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Australian Agriculture

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This brief describes the current state of Australian agriculture, with the aim of providing key information and statistics in one place. We cover six key aspects of Australian agriculture: its role in the broader economy, trends in production, industry structure, exports, productivity and risk management.

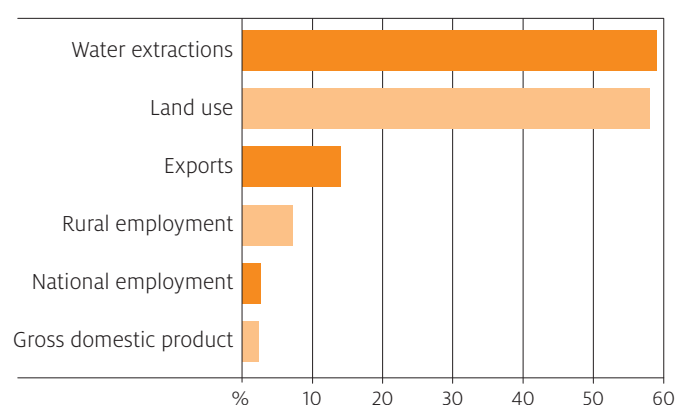
Agriculture's place in Australia

Australian agriculture accounts for:

- 58 per cent of Australian land use (385 million hectares, excluding timber production) and 59 per cent of water extractions (9,434 gigalitres used by agriculture in 2015–16);
- 14 per cent of goods and services exports in 2016–17;
- 2.7 per cent of value added (GDP) and 2.5 per cent of employment in 2016–17.

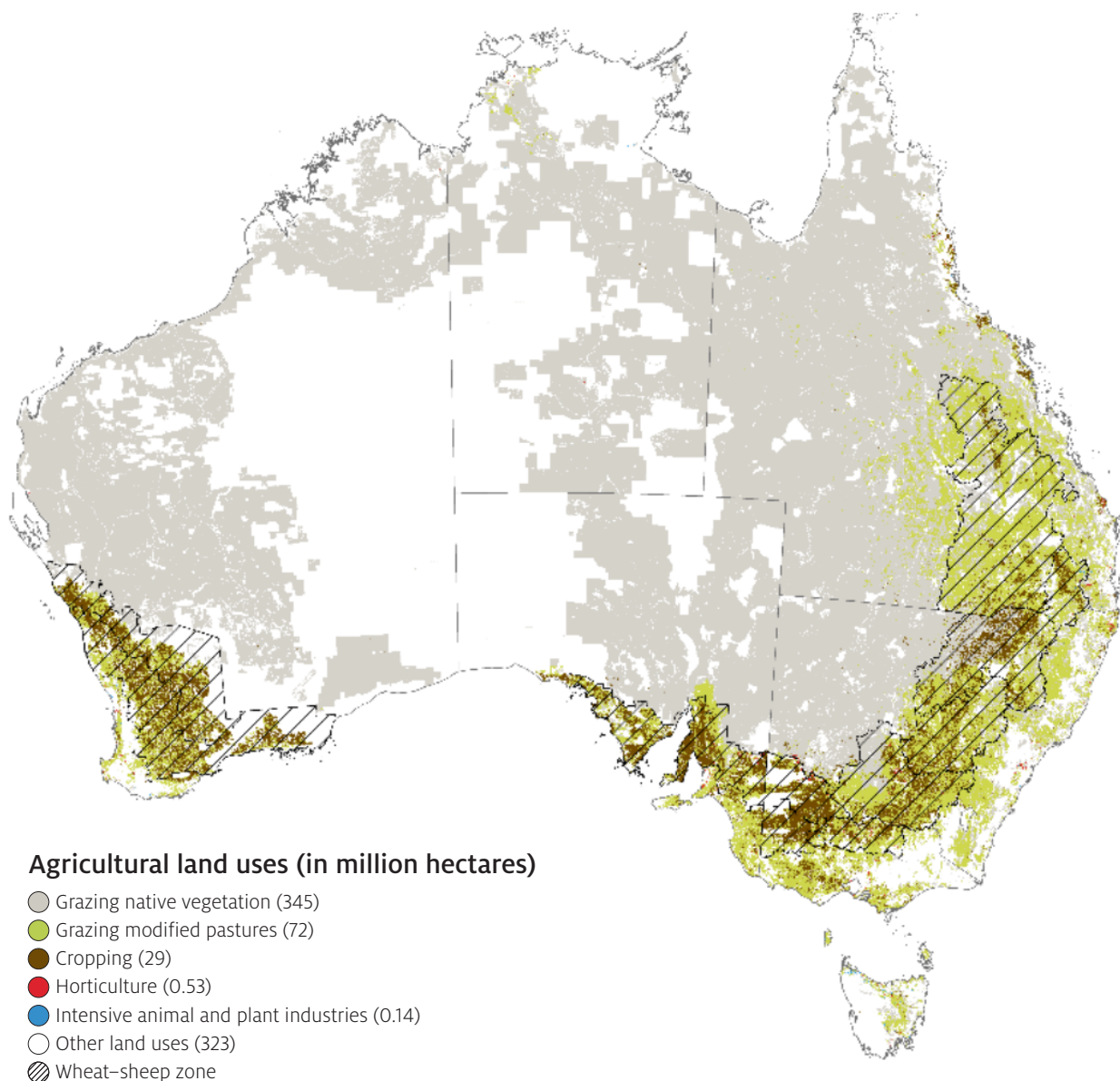
The mix of Australian agricultural activity is determined by climate, water availability, soil type and proximity to markets. Livestock grazing is widespread, occurring in most areas of Australia, while cropping and horticulture are generally concentrated in areas relatively close to the coast (see figure 2).

FIGURE 1 Selected contributions of agriculture



Sources: ABS Water Account (cat. 4610), ABS Land Management and Farming (cat. 4627), ABS Balance of Payments (cat. 5302), ABS Labour Survey (cat. 6202), ABS National Accounts (cat. 5206)

FIGURE 2 Agricultural production zones



Source: Wheat-sheep zone – Agricultural and Grazing Industries Survey, 2016, ABARES; Land use of Australia, 2010–11, ABARES.

Agricultural production is growing

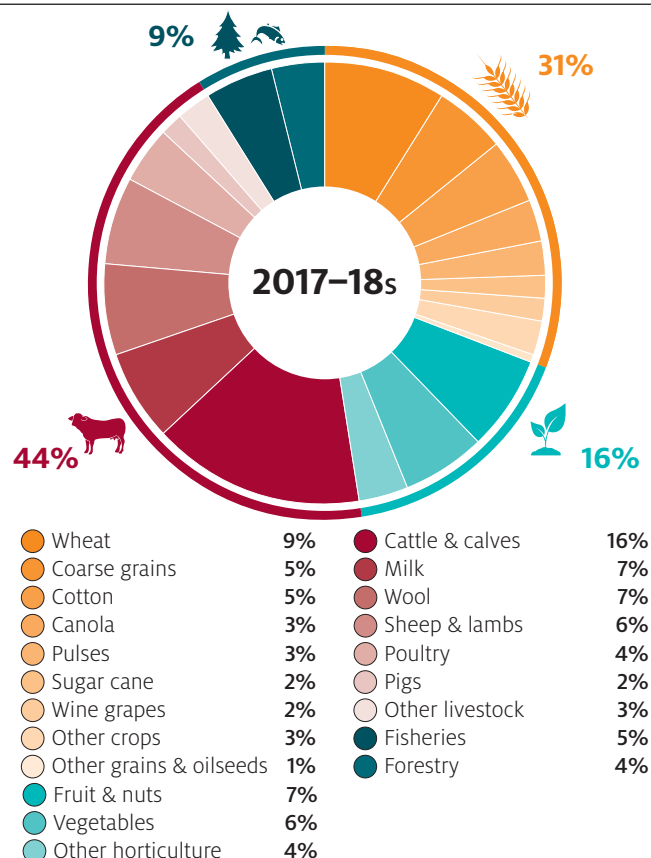
The value of agriculture, fisheries and forestry production has increased by 34 per cent in the past 20 years in real terms (adjusted for inflation), from approximately \$49 billion in 1998–99, to around \$66 billion in 2017–18 (Figure 4).

Drivers of output growth over the past 20 years vary by sector:

- In cropping, falls in real prices have been offset by volume growth as producers have improved productivity by adopting new technologies and as the area sown to crops has expanded.
- In livestock, higher prices have been the main driver of growth, reflecting growing demand for protein in emerging countries, but also some temporary factors such as drought in the US.

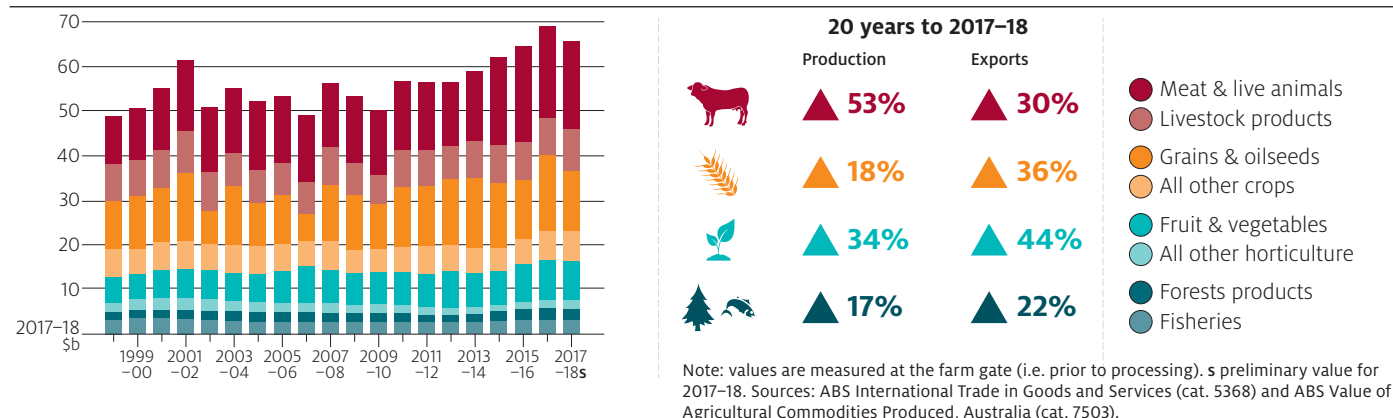
Drivers and patterns of growth vary within the crop and livestock industries – for example the dairy and beef sectors have developed in different ways, and grown at different rates, in response to different circumstances, as have the grains and horticulture sectors.

FIGURE 3 Agriculture, fisheries and forestry value of production, by commodity, 2017–18s



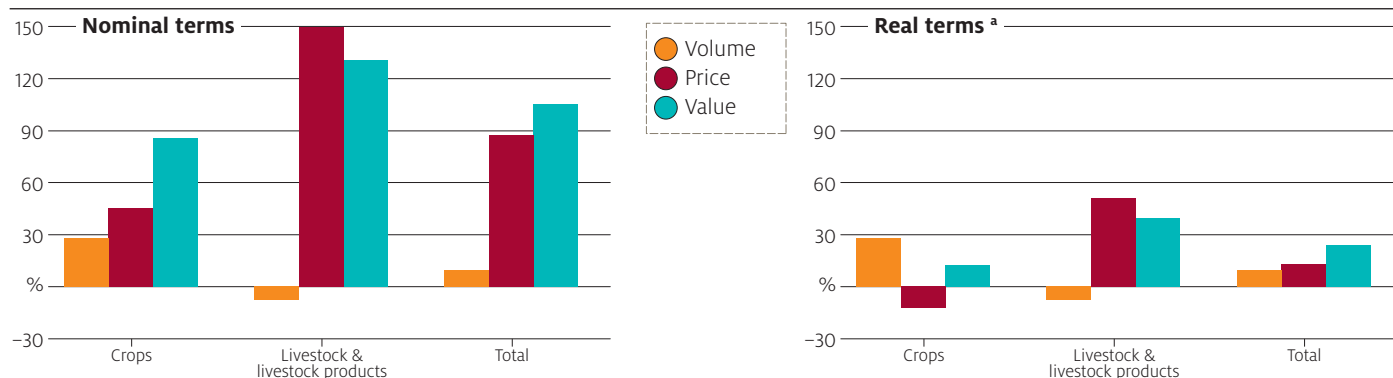
Note: values are measured at the farm gate (i.e. prior to processing). s preliminary value for 2017–18. Sources: ABS International Trade in Goods and Services (cat. 5368) and ABS Value of Agricultural Commodities Produced, Australia (cat. 7503).

FIGURE 4 Agriculture, fisheries and forestry production, 1998–99 to 2017–18s



Note: values are measured at the farm gate (i.e. prior to processing). s preliminary value for 2017–18. Sources: ABS International Trade in Goods and Services (cat. 5368) and ABS Value of Agricultural Commodities Produced, Australia (cat. 7503).

FIGURE 5 Contributions to increased value of agricultural production, 1998–99 to 2017–18s



Note: estimates relate to the agriculture sector only (does not include fisheries and forestry), crops includes horticulture, values represent the growth in each variable over the past 20 years (not the proportion of growth that can be attributed to each factor), s preliminary estimate for 2017–18, a real prices and values are adjusted to remove the effects of inflation. Source: ABARES.

Economic performance is driven by the most productive farms

Sector-level trends in performance are driven by the largest and most productive farms. A range of factors has seen large farms (with receipts above \$1 million per year in real terms) grow from around 3 per cent to around 16 per cent of the farm population over the last four decades, while their share of output has increased from 25 per cent to around 60 per cent of the value of output, as shown in Figure 6.

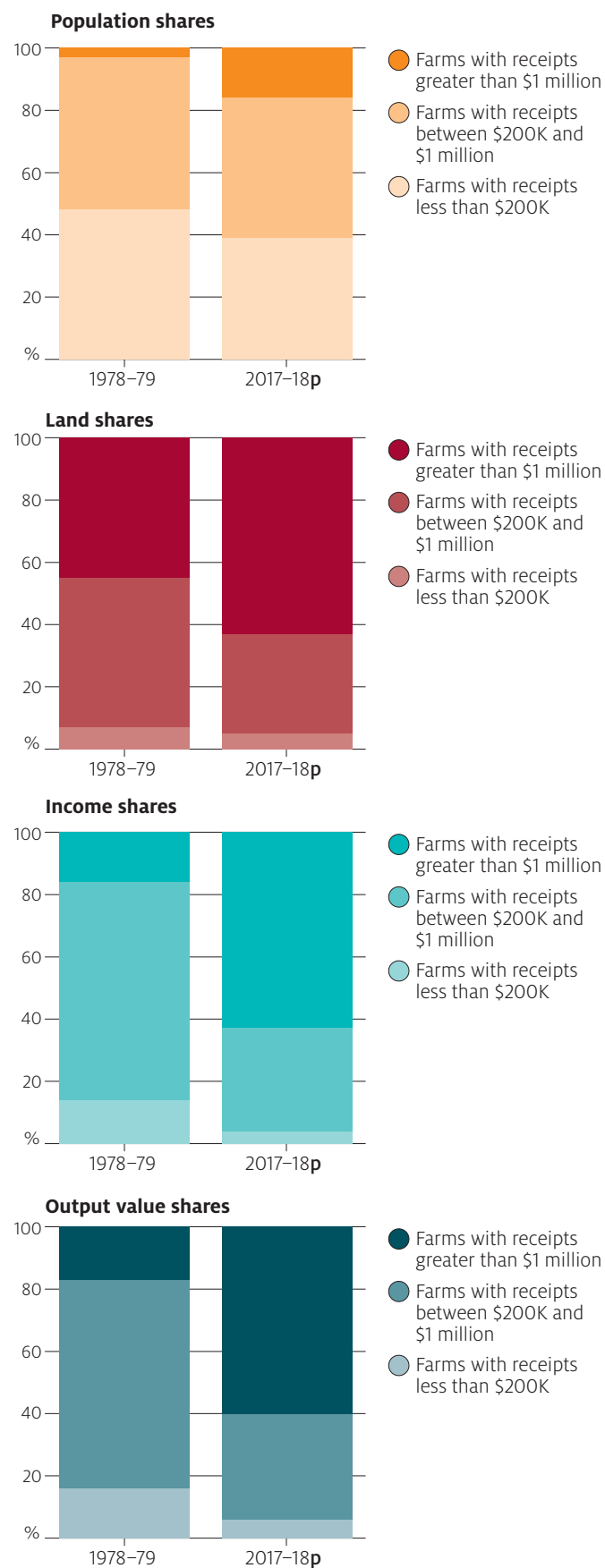
The structure of Australian farms reflects market conditions, which tend to see the best managers operating the largest farms. Farm sizes have increased over time, in terms of both total receipts and land area, as the number of farms has decreased. Increased farm size has supported improved productivity through several channels: providing access to better technology; allowing better and more flexible labour management (supporting higher labour productivity); better knowledge management; diffusion of better farm management practices; and access to positive economies of scale. These changes have been supported by deregulation of most agricultural markets and economy-wide microeconomic reforms.

Within individual regions and sectors, larger farms tend to be more productive and profitable. For example, preliminary analysis suggests that if all farms had the same output per hectare as the highest performing 20 per cent of farms, the total value of broadacre agricultural output would be around 18 per cent above current levels, and farm income (receipts minus costs) would be around 24 per cent above current levels.¹ This reflects the higher productivity of larger farms, and highlights the importance of structural change (which enables farms to grow) for industry-level competitiveness.

While smaller farms are less profitable on average than their larger counterparts, these households compare favourably with the Australian population as a whole, with comparable income, lower debt, and greater net wealth than the average Australian household.

¹ Estimates of output by farm size were constructed separately for livestock and cropping farms in individual ABARES regions and aggregated to the national level using ABARES survey weights. Comparing farms within particular regions and industries helps to control for differences in land quality and climate conditions which cause significant variations in farm performance across Australia. Because of these differences the estimates presented here should be viewed as illustrative only as the increases in production and profitability that are feasible from an agronomic perspective will be different.

FIGURE 6 High-revenue farms now account for one fifth of the broadacre population but two thirds of land, income and output



Note: farm size categories are defined in real terms (adjusted for inflation), income is measured as farm cash income (total cash receipts minus total cash costs), p preliminary value for 2017-18. Source: ABARES.

Around two thirds of agricultural output is exported

Australia exports around two-thirds of the total value of agriculture, fisheries and forestry production.

The value of agriculture, fisheries and forestry exports has grown over the last 20 years (Figure 7). Meat and live animals has been the fastest-growing export segment, growing 79 per cent in value over the 20 years to 2017–18, followed by forest products (up 53 per cent) and fruit and vegetables (up 52 per cent).

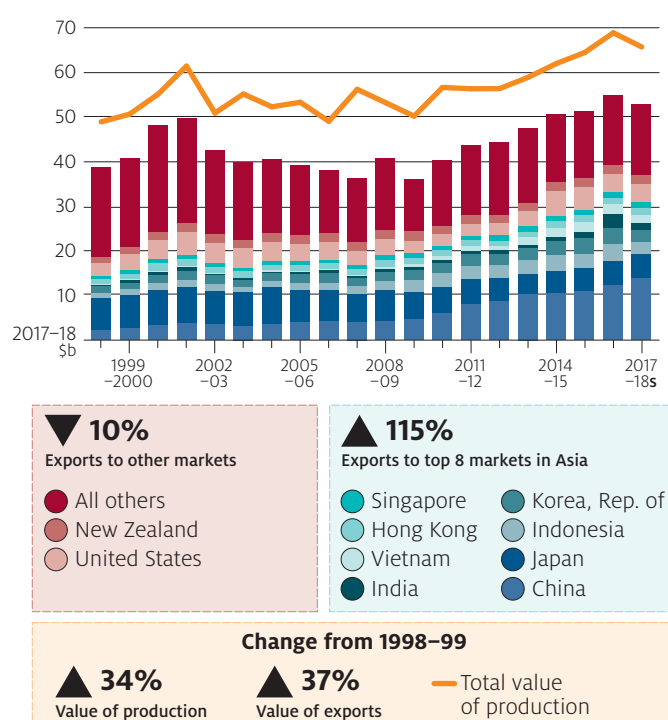
Australian farmers generally export a higher proportion of primary products than our traditional competitors such as the US and EU, although exports are of increasing importance to some key competitors such as Russia and Ukraine for wheat (see Figure 8). Greater reliance on exports means Australian producers typically face stronger competitive pressure, as output prices are largely determined on global markets.

- Export intensity varies across commodities – around 98 per cent for wool and cotton, 71 per cent for wheat, 76 per cent for beef, 41 per cent for dairy and 18 per cent for horticultural products, over the three years to 2016–17.

Global agricultural demand is growing very strongly, reflecting rising per capita incomes as well as population growth, but export competition is also increasing. Asia is the fastest growing export region for the Australian agriculture, fisheries and forestry sectors.

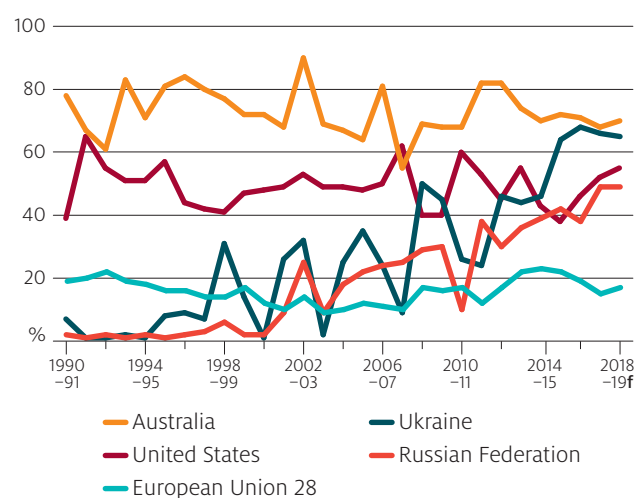
- Exports to Australia's eight largest markets in Asia increased 115 per cent to \$31 billion over the 20 years to 2017–18 and accounted for 58 per cent of the total value of agriculture, fisheries and forestry exports in 2017–18.
- China is Australia's single largest export market for agriculture, fisheries and forestry at close to \$14 billion in 2017–18. Exports to China are about 7 times larger than they were in 1998–99.
- Asian demand is projected to double between 2007 and 2050, providing opportunities for exporters of high value, high-quality agricultural and food products.

FIGURE 7 Agriculture, fisheries and forestry exports by destination



Note: export values are measured at the border and so include processing of some commodities beyond the farm gate (for example wine from grapes and cheese from milk) – for this reason production and export values are not directly comparable, s ABARES estimate. Source: ABARES, ABS International Trade in Goods and Services, Australia (cat. 5368).

FIGURE 8 Export intensity of wheat industry



Note: variable represented is share of production volume exported in each production year. Source: ABARES, USDA Foreign Agricultural Service (PSD).

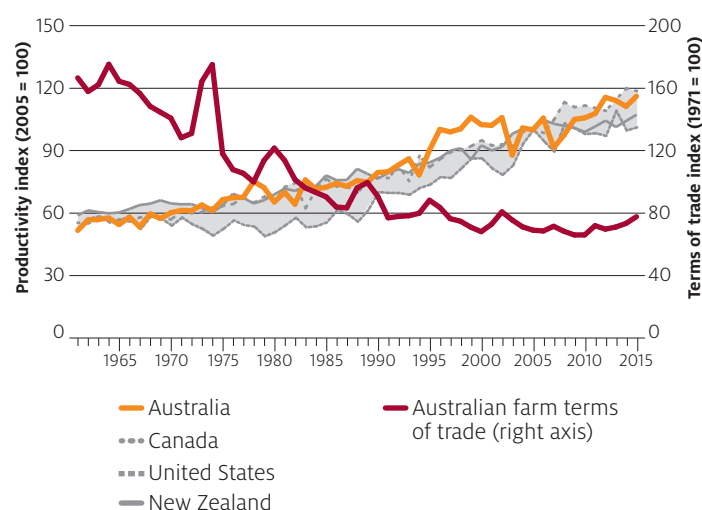
Australia is a competitive producer because of productivity growth

Australian farmers have historically achieved strong productivity growth, increasing the volume of output produced from a given set of inputs. Agricultural productivity growth has been comparable to competing farmers in other high income countries (Figure 9) and faster than other sectors of the Australian economy. This growth has been driven by improvements in technology and structural change.

Productivity growth plays a crucial role in offsetting the impacts on farm profit of ongoing declines in the terms of trade (declines in output prices relative to input prices – see Figure 9). In addition, while Australia is a relatively small agricultural producer globally, we are a significant exporter and must therefore produce at an internationally competitive cost to be profitable. Maintaining international competitiveness (often against subsidised competitors) requires ongoing productivity growth to keep up with improvements in other countries.

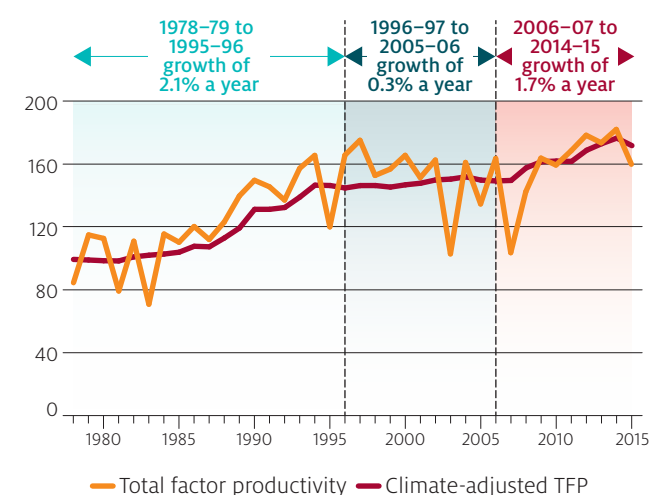
In recent years, agricultural productivity growth has slowed for a number of reasons. These include deteriorating seasonal conditions and less intense research and development efforts, although there is some evidence that crop producers have adapted to changing to climate conditions and in doing so have partly restored productivity growth (Figure 10). Ongoing efforts to reinvigorate productivity growth will be needed into the future.

FIGURE 9 Agriculture productivity growth and terms of trade, 1961 to 2015



Note: 100=2005. Shaded area represents agricultural productivity growth for Canada, United States and New Zealand. These data compare productivity growth over time, and do not represent the level of productivity in each country. Source: ABARES, United States Department of Agriculture Economic Research Service.

FIGURE 10 Climate-adjusted productivity growth, cropping farms, 1978–79 to 2014–15



Source: ABARES.

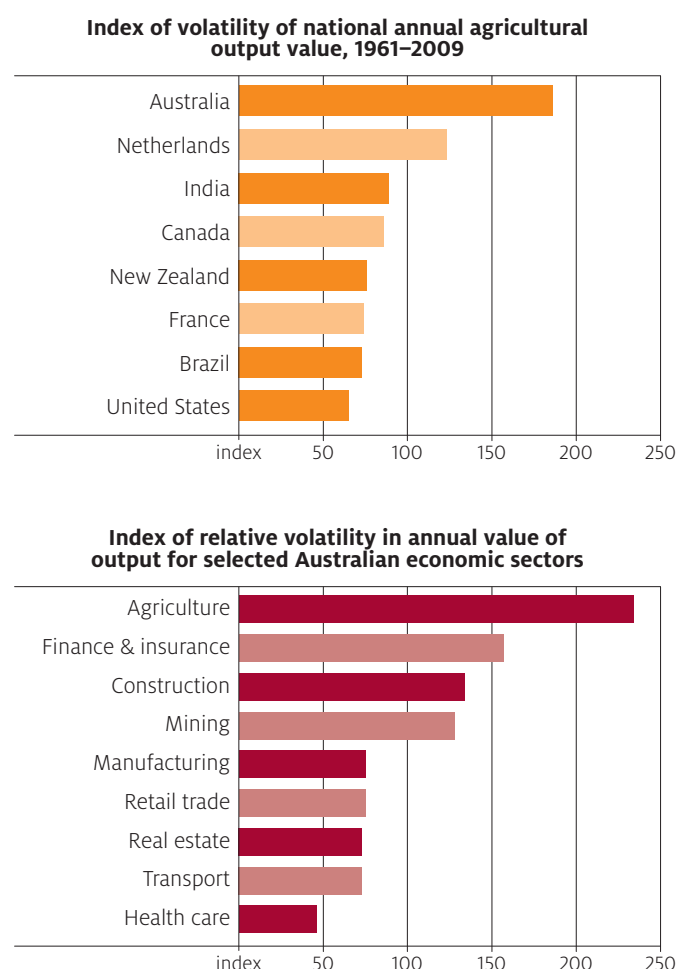
Australian farmers manage significant risk and variability

Australian agricultural producers manage very significant variability, including a highly variable climate and volatile commodity prices. These factors generate substantial variation in farm output, greater than that experienced by farmers in most other countries, and greater than that experienced by business owners in other sectors of the Australian economy (Figure 11).

Australian farmers have a number of effective strategies for managing risk, including maintaining relatively high levels of equity, liquid assets and borrowing capacity, using inputs conservatively, diversifying across enterprises and locations and earning off-farm income. Well managed farms are better prepared for droughts and other risks, such as global price shocks, and not all farmers in regions affected by drought experience economic or financial hardship.

Over the past 20 years, an average of 42 per cent of broadacre farms generated more than \$50,000 (in real terms) in farm cash income in a given year. Farm cash income is the difference between a farm's total cash receipts and its total cash costs. This proportion varies substantially with seasonal conditions and prices, from 28 per cent of farms in the drought year of 2006–07 to 66 per cent in 2016–17.

FIGURE 11 Australian agriculture is highly variable internationally and domestically



Note: average volatility of agricultural output across 15 countries (not all shown) = 100; average volatility of industry output across all sectors (not all shown) = 100.
Source: adapted from Keogh (2012) Including risk in enterprise decisions in Australia's riskiest businesses.

References and further reading

Fuglie, K. (2018). *International Agricultural Productivity*. USDA, Economic Research Service. Retrieved from <https://www.ers.usda.gov/data-products/international-agricultural-productivity/>

Hajkowicz, S., & Eady, S. (2015). *Rural Industry Futures: Megatrends impacting Australian agriculture over the coming twenty years*. Canberra: Rural Industries Research and Development Corporation. Retrieved from <https://www.agrifutures.com.au/wp-content/uploads/publications/15-065.pdf>

Hochman, Z., Gobbett, D., Holzworth, D., McClelland, T., van Rees, H., Marinoni, O., Garcia, J N, Horan, H. (2012). Quantifying yield gaps in rainfed cropping systems: A case study of wheat in Australia. *Field Crops Research*, 136, 85-96. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378429012002341>

Hughes, N., Lawson, K., & Valle, H. (2017). *Farm performance and climate: Climate-adjusted productivity for broadacre cropping farms*. Canberra: Australian Bureau of Agricultural and Resources Economics and Sciences. Retrieved from http://data.daff.gov.au/data/warehouse/9aas/2017/FarmPerformanceClimate/FarmPerformanceClimate_v1.0.0.pdf

Keogh, M. (2012). *Including risk in enterprise decisions in Australia's riskiest businesses*. Fremantle, Australia: Australian Agricultural and Resource Economics Society. Retrieved from <https://ideas.repec.org/p/ags/aare12/124202.html>

Kingwell, R., Elliot, P., White, P., & Carter, C. (2016). *Ukraine: An emerging challenge for Australian wheat exports*. Perth: Australian Export Grains Innovation Centre. Retrieved from <https://www.aegic.org.au/wp-content/uploads/2016/04/Ukraine-Supply-Chain-Full-Report.pdf>

Sheng, Y., Jackson, T., & Davidson, A. (2015). *Resource reallocation and its contribution to productivity growth in Australian broadacre agriculture*. Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences. Retrieved from http://data.daff.gov.au/data/warehouse/9aap/2015/rrcp9aap_20150417/ResReallocContribProdGrowth_20150417_v1.0.0.pdf

Sheng, Y., Mullen, J. D., & Zhao, S. (2011). *A turning point in agricultural productivity: consideration of the causes*. Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences. Retrieved from http://www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pe_abares99010542_11b.xml



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Dr Tom Jackson is a senior economist in ABARES Productivity Section, currently leading research into risk management and innovation on Australian farms.

His previous research examined various aspects of Australia's farm sector, including trends in the structure of the farm population and the effects this has on industry-level productivity growth; the drivers of aggregate farm performance; and the causes of slower productivity growth in the cropping industry.

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ABARES performs applied economic and scientific research, through developing innovative modelling techniques, undertaking comprehensive surveys and developing internationally recognised data management processes.



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Kirk Zammit is an economist at ABARES and specialises in research and analysis on the global economy, the performance of the Australian agricultural sector and agricultural export markets. Prior to ABARES,

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Over the past 20 years, he has worked in government policy agencies, research and private consulting, focusing on natural resource management, global change and sustainable prosperity. He has published in journals including *Nature* and *Science* and is an honorary Professor of Public Policy at the Crawford School, Australian National University.