains and reductions in pesticide use are higher in crops modified to confer insect resistance (the sorts of GM crops for which farmers are required to implement IPM), than they are for crops modified to confer herbicide resistance (Klümper and Qaim 2014). The question left begging is not how much the planting of insect resistant varieties increased productivity etc. relative to the years before they

³⁰ Grain Growers (2011) found that the domestic flour and feed millers, driven by consumer preference, overwhelmingly believed that genetically modified wheat would not be accepted by Australian consumers in the foreseeable future. Bearing in mind that Australia exported 67 per cent of its wheat in 2010-2011, Grain Growers also surveyed buyers in Europe, Asia and Middle east, again concluding that GM wheat would not be deemed acceptable for the foreseeable future (see also Safe Food Foundation 2013).

³¹ Available at www.fao.org/about/who-we-are/director-gen/faodg-statements/detail/en/c/247970/. Accessed 16 December 2014.

³² Ponisio et al. (2014), in fact, find from a meta analysis of 115 studies that agro-ecological practices such as multi-cropping, crop rotations and diversification substantially reduce yield gaps between conventional and organic production systems.

were planted but how much they increased productivity etc. relative to what would have been achieved through the adoption of concurrent innovations such as IPM but without GE seed.

Operationalizing a more integrated approach to agricultural research as advocated by José Graziano da Silva is possible but only if at least two challenges can be addressed. Suspicion among consumers of genetically modified and other 'industrialized' foods has already been discussed. It is important not to dismiss this too easily as a reactionary response but to remember, rather that food is not just a commodity. Its consumption is an intensely personal, emotional and social experience, intimately connected to both health and culture. It is something about which people hold passionate views. In this context, trust in regulators, science agencies and food suppliers is easily lost.

Just as importantly, institutional frameworks are required to enable the sort of cross-sectoral R&D required to embed new technologies in sustainable agro-ecologies. Public research institutions – including rural R&D corporations – have a crucial role to play linking the contributions of private actors and institutions as well as the contributions of disciplines across the social and natural sciences. And critically, institutional frameworks for cross-sectoral R&D must engage positively with the concerns and preferences of consumers if transformational technologies are to be perceived as a benefit and not a threat.

5.3 FARMS OF THE FUTURE: DIVERSITY AND FLEXIBILITY

Despite decades of talk of its demise, the family farm has proven remarkably resilient. As the *Agricultural Competitiveness Green Paper* points out, 95 per cent of Australian farms covering 77 per cent of total farmland are family owned and operated. The *Green Paper* also points out, however, that larger farms achieve significantly better rates of return on investment, have greater capacity to access finance and service debt, and better access to specialist management expertise. Economies of scale are not then just about getting maximum return on investment. They are about the ability to reinvest, to cope with market downturns and/or poor seasonal conditions, to develop stronger downstream supply chain relationships, to utilize specialist expertise in finance, human resources, natural resource management etc., and to take a generally more strategic approach to decision-making.

Rather than seeing this as an argument for further consolidation of the farm sector the *Green Paper* goes on to identify a number of options available for small to medium sized enterprises such as family farms to achieve greater economies of scale through partnerships with other businesses. These include share farming, leasing, external investment, equity partnerships and cooperatives.³³

In addition to opportunities identified in the *Green Paper*, achieving economies of scale through collaborative business models rather than through farm consolidation has potential to:

- Help manage social challenges associated with depopulation, social and professional isolation etc. by keeping people in agriculture and in rural areas.
- Address barriers to entry for people wishing to enter the farm sector through routes other than inheritance and allow for more specialized and diverse career structures in agriculture.
- Develop more stable supply chain relationships through product aggregation and security of supply.

³³ Led by NSW, a uniform set of national cooperative laws is progressively being introduced across all Australian states and territories to reduce the legal complexity and costs of cooperative business structures, remove requirements for registration across multiple jurisdictions and modernize cooperative governance structures. See www.fairtrading.nsw.gov.au.

Cooperatives, share farming etc. all, of course, have long histories. Considered support for collaborative business models is not about reinventing the wheel but about recognising that diversity and flexibility are virtues – that there is no one ideal farm size, ownership structure or career path – and that we should thus be very careful about policies or programs which either make assumptions about the ‘typical farm’ or encourage homogenization of the farm sector.

Flexibility, further, in the ways farmers use resources across space and time will be increasingly critical for farmers in coming decades as Australia experiences increasing climate variability. Again, this is not necessarily about reinventing the wheel. Larger agricultural businesses have a history of spreading their landholdings across multiple climatic zones and thence moving people, livestock and/or machinery to wherever conditions are most favourable. Smaller businesses have achieved much the same thing by agisting stock with other farmers on a contractual basis, leasing out equipment, and so on. Flexibility can certainly be achieved within conventional business structures. Nevertheless, there is potential to enhance the spatial and temporal flexibility of farm businesses by:

- Encouraging collaborative business structures oriented specifically to the management of climatic variability.
- Higher order planning and support (e.g. at the regional level) for redeployment of resources through agistment and similar arrangements (see Stafford Smith 2014).
- Reviewing drought policies and programs to ensure they encourage proactive and timely responses to changes in resource condition.³⁴

If there is no one ideal farm size or structure, the place of corporate farming (including foreign owned corporate farms) and smallholder farming in Australia both warrant consideration. Very large farms, as noted, have built-in economies of scale and – while family farms shed labour – offer invaluable opportunities for employment in farm work and management (Australian Government 2014; Sefton and Associates 2013). Small farms dependent on off-farm income ought to have more temporal flexibility (that is, the ability to adjust activities to suit seasonal conditions) but the generally low productivity of this sector suggests skilled management may be the exception rather than the norm.

In addition to a diversity of business structures, farmers operate under a diversity of tenure regimes including freehold title, pastoral leases and various forms of communal Indigenous title. As mentioned in Section 3.2, pastoral lease conditions are often criticized for locking leaseholders into uneconomic and unsustainable business models. Lease conditions have been reviewed by the state governments responsible for them but much remains to be done to reduce barriers to investment on pastoral leases (Dale et al. 2013).

Reduction of barriers to investment on land under Indigenous tenure is of particular importance. Dale et al.’s (2013) review of tenure in northern Australia argues that enabling Indigenous people to leverage land assets and raising capital without severing cultural ties offers potential for significant benefit. Options to achieve this are identified including a national trust fund and loan facility.

³⁴ Stafford Smith (2014) argues that while some drought policy instruments such as farm management deposits have the potential to allow farmers to build financial reserves in a non-distortionary way, most instruments create perverse incentives to degrade resources and thence claim relief for the negative impacts of this degradation. The Drought Policy Review Expert Social Panel (2008) reached a similar conclusion and advocated that crisis assistance measures be replaced with incentives to improve the commercial and environmental viability of enterprises.

However, governments appear, at present, to favour privatization of communally held lands.³⁵ While this should provide for involvement in conventional property and equity markets, privatization would also result in permanent extinguishment of native title and associated communal rights. For this reason, it is likely to be unacceptable to many Traditional Owners.

As noted in Section 3.2.2, Indigenous lands cover a significant and rising share of the Australian land mass, often on lands that are of high environmental value and patchy agricultural value. Realization of the economic potential of this land will depend not only on the removal of barriers to investment but on the identification of income streams that capitalize on and protect environmental and social values.

The potential opportunity, moreover, to diversify income streams from nominally agricultural lands through the provision of ecosystem and/or cultural services is in no way exclusive to Indigenous landowners, even if the nature of some of those services clearly is. Realising such opportunities is not simply about tenure reform and investment but about collaboration and planning. Genuine coalitions between agricultural industries and Indigenous land owners could create new options for landscape-level resource natural resource planning and management, reinvigoration of rural labour markets, and diversification of business opportunities.

5.4 WHAT CAN WE EXPECT OF AUSTRALIAN FARMERS?

As custodians of over half the Australian landscape and producers of some of our most essential commodities, food and fibre, it is not surprising Australian farmers are subject to myriad expectations. However, it is equally unsurprising, in light of tight terms of trade for agriculture, that many farmers express frustration about expectations they consider unreasonable and intrusive. The obvious question is what can we reasonably expect of our farmers?

It is useful here to recall a proposal put forward by Australia's Industry Commission in 1998 to explicitly define, through standards, a statutory duty of care for environmental protection to which all farmers and other land managers should be expected to adhere. Such a duty would require anyone whose actions might risk environmental harm 'to take all *reasonable and practical* steps to prevent any foreseeable harm from their actions' (Industry Commission 1998: 7, italics in original). As far as possible, the Commission argued, voluntary standards and codes of practice should guide landholders on how they should comply with this requirement. Further, where voluntary standards are not sufficient, legislative standards should focus on the outcomes to be achieved as opposed to the practices land managers will implement to achieve them.

As Section 3.3.5 demonstrated, standards have become the norm for defining 'reasonable care' in the management of food safety risks. As Section 3.3.5 also demonstrated, producers and governments are not the only stakeholders active in this domain with buyers – most particularly retailers – often defining and imposing their own standards on suppliers. For retailers, this has been as much about meeting legislative requirements imposed on them to manage food safety risks as it has been about pre-empting reputational risks that might arise from exploitative environmental and labour practices elsewhere in their supply chains.

The extension of standards and codes of practice to natural resource management on-farm is more uneven. The importance of redressing this situation as a matter of urgency is recognized by some. Deputy Chair of Cotton Australia, Peter Corish, recently stated that the industry must be 'ready and

³⁵ The Queensland Government, for example, has passed the Aboriginal and Torres Strait Islander Land (Providing Freehold) Act 2014.

able' to demonstrate its environmental and social credentials to independent auditors or risk access to international markets (Neales 2014). Public scrutiny of chemical and water use practices has encouraged the Australian cotton industry to be especially proactive on this front – as demonstrated by its voluntary myBMP (Best Management Practice) program³⁶ – but there is no reason to assume other sectors will be spared similar scrutiny.³⁷

Voluntary standards and codes, according to the Industry Commission (1998), ought to be sufficient to demonstrate compliance with a mandatory duty of care as, in theory, this should enable landholders to choose the standards most appropriate to their circumstances and to participate in and contribute local knowledge to standards development. Beyond a mandatory duty of care, the Commission argues, additional incentives and assistance should be provided to secure public good outcomes such as nature conservation on private land.

While Australia has not, to date, gone down the path of legislating a comprehensive mandatory duty of care for environmental protection³⁸ some lessons can be learned from attempts to do so elsewhere. The EU, in particular, has sought to articulate a narrative about European agriculture that explicitly links keystone programs such as the Common Agricultural Policy (CAP) to the demonstration of responsibility. Following the most recent round of reforms in 2013, the CAP is conceived as a partnership between farmers and governments to deliver quality food, sustainable use of natural resources and landscapes, and rural community development (European Commission 2013). Programs are based on the provision of various income support payments to farmers rather than, as previously, on sectorally-based commodity support. Financial support is based, further, on the premises that:

1. All farmers have statutory obligations to avoid causing environmental damage, to protect wildlife habitat, to maintain the health of natural resources, and to ensure a high standard of animal and plant health. The extent of these obligations is defined through management requirements and standards, compliance with which is a prerequisite for the receipt of income support payments.
2. Beyond these baseline statutory obligations, farmers become eligible for additional incentives and assistance for their efforts in maintaining natural and cultural heritage. The whole community thus takes a financial stake in the provision by farmers of what are deemed public environmental and social values.

There is no intent here to advocate for an Australian facsimile of the CAP. Linking income support payments to compliance with what are supposed to be universal legal obligations undermines the 'polluter pays' principle and suggests that farmers have no significant duty of care to protect resources or to avoid causing harm to others unless they are subsidized to do so (Hodge and Reader 2010). The emphasis on financial incentives is also likely to discourage voluntary activity and coordinated action among farmers while the distinctions, in practice, between 'baseline' and 'higher tier' expectations are unclear (Emery and Franks 2012; Hodge 2001; Hodge and Reader 2010).³⁹

³⁶ To date, approximately 45 per cent of Australian cotton growers participate in myBMP (Neales 2014).

³⁷ For example, fruit and vegetable producers certified against the GLOBALG.A.P. standard must demonstrate compliance with a number of environmental criteria, mostly related to chemical and water management (Lockie et al. 2013).

³⁸ Legislative controls on vegetation clearing, development that may impact endangered species, chemical use etc. do assume a duty of care in relation to specific environmental issues.

³⁹ CAP programs are also characterized by duplication, lack of targeting, lack of coordination, short-termism, bias towards large farms, and lack of capacity building (see Burton et al. 2008; Burton and Paragahawewa 2011; Emery and Franks 2012; de Saint Marie 2014; Hodge 2001; Moxey and White 2014).

As discussed in Section 3.4.3, there has been some experimentation in Australia with the payment of financial incentives to farmers for the provision of ecosystem services (e.g. biodiversity conservation) and there is potential to expand such schemes. The European case illustrates the potential for financial incentives to generate perverse outcomes and the need for care, therefore, both in the definition of standards and in the consequent development of incentives (and sanctions) to comply with or exceed those standards.

5.5 FLEXIBLE, PARTICIPATORY AND ROBUST GOVERNANCE

Defining standards that distinguish between individual and public responsibilities is necessarily complicated by several factors: (1) many natural resource conservation activities produce both private and public benefits; (2) many farmers feel a responsibility for environmental protection that extends beyond their immediate economic interests; and (3) farmers ability to act on their responsibilities varies along with their financial and managerial capacities (Lockie 2013).

Complex relationships between public and private benefit are not restricted to environmental matters. Animal health and welfare, food quality and safety, community vitality and liveability, human capital and professional development, and so on, are all issues in which both farmers and the public at large have a stake. Divisions between public and private benefit do not by themselves, therefore, provide clear guidance on what farmers should be expected to do as a normal condition of access to land and other resources or the extent and nature of assistance they should be provided to exceed these expectations. Fundamentally, these are social and political questions that can only be resolved through social and political means. The question then is how?

As we have seen elsewhere in this report, a number of mechanisms and processes already exist for discussion and articulation of various expectations. These include:

1. Multiple (mostly non-statutory) standards and codes of practice for agricultural production, product quality etc. Many of these are developed either by agricultural sectors or in consultation with them. However, retailer-led and other private sector standards are increasingly important.
2. Collaborative arrangements for natural resource planning and management at multiple scales including, but not limited to, the NLP and regional NRM arrangements. These arrangements emphasize participation, cooperation, learning and matching, as far as possible, planning and decision-making to the scale at which critical hydrological and ecological processes function.
3. Reviews of legal arrangements for property rights and associated bundles of responsibilities, most particularly in relation to Indigenous land tenures, leasehold lands, and northern Australia.

As we have also seen in this report, each of these processes is characterized by various degrees of complexity and uncertainty. In the case of standards, we see multiple competing standards and high compliance costs (Section 3.3.5). Collaborative NRM arrangements are in flux and have been undermined, according to some observers, by an emerging audit culture in government that prioritises measurable and short-term benefits (Section 2). Tenure reform promises more flexibility on pastoral leases but, where Indigenous lands are concerned, appears to be focused almost exclusively on privatization (Section 4.1).

Despite these complexities, the three mechanisms identified here – standards development, collaborative planning and tenure reform – offer the means through which to review, re-establish and monitor expectations of farmers and other land users. Given, it is suggested here, the

considerable work that has gone into developing: (1) sectorally-based standards and codes of practice such as Cotton Australia's myBMP program and Horticulture Australia's Freshcare quality and environmental standards; and (2) comprehensive institutional arrangements for local and regional planning in Australia including support of these at state and national levels; it makes more sense to stabilize and strengthen existing initiatives and institutions than it does to create new ones.

Consolidation of, for example, the national network of regional NRM groups would demonstrate good faith, reinforce collaborative networks and capitalize on the extensive learning that has already taken place about landscape processes, community engagement and effective investment in on-ground activities. Regional groups could play important roles in:

- Working with industry groups and buyers to ensure that as sectorally-specific standards and codes expand they do so in a manner that is sensitive to priority natural resource management and conservation goals.
- Supporting landholders to integrate quality assurance activities within their own business with collaborative planning and management at wider scales.
- Linking landholders into policy processes including tenure reviews and encouraging deliberation more broadly over how responsibilities for desirable social and environmental outcomes might be shared.

Robust governance is equally critical to informing the development and application of research in agriculture. As Vanclay et al. (2013) point out, technological change in agriculture often involves innovation at multiple points in the supply chain and multiple supply chain actors, including consumers, may thus need to be considered or involved in the innovation process.

A number of models of technology assessment have been developed that attempt to pre-empt or resolve social concerns through various levels of public and stakeholder involvement in science policy, technology design, approvals processes etc. and/or through earlier involvement of social scientists in the research process (see Vanclay et al. 2013). These models will not be discussed in detail here. The critical point to note is that the more scientific uncertainty or ethical and moral ambiguity surrounds deployment of a particular technology, the more need there is to utilize tools that facilitate widespread participation and deliberation (Renn and Klinke 2012).

Participation and deliberation will not always lead to acceptance of particular research programs or technologies (see for example Attar and Genus 2014). They may, however, reduce conflict, improve trust in public agencies, and contribute to more constructive dialogue over how scarce R&D resources should be allocated, how technology might be modified to address user or public concerns, the conditions under which particular technologies may be acceptable, how best to communicate benefits and risks to wider publics, and so on.

6. CONCLUSIONS

Agriculture makes numerous contributions to the social, environmental and economic wellbeing of Australia that are not readily substitutable through other land uses and industries. Yet a sense of precariousness and unrealized potential around Australian agriculture continues to persist. Despite consistent productivity gains and a constant stream of farmers leaving the sector many remain vulnerable. Social issues that must be addressed if Australian agriculture is to retain its human capital base include:

- Depopulation and the associated loss of employment opportunities and general amenity from inland rural areas.
- Declining recruitment of women and young people more generally into agriculture as their main occupation.
- Low incomes and returns on investment on the majority of farms.
- The aspirations of Aboriginal and Torres Strait Islander people to live on and derive livelihoods from land under suitable Indigenous tenure.
- Health and wellbeing gaps between rural and urban Australians and between Aboriginal and Torres Strait Islander and other Australians.

Up-scaling production research to support continued productivity gains in Australian agriculture is critical but not sufficient. No single technology will simultaneously resolve the economic, social and environmental challenges facing farmers and other rural people. Neither will any sole act of government – including regulatory reform or deregulation – or a straightforward shift from paying farmers to produce food and fibre commodities to paying them to provide cultural and environmental services. In no small way, the future prosperity of Australian agriculture will depend on its ability not simply to manage threats but to proactively engage with and exceed buyer and consumer expectations. While some will be able to exploit markets for products with specific environmental, cultural or quality claims, others will find that exceeding expectations is simply a baseline requirement of secure market access.

The political landscape of agriculture has undergone profound change, albeit change that is not necessarily obvious in the policies and discourse of political parties. Critical changes in this political landscape include:

- Increasing interest among consumers/citizens and civil society groups in how food is produced. This creates both demand for products believed or certified to meet expectations and opposition to products believed unsustainable, unsafe or cruel.
- Growing insistence from a highly concentrated retail sector that suppliers reduce reputational risk through adherence to quality standards that include cosmetic, safety and, increasingly, social and environmental criteria.
- International momentum for climate mitigation policies with potential both to drive up input costs for farmers and, conversely, to create new income streams.

Blending defence of the family farm with the usual mantra of competitiveness, market access etc. may have some appeal among rural voters. What this does not do is speak to broader public concerns about animal welfare, environmental performance and food safety which have, rightly or wrongly, gained enough traction in recent years to cause significant financial damage. Nor does it speak to the desire evident among many urban residents for a closer connection to their food. It is easy to be dismissive of people and organizations campaigning for animal welfare, environmental protection or moratoriums against genetically modified foods and nanotechnologies; to accuse them of being naïve, emotive or extremist. It is just as easy to dismiss consumers lining up for artisan, fair

trade or organic products as romantic and ill-informed. In some cases, critics of mainstream agriculture and consumers of 'alternative' products may well be misinformed romantics, but this is not the point. The point is that policy narratives need to speak to and mobilize a broader audience; an audience that is likely to interpret assertions about the intrinsic virtue of family farmers as itself romantic and self-serving.

In the short-term, it is entirely plausible that climate mitigation policies will have more impact on Australian agriculture than will climate change itself. This is not because Australian agriculture is immune to the effects of climate change but because, based on current forecasts, existing practices for the management of climatic variability may be sufficient to help farmers adapt. Some farmers will not adapt and the process of concentration will continue. However, should Australian governments or farmers fail to meet international and buyer expectations this process will be accelerated.

It is difficult here to overstate here the role of the private sector – a sector that is highly sensitive to consumer perceptions. There have been no indications, to date, that retailers will start building best practice greenhouse gas mitigation measures into the standards they impose on suppliers. However, such a move is entirely plausible given the rising market influence of the retailers, their subsequent risk of reputational and economic damage around environmental issues, and the ways they have managed such risks in the past. Even in the event retailers do not impose such conditions directly in the short-term, market opportunities may arise for producers able to associate responsible climate management practices with their produce.

Market opportunities for agricultural produce that can not demonstrate desired quality attributes – including social and environmental responsibility – will be increasingly limited and at risk of relegation to low value residual markets. It should not be assumed that rising world populations and demand for food and fibre will create a sellers' market for agricultural commodities. As the markets of Asia grow and mature, they too are placing more emphasis on demonstrable quality attributes.

Australian agriculture is more than capable of rising to this challenge. Arguably, the greatest risk to Australian agriculture is not buyer expectations or changing climates but fundamental disruption in the international system of trade. Export dependence makes Australian simultaneously well-placed to capitalize on the rise of Asia and vulnerable to major geopolitical and/or economic crisis. For the foreseeable future, this risk is low probability but high consequence.

The difference between negative and positive outcomes is not one of chance, but neither it necessarily a simply matter of choice. Some factors lie outside our control. Unexpected processes and outcomes will emerge. Divergent values and interests among stakeholders will lead us to interpret these outcomes differently. Securing desirable futures requires governance that is flexible enough to deal with the unexpected and robust enough to deal with difference in an equitable and just way.

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