Appendix 7. Australia's Agricultural Future

Introduction

Australia's agricultural sector is at a crossroads – the future is bright but there are challenges. The value of Australia's agricultural exports could double by 2050 in response to rising global population. Increasing affluence in Asia presents opportunities for growth. However, agriculture faces unprecedented pressures through climate change, funding and workforce issues.

There is a critical role for science and innovation in Australian agriculture today, and these will be even more vital for our farming future. New technologies are particularly important to dryland crops, pasture-based production, and protection against the introduction of pests and diseases. Australia has a reputation for clean, green, safe, affordable, sustainable and ethical agricultural products; hence the sector must optimise production while maintaining its national and global reputation.

Drawing on the authors' interdisciplinary expertise in agriculture, biosecurity, economics, history and philosophy of science, bioethics, science policy, food studies, mathematics and statistics and history, the report by the Australian Council of Learned Academies (ACOLA), SAF07 *Australia's Agricultural Future* (http://acola.org.au/wp/7-australias-agricultural-future/) provides a vision of Australian agriculture's future, and maps the pathway towards enhancing our outstanding reputation in agriculture, while producing more food in a sustainable way.

Australian agriculture's advantage

Agriculture accounts for ~2 per cent of Australia's total gross domestic product (GDP). The gross value of agricultural production in 2013–14 was $53 billion, with $41 billion of exported agricultural commodities.

Exports have tended to be unprocessed, and Australia is now a net importer of processed food. Australia is a major exporter of wheat, beef, cotton, wool, oilseeds, wine, lamb, sugar, barley and dairy products, driven by our comparative advantage in these commodities and by the trust in the products' quality and safety. Australia's reputation for 'clean and green' products will continue to be important for bulk commodities, as well as processed products. Such claims must be supported by evidence and accreditation.

The expected overall growth in demand for food will translate into opportunities for bulk commodity exporters. However, increased global demand for food will bring increased global competition in our markets and Australia will be generally unable to compete on price internationally with processed products.

Australia can develop niche markets for specialised, high-valued products for consumers who value safety, sustainable production, high quality and perceived health benefits over price. However, it is crucial to develop a better understanding of domestic and international consumers' views on 'clean and green' attributes, including nutrition and

environmental impacts, and the premiums they are willing to pay for such products. Sophisticated information systems and marketing strategies will be required to exploit this niche.

Furthermore, Australian farmers face challenges dealing with highly variable rainfall and poor soils. Agriculture depends on healthy soil, water and biodiversity. Cropping and grazing use ~60 per cent (456 million hectares) of the Australian continent, and agriculture accounts for 50 to 70 per cent of all water consumed in Australia. Climate change and climate variability present significant long-term risks to agriculture that need to be managed.

In summary, the major growth opportunities for Australian agriculture are in (1) raw bulk commodities and (2) high-value specialised products. The sector may also export the knowledge, experience, skills and technology to increase agricultural productivity in developing countries.

To capitalise on these opportunities, policy makers need to ensure that:

- demand growth is sustained in line with population and income drivers;
- there is access to markets, particularly international;
- agricultural protectionism is limited; and
- the diversity of consumer demands is reflected in market and regulatory processes.

Community concerns

The bush has held a special place in the traditional Australian identity. Farming employed some 270 000 people in 2013–14 (excluding forestry and fishing), or 2.3 per cent of Australia's workforce. However, this is just half of what it was in 2000. Nevertheless, labour shortages remain a problem in rural areas. The median age of Australian farmers is increasing at a faster rate than that of the general population, although Australia still has the second highest proportion of farmers under 35 years of age (14 per cent) compared with 29 other developed countries.

Understanding the variations in Australia's agricultural sector is essential for securing its future wellbeing. The sector contains a wide variety of farms, including tiny lifestyle farms, long-run family farms and large corporate farms. Family-owned farms account for 95 per cent of farms and 77 per cent of farmland. However, small family farm businesses may lack ability to adopt advanced technologies and adapt to environmental and market changes.

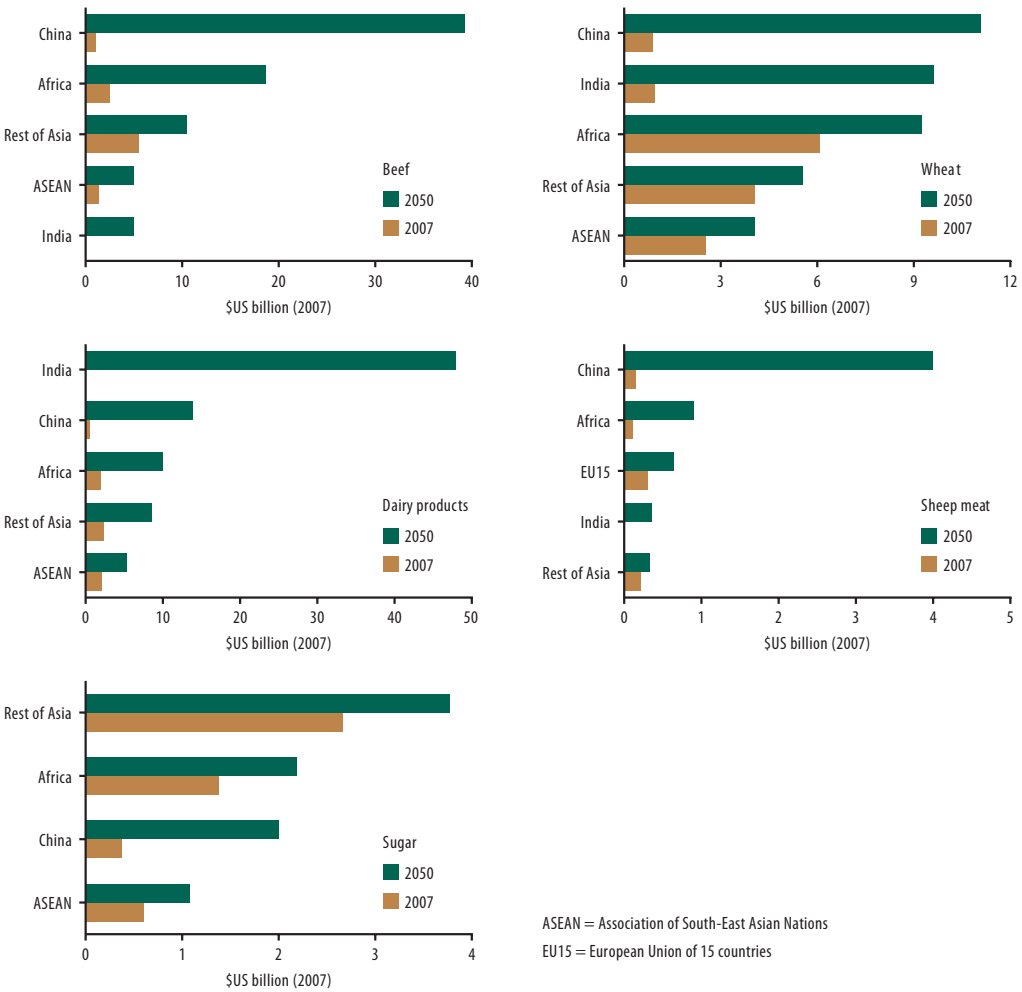
Communities and consumers recently have expressed passionate views about production methods (for example, pesticide usage) and technological innovations (for example, genetic modification). These views have attracted considerable political attention, in part because they are connected deeply to our perception of national identity and because food is a fundamental part of life, the safety of which is considered paramount.

Furthermore, community groups have concerns about the extent of foreign ownership and foreign labour in agriculture. Without more foreign investment in farms and agribusinesses, alternative models of farm financing need to be developed to meet the needs for farm businesses faced with fluctuating incomes and reduced capacity to borrow. Local superannuation funds and other Australian funders may need to be encouraged to invest in potentially risky farming enterprises.

Technology and opportunities to increase productivity

By 2050, global agriculture will need to feed a world population of nine billion. Population growth and changing dietary preferences in Asia, particularly China, India and Indonesia, could result in export opportunities worth many hundreds of billions of dollars over the next few decades.

A move to more profitable commodities and an increase in productivity of traditional commodities will require existing and new technologies, improvements in breeding made possible through advanced genomics, and improvements to management practices. Farmer-driven innovation has always been a feature of Australian agriculture, which has a long history of innovation, resilience, adaptability and growth in productivity. Partnerships between farmers, researchers, communities and others will foster innovation. But a



Current and projected (2050) global demand for major Australian agricultural export commodities. (Source: Linehan V, Thorpe S, Andrews N, Kim Y, Beaini F (2012) *Food Demand to 2050: Opportunities for Australian Agriculture*. Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra)

higher level of research and development investment is needed in areas including technology and practices, advances in genetics, and knowledge-driven systems.

Farms of the future will be unrecognisable. Robots will harvest and prune, and drones will survey fences and check for problems in high-valued crops. Farmers will use real-time information to decide on levels of fertiliser and other inputs. Automation could see reduced demand for some labour while increasing the need for new skills; for example, engineers and computing experts will be needed to run machinery, which will place agriculture in competition with other sectors for these skills.

Conclusion

Community perceptions of agriculture as a 'sunset industry' do not match the resilience shown by the sector or its bright future. Australia will have continuing comparative advantage in the export of bulk commodities and increasing opportunities to respond to the growth in demand for high-value products domestically and in Asia.

Key findings for Australia's agricultural future include:

1. Australia's reputation for safe, clean and green food needs to be sustained and underpinned by internationally recognised standards and certification.
2. The agricultural sector will need to efficiently manage its soil and water resources, including the risks associated with climate change and climate variability, to meet increased demand.
3. The sector will need to attract capital and skilled labour in competition with other parts of the Australian economy.
4. A range of community concerns with food safety, product labelling, gene technology in plant and animal breeding, foreign investment and foreign workers and other issues call for informed and respectful conversations to ensure the Australian community is onside.
5. Accelerating the uptake of advanced technologies, communications and knowledge systems is critical for success, and ongoing investment in private and public research and development is vital.

Expert Working Group Members

Dr Joanne Daly FTSE (Chair)
Professor Kym Anderson AC FASSA
Professor Rachel Ankeny
Professor Graham Farquhar AO, FAA, FRS
Professor Bronwyn Harch FTSE
Professor John Rolfe
Professor Richard Waterhouse FASSA, FAHA