
FOREWORD

ANZ insight is a series of client reports developed by ANZ. The aim of the series is to support a conversation about opportunity and the increasingly inter-connected nature of business and economic activity in the Asia Pacific region.

It reflects the importance ANZ attaches to building common ground within the business community, and among a diverse range of stakeholders, in order to advance economic relationships and growth in the region.

The series has been developed from ANZ's outward-looking orientation, as Australia and New Zealand's international bank. We believe this allows us to make a unique contribution on issues relating to the Australian, New Zealand and Asia Pacific economies.

'Greener Pastures: The Global Soft Commodity Opportunity for Australia and New Zealand' is the third report in the *ANZ insight* series and was researched and completed by Port Jackson Partners.

The purpose of the report is to quantify the size of the opportunity open to Australia and New Zealand agriculture as a result of the shift in global economic growth to Asia and to other emerging economies, and the increasing demand for protein by a growing global middle class. It also seeks to explore possible policy responses in Australia and in New Zealand to fully capture the opportunity.

The 'Greener Pastures' report is high-level and does not claim to hold all the answers. Agriculture is an industry about which participants and stakeholders have a range of often strongly-held views.

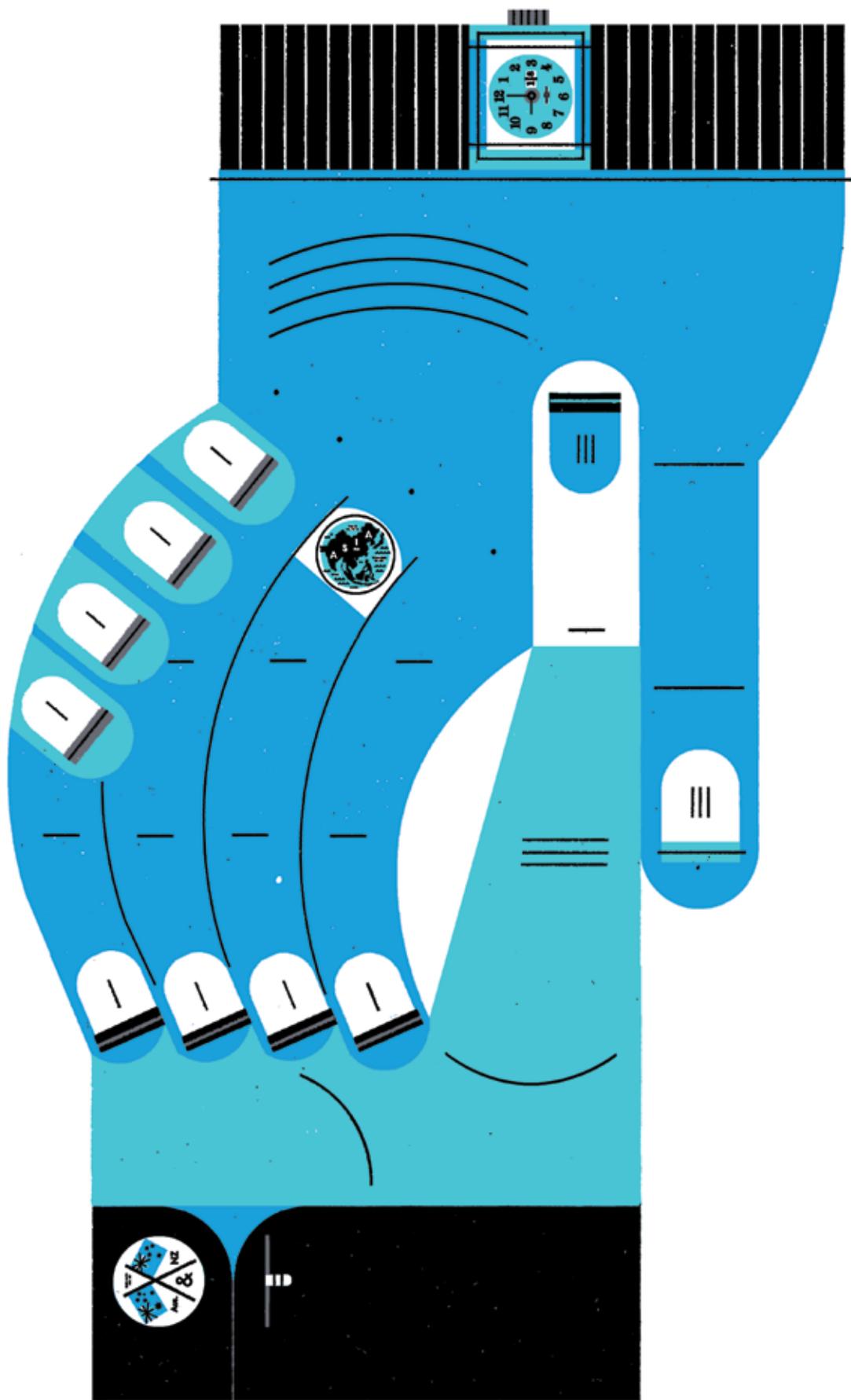
ANZ believes agriculture will be the next industry to benefit significantly from Asia-led growth. To this end, this report provides a framework to advance a conversation with clients and other stakeholders on the opportunities and challenges resulting from rising global demand for agricultural commodities, as well as possible responses advanced to unlock the full potential of Australian and New Zealand agriculture.



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1.0 EXECUTIVE SUMMARY

KEY THEMES:

- *Strong agricultural demand combined with growing supply constraints are driving an enormous opportunity for agricultural trade.*
- *Australia and New Zealand stand to capture an additional A\$0.7-1.7 trillion and NZ\$0.5-1.3 trillion respectively in agricultural exports between now and 2050.*
- *However, both countries face significant headwinds and it doesn't follow that seizing the prize will happen of its own accord.*
- *Maximising growth will require Australia and New Zealand to overcome a broad range of barriers including capital constraints, skill shortages, land-use conflicts and inefficient water markets, unfocused R&D and extension services, rising supply chain costs, and market access limitations.*
- *Leadership and commitment from all stakeholders will be critical in unlocking the full potential of Australian and New Zealand agriculture.*

1.1 BECOMING THE FOOD BOWL OF ASIA: OPPORTUNITY AND CHALLENGE

The continuing shift of economic growth from the developed world to the developing world is driving an enormous opportunity for agriculture in Australia and New Zealand.

In the five years to 2010, the developing world accounted for almost three quarters of global growth. The result has been a surge in demand for the basic materials necessary to support industrialisation and urbanisation particularly in Asia. At the same time, the new-found wealth of the developing world and rising incomes are leading to increased calorie consumption and higher protein diets. This and population growth will see the world demand at least 60% more agricultural output by 2050 compared to 2005-07. If biofuel uptake and the economic growth of developing countries accelerate, demand for agricultural products could more than double over the same period.

Little or no new land and water is coming into production, and some is being withdrawn, with supply unbalanced across the world. Improvements in productivity can boost production but recent trends suggest this alone may not be enough to fill the gap. Demand for many agricultural products has already begun to outstrip supply resulting in periods of high global food prices in recent years. This is in contrast to the experience of the 20th century where commodity surpluses dominated global trade discussions.

In the face of these shifts, some are predicting that Australia and New Zealand could become food bowls for a developing Asia. After all, these two commodity-based economies are logical sources of food and fibre for the growing and increasingly affluent markets in the region. Both countries have the land, the water, the skills and the proximity to benefit from huge middle class populations emerging with sophisticated tastes and rising incomes.

The relative scarcity of agricultural land and water in major growth markets, particularly in Asia, is central to the opportunity for Australia and New Zealand. Both countries could more than double the real value of annual agricultural exports by 2050. This would result in an additional A\$710 billion and NZ\$550 billion of revenues in 2011 dollars for Australia and New Zealand respectively over the next four decades. Moreover, the prize could increase to A\$1.7 trillion and NZ\$1.3 trillion respectively if global demand for agricultural products grows faster, and if both countries boost production volumes and shift to higher value products.

In light of the increasingly affluent and discerning global middle class, there are also a number of opportunities for Australia and New Zealand to capture price premiums. This includes expanding the production of differentiated commodity products and, in some cases, manufacturing value-added products for export markets albeit in niche areas. Coupled with an expectation that global food prices will remain high over the coming years, increased revenue per unit of production should be achievable.

It does not follow however that seizing the prize will happen of its own accord. Success depends on the agricultural sectors in each country addressing the key issues that are hindering performance and holding back potential growth. Moreover, the race to make the most of this opportunity is a global one and the competition is intense, with countries like Brazil, Malaysia and Indonesia currently leading the way. International competitiveness in agriculture is about more than just having access to good land and rainfall. It is about developing connected and mutually reinforcing areas of high capability where extremely efficient supply chains exist side by side with top research and development (R&D) capability, innovative financing, clear strategic vision and productive farms with the requisite scale, organisation, funding and skills.

These are the platforms that have seen Brazil sweep aside global competition to capture the market for soy-bean, Malaysia and Indonesia dominate the production and marketing of palm oil, while New Zealand has created and consistently grown a globally successful dairy industry.

This kind of success, based on clusters of highly competitive activities, has not emerged in Australian agriculture in any substantial way for some years; nor in New Zealand outside the dairy sector.

Future success requires a systematic focus on fostering globally competitive industries with high potential for growth. This will require the support of clusters of highly interconnected service providers including supply chain players, R&D organisations, educational institutions and financiers. When guided by the right strategies, these clusters deliver innovation and competitiveness that is realised through lower cost structures, reliable supply, consistent quality and customer-focused product differentiation.

Australia and New Zealand have fostered a host of successful agricultural industries at various points in time but agriculture in both countries faces numerous challenges. Many industries in Australia have lost momentum over the past decade, while New Zealand is heavily reliant on its dominant dairy industry which has issues of its own.

Although the recent period of drought in Australia was severe, it would be a mistake to attribute poor recent performance to adverse climate impacts alone. Similarly, sustained farm conversions to dairy farming in New Zealand should not mask the fact that many other major industries, including red meat, lack scale and have not performed to their full potential. Closer scrutiny reveals many issues have not received sufficient attention and have now put at risk the international competitive positions of agricultural industries in both countries.

1.2 POSITIONING AUSTRALIA AND NEW ZEALAND TO SEIZE THE OPPORTUNITY

Signs that great industries are losing momentum are often subtle, particularly during times of surging commodity prices. Agriculture in Australia has been understandably pre-occupied with survival during the recent drought. However, there is an urgent need for Australia and New Zealand to overcome a series of growth-limiting hurdles.

Positive progress has been made in recent years to recognise and address some of these challenges, but in many ways the task has only just begun and more needs to be done. For instance:

- **Sourcing capital:** Farmers face significant challenges in raising sufficient capital to fund growth and support farm turnover. Farm debt levels are already high and few external sources of equity capital are available to farmers, particularly in Australia. New structures for owning and operating farms need to be encouraged to attract investment from domestic and foreign investors and capital markets. These structures might include rapidly evolving equity partnerships, modern variants of share farming and use of off-take agreements, as in the mining sector.
- **Attracting skilled labour:** Labour force shortages have intensified. Widespread skill shortages across supply chains and succession concerns associated with an ageing farmer population need to be addressed by boosting the image of agriculture, attracting new workers and enhancing education platforms.
- **Accessing land and water:** Land-use conflicts are an ongoing issue and many regions in both countries still lack clear and efficient water markets. As natural resources inputs become increasingly scarce, resource management should be improved by optimising land use and making better use of each litre of water.
- **Focusing R&D:** National agricultural R&D programs need more focus and coordination to drive long term growth particularly by identifying and pursuing the highest potential opportunities.
- **Closing performance gaps:** Farms perform at substantially different levels with many delivering poor yield and profit outcomes. Closing the performance gaps means reinvigorating public and private extension systems in order to build farmer confidence and to encourage investment in new technologies and best practices.
- **Improving supply chains:** Declining performance and increasing costs for major supply chains is putting competitiveness at risk. Fixing this is critical to future growth. The key is to create or recreate contestable supply chains that are aligned with the interests of the producer, fostering greater trust and coordination. Additional investment in infrastructure is crucial.
- **Targeting key markets:** Further work is needed to understand consumer requirements and explore more innovative ways to access new markets. In addition to striking free trade agreements, strategic off-take agreements should be explored particularly in return for capital investment. There should also be a conscious effort to capture premium market opportunities.

1.3 CAPTURING A SHARE OF THE PRIZE

To restore momentum, agricultural industries in Australia and New Zealand need to focus on growth of both volume and value, in which building competitive strengths is at the core of every part of decision-making. Given the difference in maturity and performance of each agricultural industry, a tailored approach should be applied to maximise growth including:

1. Selectively reinvigorating stalled industries with growth potential such as Australian grains and oilseeds.
2. Sustaining and strengthening existing high growth industries such as New Zealand dairy.
3. Fostering new and emerging agricultural industries around high growth opportunities such as new varieties of oilseeds and advanced biofuels.

Importantly, achieving these outcomes requires leadership and commitment from industry and government. Policy makers play a critical role in facilitating discussions on the state of their nation's agricultural sector. This will mean addressing shortcomings in capital, innovation, labour and natural resources, while seeing agriculture as a sector of the future, not the past. In Australia, this process has begun with the release of the Australian Government's Green Paper, the National Food Plan. New Zealand does not yet have a fully-formed national strategy for food and agriculture, but recent developments have also been promising, including the release of industry-specific strategies from key industry bodies and sector-wide contributions from the Riddet Institute and KPMG.

Importantly, agricultural growth cannot be achieved without the support of both domestic and foreign investors. Between now and 2050, around A\$600 billion and NZ\$210 billion in additional capital will be needed to generate growth and profitability in Australia and New Zealand agriculture respectively, based on current capital valuations. A further A\$400 billion and NZ\$130 billion will be needed in each country to support farm turnover, as ageing farmers make way for the next generation. In a world where capital with a long term focus is in huge demand, agriculture in Australia and New Zealand needs to find innovative ways of attracting domestic and foreign investment, particularly given strong domestic competition from sectors such as mining.

Successfully raising capital from a broad range of sources will be central to financing this growth. Despite foreign investment's central place in both countries' rural development since settlement, concerns have grown in recent years. Australia and New Zealand will have to get the approach to foreign investment right, safeguarding national interests without discouraging offshore investment. It will be critical to align public sentiment with the investment required to boost growth and employment.

While the issues for agriculture are challenging, these sectors have overcome significant obstacles in the past. The global soft commodity opportunity presents a rare chance for Australia to reinvigorate its agriculture, and for New Zealand to apply its dairy success to other agricultural industries.

Australia and New Zealand agriculture need to rediscover their direction and momentum to drive a bold, new era. The time is right for change and the potential rewards are clear. Getting this right will help lead Australia and New Zealand to greener pastures over the coming decades.

2.0 THE GLOBAL SOFT COMMODITY OPPORTUNITY

KEY THEMES:

- *Strong growth in global agricultural demand will coincide with increasing supply constraints over the coming decades.*
- *Prices are expected to stay higher than in recent decades, alongside increasing demand for high value products, but with continuing volatility.*
- *Global agricultural trade will play an important role in correcting the global imbalance in natural resources and productivity growth.*
- *Australia and New Zealand stand to more than double the real value of annual agricultural exports by 2050 and more than triple exports if global demand grows faster, with a shift towards high value production.*
- *This would result in an additional A\$0.7-1.7 trillion and NZ\$0.5-1.3 trillion in agricultural exports for Australia and New Zealand respectively over the next four decades.*

Strong growth in global agricultural demand will likely be met with increasing supply constraints over the coming decades. Chief among the scarce inputs will be water and land. The shift to a supply-constrained agricultural market will create enormous commercial opportunities for resource-rich, export-oriented countries in the region. Australia and New Zealand could significantly increase agricultural export revenues if the right actions are taken to harness the opportunity.

2.1 MEETING THE ASPIRATIONS OF THE DEVELOPING WORLD IS DRIVING SIGNIFICANT GROWTH

Conventional economic theory has always predicted various forms of economic convergence – poorer countries catching up to the income levels of wealthier countries. The 21st century is seeing this theory become reality as the balance of economic growth shifts towards the developing world, with significant changes in the distribution of global wealth. In the five years to 2010, the developing world accounted for almost three quarters of global growth. This is a reversal of the situation prior to 2000, where approximately two thirds of global growth came from the developed world. The world is now witnessing a surge in demand for the basic materials (minerals, energy and food) necessary to house and feed a growing global middle class¹.

The developing world is driving significant growth in demand for agricultural products through two primary forces:

1. **Rising incomes:** As income levels increase, demand for food increases in two ways (Exhibit 2.1). First, per capita calorie consumption rises. Second, individual diets shift from being carbohydrate based to protein based, which is far more water and land intensive per calorie. While lower income country diets are predominantly comprised of cereals, higher income country diets are more focused on fruit and vegetables, sugars, meat, dairy and other animal products such as eggs. Moreover, developed economy diets require almost two and a half times the water (and almost three times the land) per person relative to the least developed countries, with developing countries somewhere in between.
2. **Population growth:** Between now and 2050, the world's population is expected to increase from about 7 billion people to almost 9.3 billion people, an increase of around 35%. About half of the population growth is expected to come from Sub-Saharan Africa, while Asia (largely outside China) will contribute the majority of the remaining growth².

¹ Port Jackson Partners (PJP), "Earth, Fire, Wind and Water: Economic Opportunities and the Australian Commodities Cycle", *ANZ insight*, Issue 1, August 2011.

² "World Population Prospects, the 2010 Revision", United Nations, 2011.

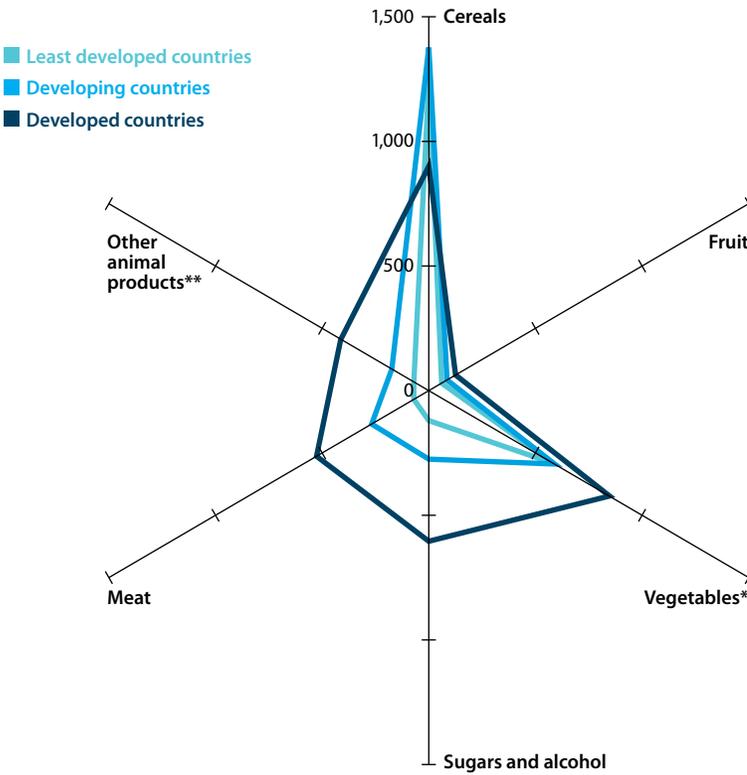
These two forces will apply significant upward pressure on agricultural demand over the coming decades, with the extent of the rising incomes being highly dependent on the rate of economic convergence of the developing world.

Exhibit 2.1

SOURCES OF CALORIE CONSUMPTION

Calorie intake by food type

Kcalories (Kcal) per person per day



Food and associated resource requirements

	Least developed countries	Developing countries	Developed countries	World
Population (billion)	0.8	4.8	1.0	6.6
Average calorie consumption (Kcal/day/capita)	2,150	2,770	3,450	2,800
Water requirements for agriculture (L/day/capita)	1,600	2,600	3,900	2,700
Water requirements per calorie consumed (L/Kcal)	0.74	0.94	1.13	0.96
Land requirements for agriculture (m ² /capita)	3.1	5.1	7.8	5.3

* Includes pulses, spices, roots and oil crops.

** Includes milk, eggs, aquatic products and cheese and excludes meats.

Source: Food and Agriculture Organisation of the United Nations (FAO); International Monetary Fund (IMF).

The Food and Agricultural Organisation (FAO) of the United Nations estimates that agricultural production in 2050 will have increased by around 60% from 2005-07 levels³ – or an average rise of 1.1% per annum during that period. Although economic convergence of the developing world is taken into account to some extent, the estimates assume global average calorie intake in 2050 will remain significantly lower than today's developed world levels – 3,070 kilocalories versus around 3,360 kilocalories per capita. The FAO argues that not all countries show the same food consumption trajectories in response to economic growth, given cultural differences. The projection also assumes almost 4% of the population in developing countries – or nearly 320 million people – will remain undernourished by 2050.

Findings from other studies however, indicate that higher levels of demand growth will occur for agricultural products. A recent study by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) estimates that agricultural production in 2050 would be 77% higher than 2007 levels, translating to an annual average increase of 1.3%⁴. Moreover, many factors could materially increase the estimated demand for agricultural products. Recent projections by the French Research Institute CEPII⁵ indicate more aggressive global GDP growth rates of 2.8% per annum to 2050 compared to the 2.1% used in FAO estimates. Others, including the World Bank, the Organisation for Economic Co-operation and Development (OECD), PricewaterhouseCoopers and HSBC, have predicted even more rapid growth rates⁶. A study by the OECD⁷ suggests that China alone could see 75% of its population reach middle class status by 2030. It also estimates that China and India together could contribute to almost 40% of global middle class consumption by 2030, rising to almost 54% by 2050. Overall, the Asian continent could account for as much as 70% of global middle class consumption by 2050. This is a staggering change as Asia currently only makes up about a quarter of global middle class consumption, of which less than a third comes from China and India.

3 "World Agriculture Towards 2030/2050: 2012 Revision", FAO, 2012.

4 Furthermore, ABARES' estimate included only agrifood products – food-based agricultural commodities and fish; "Food demand to 2050 – Opportunities for Australian agriculture", Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), 2012.

5 Jean Fouré, Agnès Bé nassy-Quéré, and Lionel Fontagné, "The great shift: macroeconomic projections for the world economy at the 2050 horizon", CEPII, February 2012.

6 van der Mensbrugge et al., "Macroeconomic environment and commodity markets: a longer term outlook", World Bank, 2009; Romain Duval et al., "Long-run growth scenarios for the world economy", Organisation for Economic Co-operation and Development (OECD) Economics Department, 2010; John Hawksworth and Anmol Tiwari, "The World in 2050 – The accelerating shift of global economic power: challenges and opportunities", PricewaterhouseCoopers, January 2011; Karen Ward, "The World in 2050: Quantifying the shift in global economy", HSBC Global Economics, January 2011.

7 Homi Kharas, "The Emerging Middle Class in Developing Countries", Working Paper No. 285, OECD Development Centre, January 2010.

To illustrate a possible bullish scenario, our assessment of the potential dimensions of the soft commodity opportunity is based on three further considerations (Box 2.1):

1. **Economic and diet convergence could occur faster.** Changing diet profiles in the developing world could occur at a much faster rate and be less constrained than FAO estimates. The next 20 years could see high growth developing countries reach agricultural consumption patterns similar to that of the West, while the least developed nations could reach similar profiles over the next four decades.
2. **Growth in biofuel demand could have a material impact.** While the potential impact of biofuels on agriculture is still dependent on government policies and the uptake rate of second-generation technologies, for example biofuels manufactured from residue non-food parts of current crops, the demand pressure on cereals and vegetable oils could be very significant.
3. **Population growth will compound the two forces.** Continued population growth will exacerbate any effects of the two factors above.

Taking these considerations into account, our estimates suggest that a Rapid Convergence Scenario would see global agricultural output more than double by 2050 from 2007 levels (Exhibit 2.2). This equates to an average annual growth rate of about 1.8% in real gross output, with more rapid growth of up to 2.6% occurring over the next two decades. Population growth, increased calorie intake and the shift in diets are each estimated to contribute roughly one third of agricultural output growth (Exhibit 2.3), while growth in biofuels could add a further 7% to total global output by 2050. Although this scenario is aggressive in some respects, it is not inconceivable. Importantly, those that are prepared for the potential upsides of global agricultural demand will capture the most value.

Furthermore, the expansion of the world's middle class will see more people paying price premiums for differentiated products that meet specific needs. This will provide opportunities across all stages of the value chain including farm, commodity processing, and value-added manufacturing. Agricultural industries able to respond quickly to these higher-value market opportunities could significantly improve per unit profitability. This is particularly important for major exporters in the developed world, many of whom are facing increasing cost-based competition from counterparts in the developing world.

Box 2.1: RAPID CONVERGENCE SCENARIO – KEY ASSUMPTIONS

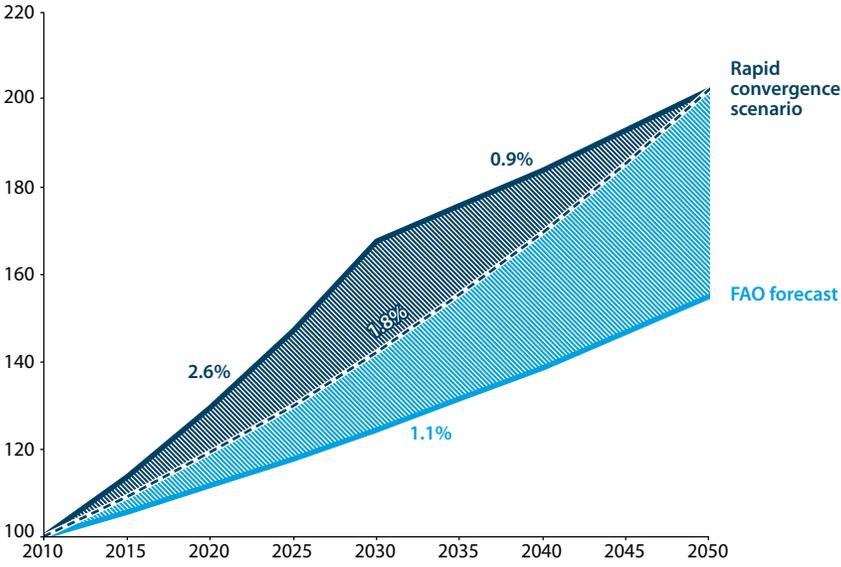
	2010-30 Assumptions	2030-50 Assumptions
1. Economic and diet convergence could occur faster	<ul style="list-style-type: none"> • Least developed nations converge on the dietary mix of developing nations and increase daily calorie intake from ~2,150 to ~2,770 Kcal/person. • India increases calorie intake from ~2,350 to ~3,000 Kcal/person and meat intake to a fifth of developing world average. • Developing nations (excluding India) converge on the dietary mix of developed nations and increase daily calorie intake from ~2,900 to ~3,450 Kcal/person. • Developed nations increase calorie intake from ~3,450 to ~3,550 Kcal/person, with further intake of meats, oils and animal products. 	<ul style="list-style-type: none"> • Least developed nations increase calorie intake to ~3,200 Kcal per person with proportional dietary mix comparable to developed nations today. • India increases calorie intake to ~3,200 Kcal/person and individual meat intake rises to about half that of developed nations. • Developing nations, having already converged with developed nations in today's terms, reach calorie intake of ~3,550 Kcal/person. • Developed nations continue to increase calorie intake to ~3,650 Kcal/person (US average at ~3,800), with further intake of meats, oils and animal products.
2. Growth in biofuel demand could have material impact ⁸	<ul style="list-style-type: none"> • Mandatory, voluntary or indicative government targets implemented by 2020. • Second-generation technologies become commercially viable by 2015; uptake is gradual. • Cereals used in biofuel production reach 327 million tonnes by 2020, and increase to 437 million tonnes by 2030. • Vegetable oils used in biofuel production reach 58 million tonnes by 2020, and 85 million tonnes by 2030. 	<ul style="list-style-type: none"> • Cereal and vegetable consumption from biofuel production remain largely constant throughout the period due to increased demand being offset by the gradual uptake of second-generation technologies. • Cereals used in biofuel production reach 446 million tonnes by 2050. • Vegetable oils used in biofuel production reach 112 million tonnes by 2050.
3. Population growth will compound the two forces	<ul style="list-style-type: none"> • Population grows at around 1% per annum, driven largely by the developing world, particularly Africa and India. 	<ul style="list-style-type: none"> • Population growth slows to around 0.5% per annum and continues to be driven by the developing world, particularly Africa and India.

⁸ "Looking ahead in world food and agriculture: perspectives to 2050"; FAO, 2009; IIASA WFS simulations, 2009; Based on FAO's variant V1 of the Target scenario (TAR-V1). The assumptions could be seen as aggressive, but illustrate the possible upsides.

Exhibit 2.2

GLOBAL AGRICULTURAL DEMAND – POTENTIAL RANGE OF SCENARIOS*

Index 2010 = 100

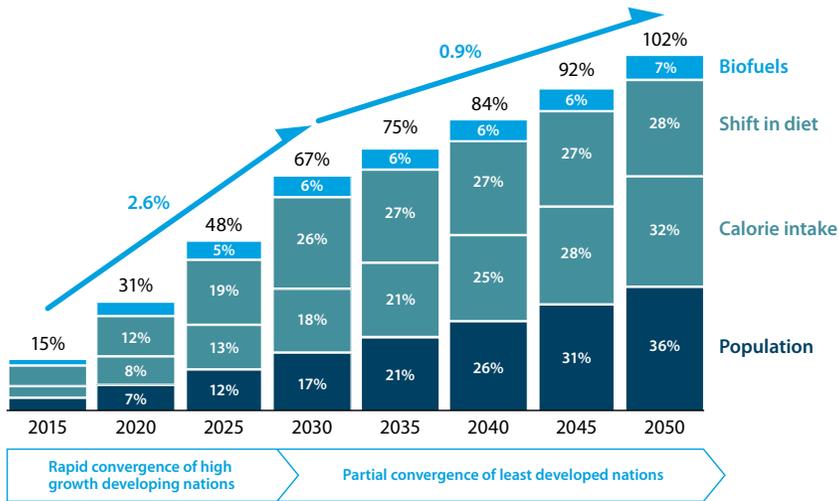


* Compound annual growth rates shown are averages over the period.
Source: FAO; PJP analysis.

Exhibit 2.3

GROWTH IN REAL GROSS VALUE OF GLOBAL AGRICULTURAL PRODUCTION – RAPID CONVERGENCE SCENARIO*

Percent increase from 2010

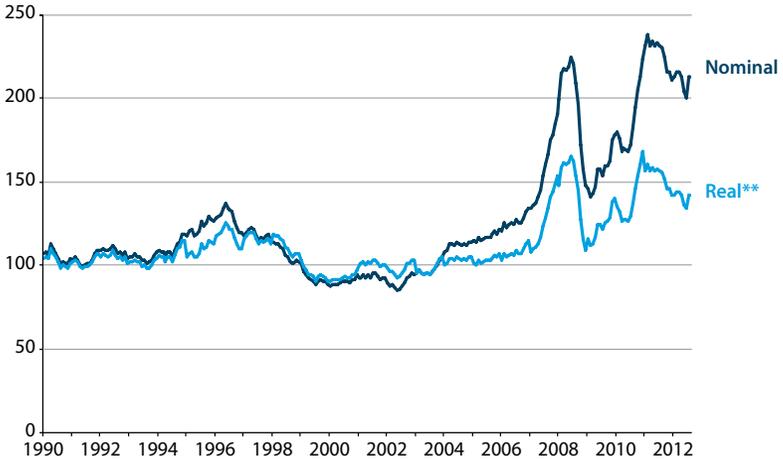


* Compound annual growth rate shown are averages over the period.
Source: PJP analysis.

2.2 INCREASING SUPPLY CONSTRAINTS EXPECTED TO KEEP PRICES HIGH

Despite strong growth in global production over the past decade, demand for agricultural products has already begun to outstrip supply. This change in market dynamics has resulted in rapid increases in real global food prices in recent years (Exhibit 2.4). Prices first peaked in 2008 and reached even higher levels in early 2011, at around 60% above the long-run average of real prices from the preceding two decades.

Exhibit 2.4
GLOBAL FOOD PRICE INDEX*
Index 2002-04 = 100



* Consists of the average of 5 commodity group price indices weighted with the average export shares of each of the groups for 2002-04; 55 commodities are included in total.

** The real price index is the nominal price index deflated by the World Bank Manufactures Unit Value Index (MUU).
Source: FAO.

These changes reflect growing constraints on the supply of land and water. With limited potential for sustainable increases in these natural inputs, higher levels of agricultural output depend on improvements in agricultural productivity. Estimates place global total factor productivity growth at approximately 1.3-1.5% per annum over the past two decades⁹, with the most optimistic reaching no more than 1.7%¹⁰. Land productivity growth has been estimated to be even lower at around 1.2%, with some estimates suggesting this could slow further. Given that global agricultural demand is expected to grow between 1.1% and 2.6% over the coming decades, productivity growth will struggle to keep up.

In the absence of significant improvements in productivity, global food prices are expected to remain high as land and water constraints intensify. Among others, the OECD supports this view and expects average real prices over the next decade to be 20-30% higher than the prior decade for many commodities¹¹. Prices will also become increasingly volatile as delayed supply responses create timing misalignments with rapidly changing market opportunities. This increased volatility is expected to cause sub-optimal investment decisions, which could further impede production increases¹².

⁹ Keith Fuglie, "Total Factor productivity in the global agricultural economy: evidence from FAO data", 2010.

¹⁰ "2011 Gap Report", Global Harvest Initiative, 2011.

¹¹ "OECD-FAO Agricultural Outlook 2012-2021", OECD, 2012.

¹² "Policy Report on Price Volatility in Food and Agricultural Markets: Policy Responses", OECD, 2011.

2.2.1 Limited potential for additional agricultural land

Agriculture already uses a significant proportion of the world's total land area, accounting for about 37% (or 4.9 billion hectares). Crop production accounts for about a third of total agricultural land. Over the past 40 years, total agricultural land area has increased at less than 0.2% per annum, with cropping area growing at 0.5% per annum. Moreover, the distribution of agricultural land per person differs greatly across regions and countries – key growth markets like China and India have disproportionate shortages (Exhibit 2.5).

On the face of it, there would appear to be potential for expansion of the world's arable land. However, the reality is sobering. About 31% of the remaining land around the world is forest area. Although deforestation contributed to arable land expansion last century, the growing global emphasis on environmental protection will make future conversions of this type less attractive. A further 27% of the world's land area is regarded as desert or lacking the soil properties needed for agricultural applications. The remaining 5% of global land area is either otherwise unsuitable or is used for urban applications. Moreover, the current supply of agricultural land faces increasing pressures from other land uses such as urban, industrial and mining developments. FAO supports the notion that the potential for additional land is limited, with arable land estimated to expand by just 70 million hectares by 2050 (or less than 5% of the current area). This translates to an average annual growth rate of 0.1%, which is a significant slowdown from 0.5% annual growth in arable land over the past 40 years¹³.

2.2.2 Water supply will be severely stressed

The constraints on the availability of water could become more pronounced than those on land. Globally, agriculture already accounts for almost 70% of all water withdrawals and will face increasingly intense competition from domestic and industrial uses. This is particularly the case in developing countries with rapid economic growth. In China during the period 1980-2005, substantial increases in industrial and domestic water consumption saw agriculture's share of water withdrawals decline from 88% to 65%¹⁴.

Furthermore, an increasing number of countries or parts of countries are reaching critical levels of water scarcity¹⁵. Among others, China, India and the US already have vast regions where water use is outstripping supply¹⁶. For example, studies have identified more than 160 areas in China suffering from the over exploitation of ground water for urban use¹⁷. Globally, one estimate suggests that between 15-35% of water used for agriculture is unsustainable¹⁸.

As with land, there exists a significant imbalance in fresh water availability around the world (Exhibit 2.5). Regions with high demand growth and large populations have significantly less water than the global average. Asia has an average of 3.5 million litres of renewable water supply per capita while the American continent has 26.5 million litres per capita. China and India, the largest high growth markets, have just 2.1 million litres and 1.6 million litres per capita respectively, and already face serious environmental challenges.

¹³ "World Agriculture Towards 2030/2050: 2012 Revision", FAO, 2012.

¹⁴ AQUASTAT, FAO, 2012.

¹⁵ "OECD-FAO Agricultural Outlook 2012-2021", OECD, 2012.

¹⁶ "Unsustainable water use threatens agriculture, business and populations in China, India, Pakistan, South Africa and USA – global study", Maplecroft, 10 May 2012.

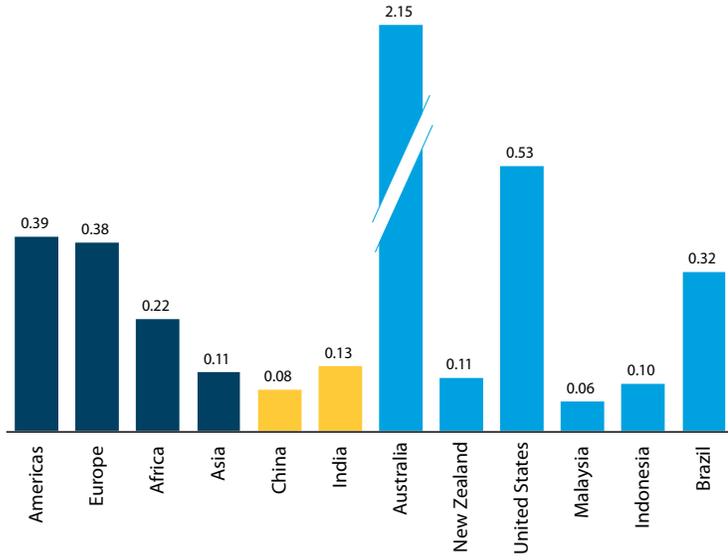
¹⁷ "Ensuring the Safety of Urban Water Supply, Facilitating the Frugal and Appropriate Consumption of Urban Water", Ministry of Construction, People's Republic of China, August 22, 2006.

¹⁸ "Ecosystems and Human Well-being: Synthesis", Millennium Ecosystem Assessment, 2005.

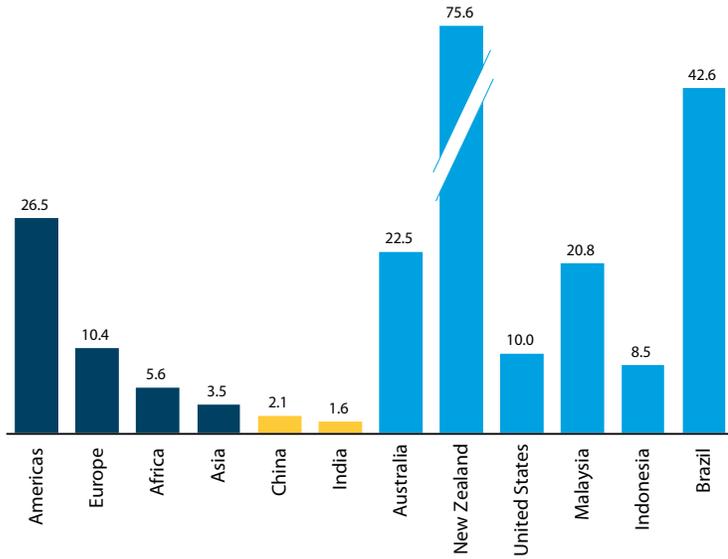
Exhibit 2.5

LAND AND WATER RESOURCES BY REGION AND COUNTRY – 2009

Arable land
Hectares per capita



Annual renewable water supply*
Million litres per capita



Continents	Major growth markets	Selected exporters
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* Fresh water from surface and underground sources, including rainfall.
Source: FAO.

2.2.3 Agricultural productivity growth has slowed

While agricultural productivity is difficult to measure, there is a growing consensus that global productivity growth has slowed in recent years, particularly in the developed world. Productivity growth has also varied significantly across the globe, with some developing countries, particularly in Asia and Latin America, delivering much higher growth as they close the productivity gap with the developed world.

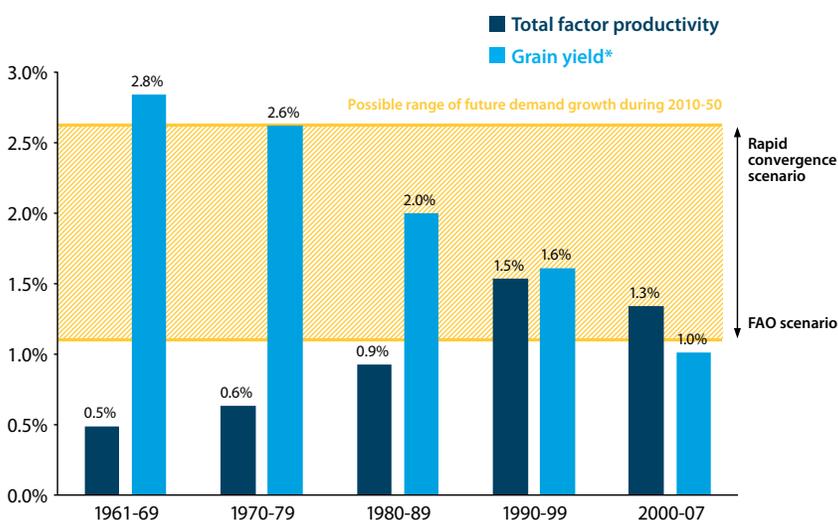
Despite strong improvements in total factor productivity during the second half of the 20th century, one study suggests that this growth on average has slowed from 1.5% per annum in the 1990s to 1.3% per annum during 2000-07¹⁹ (Exhibit 2.7). Moreover, other studies measuring partial productivity also show slowing growth. Global growth in land productivity has seen a general decline over the past 20 years, compared to the three decades prior²⁰. China and Latin America are significant exceptions, with considerably higher growth rates of land productivity since 1990. Excluding China, global average land productivity growth slowed from an average of 1.8% per annum during 1961-90 to 1.4% during 1990-2010. Global cereal yield growth has also slowed from 2.5% per annum during 1961-90 to 1.3% during 1990-2010. The FAO predicts that the downward trend could continue as cereal yields are predicted to grow by 0.7% per annum during 2005-50 compared to 1.4% per annum during 1987-2007²¹.

In the short term, increased use of inputs – in particular nitrogen fertiliser – may boost productivity, however this approach has raised environmental concerns and is considered by many as unsustainable over the longer term. A longer term reversal in declining productivity growth will require significant and widespread investment today in R&D and extension services.

Exhibit 2.6

GLOBAL AGRICULTURAL PRODUCTIVITY MEASURES

Average annual growth rate by period



* Global production of maize, rice and wheat divided by area harvested of these crops.
Source: Keith Fuglie.

¹⁹ Keith Fuglie, "Total factor productivity in the global agricultural economy: evidence from FAO data", 2010.

²⁰ Jason Beddow, Philip Pardey, and Julian Alston, 'The Shifting Global Patterns of Agricultural Productivity', Choices Magazine, 2010; Philip Pardey, "R&D and Productivity Growth in Developing Countries", ABARES Outlook Conference 2012, 7 March 2012.

²¹ Jelle Bruinsma, "The resource outlook to 2050: by how much do land, water and crop yields need to increase by 2050?", FAO, 2009.

2.3 THE IMPORTANT ROLE OF GLOBAL AGRICULTURAL TRADE

Supply deficiencies in natural resources in major growth markets, particularly in Asia, will present substantial trading opportunities for Australia, New Zealand and other resource-rich countries in the Asia Pacific region. Many countries will place less emphasis on exports and focus more on feeding and clothing their own populations. In addition, countries that are able to provide differentiated, higher quality products will be able to exploit price premium opportunities from the increasingly affluent and discerning global middle class.

At the heart of the massive trade opportunity is China and increasingly, India. The two countries are home to more than a third of the world's population but less than a fifth of the world's arable land and less than a tenth of the world's renewable water supply. China is already a major net importer of agricultural products with the average value of its agricultural imports increasing from 82% of agricultural exports in the period 1990-93 to 191% of exports during 2006-09. Major imports have been soybean to feed China's booming pig farming operations, as well as animal and vegetable oils. While India remains a net agricultural exporter, imports have also grown significantly in recent years. The average value of India's agricultural imports has increased from 35% of agricultural exports during 1990-93 to 61% during 2006-09, and reached 82% in 2009²². While both countries have aggressively pursued expansion of domestic production, the momentum in agricultural import growth is unlikely to slow.

Globally, the growth in agricultural trade has already outstripped production growth in recent years (Exhibit 2.7), with exporters in the developing world capturing much of the upside. During 2000-09, the total value of global exports grew at around 9.7% per annum while global production grew at 7.6% per annum. Brazil, which is now a top five agricultural exporter, has been particularly successful in driving production and capturing opportunities in key markets such as China. During 2000-09, Brazil's exports increased at more than 17% per annum, largely fuelled by sugar cane, soybean, beef and chicken meat production. Some developing countries in the Asia Pacific region have also enjoyed significant success in agricultural production and trade. In particular, Malaysia and Indonesia have grown their agricultural exports by 14% and 18% per annum respectively during 2000-09, largely driven by increases in palm oil production.

In contrast, exporters in the developed world have been mostly slow to respond. During 2000-09, the United States (US) increased agricultural exports by less than 7% per annum while Australia delivered an annual growth rate of less than 4%. Australia grew beef exports at 0.4% per annum during the period, in contrast to Brazil's beef export growth of more than 14% per annum²³. Overall, New Zealand fared better, growing agricultural exports at 9% per annum during the period, predominantly supported by its dairy industry.

²² The Statistics Division of the FAO (FAOSTAT), 2012.

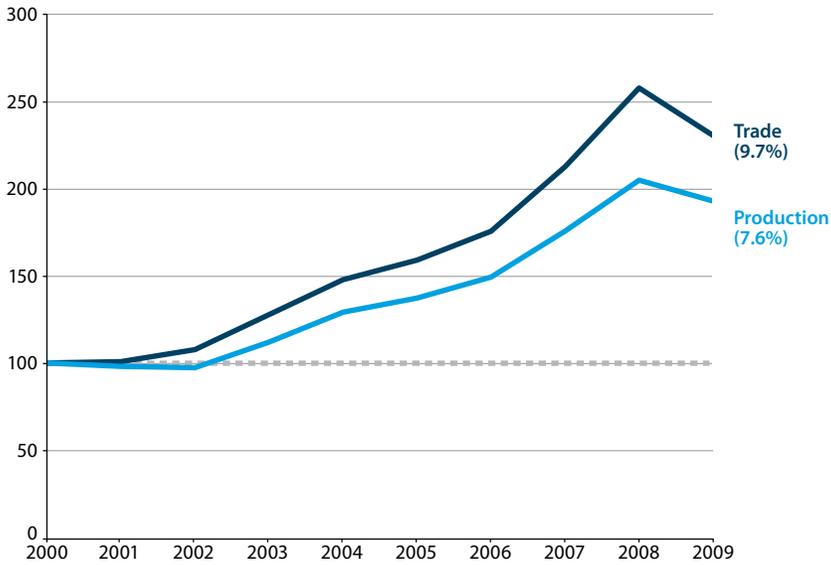
²³ Beef export growth rates are based on export volumes; US Department of Agriculture, Production, Supply and Distribution database.

Exhibit 2.7

AGRICULTURAL PRODUCTION AND TRADE VALUE

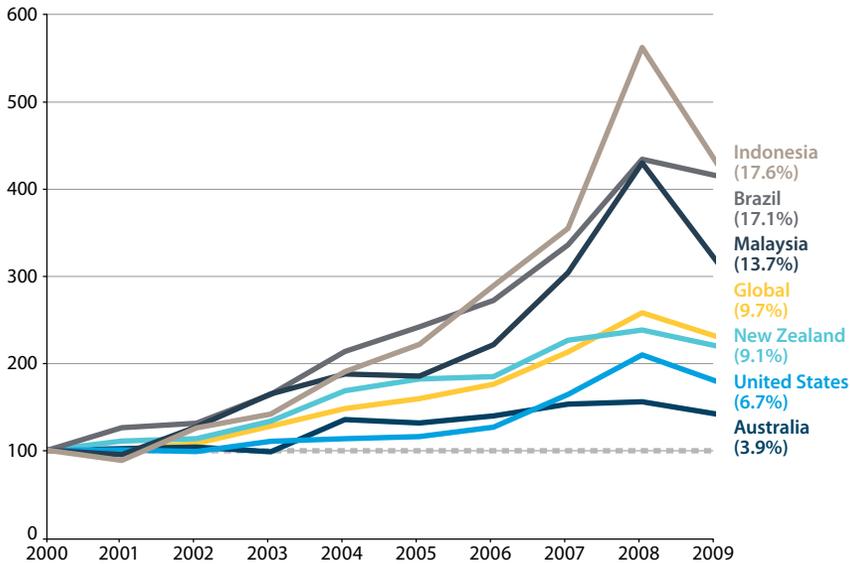
Global production and trade

Index* 2000 = 100; compound annual growth rate in parentheses



Exports by country

Index* 2000 = 100; compound annual growth rate in parentheses



* Index of nominal value, based on current US dollars using historical exchange rates.
Source: FAO.

2.4 THE ENORMOUS EXPORT OPPORTUNITY FOR AUSTRALIA AND NEW ZEALAND

Australia and New Zealand have enormous potential to benefit from the global soft commodity opportunity. Both countries could significantly increase agricultural export revenues over the next four decades, by increasing volume growth and seizing higher-value market opportunities where possible. To capture these benefits, however, targeted and timely actions will need to be taken, supported by large capital investments.

Recent estimates from ABARES²⁴ suggest the real value of Australia's agri-food exports could grow at 2.1% per annum if global output increased at an average rate of 1.3% per annum to 2050. The higher predicted rate of growth for Australian exports is largely a factor of the country's position in high demand commodities such as beef, wheat and dairy products. The estimates are likely to broadly apply to New Zealand, given its exposure to similar export markets such as dairy and red meat.

Adopting ABARES' estimates as a conservative guide for the Base Case scenario²⁵, both countries stand to more than double (i.e. increase by 125%) the real value of annual agricultural exports by 2050 from 2011. This equates to a 2050 export value of A\$73 billion for Australia and NZ\$57 billion for New Zealand, or a cumulative addition over 2011 levels of around A\$710 billion and NZ\$550 billion respectively.

Importantly, these estimates are not forecasts because they are highly dependent on the rate of global economic growth and the responses from industry and government over the coming decades. Australia and New Zealand export revenues have the potential to grow substantially more given the right conditions and responses. First, volumes could increase much faster from more rapid growth in global demand or gaining export market share. This has and will continue to be a major driver of overall sector growth. Secondly, greater value in agricultural exports could be realised through a number of ways:

- Farms producing higher value products. This includes seeking more valuable product variations, such as organics, or driving farm conversions to high returning commodities, such as shifting from beef to dairy in the South Island of New Zealand.
- Processors of agricultural products adding more value domestically. Processors of commodity products could capture small price premiums from improving quality or including other features. In some cases there is scope for processors to shift to value-added manufacturing, albeit in niche areas.
- Supply chains providing higher levels of service to attract price premiums. This includes providing more responsive, speedy or reliable supply of products to end markets.

²⁴ Verity Linehan, Sally Thorpe, Neil Andrews, Yeon Kim and Farah Beaini, "Food demand for 2050: Opportunities for Australian Agriculture", ABARES, March 2012.

²⁵ Assuming the agrifood trends modelled by ABARES broadly apply to all agricultural products in both countries.

To illustrate some potential alternatives, the Base Case has been compared with two other cases (Exhibit 2.8):

- Under the Low Case, Australian and New Zealand export revenues would grow in line with ABARES’ global demand forecasts of an average growth rate of 1.3% per annum (largely comparable to FAO estimates). This would lead to real 2050 export values 65% higher than in 2011, or A\$54 billion for Australia and NZ\$42 billion for New Zealand in 2011 prices. The cumulative value of additional export revenue would be A\$390 billion for Australia and NZ\$300 billion for New Zealand.
- Under the High Case, Australia and New Zealand export revenues would grow to respond to the Rapid Convergence Scenario and shift towards high value production. This equates to an average value growth rate of 4.8% per annum to 2030, and then at 1.8% per annum until 2050. This would lead to real 2050 export values 250% higher than in 2011, or A\$113 billion for Australia and NZ\$88 billion for New Zealand in 2011 prices. The cumulative value of additional export revenue would be A\$1.7 trillion for Australia and NZ\$1.3 trillion for New Zealand.

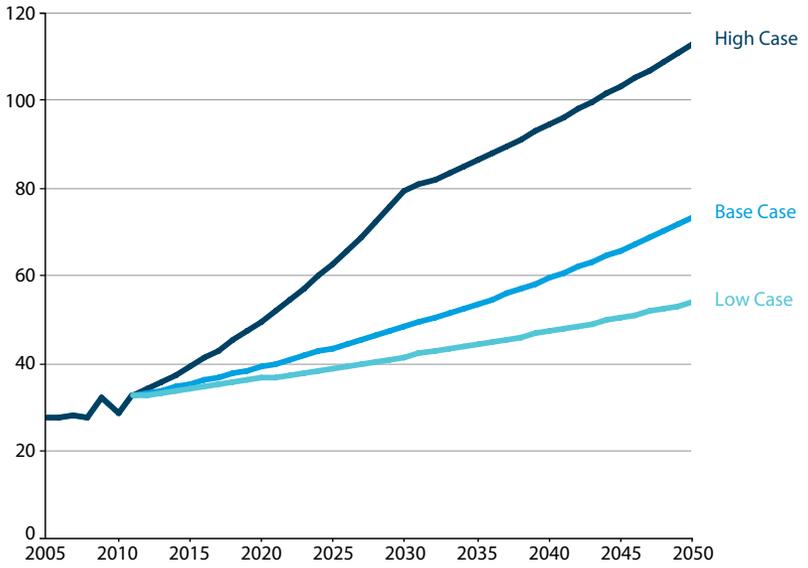
It is easy to see from these estimates how significant the opportunity can be for growth in both the production and export of agricultural goods. Moreover, improvements in the sector’s performance for both countries will provide substantial flow-on opportunities in export of agricultural and supply chain services. For Australia and New Zealand to capture their share – or more – of this opportunity, however, will require the adoption of effective strategies not just in agriculture but in the industries that support it.

Exhibit 2.8

AN ENORMOUS PRIZE – AUSTRALIAN AND NEW ZEALAND AGRICULTURAL EXPORTS*

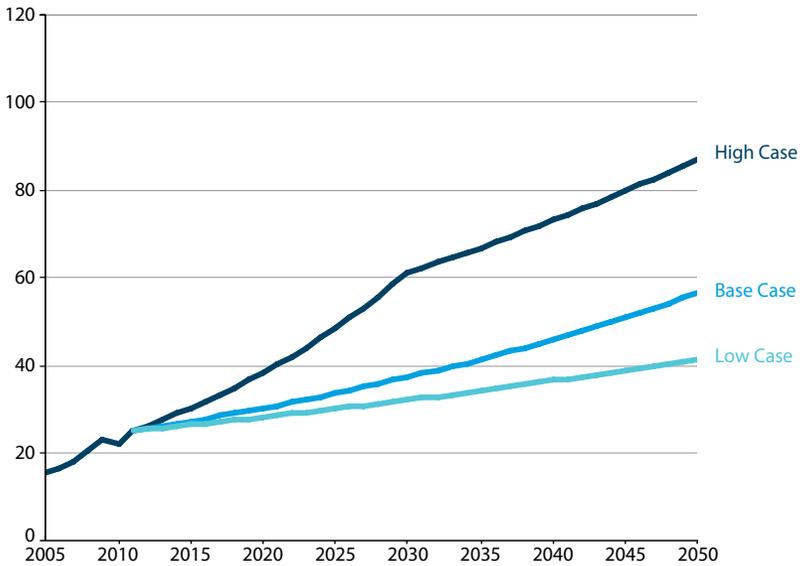
Australia

A\$ Billions (Real, 2011)



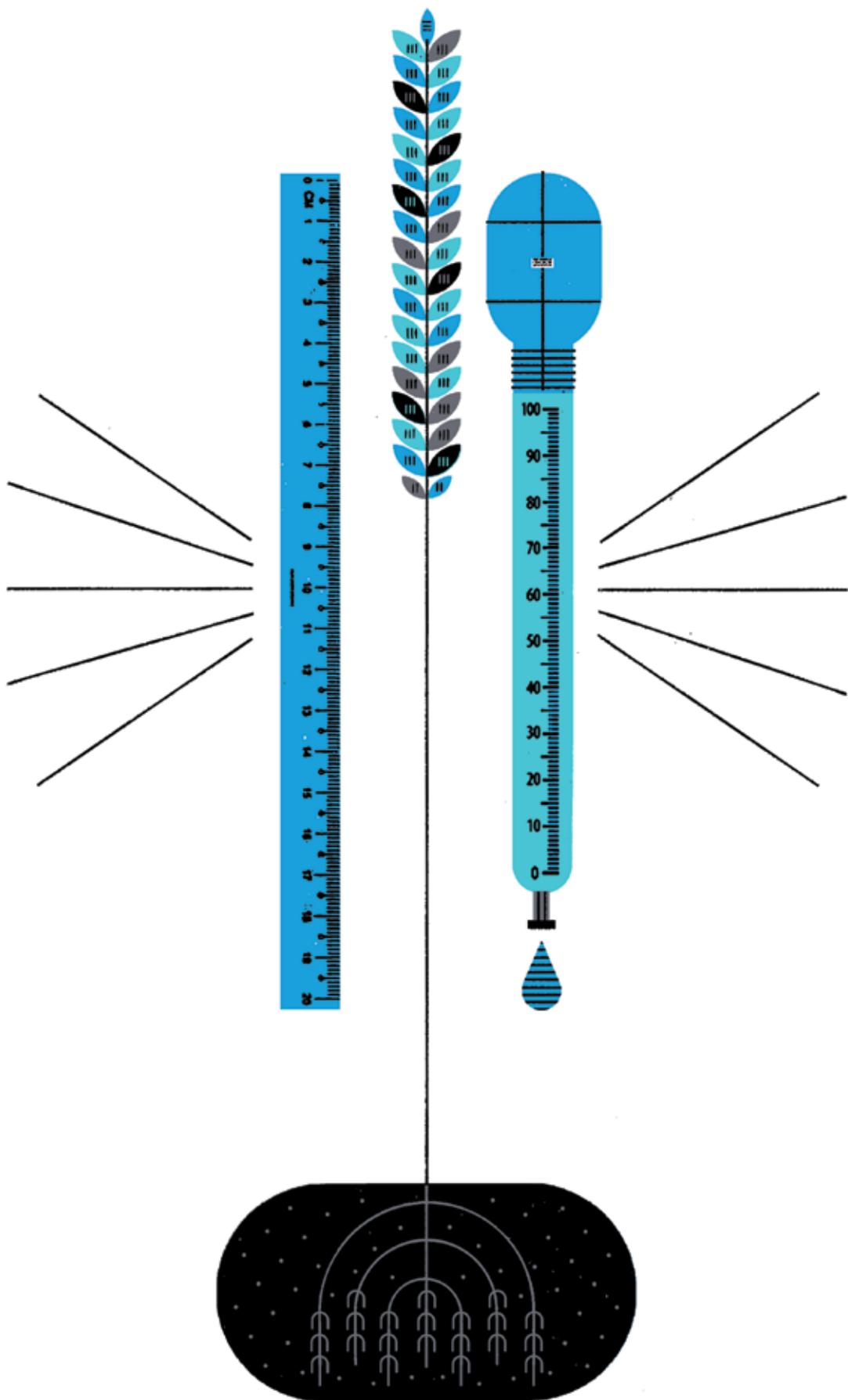
New Zealand

NZ\$ Billions (Real, 2011)



* Real commodity prices are assumed to remain constant.

Source: Australian Bureau of Statistics (ABS); ABARES; Statistics New Zealand (Statistics NZ); PJP analysis.



3.0 BUILDING COMPETITIVE ADVANTAGE IN KEY MARKETS

KEY THEMES:

- *A global race is emerging to develop high potential agricultural opportunities.*
- *Successful agricultural industries do not happen by accident but take many years of development to build complementary strengths across a number of areas.*
- *The Asia Pacific region has fostered many successful agricultural industries in recent decades including Australian cotton, New Zealand dairy, and Malaysian and Indonesian palm oil.*

3.1 THE GLOBAL RACE TO BUILD COMPETITIVE ADVANTAGE

Future success in agriculture requires a deliberate focus on fostering globally competitive industries with high potential for growth. Countries around the world are racing to cement a competitive place in agriculture to maximise their ability to capture value over the coming decades. In agriculture, competitive advantage is realised through:

- **Lower cost:** the ability to produce and deliver products from farms to markets at a lower cost than competitors.
- **Greater differentiation:** the development of differentiated products or services through quality or reliability to win favour from markets and in some cases, to capture price premiums.

Successful industries comprise more than just a group of good farmers. They compete internationally from a domestic platform of highly capable and interconnected service providers, supply chain players, R&D and educational institutions, and financiers. Harvard Business School Professor, Michael Porter, refers to this model as an industry cluster²⁶. He has argued that the interconnectedness and co-location of common and complementary players produce increased productivity resulting in “a whole greater than the sum of the parts”. These clusters support growth by delivering innovation and competitiveness.

Applying the concept of a cluster in its own right however, does not guarantee strong growth. Industries need to continuously evolve in response to changing market conditions and have strategies that reflect an ongoing focus on competitive advantage.

²⁶ Michael Porter, “The Competitive Advantage of Nations”, Harvard Business Review, 1990; Michael Porter, “Clusters and the New Economics of Competition”, Harvard Business Review, 1998.

Agricultural industries around the world broadly fall into one of three categories²⁷:

1. **Horizon 1** – industries that are mature with critical mass but no longer delivering strong growth. These industries have either stalled due to poor performance or serve markets that no longer enjoy high growth potential. New Zealand red meat and Australian wine are examples of industries that have experienced poor performance despite potential for growth.
2. **Horizon 2** – industries that possess critical mass while continuing to deliver high growth. These industries serve markets with higher growth potential and have sufficient scale and sophistication. Recent examples include Brazilian soy, New Zealand dairy, and Malaysian and Indonesian palm oil – all of which compete effectively internationally, although not without associated social and environmental concerns.
3. **Horizon 3** – emerging industries which exhibit high growth potential. These industries are small scale or lack sophistication (or both) but serve opportunities with high growth potential. Pakistani beef is an example.

Global and national success in agriculture requires well-run industries across all three growth horizons: mature industries serving low growth markets (Horizon 1) provide a base level of scale and income stability; high growth industries with sufficient scale (Horizon 2) provide immediate engines of growth; while emerging industries (Horizon 3) secure future prosperity.

In light of the global soft commodity opportunity, there is growing global competition to foster and strengthen successful industries around high growth opportunities.

²⁷ Based on the Three Horizons Framework; Mehrdad Baghai, Stephen Coley, and David White, "The Alchemy of Growth", McKinsey & Company, 1999.

3.2 KEY CHARACTERISTICS OF SUCCESSFUL AGRICULTURAL INDUSTRIES

Successful agricultural industries are fostered and strengthened through many years of nurturing by policy makers and industry leaders. These industries, and the broader clusters that support them, build competitive advantage through excelling across a number of areas:

1. **Access to and management of resources** – this includes access to key agricultural inputs such as skilled labour as well as land and water.
2. **Targeted R&D investment** – this consists of fundamental R&D, often publicly funded, supported by applied R&D where private involvement is more prevalent.
3. **Effective adoption of tailored knowledge** – building and applying knowledge that is tailored to local operating environments to maximise adoption.
4. **Exposure to high-value markets** – strong trading and marketing networks provide access to key global markets, supported by robust trade alliances.
5. **Sufficient access to capital** – ability to attract sufficient funds to support industry consolidation, farm turn-over, and growth-oriented investment.
6. **Robust and cost-effective supply chain** – highly competitive, well-capitalised, and coordinated with the ability to make long term investments.

To illustrate these concepts, it is worth exploring Brazilian soybean as a good example of a highly successful agricultural industry in recent decades. While it has its own challenges, the industry exhibits standout characteristics across many of the areas described above, particularly in R&D and its access to resources, capital and markets (Box 3.1). Developing strength across these areas has allowed it to achieve rapid growth and develop a strong, internationally competitive position.

Accounting for only around 2% of global soybean production in the 1960s, Brazil is now a major player in the global soybean market. In 2011, it overtook the US as the largest exporter of soybean, contributing around 40% of global exports²⁸. Soybean in 2010 was Brazil's third largest agricultural product by value²⁹.

Today, infrastructure is the major constraint on growth for Brazil's soybean industry. Despite strong investment, the development of transportation infrastructure (railroads, roads, waterways and ports) has not kept pace with the burgeoning industry, putting cost competitiveness at risk³⁰. Furthermore, the continued heavy use of fertilisers to offset poor nutrients in the soil is posing sustainability concerns.

²⁸ "Oilseeds: World markets and trade", US Department of Agriculture, December 2011.

²⁹ FAOSTAT, FAO, 2011.

³⁰ "Brazil: Competitive Factors in Brazil Affecting U.S. and Brazilian Agricultural Sales in Selected Third Country Markets", US International Trade Commission, April 2012.

BRAZILIAN SOYBEANS – STRENGTH ACROSS ALL COMPETENCIES

Area	Strength	Elaboration
1. Access to and management of resources	<ul style="list-style-type: none"> – Abundance of farmland and water in both per capita and absolute terms. – Large, low cost labour force. – Few farm succession issues. 	<ul style="list-style-type: none"> – Holds many times more arable land and water per capita than major demand growth markets (e.g. China and India). More renewable water and potential arable land than any other country. – Agriculture accounts for 20% of labour force and wages are significantly less than major competitors such as the US (in 2010 Brazilian labour costs were 45-60% less per kilogram). – Despite improving levels of education, rural youth typically return to work on farms.
2. Targeted R&D investment	<ul style="list-style-type: none"> – R&D to enable expanded production. – R&D to improve yields. – Strong public agricultural R&D system. 	<ul style="list-style-type: none"> – Soybean varieties were adapted to grow in vast, previously unproductive Cerrado region. – Developed varieties that were more tolerant to different soil types and with faster growing cycle. – Possess one of the best funded and developed R&D systems in the developing world.
3. Effective adoption of tailored knowledge	<ul style="list-style-type: none"> – Modern and efficient production techniques. – Regulation and legal framework for GM seeds. 	<ul style="list-style-type: none"> – Increased mechanisation (including on small family farms) and widespread utilisation of modern farming techniques such as no-till cultivation to mitigate soil erosion. – Rapid adoption of Genetically Modified (GM) seeds due to streamlined approvals process and development of intellectual property rights.
4. Exposure to high-value markets	<ul style="list-style-type: none"> – Strong domestic demand. – Reduction of trade barriers. – Growing popularity of off-take agreements. 	<ul style="list-style-type: none"> – Soybean oil has traditionally been an important food item and is still consumed domestically in large quantities. Growing livestock industries have boosted demand for soybean meal. – Policy reforms (e.g. eliminating import taxes) and regional Free Trade Agreements (e.g. Mercosur) boosted trade. – Recent deal in 2011 will see Goiás State Government supply 6 million tonnes of soybeans per year to China's Sanhe Hopeful Grain & Oil.
5. Sufficient access to capital	<ul style="list-style-type: none"> – Public investment to kick-start growing. – Foreign investment to improve and expand production. 	<ul style="list-style-type: none"> – Proterra and Polocentro land distribution and rural development programs were instrumental in initiating growth from the 1970s. National System of Rural Credit provided additional finance. – Capital from Japan (Prodecet program) and World Bank supported R&D programs and farm expansion and improvements. Recent trend towards foreign investment through strategic off-take agreements (e.g. Goiás State Government and Sanhe Hopeful Grain & Oil deal).
6. Robust and cost-effective supply chain	<ul style="list-style-type: none"> – Multinational agribusiness presence. – Cooperative presence. – Effective segregation and traceability of GM and non-GM production. 	<ul style="list-style-type: none"> – Bunge, Cargill, ADM, and Louis Dreyfus provide marketing and logistics infrastructure and have greater access to finance than smaller players. – More predominant in southern States, cooperatives provide farmers economies of scale in buying inputs and marketing products. – Geography, scale of production, and infrastructure allow cost-competitive segregation of GM and non-GM. Supply chain traceability enables producers to differentiate their products.

3.3 SUCCESSFUL AGRICULTURAL INDUSTRIES IN ASIA PACIFIC – CASE STUDIES

The global soft commodity opportunity presents substantial potential for the Asia Pacific region. Many countries in the region have significant natural resource advantages, strong agricultural expertise and are well positioned to serve high growth Asian markets.

Over recent decades, the Asia Pacific region has fostered many successful agricultural industries at various points in time. Like Brazil's success with soy, industry clusters were fostered around high growth opportunities, driving innovation and competitiveness. New Zealand dairy, Australian cotton and wine, and Malaysian and Indonesian palm oil are examples of industries that have thrived in recent decades.

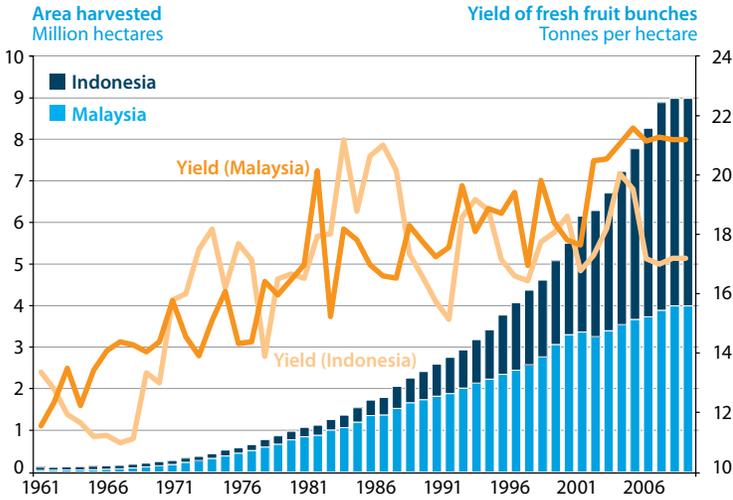
It is worth noting, however, that the economic success of some of these agricultural industries has been accompanied by undesirable side effects. Rapid growth in palm oil production in Malaysia and Indonesia has been accompanied by environmental concerns over the past few decades (Exhibit 3.1). It is estimated that more than half of the production expansion in the two countries resulted from the loss of tropical forests between 1990 and 2005³¹. The expansion has also led to significant greenhouse gas emissions and reduced biodiversity, particularly in endangered species³². Effective balancing of sustainability and production growth should be a key competency of agriculture – these goals should not be mutually exclusive.

³¹ Lian Pin Koh and David Wilcove, "Is oil palm agriculture really destroying tropical biodiversity?"; 2008.

³² "The World Bank group framework and IFC strategy for engagement in the palm oil sector", World Bank, March 2011.

Exhibit 3.1

MALAYSIAN AND INDOONESIAN PALM OIL



- More than half of land expansion between 1990 and 2005 occurred through deforestation of tropical forests.
- Animal habitat destruction and loss of biodiversity.
- Large greenhouse gas emissions from:
 - Clearing of carbon-dense tropical forest;
 - Burning of cleared biomass;
 - Draining of peatlands; and
 - Releasing of methane from effluent treatment of ponds.
- Advocacy group Roundtable on Sustainable Palm Oil (RSPO) established in 2004.
- RSPO members accounted for 40% of global palm-oil production in 2010.
- Several large companies have committed to buying only sustainable palm oil including: Unilever, P&G, Mars, and Nestlé.
- Verifying sustainable palm oil is difficult due to mixing in the supply chain.

Source: FAO; The World Bank; 'The other oil spill', The Economist, 24 June 2010.

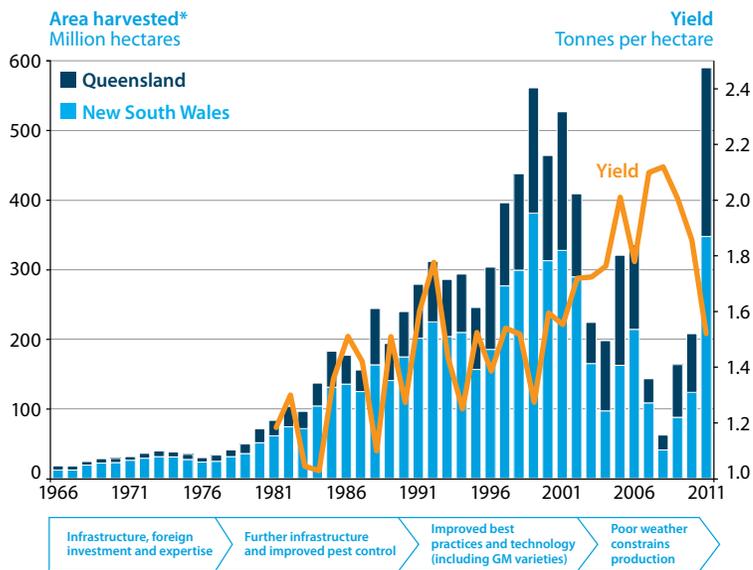
Sustainability considerations have been much more widely adopted in Australian and New Zealand agriculture but environmental challenges still exist and need to be closely monitored. Adopting the framework defined in section 4.2, this section highlights the noteworthy characteristics and developments behind the success of two industries: Australian cotton and New Zealand dairy.

3.3.1 Australian cotton

Despite facing significant challenges over the past decade, Australian cotton is a good example of an industry which was able to grow rapidly through foreign expertise, and strong investment in infrastructure and R&D (Exhibit 3.2). After recovering from prolonged drought, the industry in 2011 produced a record crop, worth A\$2.6 billion in gross value (or 5% of Australia’s agricultural production), and is one of the largest exporters in the world.

The construction of dams in the 1960s enabled the first phase of growth in the Australian cotton industry, with intensive irrigated farming, starting in the Namoi region of New South Wales. Foreign capital and expertise were instrumental. American farmers, with knowledge in efficient farming techniques for large-scale, mechanised irrigated farming and the use of chemical inputs, began to invest in farmland. By the late 1960s, Americans accounted for nearly half of growers in the Namoi region and expedited the adoption of mechanised production. Early success was achieved with a high degree of self-regulation in managing scarce water resources³³.

Exhibit 3.2
AUSTRALIAN COTTON



* Queensland and New South Wales account for nearly all cotton produced in Australia over the period.
Source: ABARES.

33 Ted Henzell, "Australian Agriculture – Its History and Challenges", 2007.

As additional dams were built throughout New South Wales and Queensland, the cotton industry expanded. A strong supply chain was quick to develop, with downstream processors and marketers operating under both cooperative and corporate structures, and companies emerged to supply inputs to farms. Industry bodies also developed and these promoted Australian cotton into key export markets.

Strong innovation alongside rapid adoption of new practices played a critical role in Australia's cotton industry. Australia's cotton R&D, in collaboration with international researchers, has delivered best practice pest management and has contributed to decades of world-leading yield improvements³⁴. Key to this success were State-administered extension services³⁵ and contracted professional consultants³⁶. They played a central role in facilitating the adoption of research innovations, including more productive cotton varieties including transgenic cotton varieties, which reduced pesticide usage and costs³⁷ and improved crop management practices. Strong relationships between researchers and industry also fostered a culture of knowledge sharing and collaboration in extension.

Despite challenges in the early 2000s driven by drought and lower prices, the industry is now producing record crops again.

3.3.2 *New Zealand dairy*

Initially founded on natural resource cost advantages, New Zealand's dairy industry has maintained its competitive advantage through continued innovation and sensitivity to changing markets. The industry has delivered rapid growth over the past two decades with milk production more than doubling throughout that period³⁸. Today, New Zealand dairy accounts for a more than a third of global dairy exports³⁹ and in 2011 accounted for NZ\$9.5 billion, or about 50%⁴⁰ of the country's gross value of agricultural production.

The industry's willingness to adapt to evolving environments and its ability to support profitable revenue and volume growth has been pivotal to its sustained success. In the mid-1980s, the Government removed agricultural subsidies as part of its response to systemic economic problems including an unsustainable fiscal deficit. Exposure to clearer price signals gave impetus to the diversification of agricultural products and markets⁴¹. In the decades since deregulation, there has been a wave of conversions from beef and sheep farming to dairy and other agricultural uses⁴². Significant investment in irrigation infrastructure also allowed dairy production to extend to the South Island, which now accounts for about a third of New Zealand dairy cattle⁴³.

Complementing these reforms were ongoing improvements to market access and industry structure. New Zealand was among the main proponents of the Uruguay Round of the General Agreement on Tariffs and Trade in the mid-1990s and in recent years has fostered a close trading relationship with China. Significant industry consolidation at the farm⁴⁴ and processor levels⁴⁵ also enabled efficiencies of scale to be realised.

34 Jeff Bidstrup, "10 years of GM cotton – where to from here?", Outlook Conference Canberra, 2006.

35 Bruce Pyke and Geoff McIntyre, "The Role and Achievements of a National Cotton Extension Program", 2007.

36 Ted Henzell, op. cit.

37 Stephen Apted, Daniel McDonald and Heidi Rogers, "Transgenic crops – welfare implications for Australia", ABARES, 2005.

38 "New Zealand Dairy Statistics 2010-11", DairyNZ, 2011.

39 "New Zealand Dairy Industry", International Union of Food workers: Dairy Division, 2011.

40 Excluding agricultural services; "Situation and Outlook for New Zealand Agriculture and Forestry", New Zealand Ministry of Agriculture and Forestry (MAF), June 2011.

41 Alex Harrington, "The Contribution of the Primary Sector to New Zealand's Economic Growth", New Zealand Treasury, November 2005.

42 Michael Robertson, "Agricultural productivity in Australia and New Zealand: trends, constraints and opportunities", Commonwealth Scientific and Industrial Research Organisation (CSIRO), 2010.

43 DairyNZ Economics Group.

44 DairyNZ, op. cit.

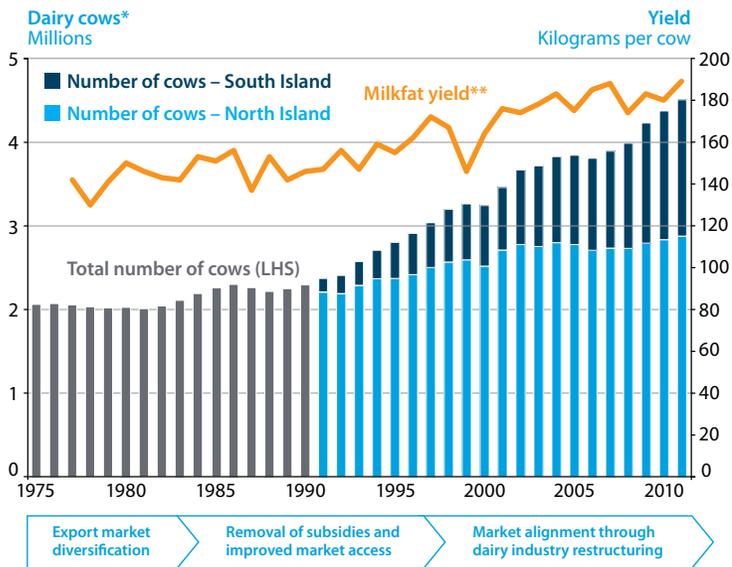
45 Alex Harrington, op. cit.

In response to changing world markets, the single-desk exporting arrangement was identified as no longer appropriate and was removed in 2001 through the Dairy Industry Restructuring Act (DIRA). This resulted in the formation of the vertically integrated farmer-owned cooperative Fonterra. While Fonterra remains the dominant player in the industry, thoughtful competition measures in DIRA fostered the emergence of a competitive fringe of processors⁴⁶. In 2011, Fonterra not only accounted for more than 90% of the New Zealand dairy market but was the largest processor of raw milk in the world⁴⁷. It currently has around 11,000 farm shareholders and an impressive global supply chain.

Direct dairy participants are supported by a world-class cluster of supporting entities. New Zealand R&D providers, strong educational institutions and specialist dairy farm management consultants have contributed to increases in yield per cow, per hectare and per labour unit. This has been achieved through the adoption of innovations such as rotary dairy platforms, automatic cup removers, improved cleaning equipment as well as the improved and increased use of inputs such as feed, fertiliser and irrigation⁴⁸. Industry associations such as Dairy NZ, provide an extensive platform for knowledge dissemination for farmers and have proactively initiated career campaigns to attract talent in recent years. The supply chain is rounded out and reinforced by well-established specialist equipment suppliers, agricultural aviation companies and large local fertiliser cooperatives.

While the industry faces environmental challenges, higher debt levels and some public resentment typical of high growth sectors, it has met such challenges before and is well positioned to overcome them again.

Exhibit 3.3
NEW ZEALAND DAIRY



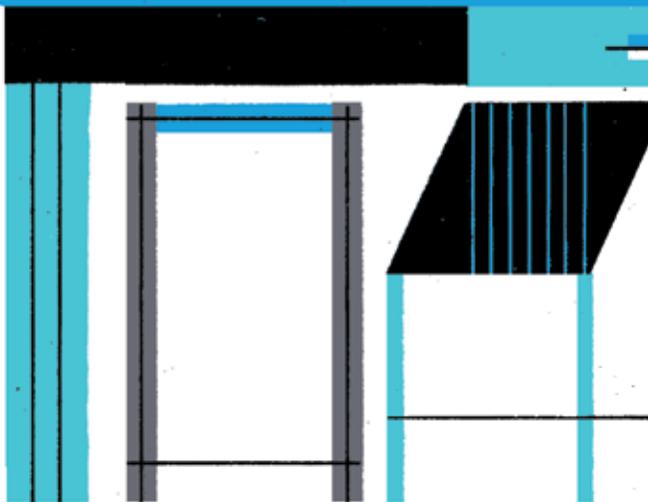
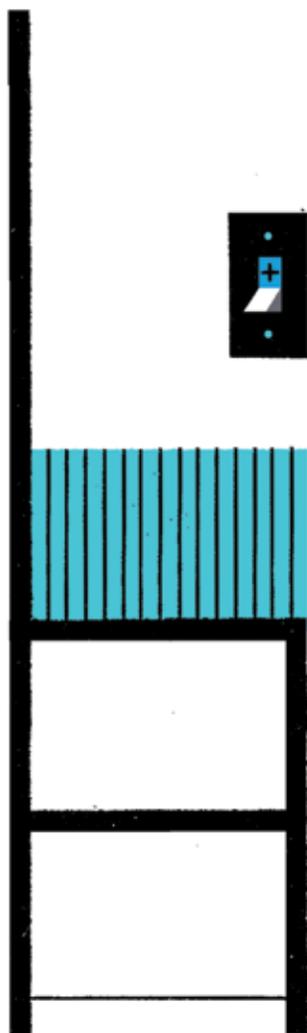
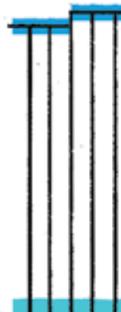
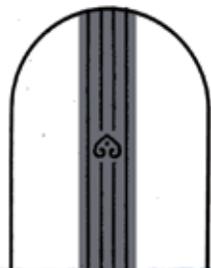
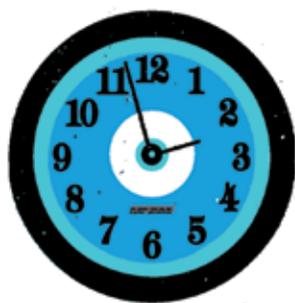
* Cow numbers are for lactating cows and are therefore less than dairy stock (which includes calves and rising heifers) reported in other sources. Regional breakdown not available prior to 1990.

** Protein yield also increased over the period where data is available, from 111 kg/cow in 1993 to 144 kg/cow in 2011
Source: Dairy NZ.

⁴⁶ "The Key Elements of Success and Failure in the NZ Dairy Industry", Lincoln University, 2008.

⁴⁷ Measured by milk intake; "IFCN Dairy Report 2011", International Farm Comparison Network (IFCN), 2011.

⁴⁸ Michael Robertson, "Agricultural productivity in Australia and New Zealand: trends, constraints and opportunities", CSIRO, 2010; Jenny Jago, Ian Ohnstad, and Douglas Reinemann, "Labor Practices and Technology Adoption on New Zealand Dairy Farms", June 2007.



4.0 THE CURRENT STATE OF AGRICULTURE IN AUSTRALIA AND NEW ZEALAND

KEY THEMES:

- *Many Australian and New Zealand agricultural industries have lost momentum over the past decade.*
- *Major growth engines in Australia have stalled while New Zealand is heavily reliant on a single, large industry.*
- *Agricultural industries in both countries are at risk of losing international competitiveness.*
- *Serious challenges need to be addressed to enable Australia and New Zealand to capture the full extent of the opportunity.*

Despite the massive opportunity for Australian and New Zealand agriculture, serious growth-constraints exist in these industries today. The first section of this chapter provides an overall assessment of agriculture in both countries. The remaining part outlines the current barriers to success.

4.1 LOSS OF FOCUS ON DRIVING COMPETITIVENESS AND LONG TERM GROWTH

It is easy to blame the drought for the poor performance of Australian agriculture in the past decade. At the same time, the success of New Zealand's dairy obscures the mixed performance of some of the country's other agricultural industries. Rising exchange rates in both countries and surging global commodity prices have also made the sectors' performance more difficult to judge. In reality agriculture in both countries has, to varying degrees, lost momentum and there are a series of hurdles to overcome in order to secure the sector's international competitiveness.

4.1.1 *Australia needs to address serious challenges and re-establish growth engines*

Australian agriculture in the 1980s and 1990s was extremely promising. While volume growth is not the only measure of performance, it is a significant one, and the final two decades of the 20th century saw rapid growth in agricultural production: both domestic and export volumes increased by about 3% per annum⁴⁹ (Exhibit 4.1). Australian agriculture boasted a handful of strong industries across all three growth horizons. The large and mature beef and wheat industries were delivering sustained output growth, while smaller high growth industries like cotton, barley, canola and wine were acting as or evolving into new engines of growth. Canola production alone increased from 0.1 million tonnes in 1991 to 2.4 million tonnes by 2000, a staggering annual growth rate of 43%.

In contrast, performance over the past decade has been disappointing. While Australia's gross production value grew at an average rate of 4.3% per annum between 2000 and 2011, surging global commodity prices masked a period of mostly flat production and export volumes⁵⁰. The beef and wheat industries stopped growing, while previously promising industries like barley, cotton and canola stalled, and even declined in some cases. The wine industry was the only exception. Although it has also stalled recently, wine delivered strong production and export growth until 2005-07. It would seem that as the world raced to capture global soft commodity opportunities, Australian agriculture came to a standstill, with no major engines of growth currently in motion (Exhibit 4.2). Moreover, the period also showed no signs of agriculture shifting to higher value products to compensate for flat production volumes.

⁴⁹ Value of exports on a Balance of Payments basis; Agriculture defined as meat and meat preparations, wool and sheepskins, cereal grains and cereal preparations, sugar, sugar preparations and honey, beverages, and other rural under the Standard International Trade Classification; ABS, 2012; Total production volumes from FAO.

⁵⁰ ABARES data suggest a flat trend in agricultural production volumes while FAO data suggest a declining trend.

It would be a mistake to attribute the poor performance of the past decade solely to adverse climate impacts. Australian agriculture has had a long history of dealing with drought⁵¹. Over the 40 years to 2000, the sector faced droughts during 1991-95 (central and northern parts of Australia), 1982-83 (countrywide), 1972-73 (eastern Australia), and 1963-68 (countrywide). Yet, the sector sustained production volume growth throughout those periods and was quick to recover from adverse climate conditions. The drought during 2002-07 was severe, but the impact on performance has been disproportionate. Production volumes did not return to 2001-02 levels until 2010-11.

Serious underlying issues were already emerging in Australian agriculture before the turn of the last century:

- Productivity growth was already slowing in major industries. ABARES research identified a fall in broadacre productivity growth from 2.2% per annum during 1953-94 to 0.4% per annum in subsequent years. While the drought exacerbated the decline, the slowdown was on trend to occur⁵².
- Farm performance varied enormously and many made little or no profit, limiting the ability of farmers to prepare for adverse situations. Since the 1990s, more than a quarter of broadacre farms made a loss every year, and half achieved a yearly cash income of no more than A\$43,000 on average⁵³.
- Skill shortages⁵⁴ and succession issues were already evident, as median farmer age rose from 44 in 1981 to 50 by 2001⁵⁵. Median farmer age is now around 53.
- Capital required by farms was largely sourced from (and constrained by) bank debt and internal farm equity, with few alternative external sources available.

These issues were left unaddressed as Australian agriculture entered the first decade of the 2000s with unfavourable climate conditions and a rising exchange rate. At the same time, agricultural supply chains were undergoing extensive restructuring through deregulation – some of it poorly executed – while the sector as a whole was being encouraged to emphasise environmental and sustainability priorities at the expense of volume increasing measures.

Australian agriculture shifted to short-run thinking to deal with short-term threats, while serious issues intensified. Farmers focused on profit protection rather than investing in growth as capital limitations saw debt levels surge and confidence plummet. A significant proportion of the labour force left the sector permanently, with the decline estimated at around 25% during 2002-07⁵⁶. Major infrastructure constraints were left unaddressed in some supply chains, for example rail freight for grain, and power imbalances undermined coordination and trust between farmers and supply chain players. The introduction of short-run policies such as the drought assistance packages⁵⁷, and a proliferation of native vegetation conservation legislation⁵⁸ may have inadvertently further discouraged productivity improvements and growth of production value and volume. The period also saw a month-long suspension of live cattle exports to Indonesia, which has significantly impacted the short to mid-term prospects of Australia's northern cattle industry.

Today, many of the inhibitors emerging in the 1980s and 1990s have become constraints on future growth. These issues not only limit Australia's ability to respond to the Asian opportunity; they also weaken the sector's resilience – its power to withstand future climate impacts. Australia risks losing international competitiveness, particularly as costs across supply chains increase.

51 "Drought in Australia: Context, policy and management", ABARES, March 2012.

52 Yu Sheng, John Mullen and Shiji Zhao, "A turning point in agricultural productivity: consideration of the causes", ABARES, May 2011.

53 "Agricultural Commodities: March Quarter 2012", ABARES, 2012.

54 "Time to shed a tired image", The Weekly Times, 12 May 1999.

55 "Trends in Australian Agriculture", Productivity Commission, June 2005.

56 "Labour shortage action plan", National Farmers' Federation (NFF), March 2008.

57 "Government Drought Support", Productivity Commission, February 2009.

58 Alistair Davidson, Kenton Lawson, Philip Kocik, Lisa Elliston, Katarina Nossal, Steve Beare and Brian S. Fisher, "Native vegetation management of on broadacre farms in New South Wales: impacts on productivity and returns", ABARES, March 2006.

By the mid-2000s, some benchmarks suggest that the average production cost of Australian beef was already double that of Argentina and Uruguay and about 20% more than Brazil; while the cost of Australian wheat was almost double that of Argentina, Russia and Ukraine⁵⁹. Without the removal of major constraints and a focus on productivity and higher returning products, it cannot be assumed that the return of favourable seasonal conditions will allow Australian agriculture to re-establish the growth trajectories of the past.

4.1.2 New Zealand agriculture: a two-speed sector

While New Zealand has fostered a highly successful dairy industry, the momentum has not been replicated in all agricultural industries. Despite steady growth in the 1980s and 1990s, overall agricultural production volumes remained flat for most of the past decade with few material signs of value growth independent of increases in commodity prices (Exhibit 4.1).

New Zealand agriculture resembles a two-speed sector that is heavily reliant on a single large industry. Much of the growth has been driven by dairy and small industries such as kiwifruit and wine (Exhibit 4.2). Dairy increased its gross output value by more than 9% per annum over the past decade and contributed to almost half of the nation's farm output in 2011⁶⁰. This strong growth has been offset by declines in other areas, particularly in the red meat industry, which has seen its share of total farm output decline from 37% in 2000 to 27% by 2011⁶¹. Despite some price-driven growth in output value, the production of lamb, beef, deer and live animals have all had volume declines. This shift has followed sustained profitability declines in red meat farming, driving land conversions to other uses such as dairy and forestry⁶². Similarly, other industries such as poultry, pig and wool have also performed poorly delivering flat or declining volumes compared to earlier in the decade⁶³.

The strong leadership and operational strength characteristic of the dairy industry has generally not been carried across New Zealand agriculture. The red meat industry has suffered from coordination challenges and misalignment between farmers and processors, resulting in a cycle of declining profitability. A handful of medium-sized processors are increasingly forced to compete aggressively in two markets in order to gain sufficient supply and differentiate in end-markets, while it's difficult for farmers to be confident to invest where there are confusing market signals from processors. Strong leadership is required to drive future growth of the industry, which includes defining and evolving its position in the global market. Gaining sufficient scale is also important for many industries outside of dairy to compete effectively in global markets. Sector-wide challenges, similar to those impacting Australia, also persist: farm debt levels have surged; capital constraints are growing; the labour force is ageing; and skill shortages are becoming a major problem. While the dairy industry is better placed than its peers, it is not free from its own set of hurdles including constraints in raising capital for downstream investment, markedly high farm debt levels, environmental concerns around increased nitrogen levels, and rising production costs, partly driven by a shift to higher input systems, which places increased risk on margins during unfavourable price volatilities.

Like Australia, agriculture in New Zealand will need to deal with sector-wide and industry-specific challenges in order to capture the full benefits of the Asian demand opportunity. Most industries are small and yet to transcend niche status. Even the dairy side of the two-speed sector is at risk of losing momentum, while the other side must overcome a number of obstacles to arrest further decline and seize growth opportunities.

⁵⁹ Mick Keogh, "Future challenges for Australian agriculture", Australian Farm Institute, 2008.

⁶⁰ "Situation and Outlook for New Zealand Agriculture and Forestry", New Zealand MAF, 2011.

⁶¹ Includes cattle meat, sheep meat, deer and sale of live animals.

⁶² "Red Meat Sector Strategy Report", Deloitte, March 2011; Beef + Lamb New Zealand Economic Service.

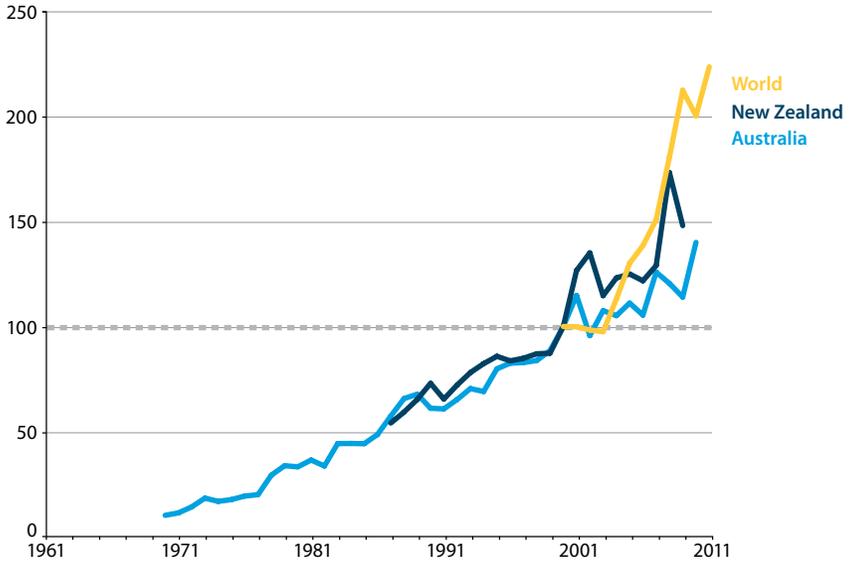
⁶³ FAOSTAT, FAO, 2012.

Exhibit 4.1

GROSS AGRICULTURAL PRODUCTION – AUSTRALIA, NEW ZEALAND AND THE WORLD

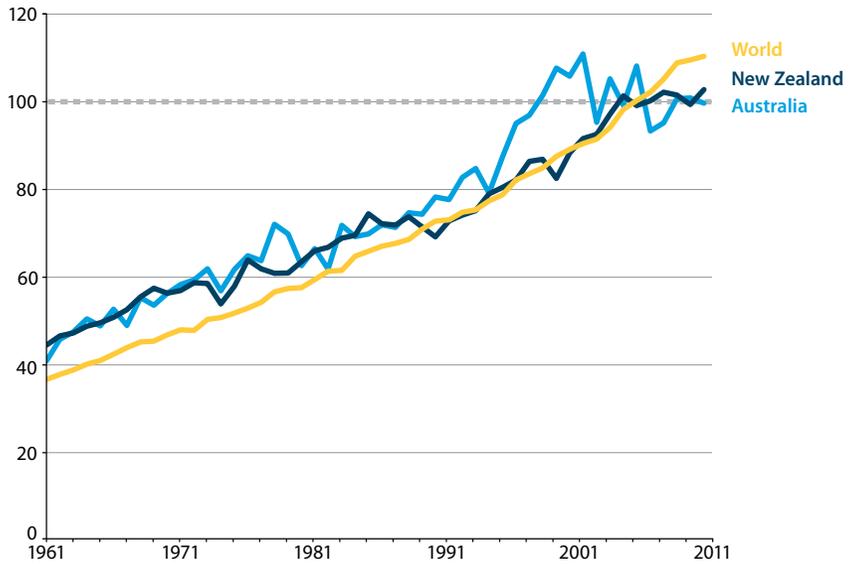
Production value index*

Index Year 2000 = 100



Production volume index**

Index Period 2004-06 = 100



* Index of nominal value expressed in respective local currencies.

** Calculated using the Laspeyres formula, weighted by 2004-06 average international commodity prices.

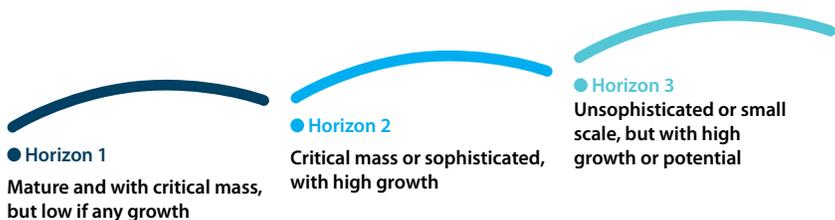
International commodity prices are derived using the Geary-Khamis formula are used to aggregated global data.

The FAO indices may differ from others due to differences in concepts of production, coverage, weighting, time reference of data and methods of calculation.

Source: FAO; ABARES; Statistics NZ.

Exhibit 5.2

THREE GROWTH HORIZONS OF AUSTRALIAN AND NEW ZEALAND AGRICULTURE – 1980 TO PRESENT



Australia

Sector	% of 2011 gross value	2000s Growth Horizon	1990s Growth Horizon	1980s Growth Horizon
Grains	21%	●	●	●
Cattle	15%	●	●	●
Fruit & Vegetables	14%	●	●	●
Dairy	8%	●	●	●
Sheep Meat	6%	●	●	●
Wool	5%	●	●	●
Cotton	4%	●	●	●
Grapes**	3%*	●	●	●
Oilseeds	3%	●	●	●
Live Cattle	1%	●	●	●
<hr/>				
80%				
<hr/>				

New Zealand

Sector	% of 2011 gross value***	2000s Growth Horizon	1990s Growth Horizon	1980s Growth Horizon
Dairy	48%	●	●	●
Cattle	11%	●	●	●
Sheep Meat	10%	●	●	●
Kiwifruit	5%	●	●	●
Other Wool	2%	●	●	●
Fine Wool	1%	●	●	●
Deer	1%	●	●	●
Grapes**	1%*	●	●	●
<hr/>				
79%				
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* Estimate.

** Predominantly used for wine making. Gross value of wine production is much greater than the gross value of grapes.

*** New Zealand share excluding agricultural services.

Source: ABS; ABARES; FAO; New Zealand MAF; "New Zealand Merino: Pursuing Acceleration Through Collaboration", Stanford Graduate School of Business (GSB), 2010; PJP analysis.

4.2 CAPITAL CONSTRAINTS PREVENTING GROWTH OF VALUE AND VOLUME

Substantial growth-oriented capital is needed in Australia and New Zealand over the coming decades. For both countries to grow agricultural exports at the Base Case, described in Chapter 2, around A\$600 billion and NZ\$210 billion in additional capital will be needed on farms and supply chains between now and 2050, respectively. A further A\$400 billion and NZ\$130 billion will be needed to support older farmers exiting the sector, allowing the next generation of farmers to buy them out.

However, traditional sources of finance for farmers – debt and retained earnings – are insufficient:

- Farm debt to asset ratios are already critically high. Over the past decade, Australian dairy and broadacre farmers grew their debt by more than 8% per annum⁶⁴, while aggregate credit extended to agriculture by New Zealand's lending institutions grew at 14% per annum⁶⁵.
- Farm equity provides limited additional capital in most industries due to low levels of profitability for the lower performing farmers. In addition to replacement capital, historic data suggests that Australian⁶⁶ and New Zealand⁶⁷ farms have the capacity to spend around 12% of revenues on growth-related capital expenditure. While this may allow for modest production growth, it is insufficient to support the maximum growth potential of both countries, let alone support farm turnover.

Given the constraints, Australian and New Zealand agriculture will face a capital gap of A\$9 billion and NZ\$2 billion in the first year of the Base Case (Exhibit 4.3). This translates to a cumulative capital gap of A\$515 billion and NZ\$110 billion by 2050 (Exhibit 4.4). While these estimates are not forecasts, they illustrate a real and growing capital deficit faced by agriculture today.

Moreover, capital constraints pose serious challenges in all scenarios considered:

- Under the Low Case of export growth, Australia and New Zealand would require an additional capital investment of A\$750 billion and NZ\$220 billion to drive growth and support farm turnover, but fall short of this requirement by A\$360 billion and NZ\$60 billion over the years to 2050.
- Under the High Case of export growth, Australia and New Zealand would require an additional capital investment of A\$1.6 trillion and NZ\$595 billion to drive growth and support farm turnover, but fall short of this requirement by A\$850 billion and NZ\$220 billion over the years to 2050.

Australia and New Zealand must find answers to questions about where the capital will come from. The situation is particularly challenging in Australia. Not only is Australia expected to have a much larger capital gap than New Zealand, the nation also has fewer alternative farm ownership and management structures in place to attract capital beyond the farm gate. These structures are critical to providing a credible means to draw investment from capital markets while ensuring farms are managed by high-yielding farmers. Purchasing farms without these mechanisms in place will adversely impact productivity and likely deliver poor returns. In a world where long-dated capital is increasingly in demand, agriculture in both countries will need to improve returns and find innovative ways to attract investment. The alternatives pathways to address the capital constraints are not attractive: a collapse in land values or delays to farm succession, which can only be sustained in the short to medium term.

⁶⁴ Over the decade to 30 June 2011; AgSurf Database, ABARES, April 2012.

⁶⁵ Over the decade to 31 March 2010; "Situation and Outlook for New Zealand Agriculture and Forestry", New Zealand MAF, 2011.

⁶⁶ Over the decade to 30 June 2011; AgSurf Database, ABARES, April 2012.

⁶⁷ "Farm Monitoring Overview", New Zealand MAF, 2011.

Given the sheer scale of the capital required, foreign investors must play a critical role in Australian and New Zealand agriculture over the coming decades, unless major new sources of domestic investment emerge. Strong levels of domestic investment coupled with lower savings rates have meant that both countries have consistently looked to foreign capital to support economic growth. Since 1980, Australia and New Zealand's annual 'savings gap' has averaged around 4-5% of GDP⁶⁸. Even with the necessary farm investment vehicles in place, domestic sources alone are unlikely to be enough for agriculture to reach its full potential in Australia and New Zealand.

However, both countries are struggling to find the optimal balance between protecting national interests and attracting foreign capital. While New Zealand's regime is seen by some as being too restrictive on foreign agricultural investment, there is increasing concern that Australia's regime places insufficient scrutiny on such investments. Foreign investment that monopolises supply chains, threatens farm gate pricing, or compromises the taxation base of Australian and New Zealand agricultural output might reasonably attract regulatory attention. But overly-restrictive regulation, particularly when applied poorly or inconsistently, could substantially deter attractive, productivity enhancing foreign investment. Both countries face challenges across multiple dimensions:

- There are public concerns about foreign investment in agriculture that reflect long standing resistance to all sources of foreign investment. A recent poll by the Lowy Institute found that although more than two thirds of respondents believed that it is very important for Australia to be well-liked by its neighbours, 81% were against foreign investment in farmland⁶⁹. Similarly in New Zealand, while 83% of respondents in an AsiaNZ Research survey felt that Asia is important to the country's future⁷⁰, another survey by URM Research found 82% of respondents believed foreign ownership in farms and agricultural land was a bad thing⁷¹.
- The national interest tests used to assess foreign investment lack clarity and transparency in relation to agricultural assets. There is a view that both countries have progressively introduced new investment guidelines on a largely ad-hoc basis in response to a rush of foreign investment, particularly from emerging investors such as Chinese State-owned enterprises⁷². While New Zealand reviews all foreign acquisitions of farmland above 5 hectares, there are also concerns that the threshold to consider foreign acquisitions in Australian farmland are too high (15 per cent or more of an entity valued at A\$244 million, indexed annually), allowing most investments to be conducted without regulatory visibility.
- Some argue national interest tests are not efficiently and effectively applied. In Australia, there are concerns that the Foreign Investment Review Board (FIRB) is not well-resourced to have the capability to identify the agriculture-specific concerns in investment proposals or do so in a timely fashion. Similarly in New Zealand, the Overseas Investment Office (OIO) is seen to be too slow at reviewing investment proposals with significant inconsistencies in its approach.
- There are ongoing disputes about the transparency and quality of data on foreign investment in agriculture, particularly on trends in farmland ownership. Australian studies to date, including recent research conducted by ABS and ABARES have been extrapolated from small data samples rather than a holistic national view. While New Zealand has recorded all foreign acquisitions of agricultural assets via the OIO in recent years, it does not have a robust or up-to-date view of the ownership status of all such assets in the country⁷³.

⁶⁸ Savings defined as total investment less gross national savings; "World Economic Outlook Database", IMF, April 2012.

⁶⁹ Fergus Hanson, "The Lowy Institute Poll 2012: Australia and New Zealand in the World", Lowy Institute, 2012.

⁷⁰ Colmar Brunton, "New Zealanders' perceptions of Asia and Asian peoples in 2011", Asia NZ Foundation, 2012.

⁷¹ Andrea Fox, "Kiwis against farms to foreigners – poll", Stuff.co.nz, 3 March 2011.

⁷² Peter Drysdale, "Australia: time to adapt", East Asia Forum, Vol. 4 No.2, 2012; Fran O'Sullivan, 'Crafar ruling robust first step', New Zealand Herald, April 2012.

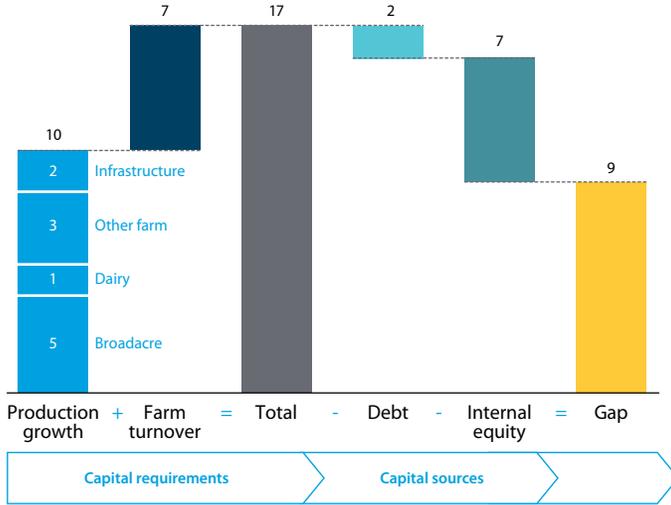
⁷³ Bill Rosenberg, "Overseas Ownership of Land Far Greater Than the 1% of the PM Claims", 2012.

It will be critical for both countries to come to a sensible conclusion on how the massive capital gap in agriculture can be filled, particularly for Australia. Inevitably, foreign investment will be an important part of the answer, but the pace of investment cannot get too far ahead of public opinion without undermining its sustainability.

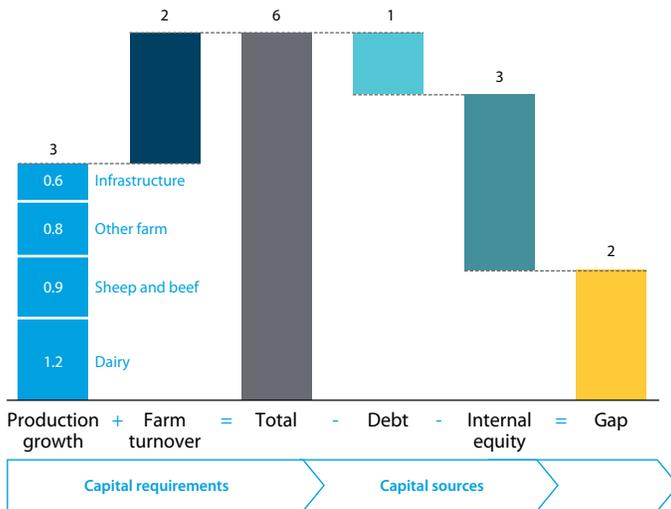
Exhibit 4.3

FIRST YEAR AGRICULTURAL CAPITAL REQUIREMENTS

Australia
A\$ Billions



New Zealand
NZ\$ Billions



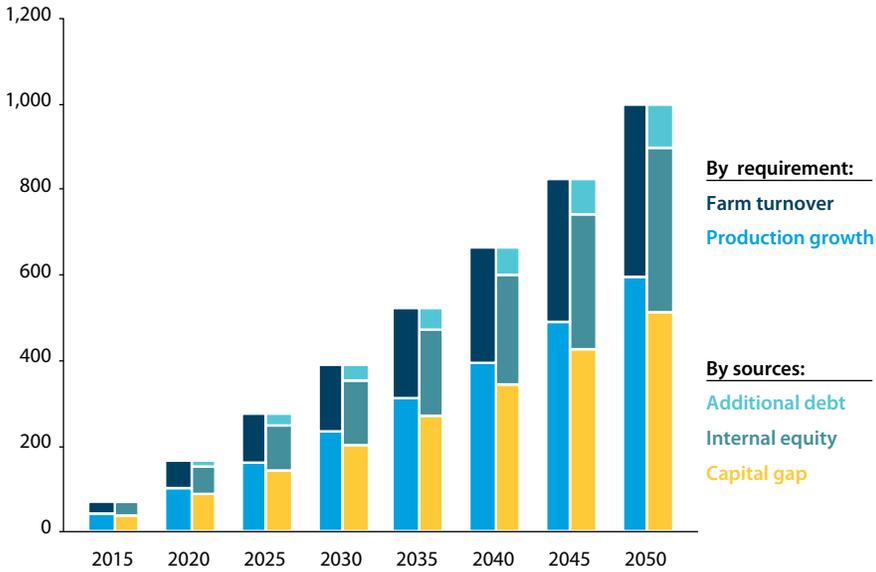
* Based on Base Case export growth scenario.
Source: ABS; ABARES; New Zealand MAF; Capital IQ; PJP analysis.

Exhibit 4.4

CUMULATIVE CAPITAL REQUIRED – BY REQUIREMENT, SOURCE*

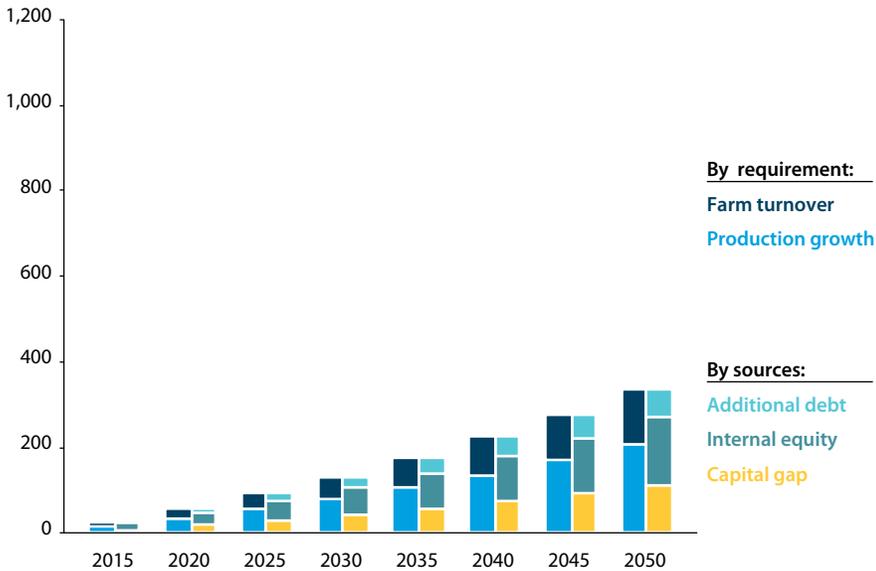
Australia

A\$ Billions (Real, 2011)



New Zealand

NZ\$ Billions (Real, 2011)



* Based on Base Case export growth scenario.
Source: PJP analysis.

4.3 HUMAN AND NATURAL RESOURCE CHALLENGES

Access to and efficient use of key inputs – including labour and natural resources – is critical to the success of agricultural industries. Both countries are now facing serious shortages in their agricultural labour force, while the effective management of land and water is becoming increasingly important.

4.3.1 *Growing labour and skill shortages, and ageing farmer populations*

Australia and New Zealand both currently face significant agricultural labour and skill shortages, spanning the entire value chain and supporting areas. It was estimated that Australian farms faced shortages in excess of 100,000 workers as of June 2009⁷⁴ with further shortages in agribusiness and agricultural science⁷⁵. Similarly, New Zealand industries struggle to fill on-farm labour needs⁷⁶ and more technical positions, including roles in agricultural sciences, are high on the country's skills shortage lists⁷⁷.

These agricultural labour shortages have already resulted in opportunity costs, particularly in Australia. In recent years, an inability to fill fruit-picking positions has cost each horticultural farm on average \$100,000 per annum in unpicked, rotting fruit⁷⁸. Increasing competition for labour from other industries, particularly from Australia's higher paid mining sector, has added to the pressure.

Compounding these immediate problems, both countries face serious challenges in attracting sufficient talent in agriculture, particularly from the younger generation⁷⁹. This is not only about fostering talented future leaders in farming but across the entire value chain including agricultural extension services, processing and marketing. Among other indicators, university graduate rates in agriculture-related disciplines are troubling in both countries. Over the past decade, Australia has seen a significant drop in the total number of university graduate completions⁸⁰ (Exhibit 4.5) and campuses offering agricultural education⁸¹. While graduate numbers in New Zealand have remained relatively flat, current levels are not sufficient to meet demand. New Zealand faces a further challenge of having a large proportion of talent leave the country permanently for overseas opportunities, accounting for as much as 24% of New Zealand-born highly-skilled personnel compared to 3% in Australia⁸².

Moreover, low entry rates into agriculture are especially concerning given the ageing of farmers and agricultural scientists⁸³. Over the past few decades the average or median age of farmers has steadily increased in Australia and New Zealand, and is approaching the mid-50s. Of further concern is that many Australian⁸⁴ and New Zealand farmers do not have formal succession plans in place⁸⁵. For example, a recent ANZ survey in New Zealand found that 71% of farmers wanted to sell their business to the next generation, but only 47% have family working in the business, and only 10% have a formal plan in place⁸⁶.

74 AEC Group, "Towards a better understanding of current and future human resource needs of Australian agriculture", Australian Farm Institute, June 2010.

75 Pratley and Hay, "The job market in agriculture in Australia", 2010; "Environmental Scan 2011", AgriFood Skills Australia, 2011.

76 "Survey of Employers who have Recently Advertised (SERA) 2007", New Zealand Department of Labour, 2007; "Agribusiness Agenda 2011", KPMG, 2011.

77 Anette Scott, "Skill shortage in ag science ranks", The New Zealand Farmers Weekly, 4 June 2012.

78 "Issues Paper – Population Policy: Labour Pains", NFF, 27 April 2010.

79 "Agribusiness Agenda 2012", KPMG, 2012.

80 Jim Pratley, "Professional agriculture – a case of supply and demand", Australian Council of Deans of Agriculture, 2012.

81 Chris McLennan, "Ag uni courses in decline", Weekly Times Now, 15 February 2012.

82 J-C. Dumont and G. Lemaitre, "Counting immigrants and expatriates in OECD countries: a new perspective", OECD, 2005.

83 Bronwyn Torrie, "Skills shortage hits agricultural science", The Dominion Post, 13 January 2012.

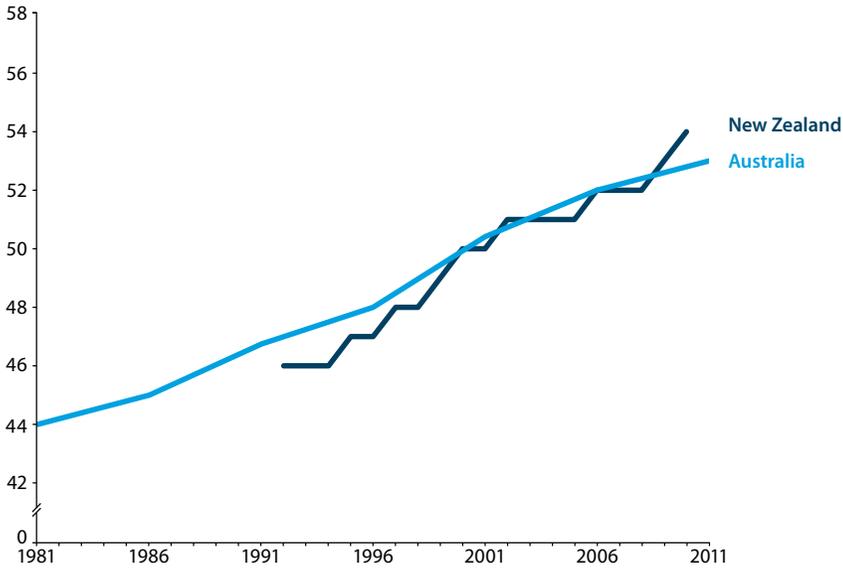
84 Katarina Nossal and Yu Sheng, "Productivity growth: Trends, drivers and opportunities for broadacre and dairy industries", ABARES, 2010.

85 John Fairweather and Stephanie Mulet-Marquis, "Changes in the age of New Zealand farmers: Problems for the future?", New Zealand Geographer, 2009.

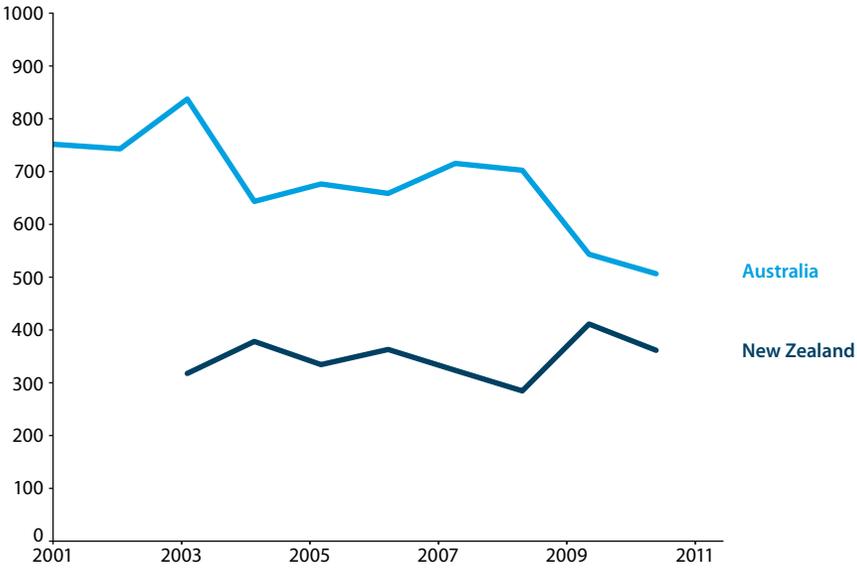
86 "Privately-Owned Business Barometer", ANZ New Zealand, 2012.

Exhibit 4.5
LABOUR FORCE ISSUES

Farmer age*
 Years



Graduates in agriculture**
 Number of graduates



* Australia: Median farmer age across all sectors. New Zealand: Average farmer age in meat and fibre sectors.

** Australia: Includes all three and four-year undergraduate courses at universities in agricultural science, agribusiness, horticulture, viticulture, wine science, and agricultural economics.

New Zealand: Includes all bachelors degrees (including honours) and postgraduate certificates/diplomas in agriculture, horticulture, viticulture, forestry, fishery, environmental studies, and other related studies.

Source: ABS; Australian Council of Deans of Agriculture; New Zealand Ministry of Education; ANZ.

4.3.2 Management of land resources

In addition to land use optimisation opportunities across different farming enterprises, agricultural land is facing increasing competition from other land uses. High level data suggests that total agricultural land in both countries has decreased over recent decades. In both countries, the rapid expansion of urban centres has contributed to this decline⁸⁷. In New Zealand, this encroachment has come at the expense of the best agricultural land⁸⁸. In Australia, major mineral and energy resources are also located under some of the most productive farm land creating further conflicts.

While some surveys and research on land use exist, quantifying the extent of any trend is difficult given that agricultural land use data for both countries is inconsistent and not sufficiently comprehensive. It is clear that more focus is needed in both countries to understand and manage conflicts in land use, particularly given that the current uncertainty could discourage growth-oriented investment by some farmers.

4.3.3 Management of water resources

Effective management of water resources is critical. Water markets in both countries are challenged by varying degrees of inefficiency in allocation, trading and use.

Water management is particularly important in Australia given the country's susceptibility to drought. Some estimates suggest climate change could cause Australian production of key commodities to decline by 13-19% by 2050 in the absence of mitigation efforts⁸⁹. It is critical that Australian farming is well equipped to adapt to possible changes in climate conditions in the coming decades. Enormous scope exists for water infrastructure improvements yet recent drought assistance packages have not been designed to encourage farmers to make long term water efficiency investments⁹⁰. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has estimated that up to half of the water used in irrigated farming may be lost from inefficiencies in irrigation systems, on-farm distribution channels and over-watering⁹¹.

While some progress has been made in Australia, particularly in the Murray Darling Basin, water reforms have suffered from delays, deep resistance and gaps in implementation⁹². Meanwhile, trading arrangements are often inconsistent across jurisdictions, and there is a lack of consistent and readily-available information on the trade approval process. Market price information is fragmented, often with inappropriate timing of release. The Murray Darling Basin Plan may resolve some of these issues, but the reform has been delayed by significant disagreements among stakeholders, at the core of which are disputes over the amount of water required for environmental purposes. Moreover, water markets outside of the Murray Darling Basin are generally less developed or non-existent⁹³.

87 Alec Mackay et al., "Land: Competition for future use", *New Zealand Science Review*, 2011; "Does Australia Need a National Policy to Preserve Agricultural Land", *Australian Farm Institute*, 2012.

88 "Impacts of urbanisation on trends on soil resource availability in New Zealand", *Proceedings of the New Zealand Grassland Association*, 2010.

89 Don Gunasekera, Yeon Kim, Catherine Tulloh and Melanie Ford, "Climate change: impacts on Australian agriculture", *Australian Commodities*, Vol. 14, no. 4, 2007.

90 "Government Drought Support", *Productivity Commission*, February 2009.

91 "An overview of climate change adaptation in Australian primary industries – impacts, options and priorities", *CSIRO*, 2008.

92 "The National Water Initiative – securing Australia's water future: 2011 Assessment", *National Water Commission*, 2011.

93 "Strengthening Australia's water markets", *National Water Commission*, 2011.

New Zealand's water use governance is less developed, with a comprehensive policy yet to be implemented. To date, New Zealand has struggled to set and manage limits on water use, despite intensive agricultural expansion, with the result being deterioration in water quality⁹⁴. The country is yet to develop a flexible means of allowing water permits to be allocated and transferred among users⁹⁵. Monitoring and enforcement of rules and consents are inconsistent as are water policies and planning processes. There are also concerns that councils governing water have insufficient resources and governance skills⁹⁶. These challenges have been recognised, with positive progress, but much more needs to be done. Moreover, industry surveys have suggested that there is widespread consensus that New Zealand still does not fully recognise the economic and social benefits that more extensive irrigation infrastructure can bring to the economy. Proposed schemes to date are often small, hobby projects being run by passionate farmers; lacking a wider vision and the necessary governance skills to bring larger projects to fruition⁹⁷.

4.4 RESEARCH AND DEVELOPMENT FUNDING NEEDS NEW FOCUS AND EFFICIENCY

Sufficient and targeted R&D is crucial to maintaining international competitive advantage in agriculture. There is currently a need for greater clarity around the extent and balance of agricultural R&D investment in Australia and New Zealand, particularly in new high potential opportunities.

Notwithstanding various attempts to gauge the adequacy of total agricultural R&D spending in Australia and New Zealand, none of the studies to date have provided a compelling basis to draw conclusions. The uncertainty is particularly prevalent in Australia, with a number of competing arguments (Exhibit 4.6):

- Public R&D investment intensity has declined and has directly impacted productivity growth. While ABARES maintains this argument, the Productivity Commission has questioned the underlying data and research methodology⁹⁸.
- Total public and private food and agriculture R&D investment intensity has remained largely steady, and broadly in line with other high income countries⁹⁹.
- High rates of R&D returns imply scope for increased investment. Domestic research indicates internal rates of return (IRR) range from 15% to 70%¹⁰⁰, and international research suggests the average IRR could be as high as 100%¹⁰¹.

⁹⁴ "OECD report on NZ water – not as clean as you'd like"; National Institute of Water and Atmospheric Research, 22 September 2011; "Water quality in New Zealand: understanding the science", Parliamentary Commissioner for the Environment, March 2012.

⁹⁵ Paul Beverly, "Under pressure: Fresh water management reform in New Zealand", Australasian Legal Business Magazine, July 2011.

⁹⁶ "Report of the Land and Water Forum: A Fresh Start for Fresh Water", Land and Water Forum, 2010.

⁹⁷ "Agribusiness Agenda 2012", KPMG, 2012.

⁹⁸ Yu Sheng, John Mullen and Shiji Zhao, "A turning point in agricultural productivity: consideration of the causes", ABARES, May 2011; "Rural Research and Development Corporations", Productivity Commission, February 2011.

⁹⁹ Philip Pardey, "Getting Research Policy for Food and Agriculture Right", Australian Agricultural and Resource Economics Society Conference, University of Adelaide, August 2011.

¹⁰⁰ John Mullen, "Productivity growth and the returns from public investment in R&D in Australian broadacre agriculture", Australian Journal of Agricultural Economics, 2007; John Mullen, "Trends in investment in agricultural R&D in Australia and its potential contribution to productivity", Australasian Agribusiness Review, 2010; "Public support for science and innovation", Productivity Commission, 2007.

¹⁰¹ Alston et al., "A Meta-Analysis of Rates of Return to Agricultural R&D: Ex Pede Herculem?", International Food Policy Research Institute, 2000.

Evaluating the effectiveness of R&D performance from trends in total expenditure is difficult. Yet, there is evidence to suggest that agricultural R&D in both countries needs greater focus, and has been hampered by an absence of clearly defined principles and a need for more efficient allocation of funding. In addition, commercialisation of research outcomes has been widely acknowledged as an area of weakness in the R&D systems of both countries¹⁰², particularly in Australia where this stage has been identified as the weakest link in the innovation chain across sectors¹⁰³.

In Australia, agricultural R&D has lacked sufficient focus on enabling long term growth; a consequence of the short-term threats of the past decade. Between 2003 and 2008, more than half of the total funding for Australia's Rural Research and Development Corporations (RDCs) served objectives outside of productivity or output growth¹⁰⁴. Even in adaptive research, there may be an over emphasis on small, short-term, low-risk projects. For example, Horticulture Australia Limited – the second largest RDC – had an average project size of only A\$150,000 during 2009-10¹⁰⁵. In contrast, New Zealand seems to be more focussed on larger, game changing research, but may need to consider more adaptive research from developments abroad given its scale. It may also benefit from a greater emphasis on market-focussed research to increase returns through capturing greater price premiums, rather than relying purely on volume growth¹⁰⁶. Clearly, no single solution fits all – each country holds unique strengths and challenges that need to be addressed via a tailored approach.

The contribution of the private sector in R&D investment has been a cause for concern in Australia and New Zealand. While the share of private sector expenditure has increased in both countries over recent decades¹⁰⁷, levels are still significantly below other high-income countries, particularly outside of food processing. Industry collaboration with research institutions may also be insufficient, and possibly in decline. For example, the CSIRO in Australia has not grown its revenue from the private sector or rural industry R&D corporations for the past 15 years, despite doubling overall revenue during the period¹⁰⁸.

Behind these potential funding imbalances sits a series of underlying operational issues in the two countries' agricultural R&D operations. A recent Productivity Commission review of Australia's RDCs highlighted the lack of high-level principles guiding agricultural R&D policy makers. It also identified coordination issues, including duplication of responsibilities, insufficient transparency and difficulty in evaluating outcomes¹⁰⁹. Crown Research Institutes (CRIs) in New Zealand have also been challenged by similar issues. Heavy reliance on short term contestable funding made it difficult for them to operate strategically and to adopt best-practice research management techniques. Multiple lines of accountability also created confusion and contributed to staff morale issues¹¹⁰. While recent CRI reforms have sought to address these challenges it is still too early to assess their success.

102 "Economic Survey: New Zealand 2009", OECD, 2009; "Support the business sector to innovate", New Zealand Ministry of Business, Innovation & Employment, 2 February 2012.

103 Saul Eslake and Marcus Walsh, "Australia's Productivity Challenge", February 2011.

104 "Promoting productivity in the agriculture and food sector value chain: issues for R&D investment", ABARES, December 2009.

105 Even after excluding smaller projects such as 'study tours, conferences and industry annual communications'; "Rural Research and Development Corporations", Productivity Commission, February 2011.

106 "Agribusiness Agenda 2011"; KPMG, 2011.

107 Philip Pardey, op cit., "Getting Research Policy for Food and Agriculture Right".

108 CSIRO annual reports.

109 "Rural Research and Development Corporations", Productivity Commission, February 2011.

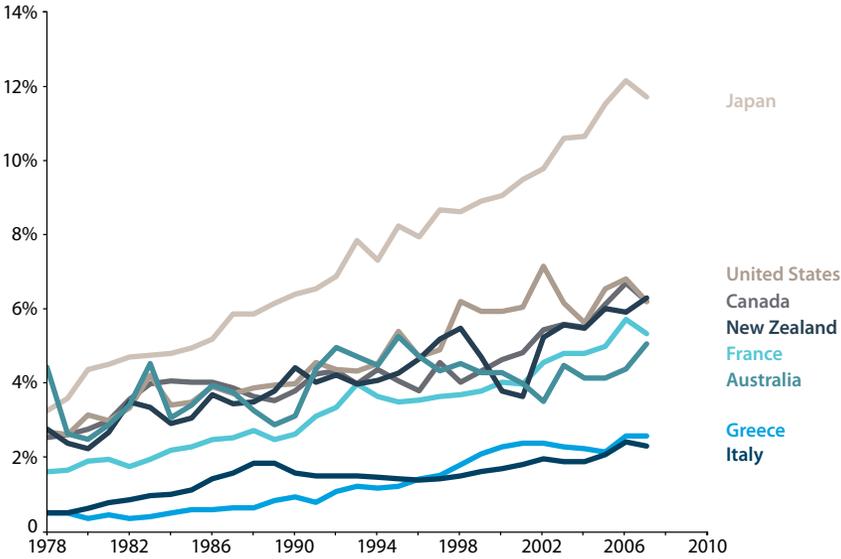
110 "How to enhance the value of New Zealand's investment in Crown Research Institutes", Crown Research Institute Taskforce, February 2010.

Exhibit 4.6

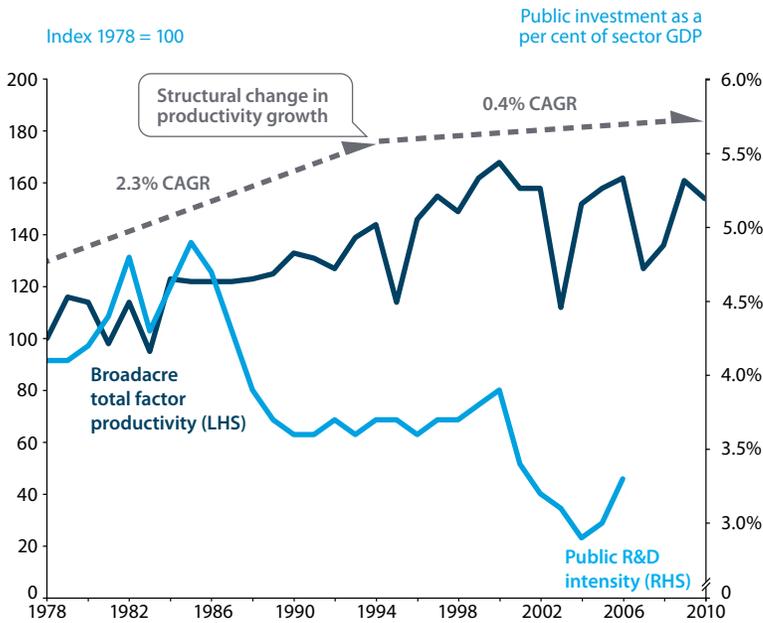
INDICATORS OF R&D SPENDING REQUIREMENTS

Food and agriculture R&D intensities – by country

Public and private investment as a percent of sector GDP



Productivity and public research intensity – Australia



Source: "Agricultural R&D as an investment", Philip Pardey and Julian Alston, 2011; ABARES; "Trends in Investment in Agricultural R&D in Australia and its Potential Contribution to Productivity", John Mullen, 2010.

4.5 MORE EXTENSION SERVICES NEEDED TO SUPPORT FARM PERFORMANCE

To achieve improvements in agricultural production, effective R&D outcomes need to be accompanied by sustained and widespread adoption of new technologies and best practices. Today, there are substantial variations in performance among farms in Australia and New Zealand, with signs that the gaps have been widening in recent decades. Agricultural extension services¹¹¹ play a critical role in driving ongoing farm improvements and closing the performance gaps. There are growing concerns that these services are not currently sufficient and possibly in decline in both countries.

In Australia, performance variations among farms can be seen in their profitability, yield and rate of technology adoption. Surveys have found that the top 20% of participating broadacre farms were significantly more profitable than the bottom 20% and have double or triple the rainfall-adjusted yield¹¹². Studies by ABARES also support the notion that performance variations among farms are widespread and that the gaps in profitability¹¹³ and technology adoption¹¹⁴ have widened in recent decades. Similarly, industry bodies in New Zealand such as Dairy NZ¹¹⁵ and Beef & Lamb NZ¹¹⁶ have found large variations in profitability between the top farms and others in their respective industries. In each case, the performance differences were driven by increased abilities to use inputs efficiently and deliver higher yields¹¹⁷.

It is clear that there is scope for improving extension services in both countries. In Australia, through workshops conducted by ABARES in 2009, farmers expressed a desire for improved extension services as they faced increasing knowledge gaps on the latest developments in new technologies and best practices¹¹⁸. Recent reviews by the Productivity Commission have also noted the insufficient adoption of research outcomes with extension not always considered part of the R&D planning and delivery process. In New Zealand, a recent study by KPMG highlighted an industry view that the agricultural extension system has not worked effectively since it was privatised in the late 1980s¹¹⁹. While the reduction of public sector involvement in extension could, in theory, create a market for private operators with superior, client-specific services, it could also adversely impact productivity – where quality gains do not justify the increase in cost. Whether the best answer is to make private services more effective, or to provide more public services, will need further debate.

111 These providers assist in the application of scientific research and best practice through farmer education.

112 "AgInsights – Volume 13", Holmes Sackett, 2011.

113 "Agricultural Commodities: March Quarter 2012", ABARES, 2012.

114 Neal Hughes, Kenton Lawson, Alistair Davidson, Tom Jackson, Yu Shen, "Productivity pathways: climate adjusted production frontiers for the Australian broadacre cropping industry", ABARES, May 2011.

115 Michael Robertson, "Agricultural productivity in Australia and New Zealand: trends, constraints and opportunities", CSIRO, 2010.

116 "Red Meat Sector Strategy Report", Deloitte, March 2011; Beef + Lamb New Zealand Economic Service.

117 Factors assessed for dairy were inputs such as land, fertiliser, livestock, and machinery. Factors for beef and lamb were land quality, farm age and size.

118 Tom Jackson, "Harvesting productivity: ABARE-GRDC workshops on grains productivity growth", ABARES, May 2010.

119 "Agribusiness Agenda 2011", KPMG, 2011.

4.6 SUPPLY CHAIN CHALLENGES AND UNFINISHED POLICY REFORMS

The history of agriculture across the globe contains many examples of supply chain failure of one sort or another. Typically, failure falls into one of three categories.

1. The supply chain is too immature to support marketing and movement of large volumes of products into end user markets.
2. Supply chains become monopolised, particularly if the product is perishable or expensive to move relative to the value of the product.
3. A loss of trust and coordination between participants in the supply chain results in persistent underinvestment. For example, in response to receiving unfavourable terms from processors, farmers halt or scale back production. This in turn creates overcapacity downstream and discourages further investment by processors.

Importantly, supply chain failures hurt the competitive position of industries, particularly in cost, and constrain the potential for future growth.

These issues are less evident when there is significant competition at each stage of the supply chain, or when there are high levels of alignment, particularly through supply chain ownership by farmers. This might involve, for example, well-run farmer owned cooperatives controlling processing or infrastructure assets. While market structure alone cannot completely mitigate supply chain failures, some models are more effective at supporting industry alignment and fostering growth than others. Government regulation can also help, but is rarely enough to achieve a robust outcome with ongoing incentives to invest.

Australia and New Zealand have come a long way in removing regulation and encouraging competition within key agricultural industries. Recent decades saw the removal of industry-distorting subsidies, deregulation of markets and the removal of single desk marketing boards. These reforms had the intention of making industries more efficient and globally competitive – and there is no doubt the changes have created huge success stories: New Zealand's dairy industry being an example. However, there is more work to be done to fully realise the original goals driving the reforms. In Australia, the deregulation, privatisation and consolidation of some supply chains have replaced heavy-handed government ownership with control by a small number of providers. There still remains some unfinished business that could unlock the full potential of some of the largest agricultural industries in both countries.

In Australia, declining supply chain performance is putting competitiveness at risk in some industries. For example, persistent underinvestment in rail infrastructure has caused major transportation bottlenecks on the east coast, limiting Australia's wheat export potential¹²⁰. The absence of coordination in addressing the issue to date, including from government, has seen the industry absorb high transport costs of up to 48.5% of the value of exported wheat from Australia to Japan¹²¹.

Both excessive concentration and fragmentation can cause problems with downstream supply chains.

¹²⁰ "Bin busting harvests threatened by infrastructure bottlenecks", Rabobank Agribusiness, Australian Bulk Handling Review, February 2011.

¹²¹ Garry Goucher & Associates, "Transport costs for Australian Agriculture", Australian Farm Institute, 2011.

Where there is high concentration of downstream ownership in supply chains not owned by farmers, regulators and farmers need to be vigilant. In the Australian grains industry, for instance, the majority of non-farmed storage, handling and transport is controlled by a single player in each State¹²². Similarly, four poultry processors account for more than 60% of the market¹²³; three millers account for a share greater than 85% in the sugar market¹²⁴; and three dairy processors account for purchasing more than 50% of milk supply¹²⁵. These Australian industries all involve products that are relatively perishable or expensive to transport from the farm gate, limiting the bargaining power of farmers. While downstream consolidation is important in driving international competitiveness, this must be balanced by ensuring alignment between farmer and supply chain priorities, or increased contestability, or both.

As described in Chapter 3, New Zealand dairy has done a good job of maintaining an aligned supply chain in a challenging industry. While Fonterra has a market share greater than 90%¹²⁶, its farmer-owned cooperative structure enables it to achieve scale efficiencies across the supply chain while maintaining alignment with its farmer shareholders. The deregulation process also promoted contestability and allowed a series of competitive fringe processors to emerge. Although cooperatives are not the only model capable of fostering growth, where they are well run they foster an environment that incentivises all supply chain participants to work together towards industry growth.

Other industries in New Zealand face supply chain issues, in some cases because of excessive fragmentation. The performance of the red meat industry has been attributed to the inefficient procurement model between farmers and processors and the lack of coordination in the marketing and selling of products overseas¹²⁷. Overcapacity at the processor stage has caused excessive competition for supply, eroding profitability and the ability to make long term decisions. Farmers in turn are hampered by unclear market signals from processors and a lack of direction for change, such as when to make expansion decisions, impacting confidence to invest.

122 "Competition in the export grain supply chain", Allen Consulting Group, March 2008.

123 "Poultry Processing in Australia", IBISWorld, March 2012.

124 "Sugar Manufacturing in Australia", IBISWorld, March 2012.

125 Excludes Murray Goulburn Co-operative; "Foreign investment in Australian agriculture", ABARES, November 2011.

126 PJP estimates Fonterra's share in 2011 was 92% based on revenues sourced from various annual reports.

127 "Red Meat Sector Strategy Report", Deloitte, March 2011.

4.7 LIMITED PROGRESS IN FURTHERING ACCESS TO KEY MARKETS

Australia and New Zealand have historically increased global market access through free trade agreements (FTA). While significant progress has been made by both countries, more can be done to enhance access to high-value markets, particularly for Australia.

Australia has yet to reach a free trade agreement with China after 18 rounds of negotiations. First initiated in April 2005, approximately six months after the New Zealand-China talks commenced, progress on Australian negotiations have stalled. Disagreements have been primarily over Australian agriculture gaining the same level of access to Chinese markets as New Zealand. An FTA with China would bring substantial benefits for Australia. Since New Zealand's FTA with China came into force in October 2008, the growth rate of New Zealand's agricultural exports has tripled to 38% per annum¹²⁸. Australia and New Zealand are also independently in trade negotiations with India, but neither have yet to come to an agreement.

Moreover, further work could be done by Australia and New Zealand to explore more innovative ways to increase market access beyond FTAs. Key growth markets such as China are increasingly concerned about food security. This has led them to pursue investments in foreign farmland and agricultural companies. In recent years, tightening land ownership policies around the world, for example in Brazil and Argentina, have led China to shift its strategy to securing strategic off-take agreements. These agreements involve investment in farm, processing or logistical infrastructure in return for output, without the need for ownership. In addition to activities in Brazil, 2011 saw an agreement between Chinese SOE Beidahuang and Argentina's Rio Negro Government. The agreement involved the investment of US\$1.5 billion in return for agricultural exports over the next 20 years. The capital will go towards developing 300,000 hectares of marginal farm land (without ownership) to produce wheat, corn, soybeans, fruit, vegetables and wine, and to expand a power plant and port for shifting produce to China¹²⁹.

¹²⁸ Craig Emerson, 'We must not cut ourselves off from China's re-emergence', *The Australian*, April 2012.

¹²⁹ Rodrigo Orihuela, 'Beidahuang will invest \$1.5 billion on Patagonian farms that it won't own', *Bloomberg*, 9 June 2011.

5.0 UNLOCKING THE FULL POTENTIAL OF AUSTRALIAN AND NEW ZEALAND AGRICULTURE

KEY THEMES:

- *Australia and New Zealand need to take deliberate steps to rejuvenate agricultural industries and foster growth.*
- *Fostering and strengthening successful industry clusters around high growth opportunities will play a critical role.*
- *Each agricultural industry also holds unique challenges which need to be addressed with a tailored approach.*

The global soft commodity opportunity presents a unique chance for Australia to reinvigorate its agriculture and for New Zealand to apply its dairy success to other industries.

Growth-limiting hurdles must be recognised and overcome. This will require the close involvement of all stakeholders across government and industry, and a high degree of commitment, collaboration and foresight. While the task ahead will be no small feat, it is important to recognise that gaining such momentum is not a new experience for agriculture in either country.

5.1 THREE PATHWAYS TO REINVIGORATE THE AGRICULTURAL SECTOR

Australian and New Zealand agriculture can recover and prosper by redeveloping and creating healthy industry clusters across all three growth horizons.

Achieving this will involve pursuing change by:

- 1. Selectively reinvigorating stalled industries with strong growth potential.**
First, there are opportunities to significantly improve the performance of some industries serving mature but growing markets. Improving the performance of Australian wheat, which still has significant scope to expand, is a good example. Second, the past decade has seen many high growth industries stall. Australian canola and wine are good examples, with potential to return to sustained, high growth trajectories (Horizon 2).
- 2. Sustaining and strengthening existing high growth industries.** For example, Tasmanian dairy, which has delivered strong growth, has potential to grow further if there is sufficient investment in irrigation infrastructure. Similarly, the strong performance of New Zealand dairy over recent decades could be sustained by alleviating capital and labour constraints, and focussing on more sophisticated production models, such as improving efficiency, market and production innovation, and business management through economic cycles.
- 3. Fostering new agricultural industries around high growth opportunities.** Future success in Australian and New Zealand agriculture requires new and emerging industries to be encouraged and nurtured. Investment needs to be targeted around high-potential opportunities. For example, Australia could consider potential opportunities in soy, safflower and biofuels.

5.2 SECTOR-WIDE PATHS TO DRIVE COMPETITIVENESS AND GROWTH

As many of the overarching issues described in Chapter 4 apply across agriculture, both Australia and New Zealand need to focus on developing strength in the following sector-wide areas to improve competitiveness and enable growth.

5.2.1 *Enhancing capital accessibility and innovation in financing*

Farmers face major challenges in raising sufficient capital to fund growth. This is particularly important for high-performing farmers who have the potential to drive substantial improvements in poor-yielding farms, but have insufficient capital to purchase additional assets independently.

Alternative farm ownership and operation structures will help to attract investment from domestic and foreign capital markets. For example, equity partnerships are common in New Zealand agriculture, particularly in dairy. While agricultural land funds already exist in Australia, equity-based investment options are still very much in their infancy.

Potential structures include:

- Agricultural management companies to provide professional management of farm businesses for investors;
- Equity partnerships in which passive investors finance part of the operation alongside the farmer;
- Structures that provide conduits to connect high-performing farmers with investors, facilitating the purchase of farmland funded by investors and managed by farmers;
- New financing models for non-land assets, such as funds for dairy cow herds, or mortgages reliant on future production as collateral;
- Less formal ownership models to enable the pooling of resources, where for example, a consortium of local farmers and/or investors jointly purchases property; and
- Off-take agreements, whereby investors receive a portion of the output of the farm in return for investment in it.

Beyond the farm gate, many agricultural industries in Australia and New Zealand could also benefit from more flexible capital raising to fund improvements in infrastructure, such as investment in transport (i.e. rail, road, ports) and irrigation. Building momentum in this area requires the public sector to actively invest while ensuring an environment that attracts private sector investment. In many cases, private and public sector collaboration, and potentially co-investment, will be required.

Ensuring sufficient capital accessibility in part will require continued involvement from foreign investors. Australia and New Zealand need to foster an environment that effectively safeguards national interests without discouraging favourable foreign investment. This will require both countries to:

- Facilitate informed discussions based on a true picture of the extent and nature of foreign investment in agricultural assets through improved data collection;
- Define clear agriculture-specific positions in relation to national interest with consideration of both the long term benefits and risks;
- Establish robust and transparent regulatory processes to prevent threats to national interest while minimising administrative disincentives for foreign investors;

- Foster the development of more innovative options to attract foreign investment in agriculture without land ownership, such as off-take agreements and leases; and
- Ensure public sentiment is aligned to national objectives and facts surrounding foreign investment in agriculture.

5.2.2 Boosting the labour force and efficiently managing natural resources

Overcoming labour force challenges requires government and industry to collaborate on how to:

- Invest in the next generation of leaders in agriculture;
- Improve the sector’s capability to attract additional domestic labour;
- Fill remaining labour force gaps with expanded immigration strategies; and
- Encourage the transition to less labour-intensive production systems.

Equally, significant growth in production over coming decades requires sustained improvements in the management of land and water. This could be achieved through:

- Optimising agricultural land use by facilitating farm conversions to higher-value products. For example, some suggest many Tasmanian beef and sheep farms could capture more value if converted to dairy or horticulture production¹³⁰;
- Managing land use conflicts, for example from urbanisation, gas and mineral projects, such that the preservation of prime agricultural land is encouraged where appropriate;
- Minimising water wastage through investing in on-farm infrastructure including more effective storage (e.g. deeper storages with smaller surface areas) and utilisation (e.g. laser levelling) solutions; investing in critical off-farm infrastructure (the ‘Water for the Future Program’ in Australia and co-investment programs in New Zealand are positive steps); improving the efficiency and transparency of existing water markets and developing water markets where they do not exist; and
- Improving the agility of agricultural production systems to better respond to volatile climate and market conditions.

5.2.3 Harnessing agricultural R&D to maximise future growth

Given that the lag between agricultural R&D investment and subsequent productivity growth could be up to 35 years¹³¹, getting the approach right today is critical for the future. Maximising the effectiveness of the R&D system in each country requires a focus on answering some central questions, such as:

- How to adopt well-defined and clearly articulated funding goals that drive national agricultural R&D, and the corresponding roles of government and the private sector. How can the two sectors prioritise research objectives such as boosting productivity and increasing competitiveness through lowering costs and/or building differentiation – particularly in areas with high growth potential;
- How to focus public funding on areas that are of strategic national importance, particularly in areas not addressable by the market¹³². The role and purpose of each publicly funded body within the R&D system would require appropriate balance across different research types (pure and applied), timeframes and objectives; and

¹³⁰ Rodney Stolorz, “Tasmanian Futures: Designing and Implementing an Innovation Strategy”, Australian Innovation Research Centre, January 2010.

¹³¹ John Mullen, “Productivity growth and the returns from public investment in R&D in Australian broadacre agriculture”, Australian Journal of Agricultural and Resource Economics, vol. 51, no. 4, 2007.

¹³² Phillip Pardey and Julian Alston, “For want of a nail – the case for increased agricultural R&D spending”, 2012.

- How to boost private investment and collaboration. Insufficient and stalling private sector engagement in R&D has been noted across the innovation landscape in both Australia and New Zealand¹³³. The private sector plays a critical role in each countries' R&D system, particularly in the commercialisation stage.

5.2.4 Re-invigorating extension services and closing the performance gap among farms

Glaring performance gaps between high and low performing farmers in Australia and New Zealand suggest both a sizeable challenge and an exciting opportunity. Making progress in this area would significantly boost the robustness and production capacity of agriculture in both countries.

A reinvigorated extension system could build farmer confidence and encourage investment in new technologies and best practices. It could involve¹³⁴:

- The application of modern, internet-based communication and education techniques to increase access and improve knowledge diffusion;
- The continued development of standardised, robust benchmarking practices across all sectors to test new technologies and encourage uptake; and
- Influencing the next generation (or successors) of farmers. Not only does this help overcome future labour challenges it may also help improve farm productivity. It has been argued that young people contribute indirectly to productivity growth by encouraging older producers to invest in new technology.

Particular measures that should contribute to extension improvement:

- Reviewing whether current public sector investment in farm extension is sufficient in Australia, and whether New Zealand should maintain a fully privatised system;
- Encouraging and facilitating professional development of extension practitioners;
- Ensuring the ageing work force and growing skill shortages in extension services are on the agenda of broader responses to agricultural labour issues;
- Maximising coordination and collaboration among industry stakeholders in supporting extension¹³⁵. This includes enhancing linkages between extension providers, R&D players and downstream players such as processors, traders and marketers; and
- Encouraging greater data collection at the farm level. This will support future improvements as new developments will increasingly revolve around data-based decision-making systems¹³⁶.

¹³³ Terry Cutler, "Venturous Australia: building strength in innovation", August 2008; "Economic Survey: New Zealand 2009", OECD, 2009; "Support the business sector to innovate", New Zealand Ministry of Business, Innovation & Employment, 2 February 2012.

¹³⁴ Emily Gray, Yu Sheng, Max Oss-Emer, and Alistair Davidson, "Agricultural productivity: trends and policies for growth", ABARES, 2012.

¹³⁵ Warren Hunt, Colin Birch, Jeff Coutts, and Frank Vanclay, "The many turnings of agricultural extension in Australia", Journal of Agricultural Education and Extension, 2012.

¹³⁶ "Agribusiness Agenda 2011", KPMG, 2011.

5.2.5 Fostering the development of robust supply chains

Robust supply chains are central to the success of agricultural industries in an increasingly competitive global market. Lowering costs and increasing supply chain differentiation will be critical for Australia and New Zealand. The key is to create, or re-create, contestable supply chain organisations aligned with the producer in a number of possible ways:

- The challenge for supply chains which are concentrated with large corporate players is to focus on raising alignment and trust along the supply chain, particularly with respect to encouraging investment. A break-down in alignment and trust will result in an unwillingness to invest. Given some of these agricultural gateways could undergo further consolidation, it is important to ensure this process does not reduce contestability and inhibit future growth. Australia's grain and sugar industries are examples;
- Concentrated, characteristically cooperative structures with large players need to keep working to reduce capital constraints. Ensuring sufficient access to capital is critical to maintain international competitiveness. New Zealand's dairy industry, largely served by Fonterra, is an example; and
- Smaller industries with relatively fragmented structures often lack an industry leader that drives innovation. Besides further consolidation, this calls for greater cooperation among players. Deep and sustained involvement by industry bodies could help drive this. One example of where this might be necessary is New Zealand's red meat industry.

Additional investment in infrastructure is critical. Potential areas include:

- Off-farm irrigation infrastructure investment to maximise the growth potential of dairy and horticulture industries. Tasmania and areas of northern Australia outside of Australia's Murray Darling Basin, New Zealand's South Island and parts of the North Island (Hawke's Bay and Wairapa) could benefit from this¹³⁷;
- Rail infrastructure investment, especially in Australia's east coast, would help to address transport bottlenecks in grain transportation¹³⁸;
- Port infrastructure investment, particularly in New Zealand (but also in Australia), as ageing terminals are unable to handle larger deep-sea ships. Of New Zealand's four busiest export hubs, only Tauranga is in advanced stages of expanding for larger vessels¹³⁹; and
- Road infrastructure investment that enables more regions to have access to higher productivity vehicles such as B-triples¹⁴⁰. Raising access to these vehicles will not only increase productivity but also improve cost competitiveness and contestability with rail, although this should be seen as complementary to investing in rail, rather than a substitute.

¹³⁷ Jonathan West, "An innovation strategy for Tasmania – A new vision for economic development", Australian Innovation Research Centre, October 2009; "Irrigated agriculture: development opportunities and implications for northern Australia", Northern Australia Land and Water Science Review, October 2009; Bill Kaye-Blake, Chris Schilling, and James Zuccollo, "The economic impact of increased irrigation: A dynamic Computable General Equilibrium analysis of increased irrigation in New Zealand", NZ Institute of Economic Research, November 2010.

¹³⁸ "Bin busting harvests threatened by infrastructure bottlenecks", Rabobank Agribusiness, Australian Bulk Handling Review, February 2011.

¹³⁹ Chris Bourke and Tracy Withers, "Fonterra Sales To China Threatened By New Zealand Ports: Freight", Bloomberg, 4 July 2012.

¹⁴⁰ "Infrastructure Australia NFF Submission", NFF, October 2008.

5.2.6 Enhancing exposure to high-value markets

Australian and New Zealand agriculture can build relevance with high potential markets through balancing two strategies:

1. Driving strong volume growth through serving large, high growth opportunities, such as the rapidly growing Asian market for products like dairy, beef, oilseeds and wheat.
2. Capturing price premium opportunities for differentiated products that serve the expanding global middle class. New Zealand's merino wool industry is one such example.

Effectively achieving these strategies will require a combination of traditional and new models of market access:

- Continue efforts to strike multilateral and bilateral free trade agreements with key growth markets. Talks with China remain a priority for Australia, while both Australia and New Zealand could accelerate negotiations with India.
- Explore more innovative ways to increase market access such as major strategic off-take agreements in return for capital investment. This approach has been adopted by Brazil and Argentina in their trade relationships with China. Interestingly, this model is not new to Australia. Australia has been striking minerals-related, off-take agreements (or the like) with countries such as China and Japan for decades. For example, Japanese financing was crucial in establishing the Port Waratah Coal Services (PWCS) port terminal in New South Wales in 1976, in return for increased off-take of coal. Japanese investment with off-take rights is routine in the development of the Pilbara and Bowen Basin.
- Capture premium market opportunities through investing in differentiated products. Effectively gauging individual market needs will be helpful in this process. Key export product categories such as dairy, red meat, wheat and oilseeds could all possess potential opportunities.

5.3 INDUSTRY SPECIFIC STRATEGIES – TWO CASE STUDIES

While many sector-wide paths to growth apply across Australian and New Zealand agriculture, each individual industry possesses unique challenges and opportunities, requiring tailored approaches. Two global market opportunities are explored in more detail in this section.

5.3.1 Dairy in Australia and New Zealand

While New Zealand and Australia are both among the top three dairy exporters in the world, their performance over recent years has diverged markedly – New Zealand has consistently increased production while Australian production has declined (Exhibit 5.1). Australian production volumes have dropped by 14% over the past decade (although Tasmania has been an exception to this trend). Notwithstanding the fundamental contrasts, both industries face a series of challenges which need to be overcome to maximise future growth.

Costs of production in New Zealand and parts of Australia (particularly in Tasmania) are rising rapidly, undermining natural advantages. Improving production systems through better management or technology could alleviate this but farmers are constrained by high debt levels. For example over the past decade, average dairy farm debt increased by 75%¹⁴¹ in Australia. Over the same period, the average debt level per kilogram of milk solids increased by 150%¹⁴² in New Zealand. Furthermore, confidence plays a critical role in an industry's willingness to make long term, growth-oriented investments. In Australia, many farmers do not have a positive view about the future of the industry and remain cautious about expanding¹⁴³. By contrast, farmer confidence has remained strong in New Zealand over the past two decades, in line with sustained growth.

While declining production volumes in Australia may reflect the exit of less efficient farmers since deregulation, it has also freed up processing capacity. As such, the challenge has been to utilise existing capacity as efficiently as possible and rationalise surplus capacity¹⁴⁴. By contrast, cooperative-based processors in New Zealand have faced growing capital constraints as they seek to raise sufficient capital to support continued growth. For example, Fonterra's shareholder equity offering in 2009 only raised 24% of total potential funds from farmers.

Industry-specific approaches or opportunities to drive growth include:

- Continue to drive the development of dairy in Tasmania, which has favourable natural conditions that could emulate the success achieved in New Zealand. For example, while the recent investment of A\$1.5 million by the Tasmanian Government on road infrastructure to enable farm conversions to dairy is a positive start, investment in irrigation infrastructure could increase the State's milk production by around two thirds¹⁴⁵;
- Enhance capital access for New Zealand's cooperative processors. While the Fonterra board has developed various strategies to protect and raise equity¹⁴⁶, cooperatives should be open-minded about alternate operating models, while recognising the desire to keep control over supply chains. Various cooperatives around the world have adopted a number of hybrid capital structures, with some success¹⁴⁷. Participating farmers also need to understand the importance of joint investment for growth;
- Manage risks and control cash flows through unfavourable or volatile price cycles. Options include using financial instruments, such as dairy futures, or long term supply contracts to smooth earnings. Greater certainty over future prices means production and investment decisions can be executed with a higher degree of confidence; and
- Grow volumes in higher value product segments. A successful example is Fonterra's Anlene 'bone health' brand in China¹⁴⁸, which capitalises on the country's growing health awareness¹⁴⁹. Further opportunities include products targeted to the advanced nutritional needs of mothers, babies and the elderly.

¹⁴¹ Average dairy farm debt per farm in real terms; Surya Dharma, "Australian dairy: Financial performance of dairy producing farms, 2009-10 to 2011-12", ABARES, May 2012.

¹⁴² Andrea Fox, 'Dairy farmers deep in debt', Fairfax NZ News, 15 May 2011.

¹⁴³ "Situation and Outlook 2012", Dairy Australia, 2012.

¹⁴⁴ "Production summary", Dairy Australia, 2012.

¹⁴⁵ Jonathan West and Robert Wilson, "Unlocking Tasmania's Dairy Industry Potential", Australian Innovation Research Centre, 2010.

¹⁴⁶ "Agribusiness Agenda 2010", KPMG, 2010.

¹⁴⁷ "Fonterra & the New Zealand dairy industry: options going forward", Coriolis Consulting Corp., February 2010.

¹⁴⁸ Ben Bouckley, 'Runaway dairy demand sees Fonterra boost Chinese milk supply', Dairy Reporter, 13 April 2012.

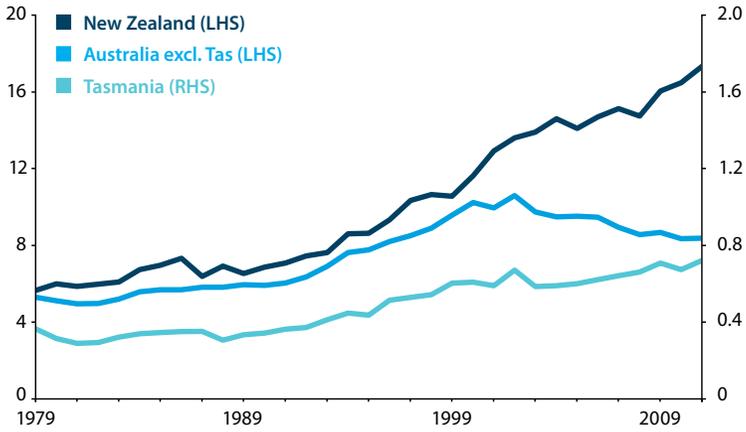
¹⁴⁹ 'The milk and dairy market in China', KPMG, 2008.

Exhibit 5.1

AUSTRALIAN AND NEW ZEALAND DAIRY – PRODUCTION AND PRODUCTIVITY

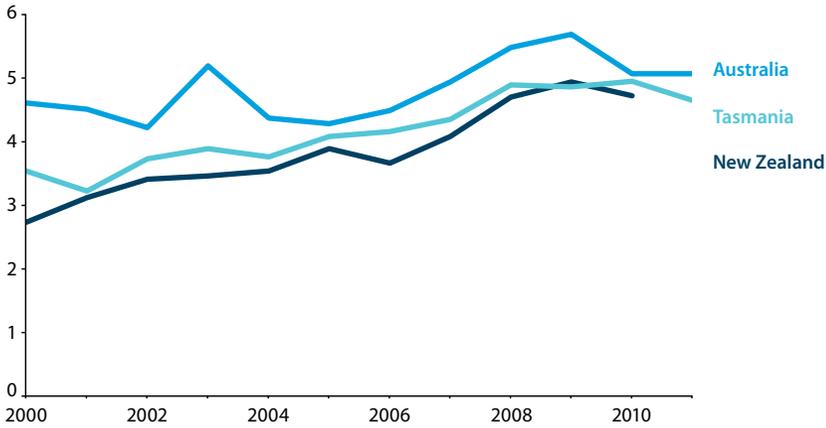
Milk production

Billion litres



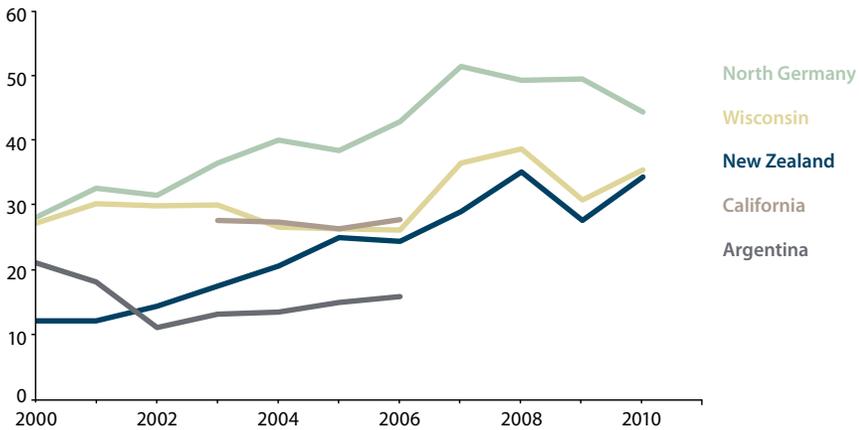
Cost of production – regional benchmarking

A\$ per kg milk solids



Cost of production – selected international competitors

US\$ per 100kg energy corrected milk



Source: ABARES, Dairy NZ; Dairy Tasmania; International Farm Comparison Network.

5.3.2 Grain and oilseeds in Australia

Grains and oilseeds together account for a significant share of Australia's agricultural production value, around \$11 billion or nearly 25% of gross agricultural production in 2011. While wheat has historically accounted for the majority of this, oilseeds (and in particular canola) have experienced rapid growth in recent decades and they are increasingly included in crop rotations. Global demand for grains and particularly oilseeds is expected to surge over the coming decades. This will be driven by growing consumption from food and animal feed needs, as well as increased use in biofuels.

Unfavourable and increasingly variable weather has affected grains and oilseeds more than the livestock industry in the past decade. This has led to reduced farmer confidence, a decline in investment in new technologies and suboptimal input use decisions, for instance, farmers not investing enough in soil nutrition or failing to utilise total available land area because of an overly pessimistic seasonal outlook¹⁵⁰. However even before the bad run of weather, yield and productivity performance were deteriorating. For example, wheat yield growth has slowed since the mid-1980s¹⁵¹ and canola yields have declined since the early-1990s. In contrast to livestock industries, cropping productivity growth also slowed since the mid-1990s and has driven the overall slowdown in broadacre productivity¹⁵².

These trends are troubling as Australian wheat and canola yields are not high by world standards and Australian varieties are relatively substitutable. Furthermore, canola is facing increased competition from other oilseeds, such as soy and palm, with new varieties causing oil profiles to become less distinct¹⁵³. These oilseeds are produced at low cost by international competitors, and Australia has yet to adopt them for widespread production. Beyond the farm, growers also face downstream contestability issues and infrastructure bottlenecks (discussed in Chapter 4).

Relative to its production volumes, Australia punches above its weight in global export share. However ensuring international competitiveness is critical.

¹⁵⁰ "Australian grains: Grains outlook for 2010-11 and industry productivity", ABARES, November 2010.

¹⁵¹ "The State of the Industry Report", Grain Growers Limited, June 2011.

¹⁵² "Agricultural productivity: trends and policies for growth", ABARES, 2012.

¹⁵³ Ruth Holtzapffel, Hilary Johnson, and Osman Mewett, "GM oilseed crops and the Australian oilseed industry", Australian Government Bureau of Rural Sciences, 2007.

Industry-specific approaches or opportunities to drive growth include:

- Adopting improved non-genetically modified varieties to boost yield and/or assist in product differentiation. Promising examples include salt-tolerant wheat and herbicide-tolerant oil seed varieties with improved yields. Other promising examples include salt-tolerant wheat¹⁵⁴, and herbicide tolerant oilseed varieties with improved yields¹⁵⁵;
- Continuing the conversation on the appropriateness of GM crops and accelerating adoption where possible. To date, adoption of GM cotton and canola has provided significant economic and environmental benefits¹⁵⁶. However in the case of canola, State moratoria delayed commercial adoption for more than 10 years in some States, despite Federal approval¹⁵⁷. This enabled competitors to gain a head start in commercial growing and realise advantages through increased yields and reduced costs. A consistent approach in the future would encourage further development and adoption of GM varieties. Many exciting opportunities are on the horizon, including a high oleic safflower¹⁵⁸ and a high-yielding wheat variety¹⁵⁹, both recently developed by CSIRO;
- Investing in critical rail infrastructure to remove major output bottlenecks, particularly in areas where road transport is not commercially viable, for example in northern New South Wales and central Queensland. Capital could be obtained through strategic off-take agreements – following Brazil's agreements with Chinese investors – or government and industry collaboration – similar to previous co-investments between Graincorp and the Victorian Government. Positive developments have been made recently in boosting Australian grain export capacity by the construction of a \$28 million port terminal in Newcastle, New South Wales, set to be completed by mid-2013¹⁶⁰; and
- Increasing competition in the supply chain through policies to facilitate the presence of additional land transport operators, traders and handlers, and encouraging on-farm storage. Provided they are managed correctly, cooperative storage and blending operations can be an effective method of increasing producers' returns through capturing additional blending margins¹⁶¹.

¹⁵⁴ "World breakthrough on salt-tolerant wheat", University of Adelaide, 12 March 2012.

¹⁵⁵ "An Economic Analysis of GRDC Investment in Oilseeds Breeding", Grains Research & Development Corporation (GRDC), 2009.

¹⁵⁶ Graham Brookes and Peter Barfoot, "GM crops: global socio-economic and environmental impacts 1996-2010", PG Economics Ltd, May 2012.

¹⁵⁷ "GM canola 2010 – regulatory approval", Agrifood Awareness Australia Limited, 2010.

¹⁵⁸ "Super-High Oleic safflower suggested for WA", Science Network Western Australia, 2 May 2012.

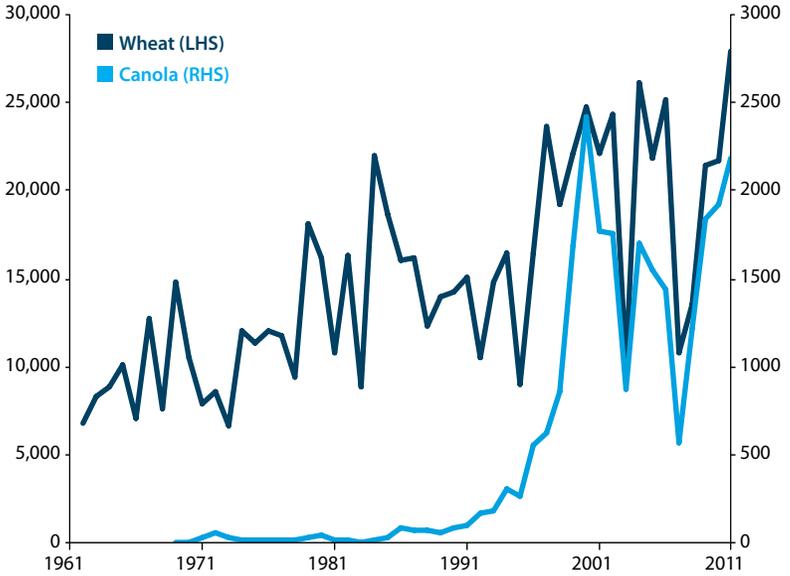
¹⁵⁹ Sue Neales, "Super-yielding wheat may solve food crisis", The Australian, 6 August 2012.

¹⁶⁰ Alan Dick, "Big grain port plans", The Land, 18 October 2011.

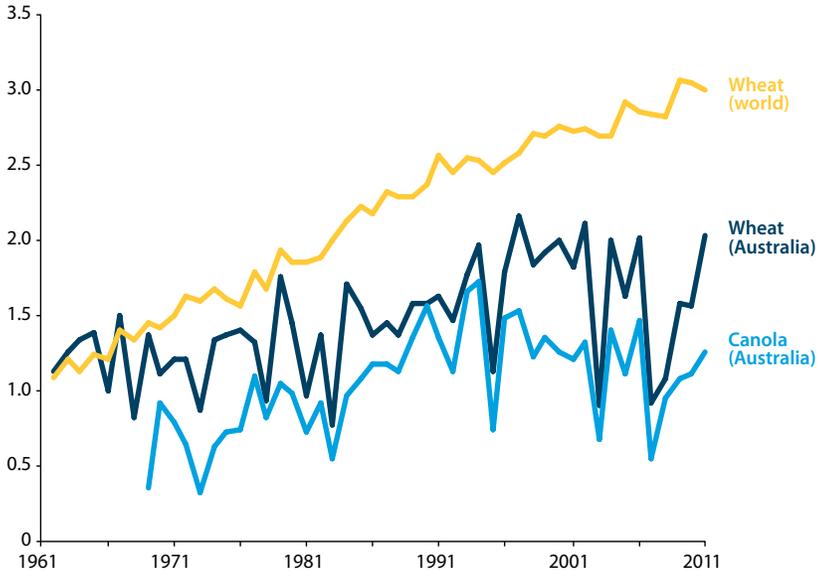
¹⁶¹ "The State of the Industry Report", Grain Growers Limited, June 2011.

Exhibit 5.2
AUSTRALIAN WHEAT* AND CANOLA

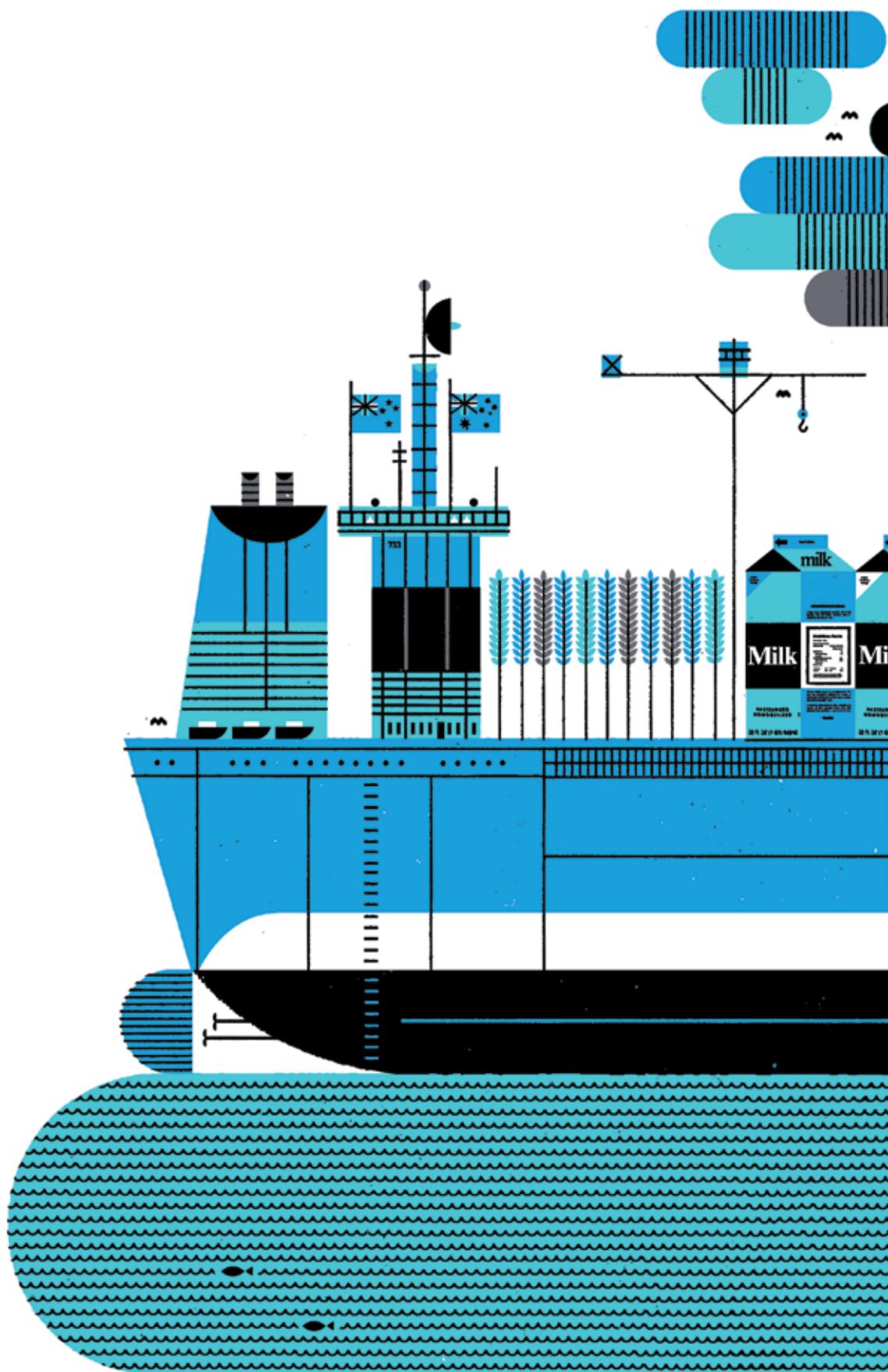
Production volume
 Kilotonnes

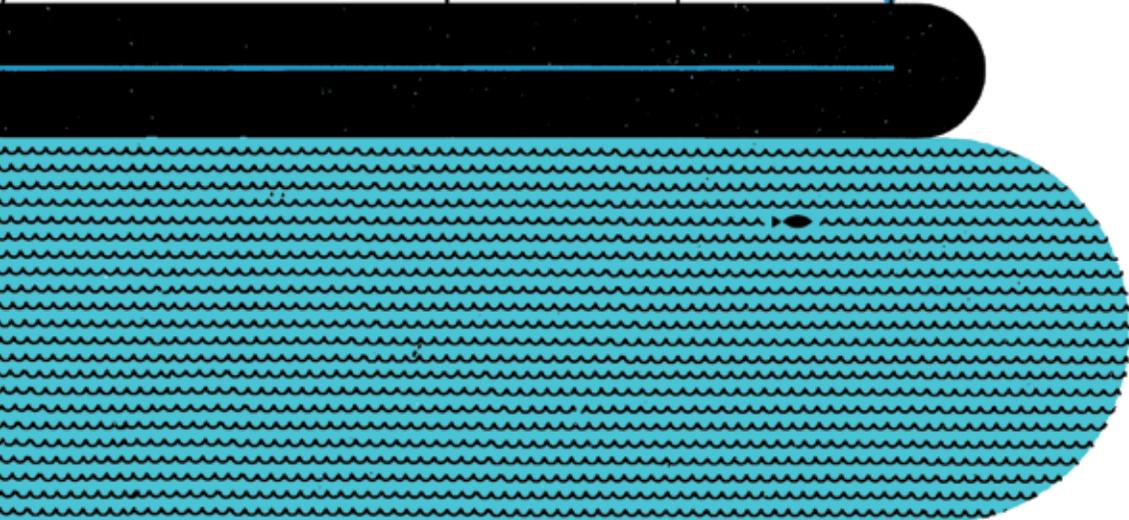
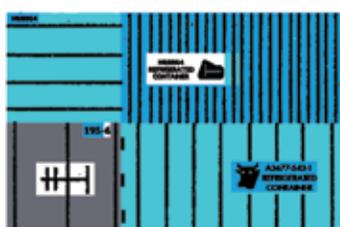
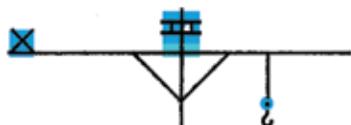


Yield
 Tonnes per hectare



* Wheat figures for 2011 are from ABARES. All other figures sourced from FAO.





6.0 IMPLICATIONS FOR KEY STAKEHOLDERS

KEY THEMES:

- *Policy makers will play a critical role in reinvigorating Australian and New Zealand agriculture across all sectors.*
- *Investors who understand agriculture very well stand to create significant wealth from agricultural investments.*
- *Industry participants including farmers, agribusinesses and industry bodies all play important roles in driving change.*

6.1 POLICY DISCUSSIONS VITAL TO LEAD THE CHANGE

The sector-wide outcomes outlined in Chapter 5 can be achieved through a broad, realistic national discussion about the state of agriculture in both Australia and New Zealand. Such discussions should focus on addressing the shortcomings in capital access, labour supply and innovation. The discussion needs to portray agriculture as a sector of the future rather than one of the past. In Australia, the recent Green Paper, the National Food Plan, released by the Australian Government is a very positive start to this process. While New Zealand is yet to have a similar plan in place, recent papers such as 'A Call to Arms' by the Riddet Institute are also promising steps in the right direction.

Discussions should focus on the following themes:

1. **Fostering an environment that encourages private investment.** Given the capital required to meet Asian soft commodity demand growth, the discussion should begin with how to connect both domestic and foreign capital markets with agriculture. Obvious related themes include facilitating private investment in agriculture, the adoption of new farm ownership and operation structures, together with greater private sector investment in critical off-farm infrastructure.

Establishing a clear approach to foreign investment while bringing public sentiment along this journey will be a critical part of the process. Achieving this should first involve improvements in data gathering, such as implementing a national register, to gauge the true extent of foreign ownership in agricultural assets. Gaining this understanding is a key step toward fostering an informed national discussion on a topic that often draws public concern. Discussions should also adopt a long term perspective with as much recognition of the benefits as the risks that would need to be mitigated. A clear policy framework is needed to manage the rise of Australia and New Zealand's Asian neighbours and support the continued growth in trade and investment. This should include a thorough review of Australia's FIRB, and potential further review of New Zealand's OIO, to ensure these regulators have the necessary mandate and resources to effectively protect national interests whilst encouraging desirable foreign investment in agriculture.

Recent developments in both countries have been promising. The Australian Government has commissioned a White Paper on 'Australia in the Asian Century' while the New Zealand Government has released a 'NZ Inc' China Strategy. The Australian Senate's enquiry into FIRB and the Coalition's policy discussion paper on agriculture are also encouraging contributions to Australia's regulatory debate.

- 2. Addressing labour shortages and developing future leaders.** Rebuilding the agricultural labour force requires both short and long term focus. First, developing the next generation of leaders depends on redefining the image of the sector and boosting development platforms, such as universities, vocational education and training and traineeship programs. Second, introducing rural relocation incentives (including via taxation, training, or infrastructure) and better publicising seasonal opportunities could improve the sector's capability to attract domestic labour. Finally, enhancing immigration policies to attract and retain agricultural labour in regional areas could help fill remaining labour force gaps.

While the Australian Government has introduced a series of programs to address labour issues, such as the 'National Workforce Development Fund', 'Skill for Australians', and the 'Seasonal Worker' program for the horticulture industry, more is likely needed, especially given that recent agricultural reviews highlight the same challenges as those evident several years ago¹⁶². In New Zealand, solutions to address labour force issues are even less developed¹⁶³.

- 3. Managing land use conflicts.** In Australia, several State Governments have developed or are reviewing policies to protect prime agricultural land, with the Federal Government making strides to ensure a coordinated approach. The New Zealand Government is taking an active interest in managing the productivity and sustainability of agricultural land but more focus on protecting the size of productive land may be required¹⁶⁴. Underpinning the policy approaches should be robust land-use data and analysis of future availability and requirements. Both countries should continue efforts to establish comprehensive and internally consistent land use data.
- 4. Establishing clear and transparent water markets.** While Australian water policy has come a long way, the task is still far from complete and it is critical that momentum is not lost. There needs to be greater clarity around recent policy developments and outcomes in the Murray Darling Basin while it is also time to focus discussions on regions without effective water markets. Next steps in the water policy agenda could include: improving public disclosure and transparency of allocations and trade approvals processing; improving the quality and availability of price information to increase market participation and efficiency; and publicly disclosing potential conflicts of interests among key stakeholders. Finally, there could be a useful role for the Council of Australian Governments (COAG)¹⁶⁵.

In New Zealand, policy makers could use Australia's experience as a case study to trigger further policy reforms to improve water use efficiency and allocation. The approval in May 2011 of the National Policy Statement for Freshwater Management set in motion a number of water management improvements. Further discussions will be required to determine important details of associated regional plans – particularly on allocation limits and systems. Considerable work remains and regional councils must ensure these improvements are reached without delay.

¹⁶² "Research Skills Training and Research", Department of Agriculture, Fisheries and Forestry, Accessed July 2012;

"Higher education and skills training to support agriculture and agribusiness in Australia", Education, Employment and Workplace Relations References Committee, June 2012.

¹⁶³ "Education and Skills", Federated Farmers of New Zealand, July 2012.

¹⁶⁴ "NZ Ahead Report Card", New Zealand Institute, October 2011.

¹⁶⁵ "Strengthening Australia's water markets", National Water Commission, 2011; "COAG: the missing piece of the water reform puzzle", NFF, 15 September 2011.

- 5. Establishing a better policy framework for R&D and extension.** In Australia, the Primary Industries Ministerial Council is developing a National Primary Industries R&D and Extension Framework, which is due to be finalised in 2012. This has been supported in parallel by efforts from the Productivity Commission and Rural R&D Council in reviewing rural R&D. In New Zealand, the Ministry of Science and Innovation was established in 2011 to oversee and improve the nation's science and innovation system, while the agricultural Primary Growth Partnerships (PGP) scheme, now worth almost NZ\$500 million, was introduced in 2009 to boost productivity. Through the PGP scheme, the recent introduction of the FARMIQ initiative to drive innovation and productivity in New Zealand's red meat industry is an example of a promising step in the right direction.

Nevertheless, the restructuring and consolidation process of Australia's national R&D and extension system could better focus on boosting growth-oriented research, particularly in new industries¹⁶⁶. The adoption of research outcomes should also be treated as an integral part of the R&D planning and delivery process. Similarly, New Zealand's Ministry of Science and Innovation should ensure sufficient focus is placed on agriculture such that industry-specific challenges are addressed. New Zealand should also consider reviewing the public sector's involvement in extension services given current concerns on the effectiveness of the fully privatised model. Furthermore, both countries could benefit from setting a clearer approach to biotechnology in agriculture, particularly in genetic modification, through a well-defined position supported by a consistent set of policies.

- 6. Encouraging supply chain investment and innovation.** Coordination and contestability are fundamental for successful agricultural gateways. This is a particularly important area of focus for Australia. It is timely to consider how to promote contestability – by identifying how best to facilitate the entry of fringe players such as rail operators, traders, and local processors, or the development of new forms of cooperatives. There is also a question of whether regulation should be strengthened in highly concentrated markets. While the Productivity Commission has already reviewed some agricultural supply chains, for example wheat in 2010, this area requires ongoing monitoring and review. Significant underinvestment in some areas of infrastructure, particularly in Australia's east coast railways for grain, also needs urgent attention as they have become major growth constraints.
- 7. Increasing market access.** In addition to driving free trade negotiations, governments in both countries can play an active role in facilitating major agricultural trade transactions. This includes establishing frameworks for strategic off-take agreements. Recent progress in Australia has been promising. A joint study with the Chinese Government was initiated to consider the potential for large-scale Chinese investment in undeveloped land in northern Australia. While there are clear public concerns about increased foreign investment in agriculture, it should be noted that mutually beneficial agreements do not necessarily have to involve land ownership. In addition, fostering a stronger network of agricultural counsellors could also help achieve market access goals through policy advocacy with host governments.

¹⁶⁶ "Rural Research and Development Corporations", Productivity Commission, February 2011.

8. **Establishing supportive fiscal and monetary policy.** Changing macroeconomic environments fundamentally influence the cost competitiveness of export-oriented industries. In recent years, the cost competitiveness of Australian and New Zealand exports has been hurt by the strength of the national currencies. A useful debate on whether there is a role for governments to alleviate pressures on trade-exposed sectors by dampening inflating exchange rates would be timely for the agricultural sector. How much could be done by running account surpluses and increasing outbound foreign investment (e.g. via a larger sovereign wealth fund), and would it be beneficial to the overall economy?

6.2 INVESTORS AND HIGH GROWTH AGRICULTURAL INDUSTRIES

Current market dynamics and resource constraints in agriculture create enormous opportunities for investors. As the global race to build competitive advantage unfolds in the coming decades, not all industries and markets will emerge as equals – there will be winners and losers. Investors might look to high growth product areas and markets around the world, and the agricultural industries that effectively serve these opportunities.

There is already increasing global activity across three agricultural investment options:

1. **Direct investment in commodity markets.** This includes investments through futures, exchange-traded funds (ETFs), or traditional commodity index products, which have outperformed other asset classes in recent years. Agricultural commodities have the advantage of being relatively less reliant on global economic conditions. Prices are also more supply driven, which is largely influenced by weather conditions with no direct relationship to other asset classes, and provides a strong inflation hedge. However, agricultural commodities are more volatile with limitations in forecasting supply and demand imbalances due to weather impacts.
2. **Investment in portfolio equities.** There are a broad range of direct players, as well as suppliers and service providers with high exposure to agriculture. Agricultural equities have significantly outperformed other benchmark indices over the past decade, but like agricultural commodities, have been more volatile.
3. **Direct investment in agricultural assets.** This could be achieved either by investing directly in land and downstream supply chain assets, or investing indirectly via a number of managed agricultural land funds. Agricultural funds management has grown rapidly in recent years, involving large scale financial institutions, hedge funds, trusts and private/public companies pursuing farm ownership¹⁶⁷. This has seen significant increases in global land acquisition activity. The Land Matrix project reported that there has been a substantial increase in major agriculture related land deals (both in number and area) over the past 10 years with most purchases in Africa and Asia¹⁶⁸. Among others, there is significant value in acquiring poorly managed farmland with high potential for productivity improvements. There has also been significant M&A activity in downstream assets across the globe as agribusinesses expand their global presence and manage risk.

¹⁶⁷ HighQuest Partners, "Private Financial Sector Investment in Farmland and Agricultural Infrastructure", OECD, 2010.

¹⁶⁸ "Transnational land deals for agriculture in the global south", The Land Matrix Partnership, April 2012.

Australian and New Zealand agriculture clearly hold significant potential and deserve ongoing consideration from investors. Both countries feature sophisticated, export-oriented supply chains that produce products that are in high demand from key growth markets. Unlike major agricultural exporters in the developing world, Australia and New Zealand are politically stable, have strong corporate governance and have demonstrated sound economic fundamentals.

While traditional investors from developed economies will undoubtedly continue to invest in Australia and New Zealand, capital constraints in the region are creating exciting opportunities for emerging investors. In stark contrast to alarming current account deficits in many key western economies, rapid economic growth and high savings rates in emerging economies are seeing a material shift in global wealth. By 2020, emerging investors, mostly in Asia, could dramatically increase their share of the world's financial assets to 36%, up from 21% in 2010¹⁶⁹.

Importantly, foreign investment in Australian and New Zealand agriculture is not a new concept. From the earliest stage of colonial development, traditional investors from the West have played an important role in the countries' economic development. For example, British investors have been at the heart of the birth of Australia's wool and wheat industries, as with American investors for cotton farming. In recent years, there has been significant investment activity from both traditional and emerging investors. Cargill, Glencore, Bunge, JBS, Wilmar, Bright Foods, Mitr Phol and COFCO are just some examples of agribusinesses which have made recent investments. As an investor, being aware of the local investment environment and its potential challenges will greatly increase the likelihood of making successful investments in both countries:

- Policies and approval processes exist to ensure major foreign investment proposals align to national interests and should be well understood when considering investment options. The policies are enforced by Australia's FIRB and New Zealand's OIO. There is also significant value in understanding Australia and New Zealand's broader policy environment, including labour laws and land and water regulations.
- As with many countries, there are public concerns around foreign investment in agriculture, particularly direct investments in farmland. Investors could also consider alternative investment strategies, including equity partnerships or strategic off-take agreements for farm assets and forming joint-ventures with local players for downstream assets. Moreover, history has shown that taking the time to gain the support from key stakeholders, including industry and community leaders, plays an important role in the successful acquisitions of agricultural assets.
- Cultural differences and sensitivity are important factors contributing to the success of foreign ventures. Experience in Australia, New Zealand and beyond has shown that completely replacing local management with foreign leadership often adversely impacts business performance and efficacy. Maintaining local talent where possible has proven to be more effective.

¹⁶⁹ "The emerging equity gap: Growth and the stability in the new investor landscape," McKinsey Global Institute, December 2011.

6.3 FARMERS WILL NEED TO INVEST FOR LONG TERM GROWTH

The decision-making of individual farmers sits at the core of Australia and New Zealand's ability to capture the global opportunity. Growth in farm profitability cannot merely rely on the potential for continued increases in global soft commodity prices. Sustained growth in agriculture requires farmers to place a relentless focus on volume growth and optimising for higher margins. This is achieved through delivering higher-value products and increased output-driven productivity.

Farmers play a pivotal role in driving the next wave of growth by:

1. **Improving physical and financial performance.** Farmers need to focus on increasing productivity, lowering debt and improving profitability. Like any producers, they must be actively involved in benchmarking their performance, replicating the success of others and seeking advice from extension providers to apply better technologies and practices.
2. **Making long term investments to build competitive advantage.** Farmers will need to focus on long term growth through increasing technology adoption, increasing scale and investing in people. Making business and succession plans is extremely important in planning for the future and provides greater clarity when securing capital. New types of farm ownership models could facilitate farm succession or alleviate capital constraints. Banks and financial institutions can offer advice and help facilitate these transactions.
3. **Building stronger networks to strengthen industry bargaining power.** Building stronger networks can enable greater knowledge sharing and provide a more unified voice to other supply chain participants. In supply chains with downstream monopoly or oligopoly structures, supporting new entrants or forming bargaining or downstream-oriented cooperatives could also assist in enhancing contestability and alignment.

6.4 AGRIBUSINESSES NEED TO DRIVE INVESTMENT IN THEIR SUPPLY CHAINS

In Australia and New Zealand there is a growing need for agribusinesses to demonstrate leadership, particularly in three key areas:

1. **Empowering farmers and building trust.** Supporting farmers to succeed delivers more growth for downstream players in the long term. Agribusinesses, particularly in highly concentrated markets, will need to work closely with farmers to ensure greater alignment of short-term and long term objectives. For example, becoming more involved in farm extension could help boost supply and build greater trust with farmers.
2. **Informing local industries on global best practices and market requirements.** As the primary industry stakeholder with direct involvement with end customers, agribusinesses play a critical role in informing farmers, research institutions and other industry participants on global best practices, and market opportunities and requirements. Given many have extensive global footprints, agribusinesses also have huge potential to enhance market access for local agricultural industries.
3. **Investing in the future of the industry with government and industry bodies.** Agribusinesses can make agricultural industries more robust and capable of future growth by working with government and supply chain players to resolve key infrastructure constraints through co-investing or negotiating incentives and collaborating with industry bodies and educators to promote agricultural careers, for example through career fairs and internship programs.

6.5 INDUSTRY BODIES, AND ENCOURAGING GROWTH AND INVESTMENT

Industry bodies play an important role in advocating the soft commodity opportunity to their members and beyond. There is an important opportunity for these organisations to be more proactive in promoting their industry and inspiring young people to make a difference in agriculture. This is a critical ingredient in addressing the escalating labour force issues in Australia and New Zealand. Industry bodies have enormous potential to deliver positive impacts for their industries in a number of ways:

- 1. Advocating the values, needs and challenges of their industry.**

As each agricultural industry holds unique challenges, industry bodies will achieve consistent results through a unified voice. They represent the industry when in dialogue with communities, policy makers, research bodies, and educational institutions. The 'State of the Industry' report prepared by Australia's industry body, Grain Growers, is an example of an effort to outline industry issues and challenges. Furthermore, Dairy NZ's 'GoDairy!' campaigns have sought to boost the reputation of industries and promote career prospects to young people.

- 2. Disseminating knowledge to improve the performance of stakeholders.**

Given the significant performance gap among farmers, industry bodies are well placed to help farmers improve profitability. In particular, they should act as a trusted collector and provider of valuable industry knowledge, including R&D developments, benchmarks and best practices. They should also encourage industry participants to invest in long term growth.

- 3. Facilitating greater coordination among industry stakeholders.**

Supply chain failures often require strong involvement from bipartisan parties to resolve effectively. Industry bodies are in a unique position to increase dialogue among industry participants and secure change. Deloitte's New Zealand 'Red Meat Sector Strategy Report', commissioned by two major industry bodies, has been a positive step in addressing the serious coordination issues in the industry.

- 4. Coordinating and sharing knowledge with other industry bodies.**

Industry bodies could benefit from greater coordination and collaboration across the industries they represent to collectively increase knowledge. For example, there is evidence to suggest that innovation developed by Dairy NZ to improve the quality of pasture growth could be beneficial and more widely used by the red meat industry¹⁷⁰.

170 "Agribusiness Agenda 2011", KPMG, 2011.

7.0 CONCLUSION – SEIZING THE OPPORTUNITY TO BECOME THE FOOD BOWL OF ASIA

Over the past few decades, agriculture has sometimes been viewed as a ‘sunset sector’ with declining interest from younger generations, particularly in the developed world. In more recent times, drought has driven Australian agriculture’s pre-occupation with survival, while in New Zealand the success of its dairy sector has often masked challenges faced by other industries.

In the meantime, global competition has intensified with countries like Brazil responding with strong and strategic agricultural development.

Today, market developments suggest that agriculture is entering a new era with significant commercial opportunities on offer. Both Australia and New Zealand have the potential to boost agricultural exports and returns, and enormous rewards await both countries if they can succeed in harnessing their agricultural industries to the growth of the Asia Pacific region.

To take advantage of this opportunity, agricultural industries in both countries need to focus on the growth of value and volume in which building competitive strengths needs to sit at the heart of every part of their decision-making.

While New Zealand’s dairy industry is an inspiring example, this approach needs to be applied across agriculture while keeping in mind the individual needs of each industry. There are many dimensions to this including fostering new agricultural leaders, achieving greater levels of efficiency in land and water utilisation, removing capital constraints, undertaking growth-oriented R&D and seeking deeper access to high value markets.

Getting this right requires the involvement and effective coordination of all government and industry stakeholders across entire supply chains and the broad clusters of suppliers and institutions that support them. In the case of Australia, reprioritising agriculture on the national agenda is critical.

Failure to respond to the challenge will result in significant opportunity costs to both nations and will have serious impacts on rural and regional communities. In addition, without a resurgence of rural productivity and performance to underpin it, the agricultural sector faces the possibility of declining standards and inappropriate practices.

Although the clock is ticking and global competition is fierce, Australia and New Zealand have both the time and the capability to respond. In some respects, industries and governments in both countries have made good progress in initiating the right discussions and formulating response strategies but, given the scale of the opportunity, they only scratch the surface. The size of the prize open to Australia and New Zealand agriculture calls for timely, transformational actions.

Getting this right will lead Australia and New Zealand to greener economic pastures over the coming decades.

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