State of Queensland agriculture report

June 2014

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Minister's foreword

The opportunities for significant growth in agricultural production are clear. As we continue along the trajectory of staggering growth projections of global food demand, it is increasingly important to document the current state of the sector and track its progress. Queensland must fully understand the sector's challenges and opportunities through the rigorous collection and dissemination of relevant data, in order to identify strategic strengths and opportunities and address emerging issues before they have a chance to stifle growth.

The Honourable
Dr John McVeigh MP
Minister for Agriculture, Fisheries and Forestry

Industry consultation for *Queensland's agriculture strategy* repeatedly highlighted that agricultural industries do not have access to the necessary data to make investment decisions and plan for the future.

We have listened to industry's call and have since embarked on a process to collate and analyse existing data from a variety of sources, and present never before seen data, to establish a critical baseline to build on.

One key issue which remains out of our control is Queensland's highly variable and sometimes harsh climate. The current drought at its peak covered 79 per cent of Queensland; which is the largest drought area ever recorded. The number of local government drought declared areas reached 38, with the addition of four partially declared shires. A better understanding of the sector's economic performance, productivity and natural resource base will help target policies and initiatives that build Queensland's resilience to future events.

Doubling agricultural production by 2040 is an ambitious task, but it is a necessary one to supply domestic markets and also tap into rapidly developing markets in Asia. China is a powerhouse economy that is impossible to overlook, so we must build solid knowledge and understanding of the sector to realise opportunities in the future. Underpinning this is a robust and cohesive biosecurity system which effectively manages increasing risks to Queensland agricultural industries, the environment, human health and social amenity.

This report documents the importance of agriculture for Queensland's economy. It provides details of the state of the sector in relation to each of the four pathways outlined in *Queensland's agriculture strategy* and includes metrics on biosecurity risks and management.

Concluding this report is a section covering medium-term industry outlooks for the next three to five years, highlighting many of the opportunities and challenges facing the sector on its journey towards doubling agricultural production by 2040.

This report is one of many initiatives being delivered to underpin the sector's growth since the creation of the Department of Agriculture, Fisheries and Forestry (DAFF) in March 2012. Some key initiatives include:

- releasing *Queensland's agriculture strategy*, which includes a vision for an efficient, innovative, resilient and profitable sector, and underpins a goal to double Queensland's agricultural production by 2040
- releasing Queensland's most comprehensive Agricultural Land Audit, which identifies important land for current and future agricultural production, as well as developing an interactive tool to help councils use the land audit in their planning decisions

- increasing the Queensland Government's investment in key commodities such as sugar, beef, grains and tropical pulses, which has considerable future growth potential in Asia
- releasing Queensland's Agricultural Research, Development and Extension (RD&E) Plan, which sets the direction for the next wave of productivity growth
- improving Queensland's biosecurity preparedness by implementing new systems that more effectively manage pest and disease threats to animals and plants
- delivering the new *Biosecurity Act 2014* which streamlines multiple acts into one act and focuses on the principals of shared responsibility, general biosecurity obligations and a risk-based approach
- developing strong trade ties that tap into burgeoning Asian food markets, through a joint trade mission with the Northern Territory Government to Indonesia, and a trade mission with Thailand and China (including Hong Kong), which focuses on opportunities for Queensland's sugar, beef and horticulture industries
- providing $10 million financial support for the North Queensland Irrigated Agriculture Strategy ($7 million from Federal Government and $3 million from State Government)
- implementing the buyback of Queensland's commercial net fishing licences to help improve economic viability, productivity and sustainability of the industry
- undertaking a review of fisheries management in Queensland as it is currently complex, costly to administer, inconsistent and a burden on the State's commercial and recreational fishers
- producing a Queensland Government response to the Queensland Forest and Timber Industry Plan and implementing priority actions
- appointing new boards and directors to the Emerald Agricultural College and Longreach Pastoral College to ensure these colleges provide practical agricultural training that the industry needs
- obtaining a $4 million grant from the Bill & Melinda Gates Foundation to research drought-resistant sorghum varieties suitable for the dry tropics through the recently renewed Queensland Alliance for Agriculture and Food Innovation (QAAFI) partnership
- revitalising frontline services to deliver on-ground solutions and outcomes for producers in areas such as wild dog management, tick control, crop protection and horticulture extension
- beginning the process to shift Queensland's regulatory systems to a more streamlined, client-focused model that encourages innovation, business resilience and growth, while removing unnecessary and costly red tape
- implementing the Growing the Agriculture Workforce Strategy aimed at helping industry to attract, retain and develop people in agricultural industries.

In response to the ongoing impacts of drought, the Queensland Government has boosted drought support by providing a package worth over $31 million in 2013–14. The package includes fodder freight subsidies, emergency grazing in some national parks, an emergency water infrastructure rebate, land rent relief, water licence waivers, mental health workshops, improved road train access, and community support funding.

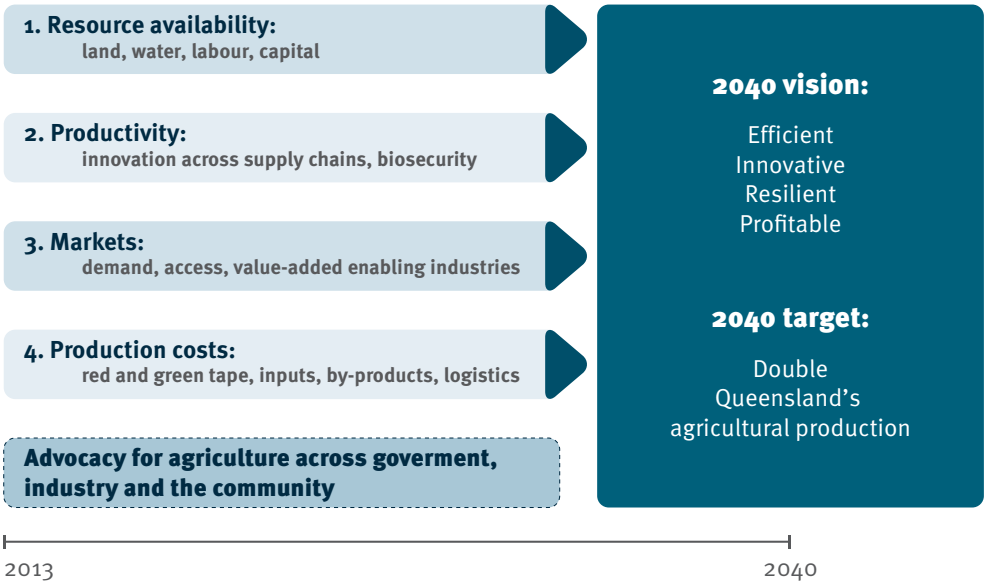
The Queensland Government has also responded to the needs of producers impacted by Tropical Cyclone Ita. Natural disaster relief and recovery arrangements were made available across a range of shires impacted by the cyclone. Producers were assisted with technical advice and given access to financial support, including concessional loans and freight subsidies to help re-establish primary production.

While getting producers back on track after the drought and cyclone is an immediate concern, in 2014 we will continue to deliver on a range of other key initiatives focused on driving long-term agricultural growth.

Purpose and scope

This report fulfils a commitment outlined in *Queensland's agriculture strategy* to develop the *State of Queensland agriculture report*, providing measures of vital growth indicators to the industry, and tracking progress towards the target of doubling agricultural production by 2040.

The report also delivers on the needs of Queensland's agricultural industries for consistent, industry-specific data for Queensland to establish baseline information, including a range of metrics across the four key pathways to production. The pathways are: resource availability, productivity, markets and production costs.



For the first time, this report captures and synthesises agriculturally relevant data from a wide range of providers including government, investment institutions and industry organisations. There is also some data and analysis that has never before been seen in Queensland, which will assist in painting a more accurate picture of the sector. Analyses include total factor productivity (TFP) and supply chain efficiency analysis.

This report is primarily targeted at Queensland's agricultural industries, agricultural bankers and investors, decision-makers in the upstream and downstream industries that support Queensland agriculture, and key decision-makers within government.

It aims to provide the target audiences with baseline data available at the time of publication, along with information to assist in decision making and reporting on progress towards achieving the target of doubling agricultural production by 2040. Data can be a powerful tool for targeting specific initiatives or projects aimed at addressing emerging issues and unlocking unrealised potential within the sector.

Although Queensland's key agricultural industries are the focus of this report, the report also includes metrics relating to forestry and commercial fisheries. Recreational fishing is mostly excluded.

This report provides an indication of the state of the sector now and looks forward at a range of medium-term outlooks for Queensland's key primary industries.

It also aims to highlight specific data from a range of sources. These sources are referenced in case further detail is required by the reader. For example, the *Queensland Agricultural Land Audit*, *State of Environment Queensland 2011 Report*, *2011 Rural Debt Survey* and *Queensland AgTrends*.

The Department reinforces its commitment to providing relevant information through the ongoing development and release of Queensland AgTrends reports which include the latest economic forecasts for the State's food, fibre and foliage industries. The main edition contains initial forecasts for the financial year and is published in October. Changes to the initial forecasts are reported in the subsequent April edition of *AgTrends Update*.

While the report is wide-ranging, there are some information gaps or areas where poor and unreliable data is available. For some indicators, data is shown for Australia as a whole if it is likely to be relevant to Queensland and if state-specific data is not available. The Department will continue to work with major data custodians such as ABARES, industry stakeholders and other government organisations to address these gaps in the future.

Particularly at the state and regional level, there are data gaps in:

- on-farm management practices
- skill levels and workforce requirements
- contract workforce
- level and nature of capital investment into the sector
- farm profitability across industries, regions and time
- productivity trends and drivers
- patterns of innovation within the sector
- patterns of research and development investment into the sector
- characteristics of the most successful producers
- ownership structures
- inter- and intra-state trade flows
- pre- and post-farm gate supply chain efficiency
- regulatory costs
- costs of managing biosecurity risks such as invasive plants and animals, and diseases
- ongoing reporting on rural debt in Queensland
- detailed indicators on sugar, fruit and vegetable industries.

The Queensland Government welcomes industry collaboration where more data is required. Not all data needs can be met cost-effectively; however, regular updates will be provided where possible. In the future, DAFF's work in supply chain analyses, such as the *Queensland Agricultural Transport Blueprint* and further work with the Federal Government to better classify agricultural skills and occupations, will help fill these gaps.

Executive summary

Queensland's agriculture, fishing, forestry and food processing industries have long made a major contribution to Queensland—not only to the economy, but also to society, history, culture and politics. These sectors will continue to make a contribution as the Queensland Government strives to achieve the target of doubling agricultural production by 2040.

This is an achievable target because of the enormous opportunities created by growth in emerging economies. These opportunities boost the demand for food and fibre in general, but also for high-quality, high-protein products that are Queensland's specialty. The sheer scale of this growth means that even with production doubled, Queensland will still only be providing a small proportion of the food imports needed by emerging economies in Asia.

The global economy is slowly recovering from the effects of the 2008 global financial crisis (GFC). Emerging economic growth—particularly in China, but also in India, Indonesia and a host of other emerging economies—is expected to remain strong for years to come. As a consequence, global commodity prices are likely to remain at relatively high levels. However, Queensland is not the only place wanting to expand its agricultural output. Global competition is increasing and it would be foolish to be overly optimistic about future price growth.

The Australian economy has performed better than most advanced economies since the GFC. A mining investment boom of historic proportions has been managed without an inflationary blow-out. One reason for this has been the high Australian dollar—peaking well above parity with the US dollar in 2011—which largely negated the value of high world commodity prices for Australian producers. The Australian dollar is now easing back towards more sustainable levels, so it has now become a source of support for the sector.

Seasonal variability remains one of the major challenges facing Queensland agriculture and this is not going to change. The year 2013–14 was a relatively dry year; with forecast production for the year revised downwards by $190 million in the last six months. Financial stress has increased—and therefore other forms of family stress on-farm—with the proportion of broadacre farms experiencing low equity and high interest payments more than doubling over the last two years, to 11 per cent in 2013–14. Tailoring drought policies to meet the welfare needs of farming families in a way that supports, rather than diminishes, sound drought management practices and productivity growth on-farm remains an ongoing challenge.

Total output of the farm, fisheries, forestry and first stage processing sectors is forecast at approximately $14.7 billion in 2013–14. Even with the dry season, this is 3 per cent above the five-year average and (after adjusting for input costs) represents around 4 per cent of gross state product. The sector is highly diversified, with the largest contributions from meat products (38 per cent), horticulture products (28 per cent), sugar (11 per cent), cereal grains (6 per cent) and cotton (5 per cent).

There are approximately 28 000 farm businesses in Queensland, plus approximately 1500 businesses in fishing, forestry and food processing. The number of farm businesses has been in steady decline, by approximately 1 per cent per annum. A significant proportion of farm businesses are not full-time operations, with as many as half of them only viable because of the availability of off-farm incomes.

Agriculture, including grazing, accounts for approximately 85 per cent of land use in Queensland. The State Government's recent Queensland Agricultural Land Audit identifies limited opportunities to expand the total amount of land available for agriculture. However, of greater promise is the opportunity to expand the intensity of land use through more intensive farming methods.

Agriculture, forestry and fishing businesses employ approximately 62 000 people. The entire supply chain however, including food processing, retailing, food services and transport, employs over 300 000 people.

Labour supply for the sector is limited. Unemployment of agricultural workers is low, at around 3 per cent, although there is a steady supply of apprentices and trainees. Supporting adequate skilled labour supply remains a major challenge for policy.

The sector receives its share of capital investment, which has resulted in strong growth of capital stock such as buildings and structures over the past decade. Investment is partly debt-financed, although debt is also incurred for other reasons, such as carry-on finance. A long-term trend increase in rural debt levels has been reversed in recent years.

Productivity trends can be masked by seasonal variations. However, it is clear that productivity growth in Queensland's agriculture, fisheries and forestry sector has been broadly in line with elsewhere in Australia and overseas, and in line with other industries in Australia. The sector appears to have experienced the general Australia-wide productivity growth slowdown of recent years.

The main drivers of long-term total factor productivity (TFP) growth are technological advances and innovation, as well as changes in scale and output mix. These are, in turn, driven by competition (including a facilitative regulatory environment), human capital, investment on- and off-farm (including infrastructure) and scientific progress.

A strong link between productivity and investment in research, development and extension (RD&E) has been established. Queensland has a strong profile in rural R&D, although as is the case for the rest of Australia, funding levels have declined over the past decade. This reflects a general trend towards shrinking public investment in research, which is driven by tightening fiscal conditions and increasing partnerships with institutions and industry that are supporting research to deliver commercial outcomes.

Much discussion and public attention focuses on 'average' farms. However, production, productivity and even technology and marketing trends are largely driven by the most successful farms. The top 25 per cent of farms are responsible for well over half of total output and most capital investment. Their rates of return are significantly higher than average, over a long period of time. These top 25 per cent of farms are found among all farm sizes, industries, ownership structures and regions, suggesting there is scope for better performance by many other farms.

Government assistance is provided to the sector and is estimated at around $3 billion per annum across Australia as a whole. This represents an effective rate of assistance of 3.3 per cent, which is well below past levels and the levels provided in most other countries. This low level of assistance underpins the market- and innovation-orientation of the sector.

Overseas markets (exports) are worth approximately $8.9 billion to the agriculture, fishing, forestry and food processing sector in Queensland and account for approximately 60 per cent of the sector's output. Interstate markets are worth approximately $3.6 billion or 25 per cent of the sector's output, with the remainder being sold into the Queensland market.

The efficiency of the supply chain from the farm-gate to the ultimate consumer is a major issue for Queensland farmers. For other commodities such as poultry and lamb there appears to be a trend improvement in the farm-gate price relative to consumer prices. For most commodities such as fruit, vegetables and pork, little trend is apparent. Beef shows a slightly increasing gap between farm-gate and consumer prices.

Farm profitability is determined by trends in market returns and productivity relative to costs. The long-term trend decline in farmers' terms of trade (ratio of prices received to prices paid) has continued, but at a significantly slower rate since 1990. As a result, ongoing productivity growth has been supporting profitability.

The major farm costs are fuels, fertilisers and chemicals (16 per cent), depreciation (14 per cent), labour and interest (both 12 per cent), and seed and fodder (12 per cent). A spike in fuel, fertiliser and chemical prices prior to the GFC was broadly matched by the prevailing high world prices for food and fibre products (which were dampened by the rising Australian dollar at the time).

Other costs include transport, electricity, government regulations and pests and diseases. Transport costs are around 12 per cent of farm-gate returns, although this varies widely.

There is little detailed information available on the costs of regulations or managing biosecurity risks such as invasive plants and animals, and diseases. These costs include not only direct management costs but also the cost of opportunities foregone.

There is little information available on the costs of regulating Queensland's agricultural sector. Regulation costs include transactional costs associated with completing forms, costs arising from delays in approvals, and missed opportunities due to regulation. For example, redirecting innovative efforts from productive uses into avoiding regulations, or innovation lost from restricting competition within the industry. The Queensland Government is committed to reducing red tape by 20 per cent by 2018 to reduce costs for businesses, not-for-profit organisations, community groups, families and individuals.

Queensland's biosecurity systems provide the foundation for Queensland's agricultural productivity, market access, food safety, animal welfare and frontline defence against pests and diseases. These systems are coming under increasing pressure from growing global trade and movement of products and people. The costs of managing these impacts are difficult to ascertain. Effective surveillance systems will continue to monitor pest and disease status to ensure market access and demonstrate successful eradication.

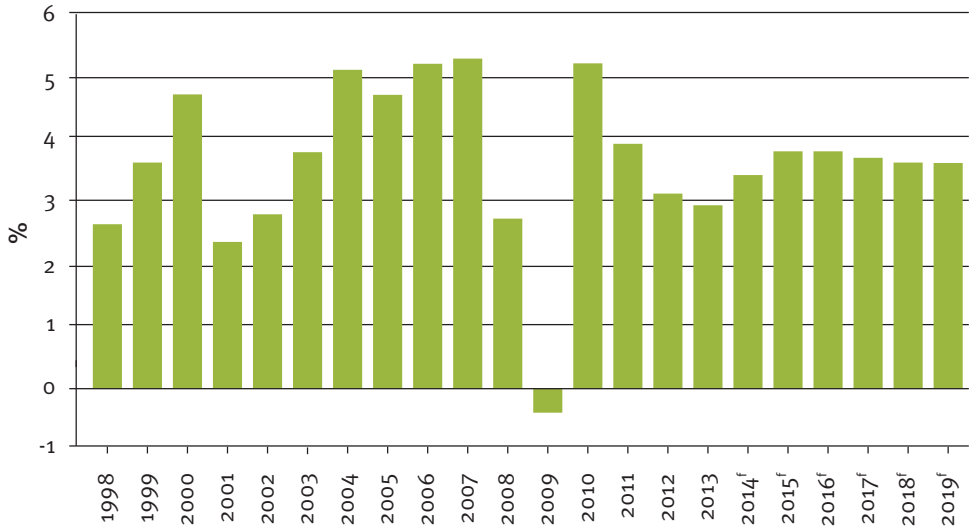
Over the medium term to 2018–19, expectations for key commodities are for:

- cattle slaughter rates to increase gradually as Australia's cattle herd is forecast to continue to move north to Queensland and the Northern Territory
- strong growth in national poultry meat industry gross value of production (GVP). Queensland is expected to lead this trend
- Queensland pig meat production growth and prices to be slightly higher than the national average
- Australian milk production to rise to approximately 10.1 billion litres in 2018–19, reflecting further increases in milk yield per cow
- national egg industry revenue to grow by 12 per cent. Queensland is forecast to follow this trend
- Queensland's wool industry to grow steadily with prices expected to peak at 1155 cents a kilo in 2015–16
- Queensland's fruit and nut industry to increase production, reflecting rising global demand
- further switching from mainstream Queensland cereal grains crops, such as wheat, sorghum and barley, into more minor but higher value crops
- continuation of relatively healthy output levels for sugar and cotton
- future market opportunities for timber and wood products due to population growth and associated housing demand consistently increasing timber demand
- stability in fisheries production and increasing opportunities in aquaculture.

Economic overview

Global growth has recovered from the effects of the GFC, but remains modest. While global growth is being suppressed by the ongoing poor performance of the Eurozone it is supported by continuing growth in emerging economies, particularly China. Growth in China is likely to ease in the medium term, while remaining at a high rate of 7 per cent, with global growth supported by improvement in India and limited recovery in Europe and the USA. As a result, global growth is expected to improve slightly from 2.9 per cent in 2013 to approximately 4 per cent over the five years to 2018.[1]

Figure 1.1 Global economic growth



f forecast

Source: Agricultural commodities 2014, ABARES

Economic growth in most major Organisation for Economic Co-operation and Development (OECD) economies is expected to recover gradually in the short term. It is estimated to be at 2 per cent in 2014, increasing to 2.5 per cent in the medium term. Private demand in the USA shows signs of strength, while in the Eurozone there are signs that many core economies have pulled out of recession.

Growth in Japan—Queensland's largest market for agricultural exports—is forecast to slow with an expected tightening of fiscal policy, resulting in forecasts of 1.2 per cent growth in 2014 down to 1.1 per cent in subsequent years.

Growth in Queensland's other major advanced economy export destinations in Asia—Korea, Taiwan, Singapore and Hong Kong—is likely to continue its solid pace of recent years at 4 per cent per annum.

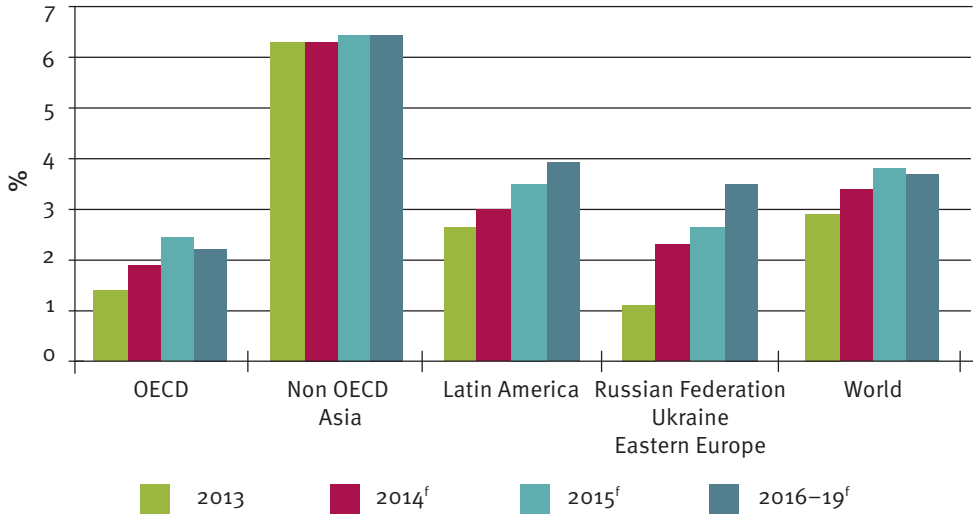
A smaller but growing share of Queensland's agricultural exports go to emerging markets in Asia. China has been undertaking economic reforms and transitioning to a more stable and sustainable growth path. Growth in China was 7.6 per cent in 2013, with an expected decline to 7.0 per cent by 2018.

1 *World Economic Outlook,* October 2013, International Monetary Fund

India's earlier impressive growth faltered in recent years, largely due to the stalling of domestic reforms. However, the impetus for reform seems to be re-emerging and is likely to restore healthy growth rates in excess of 6 per cent per annum in the medium term. Other emerging markets such as Indonesia and Malaysia are also expected to continue to show solid growth in the region of 5 to 6 per cent in the medium term.

Some of Queensland's competitor regions for agricultural exports are also expected to show healthy growth rates in the medium term. Latin American growth is estimated to be less strong than emerging economies in Asia, in the vicinity of 4 per cent per annum in the medium term. Central and Eastern European growth rates are projected to gradually increase due to improving domestic financial conditions.

Figure 1.2 Regional economic growth



f forecast

Source: *Agricultural Commodities 2014*, ABARES

Table 1.1 Economic growth (% per annum)

	Share of Qld agricultural exports (%)	Ten years to 2012	2013	2014	Four years to 2018
Australia		3.1	2.5	2.8	3.0
Japan	24	0.8	2.0	1.2	1.1
Korea	15	4.0	2.8	3.7	4.0
USA	10	1.8	1.6	2.6	3.3
New Zealand	4	2.4	2.5	2.9	2.5
Taiwan	4	4.2	2.2	3.8	4.3
Singapore	3	5.9	3.5	3.4	3.8
Hong Kong	3	4.3	3.0	4.4	4.5
EU	2	1.1	0	1.3	1.9
Advanced economies		**1.4**	**1.2**	**2.0**	**2.5**
China	6	10.3	7.6	7.3	7.0
Indonesia	6	5.6	5.3	5.5	6
India	4	7.3	3.8	5.1	6.5
Malaysia	4	5.1	4.7	4.9	5.2
Developing world		**6.5**	**4.5**	**5.1**	**5.5**
World		**3.7**	**2.9**	**3.6**	**4.1**

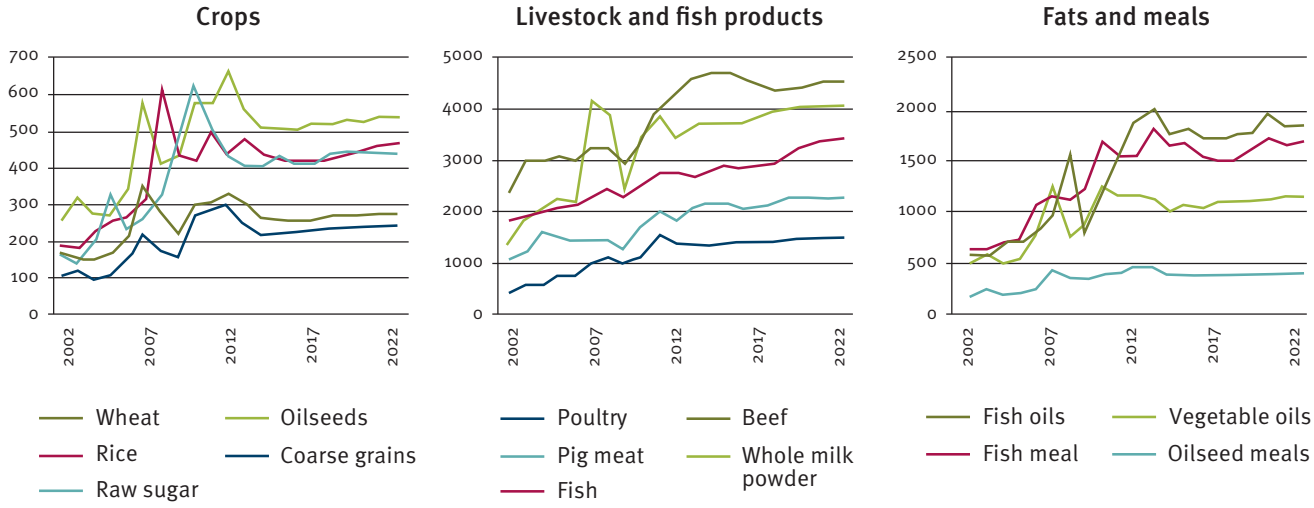
Source: *World Economic Outlook*, October 2013, OESR trade data, International Monetary Fund

The economic growth outlined in Table 1.1 is likely to continue to underpin global commodity prices. Major emerging economies such as China and India are at the intensive energy and materials use stage of development. Rapid income growth in these countries is also reinforcing the demand for higher-quality foods, particularly from the emerging middle class. However, demand for food as a whole usually rises less rapidly than incomes. The economies of India and China are both quite distinct in terms of food demand patterns. India is largely vegetarian with an increasing reliance on dairy and fruit and vegetable imports, but remains relatively self-sufficient for grains and minor meat products. China, on the other hand, will be significantly increasing its beef consumption and subsequently importing fruit and vegetables and other higher-value products.

This demand will be matched by increasing commodity supply. High commodity prices in the mid-2000s and again during recovery from the GFC reflected the unexpected strength and duration of demand growth, particularly from China, which exceeded planned capacity increases. Investment and productive capacity is now responding, following a lag that was exacerbated by the GFC.

As a result, commodity price projections from the Food and Agriculture Organisation of the United States and the OECD are for a near-term downward adjustment, particularly in crop prices, as production increases. However, rising prices for both crop and livestock products are projected over the coming decade as demand remains strong and production growth slows. Meat, fish and biofuel prices are projected to rise more strongly than primary agricultural products.

Figure 1.3 FAO/OECD Outlook for world agriculture prices to 2022 (USD/t)



Source: *Agricultural outlook 2013–22*, OECD–FAO

Australia's economic growth in 2013 was 2.7 per cent and is forecast to be 2.5 per cent in 2014 and 2015 before recovering to around 3 per cent in the medium term.[2] The below-trend growth reflects a decline in business investment, largely attributed to the mining sector shifting from an investment phase to a production phase. In addition, a backdrop of fiscal consolidation as Australia attempts to lower debt, as well as lagging non-mining sectors and a high exchange rate are also contributing factors to the slower growth. Despite the below-trend performance in 2013, Australia has outperformed most other advanced economies.

Australia's inflation is within target at 2.7 per cent per annum in 2013. Underlying inflation is expected to decline towards 2.5 per cent[3]. The cash rate is sitting at a historical low of 2.5 per cent since August 2013 and is expected to remain unchanged in the short term.

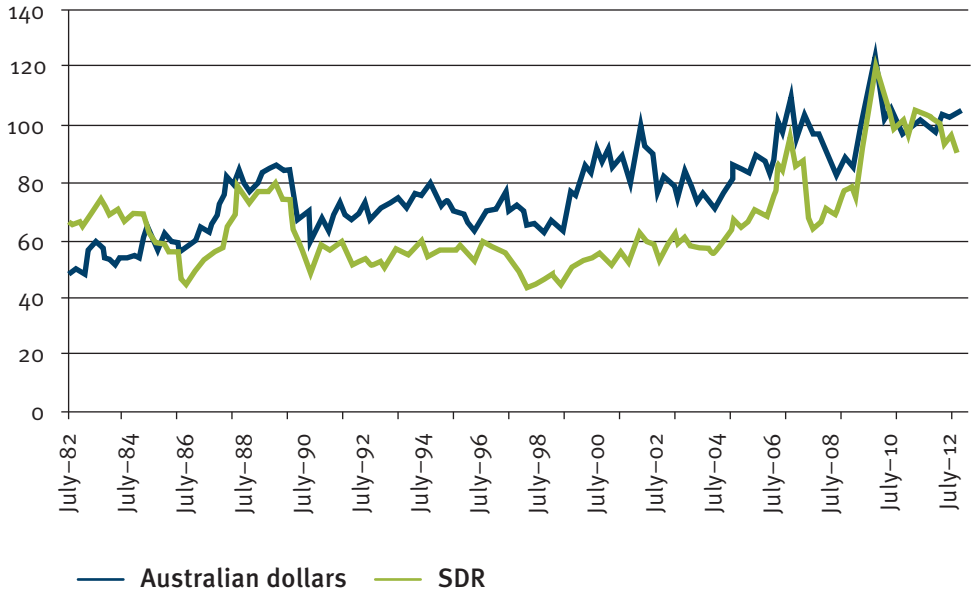
The first quarter of 2014 saw the Australian dollar floating around USD0.90, down from a high of USD1.11 in 2011, alleviating some of the competitive pressure on tradeables industries. This decline reflected a fall in commodity prices, and a narrowing in the gap between Australia's low interest rates and the zero to near-zero rates in major advanced economies. These factors are expected to continue to push the dollar down slightly in the short to medium term, with forecasts of USD0.80 to USD0.85 cents.

Regardless, the Australian dollar would still remain well above the historical average since floating. This indicates that commodity prices are likely to remain strong relative to historical norms, and that interest rates in Australia are likely to rise in line with those in other countries in the medium term.

2 *Agricultural commodities 2014*, ABARES

3 Board meeting minutes, February 2014, Reserve Bank of Australia

Figure 1.4 Reserve Bank of Australia's index of rural commodity prices, 2011–12 = 100



Source: Reserve Bank of Australia

Domestic food and fibre demand growth is likely to remain subdued. Currently, Australia's population growth is approximately 1.8 per cent per annum.[4] In most scenarios this is projected to slowly decelerate, perhaps to around 1 per cent per annum by 2045, depending on trends in fertility, longevity and net overseas migration. Domestic food and fibre demand is likely to grow slightly more rapidly than population growth, reflecting some income growth and new sources of demand such as biofuels.

4 Australian Demographic Statistics, Australian Bureau of Statistics 3101.0

Queensland snapshot

Regional context and importance

Agriculture industries are integral to Queensland's economy. The agriculture, fisheries and forestry sector as a whole is the backbone and social fabric of many rural and regional communities throughout the State.

Queensland is Australia's second-largest state, covering more than 173 million hectares of land. It has the highest proportion of land area dedicated to agriculture and is broken into 77 local government areas of varying sizes. Agriculture is a dominant economic contributor to many of Queensland's local communities.

In the beginning

Primary products for food, clothing and shelter have been harvested and traded with our neighbours for as long as aborigines have inhabited the continent. It is believed that trading of primary products, particularly seafood products, occurred for centuries before European settlement, between what is now known as North Queensland, Papua New Guinea and Indonesia.

Since European settlement, grazing has been a dominant part of agriculture in Queensland. Between 1840 and 1860 there was significant settlement of pastoral land, primarily for grazing sheep for wool.

By 1860, there were 3.5 million sheep and 500 000 cattle. Pastoral interests generated 70 per cent of Queensland's revenue, representing over 90 per cent of exports. Cropping was largely limited to the Eastern Darling Downs where large pastoral properties were subdivided into smaller properties in the 1870s.

In the 1860s land regulations were introduced permitting one-year licences on properties of 100 square miles. This resulted in rapid expansion of the grazing industry. From 1880, the industry was further strengthened by the tapping of artesian water, providing a reliable water source for livestock.

Railway extensions enabled efficient transport of wool for export and livestock to processing works on the coast. The establishment of stock route networks enabled movement of cattle to railways for loading. The development of refrigeration technology after 1883 meant that shipments of beef and mutton could be sent to overseas markets.

By 1892 sheep numbers reached 21 million and cattle numbers reached 7 million shortly after, but drought, dust storms, strike action, economic depression and tick fever led to a decline in stock numbers.

In 1862 the first successful sugar cane crops in Australia were grown by Captain Hope. He grew eight hectares of sugar cane near Brisbane and opened Australia's first raw sugar mill at Ormiston in 1865. By the end of 1867, there were 800 hectares of sugar cane in the Brisbane district. As sugar cane growing spread further north, mills were built at Maryborough and Mackay in 1866, at Bundaberg in 1872 and at Cairns in 1882.

Farm selections in the Atherton Tableland began in 1882. A railway opened between Cairns and Mareeba in 1893 and it was extended to Atherton by 1903. Atherton and Mareeba provided markets, transport and social infrastructure to support the growing agricultural industries. With the construction of the Tinaroo Dam for irrigation in post-war reconstruction, farming diversified into cereals, feed crops, pigs and beef cattle.

From the early 1900s vegetation was cleared across eastern Queensland to access the fertile clay soils underneath. However, thick regrowth and prickly pear were problems. The practice of feeding prickly pear to stock during the drought of 1901–02 spread the species, and by 1926 prickly pear was so thick in some areas that settlers abandoned their properties. In the late 1920s the cactus moth was used to successfully control prickly pear and by 1934 prickly pear was no longer a problem.

In 1962 the Brigalow Development Scheme began. It was the first 'closer settlement' policy to provide a combination of transport infrastructure, generous financial assistance in the form of interest-free loans and large, economically-viable holdings.

Within five years, 30 per cent of vegetation had been cleared in the areas around Taroom, Bauhinia, Duaringa and parts of the Northern Brigalow Belt. The intention was to maintain a minimum of 10 per cent vegetation on each property in the form of shade lines. However, much of the vegetation was destroyed by very hot fires resulting from burning piles of 'pulled' Brigalow, and clearing evolved into a practice that typically left little or no remnant vegetation.

The Nogoa–Mackenzie Water Supply Scheme near Emerald and the Burdekin Falls Dam and associated water supply scheme south-west of Townsville were established in 1968 and 1987 respectively. They were established to meet agricultural, urban and industrial water requirements. The main crops irrigated near Emerald are cotton, citrus and grapes. The Burdekin–Haughton Water Supply Scheme was used to irrigate sugar cane and various horticultural crops. These irrigation schemes have enabled production and incomes to stabilise and the benefits have flowed on to local and regional communities.

From the 1930s to the 1980s the Queensland Government established softwood plantations for saw log production in coastal areas, primarily in the south of the State. From the late 1990s, hardwood plantations in Queensland were established by private investors and the Queensland Government. In 2010 the plantation forestry estate on state-owned land was licensed and on freehold land it was sold to private interests.

Best practice management

In the 1980s there was growing awareness of land management practices to protect soil and water resources and sustain agricultural production. In recent decades there has been a significant investment in improving land management, in recognition of the role land condition plays in productivity. On-farm biosecurity management practices are critical for reducing the risk of establishment and spread of pests and diseases, and to facilitate early detection.

Improved soil conservation practices introduced in the 1980s and 1990s resulted in greatly reduced levels of soil loss from cropping lands in the Darling Downs and Central Highlands regions. The practices also improved soil structure and fertility. Practices included stubble retention and reduced tillage and contour construction.

Green-cane harvesting in the last 20 years has led to improvements in soil health and production, and has reduced off-site impacts. Green-cane harvesting substantially reduces soil erosion, helps control weeds, improves soil structure, conserves soil moisture and reduces fertiliser requirements.

Breeding for climatic conditions and markets, and improving land condition and herd management have been the focus of best practice in the beef and sheep industry, and present the most significant opportunities for growth.

Cattle are bred to comply with meat quality market specifications and cope with climatic conditions and parasites. In North Queensland, Brahman cattle were crossed with British beef herds in the early 1900s. In the 1980s and 1990s there was rapid improvement in beef herds to meet market standards and environmental conditions.

Recent developments

Since the 1980s, agriculture has become more diverse and increasingly export-oriented. It includes non-traditional commodities and processed products where opportunities to add value have been identified. There are several niche processing facilities for products such as gourmet dairy cacao, vanilla bean, condiments, dried fruit and vegetables, and frozen vegetables.

There is significant growth in specific market segments, such as grass-fed, chemical-free or free-range ‘branded’ beef, poultry and lamb. There are also opportunities for organic produce. In Queensland’s western regions, particularly in Channel Country, organic beef is cost-effective and reliable due to the availability of extensive native pastures, and drier conditions which lower the risk of pests and diseases and subsequently reduce the need for chemicals or antibiotics. Again, biosecurity is critical in maintaining Queensland’s reputation and product quality.

Queensland’s agriculture industry has grown and evolved as markets, infrastructure and services have evolved. It is expected that the industry will continue this tradition for some time.

Map 1.1 Location of Queensland's primary industries

Industry overview

The gross value of production for agriculture, fisheries and forestry in Queensland is estimated to be $14.7 billion in 2013–14. This includes approximately $11.6 billion at the farm gate and $3 billion in added value from first stage processing at abattoirs, dairies, mills and the like.

Queensland's overseas agriculture exports are worth $8.9 billion per annum and account for approximately 16 per cent of the State's overseas commodity exports.

Geographically, Queensland is Australia's second largest state, covering more than 173 million hectares of land. Almost 144 million hectares or 85 per cent of land in Queensland is used for agriculture and grazing. Queensland not only has the largest area of agricultural land of any Australian state, it also has the highest proportion of land area dedicated to agriculture.

Queensland also has the largest amount of 'certified organic' agricultural production land in Australia, with almost 2.3 million hectares in total. This includes large tracts of organic grazing land in Queensland's Channel Country, resulting in almost 70 per cent of Australia's growing organic beef industry coming from Queensland.

There were approximately 28 000 businesses conducting agricultural activity in Queensland in 2011–12. This represented 20.7 per cent of the national total. The number of farm businesses was down slightly over the previous year, continuing a long-term trend of declining farm numbers.[5]

Table 1.2 shows the number of farm businesses in Queensland by industry class and turnover in 2011–12.[6]

Most agricultural industries recorded a decline in the number of businesses over the year to June 2012. However, the generally small net reduction reflected a more substantial flow of exits—typically around 10 per cent—which was largely offset by a flow of new entrants to the industry.

5 *Agricultural Commodities Australia, 2011–12*, Australian Bureau of Statistics 7121.0. For the purposes of this publication, an agricultural business is defined as a business whose main activity is in agriculture and which had an estimated value of agricultural operations exceeding $5000 in 2011–12.

6 The components of the table do not sum to the total, partly because of the large number of multi-commodity producers.

Table 1.2 Number of farm businesses in Queensland, June 2012[a]

	Number of farm businesses	Turnover				% change	Entry rate	Exit rate
		<$50k[b]	$50–200k	$200k–2m	>$2m			
Nursery production (undercover)	139	57	43	32	7	-5	4	6
Nursery production (outdoor)	176	65	56	52	3	-7	3	10
Turf growing	189	49	50	79	11	-5	6	12
Floriculture production (outdoor)	162	73	47	34	8	-1	11	9
Vegetable growing (undercover)	211	99	56	51	5	-7	4	10
Vegetable growing (outdoor)	1 255	422	340	401	92	0	9	8
Grape growing	320	210	63	38	9	-14	4	19
Berry fruit growing	156	54	31	54	17	-3	7	10
Stone fruit growing	163	67	50	43	3	0	4	2
Citrus fruit growing	229	93	40	69	27	-3	9	11
Olive growing	156	147	5	4	0	-10	7	20
Other fruit and tree nut growing	1 764	840	406	436	82	-4	7	11
Sheep farming (specialised)	560	179	158	211	12	-4	4	7
Beef cattle farming plus beef cattle feedlots	17 195	8 163	4 894	3 772	366	0	7	8
Sheep—beef cattle farming	1 059	311	252	465	31	-1	6	7
Grain-sheep or grain-beef cattle farming	2 607	1 012	755	768	72	-3	5	8
Other grain growing	1 434	384	408	576	66	-2	5	7
Sugar cane growing	4 764	1 130	1 826	1 730	78	-2	5	6
Cotton growing	492	75	64	260	93	-1	6	6
Other crop growing (n.e.c)	834	345	257	214	18	-4	5	9
Dairy cattle farming	1 332	433	380	499	20	-3	3	7
Poultry farming (meat)	171	32	31	99	9	-4	8	7
Horse farming	831	478	232	113	8	-3	8	12
Other livestock farming (n.e.c)	363	216	87	55	5	-7	4	13
Pig farming	289	72	90	98	29	-6	2	10
Beekeeping	171	88	53	30	0	1	8	5
Onshore aquaculture	161	70	30	49	12	-11	7	17
Forestry	1 740	1 546	131	52	11	-20	8	28
Logging	346	126	114	96	10	-3	12	15

	Number of farm businesses	Turnover				% change	Entry rate	Exit rate
		<$50k[b]	$50–200k	$200k–2m	>$2m			
Rock lobster and crab potting	214	93	85	33	3	0	19	22
Prawn fishing	325	91	94	130	10	-4	6	11
Line fishing	264	100	119	45	0	-2	9	9
Fish trawling, seining and netting	328	107	127	87	7	-7	8	14
Other fishing	236	96	85	52	3	-11	6	16
Hunting and trapping	278	122	121	35	0	-1	10	11
Forestry support services	246	155	52	33	6	-10	13	21
Other agriculture and fishing support services	2 525	782	786	896	61	-1	12	12
Meat processing	126	39	14	40	33	-2	8	13

a Industries with less than 100 Queensland producers are not shown

b Includes businesses with an estimated value of under $5000 in 2011–12 in agricultural operations. These businesses are not included in other agricultural statistics.

Source: *Counts of Australian businesses including entries and exits, June 2008 to June 2012*, Australian Bureau of Statistics 8165.0

Of the Queensland agricultural businesses operating in June 2008, 90.7 per cent were operating one year later, and 73.6 per cent were operating four years later. This rate of decline was lower for larger businesses, at 94.8 per cent and 81.6 per cent respectively, with turnover exceeding $2 million. Four-year survival rates were lower for businesses in other sectors; 61.7 per cent in aquaculture, 38.4 per cent in forestry and logging, 60.1 per cent in fishing, hunting and trapping, 61.4 per cent in support services to the sector, and 61.7 per cent in food product manufacturing.

Nationally, agriculture had one of the highest four-year survival rates of all industries in the four years to 2013, but it had the lowest entry rate. The survival rate was 71.3 per cent compared with the survival rate of 62.9 per cent for all industries. The entry rate was 4.9 per cent in 2012–13 compared with 11.2 per cent for all industries.

Of the 2849 businesses that entered Queensland's agriculture industry in 2008–09, 81.9 per cent survived until June 2010 and 62.8 per cent survived until June 2012.

Most agricultural businesses are small. An estimated 10 300 agricultural businesses (approximately 36 per cent of the total) employ one or more people in addition to farm operators. Only around 1100 employ 20 or more people. Around 11 300 farm businesses have turnover exceeding $200 000 per annum. Few businesses with turnover below this level would be earning the equivalent of a full-time income from farming activities.[7]

7 *Counts of Australian businesses including entries and exits, June 2008 to June 2012*, Australian Bureau of Statistics 8165.0

While corporate farms are only a small proportion of the number of farms, they tend to be relatively large and therefore account for a larger share of total output. Nevertheless, the family farm remains the dominant form of agricultural enterprise and there is little evidence of that changing.

Livestock industries

Queensland is the largest beef-producing state or territory in Australia, representing almost 50 per cent of Australia's total gross value of production each year. Beef is the most significant agricultural commodity for Queensland with cattle and calf sales worth an estimated $3.259 billion in 2013–14.

The significant area of high-quality grazing country in Queensland enables beef to largely be grass-fed in extensive grazing systems, with the option of feedlot finishing. The market for grass-fed beef is growing.

Queensland is also the largest producer of pigs in Australia. The estimated gross value of production in 2013–14 is $210 million, which represents approximately 25 per cent of Australia's total pig production.

Poultry meat is also significant in Queensland and is worth an estimated $456 million in 2013–14. Queensland currently ranks third in Australia in terms of poultry production, producing around 19 per cent.

Other important animal products produced in Queensland are milk (worth $215 million), eggs (worth $140 million), wool (worth $83 million), sheep and lambs (worth $78 million), and kangaroos (worth $12 million).

Horticulture

Queensland is the largest producer of vegetables in Australia and the second largest producer of fruit. In 2013–14, Queensland's total vegetable production is estimated to be worth $1.211 billion and its total fruit production is estimated to be worth $1.547 billion.

It produces many varieties of fruit and vegetables in seasonal windows that are different from other Australian states and territories, which enables year-round availability of those commodities.

Queensland produces 90 per cent of Australia's bananas, worth $570 million. It is also the biggest producer of tropical fruits like mangoes, pineapples, avocados, limes and lychees.

It is also the second largest producer of strawberries, producing around one third of Australia's total strawberries, worth an estimated $170 million in 2013–14.

Queensland produces more than 50 per cent of Australia's tomatoes (worth $291 million), approximately 75 per cent of Australia's capsicums (worth $155 million) and 40 per cent of Australia's sweet corn (worth $38 million). Queensland is also a major producer of beans, lettuce, pumpkins, mushrooms and herbs.

Lifestyle horticulture

Lifestyle horticulture is another important sector for Queensland and is estimated to be worth $1.158 billion in 2013–14. Nurseries contribute $867 million to this total and provide the root stock for much of the horticulture sector.

Queensland's turf industry is worth $140 million and cut flowers are worth $151 million, making Queensland the biggest producer of cultivated turf in Australia, producing over one third of total production.

Broadacre cropping and sugar cane

Queensland has the third highest value of production for broadacre cropping as a whole in Australia. The total estimated value of broadacre cropping in 2013–14 is $2.645 billion.

Queensland's broadacre cropping is largely rain-fed, so the area planted and subsequent yields are closely linked to seasonal rainfall conditions and available soil moisture.

Queensland is the largest producer of sugar cane. It produces 94 per cent of Australia's total sugar cane and 61 per cent of Australia's total sorghum. In 2013–14, sugar cane is estimated to be worth $1.068 billion and sorghum is estimated to be worth $230 million.

Sugar cane grown in coastal Queensland has naturally high levels of sugar. Queensland's sugar cane production practices are now seen as some of the most efficient and sustainable in the world, due to the significant investment in green-cane harvesting and reduced chemical use.

Queensland is also a major producer of cotton, growing approximately 41 per cent of Australia's cotton crop, with an estimated value of $632 million. Queensland-grown cotton produces some of the highest-quality lint in the world and usually sells for a premium price on the global market.

Queensland produces Australian Prime Hard Wheat which is high-protein milling wheat of exceptional quality. Flour milled from this wheat is used to produce high-protein noodles and is also suitable for high-protein, high-volume bread. Queensland wheat production is estimated to be worth $375 million in 2013–14.

Other important crops produced in Queensland include maize, pulses and barley.

Forestry

The value of Queensland's forestry sector is estimated to be $175 million in 2013–14, representing approximately 10 per cent of Australia's production. Queensland's annual timber harvest for logs is approximately 2.5 million cubic metres each year.

Most of the annual harvest is processed in Queensland by the primary timber processing sector. In Queensland, timber and wood-based product processing and manufacturing segments account for approximately one third of overall industry sales. These sales include the production of plywood, veneer, panel boards, laminated timber products, doors, structural frames, roof trusses, flooring and decking, wooden containers, pallets and packing cases.

Fisheries and aquaculture

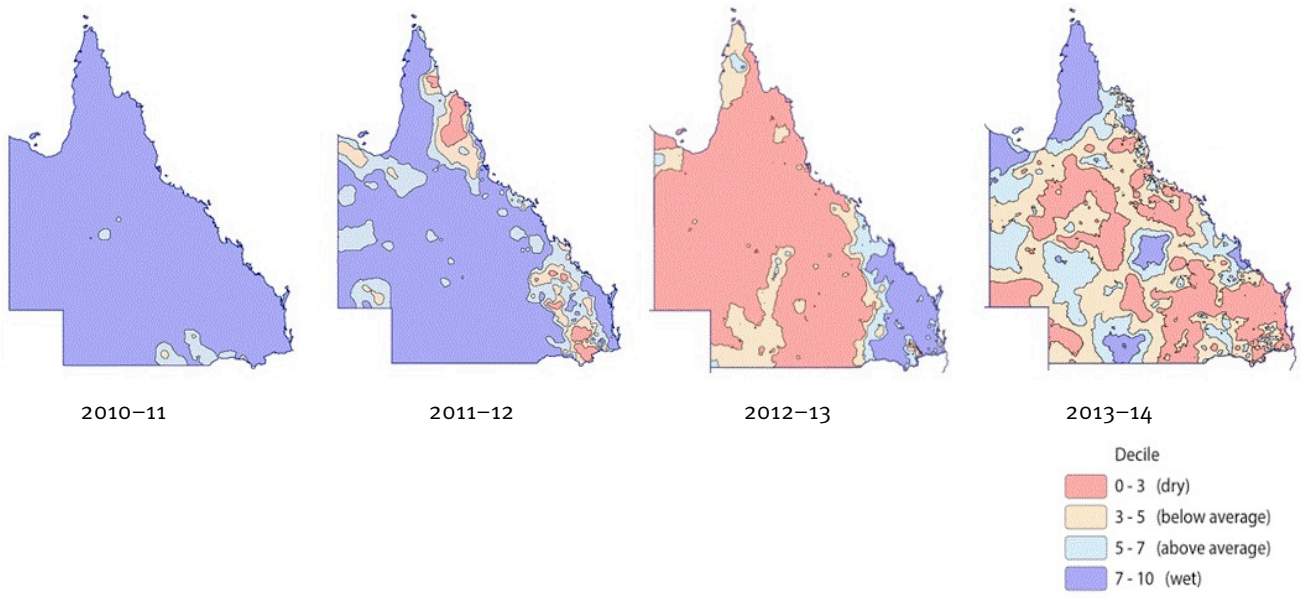
Queensland has an extremely diverse range of fisheries that are targeted by both recreational and commercial fishers. The commercial and aquaculture sectors are estimated to be worth $250 million and $101 million respectively in 2013–14. Queensland produces approximately 50 per cent of Australia's prawns, crabs and scallops and 25 per cent of Australia's finfish (excluding tuna and salmonoids).

Seasonal conditions

Historical rainfall variability

By world standards, Queensland's rainfall is extremely variable as recent years have highlighted. Widespread wet conditions experienced throughout most of Queensland during 2010 and 2011 have have been followed by widespread drought over the last two years (see Figure 1.5).

Figure 1.5 Rainfall patterns over Queensland for the last four summers (November to March)

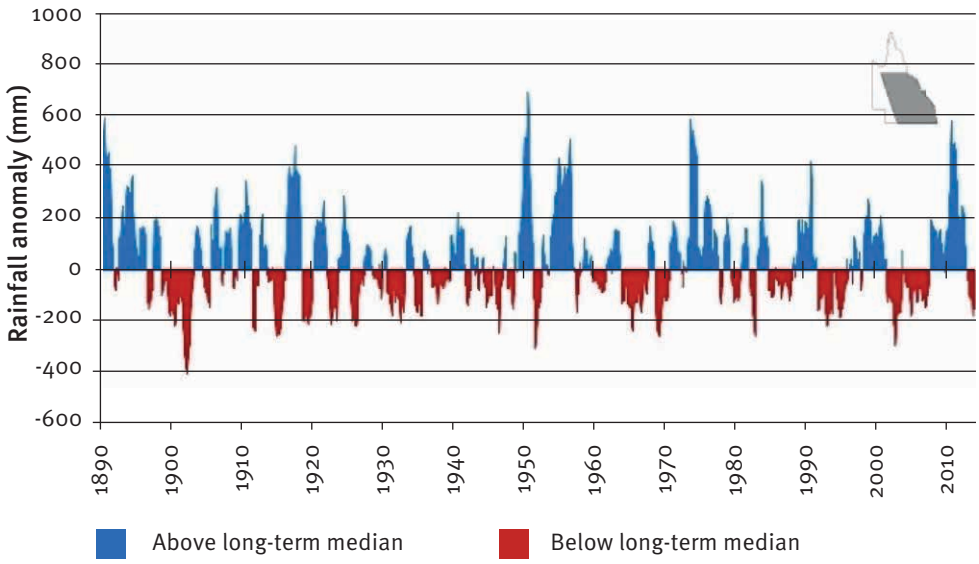


Source: Department of Science, Information Technology, Innovation and the Arts (DSITIA)

For the major grazing region in Queensland, the long-term rainfall record clearly shows a pattern of rainfall extremes (see Figure 1.5). Over the historical record, multi-year periods of average to well-below average rainfall have alternated with multi-year periods of well-above average to extremely high rainfall. This time-series is indicative of the historical rainfall pattern for any region of Queensland and the State as a whole. Rarely, if ever, has there been an extended period of near-average rainfall in Queensland. However, the historical rainfall pattern shown in Figure 1.5 is based on 12-month rainfall averaged over nearly half of the State. This time-series can mask significant rainfall extremes occurring over shorter or longer time-scales, particularly for more localised areas.

The shaded region of Queensland shown in Figure 1.6 represents approximately 50 per cent of Queensland's land area, which carries over 80 per cent of the State's livestock. Rainfall averaged over this area provides a useful, broad-scale index of grazing land rainfall being biased toward the most heavily stocked regions of Queensland.

Figure 1.6 Broadscale index of Queensland's grazing land rainfall



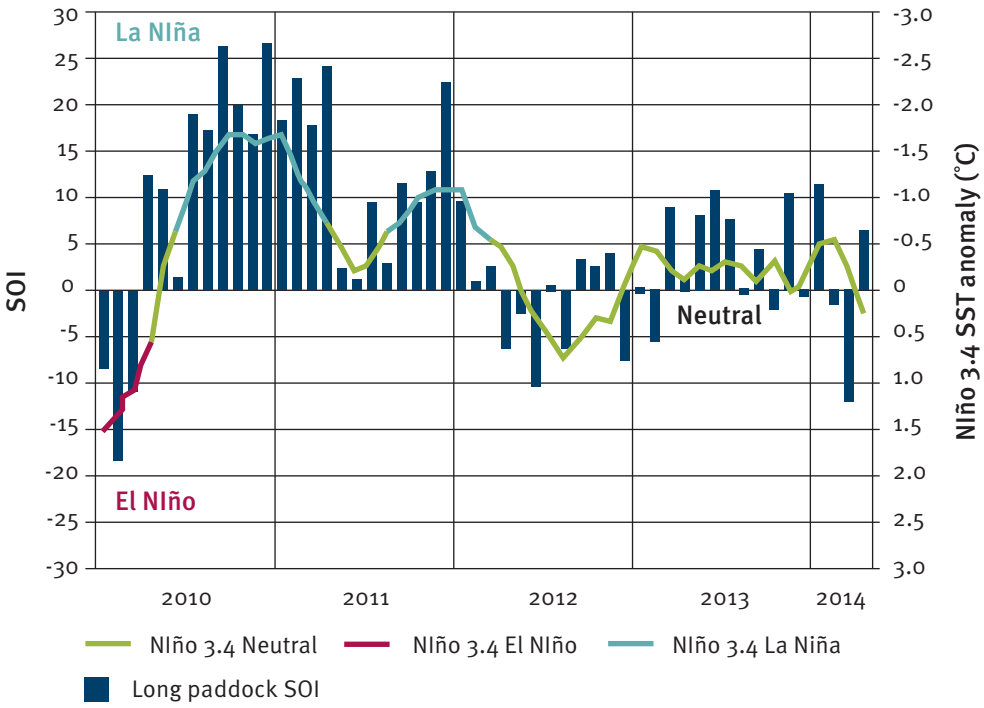
Source: DSITIA

The clustering of wet and dry periods throughout history is partly due to the strong influence of the El Niño-Southern Oscillation (ENSO) on Queensland's rainfall and partly due to the influence of the Interdecadal Pacific Oscillation (IPO) that affects the frequency and strength of El Niño and La Niña events. El Niño and La Niña represent opposite extremes of the global ENSO phenomenon. This phenomenon leads to a global redistribution of rainfall each year and has a strong influence on rainfall and temperature in Queensland. ENSO indices, such as the well-known Southern Oscillation Index (SOI) and central Pacific Ocean sea surface temperatures, account for approximately 25 per cent of the historical year-to-year variations in Queensland's rainfall. However, the strength of this relationship has varied over time, apparently breaking down during the 1920s, 1930s and 1940s but being stronger in the decades prior to and after those decades.

The last four years

The widespread wet conditions during 2010–11 and 2011–12 were associated with back-to-back La Niña events. The 2010–11 La Niña event was particularly strong (see Figure 1.7). The widespread drought conditions that followed developed during an 'ENSO-neutral' period when the SOI and sea surface temperature (SST) indices remained close to their average values (see Figure 1.7).

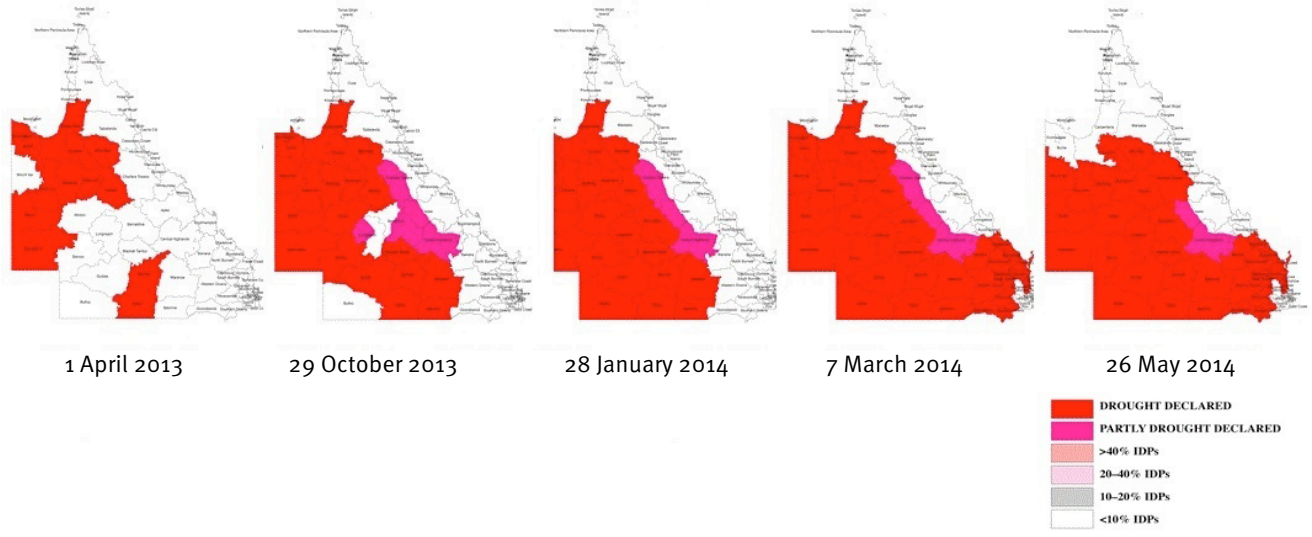
Figure 1.7 Fluctuations in the Southern Oscillation Index (SOI) and central equatorial Pacific Ocean sea surface temperatures (Niño 3.4 region) since 2010



Source: Southern Oscillation Index, DSITIA; SSTs, National Oceanic and Atmospheric Administration

The 24-months leading up to and including the 2011–12 Summer was one of the wettest 24-month periods on record in Queensland. In 2010–11, rainfall in the major grazing land region of the state (see Figure 1.6) was more than double the long-term (1890–2013) average. Rainfall was also well above average in 2011–12. The 2010–11 Summer will long be remembered as one of the wettest summers on record with widespread flooding across much of Queensland in December 2010 and January 2011. Most locations in Queensland received summer rainfall within the highest 10 per cent of rainfall totals on record with many of those locations receiving their highest summer rainfall in history. In contrast, the ensuing two-year period culminated in 80 per cent of the Queensland being drought declared in March 2014 (see Figure 1.8).

Figure 1.8 Queensland drought declared areas at selected times during 2013 and 2014



Source: DAFF

Drought declarations

From February 2011, Queensland enjoyed a rare period that was free of drought declarations, but that ended in April 2013 with 13 western Queensland local government areas being drought declared by the Queensland Government, following a particularly dry summer. For much of inland Queensland, hot and dry conditions persisted through winter and spring but by November 2013, water and forage shortages led to drought declarations being extended across much of inland Queensland (20 local government areas and six part shires). A dry start to the 2013–14 Summer saw drought declarations further extended in western Queensland with a total of 23 local government areas and four part local government areas drought declared by the end of January 2014.

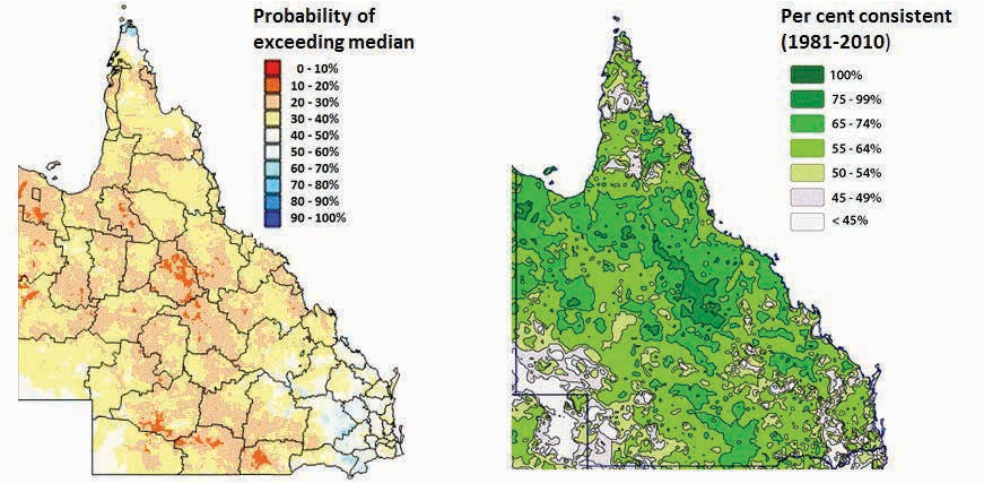
Although south-eastern Queensland had received high rainfall totals towards the end of the 2012–13 Summer, the following twelve-month period was extremely dry, leading to several local government areas being drought declared in March 2014 due to high rainfall deficits. Subsequently, high but patchy rainfall associated with an active late monsoon brought relief to some drought affected regions. However, as it was late in the pasture growing season it only brought some relief to short-term surface water issues, rather than providing lasting feed growth. In cropping regions, this rainfall also benefited late plantings of summer crops and helped replenish rural water supplies for irrigators.

Outlook for 2014–15 Summer

Queensland graziers have borne the brunt of drought conditions over the last two years. Many Queensland graziers, some having faced two years of drought conditions, currently face the prospect of managing through the seasonally dry winter period with little pasture that can sustain cattle. To add to this challenge, there is currently the threat of El Niño conditions developing in coming months and with this, a threat of dry conditions over winter and summer. This is not only a concern for graziers but also for the cropping sector, including both irrigated and dry land cropping.

International agencies currently rate the chances of an El Niño event developing this year as high as 75 per cent. The Bureau of Meteorology has indicated that El Niño conditions may be evident as early as July this year. Despite the strong El Niño forecast it is currently too early to base seasonal rainfall forecasts on this information. However, at this time of year, it is possible to issue long-lead rainfall outlooks for the coming summer based on the extra-tropical, sea surface temperature pattern associated with the Interdecadal Pacific Oscillation (IPO). Climate scientists from DSITIA have developed an approach to track this pattern on an annual basis in March each year and also provide rainfall probabilities for the following summer. This experimental approach currently indicates a high probability of below-average rainfall over the coming summer and, with this, a low probability of widespread drought-breaking rainfall (see Figure 1.8).

Figure 1.9 The probability of exceeding median summer rainfall in 2014–15 (November to March)



Note: Probabilities outlined in Figure 1.9 are generated from DSITIA's analysis of Pacific Ocean sea surfaces temperatures in March 2014. This outlook is based on historical statistics for the 100-year period from 1900–01 to 1999–2000.

Source: DSITIA

From June 2014 the outlook for summer rainfall will be updated on a monthly basis, incorporating SSTs associated with the evolving ENSO pattern. These forecasts will progressively become more confident as the ENSO situation unfolds. If an El Niño event develops, as seems likely in coming months, it would increase the likelihood of a dry summer in 2014–15 and DSITIA's confidence in this outlook.

The future

Part of the challenge for agriculture in Queensland is to continue to find ways to adapt to Queensland's highly variable rainfall. In this respect, fluctuations in Pacific Ocean sea surface temperatures not only help to explain historical variability in Queensland's rainfall but also enable seasonal rainfall forecasts to be provided up to several months in advance.

Part of ongoing adaptation to rainfall variability in Queensland must involve improving understanding of the processes which lead to rainfall variability at both inter-annual and multi-year timescales. The development of more accurate and timely rainfall outlooks linked to agricultural production cycles will benefit government decision-making and planning, industry and individual primary producers. Integration of accurate forecasts into decision-making will help producers be more resilient to Queensland's variable climate and improve productivity and profitability.

Resource availability

As the first pathway of *Queensland's agriculture strategy*, securing and increasing resource availability is critical for growth. 'Resources' in this section of the report refer to natural resources, land, people and capital investment, which are all critical elements underpinning the sector's viability and future growth.

Natural resources

The productivity of Queensland's agriculture, fishing and forestry sector is highly dependent on the condition and availability of natural resources, namely land and water. Queensland is a large and variable state, providing opportunities to produce a vast array of commodities.

The Queensland Agricultural Land Audit (Land Audit), conducted by the Queensland Government in 2013, provides a comprehensive overview of the status and extent of current and potential agricultural land in Queensland. It provides information about the location, land area and types of existing productive agricultural land, and sites with the potential for future agricultural development.

The Land Audit also identifies biophysical, geographical and socio-economic constraints to agricultural production. It is available at www.daff.qld.gov.au.

In addition, the Queensland Government regularly publishes information on the condition of the State's environment and natural resources. Relevant publications include the *State of the Environment Queensland 2011 Report*, available at www.ehp.qld.gov.au, and the *Minister's Report 2012–2013 for Queensland's Water Resource Plans*, available at www.dnrm.qld.gov.au.

Land

Agricultural development in Queensland reflects the soils, topography and climate found in different regions. Topographically, the Great Dividing Range—which in Queensland is a low mountain range with peaks generally between 600 metres and 900 metres—separates the coastal plain from the wide and generally flat to undulating inland plain, and has a few low ranges of up to 600 metres high.

The coastal plain is dissected by short, relatively fast-flowing streams, while much of the inland plain features highly interwoven and short-lived watercourses with wide flood plains.

The most widespread soils in Queensland are:

- infertile red and yellow soils (kandosols), which are found throughout much of the inland and far northern areas
- texture-contrast soils (sodosols), which are erosion-prone and relatively infertile, on the inland foothills of the coastal range and in the northern inland and far south-western areas
- clay soils of high fertility (mainly vertosols), which tend to be found on open, grassy plains in central, western and southern areas.

Other soils that are fertile and suitable for agriculture, but are less widespread, include:

- well-drained, friable clay-loam soils high in iron (ferrosols), which occur in patches, usually in elevated country along the coastal range
- diverse soils with loam to clay textures (dermosols), which are extensive on the coastal plain and adjoining foothills, particularly in the north.

Land use

Agriculture is the predominant land use in Queensland. Approximately 85 per cent of the State is used for grazing and 2 per cent of the land area is used for cropping. Other agricultural industries (excluding forestry) each occupy less than 1 per cent of the State.

Queensland has in excess of 52 million hectares of native forest, comprising approximately one third of Australia's total native forests and the largest forested area of any Australian state or territory.

Commercial native timber supply is sourced from approximately 20–40 per cent of this area, on both state-owned and private land, predominately in coastal and southern inland areas of Queensland. Native forests that produce commercial timber are generally also used for grazing and are managed as silvopastoral systems—production systems that combine forestry and grazing in a mutually beneficial way.

Table 2.1 Current and potential land use

Queensland Land Use Mapping Program (1999, 2006 and 2009)[a]	Current land use		Potential land use[b]	
	Area (ha)	% of state	Area (ha)	% of state
Broadacre cropping	3 547 778	2.06	10 921 561	6.34
Sugar cane	565 162	0.33	6 997 216	4.06
Perennial horticulture	87 829	0.05	12 827 225	7.45
Annual horticulture	47 166	0.03	21 848 591	12.68
Grazing	147 926 860	85.87	155 729 682	90.39
Sown pastures	16 041 166	9.31	15 627 696	9.07
Intensive livestock	37 856	0.02	26 930 082	15.63
Aquaculture	4 548	0.00	492 557	0.29
Other land use (non-agricultural land use, may include some forestry)	20 060 748	11.64		
Total	**172 277 947**	**100.00**		

a Information contained in this table is based on Queensland Land Use Mapping Program (QLUMP) mapping from 1999, 2006 and 2009 which best represents the agricultural land use categories used in the audit. Discrepancies that may exist between this data and other data are likely to relate to the different years in which the information was collected, base area calculations and differences in the methodology of classifying grazing and residual native vegetation.

b Potential areas include where the majority of production currently occurs as well as where production could potentially occur, except for sown pastures for which the potential area is in addition to the current area.

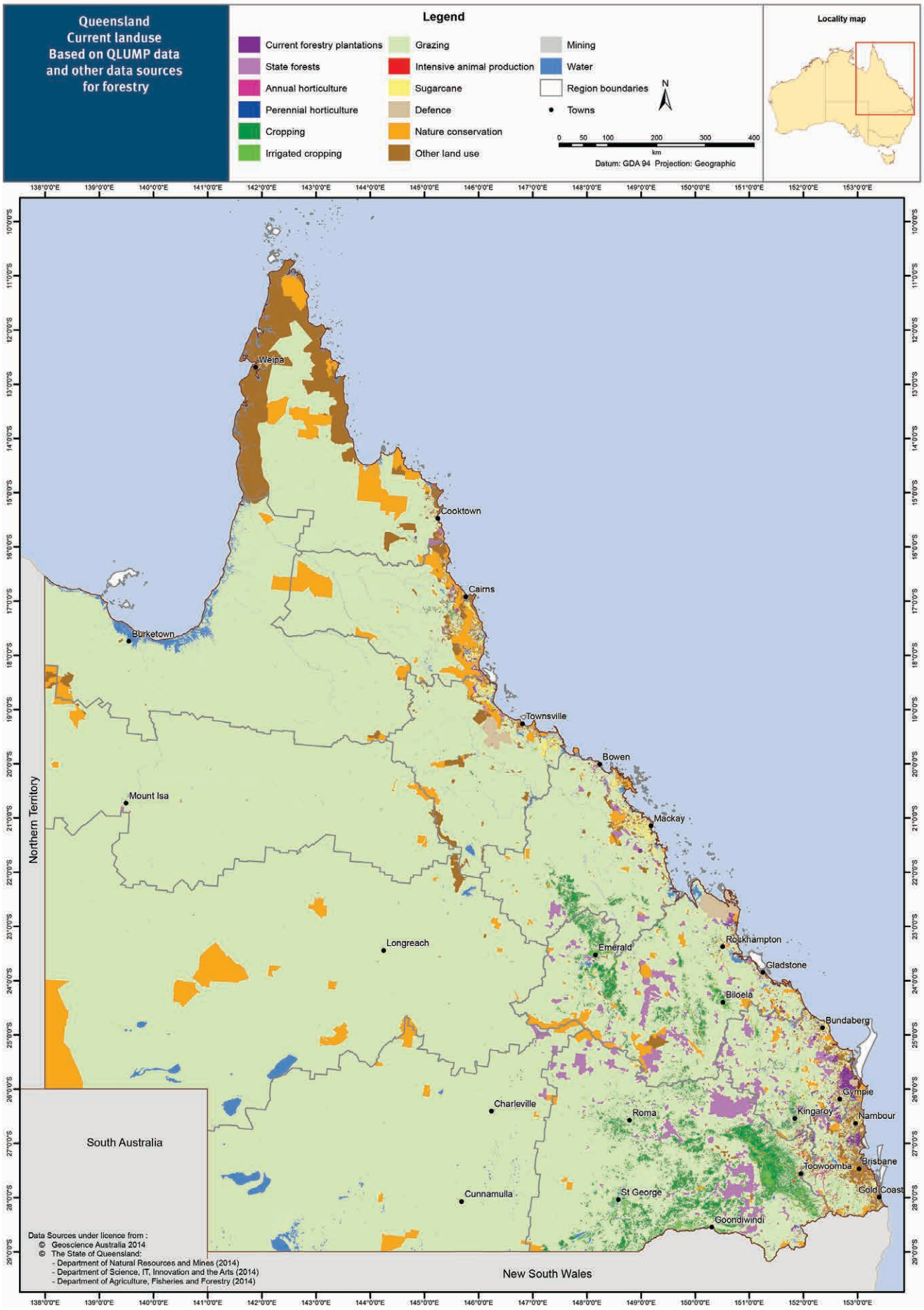
Source: *Queensland Agricultural Land Audit 2013*, DAFF

Table 2.1, taken from the Land Audit, shows the potential for expanding land use for different agricultural purposes, calculated from a purely agronomic point of view. It is instructive to note the capacity for very significant expansion in cropping and intensive livestock (including aquaculture), and even for moderate expansion in extensive grazing.

The viability of this expansion would depend on factors such as alternative land uses and the availability of markets and other infrastructure. This is why expanded land use is likely to play a relatively minor role in doubling agricultural production by 2040, with most of the increased output likely to be associated with increased intensity of land use.

For more information on current land use and the potential for agricultural production in Queensland, see the Land Audit at www.daff.qld.gov.au.

Figure 2.1 Current land use in Queensland



Tenure

Table 2.2 Tenure in Queensland

Tenure	Area (ha)	% of state	No. of parcels
Freehold	45 820 894	25	2 577 440
Leasehold	113 725 006	63	53 734
Protected area	8 717 311	5	4 502
Forestry	3 236 642	2	3 076
State land	1 290 351	1	21 329
Reserve	1 733 328	1	36 406
Other (everything else)	1 911 073	1	250 912
None (roads, rivers etc.)(blank)	4 094 173	2	559 578
Total	**180 528 776**	**100**	**3 506 977**

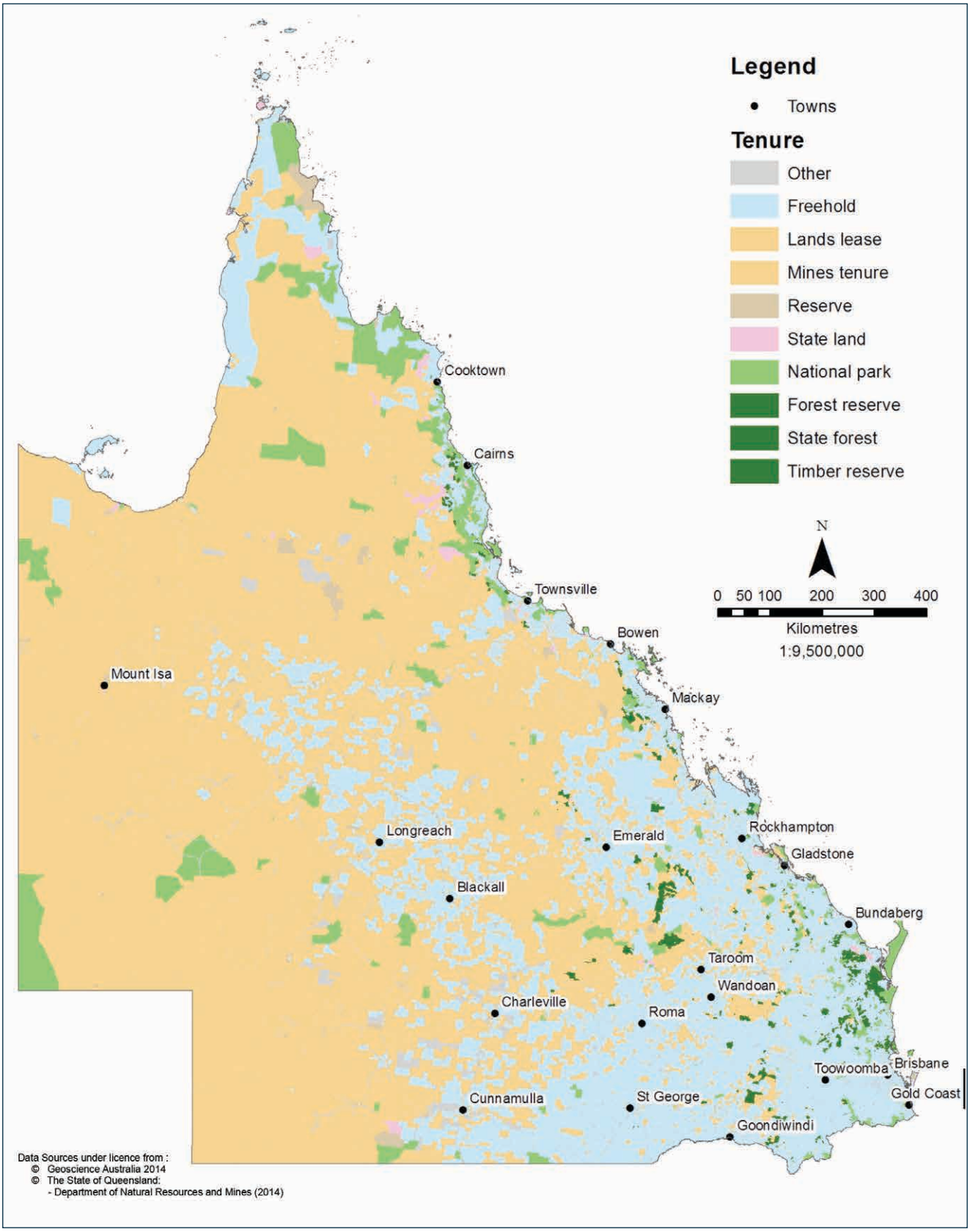
Note: Tenure area totals include all offshore islands, hence the difference to the total figures in QLUMP mapping.

Source: Department of Natural Resources and Mines (DNRM)

Only 25 per cent of Queensland is privately owned; 63 per cent of Queensland is leasehold land. The 63 per cent of leasehold land is predominantly used for agricultural purposes. There are approximately 2744 perpetual leases and 2992 term leases over 106.5 million hectares of rural leasehold land.

In recent years, leasehold properties have traded at comparable prices with freehold properties. This reflects the relative security of tenure and common regulatory provisions over different tenures.

Figure 2.2 Tenure in Queensland



Native vegetation

The *Vegetation Management Act 1999* underwent significant legislative reform in 2013. As a result, the area of the State constrained by regulated vegetation has reduced since the publication of the Land Audit. Furthermore, the introduction of an allowable purpose for clearing for high-value, including irrigated high-value agriculture, may enable the development of new production areas.

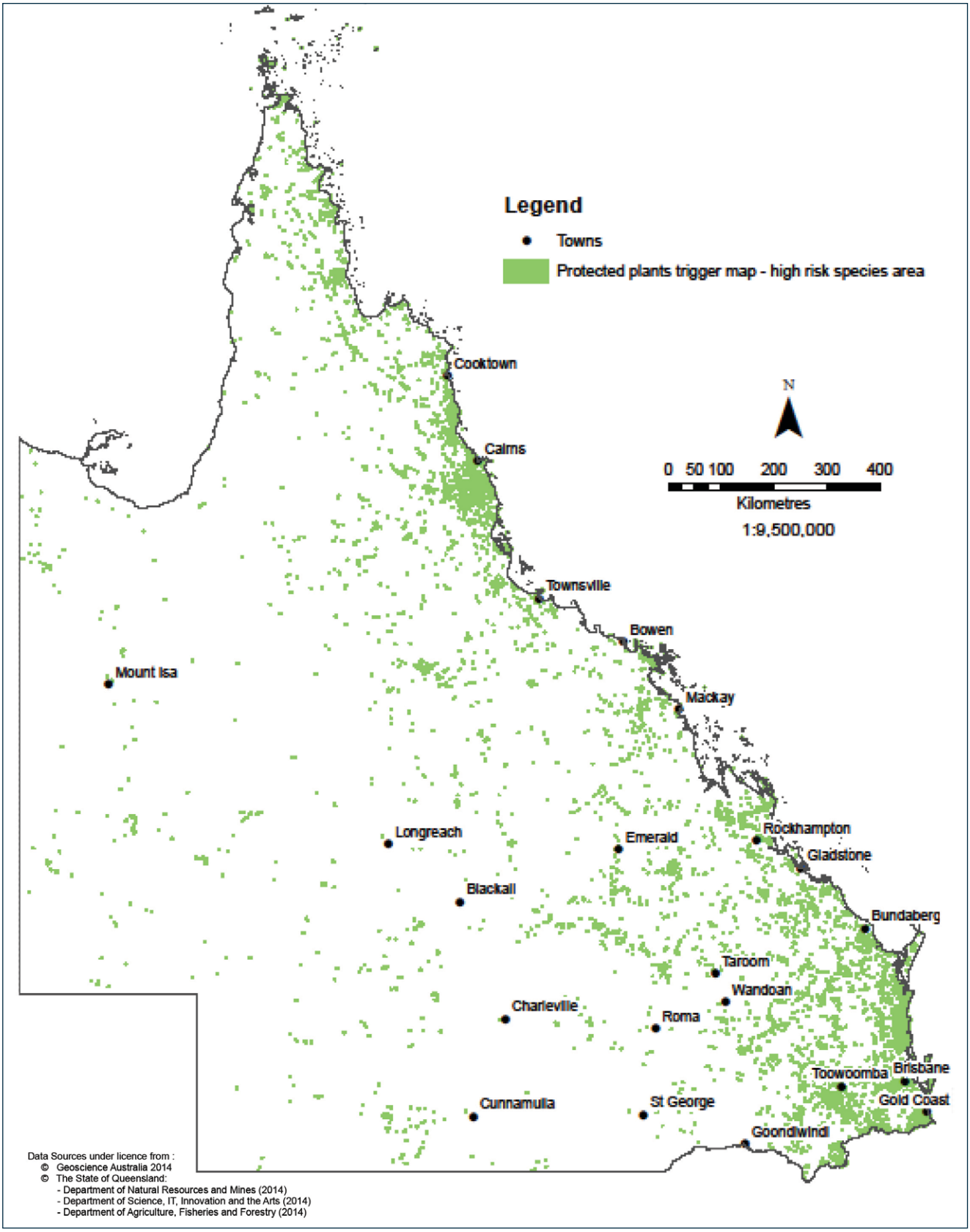
Table 2.3 Regulated vegetation in Queensland

Category	Area (ha)
Category A: Vegetation offsets/compliance notices and variable Declarations	29 494
Category B: Remnant	138 419 192
Category C: High-value regrowth	407 954
Category R: Reef regrowth watercourse vegetation	249 147
Category X: Not regulated under the VMA	33 707 985
Water	27 020 394
Outside	521 040
Total	**200 355 206**

Source: DNRM

In Queensland, plants of conservation value are protected under the *Nature Conservation Act 1992*. Recent amendments to the protected plants framework have reduced the area that is subject to protected plant requirements for clearing activities from 100 per cent of the State down to approximately 3.5 per cent.

Figure 2.3 Protected plants trigger map



Environmental protection on farm

Approximately 53.2 per cent of agricultural producers consciously protect native vegetation on their properties. However, this is below the national average of 57.8 per cent. Queensland's agriculture industry also lags behind the national average in the protection of wetland areas, but is above average in the protection of river and creek banks.

Table 2.4 Protection of the native environment on farm, 2011–12

	Queensland	Australia
Agricultural businesses		
Agricultural businesses	28 171	135 692
Native vegetation on holding	19 926	85 212
Wetlands on holding	3648	18 831
Rivers or creeks on holding	17 015	71 024
Undertook activities to protect natural environment areas (%)		
Protected native vegetation	53.2	57.8
Protected wetland areas	47.3	50.4
Protected river and creek banks	54.2	51.7

Source: Land management and farming in Australia, 2011-12, ABS 4627.0

While largely associated with vegetation management regulations, the higher proportion of farmers protecting river and creek banks may partly be attributed to large numbers of landholders across six catchments participating in best management practice (BMP) programs and other programs as part of the Reef Water Quality Protection Plan (Reef Plan) and related initiatives.

BMP programs have been designed for a number of specific commodities. They aim to boost productivity or profitability, while setting a standard for environmental stewardship to foster more sustainable environmental outcomes.

In particular, certain BMP modules focus on maintaining or improving land condition and water quality. As these natural resources are the basis of agricultural production, adopting improved practices can benefit the environment and ensure the longevity of agricultural production in Queensland.

Improved management practices have also been identified outside of BMP programs. Between 2009 and 2011, 17 per cent of graziers, 34 per cent of cane farmers and 25 per cent of horticultural producers within reef catchments adopted improved practices. For more information on improved management practices adopted under the Reef Plan, see www.reefplan.qld.gov.au.

Case study

Improved management practices

The Queensland Government is committed to building a strong and sustainable agricultural industry; which has been demonstrated through its ongoing commitment to the Reef Water Quality Protection Plan and other land management initiatives. Agricultural practices may impact the environment and natural resources that the industry depends on. However, improving agricultural practices may result in a two-fold benefit of improved environmental outcomes and economic benefit over the long term.

Modelling of a typical cane farm near Cairns showed that income increased by improving practices such as reducing tillage and nitrogen application and legume fallow. Although analysis indicated a small reduction in crop yield, financial returns were enhanced through reduced tillage operations, increased efficiencies and inputs over a full crop cycle. Overall, operating with these improved practices provided important economic benefits to a farmer at the plot level and resulted in positive effects on profitability.

A 95 hectare banana farm that adopted improved practices after Severe Tropical Cyclone Larry in 2006, improved its financial viability, with benefits extending to the bordering wetlands. The farm's gross margin improved due to increased yields and savings associated with improved practices, and the net present value of the practice change was positive. Improved practices included:

- nutrient management
  - Soil and leaf analysis
  - Nutrient application matched to crop needs
  - Fertigation and foliar application allowing smaller and more regular doses
- pest management
  - Targeted chemical application (injecting rather than spraying)
  - Reduced chemical use
- soil and water management
  - Reduced tillage
  - Longer crop cycles
  - Minimised traffic in wet season
  - Soil moisture monitoring
  - Interrow vegetation
  - Composting.

Capital outlay was needed for purchasing three harvesters and a slasher and to make changes to the irrigation and fertigation system. The farmer considered it a worthwhile investment as it led to a 20 per cent reduction in irrigation-related costs and improved soil and plant health.

Water monitoring equipment and a soil analysis was also purchased, which resulted in a considerable reduction in chemical (fertiliser and pesticide) costs. For example:

- herbicide usage reduced by 50%
- fungicide usage reduced by 60%
- granular fertiliser usage reduced by 30%
- no nematicides needed to be used.

There were also production benefits in terms of site preparation as the use of the ripper and plough were down by 60 per cent and irrigation costs reduced.

For more information on the Reef Water Quality Protection Plan, go to www.reefplan.qld.gov.au. For more examples of the economic benefits of improved land management practices, please see the Improved Practices Catalogue at www.daff.qld.gov.au.

Water resources

Agriculture used just over two million megalitres of water in 2011–12, which is equivalent to 60 per cent of Queensland's total demand for water (see Table 2.5). Cropping was responsible for the bulk of water usage.

Table 2.5 Water use in Queensland, 2011–12

	Self-extracted (ML)	Distributed (ML)	Reuse (ML)	Total (ML)
Agriculture				
Nursery and floriculture production	8 505	6 680	19	15 204
Mushroom and vegetable growing	69 060	31 246	309	100 615
Fruit and tree nut growing	75 802	46 606	51	122 460
Sheep, beef cattle and grain farming	212 107	121 435	816	334 357
Other crop growing	815 391	546 309	9 583	1 371 283
Dairy cattle farming	31 014	13 976	95	45 084
Poultry farming	5 031	2 697	0	7 728
Deer farming	2	2	0	3
Other livestock farming	11 015	6 061	19	17 096
Total – Agriculture	**1 227 926**	**775 012**	**10 892**	**2 013 831**
Aquaculture			0	679
Forestry and logging				3 302
Agriculture, forestry and fishing support services	15 113	9 284	0	24 398
Food, beverage and tobacco product manufacturing	24 039	45 784		70 394
Total of all uses	**4 249 354**	**1 911 183**	**57 721**	**3 374 884**

Source: Water Account, Australia, 2011–12, ABS 4610.0

Irrigation accounted for agricultural production worth $3.57 billion in Queensland in 2011–12, which was 35.6 per cent of the State's total. The largest contributions went into the following industries: cotton ($915 million), vegetables ($726 million), fruit ($651 million) and sugar cane ($646 million). Irrigation's largest contributions by region were: Burdekin ($719 million), Border Rivers ($669 million) and Burnett-Mary ($556 million).[1]

Water resources in Queensland are regulated through water resource plans for 23 water resource areas. A water resource plan for the Cape York region is currently under development.

For more information on agricultural water use and water availability, refer to the Land Audit at www.daff.qld.gov.au and the *Minister's Report 2012–2013 for Queensland's Water Resource Plans* at www.dnrm.qld.gov.au.

1 Gross value of irrigated agricultural production, 2011–12, ABS 4610.0.55.008

Water storage levels

SunWater is a bulk water infrastructure developer and operator of Queensland's major water supply schemes. It supplies approximately 40 per cent of all water used commercially in Queensland. SunWater provides water to over 5000 irrigation customers in the agriculture industry and also provides services for local governments, mining and other industrial customers.

SunWater owns and manages around $7 billion in water infrastructure assets with a distribution network in Queensland comprising 19 major dams, 63 weirs and barrages, 80 major pumping stations, 2500 kilometres of pipelines and channels, and 730 kilometres of drains (see Figure 2.4).

Table 2.6 outlines water storage levels as at June 2014. Up to date water storage levels can be found on the SunWater website (www.sunwater.com.au).

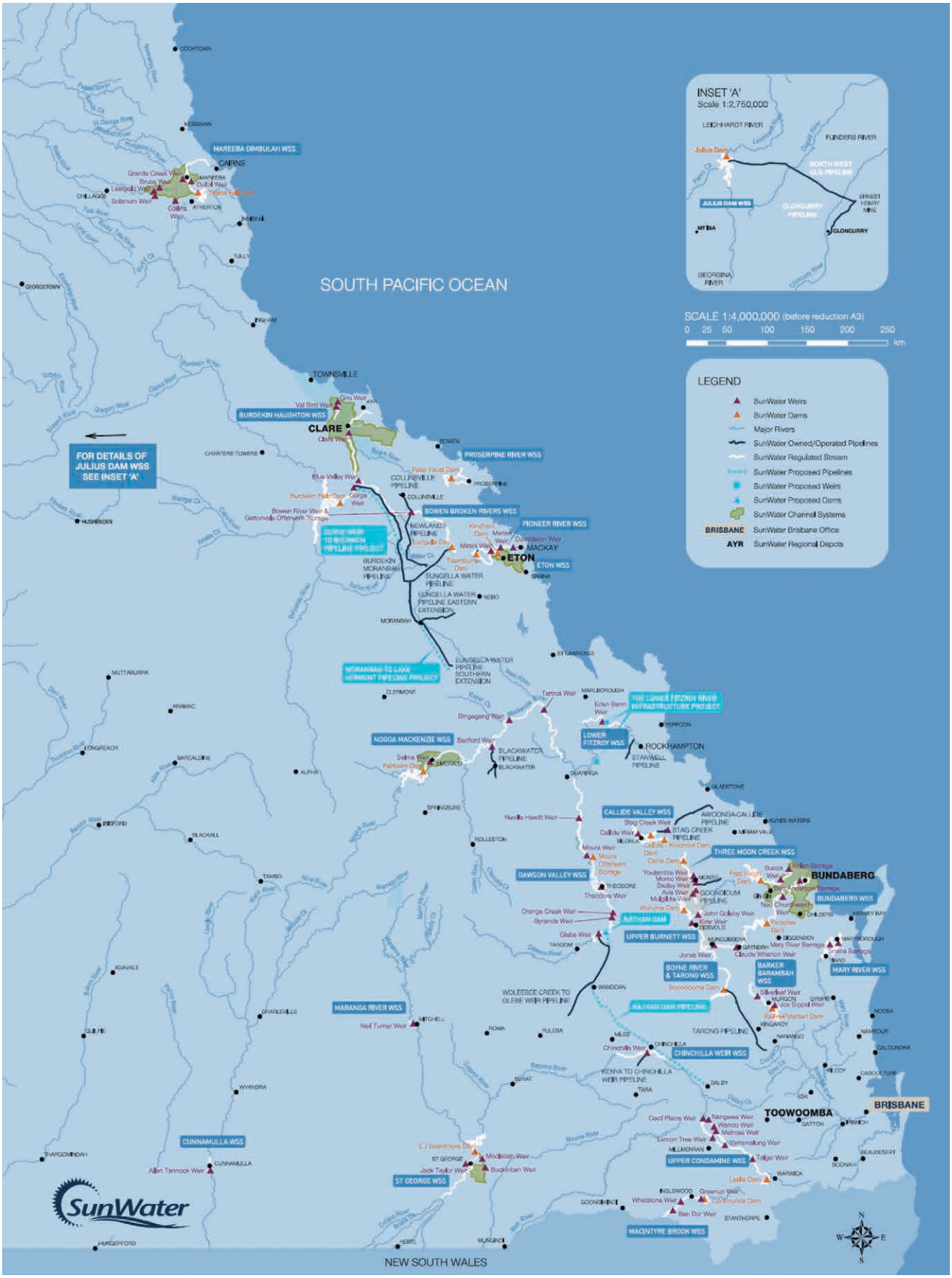
Table 2.6 SunWater storage summary

Water supply scheme	Storage	Full capacity (ML)	Current storage		
			(ML)	Date	% full
Barker Barambah	Bjelke-Petersen Dam	134 900	91 400	06 Jun 2014	68
	Joe Sippel Weir	710	710	05 Jun 2014	100
	Silverleaf Weir	580	550	06 Jun 2014	95
Bowen Broken Rivers	Bowen River Weir	943	940	25 May 2014	100
	Eungella Dam	112 400	112 300	06 Jun 2014	100
	Gattonvale Offstream	5 230	4 920	04 Jun 2014	94
Boyne River and Tarong	Boondooma Dam	204 200	158 000	06 Jun 2014	77
Bundaberg	Ben Anderson Barrage	30 300	22 800	06 Jun 2014	75
	Bucca Weir	11 600	6 770	06 Jun 2014	58
	Fred Haigh Dam	562 000	489 600	06 Jun 2014	87
	Kolan Barrage	4 020	3 750	06 Jun 2014	93
	Ned Churchward Weir	29 500	28 100	06 Jun 2014	95
	Paradise Dam	300 000	165 100	06 Jun 2014	55
Burdekin Haughton	Burdekin Falls Dam	1 860 000	1 847 000	06 Jun 2014	99
	Clare Weir	15 900	15 900	06 Jun 2014	100
	Giru Weir	1 025	930	06 Jun 2014	91
	Val Bird Weir	615	610	03 Jun 2014	99
Callide Valley	Callide Dam	136 370	88 500	06 Jun 2014	65
	Kroombit Dam	14 600	6 610	06 Jun 2014	45
Chinchilla Weir	Chinchilla Weir	9 780	9 410	06 Jun 2014	96
Cunnamulla	Allan Tannock Weir	4 770	2 860	14 May 2014	60
Dawson Valley	Glebe Weir	17 700	17 200	06 Jun 2014	97
	Gyranda Weir	16 500	15 400	06 Jun 2014	93
	Moura Offstream	2 820	740	06 Jun 2014	26
	Moura Weir	7 700	7 400	06 Jun 2014	96
	Neville Hewitt Weir	11 300	N/A	N/A	N/A
	Orange Creek Weir	6 140	6 140	06 Jun 2014	100
	Theodore Weir	4 760	4 350	06 Jun 2014	91
Eton	Kinchant Dam	62 800	61 100	06 Jun 2014	97
Julius Dam	Julius Dam	107 500	81 600	06 Jun 2014	76
Lower Fitzroy	Eden Bann Weir	35 900	35 900	04 Jun 2014	100
Macintyre Brook	Ben Dor Weir	700	670	05 Jun 2014	96
	Coolmunda	69 000	35 300	06 Jun 2014	51
	Whetstone Weir	506	500	05 Jun 2014	99
Maranoa River	Neil Turner Weir	1 470	N/A	N/A	N/A

Water supply scheme	Storage	Full capacity (ML)	Current storage		
			(ML)	Date	% full
Mareeba Dimbulah	Tinaroo Falls Dam	438 920	398 200	06 Jun 2014	91
Mary River	Mary Barrage	12 000	12 000	06 Jun 2014	100
	Tinana Barrage	4 750	4 750	06 Jun 2014	100
Nogoa Mackenzie	Bedford Weir	22 900	18 000	02 Jun 2014	79
	Bingegang Weir	8 060	8 030	22 Apr 2014	100
	Fairbairn Dam	1 301 000	664 700	06 Jun 2014	51
	Tartrus Weir	12 000	12 000	06 Jun 2014	100
Pioneer River	Dumbleton Weir	8 840	6 260	06 Jun 2014	71
	Marian Weir	3 980	3 980	06 Jun 2014	100
	Mirani Weir	4 660	2 940	06 Jun 2014	63
	Teemburra Dam	147 500	147 500	06 Jun 2014	100
Proserpine River	Peter Faust Dam	491 400	471 400	06 Jun 2014	96
St George	Buckinbah Weir	5 120	4 490	06 Jun 2014	88
	EJ Beardmore Dam	81 700	73 400	06 Jun 2014	90
	Jack Taylor Weir	10 270	9 260	06 Jun 2014	90
	Moolabah Weir	3 950	1 060	06 Jun 2014	27
Three Moon Creek	Cania Dam	88 500	81 200	06 Jun 2014	92
Upper Burnett	Claude Wharton Weir	12 800	8 270	06 Jun 2014	65
	John Goleby Weir	1 690	1 690	06 Jun 2014	100
	Jones Weir	3 720	3 680	05 Jun 2014	99
	Kirar Weir	9 540	9 540	06 Jun 2014	100
	Wuruma Dam	165 400	134 300	06 Jun 2014	81
Upper Condamine	Leslie Dam	106 200	41 400	06 Jun 2014	39
	Yarramalong Weir	390	280	06 Jun 2014	72
Total		**6 729 529**	**5 441 000**		**81**

Source: SunWater current storage summary – April 2014, SunWater

Figure 2.4 SunWater operations and infrastructure 2013



Source: *SunWater 2012–13 Annual Report*, SunWater

Table 2.7 SEQWater Current Storage Summary

Storage	Full Capacity (ML)	Current Storage		
		(ML)	Date	% Full
Atkinson Dam	30 401	20 069	06 Jun 2014	66
Baroon Pocket Dam	61 000	42 512	06 Jun 2014	70
Bill Gunn Dam	6 947	5 245	06 Jun 2014	76
Borumba Dam	45 952	46 048	06 Jun 2014	100
Bromelton Dam	8 210	5 623	06 Jun 2014	69
Cedar Pocket Dam	730	768	06 Jun 2014	105
Cooloolabin Dam	13 820	7 116	06 Jun 2014	52
Enoggera Dam	4 567	4 565	06 Jun 2014	100
Ewen Maddock Dam	16 587	16 371	06 Jun 2014	99
Gold Creek Dam	801	774	06 Jun 2014	97
Hinze Dam	310 730	287 668	06 Jun 2014	93
Lake Clarendon Dam	24 276	17 969	06 Jun 2014	74
Lake Macdonald	8 018	8 120	06 Jun 2014	101
Lake Manchester Dam	26 217	26 004	06 Jun 2014	99
Leslie Harrison Dam	24 868	18 703	06 Jun 2014	75
Little Nerang Dam	6 705	5 805	06 Jun 2014	87
Maroon Dam	44 319	41 918	06 Jun 2014	95
Moogerah Dam	83 765	78 477	06 Jun 2014	94
Nindooinbah Dam	322	212	06 Jun 2014	66
North Pine Dam	214 302	160 812	06 Jun 2014	75
Poona Dam	655	505	06 Jun 2014	77
Sideling Creek Dam	14 370	10 768	06 Jun 2014	75
Somerset Dam	379 849	377 328	06 Jun 2014	99
Wappa Dam	4 694	4 699	06 Jun 2014	100
Wivenhoe dam	1 165 238	1 053 447	06 Jun 2014	90
Wyaralong Dam	102 883	101 435	05 Jun 2014	99
Total	**2 600 226**	**2 342 961**		**90**

Source: SEQWater Latest Dam Levels, June 2014

Declared Fish Habitat Areas

Over one million hectares of Queensland's key coastal fish habitats are protected through the declaration of 70 Fish Habitat Areas (FHAs). These FHAs protect the habitat from development impacts in order to maintain fisheries' productivity.

The FHA network focuses on estuarine and coastal habitats that support up to 75 per cent of Queensland's commercial catch and most of the recreational and traditional fishing catch. For more information on the status of Queensland's declared FHAs, refer to the *Declared Fish Habitat Area Network Assessment Report 2012* at www.nprsr.qld.gov.au.

People

Queensland's agriculture, forestry and fishing sector directly employed around 60 000 people in 2013.

- The 2013 figure is down from over 80 000 in 1985, which is a rate of decline of 1.1 per cent per annum. This rate of decline is projected to continue in the medium term to 2018.[2]
- 76 per cent of these people were employed full-time.[3]
- In 2011–12, an estimated 36 610 were employed in sheep, beef and grain, 2250 in dairy, 5710 in fruit and tree nut growing, 6130 in vegetables, 4560 in agriculture and fishing services, and 3010 in other livestock farming.[4]
- 70 per cent were male employees. Gender balance has not changed since the early 1990s after recording strong increases in women's participation in the 1970s and 1980s. The increase probably reflected the ability of women to more accurately describe their farm management role, rather than an increase in participation per se.
- 48 per cent of those employed in agriculture, forestry and fishing were managers and 29 per cent were labourers. Other major occupational groups were technicians and trades, clerical and administrative, machinery operators and drivers (accounting for 6 per cent) and professionals (accounting for 2 per cent).
- 61 per cent were employees, 29 per cent were self-employed and 9 per cent were employers.
- In 2012 the average age of owner-managers of Queensland broadacre farms was 61 years, up from 54 years in 1990.[5] A recent Rural Industries and Research Development Corporation (RIRDC) study largely attributes the increasing age of farmers to the decline in the number of farms.[6]

2 *Employment projections,* Department of Employment, http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections

3 Although not necessarily full-time in agriculture, agriculture was their main job but some would have second jobs in other industries. These figures also do not include people who are employed part-time in agriculture and have a full-time job in another industry.

4 Employment and Workplace Relations 2012, Department of Education, http://www.deewr.gov.au/lmip/default.aspx?LMIP/Publications/IndustryEmploymentProjections

5 AgSurf database, ABARES

6 *New entrants to Australian agricultural industries – Where are the young farmers?* February 2014, RIRDC

The food and beverage processing sector in Queensland is made up of approximately 1200 businesses. The majority of the sector (95 per cent) comprises micro- or small-sized businesses (under 20 staff) and medium-sized businesses (under 200 staff).

An estimated 300 000 people are employed across the agricultural supply chain as a whole:

- 4000 in the production of inputs to the Queensland agriculture, fisheries and forestry sector[7]
- 62 000 in agriculture, fisheries and forestry in 2013[8]
- 42 000 in food processing as at June 2013[9]
- 97 500 in food wholesale and retail in 2013[10]
- 58 000 in food service in 2013[11]
- 37 000 employed in the transport and logistics of food between these sectors in 2013[12]

An ageing workforce, combined with increased competition and decreasing enrolments in agricultural courses is impacting on the productivity of the industry, and this is likely to continue.

At the same time, there has been a shift towards the use of contract workers by agribusinesses to enable more efficient use of workers at peak times. This alleviates some of the additional requirements and costs associated with, but not limited to, leave entitlements, insurance and workplace health and safety.[13]

For further information at a national level, refer to the *Blueprint for Australian Agriculture 2013–2020* at www.nff.org.au.

7 Labour Force, Australia, detailed, quarterly, Feb 2014, derived from ABS 6291.0.55.003; *Food for a growing economy*, 2011, Queensland Government

8 Labour Force, Australia, detailed, quarterly, Feb 2014, ABS 6291.0.55.003

9 Australian industry, 2011–12, ABS 8155.0

10 Labour Force, Australia, detailed, quarterly, Feb 2014, derived from ABS 6291.0.55.003; *Food for a growing economy*, 2011, Queensland Government

11 Labour Force, Australia, detailed, quarterly, Feb 2014, derived from ABS 6291.0.55.003; *Food for a growing economy*, 2011, Queensland Government

12 Labour Force, Australia, detailed, quarterly, Feb 2014, derived from ABS 6291.0.55.003; OESR Input–Output tables 2005–06

13 *Agriculture: ISB 2013 Workforce development and planning,* DAFF

Labour shortfall

In 2013, only 2100 people whose last job was in agriculture, forestry or fishing, were identified as being unemployed. This represents an unemployment rate of 3.3 per cent, which is well below the all-industry average, suggesting that labour supply for the sector is limited.

The *2012 Agriculture Workforce Development and Planning Report* identified a labour shortfall in Australia of 96 000 full-time workers.[14]

AgForce has quantified the labour shortfall in Queensland's beef and sheep meat and grain industries as 5000 skilled full-time employees and 17 000 casual employees.[15]

Apprenticeships and traineeships

Approximately 1600 young people enter agriculture-related apprenticeships and traineeships each year, although the combined intake slumped to under 900 in 2012–13. The completion rate averages over 60 per cent, which is slightly below the all-occupations average of 67 per cent.

Little growth in the uptake of apprenticeships and traineeships may be partly due to industry preferences for skill sets, training and non-accredited extension. The relatively low completion rate may be attributed to participants failing to continue to accreditation stage once they have learnt the required skills.

Skills demand

Many industries have identified their future training needs as technology and innovation in new processes and machinery.

Based on intelligence from 11 of Queensland's agricultural peak bodies, the two key training areas demanded by most agricultural industries in Queensland are business and professional services, and maintenance and farm assistance skills.

Workers are increasingly being shared across industries, emphasising the need for common skills, such as:

- succession planning, reflecting an ageing workforce
- workplace health and safety
- business and financial management across industries
- mechanical and machinery maintenance
- farm assistance skills
- biosecurity (pest and disease identification and management).

14 *Agriculture: ISB 2013 workforce development and planning,* DAFF

15 *Skills and labour news review analysis*, 2012, AgForce

Investment

Industry investment

In 2011–12, $16.2 billion was invested in the agriculture, fisheries and forestry sector nationally. This represents 6.6 per cent of the total $246.5 billion invested across the four major sectors—services, manufacturing, mining, and agriculture, fisheries and forestry.

The $16.2 billion investment represents an 18.7 per cent annual growth in investment for agriculture, fisheries and forestry. This was a higher annual growth rate than in the services and manufacturing sectors, but lower than mining. While investment projects can be irregular and averages are often skewed by large transactions, it suggests that agriculture is receiving its share of investment.

Table 2.8 Australian industry investment, 2011–12

	Services	Manufacturing	Mining	Agriculture, forestry and fishing	Total
Levels ($b)	106.9	20.8	102.6	16.2	246.5
Industry share (%)	43.4	8.4	41.6	6.6	100.0
Annual growth (%)	0.0	5.6	57.1	18.7	20.0

Source: Key facts Australian industry 2011–12, Department of Industry

Across the agribusiness supply chain, which includes first round processing, there was significant additional investment in 2011–12 in the manufacturing sector.[16] This additional investment was in the following manufacturing industries:

- food, beverage and tobacco products ($4.28 billion)
- wood, pulp and paper products ($2.05 billion)
- furniture and other manufacturing ($2.21 billion).

An alternative measure of investment for Australia as a whole can be derived from ABS estimates of capital inputs. These estimates account for depreciation of capital assets and exclude land purchases. In 2012–13, the estimated value of capital inputs to agriculture increased by $6.6 billion in real terms to $177.3 billion (see Figure 2.5). This represents an average increase of 1.1 per cent per annum since 1989–90. However, all of the increase has occurred since 2002–03, suggesting a significant improvement in business confidence in the sector since that time.

It is clear that investment funds continue to flow to agriculture suggesting a level of confidence in the future of the sector.

16 Key facts Australia Industry 2011–12, Department of Industry

Figure 2.5 Change in productive capital stock chain volume measure in Australia – agriculture, fisheries and forestry

Source: Estimates of industry multifactor productivity, 2012–13, ABS 5260.0.55.002

Foreign investment

Foreign investment in land is a significant issue in Australia, with concerns about potentially adverse impacts on the competitiveness of the agriculture, fisheries and forestry sector and, more broadly, on national identity. Such concerns need to be weighed against the potential benefits of foreign investment, including access to markets, technology and capital.

In December 2010, 99.4 per cent of Queensland farm businesses were wholly Australian-owned, covering 88.2 per cent of the area of agricultural holdings and 92.0 per cent of water entitlements. An estimated 16.3 million hectares was under foreign ownership, in whole or part.[17] As there has been some level of foreign ownership of the sector for decades, this information does not suggest that the level of foreign ownership is increasing rapidly.

The Foreign Investment Review Board (FIRB) examines proposals by foreign investors in Australia and makes recommendations to the Federal Treasurer on investments that are subject to the *Foreign Acquisitions and Takeovers Act 1975* and Australia's foreign investment policy. In 2011–12, agriculture, fisheries and forestry accounted for $3.6 billion in FIRB approvals. This was only 2 per cent of total approvals, compared with 35 per cent for real estate and 30 per cent for mineral exploration and development.

17 Agricultural land and water ownership, December 2010, Australian Bureau of Statistics 7127.0

Foreign investment also occurs in processing assets. For example, this was demonstrated by the takeover of Sucrogen (previously CSR Sugar) by Singaporean agribusiness giant, Wilmar International Limited, in late 2010. This was followed by the purchase of Mulgrave Mill and Bundaberg Sugar's Far North Queensland mills by Maryborough Sugar Factory (MSF). MSF brought about the closure of the Babinda Mill; and in early 2012, Thailand's biggest producer of sugar, Mitr Phol Sugar Corp, stepped up its stake in MSF. Chinese company, COFCO, took a controlling interest in the Tully Mill in mid-2011 and Sucrogen acquired Proserpine Mill in mid-2012.[18]

Table 2.9 Foreign investment application – agriculture, fisheries and forestry, Australia

	2009–10	2010–11	2011–12	Three-year average
Number of approvals	17	17	49	28
Proposed investment ($b)	2.3	1.4	3.6	2.4
Percentage of all proposals	2.00	0.79	2.00	1.60

Source: FIRB Annual Report 2011–12, Foreign Investment Review Board

Over the five years to 2011–12, the average level of foreign investment in the agriculture sector has been almost $2.5 billion per annum. It should be noted that investment proposals vary greatly in size and averages can be skewed by large transactions.

The three main investment strategies used by recent foreign buyers of agricultural land in Australia appear to be:

- agribusiness companies (private or government-owned) seeking to extend their activities up the supply chain to secure supply sources
- investment or pension funds seeking profits from owning and operating Australian agricultural land
- mining companies seeking land predominantly for mining activities, while maintaining some agricultural activities.

In 2011–12 the largest source countries of investment in the agriculture sector by value were:

- Canada ($1.4 billion)
- UK ($0.6 billion)
- USA ($0.5 billion)
- Thailand ($0.3 billion)
- Singapore ($65 million)
- China ($27 million).

18 Statistics – Facts and Figures, CANEGROWERS

Foreign Ownership of Land Register

The Foreign Ownership of Land Register is a public register of all land in Queensland held by foreign persons or foreign companies, as defined in the *Foreign Ownership of Land Register Act 1988*. This is a tighter definition of foreign ownership than that used in the ABS survey quoted previously.

The Act provides for the disclosure of foreign ownership of land in Queensland. All foreigners, defined under the Act, are required to notify the Registrar of Titles of any acquisition or disposal of land or a relevant interest in land.

An interest in land, as defined under the Act, can include an interest in freehold land, state leasehold land and other specific types of interests. The register is available online at www.dnrm.qld.gov.au.

As at 30 June 2013, foreign-owned interests in land totalled 5 084 200 hectares, representing less than 3 per cent of Queensland's land area. There were 129 countries of origin recorded in the register.

While the register does not specifically identify foreign-owned land used for agricultural purposes, it does highlight that there is significant foreign investment in land within Queensland.

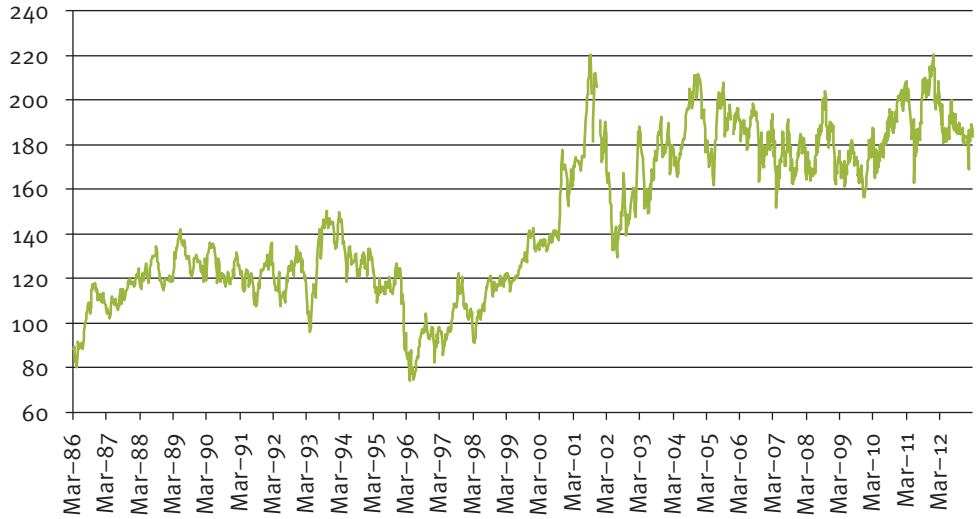
Cattle and calves micro view – case study[19]

The northern Australian beef industry is currently suffering the bust stage in a two decade cycle of boom and bust. Survey data from the ABARES and ABS for specialist beef producing farms in Queensland reveals progression of the cycle but not the outcomes.

The rate of return on equity generated by a business drives its capacity to expand or service debt.

Specialist Queensland beef businesses showed a marked improvement in the average rate of return on equity (net of capital appreciation) over the period 1997–98 to 2001–02. This improved profitability was based on productivity improvements made during earlier decades and the rising price of beef. Expectations that this would continue stimulated a round of capital expenditure that included significant purchases of additional property and saw many beef producers trading up.

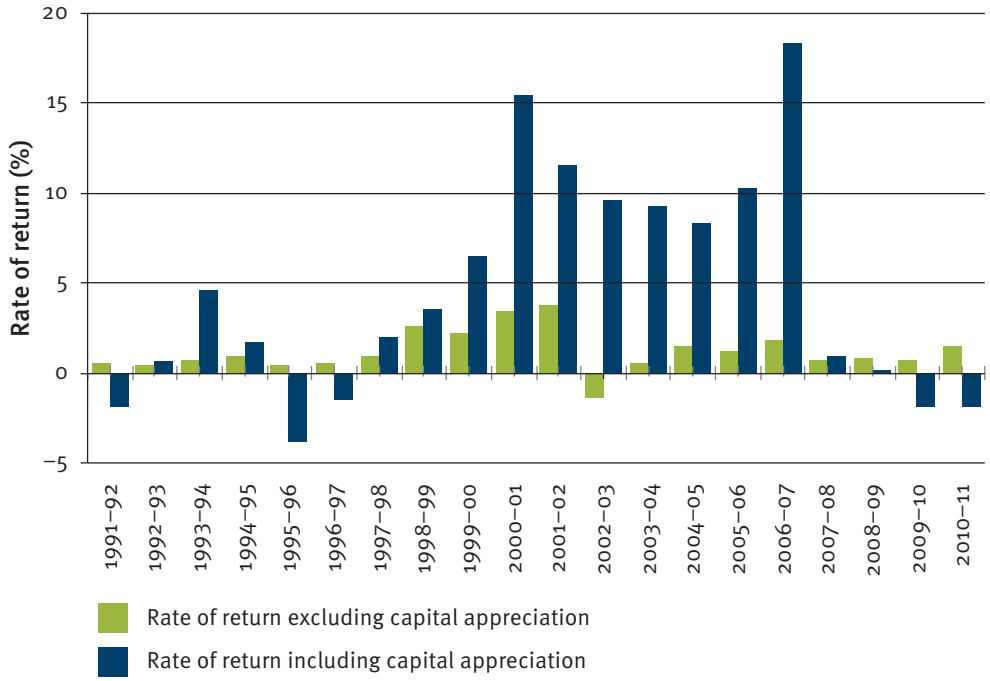
Figure 2.6 Queensland Cattle Market Index



Source: Damon Holmes, Livestock Market Analyst, Meat and Livestock Australia

19 The farm survey data used in this analysis is available at http://abares.win.hostaway.net.au/AME/mla/mla.asp

Figure 2.7 Rate of return on equity for specialist Queensland beef producers (excluding and including capital appreciation)



Source: http://abares.win.hostaway.net.au/AME/mla/mla.asp

The initial round of enthusiasm for property expansion and aggregation led to an across-the-board increase in asset valuations. By the mid-2000s lenders were funding a bubble in land values of major proportions. As is generally the case in a bubble, the lending was based on rapidly improving property valuations, not the long-term prospects of success for the borrower.

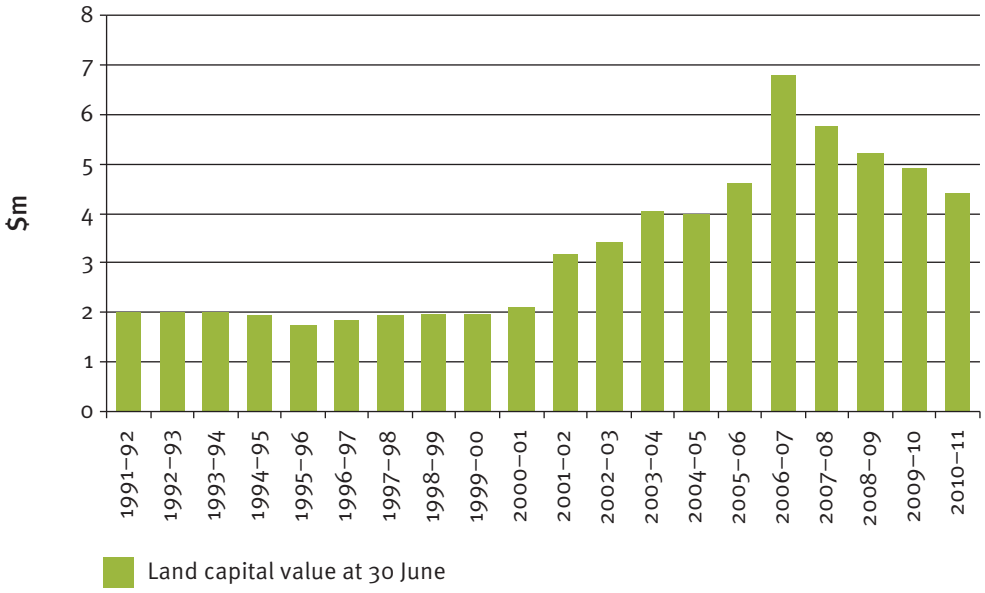
Rates of return on capital (including capital appreciation) of 8 per cent to 15 per cent per annum during this period caused some lenders and investors to seriously over extend themselves. Essentially, they were paying prices for assets that could not be justified by the underlying capacity of the beef business to service those debts.

Profitability improvements ceased from the early 2000s, partly reflecting the long series of dry seasons in Queensland. While product prices remained high they stopped increasing in Australian dollar terms. Expectations of future profitability remained high, particularly as a result of growing demand from emerging economies such as China.

This bubble was evident in many property markets around the world, bringing about the GFC in 2008. The GFC inhibited lenders from funding new loans and the market for beef properties became very subdued. The capital value of surveyed specialist beef properties in Queensland peaked (in real terms) in 2006–07 then subsequently declined.

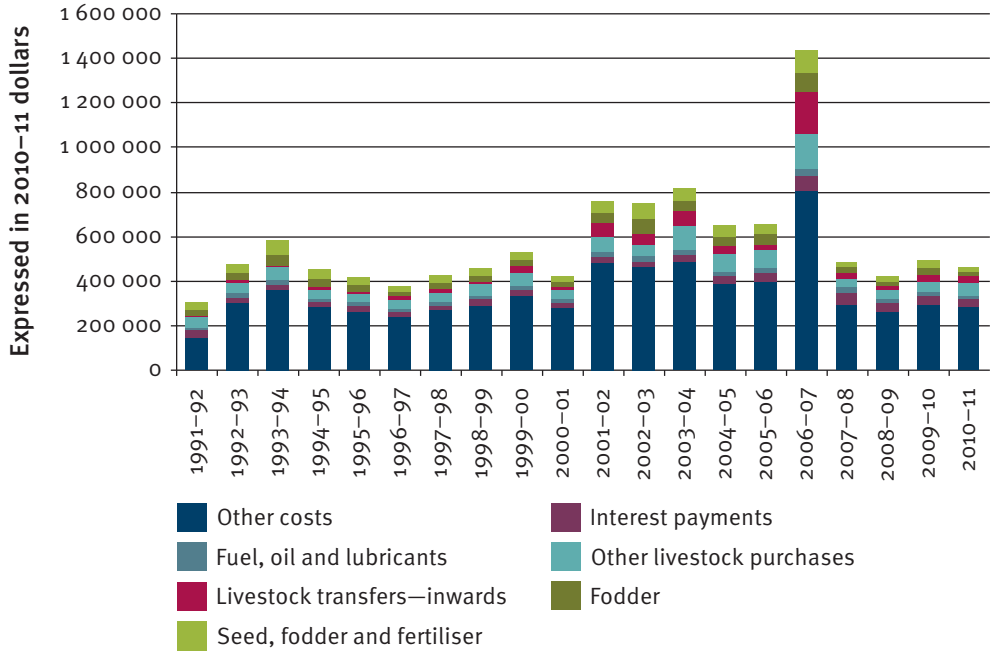
This process is expected to continue until the relationship between land value and expected profitability is restored. While markets are notoriously liable to overshoot in such circumstances, it is unlikely to occur because of the continued positive outlook for the global beef market.

Figure 2.8 Land capital value for surveyed specialist Queensland beef producers (expressed in constant 2010–11 dollars)



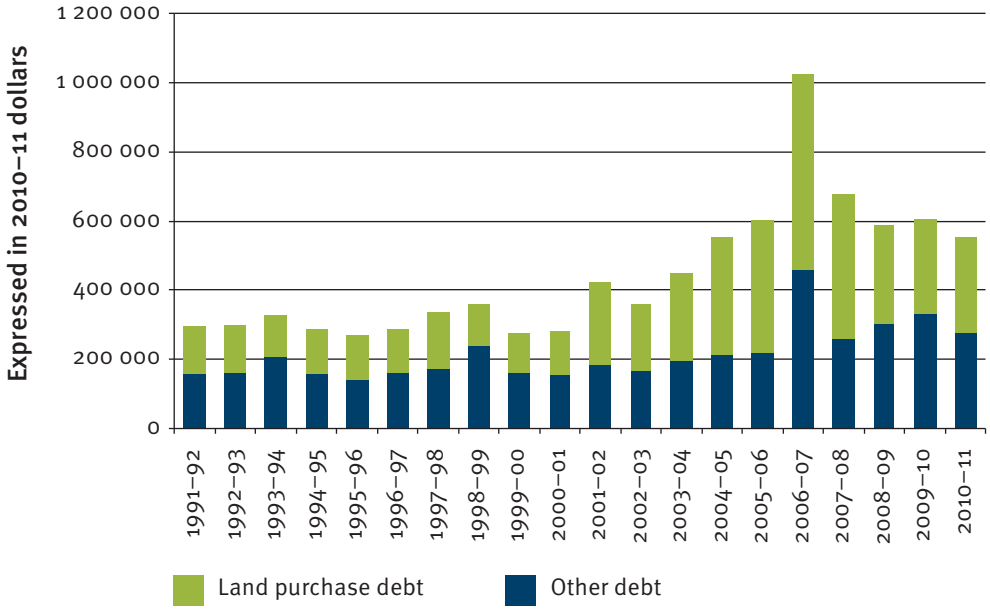
Widespread drought during the early and middle part of the last decade significantly increased cash and non-cash costs, with 2006–07 being something of a watershed year for both costs and asset values. The reduction in costs to their long-term level (in real terms) since 2006–07 reflected the massive efforts of producers reducing costs to survive. Better seasons in recent years have also contributed to the relative reduction in costs.

Figure 2.9 Cash and non-cash costs incurred by surveyed specialist Queensland beef farms



One of the consequences of the asset price bubble was a build-up of debt levels (see Figure 2.10). Profitability has been sufficient to enable significant reductions in debt since the 2006–07 peak, and has been assisted by falling costs and interest rates since that time. However, this remains a risk for the future of the industry, particularly as current low interest rates cannot be expected to last indefinately.

Figure 2.10 Debt levels for surveyed specialist Queensland beef farms



The *Northern beef report – 2013 Northern beef situation analysis*[20] reaffirms these trends by outlining the performance of the northern beef industry across Western Australia, the Northern Territory and Queensland over the last 12 years.

Interestingly, while profits remain stable across the region, the increasing debt of top performers has eroded profitability with wide variation across producers. The superior performance of the top 25 per cent of producers can be attributed to higher incomes from better herd productivity (through higher reproductive rates, lower mortality rates and heavier sale weights) and lower operating expenses (through better labour efficiency). There is little correlation with beef prices, rainfall and land quality.

Importantly, there appears to be an optimal operating scale range, with herd sizes on either side of the scale leading to reduced performance.

20 McLean et al (2014), *The Northern beef report – 2013 Northern beef situation analysis*, Meat and Livestock Australia, B.COM.0348

Case study

Information to support producers

As the production of food and fibre has changed, so have sources of information available to industry. In Queensland, extensive use of online technologies by the FutureBeef eExtension team has enabled rapid, targeted and interactive information sources in response to Queensland's worsening drought situation.

A dedicated drought page on the FutureBeef website (http://futurebeef.com.au/topics/drought/) provides 24/7 access to the latest drought information and management options. The web page receives almost 100 unique visits per week.

The webinar 'Decisions for drought affected producers' was developed and presented in February 2014, attracting over 260 registrations. The webinar focused on the current drought situation and decisions that producers need to be making. Attendees were also introduced to an interactive tool to help them better calculate the financial options of selling versus feeding stock. The webinar was posted on the FutureBeef website and has already received over 100 views in three months.

As social media continues to be a vital, word-of-mouth tool, FutureBeef social media champions use Twitter and Facebook to keep producers connected, included and informed. More in-depth information is available in *FutureBeef eBulletins* which are sent to nearly 3000 subscribers.

Because producers don't all access information in the same way, drought-focused articles will soon appear in all three FutureBeef newsletters—*Northern Muster*, *Beeftalk* and *CQ BEEF*. They will also appear as feature articles in the *North Queensland Register* and *Queensland Country Life* (both in hardcopy and online), which will communicate the information to over 50 000 readers.

Productivity

Driving productivity growth accross the supply chain is the second pathway under *Queensland's agriculture strategy*.

Productivity is the ratio of output to inputs in production, and is an average measure of the efficiency of production. Productivity growth means that output is growing more rapidly than inputs in real terms.

Ultimately, productivity growth is the major driver of real income growth and subsequently, living standards. In fact, the only sources of real income growth are productivity and terms of trade (which is the ratio of prices received to prices paid). Agriculture's terms of trade show long-term decline, so productivity is really the only ongoing source of output growth.

Conceptually, productivity relates the total social value of an activity to the total social value of the inputs to that activity. However, data does not exist to measure such a broad concept of productivity. For example, the environmental costs of an activity are not necessarily priced through market or other mechanisms and so are rarely taken into account in productivity measures. Similarly, the social impacts of an activity over and above those measured through market prices are not taken into account.

Traditionally, partial measures of productivity were widely used, such as yields (output per hectare) or labour productivity (output per person employed or per hour worked). More recently, broader measures of productivity have been developed to combine labour and capital inputs, and they are known as multi-factor productivity (MFP) measures. However, the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) has taken this further and developed a total factor productivity (TFP) index, which incorporates inputs of labour, capital, energy, materials and services.[1]

Productivity is related to profitability, in that both relate outputs to inputs. Increased productivity growth can help businesses become more efficient, resilient and profitable. Productivity growth is important for maintaining the long-term viability of an industry, especially in industries like agriculture that are largely trade exposed.

This section provides information on Queensland's agricultural production by industry, farm performance and productivity measures, fisheries, forestry and food manufacturing output, investment in research, development and extension, innovation, debt and government assistance measures.

1 TFP is not a true 'total' measure because unpriced inputs such as environmental impacts and the social benefits of an activity are not taken into account.

Value and volume of production

Value of production

For 2013–14, the total value of Queensland's primary industry commodities—combined gross value of production (GVP) and first-round processing—is forecast to be approximately $14.7 billion, which is 3 per cent higher than the average for the past five years. Dry seasonal conditions have reduced the forecast for 2013–14 GVP by an estimated $190 million in the last six months.

The total estimated primary industries value at the farm gate for 2013–14 is approximately $11.6 billion, which is 3 per cent higher than the average for the past five years.

For 2013–14, the value of first-stage processing (or value-added production) is forecast to be approximately $3 billion, which is 1 per cent higher than the average for the past five years.

Table 3.1 Estimates and forecasts of Queensland GVP – first-round processing and total primary industry, 2010–11 to 2013–14

	2010–11[b] ($m)	2011–12[b] ($m)	2012–13[b] ($m)	2013–14 Forecast, April 2014[c] ($m)	Change from October 2012–13 (%)	Change from last five-year average (%)
Commodity GVP[a]						
Livestock disposals						
Cattle and calves	3 418	3 281	3 247	3 259	0	-2
Sheep and lambs	396	67	47	78	66	47
Pigs	221	220	204	210	3	-5
Poultry	55	377	438	456	4	16
Kangaroos	39	20	12	12	0	-30
Other livestock	0	0	30	30	0	136
Total livestock disposals	**4 129**	**3 965**	**3 978**	**4 045**	**2**	**0**
Livestock products						
Wool	258	130	106	83	-22	-19
Milk (all purpose)	149	242	226	215	-5	-19
Eggs	118	112	138	140	1	5
Total livestock products[d]	**524**	**484**	**470**	**438**	**-7**	**-13**
Total livestock	**4 653**	**4 449**	**4 448**	**4 483**	**1**	**-1**

	2010–11[b] ($m)	2011–12[b] ($m)	2012–13[b] ($m)	2013–14 Forecast, April 2014[c] ($m)	Change from October 2012–13 (%)	Change from last five-year average (%)
Horticulture						
Fruit and nuts						
Bananas	283	360	550	570	4	40
Pineapples	50	68	77	73	-5	2
Mangoes	55	70	70	77	10	17
Mandarins	89	74	69	77	12	6
Strawberries	74	145	125	170	36	46
Avocados	170	145	140	167	19	40
Macadamias	35	42	59	54	-9	46
Apples	60	78	95	77	-19	-19
Table grapes	32	50	50	50	0	57
Other fruit and nuts	129	235	218	232	7	44
Total fruit	**978**	**1 189**	**1 453**	**1 547**	**7**	**32**
Vegetables						
Potatoes	52	54	54	54	0	4
Beans	94	78	74	79	7	14
Carrots	14	24	24	25	4	18
Lettuce	64	54	54	54	0	-12
Melons (rockmelon and cantaloupe)	24	34	32	36	13	20
Melons (watermelon)	30	37	36	33	-8	-13
Mushrooms	41	64	64	64	0	43
Pumpkin	26	21	21	22	5	-14
Onions	35	25	25	25	0	-11
Sweet corn	36	36	36	38	6	22
Tomatoes	230	266	243	291	20	36
Capsicums and chillies[e]	83	139	139	155	12	40
Zucchini and button squash	33	43	42	47	12	10
Sweet potatoes	53	56	52	52	0	0
Other vegetables	262	257	223	236	6	2
Total vegetables	**1 077**	**1 188**	**1 119**	**1 211**	**8**	**15**
Total fruit and vegetables	**2 055**	**2 377**	**2 572**	**2 758**	**7**	**24**

	2010–11[b] ($m)	2011–12[b] ($m)	2012–13[b] ($m)	2013–14 Forecast, April 2014[c] ($m)	Change from October 2012–13 (%)	Change from last five-year average (%)
Lifestyle horticulture production						
Nurseries	912	821	867	867	0	0
Turf	159	146	125	140	12	-1
Cut flowers	182	151	151	151	0	9
Total lifestyle horticulture production[f]	**1 253**	**1 118**	**1 143**	**1 158**	**1**	**1**
Total horticulture	**3 308**	**3 495**	**3 715**	**3 916**	**5**	**16**
Other field crops						
Sugar cane	940	1 218	1 140	1 068	-6	-4
Cotton (raw)[g]	660	872	633	632	0	7
Other crops[h]	79	105	197	155	-21	-18
Total other crops	**1 679**	**2 195**	**1 970**	**1 855**	**-6**	**-2**
Cereal grains						
Wheat	302	313	554	375	-32	-9
Barley	33	45	44	51	16	34
Grain sorghum	320	313	305	230	-24	-19
Maize	136	43	34	48.6	43	-24
Other cereal grains	111	37	164	85	-48	-12
Total cereal grains	**902**	**751**	**1 101**	**790**	**-28**	**-12**
Total crops	**5 889**	**6 441**	**6 785**	**6 560**	**-3**	**7**
Total agriculture	**10 542**	**10 890**	**11 233**	**11 043**	**-2**	**3**
Fisheries[hi]						
Commercial fishing						
Crustaceans	151	161				
Molluscs	9	9				
Finfish	100	114				
Total commercial fishing	**260**	**284**	**260**	**250**	**-4**	**-8**
Aquaculture	94	91	101	101	0	6
Total fisheries*	**354**	**375**	**371**	**351**	**-5**	**0**
Forestry and logging[j]	**187**	**189**	**150**	**175**	**17**	**2**
Total primary industries (farm gate)	**11 083**	**11 454**	**11 744**	**11 569**	**-2**	**3**

	2010–11[b] ($m)	2011–12[b] ($m)	2012–13[b] ($m)	2013–14 Forecast, April 2014[c] ($m)	Change from October 2012–13 (%)	Change from last five-year average (%)
First-round processing value added(k)						
Meat processing[h]	1584	1521	1526	1551	2	0
Sugar processing[h]	550	712	646	605.2	-6	1
Milk and cream processing[h]	136	128	119	113	-5	-19
Fruit and vegetables processing[h]	177	200	216	232	7	24
Flour mill and feed processing[h]	73	61	89	64	-28	-12
Seafood processing[h]	64	67	65	64	-2	0
Log sawmilling and timber dressing and plywood and veneer manufacturing[h]	386	390	309	361	17	2
Cotton ginning[h]	75	99	72	72	0	7
Total primary industries (first-round processing)	**3045**	**3178**	**3043**	**3063**	**1**	**1**
Total primary industries	**14 128**	**14 632**	**14 788**	**14 632**	**-1**	**3**

a GVP is 'gross value of commodities produced'. It is a measure of economic output. In this publication, GVP relates to the output of primary industry commercial operations only. The GVP is the value of recorded production at wholesale prices in the marketplace (e.g. cattle sold at saleyards, sugar cane at the mill door, fruit and vegetables at the wholesale market). It is derived by multiplying the output from each primary industry by the average wholesale price paid to producers.

b Australian Bureau of Statistics (ABS) final estimates unless otherwise indicated

c DAFF forecasts

d Excludes minor commodities such as honey, beeswax and mohair

e DAFF estimate does not include chillies

f The value of the lifestyle horticulture services sector has been calculated on a gross turnover basis rather than a value-added basis and will therefore contain some double counting.

g Includes value of cottonseed and lint

h DAFF estimates

i Includes catch from both federal-managed fisheries and state-managed fisheries

j Australian Bureau of Agricultural and Resource Economics and Sciences estimates

k 'Value added' is the value of the output produced minus the costs of the intermediate inputs.

* Recreational fishing has been mostly excluded from this report so the figures are slightly different to *AgTrends* releases.

Source: *AgTrends Update*, April 2014, DAFF

Production volumes

Data on the production of individual agricultural commodities in Queensland has been collected for many decades. Since 1996–97, this data has been combined into a volume of production index, which enables the aggregation of growth in production volumes across commodities to be put into a single, statewide index. This index can be used to distinguish between the influences of prices and volumes on the overall value of production.

Table 3.2 Volume of production index for Queensland's major agricultural commodities

	1996–97	1998–99	2000–01	2002–03	2004–05	2006–07	2008–09	2010–11	2011–12	2012–13
Grain sorghum	100	106	115	93	116	89	176	134	139	159
Major cereal grains	100	98	72	50	74	51	117	74	79	108
Sugar cane	100	98	71	94	97	91	82	77	77	83
Cotton lint	100	146	129	50	151	42	93	148	243	185
Major fruit and vegetables	100	102	132	119	134	145	138	164	167	153
Crops	100	105	92	82	105	85	103	104	118	117
Cattle calves and live exports	100	125	140	136	135	140	134	132	131	129
Poultry	100	108	111	123	138	147	158	170	174	174
Major livestock disposals	100	122	134	132	132	137	132	131	130	132
Milk (all purposes)	100	104	95	90	78	67	64	61	59	56
Eggs	100	133	173	135	191	260	266	495	504	562
Total agriculture	**100**	**111**	**107**	**98**	**109**	**100**	**107**	**109**	**117**	**116**

Source: *Queensland AgTrends 2012–13: Forecasts and trends in Queensland agriculture, fisheries and forestry production*, DAFF

Table 3.2 shows that eggs, poultry and cotton experienced the biggest increases in production volume; while the production volume of milk and sugar cane declined over the same period.

Table 3.3 Production volume – 10 year average

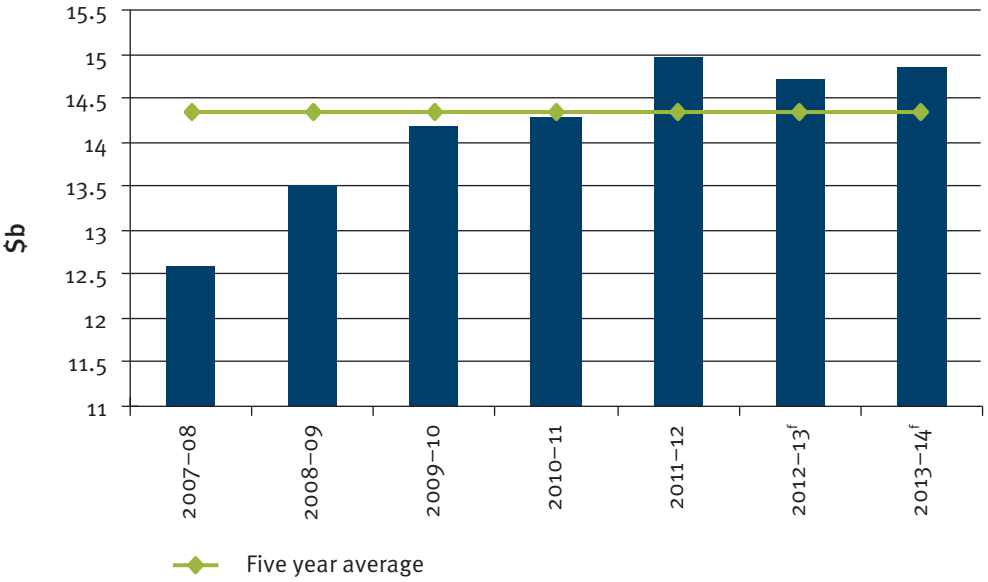
Commodity	Volume	Measure
Milk	534 430 000	litres
Eggs	70 629 247	dozens
Sugar cane (crushed)	30 878 992	tonnes
Grain sorghum	1 313 914	tonnes
Wheat	1 260 129	tonnes
Beef and veal	1 052 209	tonnes
Bananas	220 997	tonnes
Cotton lint	174 753	tonnes
Barley	160 057	tonnes
Tomatoes	121 431	tonnes
Pineapples	118 030	tonnes
Potatoes	101 084	tonnes
Pig meat	90 860	tonnes
Lettuce	55 628	tonnes
Capsicum and chillies	48 160	tonnes
Mangoes	29 643	tonnes
Avocados	25 924	tonnes
Wool	18 841	tonnes
Strawberries	11 682	tonnes
Macadamias	11 140	tonnes

Over the last 10 years, Queensland has produced a wide variety of agricultural products. Production on average includes 534 million litres of milk, nearly 71 million dozen eggs, just under 31 million tonnes of crushed sugar cane, approximately 1.3 million tonnes of both wheat and grain sorghum respectively, and just over 1 million tonnes of beef and veal.

This highlights that Queensland has continued to be a consistent, significant producer of agricultural commodities, despite natural disasters such as droughts and cyclones that occurred during that period.

Production trends

Figure 3.1 Gross value of production (GVP) for farm gate and first-round processing

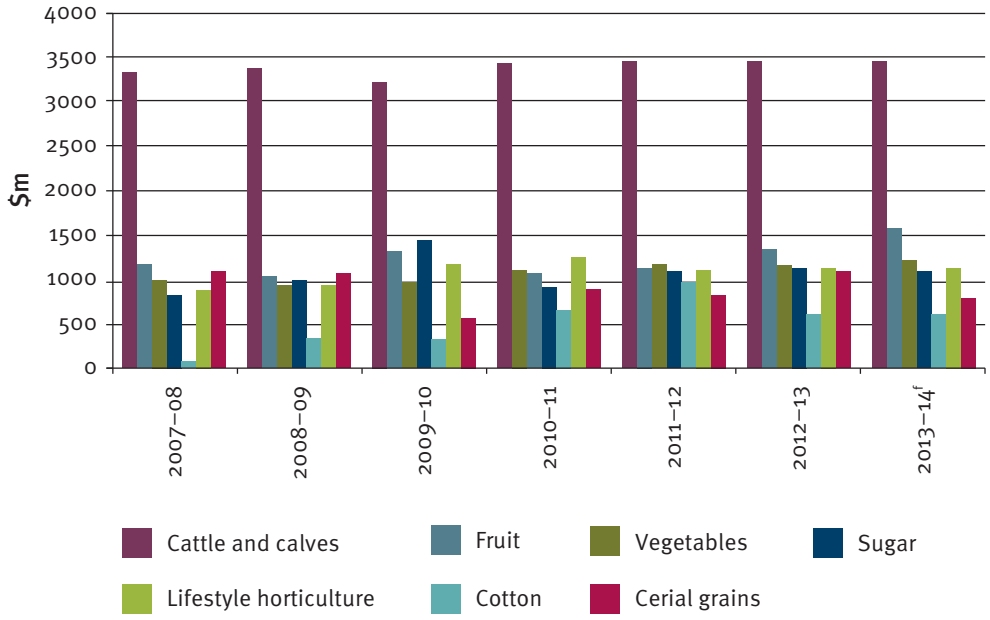


f forecast

Source: *AgTrends Update*, 2014, DAFF

Total Queensland nominal GVP (farm gate and first-round processing) has been trending upwards. Despite floods, cyclones and widespread drought conditions, the primary industry sector has demonstrated its resilience by remaining above the five-year average over the past two years. It is forecast that this trend will continue in 2013–14.

Figure 3.2 Major commodities



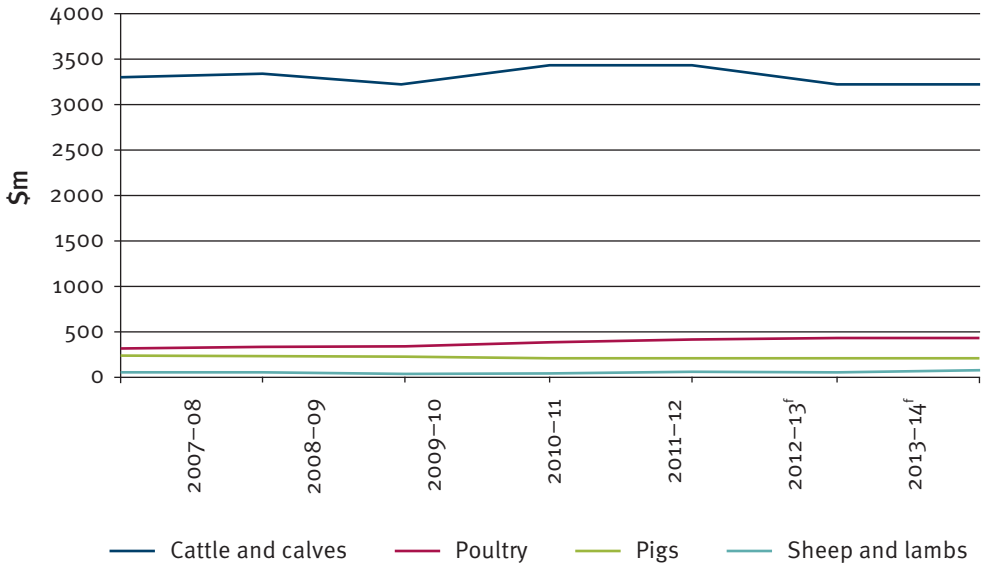
f forecast

Source: *AgTrends Update*, 2014, DAFF

The major primary industries in Queensland are cattle and calves, fruit, vegetables, sugar, lifestyle horticulture, cotton and cereal grains. The cattle and calves industry has a significantly higher nominal GVP than the other industries, which are only around one third of the figure, with the exception of cotton.

Livestock trends

Figure 3.3 Livestock disposals



f forecast

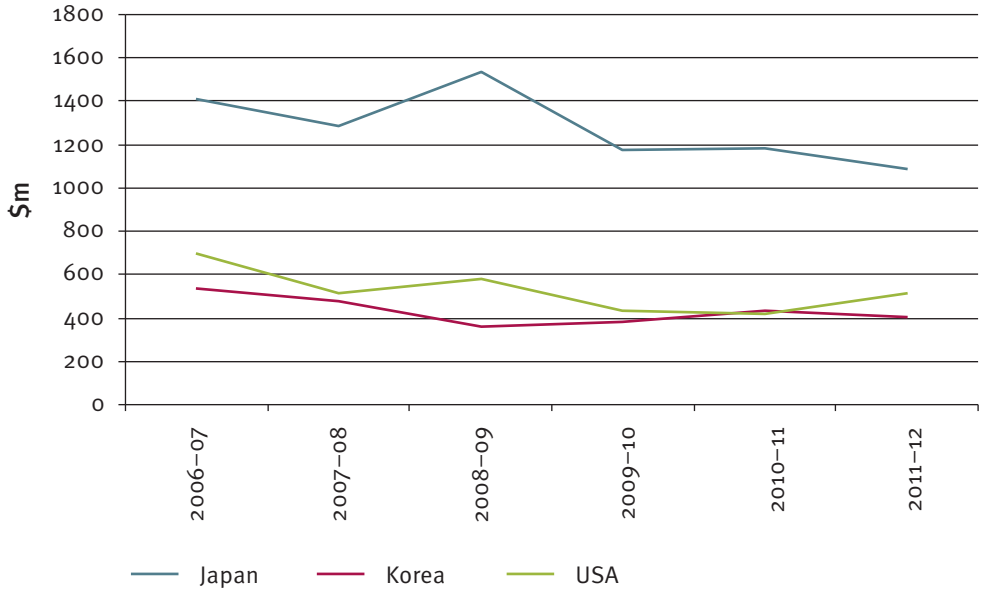
Source: *AgTrends Update*, 2014, DAFF

In Queensland, cattle and calves account for the majority of livestock disposals, which have displayed a relatively flat trend over the last five years.

Poultry meat is the second largest livestock industry in Queensland, and it has been slowly trending upwards over the last five years. In contrast, pigs and sheep and lambs have remained stagnant over the same period.

Beef market trends

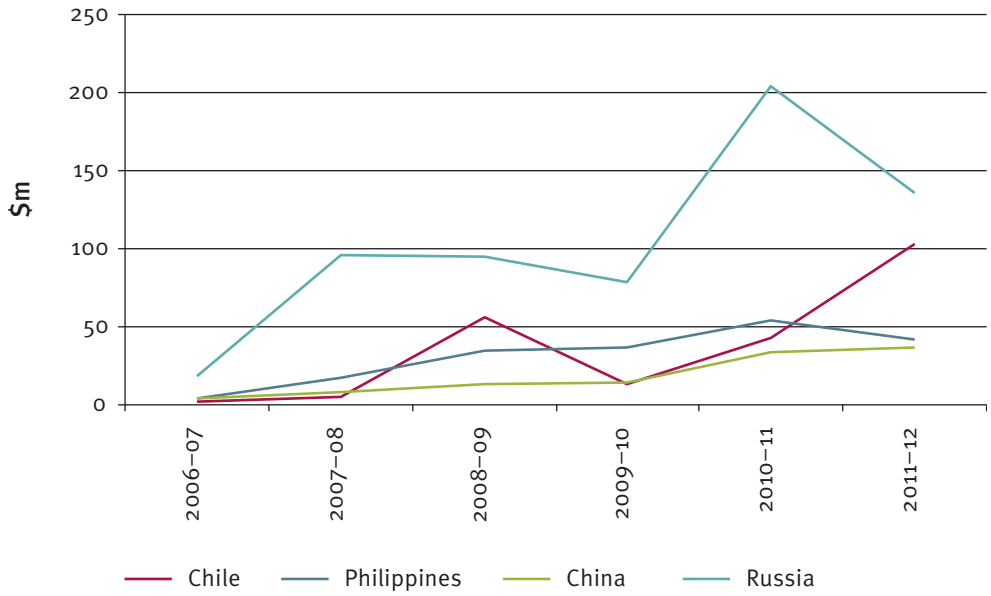
Figure 3.4 Traditional beef markets



Source: *Queensland AgTrends 2012–13: Forecasts and trends in Queensland agriculture, fisheries and forestry production*, DAFF

Japan, Korea and the USA have been Queensland's traditional major trading partners for beef. However, over the last five years the trend for these markets has been generally downward.

Figure 3.5 Emerging beef markets

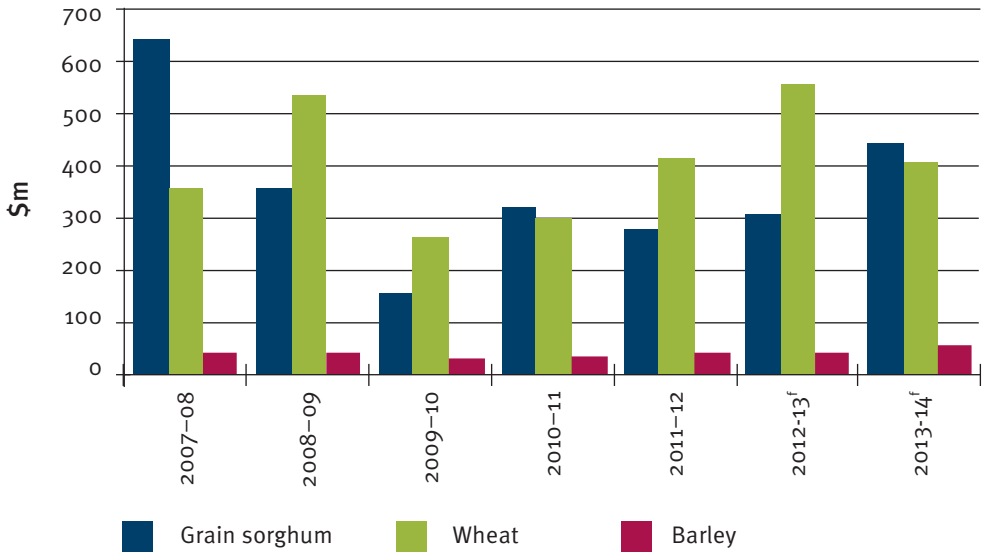


Source: *Queensland AgTrends 2012–13: Forecasts and trends in Queensland agriculture, fisheries and forestry production*, DAFF

The downward trend in traditional beef markets has been offset by emerging new export markets for Queensland beef. The emerging markets include Chile, the Philippines, Russia and China. While these markets currently take lower volumes than Queensland's traditional markets, they still offer significant opportunity.

Crop trends

Figure 3.6 GVP of major crops

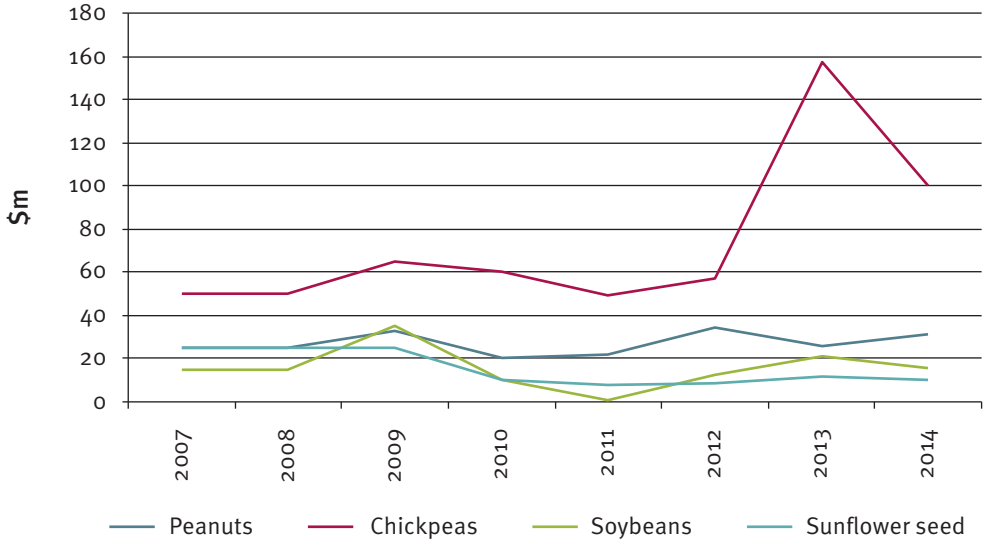


f forecast

Source: *AgTrends Update*, 2014, DAFF

In Queensland, grain sorghum and wheat have been competing as the top grain crop over the past few years. Barley has been a consistent crop in Queensland, but is minor compared with grain sorghum and wheat.

Figure 3.7 GVP of minor crops



Source: *Queensland AgTrends 2012–13: Forecasts and trends in Queensland agriculture, fisheries and forestry production*, DAFF

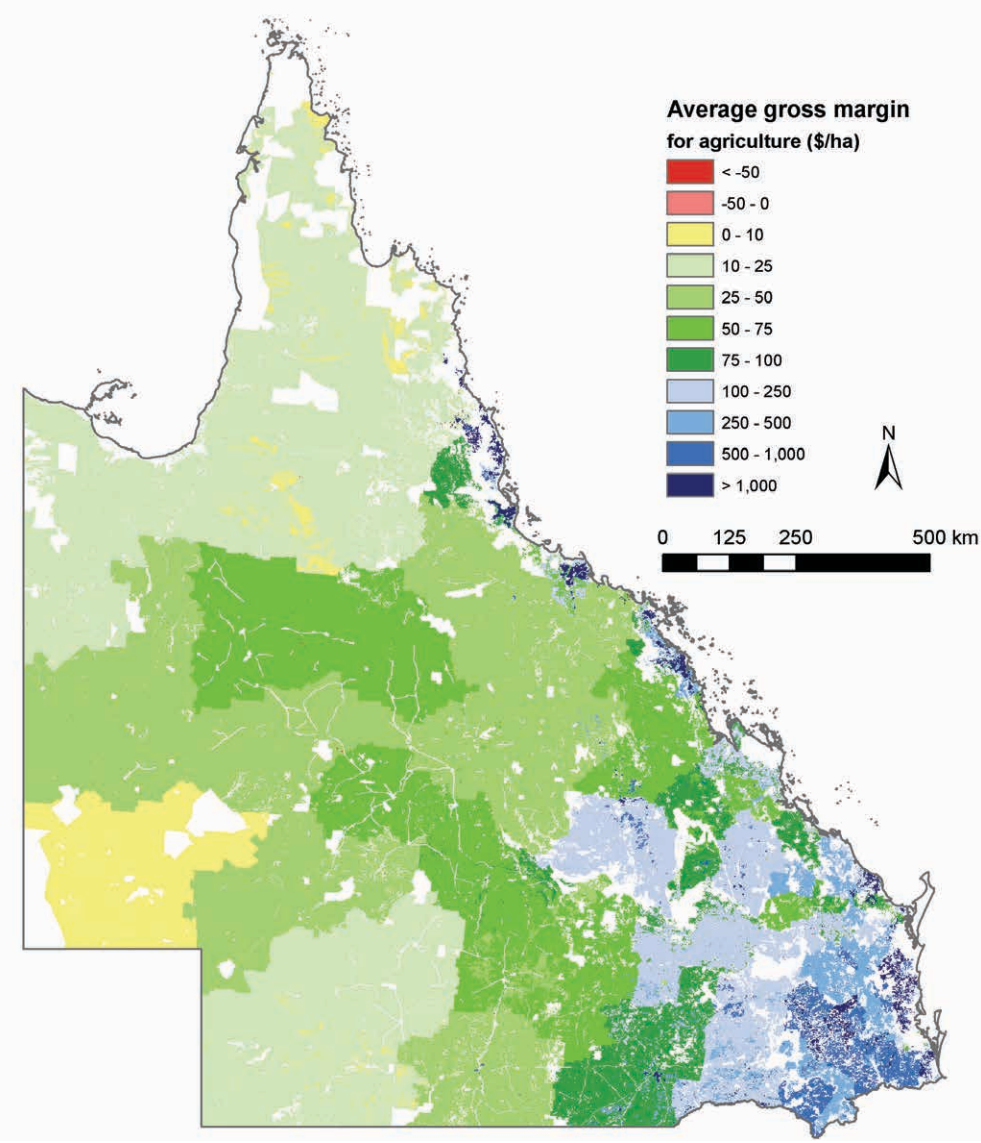
In recent years, chickpeas have emerged to challenge barley as Queensland's third largest cereal grain due to the significantly increased value of chickpeas over the last two years. Peanuts, soybeans and sunflower seed remain constant but are minor crops.

Gross margin

Gross margin is the difference between revenue and directly attributable costs of production for an activity. As such, it is a relatively simple partial measure of profitability at the activity level, before considering the overhead costs. Gross margin is widely used in farm business and financial analysis because of the availability of the required data.

CSIRO has generated a map indicating the average agricultural gross margin on a per hectare basis throughout Queensland. Figure 3.8 shows the generally greater gross margins in the more intensively-farmed, eastern part of Queensland. Data at a local level is available and can be used by producers, their advisers and other analysts for a range of purposes, such as benchmarking individual operations with similar enterprises in a region.

Figure 3.8 Average gross margin for agriculture in Queensland

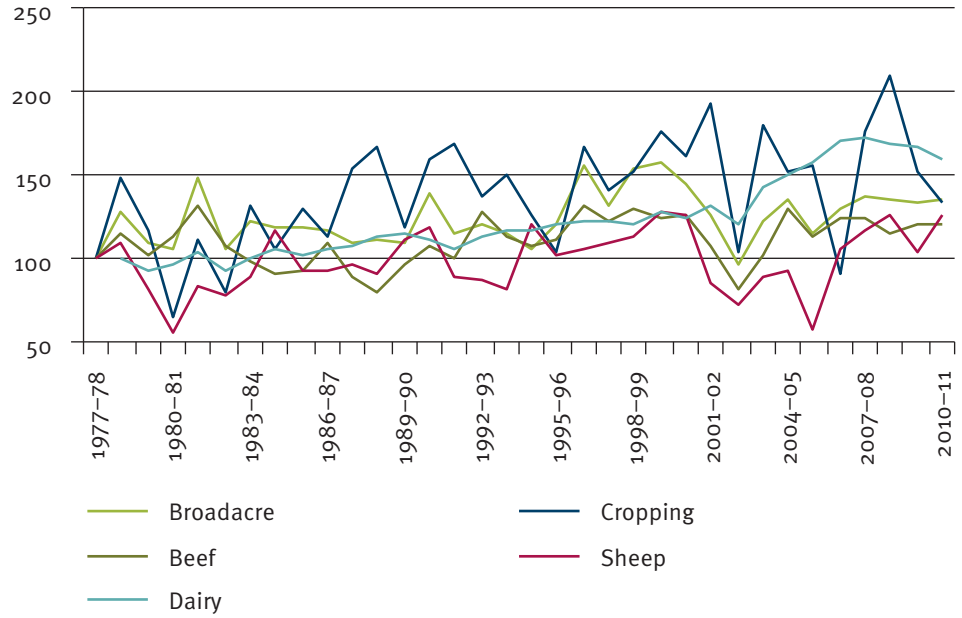


Source: Map of time series average gross margins ($/ha for the state of Queensland – eight observations between 1992–93 and 2010–11), CSIRO. (Dollar values are in 2011 dollars. Artificial borders in the map are caused by the underlying statistical entities to which census data is aggregated as per the ABS.)

Total factor productivity change

ABARES estimates of total factor productivity change (TFP) growth in Australian broadacre agricultural industries are based on ABARES farm surveys which record farm output as well as input use, such as capital, labour, energy, materials and services.[2]

Figure 3.9 Total factor productivity change in Queensland's agricultural industries



Source: ABARES, 2013[3]

Figure 3.9 shows the TFP performance of broadacre industries relative to 1977–78, and dairy industries relative to 1978–79. An upward trend is apparent, although annual rates are highly volatile, largely reflecting factors such as weather.

Table 3.4 Estimates of annual rates of TFP change in Queensland's agricultural industries

	Broadacre (%)	Cropping (%)	Beef (%)	Sheep (%)	Dairy (%)
Average annual TFP growth rates, 1978 to 2011	0.93	0.86	0.57	0.71	1.47
Last 10 years	-0.60	-1.88	-0.43	-0.03	2.46
Last 5 years	3.32	-3.09	1.35	17.29	0.26

Source: ABARES, 2013

2 A detailed description of the estimation methodology and description of inputs can be found in Nossal, K, Zhao, S, Sheng Y & Gunasekera, D 2009, 'Productivity movements in Australian agriculture', *Australian Commodities*, March quarter 09.1, pp206–216.

3 Dahl, A, Leith, R & Gray, E 2013, 'Productivity in the broadacre and dairy industries', *Agricultural Commodities*, vol. 3, no. 1, March quarter, ABARES, Canberra, pp.200–220.

Total factor productivity domestic comparisons

Queensland's average annual broadacre TFP growth of 0.5 per cent from 1978 to 2011 is the second lowest in Australia, only exceeding Tasmania (0.1 per cent). This reflects different industry structures across the states, in particular Queensland's higher reliance on grazing industries which had lower TFP growth than cropping industries.[4]

Table 3.5 Broadacre average annual TFP growth by state, 1977–78 to 2010–11

	Input growth	Output growth	TFP growth
All	-0.9	0.1	1.0
NSW	-1.2	-0.4	0.8
Vic	-1.1	-0.1	1.0
Qld	-0.6	-0.1	0.5
SA	-0.9	0.7	1.6
WA	-0.8	0.8	1.6
Tas	-2.9	-2.9	0.1
NT (beef only)	-0.5	1.1	1.6

Source: ABARES, 2013

Total factor productivity for other industries

Due to differences in data and methodologies, ABARES estimates of TFP are not comparable with estimates from the ABS for other industries. The ABS[5] produces similar estimates (termed multi-factor productivity); however, they are not available at state level and they also incorporate forestry and fisheries.

At the national level, the agriculture, forestry and fishing sector recorded TFP growth of 2.0 per cent per annum, the second highest rate of TFP growth of any industry over the period 1975 to 2010. It was second to the information media and telecommunications sector.[6]

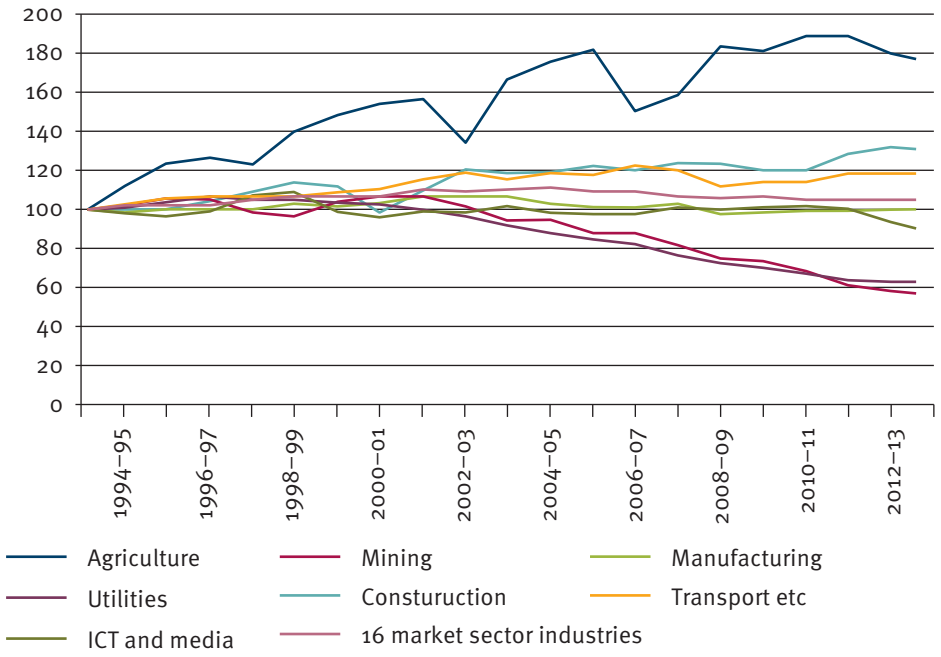
For the more recent period of 1994–95 to 2012–13, agriculture, forestry and fishing recorded the highest rate of TFP growth at 3.0 per cent per annum (see Figure 3.10). This represented the net impact of output growth of 3.0 per cent per annum, declining labour input of 1.2 per cent per annum, and growth in capital inputs of 0.7 per cent per annum. Almost three quarters of the growth in capital was due to investment in buildings and structures.

4 Nossal, K & Sheng, Y 2010, 'Productivity growth: Trends, drivers and opportunities for broadacre and dairy industries', *Agricultural Commodities*, vol. 17, no. 1, March quarter, ABARES, Canberra, pp.216–230.

5 ABS catalogue number 5260.0.55.002

6 http://www.pc.gov.au/__data/assets/pdf_file/0018/118116/11-coag-reform-supplement-chapter10.pdf

Figure 3.10 Total factor productivity by industry, Australia, 1994–95 = 100

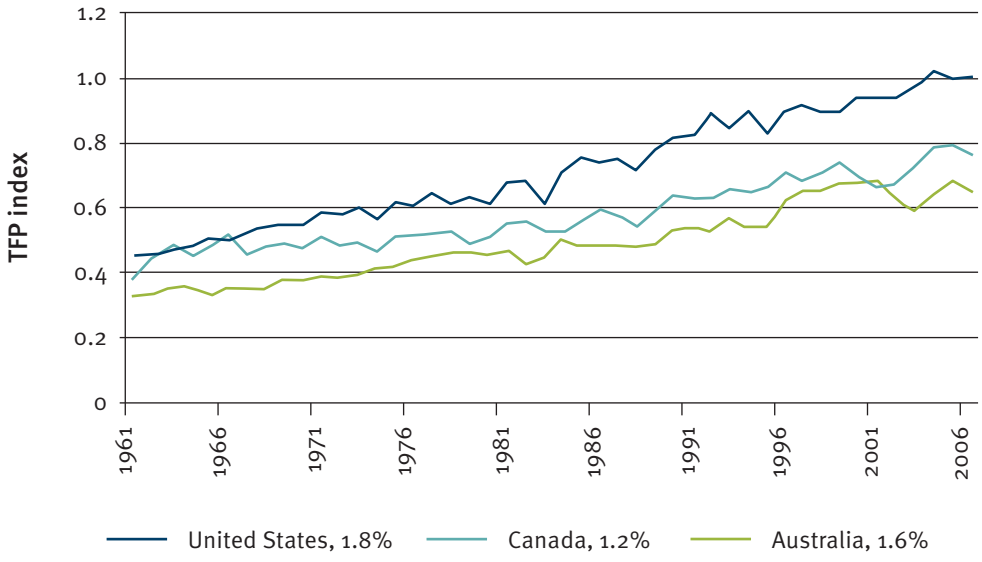


Source: Estimates of industry multifactor productivity 2012–13, ABS 5260.0.55.002

Trends in agricultural TFP are somewhat masked by the effect of variable seasonal conditions, with TFP falling in drought years as output declines proportionally more than inputs. Nevertheless, strong growth in agricultural TFP in Australia is apparent over the decade up to 2005–06. This is broadly in line with, and indeed ahead of, the acceleration of national productivity growth during this period. Agricultural productivity growth appears to have slowed since 2005–06 in line with the national productivity slowdown, taking into account the seasonal influences.

Total factor productivity international comparisons

Figure 3.11 TFP change for Australia, Canada and the USA, 1961–2007



Source: ABARES, 2013

ABARES[7] estimates that while Australia's agricultural TFP is lower than that of the USA and Canada, the rate of growth in Australia is higher than in Canada and only just below the USA's growth rate.

Arguably, Queensland's largest international competitor is Brazil. Studies comparing Australian and Brazilian agricultural TFP directly[8] estimate that Brazil's average annual rate of TFP change over the period of 1970–2001 was 1.4 per cent per annum, whereas Australia's averaged 2 per cent per annum.

Drivers of total factor productivity growth

The main drivers of long-term TFP growth are technological advances and innovation, as well as changes in scale and output mix. These are, in turn, driven by competition (including a conducive regulatory environment), human capital, investment both on and off the farm (including infrastructure), and scientific progress.

Mullen (2007)[9] found a strong link between investment in agricultural research, development and extension (RD&E) and TFP growth, with lags of up to 35 years. Evaluations of rural R&D projects typically show high average rates of return, with benefit-cost ratios of around 6:1.[10] These benefits are widely distributed across the supply chain, with studies suggesting that consumers are the main beneficiaries of rural RD&E.[11]

While these studies can suffer from attribution problems it is clear that on average RD&E is a worthwhile investment for society, and there is no evidence that these returns are falling over time.

7 Sheng, Y 2013, 'Comparing agricultural total factor productivity across countries: The case of Australia, Canada and the United States', paper presented at *Australian Agriculture and Resource Economics Society conference*, Sydney, 5-8 February, http://www.aares.org.au/aares/documents/2013AC/Presentations/Sheng.pdf

8 Rao, P, Coelli, T & Alauddin, M 2004, 'Agricultural productivity growth, employment and poverty in developing countries: 1970–2000', *Employment Strategy Papers*, University of Queensland, Centre for Efficiency and Productivity Analysis, School of Economics, Brisbane.

9 Mullen, JD 2007, 'Productivity growth and returns from public investment in R&D in Australian broadacre agriculture', *Australian Journal of Agriculture and Resource Economics*, journal 51, pp.359-384.

10 Successive RD&E evaluations conducted by the Rural Industries R&D Corporation (RIRDC).

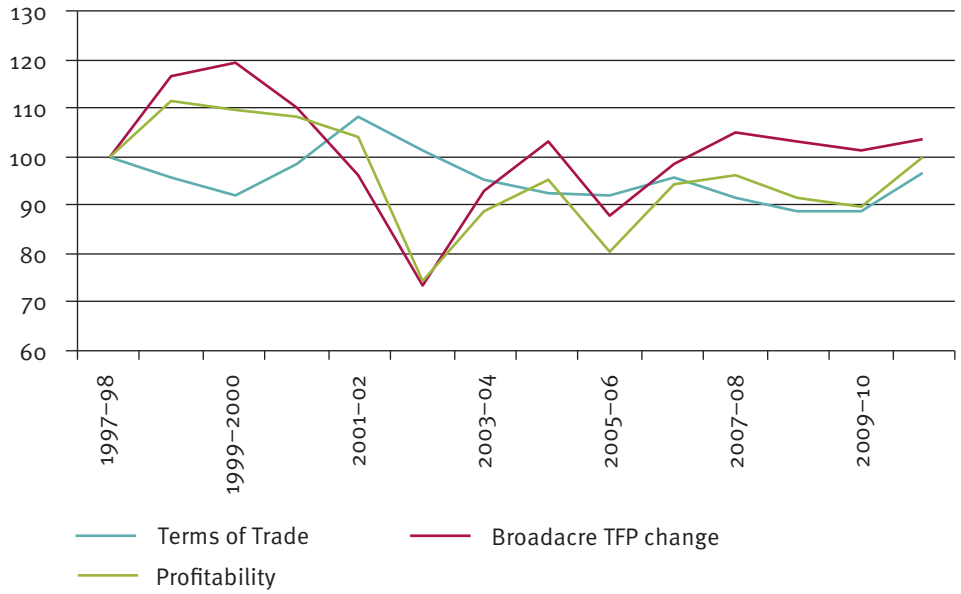
11 Zhao et al, *The incidence of gains and taxes associated with R&D and promotion in the Australian beef industry*, Department of econometrics and business statistics, Monash University, working paper 16/2002

Profitability

While it can be argued that a producer's goal tends to be profitability rather than productivity, changes in productivity can impact on profitability. Since TFP is the ratio of output quantities to input quantities, and terms of trade means the ratio of output prices to input prices, profitability change can be calculated as the product of an index of TFP change and an index of terms of trade.

ABARES only provides estimates of terms of trade for Australia as a whole, and only for the total broadacre industry. However, using the assumption that prices do not vary significantly across Australian states, estimates of profitability change for the Queensland broadacre industry are presented in Figure 3.12. These estimates show the high variability of profitability, but little trend change.

Figure 3.12 TFP, terms of trade and profitability change, 1998–2011, 1997–98=100



Source: ABARES, 2013

Farm financial performance

Table 3.6 shows overall farm financial performance data for Queensland broadacre industries from the latest ABARES farm surveys.

The data shows average farm business equity at just under $4 million. This figure has fallen significantly due to falling land prices post the global financial crisis (GFC). The 2013–14 dry season has depressed receipts, and therefore incomes significantly, resulting in negative farm business profits. As a result, the proportion of farms with low equity ratios has increased.

This pattern is broadly similar across the grains, sheep, beef and dairy industries. ABARES has also provided data for the vegetable industry to 2012–13. Average farm cash incomes have been slightly higher in the dairy and vegetable industries ($114 000 and $162 000 respectively on average since 2007–08) than in the beef industry ($68 000).

An estimated 11 per cent of Queensland broadacre farms had low equity and a high interest burden in 2013–14, up from 9 per cent in 2012–13 and 5 per cent in 2011–12. Table 3.7 shows the industry and regional breakdown of these indicators. Of particular note are the relatively low proportion of dairy farms with low equity/high interest, and the very high proportion of farms in the Central North and Charleville/Longreach regions with low equity/high interest.

Table 3.6 Farm financial performance, Queensland broadacre industries

		Average for five years to 2011–12	Preliminary estimate 2012–13	Provisional estimate 2013–14
Farm financial performance				
Total cash receipts	$	**390 402**	**366 166**	**325 608**
Total cash costs	$	**306 378**	**274 241**	**286 201**
Farm cash income	$	84 024	91 925	39 407
Cash operating margin	%	22	25	12
Farms with negative farm cash income	%	29	33	33
Farm business profit	$	20 672	-5 036	-77 682
Rate of return to total capital used	$	1.2	0.8	-0.7
Rate of return to total capital used, including capital appreciation	$	-0.3	-0.9	n/a
Total capital value at 30 June	$	**5 882 616**	**4 854 235**	**n/a**
Net capital additions	$	44 014	-18 060	n/a
Farm business debt and equity				
Farm business debt at 30 June	$	612 243	562 017	586 281
Farms with less than $10 000 debt	%	40	40	43
Farm business equity at 30 June	$	4 990 000	4 134 138	3 974 079
Equity ratio	%	89	88	87
Interest paid to receipts ratio	%	11	11	12
Farms with high debt servicing costs and low security for further borrowing				
Farms with interest to receipts ratio over 15%	%	25	24	26
Farms with less than 70% equity ratio	%	6	10	12
Farms with high interest to receipts and low equity	%	5	9	11

Source: *Australian Agricultural and Grazing Industries Survey*, ABARES

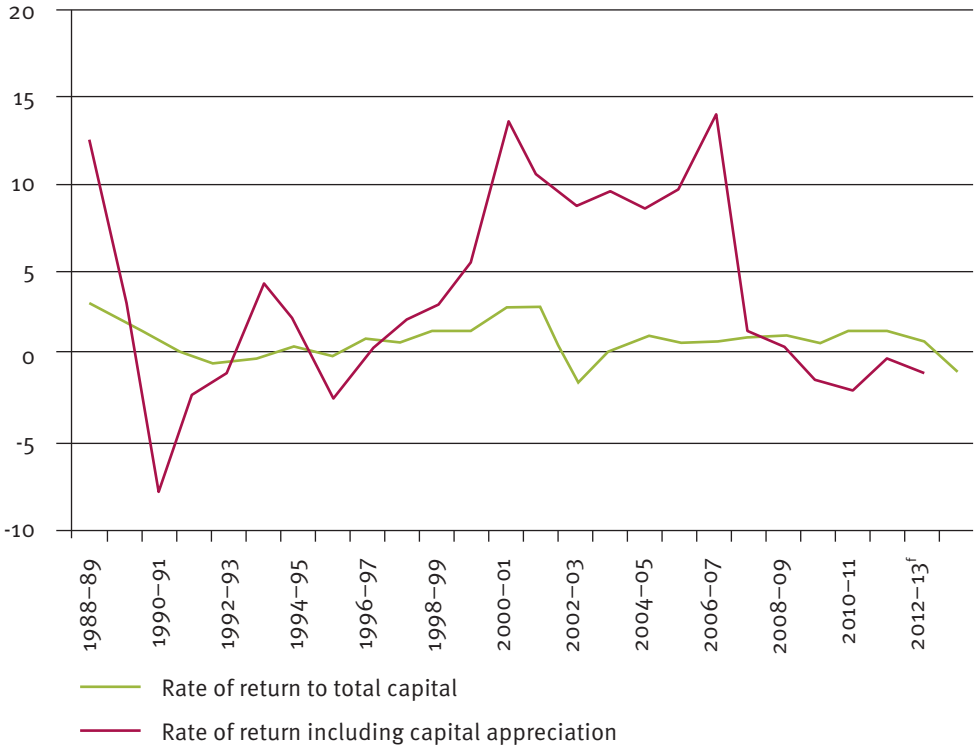
Table 3.7 Farm incomes and business equity

Industry	Farm cash income ($)		Farm business equity ($)		Proportion with low equity and high interest (%)	
	2012–13	2013–14	2012–13	2013–14	2012–13	2013–14
Grains	179 129	31 833	3 807 265	3 682 840	7	13
Sheep	74 824	76 280	2 977 259	2 842 110	11	11
Beef	67 010	38 938	4 319 171	4 163 692	9	11
Total of above	91 925	39 407	4 134 138	3 974 079	9	11
Dairy	80 925	80 133	2 621 120	2 571 282	3	2
Vegetables	130 000					
Region						
Cape York/Gulf of Carpentaria	86 676	55 313	6 369 774	6 259 787	8	8
West/South West	335 262	53 741	5 144 678	4 955 954	6	7
Central North	125 533	- 34 077	5 424 055	5 198 283	31	32
Charleville/Longreach	124 760	73 058	4 668 068	4 255 626	29	34
Eastern Darling Downs	67 153	15 267	2 665 399	2 487 839	4	6
Darling Downs/Central Highlands	118 490	45 314	5 056 895	4 892 714	6	10
South Queensland Coastal	17 413	50 105	3 535 894	n/a	5	5
North Queensland Coastal	18 543	48 881	3 273 123	n/a	3	3

Source: *Australian Agricultural and Grazing Industries Survey*, ABARES

Figure 3.13 shows the percentage rates of return for average Queensland broadacre farms since 1988–89; indicating that rates of return are sensitive to seasonal conditions. There is a positive rate of return before capital appreciation in most years. A pre-GFC land price bubble is evident between 2000–01 and 2007–08, due to high rates of return (including capital appreciation) during those years.

Figure 3.13 Percentage rate of return for average Queensland broadacre farms (excluding and including capital appreciation) from 1988–89 to 2013–14

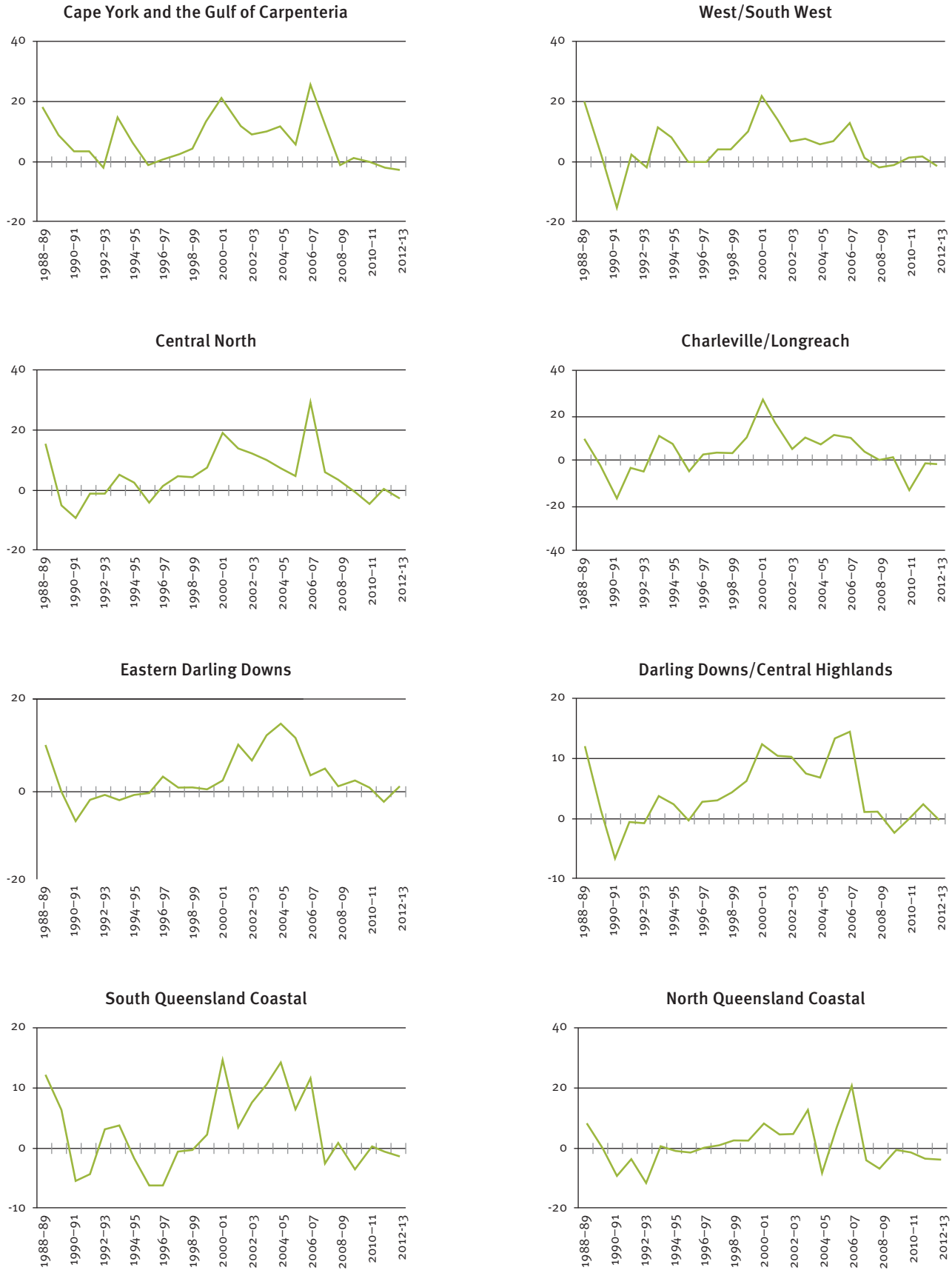


f forecast

Source: *Australian Agricultural and Grazing Industries Survey*, ABARES

Figure 3.14 shows a regional break-down of the rate of return including capital appreciation. The mid-2000s land price bubble was evident in all regions of Queensland (which is not surprising as it was a global phenomenon); equally the adjustment through low returns since the GFC is also evident in all regions.

Figure 3.14 Percentage rate of return (including capital appreciation) for Queensland regions



Source: *Australian Agricultural and Grazing Industries Survey*, ABARES

While ABARES does not publish data on the most successful farms in individual Australian states, it does publish data for Australia as a whole. The top 25 per cent of farms ranked by their rate of return to capital[12]:

- achieved consistently higher rates of return—5.9 per cent on average over the last 20 years, compared with 1.1 per cent for all broadacre farms
- produced 54 per cent of the sector's output over the three years ending 2011–12
- accounted for 64 per cent of net capital additions on farms over the three years to 2011–12.

The top 25 per cent of farms ranged in size, industry, ownership structure and region, suggesting there is scope for many farms in Australia to improve their performance.

Farm management deposits

Farm management deposits (FMDs) are issued on behalf of the Australian Government to help farmers handle the variability of farm returns and particularly to help them prepare for drought.

As at March 2014, Queensland farmers held 7857 FMDs worth $686 million, representing 21 per cent of the national total.

The highest levels of holdings were among beef producers ($207 million), followed by horticulture ($109 million) and sugar ($102 million).

The value of FMDs increased slightly among Queensland farmers, up by 1.7 per cent over the year to March 2014.[13] This is consistent with the view that FMDs help farmers manage their individual circumstances regardless of industry fluctuations.

Government assistance

The Australian Government's Productivity Commission estimated the net value of all government assistance to Australian primary industries in 2011–12 at $1.576 billion, with a further $1.318 billion contributed to food manufacturing. The effective rate of assistance (net assistance as a proportion of unassisted value added) for manufacturing as a whole is 4.1 per cent and 3.3 per cent for both primary industries and food manufacturing.

Budget outlays ($891 million) and tax concessions ($548 million) provided most of the assistance for primary industries, whereas most assistance for food manufacturing arrived in the form of net tariff protection ($1.212 billion).[14]

12 *Agricultural Commodities*, December 2013, ABARES

13 *Farm Management Deposits Statistics*, Australian Department of Agriculture

14 *Trade and Assistance Review 2011–12*, Productivity Commission. (Net tariff protection is the gross benefit an industry receives from tariffs on competing imports minus the cost of tariffs on imported and import-competing inputs.)

In Australian primary industries the highest effective rates of assistance were for forestry and logging (7.2 per cent) and horticulture (3.5 per cent).

Effective rates of assistance have declined significantly over the years, down from 5.9 per cent in 2006–07 for primary industries. The largest falls during that period were recorded for dairy cattle farming (from 12.5 per cent down to 1.8 per cent) and fishing and aquaculture (from 12 per cent down to 3.3 per cent).

From a longer-term perspective, effective rates of assistance for both agriculture and manufacturing have fallen since the early 1970s, with assistance to manufacturing falling to around the same level as agriculture since the mid-1990s.

Government support for Australian farmers is low by international standards. The OECD estimates the producer support equivalent for Australian farmers at 2.7 per cent in 2012, compared with the OECD's average of 18.6 per cent. International support for farmers has also been falling, down from 30.6 per cent in 2002. Only New Zealand (0.8 per cent) and the Ukraine (1.3 per cent) had lower support for farmers in 2012.[15]

Low levels of assistance have forced Australian farmers to be more innovative and competitive, which has strengthened productivity growth in the sector.

This support is delivered at both the federal and state level. Queensland Government assistance is largely provided in the form of drought assistance, estimated to be worth $31 million in 2013–14; which is a nominal rate of assistance of around 0.4 per cent. However, the Queensland Government also provides substantial support for the sector through other means, such as research, development and extension, biosecurity, and fisheries management.

15 Agricultural Policy: Monitoring and Evaluation 2013, OECD

Rural debt

Farmers take on debt to finance investment in land, equipment and structures. They also take on debt to help them through what they hope will be temporary downturns. Whether trends in rural debt are considered 'good' or 'bad' is dependent on which motive is dominating, whether any current downturn is in fact temporary, and on likely movements in interest rates.

Figure 3.15 shows rural debt as a share of agricultural output. There was a trend increase in debt levels over the 30 years prior to the GFC, with an acceleration around 2003 that coincided with increased capital investment. Since the GFC however, debt levels have declined back towards the pre-2003 trend.

Figure 3.15 Rural debt as a percentage of annual agricultural production in Australia

Sources: Reserve Bank of Australia 2014; *Australian national accounts*, ABS, cat. no. 5206.0

Debt levels tend to be higher among the better performing farms, suggesting that the investment motive is dominant. Approximately 11 per cent of Queensland broadacre farms have a high interest payment to receipt ratio and low equity, up 5 per cent from two years prior. This suggests that the overwhelming majority of farmers do not have debilitating debt and only a small proportion of farmers have debt problems. More detailed data on the distribution of debt is only available to 2012. This shows that, as at 30 June 2012, 56 per cent of Queensland broadacre farms had less than $100 000 in debt, and 72 per cent of farms had equity ratios exceeding 90 per cent. The figures for Queensland dairy farms were similar at 49 per cent and 78 per cent respectively. These figures are slightly higher than the Australia-wide average at that time for broadacre farms and are significantly higher for dairy farms.[16]

In the medium term however, the relatively benign environment for rural debt of recent years is likely to deteriorate. This reflects a likely decline in commodity prices from relatively high levels, as well as a rise in interest rates from currently very low levels.

16 Australian farm survey results 2010–11 to 2012–13, ABARES, Canberra

Rural debt is defined as the total indebtedness of all farmers/rural enterprises throughout Queensland, where the servicing of rural debt relies primarily on rurally-generated income.

Debt was mainly sourced through commercial credit providers such as major trading banks and their financial subsidiaries and specialist rural debt agencies and institutions.

Size

The 2011 Rural Debt Survey by the QRAA found significant diversity in rural debt, both in industry sectors and locality, due to the geographical size of Queensland. The survey identified $16.976 billion of rural debt in Queensland, with an average debt per borrower of $1.073 million. These figures are current as at 31 December 2011.

The survey identified a 19 per cent increase in rural debt between 2009 and 2011, with an increased average debt per borrower of 17 per cent over the same period.

Table 3.8 Rural debt movement, 2009 to 2011

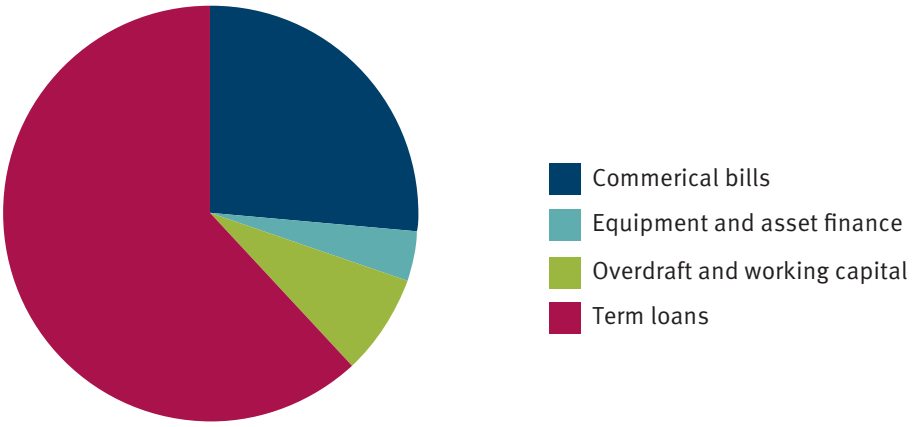
Amount ('000)	2009	2011	Movement ($)	Movement (%)
Total debt ($)	14 308 873	16 976 301	2 667 428	19
Number of borrowers	15 540	15 822	282	2
Average debt per borrower ($)	921	1073	152	17

Sources: *2011 Rural Debt Survey*, QRAA, page 7

Loan type

The 2011 survey was the first time that the types of loan facilities held by borrowers were released by financiers. This information is critical for highlighting that the majority of the $16.9 billion debt held in 2011 by rural borrowers was for term loans (63.3 per cent), with commercial bills (27.1 per cent), overdrafts and working capital (7.8 per cent) and equipment and asset finance (1.7 per cent) making up the rest of the total debt.

Figure 3.16 Rural debt by loan type



Source: *2011 Rural Debt Survey*, QRAA, p10

Debt by industry

In 2011, analysis of debt levels by industry indicated that the beef industry (54.1 per cent) remains the largest contributor to overall rural debt in Queensland. This was followed by the cotton industry (7.7 per cent), grain and grazing (6.8 per cent) and grain (6.5 per cent). All of these industries combined, make up more than three quarters of the total debt.

Table 3.9 Rural debt survey

Industry		Total debt ($000)	Number of borrowers	Average debt per borrower ($000)
Beef	2009	7 832 637	5 658	1 384
	2011	9 178 477	6 499	1 412
	Movement (%)	17	15	2
Wool	2009	88 868	106	840
	2011	96 677	152	636
	Movement (%)	9	44	-24
Cotton	2009	954 034	382	2 498
	2011	1 305 935	361	3 618
	Movement (%)	37	-5	45
Sugar	2009	845 851	2 038	415
	2011	976 030	1 742	560
	Movement (%)	15	-15	35
Grain	2009	937 686	706	1 328
	2011	1 098 885	826	1 330
	Movement (%)	17	17	0
Dairy	2009	266 084	434	613
	2011	237 420	452	525
	Movement (%)	-11	4	-14
Grain and grazing	2009	865 496	969	893
	2011	1 160 728	1 140	1 018
	Movement (%)	34	18	14
Horticulture – tree crops	2009	577 442	752	767
	2011	590 035	779	757
	Movement (%)	2	4	-1
Horticulture – vegetables	2009	500 603	762	657
	2011	595 624	707	842
	Movement (%)	19	-7	28

Industry		Total debt ($000)	Number of borrowers	Average debt per borrower ($000)
Intensive livestock	2009	436 072	435	1 002
	2011	471 642	495	953
	Movement (%)	8	14	-5
Commercial fishing (marine fishing)	2009	151 041	336	449
	2011	140 904	280	503
	Movement (%)	-7	-17	12

Source: *2011 Rural Debt Survey*, QRAA

The largest increase in the amount of debt held from 2009 to 2011 was in the beef industry, which increased by over $1.3 billion. This included an increase in the number of borrowers and a slight increase in the average debt held by those borrowers.

Fisheries catch, effort and licences

Commercial fishing is forecast to be worth $250 million in 2013–14, including fisheries targeting crustaceans, molluscs and finfish, which is 8 per cent lower than the five-year average. Approximately $184 million is expected to be derived from state-managed fisheries and $66 million from federal-managed fisheries in Queensland.

In Queensland's conservatively-managed fisheries, commercial catch closely follows fishing effort which, in turn, is strongly influenced by the number of licensed fishers (see Figure 3.17). Nevertheless, the relationship between catch and effort is not stable because productivity growth in fishing often takes the form of 'effort creep'—which means increasing catch per unit of effort over time. This represents an ongoing challenge in managing fisheries.

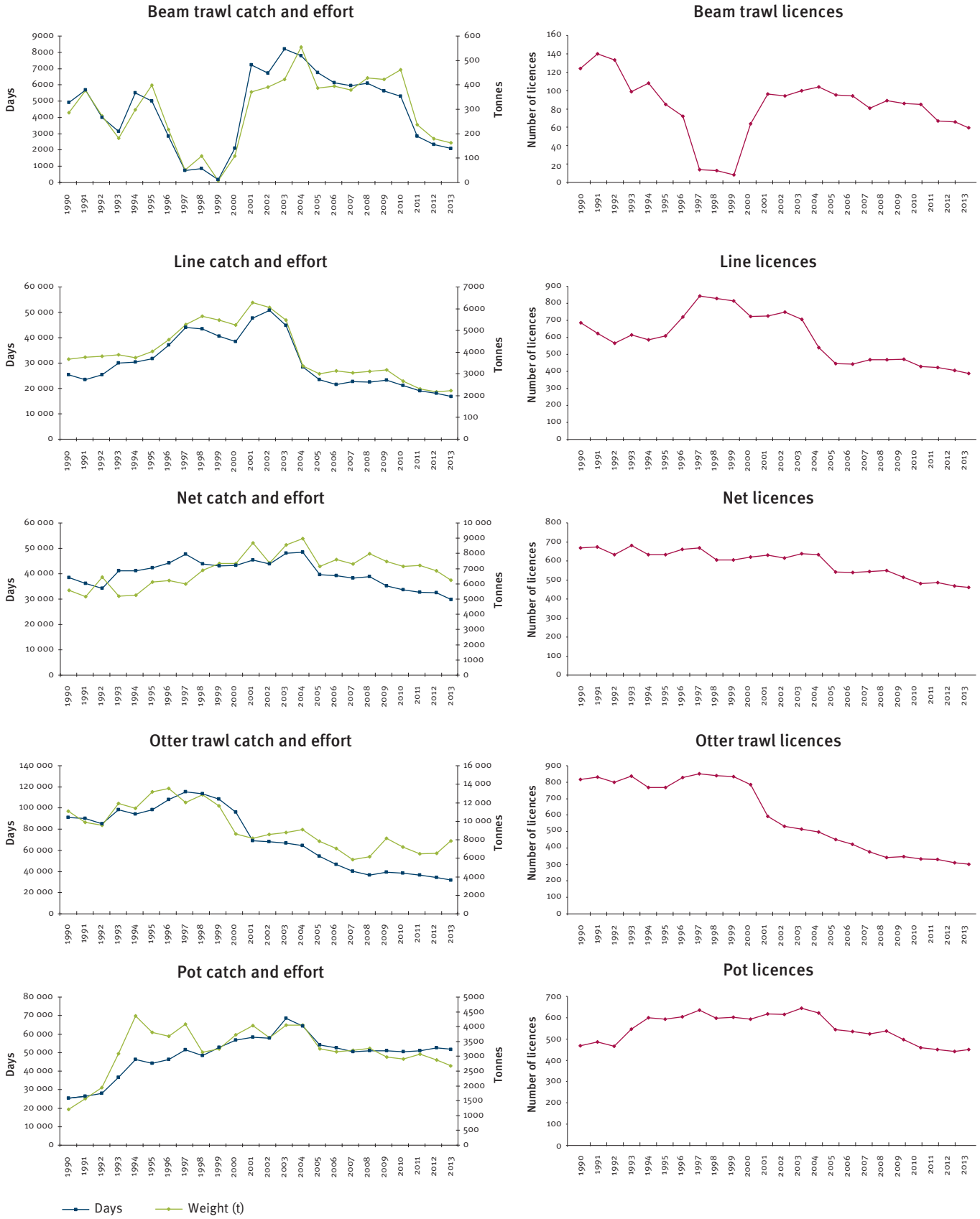
An abrupt decline in catch, effort and licences for some fisheries in the early 2000s reflected the establishment of a Great Barrier Reef Marine Park Zoning Plan, which excluded fishing from certain areas and included a structural adjustment scheme to avoid displaced effort.

Fisheries stock status

As at 2012, 75 Queensland-managed stocks were assessed—65 east coast stocks and 10 Gulf of Carpentaria stocks. Of those assessed, 31 were considered sustainably fished:

- Snapper was the only stock considered 'overfished' against the criteria, whereas three stocks were not fully utilised.
- Remaining stocks were 'uncertain' or 'undefined', reflecting a lack of data rather than sustainability concerns.
- Coral trout and blue swimmer crab moved from 'sustainably fished' in 2011 to 'uncertain' in 2012 due to depressed catches and catch rates.

Figure 3.17 Fisheries catch and effort



Source: DAFF

Table 3.10 Fisheries stock status assessments

Category	Definition	Stocks in category
Not fully utilised	Resource is underutilised and has the potential to sustain harvest levels higher than those currently being taken.	Spanner crab, redthroat emperor (east coast), trochus
Sustainably fished	Harvest levels are at, or close to, optimum sustainable levels. Current fishing pressure is considered sustainable.	Barramundi (east coast and Gulf), yellowfin bream, balmain bugs, Moreton Bay bugs, mud crab (Gulf), three-spot crab, grey mackerel (east coast), eel, dusky flathead, Spanish mackerel (east coast and Gulf), spotted mackerel, banana prawns, eastern king prawns, endeavour prawns, northern king prawns, tiger prawns, saucer scallop, white teatfish (sea cucumber), sea mullet, stripey snapper, tailor, blue threadfin (east coast and Gulf), tropical rock lobster, sand whiting, stout whiting
Uncertain	There are inconsistent/contradictory signals in the information available that preclude determination of exploitation status with any degree of confidence.	Blue-swimmer crab, coral trout (east coast), mud crab (east coast), red emperor (Gulf), grey mackerel, (Gulf), pearl perch, crimson snapper (Gulf), saddletail snapper (Gulf), king threadfin (Gulf)
Undefined	Some information is available but no reasonable attempt can been made to determine exploitation status at this time. This may be due to the need for additional information or analyses to adequately determine stock status against the criteria.	Amberjack, blue eye trevalla bonito, cobia, cuttlefish, grass emperor, red emperor (east coast), spangled emperor, groper, javelin (east coast and gulf), yellowtail kingfish, red champagne lobster, school mackerel, shark mackerel, mahi mahi, octopus, coral prawn, greasyback prawn, school prawn, bar rockcod, mud scallop, burrowing blackfish, sharks, crimson snapper (east coast), goldband snapper, hussar snapper, rosy snapper, saddletail snapper (east coast), pencil squid, teraglin, king threadfin (east coast) trevally, tuskfish
Overfished	Harvest levels may be exceeding sustainable levels and/or yields may be higher in the long term if the effort levels are reduced. The stock may still be recovering from previous excessive fishing pressure. Recovery strategies will be developed for all overfished stocks to reduce fishing pressure within prescribed time frames.	Snapper

Source: Stock status assessments, DAFF, http://www.daff.qld.gov.au/fisheries/monitoring-our-fisheries/data-reports/sustainability-reporting/stock-status-assessments

Fisheries export accreditation

Nineteen Queensland fisheries are accredited as being sustainably managed under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), permitting export of product. To maintain export approval, the Department of Environment requires certain conditions to be actioned within a specified time frame. If these conditions are not met the Department of Environment can withdraw the accreditation.

Table 3.11 Export accreditation for Queensland fisheries

Fishery	Current accreditation expires
East Coast Bêche-de-mer	17 Jul 2014
Stout Whiting Trawl	15 Aug 2014
Gulf of Carpentaria Inshore Fin Fish	20 Nov 2014
Marine Aquarium Fish	25 Nov 2014
Pearl	20 Jan 2015
Mud Crab	20 Feb 2015
East Coast Inshore Fin Fish	27 Feb 2015
River & Inshore Beam Trawl	10 Apr 2015
Trochus	3 Jun 2015
Coral Collection	26 Jun 2015
Blue Swimmer Crab	14 Oct 2015
Gulf of Carpentaria Fin Fish	25 Nov 2015
Tropical Rock Lobster	17 Dec 2015
Coral Reef Fin Fish	6 May 2016
East Coast Otter Trawl	25 Nov 2016
Gulf of Carpentaria Line	24 Nov 2016
Spanner Crab	1 Feb 2017
East Coast Spanish Mackerel	14 Jul 2017
Eel	17 Apr 2019

Case study

Coral trout fishery

Commercial coral trout fishing can be a lucrative business as the species is highly regarded by international consumers who are prepared to pay a premium due to its superb eating qualities. The fishery has evolved from producing frozen product in the 1980s to targeting the modern, high-value, Asian live fish market.

It is managed as part of Queensland's Coral Reef Fin Fish Fishery (CRFFF) which extends from the tip of Cape York to the Queensland – New South Wales border, although much of the coral trout fishing occurs in the Great Barrier Reef Marine Park.

The fishery is primarily managed through:

- a limited number of licences (367)
- an overall quota of 1088 tonnes that is divisible and transferable
- minimum size limits for fish
- seasonal spawning closures
- technical restrictions on boat size
- numbers of fishing tenders
- numbers of lines and hooks.

Commercial fishing for coral trout generally occurs out of tenders (small vessels) operating from a primary vessel and using a hook and line fishing method. However the types of businesses operating in the fishery are very diverse, given the variety of vessel sizes, numbers of tenders, fishing trip length, amount of quota owned or leased, and how crew are employed and paid. These factors all affect the level of return for the business owners.

CSIRO led a unique, in-depth project to investigate the CRFFF after it identified a need to improve understanding about the economics, business profiles and management strategy for the fishery's ongoing viability. The project was part of a broader management strategy evaluation funded by the Fisheries Research and Development Corporation.

A unique survey was conducted to provide the most up-to-date and comprehensive understanding of the economic characteristics of the fishery. The CSIRO economic survey estimated the gross value of the CRFFF at $44 million, of which $36 million can be attributed to live coral trout, and the remaining to 'dead' coral trout and other coral reef finfish. These figures are based on the 2010–11 financial year.

Analysis of the business profiles found that fishing businesses are clearly differentiated into three groups based on similar vessel characteristics and activity profiles.

- Group 1—Two thirds of businesses in the fishery operated smaller boats under 10 metres in length, and landed 20 per cent of coral reef finfish which primarily ended up as frozen produce.
- Group 2—One quarter of businesses focused on live coral trout and contributed to three quarters of the total harvest in the CRFFF, operating larger boats of around 15 metres and expending a high level of fishing effort in the fishery.
- Group 3—This group comprised diversified businesses operating within a range of fisheries where coral reef finfish are a small component of the landings.

Quota ownership is also an important point of diversification between businesses. A key finding of the survey indicated that 42 per cent of the quota was owned by investors who lease the quota out to fishers, while lease-dependant businesses held only 11 per cent of the quota but harvested more than two thirds of coral trout landed by the fishery.

Quota ownership structure will greatly influence the level of inherent risk and response by businesses to externally driven changes in the operating environment. Overall, industry-wide changes may generate different responses from different businesses, which also explains the variety of perspectives in relation to the future management of the fishery (particularly quota for coral trout).

Similarly, whether fishing vessels are operated by their owners or a hired skipper is a key distinction that is instrumental to the ongoing viability of businesses during tough economic conditions. This was evident in how businesses responded to reduced harvest levels caused by Tropical Cyclone Hamish in 2009 and Yasi in 2011, which caused extensive damage to reef off Cairns to Gladstone.

Owner-operators were able to offset the adverse impacts of the cyclone by temporarily adjusting their returns to labour downward in order to remain viable. In contrast, businesses that had chosen to operate with hired skippers were more limited in the adjustments they could make to skipper remuneration and levels of returns on investment, with the risk of losing skilled employees.

This high diversity in businesses operating in the CRFFF is an important consideration when developing regulatory frameworks, as the businesses are impacted differently by external factors that erode profitability and subsequently, short- and long-term economic viability. This calls for flexibility, adaptability and responsiveness in the regulatory framework.

The diversity also influences the flow-on effects of incentives for business investment in the fishery, and for individual businesses to support alternative approaches aimed at restoring the overall economic health of the fishery. The detailed investigative approach and knowledge gained can be applied to various primary industries in Queensland, based on their ability to respond to external factors such as drought and related assistance and preparedness programs, uptake best management practices, and operate within regulatory frameworks. Increasing understanding of businesses across the sector will guide the delivery of policy and initiatives which provide the framework for growth and profitability into the future.

Forestry

Queensland harvests around 2.5 million cubic metres of log timber (softwood and hardwood) each year. Most of this annual harvest is processed by Queensland's primary timber processing sector.

Around 80 per cent of this volume is sourced from Queensland's privately-owned timber softwood and hardwood plantation estates of approximately 250 000 hectares. The remaining amount is sourced from state and privately-owned native forests (estimated at more than 10 million hectares).

The forecast value of forestry and logging in Queensland in 2013–14 is $175 million, which is an increase of 2 per cent over the average of the previous five years.

Timber and wood processing

Queensland has a diverse timber and wood product processing and manufacturing sector that predominantly processes locally-grown plantation softwood, but also hardwood and cypress softwood from native forests. The sector, particularly the secondary processing sector, is increasingly using imported sawn timber from overseas and interstate producers.

The sector includes primary processing activities that transform log timber into a range of products using sawing, veneering and chipping processes, as well as secondary processing or manufacturing activities that transform the output of the primary processing sector into a range of more complex timber-based and paper-based products.

Primary processing plants range from large-scale, fixed location sawmills or plants producing veneered products, woodchips or reconstituted timber and panel products, through to small, portable or 'mobile' sawmills operating within forests.

The number of primary processing plants in Queensland (and Australia) has fallen significantly over the last decade. The former Queensland Department of Primary Industries and Fisheries identified 222 licensed 'fixed location' sawmills (under the now repealed *Sawmills Licensing Act 1936*) in Queensland in 2001–02.

This is in comparison to the 100 primary processing plants in Queensland reported by ABARES in 2012, which represent about 26 per cent of all primary processing plants in Australia. Although this data should be interpreted cautiously, given the differences in data collection processes, both provide a strong indication of a significant consolidation in Queensland sawmilling over the last decade.

The forecast value of log sawmilling, timber dressing, and plywood and veneer manufacturing in Queensland in 2013–14 was $361 million, which is an increase of 2 per cent over the average of the previous five years.

In 2011–12, wood product manufacturing as a whole—which includes sawmills as well as processing and fabrication operations—employed 9865 people in Queensland. This figure was down 4.3 per cent on the previous year. Total industry turnover was $2.6 billion, down 10.6 per cent on the previous year; in line with declining residential construction during that year.

Food processing

Processed food is any food that has been transformed from its raw form.

Primary food processing begins with whole raw products in their natural state. It then transforms them either into a finished product ready for consumption, an ingredient, or an unfinished product that will be processed further. These foods are simple, that is, they have not yet been mixed with other ingredients.

Secondary food processing further transforms primary processed foods in one or more ways to create a different finished food or ingredient. These foods are still simple in that they have not yet been mixed with other ingredients.

Composite food begins with a mix of primary and/or secondary processed foods and/or food ingredients and combines them to make an elaborate food product.

The following table provides examples of various foods at each stage of processing. These food products can be fresh, frozen, cooked, packaged or unpackaged.

Table 3.12 Processed food stages (primary, secondary, composite)

Live	Minimally transformed	Substantially transformed	Elaborately transformed
Whole live product	**Primary processed**	**Secondary processed**	**Composite food**
Cattle, chickens, pigs, goats, fish and seafood	Farm animal and poultry carcase, scaled fish, shelled or chilled seafood	Meat and poultry cuts, mince, bones for stock, trimmed offal	Burgers, sausages, pies, stews, soups, sauces, ready to eat meals, pet food Pet foods
Sugar cane	Sugar cane juice	Sugar, molasses, treacle, refined cane juice	Toppings, jam, confectionery, cakes, biscuits, desserts, drinks
Fruit, vegetables and herbs	Washed/frozen dried fruit, rinds, vegetables and herbs	Sliced/juiced/diced/dried/ peeled/pitted fruit and vegetables	Soups, pies, ready to eat meals, jams, herb pastes, prepared salads
Grains, seeds and nuts	De-husked whole grains, seeds and nuts	Flour, precooked/rolled/ puffed grain, bran and germ, oil, milk, stock feed	Bread, biscuits, cakes and cake mix, thickeners, cereal, health bars
Milk	Pasteurised/skimmed/ homogenised milk	Cream, butter, cheese, yoghurt, buttermilk	Custard, yoghurt, desserts, drinks, ice-cream, snacks, ready to eat meals

There are approximately 1200 food and beverage processing businesses in Queensland. In terms of size, the majority (95 per cent) of these businesses are either classified as micro or small (employing under 20 staff) or medium (employing under 200 staff), while the remaining 5 per cent are larger businesses. The larger businesses include multi-nationals specialising in a range of sectors, such as beef, sugar, beverage and food ingredient processing. Many of these large businesses are foreign-owned and are part of global supply chains.

Queensland's industry ranges from producers of fresh, natural and organic products to producers of manufactured foods, such as ready-made meals, confectionery, beverages, additives and nutritional supplements. The industry is supported by Queensland's extensive agriculture industry, including beef, seafood, grains, fruit and vegetables.

In Queensland, the food and beverage processing sector is the largest employer of manufacturing workers, with an estimated 42 000 employees.[17] This equates to approximately one quarter of Queensland's entire manufacturing workforce.

Value of food processing

Food and beverage processing is Queensland's largest manufacturing industry in terms of revenue. It generated $18.2 billion or approximately 25 per cent of Queensland's total manufacturing revenue in 2010–11.[18]

The value of Queensland's processed food and beverage exports was $5.265 billion in 2012–13. This increased in value by 5 per cent from 2008–09, with exports accounting for 25 per cent of production in 2010–11.

Not surprisingly, meat and meat product manufacturing dominates Queensland's processed food and beverage exports, and was valued at $4.045 billion in 2012–13. This was an increase of 4.8 per cent from 2008–09.

Table 3.13 Value of Queensland's processed food and beverage exports from 2008–09 to 2012–13

	2008–09	2009–10	2010–11	2011–12	2012–13
Meat and meat product manufacturing	3 860 117 039	3 187 878 034	3 646 398 008	3 772 684 048	4 045 969 080
Dairy product manufacturing	28 801 020	32 784 826	33 852 034	36 958 775	44 430 781
Fruit and vegetable processing	276 857 845	282 879 504	283 213 055	359 426 697	494 022 909
Oil and fat manufacturing	46 915 636	35 937 931	37 677 483	39 928 320	32 787 958
Flour mill and cereal food manufacturing	34 945 946	29 970 337	26 204 805	29 501 450	24 492 760
Bakery product manufacturing	22 934 855	24 603 886	22 510 993	24 038 664	21 389 038
other food manufacturing	721 020 571	434 169 547	537 257 684	588 028 290	549 985 404
Beverage and malt manufacturing	22 403 956	26 542 995	26 722 942	48 320 062	52 255 804
Total food and beverage exports	**5 013 996 868**	**4 045 767 060**	**4 613 837 003**	**4 898 886 306**	**5 265 333 734**

Source: Exports – Industry (4-digit ANZSIC 1993 edition), Queensland Treasury

17 Labour force, Australia, details, quarterly, February 2014, Australian Bureau of Statistics, 2012–13, ABS 6291.0.55.003

18 Australian industry, 2011–12, ABS 8155.0

Research, development and extension

Research, development and extension (RD&E) assists productivity growth and creates new economic possibilities by:

- providing purposeful changes to agricultural products and production techniques
- creating new products
- increasing production efficiency of existing products in collaboration with producers, industry and other stakeholders
- enabling producers and the industry to act on new technical possibilities and new market opportunities.

In particular, Queensland's RD&E efforts focus on tropical and subtropical agriculture, and are driven by 'market failure' to convert basic research into technology that the industry needs.

Research is systematic investigation or experimentation involving innovation or technical risk. The outcome of research is new knowledge or new or improved products, processes, materials, devices or services. RD&E activity extends to modifications to existing products and processes.

Development is systematic work using knowledge gained through research or practical experience. It is directed into producing new materials, products, devices, policies, behaviours or outlooks; and installing new processes, systems and services, or substantially improving those already produced or installed.

Extension involves a range of activities that enable producers to improve productivity and profitability in collaboration with researchers and the broader industry. Activities include engaging in the development of research priorities, co-developing and co-designing solutions via development extension, providing advice, information and community education, and disaster management support.

RD&E funding

The agricultural RD&E system in Australia is a cooperative model involving:

- state and federal government
- producers
- industry bodies
- rural research and development corporations (RDCs)
- Collaborative Research Centres
- universities and research bodies
- non-government organisations (NGOs)
- private enterprise.

Policy and funding reflects the complex set of relationships across the value chain. The National Primary Industries RD&E framework articulates federal, state and industry priorities, while sector strategies (developed by RDCs) further explore RD&E priorities for particular sectors. Sector strategies are also linked to multiple commodity plans, for example the Citrus Plan. The National Primary Industries RD&E framework also forms part of the work program linked to the Intergovernmental Agreement on Biosecurity.

A range of cross-sector strategies also come into play for elements such as food, biofuels, soils etc. Each strategy is championed by a research and development corporation (RDC) with an interest in achieving cross-sector outcomes.

Funding for RD&E is also cooperative. A funding pool is drawn from primary producers who provide significant support for RD&E through national levies managed by RDCs. These levies attract matching funding from the Australian Government. Other sources of funding come through the CSIRO, higher education institutions, other research programs and the Queensland Government particularly through DAFF, non-profit organisations and privately-owned businesses.

Table 3.14 Summary of sectoral agricultural R&D activity nationally in 2011–12

	Field of research: Agricultural and veterinary sciences		Socio-economic objective: Economic development		
			Plant production and products	Animal production and products	Total
	($m)	(%)[a]	($m)	($m)	(%)[a]
Business[a]	455.4	34.2	302.5	165.6	34.7
Australian Government[b]	176.8	13.3	121.1	98.0	16.2
State governments	393.3	29.5	188.9	154.8	25.5
Higher education[c]	307.9	23.1	198.4	120.9	23.6
Total[d]	**1333.4**	**100.0**	**810.9**	**539.3**	**100.0**

a Relates to funding, not necessarily where the R&D is carried out

b Relates to R&D by Federal Government entities such as the CSIRO and AIMS; excludes federal funding to research providers in other sectors

c Higher education refers to the year 2010

d Indicative total only

Source: Research and Experimental Development series, ABS

The ABS no longer publishes information on the state location of most of this agricultural R&D activity. Available information shows:

- In 2011–12, the Queensland Government spent $260 million on all in-house R&D programs. This represented 23 per cent of all State Government R&D spending. On the other hand, only 10 per cent of all Federal in-house R&D spending was in Queensland.[19]
- In 2011–12, the Queensland Government spent $105 million on agricultural research. Most of this (approximately $83 million) was spent in-house.[20] Agricultural R&D therefore represents a large proportion of total State Government R&D spending. This represents about 21 per cent of spending on agricultural R&D by state governments, broadly in line with Queensland's share of national agricultural output.

19 *Research and experimental development,* government and private non-profit organisations, Australia, 2011–12, ABS 8109.0

20 *Queensland Government Research and Development Expenditure Report 2011–12*, Queensland Government Chief Scientist

- In 2011–12, Queensland agriculture, forestry and fishery businesses spent an estimated $33.2 million on R&D, which is 17.5 per cent of the national total.[21] This is slightly below Queensland's share of the national agricultural sector. However, it does not include Federal R&D levies, nor does it include agriculture-related R&D by non-agricultural enterprises, such as chemical companies.
- In 2010, Queensland universities carried out an estimated $73.5 million in agricultural and veterinary science R&D. This represented 24 per cent of the national university effort in this area, but only 5 per cent of the total R&D activity by Queensland universities.[22] Again, these percentages are broadly in line with the sector's share of the overall economy.
- In 2012, Queensland universities carried out an estimated $98.8 million in agricultural and veterinary science R&D. This represented 25 per cent of the national university effort in this area, slightly ahead of Queensland's share of sectoral activity, but only 6 per cent of the total R&D activity by Queensland universities.[23] It was a significant increase from activity in 2010 ($73.5 million), partly reflecting the re-allocation of research activity from the Queensland Government through the creation of the Queensland Alliance for Agriculture and Food Innovation.

Department of Agriculture, Fisheries and Forestry (DAFF)

The Queensland Government, through DAFF, undertakes research, development and extension to lift the productivity of Queensland's agricultural businesses. A breakdown of the funding sources for DAFF programs from 2008–09 to 2012–13 is provided in the following table.

Table 3.15 Breakdown of funding sources for DAFF programs from 2008–09 to 2012–13

Fund source	2008–09 ($)	2009–10 ($)	2010–11 ($)	2011–12 ($)	2012–13 ($)
Australian Government	5 324 872.70	4 693 123.00	5 857 043.64	6 404 865.20	5 224 737.25
Business	1 037 788.96	1 965 827.00	1 805 412.19	1 037 511.32	820 631.53
State funds	64 980 932.13	60 014 568.00	60 940 840.17	56 589 062.21	56 671 724.82
Joint government/business	19 951 367.00	22 632 995.00	21 809 360.06	22 127 756.23	16 151 068.23
Other state and local government	1 860 042.45	1 041 549.00	1 293 161.29	1 001 194.12	769 234.14
Overseas sources	8 958.70	48 073.00	104 353.00	15 834.09	97 233.93
Universities	625 369.79	1 437 706.00	3 286 897.86	5 502 086.89	5 587 409.51
Other Queensland Government		721 284.00	593 439.75	1 032 088.42	281 584.44
Total	**93 789 331.73**	**92 555 125.00**	**95 690 507.96**	**93 710 398.48**	**85 603 623.85**

Note: 2012–13 was based on R&D activities only. No extension included.

Source: Agri-Science Queensland, DAFF

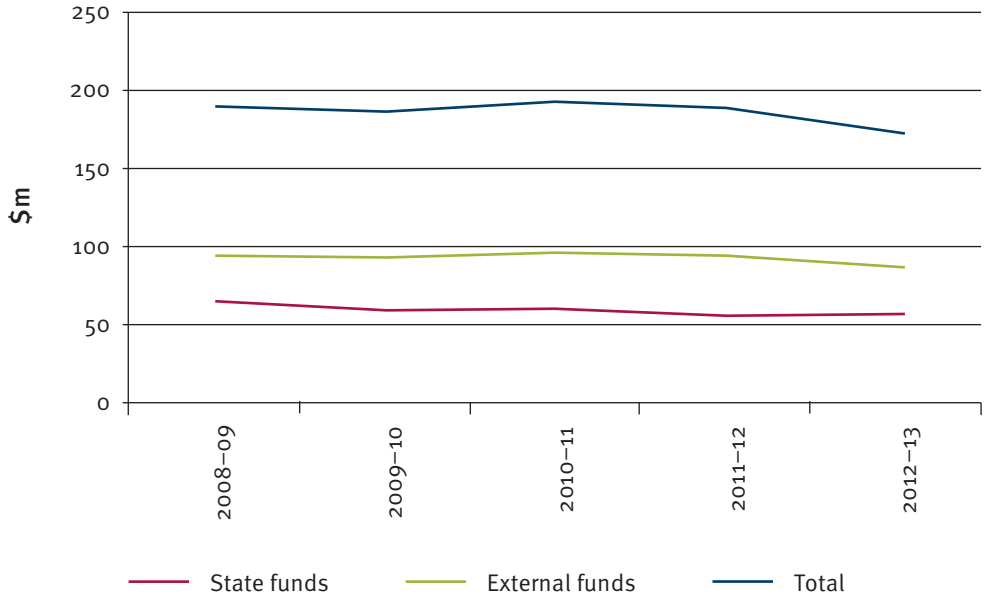
21 Research and experimental development, businesses, Australia, 2011–12, ABS 8104.0

22 *Research and experimental development*, higher education organisations, Australia, 2010, ABS 8111.0

23 Research and experimental development, higher education organisations, Australia, 2012, ABS 8111.0

Figure 3.18 shows a general downward trend in funding over the period, particularly in external funding.

Figure 3.18 State-sourced funding vs. external funding from 2008–09 to 2012–13



Source: Agri-Science Queensland, DAFF

Case study

Strawberry runners

In the 1990s, Queensland's $40 million strawberry industry struggled to stay competitive. With poor 'runner quality' identified as the major contributor to poor crops and reduced monetary returns for producers, DAFF researchers set about improving the quality of runners and their production and management systems.

The research focused on delivering high-quality, minimally-diseased and pest-free strawberry plants to approved runner growers in a timely manner. This meant:

- establishing and maintaining nucleus plants in high health status greenhouses
- tissue culturing plants
- conducting DNA testing for trueness to type
- maintaining minimal pest and disease levels
- virus indexing runners to ensure no viruses are present.

The research program has since seen:

- development of a number of new strawberry varieties suitable for Queensland growers. The most successful to date is Rubygem, with more than three million plants producing fruit in Queensland each year and 10 million plants sold overseas
- new vegetative methods of producing minimally-diseased, pre-foundation plants from nucleus plants in sterile media to replace the labour intensive and expensive tissue culture of foundation plants.

To maintain the momentum of productivity gains, DAFF set up an industry steering committee in 2011 that included fruit and runner growers. The aim of this committee was to develop a new, approved runner scheme for the Queensland Strawberry Growers Association.

In 2014, the committee established the industry-owned and run Australian Strawberry Runner Accreditation Authority (ASRAA) Limited to manage the approved runner scheme. ASRAA was incorporated on 17 March 2014.

In line with the Government's priority for building market capability, runner growers have set up new licence arrangements for University of Florida bred cultivars with the California based licensor, and contracted the work producing pre-foundation plants (previously done by DAFF) to Crop Health Services in Victoria.

Now, there are approximately 200 strawberry growers in Queensland producing between 6000 tons to 15 000 tons (60 million punnets) of strawberries per season. The industry is now worth approximately $180 million to Queensland's economy and produces 60 per cent of Australia's strawberries.

Innovation

In 2010–11, an estimated 30 per cent of Australian agricultural businesses engaged in innovation. Innovation relates to changes in goods or services, and changes in operational, organisational and managerial processes or marketing methods. This compares with 39 per cent of Australian businesses as a whole engaging in innovative activity.

Compared with other industries, innovation in agriculture is more concentrated on acquiring machinery, equipment or technology (52 per cent compared with the average for Australian businesses as a whole of 36 per cent).[24]

Computer use on farms has been expanding rapidly. In 2012–13, computer hardware and software assets in Australian farm businesses totalled $887 million or 0.5 per cent of all (non-land) capital assets. This figure was up from $116 million or 0.1 per cent of (non-land) capital assets in 1989–90.[25]

In 2011–12, 84 per cent of Australian agricultural businesses had internet access and 11 per cent had an online presence. These figures compare with Australian businesses as a whole, at 92 per cent and 45 per cent respectively. Thirty-seven per cent of farm businesses placed orders via the internet, compared with 55 per cent of Australian businesses as a whole.

The ABS does not release a state by state breakdown of this data at industry level.

24 *Innovation in Australian business*, 2010–11, ABS 8158.0

25 *Estimates of industry multifactor productivity*, 2012–13, ABS 5260.0.55.002

Markets

Increasing demand in current markets and securing access to additional markets forms the third pathway to growth outlined in *Queensland's agriculture strategy*. Securing and increasing market access will underpin the long-term competitiveness of the sector.

Queensland's agricultural producers currently service domestic markets and a number of international markets. Exports are worth approximately $8.9 billion, which represents 60 per cent of the sector's output. Interstate markets are worth approximately $3.6 billion or 25 per cent of the sector's output, with the remaining output sold in Queensland.

While many of the current domestic markets are mature, there is still some potential to expand these markets for some commodities. However, it is international markets, particularly in Asia, that offer the greatest opportunities for increased output.

International markets

National and international policy environment

Queensland's agricultural producers have access to overseas markets through negotiations involving multilateral, regional and bilateral approaches by the Australian Government. These include:

- Australia as signatory to successive multi-lateral trade negotiations and its membership of the World Trade Organisation (WTO)
- free trade agreements (FTAs)—Australia currently has seven FTAs in force, covering 28 per cent of Australia's total trade, with a further eight under negotiation, covering a further 45 per cent of trade (see Table 4.1)[1]
- a wide range of other more specific trade arrangements—see http://www.daff.gov.au/market-access-trade/market-access-news/achievements
- agreements which confer both rights and obligations in relation to decision-making processes related to the assessment and application of sanitary and phytosanitary measures. These processes are set out in:
  - the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement)
  - the International Plant Protection Convention (IPPC)
  - the associated International Standards for Phytosanitary Measures (ISPM).

1 http://www.dfat.gov.au/fta/

Table 4.1 Established FTAs and FTAs under negotiation as at April 2014

Australia's established FTAs	FTAs under negotiation
Closer Economic Relations (CER) Agreement between Australia and New Zealand (1983)	Australia–China (ACFTA) Negotiations commenced in April 2005
Singapore–Australia FTA (2003)	Australia–Japan (AJFTA) Negotiations concluded in April 2014 FTA still to be signed
Thailand–Australia FTA (2005)	Australia – Gulf Cooperation Council (GCCFTA) involving Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE Negotiations commenced in July 2007
Australia–United States FTA (2005)	Trans – Pacific Partnership Agreement (TPP) involves 11 members: Australia, Brunei, Canada, Chile, Malaysia, Mexico, New Zealand, Singapore, United States, Peru and Vietnam Negotiations commenced in 2008
Australia–Chile FTA (2009)	Pacific Agreement on Closer Economic Relations (PACER Plus) involves Australia and the Cook Islands, Micronesia, French Polynesia, Fiji, Kiribati, New Caledonia, Nauru, Niue, Palau, Papua New Guinea, Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu Negotiations commenced in August 2009
ASEAN – Australia – New Zealand FTA (2010) The ASEAN (Association of South East Asian Nations) comprises Burma, Brunei, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam	Australia–India Comprehensive Economic Cooperation Agreement (AI-CECA) Negotiations commenced in May 2011
Malaysia–Australia FTA (2013)	Indonesia–Australia Comprehensive Economic Partnership Agreement (IA-CEPA) Negotiations commenced in Jakarta in September 2012
Australia–Korea FTA (2013) (Note: concluded and signed but not yet in force.)	Regional Comprehensive Economic Partnership (RCEP) initially includes the 10 ASEAN member states and those countries which have existing FTAs with ASEAN: Australia, China, India, Japan, Republic of Korea and New Zealand Negotiations were launched in November 2012

Source: http://www.dfat.gov.au/fta/

The SPS Agreement

WTO member countries are expected to use any existing international standards, guidelines and recommendations to promote the harmonisation of sanitary and phytosanitary measures in international trade. The standards are developed by leading scientists and government officers with relevant expertise, and are subject to international scrutiny and review. The standards are adopted and managed by the Commission on Phytosanitary Measures (CPM), who is also responsible for the international implementation of the IPPC.

The SPS Agreement is applied at a national level and is defined by a number of principles that support the application of phytosanitary measures. These principles include sovereignty, necessity, minimal impact, modification, transparency, harmonisation, equivalence, risk analysis and regionalisation.

The SPS Agreement recognises that there may be a number of different mitigation measures that can be applied to achieve an equivalent and acceptable level of risk. In practice, this means that where a country can show that the measures it applies provide the same level of risk mitigation as other measures already agreed to by the receiving country, then these measures should be accepted as equivalent. Alternatives must be technically and economically feasible and provide the same level of protection. The measures selected should be the least trade restrictive to achieve the appropriate level of protection (ALOP) for that country.

International standards are agreed by three organisations known as the 'Three Sisters'—who develop international standards, recommendations and guidelines for plant and animal health, as well as food safety. The Three Sisters are the:

- International Plant Protection Convention (IPPC)
- World Organisation for Animal Health (Office International des Epizooties, OIE)
- Codex Alimentarius Commission (Codex).

Precise details of export conditions negotiated for Australian agricultural produce are managed by the Department of Agriculture who oversee compliance with programs established to meet the quarantine requirements of destination countries. Quarantine requirements are based on the presence or absence of pests and diseases of concern in both the growing region and also the destination country. In order to provide evidence of absence or otherwise on which to base the negotiation of market access protocols, surveillance programs are undertaken by DAFF (Biosecurity Queensland) to support the pest status claimed. Tables in the appendix show the current status of agricultural pests of concern in Queensland.

To help exporters understand the quarantine requirements of destination countries, the Department of Agriculture manages a number of databases including MiCor, Phyto and Exdoc. The Department of Agriculture also manage the auditable certification processes that vary according to the commodities and the destination country. DAFF provides supporting services under agreement with the Department of Agriculture, as required.

The Codex Alimentarius Commission was established by the Food and Agricultural Organisation (FAO) and the World Health Organisation (WHO) in 1963. Its purpose is to guide the development of harmonised international food standards, guidelines and codes of practice to protect the health of consumers and ensure fair practices in the food trade.

In Australia, guided by Codex, the requirements for food standards for Australia and New Zealand are managed by Food Standards Australia and New Zealand (FSANZ). Safe Food Production Queensland (SFPQ) provides operational support for FSANZ in Queensland, in collaboration with DAFF and Queensland Health (QH). In Queensland there are two major pieces of legislation regulating food safety:

- *Food Production (Safety) Act 2000*, administered by SFPQ
- *Food Act 2006*, administered by QH

Businesses producing or processing meat, dairy, eggs or seafood may be required to have an accreditation with SFPQ under the appropriate scheme:

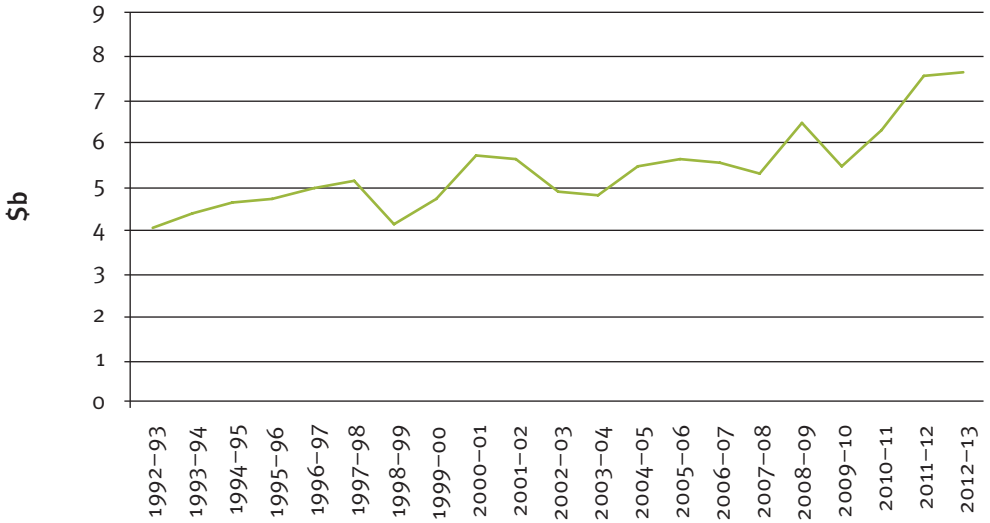
- Meat and Meat Products Scheme (the Meat Scheme)
- Dairy Food Safety Scheme (the Dairy Scheme)
- Egg and Egg Products Scheme (the Egg Scheme)
- Seafood Scheme

To comply with Queensland law, businesses that are registered through the Department of Agriculture (Biosecurity) to export meat, dairy or seafood, must also be accredited with SFPQ. These businesses may also be required to submit a food safety program or management statement. The Department of Agriculture oversees compliance with programs established to meet the quarantine requirements of destination countries.

Market trends

The Queensland Government Statistician's Office (QGSO), within Queensland Treasury and Trade, provides information about the state's main agricultural commodity exports—including beef, horticulture, cotton, sugar and wheat—over the last 10 years. (See the information tables at the end of this chapter and in Section 7: Appendix.)

Figure 4.1 Value of Queensland agriculture exports



Source: DAFF

Beef

Queensland's beef is exported in a number of different forms: live cattle exports (feeder and slaughter), live exports (breeding cattle), chilled or frozen meat (bone in) and chilled or frozen meat (boneless). Each of these products are suitable for very different markets and this is generally reflected by the level of development in the destination country.

Indonesia has been the primary market for live cattle exports (feeder and slaughter) for the past 10 years. This market is mainly made up of developing countries with religious slaughtering rituals and a culture of purchasing from markets due to the absence of refrigerators in many homes. Live exports (breeding cattle) are mainly destined for countries endeavouring to build up their own herds.

The data in the tables in the appendix show the impacts on the live trade market when the Federal Government suspended trade to Indonesia in 2010 following reports of animal welfare incidents. Live trade was re-established in 2011.

Cattle tick is a barrier to market access for live cattle intrastate, interstate and internationally. Cattle tick is managed by regulating cattle movement across a designated tick line separating free and endemic areas of Queensland.

The National Livestock Identification System (NLIS) supports market access and traceability requirements, and is held in high regard by destination countries. Queensland's strong regulatory system helps prevent the entry of Bovine spongiform encephalitis, making our product highly-desirable in markets such as Korea, Japan and the USA.

The following table shows the meat safety and traceability programs that are supporting the industry in Australia. These systems provide customers with reassurance regarding the quality and safety of Queensland meat products.

Table 4.2 Meat safety and traceability programs currently operating in Australia

Supply chain position	Safety program or initiative
On-farm	• Livestock Production Assurance • LPA Quality Assurance
Feedlot	• National Feedlot Accreditation Scheme
Transport	• TruckCare
Saleyards	• National Saleyard Quality Assurance Program
Processing	• Australian Government legislation and standards • AQIS health certificate • Australian Government Halal Slaughter Program • Micro-organism monitoring • MLA food safety program • National Residue Survey
Export	• Department of Agriculture Biosecurity
Overall supply chain	• National Livestock Identification System • AUS-MEAT

Source: MLA, http://www.mla.com.au/Meat-safety-and-traceability

Horticulture

Over the last 10 years, most of Queensland's fruit, vegetable and nut markets have been consolidated into the Asia-Pacific region, with the exception of United Arab Emirates. The largest markets over this period have consistently been Hong Kong and New Zealand. Other important markets include Singapore, Indonesia, Thailand and Japan.

The Queensland fruit fly (*Bacterocera tryoni*) is one of the most significant pests of concern for many destination markets and requires produce to be treated to reduce the risk of this pest being introduced in consignments. This is particularly limiting for tropical fruits. Cold storage treatment, which is used to treat fruit fly, is the main market access measure used for citrus—one of our largest commodity exports. However, this treatment isn't ideal for tropical fruit as it damages the fruit quality.

Changes to the permitted usage of two of the main post harvest chemical treatments used to treat produce for fruit fly—dimethoate and fenthion—have resulted in loss of market access into New Zealand since 2012 for tomatoes and capsicums.

Although *B.tryoni* is an endemic pest, Queensland remains free of other exotic fruit flies through continued participation in the national Ports Trapping Program. This program is supported by the Long-term Containment Strategy for Exotic Fruit Flies in Torres Strait which combines surveillance for exotic fruit flies with containment activities that ensure mainland Australia remains free from these pests.

Queensland's main export markets tend to be:

- in the northern hemisphere where seasonality gaps are filled
- in countries where there is limited ability for local produce to meet the market's needs
- in temperate regions that are unable to produce tropical and sub-tropical fruits and vegetables.

These countries also tend to have a large middle class with an ability to purchase higher-priced, quality products—for example, Hong Kong (SAR of China), Korea, New Zealand, Indonesia, Singapore and the United Arab Emirates. China has only recently emerged as a large market fitting the same profile. (See Section 7: Appendix for more details.)

Case study

Torres Strait fruit fly eradication

The papaya fruit fly is endemic to Thailand, Malaysia, Borneo, Indonesia and Singapore. It is considered a significant agricultural pest, lowering production yields in countries where it has established.

It infests twice the number of fruit varieties as the Queensland fruit fly (209 compared with 116) and often infests at a greener stage of fruit development. In order to control the pest, spray regimes need to begin earlier and become more frequent. In countries where the pest is established, growers can encounter significant market access barriers when exporting their produce.

The papaya fruit fly has been found in Papua New Guinea since 1992 and was detected for the first time in the Torres Strait (part of Australia) in March 1993.

In October 1995 an incursion of the species was found near Cairns. The incursion into mainland production areas sparked a four-year eradication campaign costing $34 million in direct costs. Another $100 million was incurred in additional control regimes, quarantine and disinfestation activities, crop damage and lost trade.

Following its eradication from mainland Australia, the Queensland Government and Federal Government began a cooperative arrangement to monitor and eradicate annual incursions of exotic fruit flies in the Torres Strait under the Long Term Containment Strategy for Exotic Fruit Flies in Torres Strait.

A number of exotic fruit fly species, including the papaya fruit fly, spread to the Torres Strait from nearby Papua New Guinea each year. If they are allowed to establish on the islands they will eventually spread to the Australian mainland, where they have the potential to cause severe disruption to market access.

Since the program's inception, the average annual cost of surveillance and proactive eradication of all six fruit fly species of concern has averaged $200 000 per year. Subsequent to the 1995 mainland incursion, the dynamics of Australian horticulture has changed with increasing production value and diversity of crops, and larger growing regions.

In 2013, the ABARES estimated the potential cost of an incursion of exotic fruit flies from the Torres Strait at between $442.9 million to $3.3 billion with a benefit:cost ratio ranging from 63:1 to 339:1. Producers' losses are estimated to range from $269 million to $2.1 billion.

In addition to the Torres Strait fruit fly program, Queensland also manages a trapping grid to monitor for a range of exotic fruit fly species (species not present within the state or the country) in high-risk areas of Queensland, including Brisbane and Cairns. This network of traps provide early warning of new incursions of exotic fruit fly species and contribute to Australia's national country freedom from species of quarantine concern. This trapping will continue to support market access to fruit fly sensitive countries.

Industry consultation will soon begin for the program to be delivered under the Emergency Plant Pest Response Deed. This will give the industry more opportunity to provide input into the delivery strategies that form an eradication response plan. Implementation of the response plan is scheduled to occur in July 2015.

Dairy

Dairy exports have significantly declined over the past 10 years (see the tables in the appendix), mirroring the general decline of the industry in Queensland since deregulation occured in 2001. In 2000, there were 1545 dairy farms in Queensland but by 2010 this number had fallen to 610.

As the demand for fresh milk and dairy products in developing Asian countries increases, particularly in China, exports provide an opportunity to reverse past declines.

Cotton

Almost all of Queensland's cotton is exported. Growth of the textiles industry and associated manufacturing industries in the East Asia region have been the main source of growth in Queensland cotton exports.

This is reflected in increased exports to China, Indonesia, Thailand and other East Asian countries. At the same time European markets have reduced, particularly after the GFC in 2009.

Sugar

The data for sugar exports is limited in availability due to it being commercial-in-confidence and therefore the data provided in the appendix should be used with caution. Also, values for sugar are difficult to report due to the sugar pricing methodology adopted by the market. Sugar is priced over a period of time with different prices prevailing over that period. Sugar is also sold on the forward market adding to the complexity.

Data provided in the tables in the appendix has been taken from OESR data. Queensland Sugar Limited, the main sugar marketer in Queensland, has also provided sales by volume and destination for the past five years.

The available data shows that sugar markets are global, with Asia, Europe and the USA being key markets for Queensland. The increasing proportion of the Asian market has provided the main source of growth in sugar exports.

While Korea has consistently been Queensland's largest buyer, latest figures show the extremely rapid emergence of the Chinese market over the last four years.

Wheat

Wheat export data is also limited in availability due to it being commercial-in-confidence and therefore the data provided in the tables in the appendix should also be used with caution. Until 2006, export sales were via a single desk model, but there are now a number of companies filling this role. Like sugar, marketing and sales of wheat are complex.

Queensland's wheat exports are distributed to various destinations according to the different qualities and protein content of the wheat. Asia has been the main driver of increased exports in wheat over the last 10 years.

The Korean market drives demand for Australian Prime Hard quality wheat as it is highly suited to noodle-making; and Queensland is one of the two main growing regions in Australia. Queensland's wheat industry has also benefited from the rapidly emerging Chinese market.

The traditional markets of the USA and Italy remain important markets for Queensland. Despite the US market contracting after the GFC it appears to have regained prominence. The Italian market has also been contracting over recent years and has yet to show signs of recovery.

Domestic markets

Queensland's interstate primary production exports were estimated to be valued at approximately $3.6 billion in 2013[2], representing approximately 25 per cent of production, while interstate imports exceeded this figure at approximately $5.8 billion.

More detailed data on interstate trade by commodity and industry is not available, partly due to the absence of central collection points for the data. This absence reflects the number of different pathways through which products can flow, including the traditional central market system which previously dominated.

However, supermarkets now have direct purchasing arrangements with producers throughout Australia. This means that product can be purchased in Queensland, shipped in bulk to another state for packaging and then shipped for sale—either to another state or back to Queensland.

For some commodities such as beef, data from the National Livestock Identification Database potentially provides a better understanding of the domestic markets for Queensland's products. The Animal Health Committee also commissioned some older analyses of livestock data, showing Australia's domestic markets for livestock.[3]

Biosecurity Queensland negotiates domestic quarantine market access measures on behalf of the Queensland horticulture industry. The following tables list Interstate Certification Assurance (ICA) scheme accreditations to certify their products for interstate markets.

2 Interstate trade, Queensland, December 2013, Australian Bureau of Statistics 8502.

3 http://www.daff.gov.au/animal-plant-health/animal/livestock_movement_in_australia_and_emergency_disease_preparedness

Case study

Citrus canker

In June 2004 the highly destructive disease known as citrus canker was detected on a farm at Emerald in Central Queensland. The disease is caused by extremely contagious bacteria that cause a significant decline in tree health to the point where no fruit is produced.

The disease can be spread through infected plant material and also by rain, equipment, animals, birds, humans and clothing. It infects all types of citrus crops including oranges, grapefruit, tangerines, lemons and limes.

Citrus canker is common in many citrus-growing areas of the world including Japan, Central Africa, the Middle East, the Pacific Islands and parts of South America, and it is responsible for devastating Florida's citrus industry in the USA.

Outbreaks in Australia's Northern Territory were eradicated in 1912, 1991 and 1993 by removing and destroying all host plants in the vicinity.

In 2004 the disease was detected in Queensland, and the then Department of Primary Industries and Fisheries immediately quarantined the infected property to help control and eradicate the disease. Funding for the eradication program was provided by Australian states and territories producing citrus, along with the Federal Government and the citrus industry.

The program had an initial budget of $18.8 million over more than four years and employed up to 95 officers. Queensland coordinated containment and eradication activities through removing infected plant material, conducting extensive surveillance around the initial detection area, and establishing market access arrangements to help recommence interstate trade in Queensland citrus produce.

By January 2006, all high-risk host plants had been destroyed, including around 490 000 commercial citrus trees, 4000 residential trees and 150 000 native citrus plants. The area was kept clear of all citrus plants for 18 months and commercial growers were then given a further 18 months to replant. The new plantings were inspected by Biosecurity Queensland officers at three-monthly intervals to ensure the new plants remained disease-free.

In January 2009, the Emerald area, Queensland and Australia were once again declared free of citrus canker. The biosecurity effort delivered a clean, marketable and positive future for Queensland's citrus industry, estimated to be worth more than $133 million in 2010–11.

Table 4.3 ICA accreditations as at March 2014

Procedure code	Procedure	Number of accreditations
ICA01	Dipping with Dimethoate or Fenthion	10
ICA02	Flood Spraying with Dimethoate or Fenthion	50
ICA03	Low Volume Non-recirculated Spraying	28
ICA04	Fumigation with Methyl Bromide	8
ICA06	Hard Green Condition of Bananas	118
ICA08	Mature/Immature Green Condition of Papaw & Babaco	4
ICA10	Hot Water Treatment of Mangoes	1
ICA13	Unbroken Skin Condition of Approved Fruits	17
ICA15	Mature Green Condition-Passionfruit/TLime/BSapote	22
ICA16	Mature Green Condition of Bananas	30
ICA17	Splitting & Reconsigning Certified Produce	36
ICA18	Treatment & Inspection of Custard Apple	2
ICA19	Treatment & Inspection of Mangoes	21
ICA20	Pre-Harvest Treatment & Inspection of Grapes	25
ICA21	Pre-Harvest Treatment & Inspection Approved Fruits	3
ICA26	Pre-Harvest Treatment Tomato, Capsicum, Chilli, Eggplant	38
ICA28	Pre-Harvest Bait Spraying & Inspection of Citrus	8
ICA29	Treatment of Nursery Stock and Soil-less Media	16
ICA30	Hard Green Condition of Avocados	3
ICA34	Pre-Harvest Control & Inspection of Strawberries	20
ICA35	Inspection & Treatment for Spiraling Whitefly	5
ICA36	Property Freedom for Spiraling Whitefly	4
ICA38	Inspection for Melon Thrips	29
ICA39	Inspection and Treatment of Plants for Red Imported Fire Ant	1
ICA42	Nursery Freedom, Treat & Inspect For Myrtle Rust	2
ICA47	Inspection for Freedom from Fruit Fly	11
ICA48	Pre-Harvest Treatment Tomato, Capsicum-Bowen Gumlu	1
ICA55	Irradiation Treatment	1
ICA42	Nursery freedom, treat and inspect for myrtle rust	2
ICA47	Inspection for freedom from fruit fly	11
ICA48	Pre-harvest treatment tomato, capsicum-bowen gumlu	1
ICA55	Irradiation treatment	1

Note: A business may have more than one accreditation. Just because a business maintains an accreditation it does not necessarily mean it is sending product interstate.

Table 4.4 Active non-ICA accreditations as at March 2014

Procedure Code	Procedure	Number of accreditations
BHA01	BioSecure HACCP Arrangement	2
CLS01	Cercospora Leaf Spot Area Freedom	89
EEA01	Electric ant – Certification Services	43
GRF01	Garlic Rust Property Freedom Cured	33
GRF03	Garlic Rust Freedom – Repacking Alliums	2
ISC01	Inspection of seed crops intended for export	3
ISC02	Inspection of grass and legume pasture seed crops	1
MLH01	Treating mango plants for mango leafhopper	1
MTF01	Melon Thrips Area Freedom – 100 km	11
MTF03	Melon Thrips Nursery Inspection	13
MTF04	Melon Thrips – Treatment of Tomato Fruit	9
NPM01	Nursery Potting Mix – soil free media	20
PAF01	Phylloxera Area Freedom	1
PHY02	Phylloxera Area Freedom, Phylloxera Exclusion Zone	29
PHY03	Phylloxera Area Freedom 40 km	15
PHY04	Phylloxera not in area and >50 m from grapevine	7
PHY05	Grown more than 50 m from a grapevine	28
PHY06	Phylloxera Property Freedom Survey	1
PST01	Phylloxera Sulphur Treatment	9
RAF01	RIFA Area Freedom – 5 km	326
RLR02	RIFA Low Risk Enterprise – NSW Approval	2
RPF01	RIFA Property Freedom	46
SPW03	Spiraling Whitefly Area Freedom – 10 km	8
Total number		**697**

Note: GRF01 and GRF02 are property freedom accreditations that have recently been discontinued following the detection of garlic rust in South Australia. ISC01 and ISC02 are accreditations provided for international exports. MLH01 is an accreditation for movement within Queensland. Businesses may have more than one accreditation.

While the Australian Food and Grocery Council (AFGC) provides data on the volume of domestic sales in the retail food sector, the origin of food sold in each state is unclear. However, figures do suggest the domestic market is mature with a slight contraction nationally of 0.7 per cent in 2011–12. During the same period, Queensland's share of turnover in the fresh produce sector increased from 29.1 per cent to 32.5 per cent.[4]

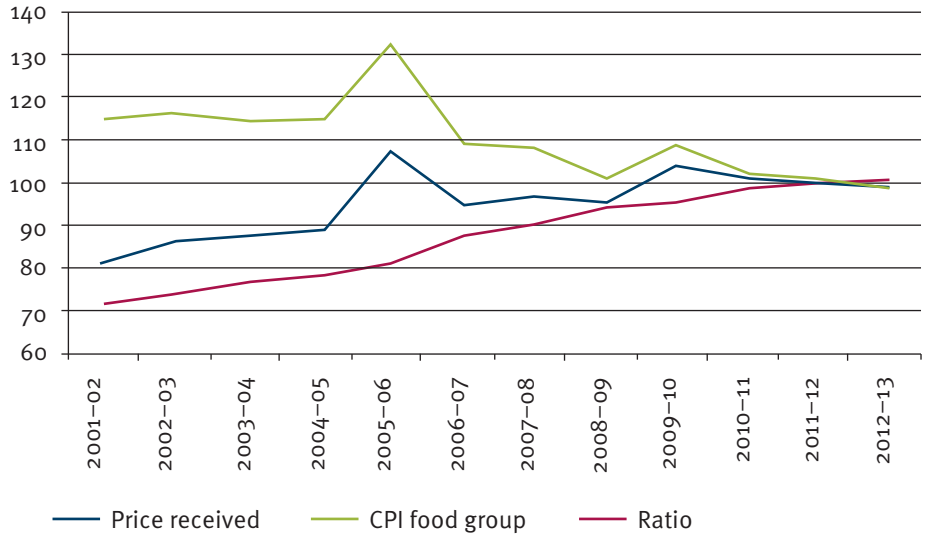
4 http://www.afgc.org.au/state-of-the-industry-2013.html

Supply chain efficiency

Figure 4.2 shows an index of supply chain efficiency, calculated by comparing movements in the Brisbane food groups consumer price index (CPI) with an estimate of average prices received by Queensland farmers.

Collectively, since 2001–02, the Brisbane food groups CPI has generally increased (3.4 per cent per annum) more rapidly than prices received by Queensland farmers (1.7 per cent per annum). Therefore, the ratio of the two has fallen.

Figure 4.2 Supply chain efficiency



Source: Value of agricultural commodities produced, Queensland, ABS, cat. no. 7503.0 (series); Agriculture, Queensland, ABS, cat. no. 7113.3; and unpublished ABS data.

On the surface this might suggest a decline in supply chain efficiency. However, there are substantial compositional differences between the pattern of domestic food consumption and the pattern of Queensland agricultural production. Figure 4.3 shows the ratio of prices received by Queensland farmers to the relevant Brisbane food groups CPI at a more detailed level.

This does not represent the entire picture of the declining ratio of farm gate prices to consumer prices. For some commodities (cattle and eggs) there appears to be a declining trend; for most other commodities such as cereals, fruit, vegetables and pork, little trend is apparent. The commodities of sheep and poultry show a rising trend.

Consumer prices for dairy products have fallen slightly since 2008–09, reflecting a 15 per cent fall in fresh milk prices, which is likely to be related to supermarket pricing practices. Prices received by farmers have fallen in line with overall dairy product prices but by much less than retail milk prices. This may suggest that some, but not all, of the retail price reduction is being passed back onto farmers.

Figure 4.3 Ratio of Brisbane CPI group to price received by Queensland farmers, 2011–12 = 100

Source: Value of agricultural commodities produced, Queensland, ABS, cat. no. 7503.0 (Series); Agriculture, Queensland, Australian Bureau of Statistics, cat. no. 7113.3; and unpublished ABS data.

To DAFF's knowledge, this is the first time such an index has been calculated and published for Queensland. DAFF welcomes comments about the validity and value of the index.

Transport pathways

This section provides some information about physical flows for produce. Information on transport costs is presented in Section 5: Production costs.

Livestock flows toward sales points located along the transport routes listed in Table 4.5, then on to regional processing centres.

Table 4.5 Queensland cattle saleyards

Location	Saleyard name
Beaudesert	Beaudesert Saleyards
Belyando	Clermont Saleyards
Biggenden	Biggenden Saleyards
Blackall	Blackall Municipal Saleyards
Cloncurry	Cloncurry Saleyard
Cooloola	Gympie Saleyard
Dalby	Dalby Saleyards
Dalrymple	Dalrymple Saleyard
Emerald	Emerald Saleyard
Goondiwindi	MacIntyre Saleyards
Kingaroy	Coolabunia Saleyards
Longreach	Longreach Saleyard
Mareeba	North Queensland Saleyards
Moreton	Moreton Saleyards
Murgon	Murgon Municipal Saleyards
Nebo	Nebo Saleyard
Rockhampton	Central Queensland Livestock Exchange CQLX
Roma	Roma Saleyards
Silverdale	Silverdale Saleyards
Wandoan	Dalby Regional Council Saleyards
Warwick	Warwick Saleyards

The following tables show primary product exports from Queensland ports.[5] In tonnage terms the most significant ports are Brisbane, especially for meat products and cereals; Townsville, especially for sugar; and Mackay, especially for sugar and cereals.

5 *Trade statistics for Queensland ports*, DTMR, http://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports.aspx

Table 4.6 Meat and livestock products: Trade statistics

Financial year	2007-08	2008-09	2009-10	2010-11	2011-12	Variance	
						Amount	%
Export tonnes							
Brisbane							
Meat products	746 691	754 356	740 155	777 274	786 832	9 558	1.2%
Tallow	201 742	184 874	186 071	193 977	190 358	- 3 619	-1.9%
Karumba							
Livestock	4 431	5 018	6 842	7 036	5 261	- 1 775	-25.2%
Mackay							
Cattle	0	1 085	0	0	0	0	0.0%
Tallow	4 844	3 813	2 803	5 677	5 724	47	0.8%
Mourilyan							
Livestock	1 864	3 938	3 289	1 197	0	- 1 197	-100.0%
Rockhampton							
Tallow	29 822	33 498	25 834	26 678	28 092	1 414	5.3%
Townsville							
Cattle	13 580	76 204	45 031	23 888	10 863	- 13 025	-54.5%
Meat and meat by products	7 728	6 832	15 129	27 188	21 288	- 5 900	-21.7%
Weipa							
Livestock	0	0	595	0	0	0	0.0%
Total exports	**1 010 702**	**1 069 618**	**1 025 750**	**1 062 914**	**1 048 418**	**- 14 496**	**-1.4%**
Total throughput	**1 010 702**	**1 069 618**	**1 025 750**	**1 062 914**	**1 048 418**	**- 14 496**	**-1.4%**

Trade statistics for Queensland ports, DTMR, http://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports.aspx

Table 4.7 Livestock: Export statistics

Financial year	2007-08	2008-09	2009-10	2010-11	2011-12	Variance	
						Amount	%
Exported livestock per head							
Brisbane	22 009	16 498	14 938	12 389	15 776	3 387	27.3%
Karumba	12 659	14 337	13 684	14 072	10 522	- 3 550	- 25.2%
Mackay	0	0	3 099	0	0	0	0
Mourilyan	5 326	11 252	6 578	2 393	0	- 2 393	-100.0%
Townsville	27 159	131 887	90 062	47 776	21 725	- 26 051	-54.5%
Weipa	0	0	1 701	0	0	0	0.0%
Total livestock	**67 153**	**173 974**	**130 062**	**76 630**	**48 023**	**- 28 607**	**-37.3%**

Trade statistics for Queensland ports, DTMR, http://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports.aspx

Table 4.8 Sugar: Trade statistics

Financial year	2007-08	2008-09	2009-10	2010-11	2011-12	Variance	
						Amount	%
Export tonnes							
Brisbane							
Sugar	75 249	65 048	40 008	64 986	42 589	- 22 397	-34.5%
Bundaberg							
Sugar	223 654	248 938	282 324	280 071	252 858	- 27 213	-9.7%
Cairns							
Sugar	289 123	221 546	297 115	197 024	157 239	- 39 785	-20.2%
Lucinda							
Sugar	570 684	591 500	583 351	404 694	0	- 404 694	-100.0%
Mackay							
Refined sugar	329 105	314 843	337 107	312 271	298 941	- 13 330	-4.3%
Sugar	883 203	698 735	765 215	575 522	382 966	- 192 556	-33.5%
Mourilyan							
Sugar	470 224	564 239	465 500	435 868	322 425	- 113 443	-26.0%
Townsville							
Sugar	1 184 190	1 078 520	1 190 898	958 720	1 490 541	531 821	55.5%
Total exports	**4 025 432**	**3 783 369**	**3 961 518**	**3 229 156**	**2 947 559**	**- 281 597**	**-8.7%**
Total throughput	**4 025 432**	**3 783 369**	**3 961 518**	**3 229 156**	**2 947 559**	**- 281 597**	**-8.7%**

Trade statistics for Queensland ports, DTMR, http://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports.asp

Table 4.9 Timber and woodchip: Trade statistics

Financial year	2007-08	2008-09	2009-10	2010-11	2011-12	Variance	
						Amount	%
Export tonnes							
Brisbane							
Timber	263 640	205 056	204 363	191 268	155 024	- 36 244	-18.9%
Woodchip	280 264	145 537	219 191	134 733	72 174	- 62 559	-46.4%
Mackay							
Logs	0	0	0	40 114	46 803	6 689	16.7%
Mourilyan							
Timber	0	0	0	0	51 133	51 133	100.00%
Townsville							
Timber	114 641	0	0	0	318 696	318 696	100.0%
Total exports	**658 545**	**350 593**	**423 554**	**366 115**	**643 830**	**277 715**	**75.9%**
Import tonnes							
Brisbane							
Timber	375 048	264 127	272 640	323 475	287 177	- 36 298	-11.2%
Total imports	**375 048**	**264 127**	**272 640**	**323 475**	**287 177**	**- 36 298**	**-11.2%**
Total throughput	**1 033 593**	**614 720**	**696 194**	**689 590**	**931 007**	**241 417**	**35.0%**

Trade statistics for Queensland ports, DTMR, http://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports.aspx

Table 4.10 Grains and cereals: Trade statistics

Financial year	2007-08	2008-09	2009-10	2010-11	2011-12	Variance	
						Amount	%
Export tonnes							
Brisbane							
Cereals	505 047	1 881 841	1 207 311	1 272 938	2 031 197	758 259	59.6%
Gladstone							
Grain	18 345	446 449	240 762	260 218	338 245	78 027	30.0%
Mackay							
Grain	194 002	310 909	278 406	350 056	386 324	36 268	10.4%
Total exports	**717 394**	**2 639 199**	**1 726 479**	**1 883 212**	**2 755 766**	**872 554**	**46.3%**
Import tonnes							
Brisbane							
Cereals	98 669	74 487	100 695	66 941	62 744	- 4 197	-6.3%
Total imports	**98 669**	**74 487**	**100 695**	**66 941**	**62 744**	**- 4 197**	**-6.3%**
Total throughput	**816 063**	**2 713 686**	**1 827 174**	**1 950 153**	**2 818 510**	**868 357**	**44.5%**

Trade statistics for Queensland ports, DTMR, http://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports.aspx

Production costs

The final pathway in *Queensland's agricultural strategy* is production costs. For agriculture, production costs include the cost of inputs, regulatory compliance and the logistical costs of supplying markets. They also include the cost of opportunities forgone, such as production lost through pests and diseases or as a result of regulatory intervention. To ensure the ongoing profitability and viability of businesses it is necessary to minimise production costs while ensuring reliable access to inputs. A competitive market for the supply of inputs to production will ensure downward pressure is maintained on input costs, and that they are supplied to the sector as efficiently as possible.

Input costs

It is estimated that in 2012–13 Queensland's agricultural industries used more than $4.4 billion of inputs from a range of industries to produce their products. The purchase of these inputs supports rural and regional economies throughout Queensland.

Table 5.1 provides a breakdown of farm costs in Australia in 2012–13. The most significant costs are depreciation, seed and fodder, wages, interest paid, and repairs and maintenance.

Table 5.1 Breakdown of farm costs in Australia in 2012–13

	$m	%
Materials and services		
Fuel	2 184	5.9
Fertiliser	2 213	6.0
Chemicals	1 422	3.8
Seed and fodder	4 589	12.4
Marketing	3 756	10.1
Repairs and maintenance	4 054	10.9
Other	4 495	12.1
Total	**22 715**	**61.2**
Other costs		
Wages	4 326	11.7
Interest paid	4 341	11.7
Other overheads	537	1.4
Total	**9 204**	**24.8**
Total cash costs	31 919	86.0
Depreciation	5 199	14.0
Total farm costs	**37 118**	**100.0**

Source: ABARES, 2013

Table 5.2 provides a detailed breakdown of inputs to Queensland primary industries. Unfortunately, the data refers to 2005–06, which is the latest year of available input–output data.

The most significant inputs are labour costs (32 per cent), finance, property and business services (12 per cent), transport (11 per cent), machinery and other manufactured inputs (9 per cent), and fuel, fertiliser and chemicals (7 per cent).

Meat & Livestock Australia publishes estimated cash costs for northern beef farms (see Table 5.3). The most significant costs are cattle purchases, repairs and maintenance, and fuel.

Table 5.2 Upstream industry suppliers to Queensland primary industries during 2005–06 ($m)

Industry	Sheep	Grain	Beef cattle	Dairy cattle	Pigs and poultry	Fruit and vegetables	Cotton	Services to agriculture	Sugar cane growing	Forestry and logging	Commercial fishing	Meat and meat products	Sugar manufacturing	Food manufacturing (n.e.c.)	Wood and paper manufacturing	Total[d]
Services to agriculture	13.6	31.4	189.9	12.8	25.3	45.6	4.9	3.9	1.6	0.3			0.2	0.4		358.8
Other agriculture	4.5	32.3	24.0	7.7	6.6	43.5	51.0	248.9	97.6	0.6		2 883.5	885.6	687.2		518.50
Chemicals and fuels	4.9	31.4	130.3	11.1	21.2	89.4	12.6	2.3	9.0	6.9	15.4	15.2	2.8	241.2	314.0	945.6
Other manufacturing[a]	2.2	14.8	42.1	4.3	13.8	29.8	3.5	0.8	8.0	13.2	37.5	314.9	13.5	1 846.6	564.7	1 227.1
Electricity, gas and water	1.0	18.0	46.8	7.6	15.0	7.0	1.8	0.1	4.9	0.2	0.8	45.6	6.6	126.7	116.8	410.3
Construction[a]	2.1	6.2	40.8	2.8	15.4	8.7	1.4	0.4	1.1	1.0	1.0	10.5	0.1	48.9	52.4	197.2
Transport	5.0	40.1	118.4	15.6	36.9	94.6	5.6	3.5	25.9	2.8	6.5	351.6	22.2	590.8	312.4	1 653.6
Finance, property and business services	7.2	34.0	168.2	10.3	34.2	52.5	7.5	7.2	37.9	4.4	11.1	134.9	16.0	431.7	712.9	1 703.7
Total Intermediate[b]	**51.2**	**255.7**	**988.0**	**87.7**	**201.9**	**507.3**	**105.6**	**275.7**	**230.6**	**59.5**	**105.2**	**3 908.7**	**976.5**	**4 943.9**	**2 789.3**	**9 480.90**
Compensation of employees	25.5	57.9	577.6	52.7	43.4	291.2	24.4	124.4	145.8	36.0	42.0	592.3	235.6	914.7	1 134.6	4 531.8
Total[c]	**76.7**	**313.6**	**1 565.6**	**130.4**	**245.3**	**798.5**	**130.0**	**400.1**	**376.4**	**95.5**	**147.2**	**4 501.0**	**1 212.1**	**5 858.6**	**3 923.9**	**14 012.70**

a Refers to intermediate inputs, therefore excluding purchases that would be classed an investment

b Includes other industries

c Does not include interest, taxes or subsidies, or imports

d Adjusted to exclude agricultural inputs to manufacturing sectors

Source: Updated OESR input–output tables

Table 5.3 Cost of production and net margin of beef cattle production in northern Australia by scale of beef meat production (live weight basis) 2007–08

Average per farm		Small	Medium	Large	Very large	Average
Derived total meat production	kg	21 751	88 920	234 976	869 690	148 292
Average price received						
per kg live weight	cents/kg	172	170	173	168	70
Cash cost of production						
administration	cents/kg	15	9	6	4	6
cattle purchased	cents/kg	21	19	20	21	20
crop and pasture chemicals	cents/kg	5	4	2	1	2
fertilisers	cents/kg	2	1	0	0	0
fodder	cents/kg	22	13	12	7	10
freight	cents/kg	8	6	6	10	8
fuel, oil and grease	cents/kg	20	14	11	8	11
handling and marketing	cents/kg	9	6	5	4	5
hired labour	cents/kg	2	2	5	9	7
livestock materials	cents/kg	9	3	4	3	4
repairs and maintenance	cents/kg	38	16	16	11	15
water rates and charges	cents/kg	0	0	0	0	0
other cash costs	cents/kg	63	30	31	24	29
Total beef cattle cash costs	cents/kg	**215**	**123**	**117**	**103**	**118**
Imputed cost of family labour used for beef cattle production	cents/kg	135	49	23	8	27
Total beef cattle cash costs including family labour	cents/kg	**350**	**172**	**140**	**111**	**145**

Source: Meat & Livestock Australia, http://apps.daff.gov.au/MLA/

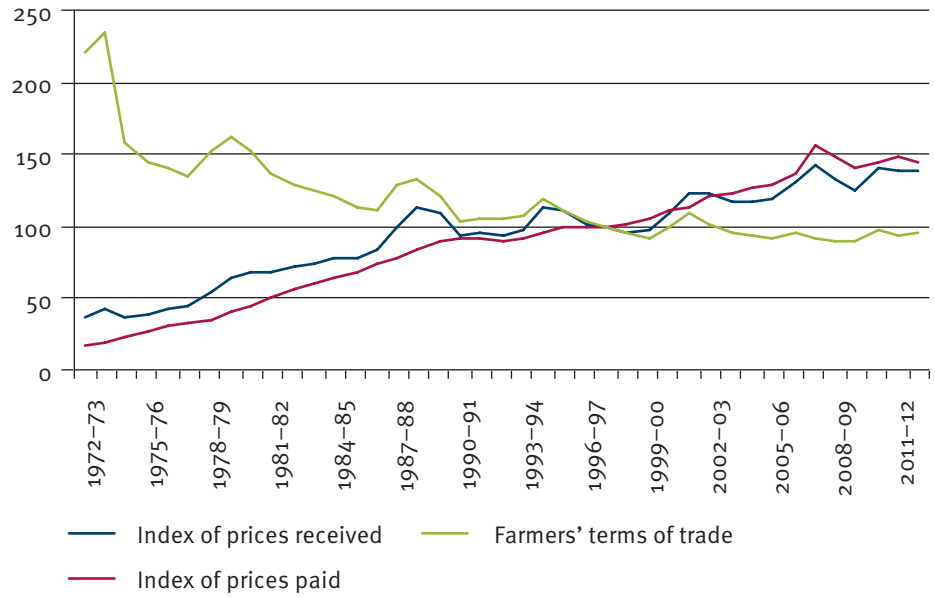
Figure 5.1 illustrates how farmers' terms of trade (which are the ratio of prices received to prices paid) show a trend of long-term decline, as trend growth in supply exceeds trend growth in demand. This is because supply grows at least as rapidly as overall productivity in an economy, whereas demand grows less strongly than incomes. Also, the pace of increase of farm costs broadly matches overall inflation rates. Consequently, economic development is synonymous with a declining share of agriculture in the economy.

These long-term trends can be masked by other short- and medium-term developments. Figure 5.1 shows short-term spikes in prices received in 1973–74, 1980–81, 1988–89, 1994–95, 2002–03 and 2007–08. Spikes in prices received were not matched by comparable spikes in prices paid, therefore farmers' terms of trade rose during those years, with the exception of 2007–08. Those years were an exception because the pre-GFC increase in global commodity prices affected farm inputs, such as fuel and fertilisers, as much as farm returns.

The trend of long-term decline in farmers' terms of trade seems to have slowed post 1990. Analysis shows a trend in decline of 3 per cent per annum during the 20 years to 1992–93, slowing to 0.9 per cent per year in the subsequent 20 years. It is likely that this relative improvement reflects:

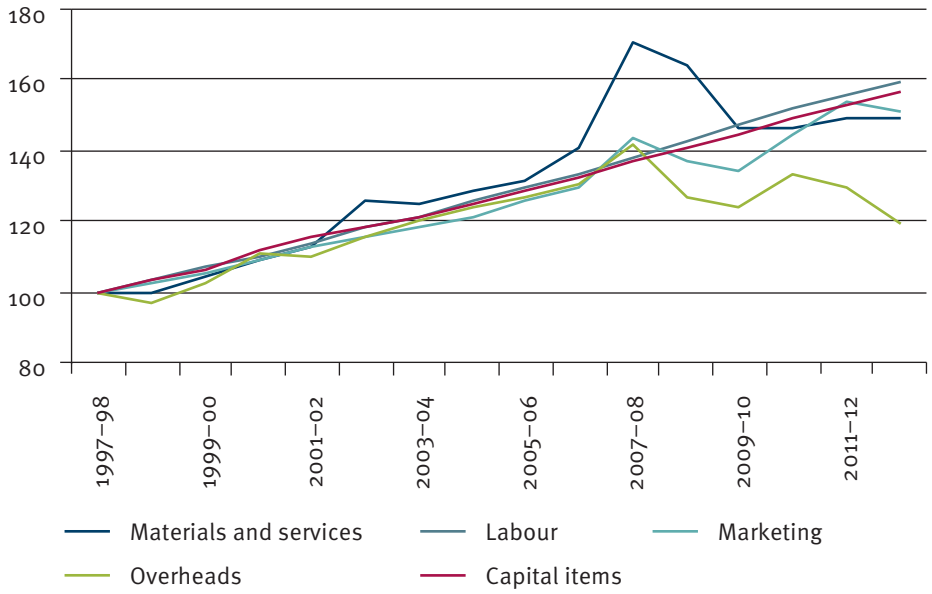
- the effect of the Uruguay round of multilateral trade negotiations in slowing, and partly reversing, growth in price-depressing agricultural subsidy practices by major northern hemisphere producers
- growing demand for food and fibre in China and other emerging economies, which outstrips growth in domestic output
- domestic economic reforms, including more competitive input markets and more successful monetary policy settings, with overall inflation limited to the Reserve Bank of Australia's target of 2–3 per cent per year. This has reduced overall cost pressures, enabling the Australian dollar to move more closely in line with economic fundamentals such as commodity prices.

Figure 5.1 Australian farm prices and costs in 1997–98 = 100



Source: ABARES, 2013

Figure 5.2 Input price indexes for Australian farm cost components, 1997–98 = 100



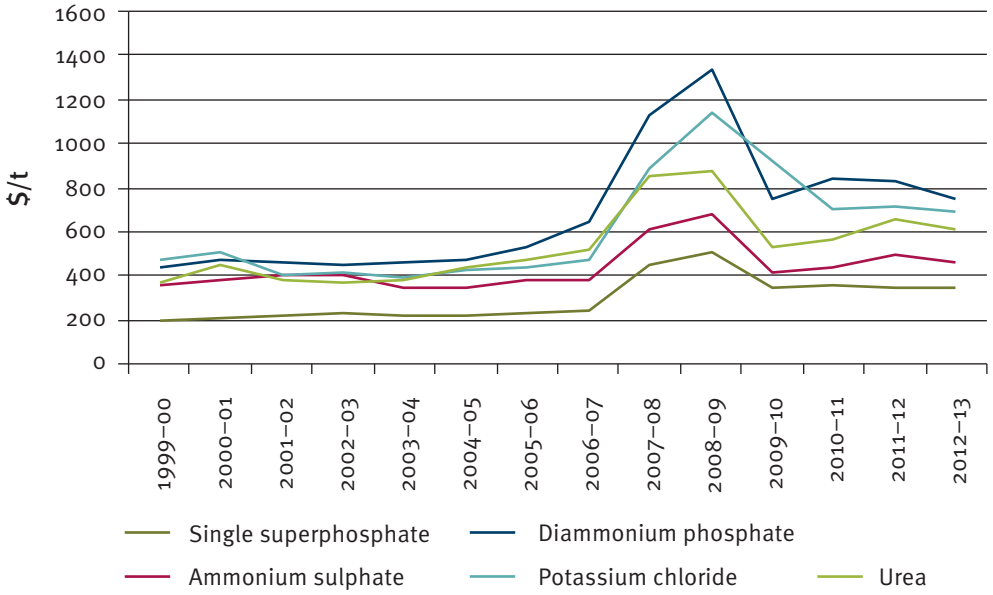
Source: ABARES, 2013

Figure 5.2 illustrates the input price index for Australian farm cost components. It shows that prices paid by farmers for key inputs have risen by an average of 2.5 per cent per year since 1997–98. This figure is marginally less than CPI (3 per cent) over the same period. The largest price increases over the period have been for fuel and lubricants (averaging 5 per cent per annum), insurance (4.4 per cent), electricity (4 per cent) and store and breeding stock (3.7 per cent).

In contrast there has been a visible decline in overhead input costs since 2007–08. This was largely driven by a significant decline in interest rates paid over the period, which was partly offset by increases in the price of insurance.

Currently, input price data is only available at a national level so prices paid by Queensland farmers may differ slightly from the costs detailed above, especially for non-tradeable items such as electricity. However, these figures provide a good indication of the input cost pressures faced by Queensland producers.

Figure 5.3 Australian fertiliser prices



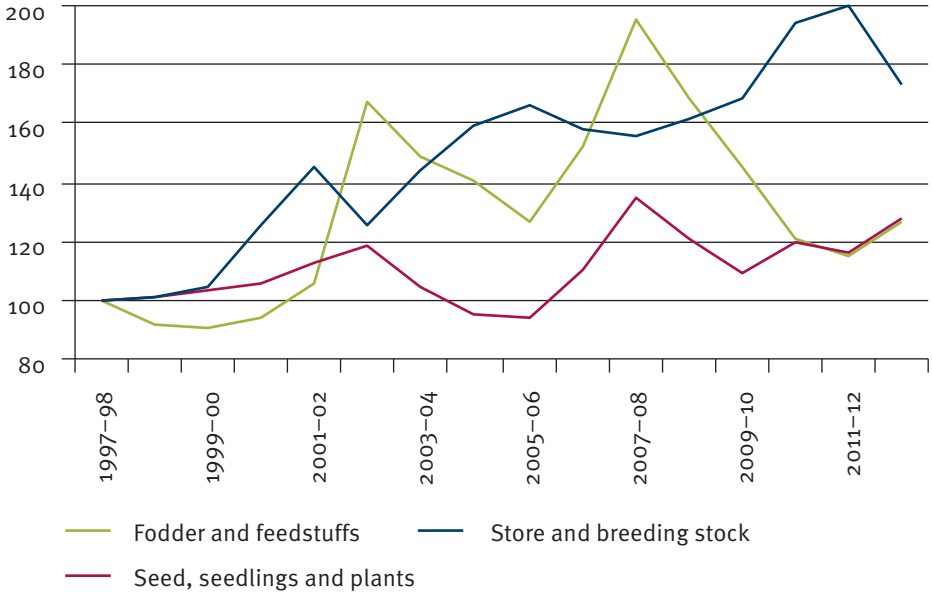
Source: ABARES, 2013

Figure 5.3 shows that fertiliser prices in Australia have fallen from record highs in 2008–09. However, the prices appear to be continuing their long-term trend which has seen them increase by an average of 3.6 per cent per year since 1999–2000.

In 2011–12, 40.3 per cent of Queensland farms used fertiliser. Fertiliser is only used on a small proportion of agricultural land in Queensland—2.7 million hectares or 1.6 per cent of total agricultural land, compared with 7.4 per cent in the rest of Australia. However, the average fertiliser application rate in Queensland (0.44 tonnes per hectare) is over three times higher than the rest of Australia (0.15 tonnes per hectare).[1] Fertiliser is a particularly important input to Queensland's horticulture, sugar cane and broadacre cropping industries.

1 Land management and farming in Australia, 2011–12, ABS, 4627.0

Figure 5.4 Price indexes: Australian seed, fodder and livestock, 1997–98 = 100



Source: ABARES, 2013

Figure 5.4 shows that the price of store and breeding stock in Australia has increased on average by 3.7 per cent per year since 1997–98.

The prices of fodder and feedstuffs have also significantly changed, although the underlying price has only increased by an average of 1.6 per cent per year. Price shocks appear to correlate mainly with droughts, at times when fodder and feedstuffs are in higher demand.

Seed, seedlings and plant prices have been less volatile, increasing by an average of 1.7 per cent per year.

Figure 5.5 shows farm chemical price movements. Chemical prices have increased by an average of 0.8 per cent per year since 1997–98, but have fallen substantially since the pre-GFC peak, as have fertilisers.

Similarly, Figure 5.6 shows farm fuel price movements. These fuel prices increased more strongly than chemical prices in the pre-GFC period but less strongly than some fertiliser prices. However, unlike chemicals and fertilisers, fuel prices haven't recorded substantial falls post-GFC. Since 1997–98, farm fuel prices have increased by an average of 5.1 per cent per year.

Figure 5.7 compares rural wage movements, average weekly earnings across the economy as a whole, and the consumer price index (CPI). Prior to about 2000, rural wages moved broadly in line with average earnings for the workforce as a whole, but have lagged since that time. Rural wages have however outpaced CPI growth, indicating that there has been some increase in real wages of rural workers.

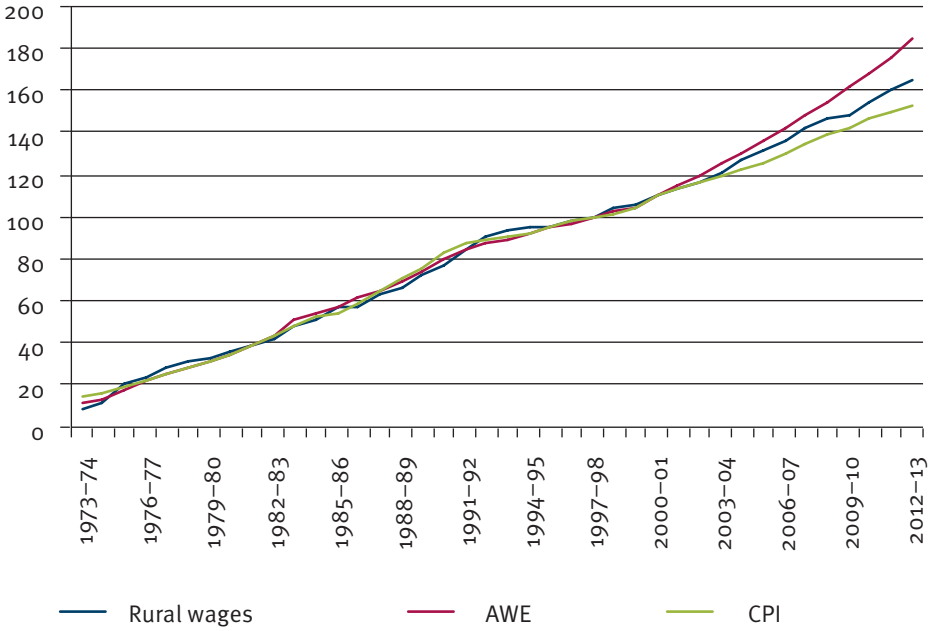
Figure 5.5 Farm chemical prices, 1997–98 = 100

Source: ABARES, 2013

Figure 5.6 Farm fuel prices, 1997–98 = 100

Source: ABARES, 2013

Figure 5.7 Rural wages, average weekly earnings and the consumer price index, 1997–98 = 100



Source: ABARES, 2013

Regulatory costs

There is little information available on the cost of regulating Queensland's agricultural sector. Regulation costs include transactional costs associated with completing forms, costs arising from delays in approvals, and missed opportunities due to regulation. Some examples could include innovative efforts being redirected from productive uses into avoiding regulations, or innovation lost from restricting competition within the industry.

Reducing red tape is critical in ensuring Queensland's economic growth is not constrained by an unnecessary and excessive regulatory burden. The Queensland Government is committed to reducing red tape by 20 per cent by 2018 to reduce costs for businesses, not-for-profit organisations, community groups, families and individuals.

To achieve this aim, the Queensland Government has implemented a comprehensive and rigorous framework for reducing the regulatory burden. Substantial reforms have been implemented across all sectors of the economy, ranging from major legislative reforms to specific administrative changes.

A key focus of the Government's reform agenda has been to reduce red tape for agricultural industries in areas such as environment and vegetation management, land management, water supply and biosecurity.

Many of these reforms will deliver significant time and cost savings to agricultural businesses and broader economic benefits to Queensland over time. Examples of the key reforms providing direct and tangible benefits for agriculture include:

- streamlining the vegetation management framework—so landholders can carry out routine management activities such as thinning, weed control, fodder harvesting and clearing of vegetation encroachment without the need to regularly apply for permits
- streamlining low-risk environmentally relevant activities (ERAs)—to reduce the range of activities regulated as ERAs, providing savings for agricultural businesses
- implementing area management plans for vegetation clearing activities—these plans cover a range of vegetation clearing activities and remove the need for separate and individual development permits
- removing the requirement for land and water management plans—amendments to the *Water Act 2000* will remove the requirement for these plans. This will reduce paperwork and compliance costs, saving over $6 million annually
- simplifying land management for pastoral leases—providing efficiencies in the management and monitoring of land condition for state rural leasehold land
- simplifying the renewal process of water licences—up to 27 000 farmers and landholders will no longer have to apply to renew their water licences, however they still need to continue ensuring they responsibly manage water resources
- simplifying biosecurity legislation—the *Biosecurity Act 2014* and associated regulations will provide a simplified, consolidated legislative framework for managing biosecurity risks in Queensland
- implementing sugar cane industry best management practices—this will help achieve soil health and pest, weed and water management without the need for regulatory impost.

Case study

Kalei apple

The Queensland apple industry contributes $40 million per year to the Southern Downs regional economy. With apple scab—a major fungal disease—costing upwards of $10 million in chemical control and fruit losses annually across Australia, the industry looked to DAFF horticultural researchers for a solution.

DAFF researchers crossed a wide range of apple parents and evaluated over 100 000 cross breeds during a 20-year search for the perfect combination of disease resistance, yield, taste and quality. As very promising lines emerged, Horticulture Australia Limited and Apple and Pear Australia Limited (APAL) provided additional financial support.

The Kalei apple resulted from this research. The Kalei is bred without using chemicals or genetic engineering. It is not only resistant to apple scab, it also tastes great and retains firmness and crispness even after long-term storage. It is widely expected to be the world's first, great-tasting, organically-grown apple. As this variety is also high-yielding when grown on modern trellised systems, there is real potential for orchardists to greatly improve productivity.

While DAFF focuses on the research and development, commercialisation partners are bringing the product to market. After running a competitive tender process to select the most suitable industry partner to commercialise the Kalei apple, a licence agreement was signed with Coregeo—the commercial arm of APAL—to market the variety worldwide. Kalei trees are currently being grown by accredited nurseries and commercial planting has begun.

While the Kalei apple is still on its way to market it is expected to help agribusinesses reduce the use of chemical treatments, improve yields and grow the profitability and size of the industry.

Costs of invasive plants and animals

Invasive plants and animals continue to put significant pressure on agricultural industries in Queensland. Queensland is home to many species that have been either deliberately or accidentally introduced since European settlement (see Figures 5.8, 5.9 and 5.10). Those pest species considered to pose the most significant threat to Queensland are declared Class 1 and Class 2 pests under Queensland legislation. Some species have become invasive, meaning they have spread and multiplied to the point where they can cause damage to agriculture, the environment, human health and recreation. There is potential for the distribution of these pests and new ones to increase across Queensland, causing greater impact to agricultural productivity (see Figure 5.11, 5.12 and 5.13).

A variety of terrestrial and aquatic weed species are normally found in highly-populated areas. (Refer to the following figures for class 1 and 2 pest animals and weeds.)

Figure 5.8 Number of observed Class 1 and Class 2 terrestrial pest plants

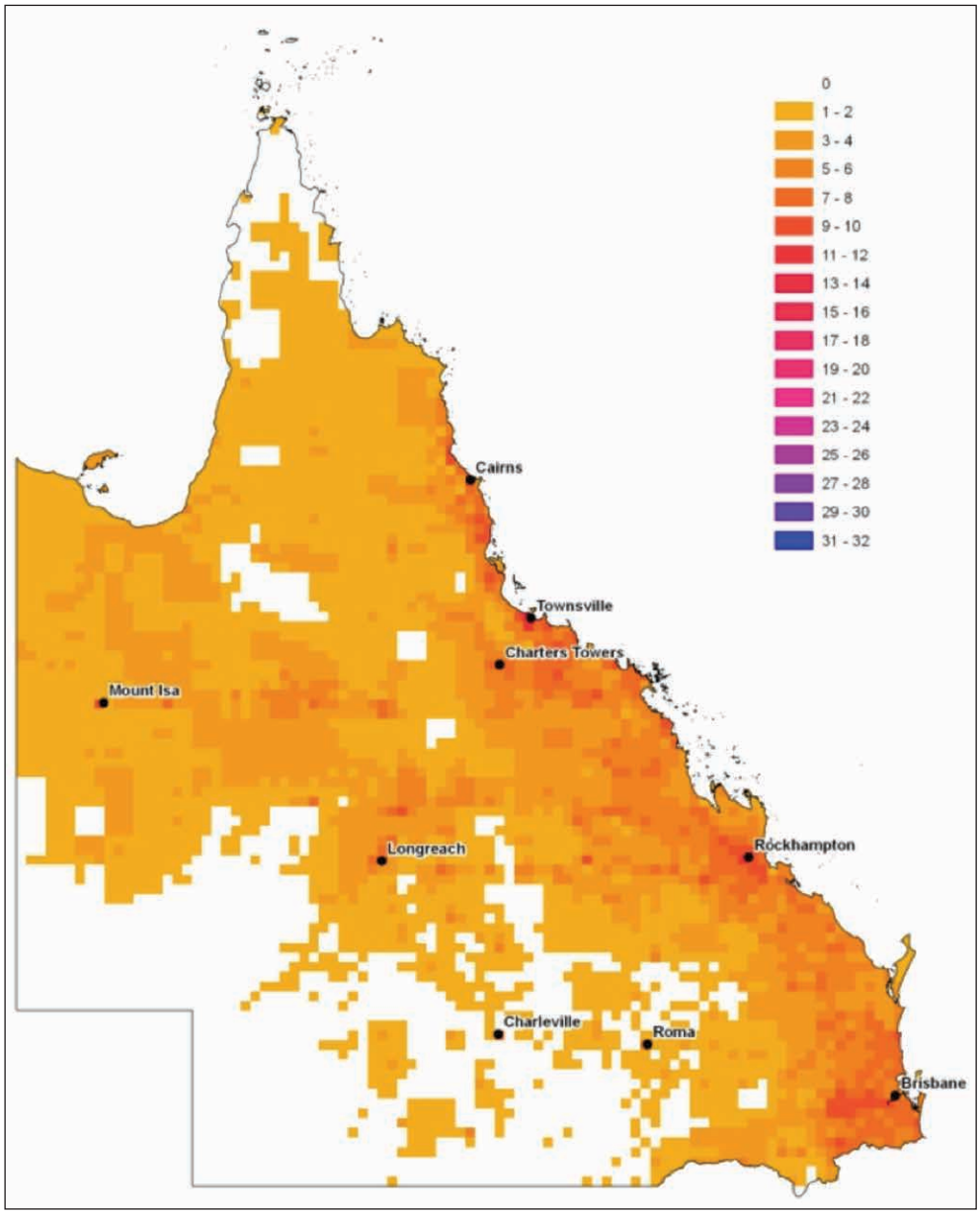
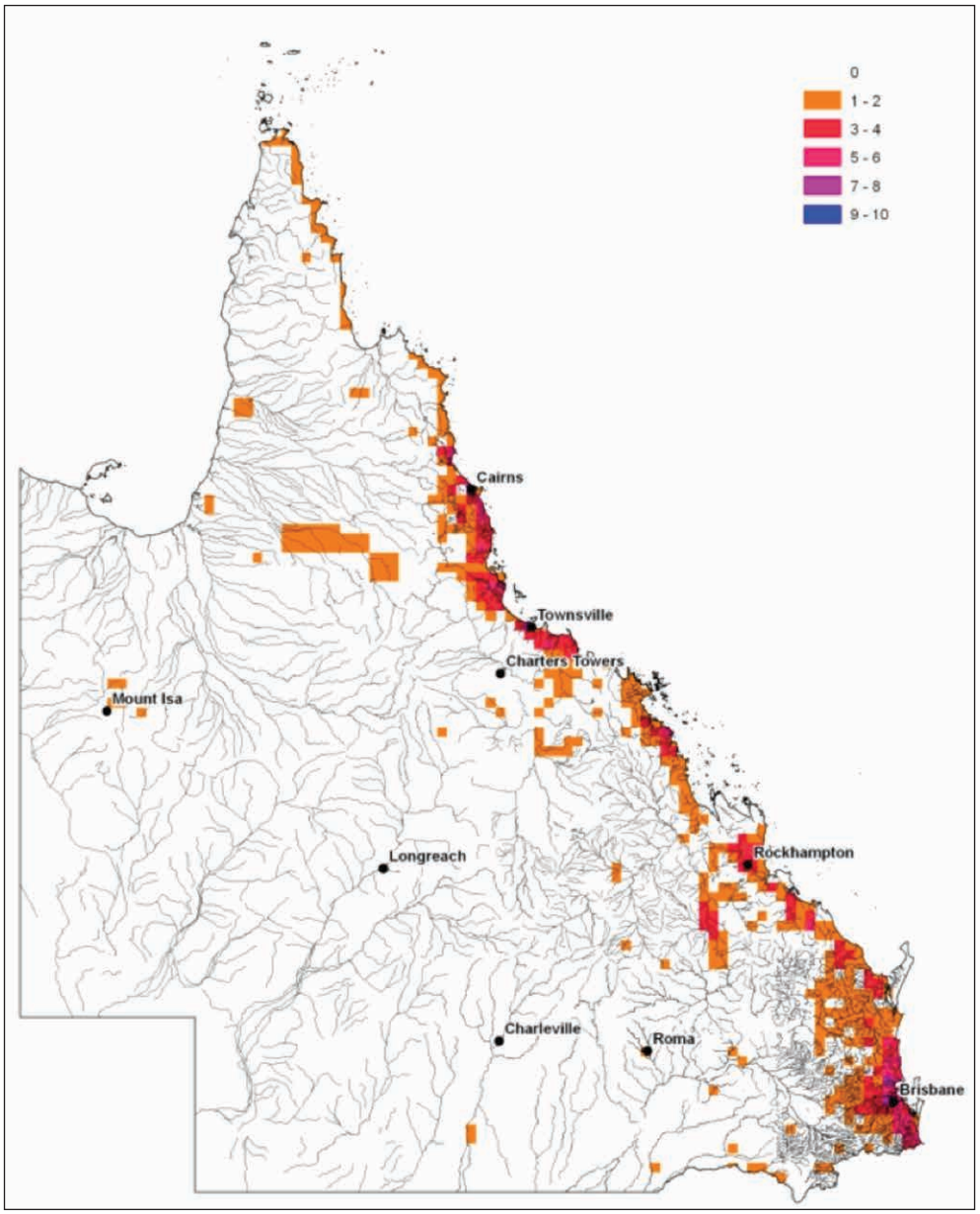


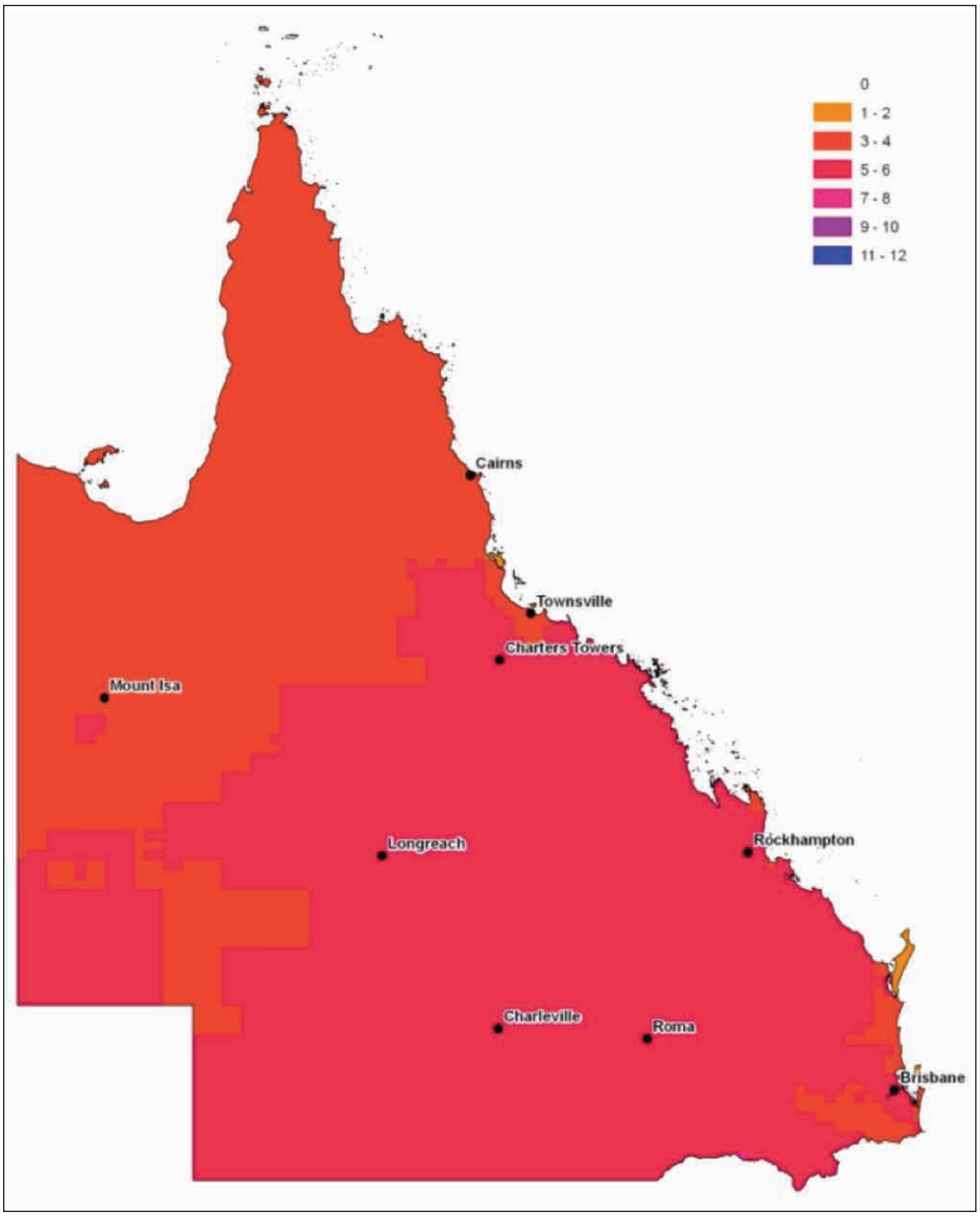
Figure 5.9 Number of observed Class 1 and Class 2 aquatic pest plants



This trend is reversed for terrestrial pest animals where a larger variety of pest animals are observed in less populated, rural areas.[2]

2 Annual pest distribution maps (2011 dataset), DAFF, Queensland Government, 2014, http://www.daff.qld.gov.au/plants/weeds-pest-animals-ants/pest-mapping/annual-pest-distribution-maps

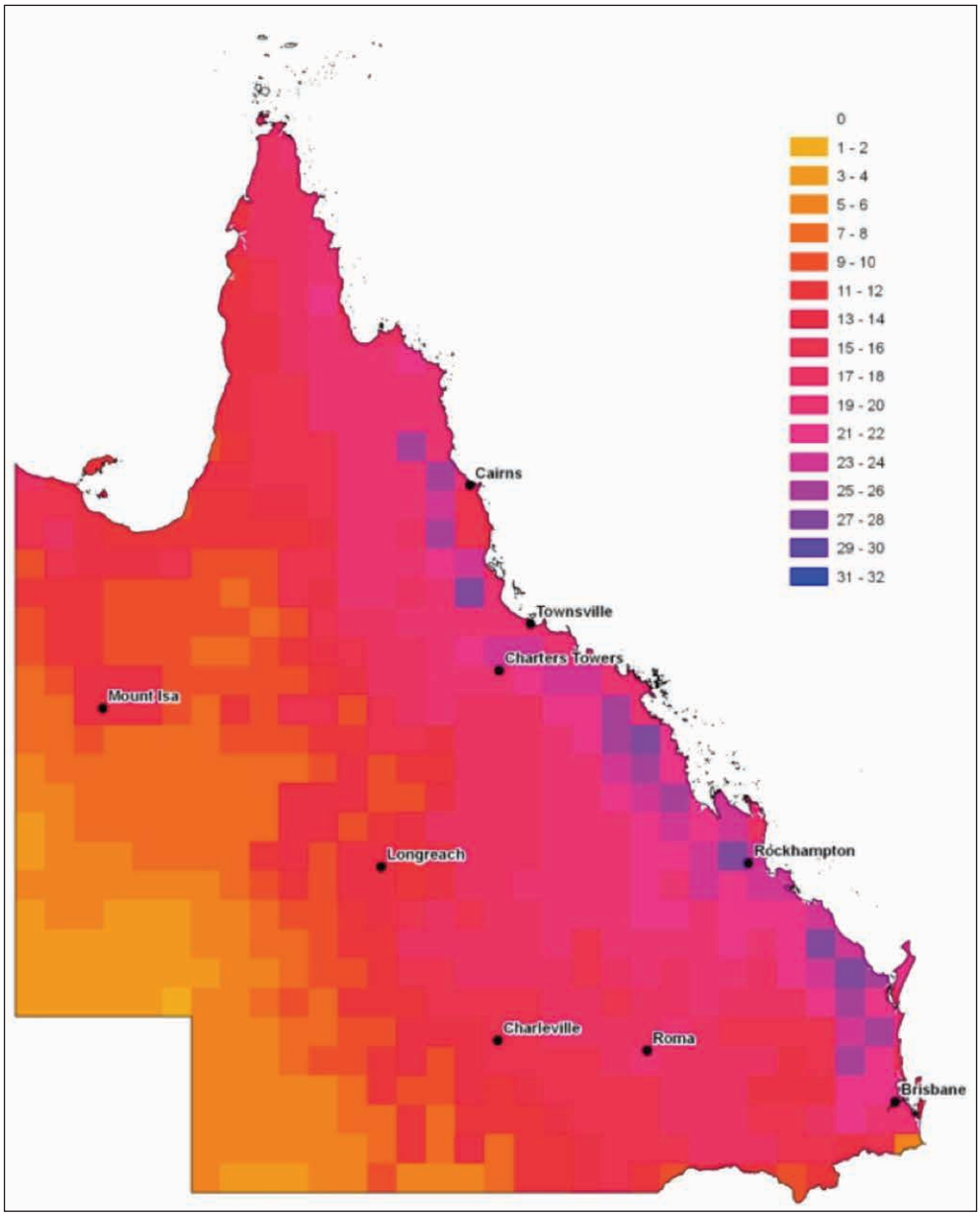
Figure 5.10 Number of observed Class 1 and Class 2 terrestrial pest animals



Potential maximum extent of pests

Based on predictive mapping, current Class 1 and most Class 2 terrestrial weeds do not occupy their maximum distribution and therefore have significant potential to spread.[3] (Refer to figures for potential Class 1 and 2 species distribution.)

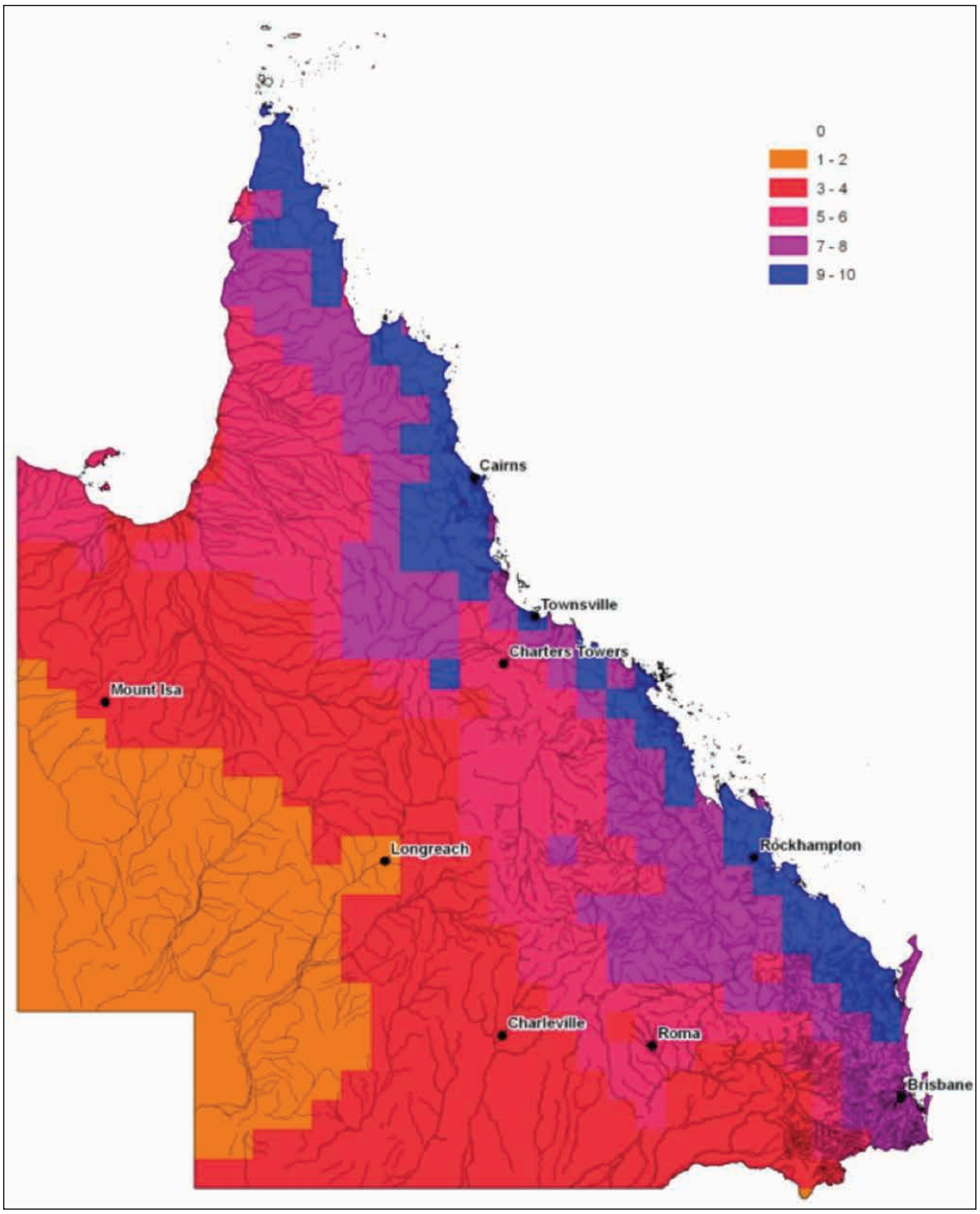
Figure 5.11 Potential number of predicted Class 1 and Class 2 terrestrial pest plants



Aquatic weeds, such as alligator weed, have the potential to increase their current distribution from scattered populations in South-East Queensland to continuous populations along the entire Queensland coast and into future agricultural growth cropping lands.

3 Predictive pest maps, DAFF, Queensland Government, 2014, http://www.daff.qld.gov.au/plants/weeds-pest-animals-ants/pest-mapping/predictive-pest-maps

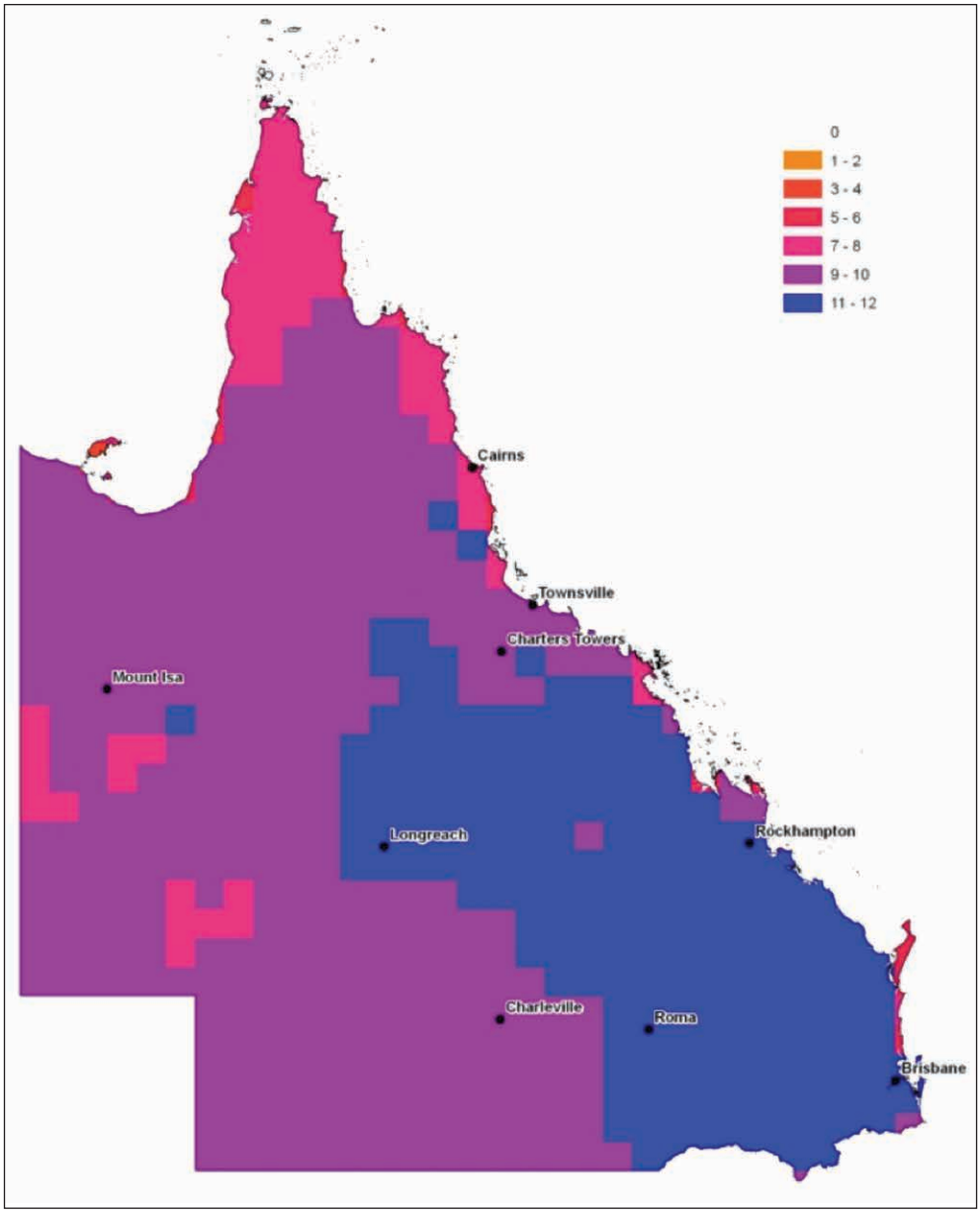
Figure 5.12 Potential number of predicted Class 1 and Class 2 aquatic pest plants



While Queensland is currently free of any formally recognised marine pests the warm climate provides a suitable habitat for pests, such as Asian green mussels and Asian bag mussels, to establish.

With the exception of feral deer most pest mammals are widely distributed throughout Queensland. Continued introductions of other species may also result in further pressure in rural areas.

Figure 5.13 Potential number of predicted Class 1 and Class 2 terrestrial pest animals



In 2013, the Queensland Government's weed spotter project provided 92 notifications on 49 declared and special watch species that have been found for the first time or have expanded their range. While it is important that new incursions are found quickly, pest plants can sometimes be present for many years before they are detected or even recognised as having potentially adverse impacts. For example, red witch weed, which looks similar to other native species, was formally detected in 2013 although investigations indicate it may have been present for some time.

Since 2011, Queensland has seen the arrival of over 20 pest animal species including ferrets, boa constrictors, American corn snakes, a saw-scaled viper, red-eared slider turtles and a Chinese striped-neck turtle. These species have been removed and are not known to be present now.

In 2008 and 2011 areas such as Clifton and Maranoa experienced plagues of mice. Significant increases in rainfall since 2008 produced favourable conditions and population increases for a number of terrestrial pest animals, such as wild dogs, feral pigs and feral deer.

Most pest animals in Queensland were introduced at the time of European settlement as a source of food, and for sport and aesthetic value. Today, potential pest animals are most likely to be introduced legally and illegally as pets, or unintentionally through the transport of goods and people. The small size of invertebrates, the increasing speed of international transport and our proximity to South-East Asia increases the chance of these potential pests being introduced and evading detection.

Pest plants can be introduced through the transport of goods and people. Seeds can hitchhike to new locations via vehicles, machinery and equipment, clothing and on the soles of shoes. Stock movement can also cause weeds to spread if animals consume weed seeds at their point of origin and then defecate them at a location not previously infested. Products such as hay, silage and seed for planting can also be contaminated with weed seed and transported to new sites.

A number of production industries have been identified as potential sources of weed introduction. Approximately 70 per cent of the nearly 2000 agricultural and environmental weeds in Australia began as garden specimens[4], while the others have been introduced through production industries. Increased online trading of plants and seeds make it particularly difficult to control the introduction of potentially invasive species. Plants cultivated for pasture or fodder can also invade adjacent habitats.

Costs related to invasive plants and animals include:

- direct management costs on farms (e.g. for the use of chemicals)
- prevention, detection and eradication program costs incurred at federal, state and local government levels. The 2013–14 budget for Biosecurity Queensland is $93.6 million[5]; while the Federal Department of Agriculture's budget for animal and plant health is $558.9 million[6]
- productivity losses due to the presence of invasive plants and animals, both directly and indirectly (e.g. from increased fire risk)
- costs arising from impacts to the environment, recreation activities and human health etc.

In 2006–07, 86 per cent of agricultural businesses in Queensland reported conducting weed control activities and 81 per cent reported conducting pest animal control activities. Expenditure was $269 million and $182 million respectively, and 52 per cent of these costs were for herbicides and pesticides.

4 Groves, RH, Boden, R & Lonsdale, WM 2005, *Jumping the garden fence: invasive garden plants in Australia and their environmental and agricultural impacts*, CSIRO report prepared for World Wildlife Foundation, Sydney

5 DAFF Service Delivery Statement, 2013–14

6 DAFF Portfolio Budget Statement, 2013–14

According to a report[7] by the Invasive Animals Cooperative Research Centre, the direct economic impact from pest animals is $743 million. The report conservatively estimates that pest animals cost Queensland $215 million per year by preying on livestock, causing crop losses, competing for pasture and spreading diseases. Other uncosted environmental and social impacts include overgrazing, predation, competition, poisoning, spreading diseases to humans and pets, and traffic hazards.

Invasive terrestrial weeds cost Queensland an estimated $600 million each year in primary production losses and control costs. Weeds also degrade the natural environment and can pose health and safety risks for humans and animals, for example parthenium can trigger significant hay fever and respiratory reactions in humans.

Increasing distribution of pest animals and weeds has potentially negative implications for agricultural industries, including:

- rising costs of production
- reduced viability of industries
- damage to water infrastructure
- increased management costs to reduce water weed impacts
- increased costs to prevent spread from machinery and equipment into new areas
- increased social trauma to landholders from stock loss and crop damage.

An internal DAFF report by Price Waterhouse Coopers conservatively estimated that the risk to Queensland from weeds and pest animals would, if left unchecked, escalate to $1.1 billion each year. Specific costs were: $380 million for established pest animals such as wild dogs and feral pigs, $227 million for established weeds such as prickly acacia and parthenium, and $194 million for water weeds including water hyacinth and salvinia.

7 Gong W, Sinden J, Braysher M and Jones R 2009, *The economic impacts of vertebrate pests in Australia*, Invasive Animals Cooperative Research Centre, Canberra

Case study

Sorghum

Local and international interest in more drought tolerant crops, such as sorghum, has intensified as climate variability has impacted agricultural productivity . Sorghum is important to Queensland's economy as it is the world's fifth most important cereal and is a staple food crop.

As a result, Queensland's sorghum research program has grown in importance and Queensland is taking a leading role in sorghum research throughout Australia. Given sorghum's role in food security in Africa, the research program also has international recognition.

The sorghum program is at the leading edge of sorghum-breeding technologies', and is funded by the Queensland Government, Australian farmers through the Grains Research and Development Corporation, seed companies (such as Pacific Seeds and DuPont Pioneer), the Australian Research Council, and the Bill & Melinda Gates Foundation. The research is regionally led from the Hermitage Research Station near Warwick, and other research stations throughout Queensland support testing.

Research focuses on:

- building resistance to the sorghum midge, drought, sorghum ergot and Johnson Grass Mosaic Virus
- increasing genetic diversity and improving hybrids
- increasing feed grain quality
- improving grain yield.

This joint research effort has seen increased yields of 28 per cent since 1985, particularly through high-yielding hybrids such as MR Buster, MR43 and Bonus MR.

A reduction in spraying to control sorghum midge, has significantly reduced (›100 000 litres) the amount of Chlorpyriphos entering the environment. The estimated total average benefit from midge resistance alone is $20 million annually.

As well as 'growers … seeing tangible benefits in their sorghum paddocks' this critical research collaboration has achieved advances in breeding, physiology and bioinformatics—which all help to position Queensland as a knowledgeable economy.

Supply chains

Agricultural producers are major users of Queensland's freight network. This freight network supports producers in getting agricultural commodities to market. Queensland's primary freight network includes:[8]

- 13 600 kilometres of road (supported by state-controlled, local-controlled and franchised road networks — totalling a length of 227 000 kilometres[9])
- 9550 kilometres of rail line (including a combination of publicly and privately managed, narrow, standard and dual gauge lines), plus a further 3980 kilometres of specialised cane rail
- 15 trading ports
- 3 international airports and multiple domestic airports
- 3 key intermodal rail freight terminals and multiple smaller freight terminals and rail sidings.

Figure 5.14 highlights the critical road and rail links that support agricultural producers in getting their products to processors and to market.

Agriculture commodities and their derivatives, including livestock, are the second most valuable export for Queensland. In 2012–13, Queensland exported over 9 million tonnes of agricultural products including food, beverages and live animals (3.2 million tonnes), grains, cereals and cereal preparations (2.7 million tonnes), animal and vegetable oils, fats and waxes (0.3 million tonnes)[10], and sugar (approximately 3 million tonnes). This represents 4.2 per cent of the total volume of exports from Queensland.

8 *Moving Freight*, Department of Transport and Main Roads

9 *Australian Infrastructure Statistics Yearbook 2013*, Bureau of Infrastructure, Transport and Regional Economics

10 *Moving Freight*, Department of Transport and Main Roads

Table 5.4 Transport inputs, 2005–06 ($m)

Industry	Road	Rail	Other	Total
Sheep	4.0	0.3	0.7	5.0
Grains	27.4	2.8	9.9	40.1
Beef cattle	105.3	2.8	10.3	118.4
Dairy cattle	14.6	0.3	0.7	15.6
Pigs	11.3	0.4	0.6	12.3
Poultry	19.6	0.5	4.4	24.6
Vegetables	44.7	1.7	3.4	49.8
Fruit	40.1	1.3	3.4	44.8
Cotton	4.8	0.5	0.4	5.7
Other agriculture	19.4	0.5	1.8	21.7
Services to agriculture	3.5			3.5
Sugar cane growing	22.0	1.7	2.1	25.9
Forestry and logging	2.6	0.1	0.2	2.9
Commercial fishing	5.5		1.0	6.5
Meat and meat products	330.8	6.5	14.3	351.6
Sugar manufacturing	11.4	0.7	10.0	22.2
Other food manufacturing	419.0	42.0	129.9	590.8
Wood and paper manufacturing	139.8	16.0	156.6	312.4
Total	**1 225.7**	**78.3**	**349.7**	**1 653.6**
Percentage	**74.1**	**4.7**	**21.1**	**100.0**

Source: Updated OESR Input–output tables

The road transport sector was responsible for three-quarters of the transport inputs into the agriculture, fisheries and forestry sector in 2005–06 by value, with rail's share under 5 per cent. The industries listed in Table 5.4 were responsible for 15 per cent of the intermediate demand for transport services in Queensland in 2005–06.

In 2011–12, trucks carried 77.9 million tonnes of agricultural products in Queensland. This represented 21 per cent of the national total and 15 per cent of the total tonnage carried by trucks in Queensland. Nationally, road transport of agricultural products increased at an annual average rate of 2 per cent over the decade to 2011–2012.[11]

11 *Survey of motor vehicle use*, Australia, 12 months to 30 June 2012, ABS, 9208.0

The Australian Farm Institute[12] estimated that transport costs were equivalent to 13.1 per cent of the farm gate price in delivering beef from Queensland to Japan, and 13.4 per cent of the farm gate price in delivering bananas from northern Queensland to Melbourne.

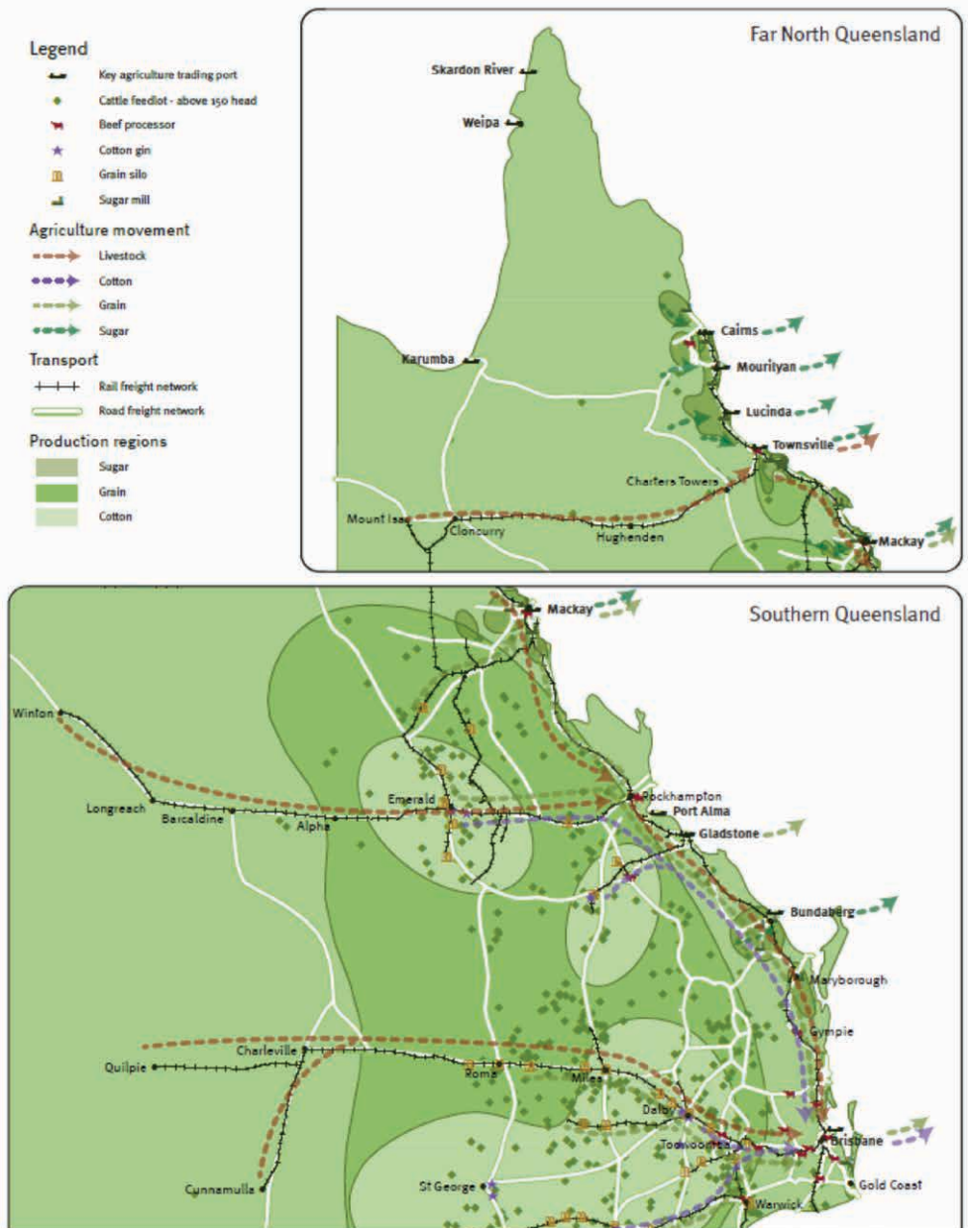
- For the beef case study, road transport from the farm to the processor accounted for 18.5 per cent of the transport cost, road transport from the processor to the port accounted for 20.2 per cent, and sea transport to Japan accounted for 61.3 per cent.

- For the banana case study, the estimate is likely to be affected by the circumstances of recovery from cyclone damage at the time of the case study. The author estimates a more 'normal' figure of 24.6 per cent of farm gate price.

Other case studies in the same study show a wide range of transport costs, ranging from 4.1 per cent of the farm gate price in delivering New South Wales apples to Sydney to 48.5 per cent in delivering New South Wales grain to Japan.

12 *Transport Costs for Australian Agriculture*, December 2011, Australian Farm Institute

Figure 5.14 Key agricultural production areas and critical road and rail links supporting agriculture



Source: *Moving freight – A strategy for more efficient freight movement*, Department of Transport and Main Roads

Medium-term industry outlooks

Summary

This section provides medium-term outlooks for Queensland's main primary industries including cattle and calves, poultry, pigs, sheep and lambs, milk, eggs, wool, fruit and nuts, vegetables, sugar, cotton, cereal grains, fisheries and forestry and timber.

The medium-term outlook provides a prospectus for each of these industries in Queensland over a period of three to five years, based on current information.

A brief summary has been provided for each industry, outlining past trends and forecasts for the medium term, along with some of the key opportunities and challenges that may impact on the final outcome for each of these industries over the medium term.

Looking forward, the majority of Queensland's primary industries are projected to grow. Over the medium term to 2018–19, expectations for key commodities are for:

- **cattle slaughter** rates to increase gradually as Australia's cattle herd is forecast to continue to move north to Queensland and the Northern Territory
- national **poultry meat** industry GVP to grow strongly. Queensland is expected to lead this trend
- Queensland **pig meat** production growth and prices to be slightly higher than the national average
- Australian **milk production** to rise to approximately 10.1 billion litres in 2018–19, reflecting further increases in milk yield per cow
- national **egg industry** revenue to grow by 12 per cent. Queensland is forecast to follow this trend
- Queensland's **wool industry** to grow steadily with prices expected to peak at 1155 cents a kilo in 2015–16
- Queensland's **fruit and nut** industry to increase production, reflecting rising global demand
- further switching from mainstream crops in Queensland **cereal grains**, such as wheat, sorghum and barley, into more minor but higher value crops
- continuation of relatively healthy output levels for **sugar** and **cotton**
- future market opportunities for **timber and wood products** due to population growth and associated housing demand consistently increasing timber demand
- stability in **fisheries** production and increasing opportunities in **aquaculture**.

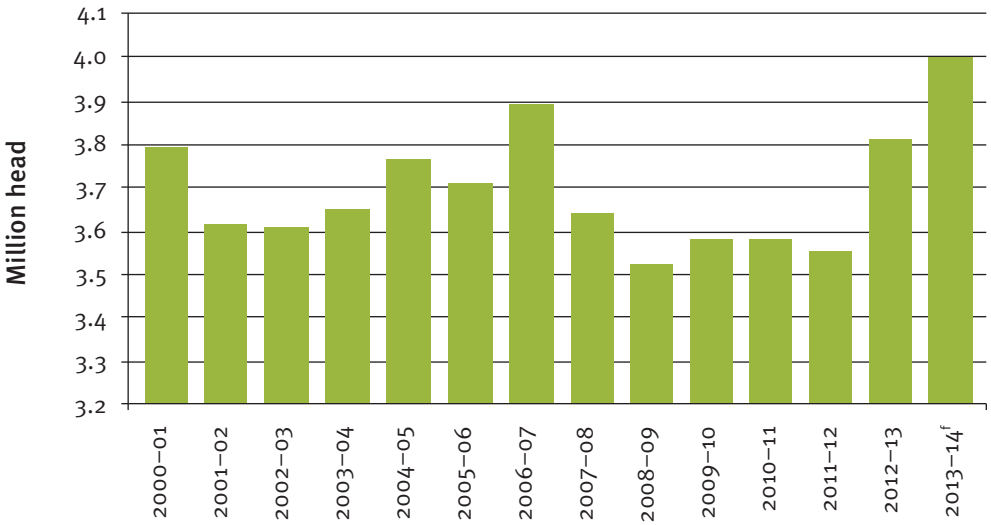
Cattle and calves[1]

Past trends

To date, Australia's beef herd has been moving north due to more reliable seasonal conditions (such as an annual wet season), improved access to processing and lot feeding facilities, exposure to both the live export and slaughter trade, and a lack of competition in many regions from other enterprises (such as crops and sheep that exist in the southern states). More than 59 per cent of total beef cattle are now found in Queensland, the Northern Territory and at the top of Western Australia. This proportion has grown from about 54 per cent in 1998, while the total number of beef cattle in northern Australia has grown at a compound rate of approximately 1.6 per cent per annum since the low point of 1988.

Cattle and calf slaughterings in Queensland steadily increased from 2001–02 to a drought induced high in 2006–07. From 2007–08 to 2011–12 Queensland slaughterings stabilised at approximately 3.55 million per head per annum. Drought conditions in 2012–13 saw a 7 per cent increase from the prior four-year average of slaughterings (see Figure 6.1).

Figure 6.1 Cattle and calf slaughterings in Queensland

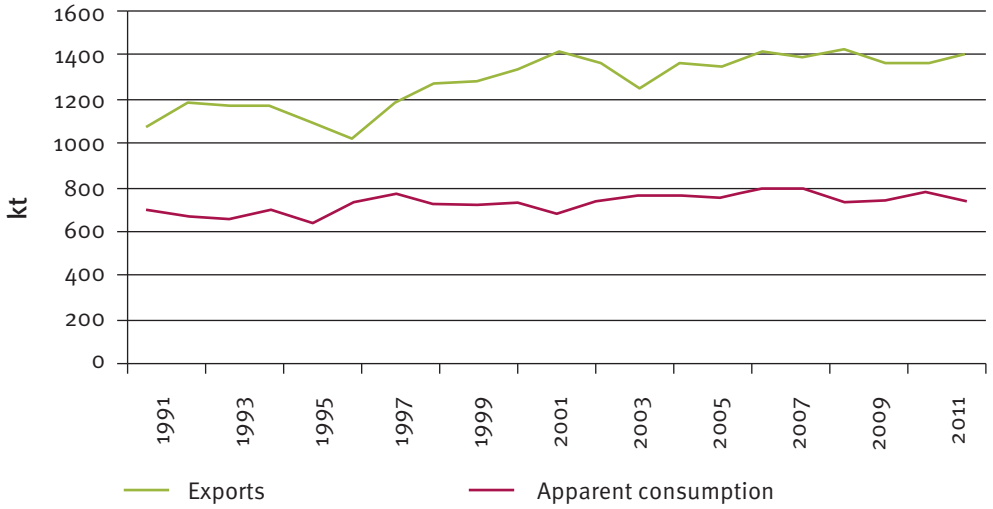


f forecast

Domestic consumption of beef has grown at about 0.35 per cent per annum over the long term and the rate of growth appears unlikely to increase (see Figure 6.2). Exports of beef have grown at about 1.3 per cent per annum over the same period.

1 This section is in part a summary of *Australian cattle industry projections* published in 2014 by Meat & Livestock Australia Ltd (MLA), supplemented with data sourced from the Australian Bureau of Statistics (ABS) and the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES).

Figure 6.2 Australian beef exports and apparent consumption

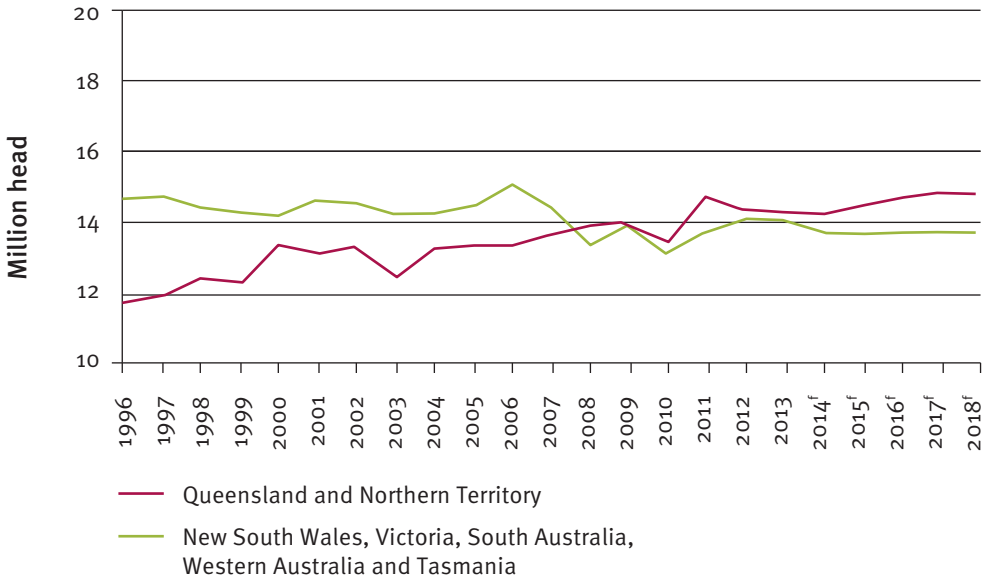


Sources: ABARES; *Agricultural commodities*, Australia, ABS, cat. no. 7121.0; *Livestock products*, Australia, ABS, cat. no. 7215.0; Export statistics, Canberra, DAFF

Forecasts

In the medium term Australia's cattle herd is forecast to continue to move north (see Figure 6.3).

Figure 6.3 Australian cattle herd by state and territory



f forecast

Source: MLA forecasts as at 31 March 2014; ABS

Australian adult cattle slaughter rates are forecast to increase gradually through to 2017–18, based on the assumption of improved branding rates from late 2014 onwards and the assumption of average seasonal conditions. By 2018, adult slaughter is forecast to reach 7.85 million head, which is still well below the drought-inflated 2013 slaughter.

Meat & Livestock Australia Ltd (MLA) forecasts that Australian beef and veal production in 2013 will exceed 2.2 million tonnes cwt for the first time on record. This is mainly due to a 3.7 per cent increase in adult cattle slaughter, along with high carcass weights.

MLA also expects Australia's beef and veal production to increase gradually with beef production forecast to hit 2.34 million tonnes cwt in 2017 (up 8.1 per cent on 2012), as adult cattle slaughter starts to reach levels that impact total herd numbers.

Australia's beef exports are expected to continue to increase. The USA is forecast to be the fastest expanding market (in volume terms) in 2013 for the second year running. Growth is also expected to continue in most of the smaller Asian markets, along with the Middle East, while the increased access for Australian beef into Europe is expected to again assist grainfed exports.

Markets for Australian beef that are forecast to be tougher in 2014 include the major markets of Japan and Korea, along with Indonesia and Russia.

MLA see the outlook for the live cattle sector continuing to be tough, with tightening import permits into Indonesia impacting on the viability of northern Australian producers. A further reduction in import permits in 2014 is expected to increase the pressure for cattle producers to find alternative markets, which will be accentuated if the 2013–14 wet season continues to be below expectations. However, judging by the limited success in expanding live export markets over the past year, the longer term outlook for the trade still seems heavily reliant on Indonesia.

Opportunities

- There is increasing demand for quality protein due to rising incomes in a range of emerging market economies.
- Opportunities exist for increased exports to the United States as the US cattle industry is expected to enter a rebuilding phase, characterised by lower cow slaughter and reduced domestic manufacturing beef production.
- Opportunities exist for increased beef exports to the Republic of Korea as their beef production is likely to fall as more producers take advantage of government subsidies to exit the industry because of poor profitability.
- Vietnam is likely to become an increasingly important market for live cattle exports in the short term. Vietnam, the Philippines and Malaysia are important markets for northern Australian cattle producers because they impose no restrictions on the number of cattle imported or on cattle weight.

Challenges

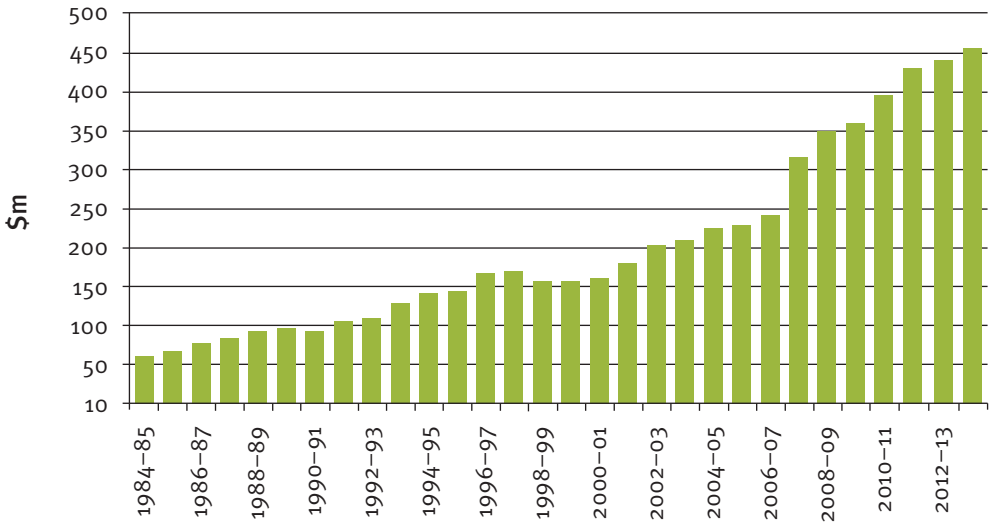
- Increased competition in the Japanese market is expected from the US beef industry.
- Competition from other beef exporting countries in the Chinese market is expected to increase.
- Maintaining Queensland's disease-free status

Poultry

Past trends

The gross value of poultry meat has broadly increased since 2001–02, with particularly strong growth from 2007–08 onwards. This mainly reflects production growth but also a small contribution from price increases.

Figure 6.4 Value of poultry meat produced in Queensland



Source: Value of agricultural commodities produced, Australia (various years), ABS, cat. no: 7503.0

Forecasts

Growth in national poultry meat industry revenue is forecast to be moderate over the medium term according to IBISWorld, whilst ABARES forecasts strong industry growth in terms of gross value of production[23] (see Figure 6.5). Underpinning both ABARES and IBISWorld forecasts is an assumption of consecutive growth in the levels of production, supported by increases to poultry prices both at the retail level and to a lesser extent at the farm gate.

Production growth in the poultry industry is forecast over the medium term to be characterised by two main factors—productivity improvements and increases to the quantity of poultry being produced. Continued genetic improvements are expected to allow producers to improve productivity through increases to meat yield per bird, feed conversion efficiency and disease resistance.

Growth in the poultry industry over the medium term is expected to be supported by an increase in per capita chicken meat consumption, as it retains its price competitiveness against substitute meats such as beef, lamb and pig meat. Australian consumption per person is projected to increase to 47.7 kilograms in 2018–19, which is an 8.4 per cent increase from 2011–12.

2 Sivasailam, N 2012, *IBISWorld Industry Report C2112: Poultry processing in Australia*, IBISWorld, Melbourne, p.7

3 *Agricultural Commodities*, Volume 4, Number 1, March quarter 2014, ABARES

Figure 6.5 Forecast growth in Australia's poultry production

f forecast

Source: ABARES, 2014

Queensland poultry meat export growth should mirror the ABARES projection for national poultry meat exports to 2017–18. ABARES does not project imports of poultry meat.

Opportunities

- There may be opportunities for further automation and efficiencies in poultry production systems over the medium term. When coupled with genetic improvements, these opportunities will allow for more efficient feed conversion and will also help the industry stay competitive, increase profits and limit price increases.
- There are favourable prospects for an increase in the export of value-added poultry products, exotic poultry and specialty poultry products such as chicken feet for Asian markets.

Challenges

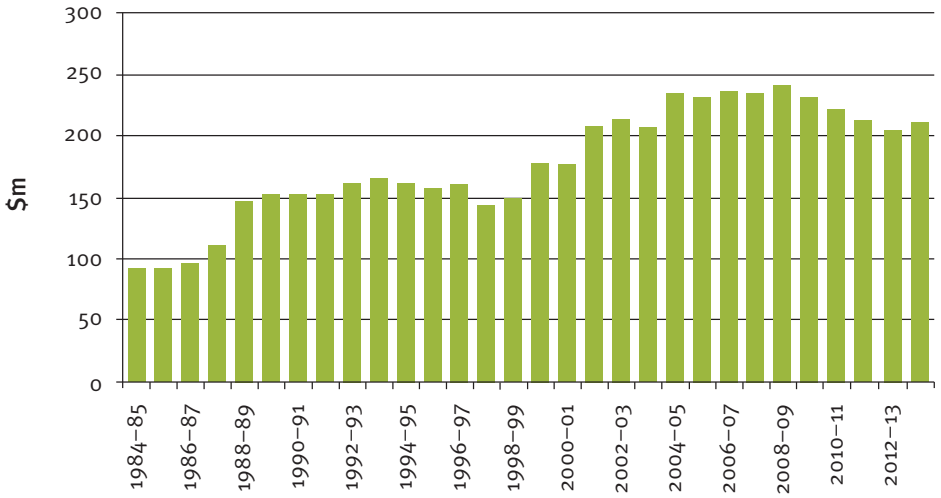
- The poultry industry is expected to face increasing competition from substitute meats such as beef and lamb. The price competitiveness of poultry meat may come under threat as more red meat (beef and lamb) is sold on the domestic market due to the high Australian dollar and weaker export markets. Furthermore, red meat industries have produced campaigns that raise awareness about the health benefits of red meat.
- The likelihood of increased import of processed meats will be a significant concern over the medium term as they will compete with domestic supplies. Importation requirements are a key concern for biosecuity to ensure that the Australian poultry industry remains free of diseases such as avian influenza.
- Maintaining disease-free status in the face of sporadic outbreaks of avian influenza through appropriate and timely responses.

Pigs

Past trends

The gross value of production (GVP) for pig meat has been variable over the past decade, falling over the four years leading up to 2012–13, but it is now expected to recover slightly to $210 million in 2013–14 (see Figure 6.6). This period of decline reflected strong import competition and declining export returns which, in turn, partly reflected the strong Australian dollar.

Figure 6.6 Value of pig meat produced in Queensland



Source: Value of agricultural commodities produced, Australia (various years), ABS, cat. no: 7503.0

Forecasts

Queensland pig meat production and prices are forecast to be slightly higher than the national average in the coming five years according to Queensland Pork Producers Inc. Similarly, exports are likely to be slightly above the national average in the coming five years. This is partly due to Queensland's proximity to major Asian export markets, meaning lower freight times.

Growth in national pig meat industry revenue is expected to be marginal over the next five years according to IBISWorld.[4] The high Australian dollar has encouraged high import growth over the past few years and this impact will continue, albeit at a slower pace. Increased competition from other meat industries will also contain industry revenue and profit.

The quantity of pig meat from pigs slaughtered appears to have stabilised over the past few years. Therefore, more pigs will be needed to increase the supply of pig meat in the future. Fresh pig meat production is projected to increase by 2018–19 while processed pig meat production is projected to fall due to greater import competition, according to ABARES.[5]

4 Outlaw, K 2012, *IBISWorld Industry report AO151: Pig farming in Australia*, IBISWorld, Melbourne, p.4

5 *Agricultural commodities*, Volume 4, Number 1, March quarter 2014, ABARES

Growth in the national export of pig meat is forecast by the ABARES to slowly grow in the years to 2018–19, following a fall in 2012–13.[6] The value of exports is projected to increase to $93 million in 2016–17 and then fall to $92 million in the following two years. Export prices are projected to decline by 1.7 per cent from 2013–14 to 2018–19, whilst the volume of pig exports is projected to increase by 10 per cent over the same period to 30 000 tonnes in 2018–19.

Statistics on Queensland show pig meat export volumes and prices trending upwards over the five years to 2011–12.[7] The value of pig meat and associated processed products from Queensland was $35 million in 2011–12, with most being either fresh or chilled swine meat or frozen swine meat. However, this figure decreased to $21 million in 2012–13.

The introduction of sow stall-free pig production from 2017— a consumer-driven, yet economically less efficient means of producing pig meat—is likely to squeeze the profit margins of domestic producers.

Opportunities

- Increasing domestic and international demand.
- Establising new niche markets, such as organic free-range pigs (this costs more to produce but can command a 100 per cent higher price).
- Adopting technology and improved feed-grain preparation to increase the metabolisable energy content of grain.

Challenges

- Competition from substitute meats
- Increasing input costs
- Water availability for new development
- Significant challenges in terms of animal welfare

6 *Agricultural Commodities*, Volume 4, Number 1, March quarter 2014, ABARES

7 Trade data – commodity and industry, Exports, 2014, OESR

Sheep and lambs

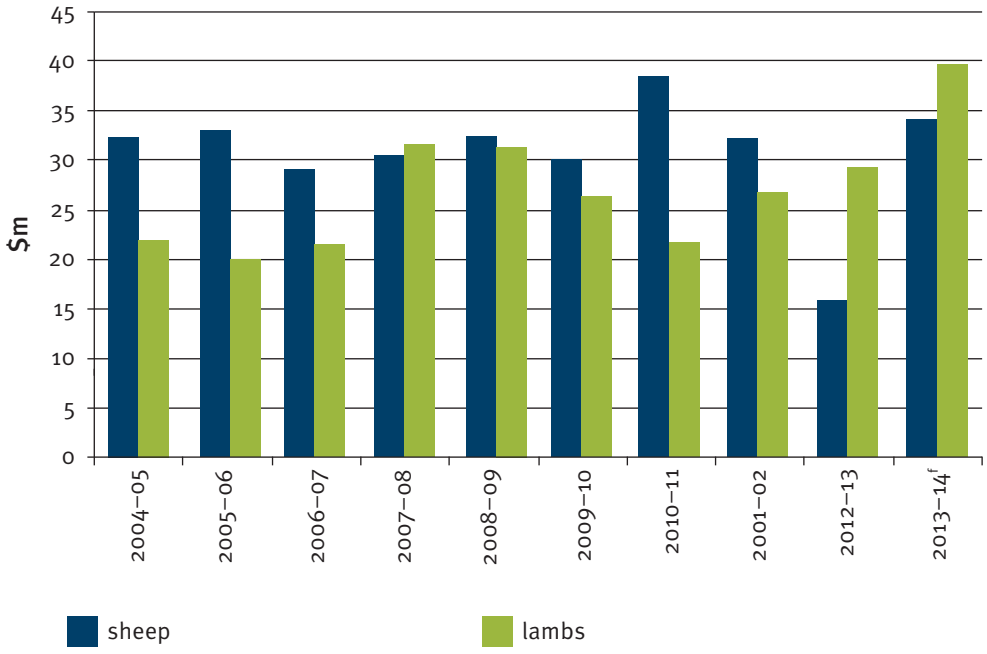
Past trends

The sheep meat industry in Queensland has gone through significant structural change over the past two decades. In the five-year period from 1999 to 2003 Queensland's sheep flock declined by almost 60 per cent to 4.43 million.[8]

Much of this decline can be attributed to a decline in global demand for wool in the early 1990s, coupled with severe drought conditions in Queensland's sheep regions in the early 2000s. These factors led to many producers leaving the sheep industry, and a shift from using sheep for wool to using them for sheep meat. The resulting loss of industry infrastructure and increased dog predation accelerated the decline.

Throughout the last decade real sheep and lamb GVP has been variable, with a lower GVP on average across 2003–04 to 2007–08 versus 2008–09 to 2012–13 (see Figure 6.7). Both sheep and lamb prices reached highs in 2010–11 in response to lower slaughter rates as favourable seasonal conditions saw producers rebuild flocks (see Figure 6.8).

Figure 6.7 Queensland GVP – sheep and lamb



f forecast

Sources: *Prospects* and *Queensland's primary industries trends*, 2012, both sources from DAFF

8 Principal agricultural commodities, Australia, 1998–99, Australian Bureau of Statistics, 1999, 7111.0

Figure 6.8 Queensland sheep and lamb slaughterings and saleyard prices

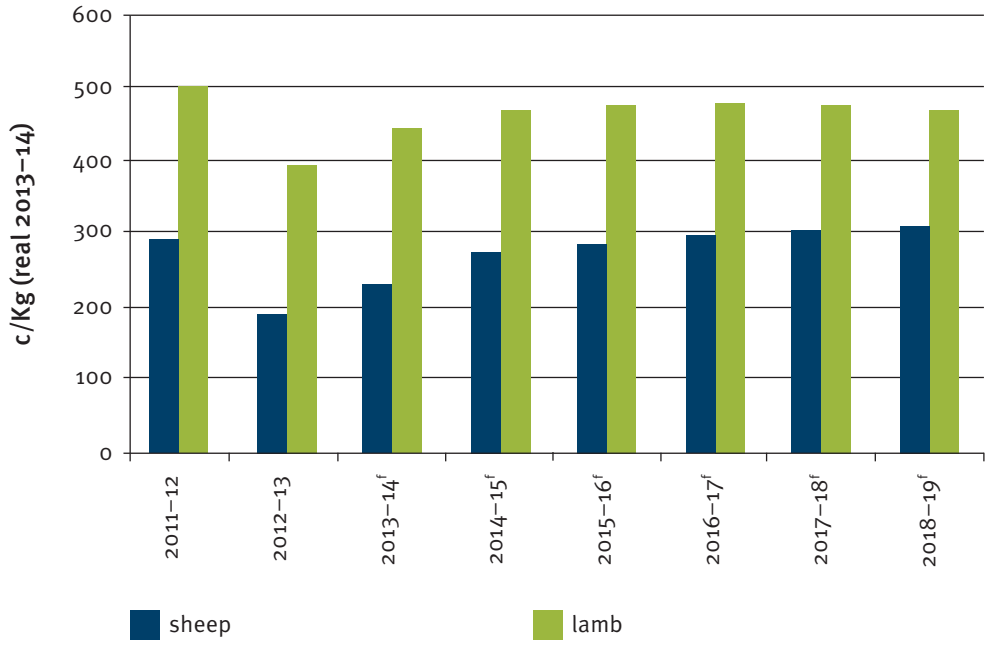
f forecast

Source: ABS unpublished slaughter data; *Queensland's primary industries trends*, unpublished data; DAFF, Queensland Government, Brisbane

Forecasts

The ABARES forecasts that sheep and lamb meat saleyard prices will ease in real terms over the medium term due to a projected rise in sheep and lamb slaughter rates (see Figure 6.9). Flock rebuilding is expected to continue to increase at a gradual rate over the medium term.

Figure 6.9 Forecast Australian saleyard prices for sheep and lamb

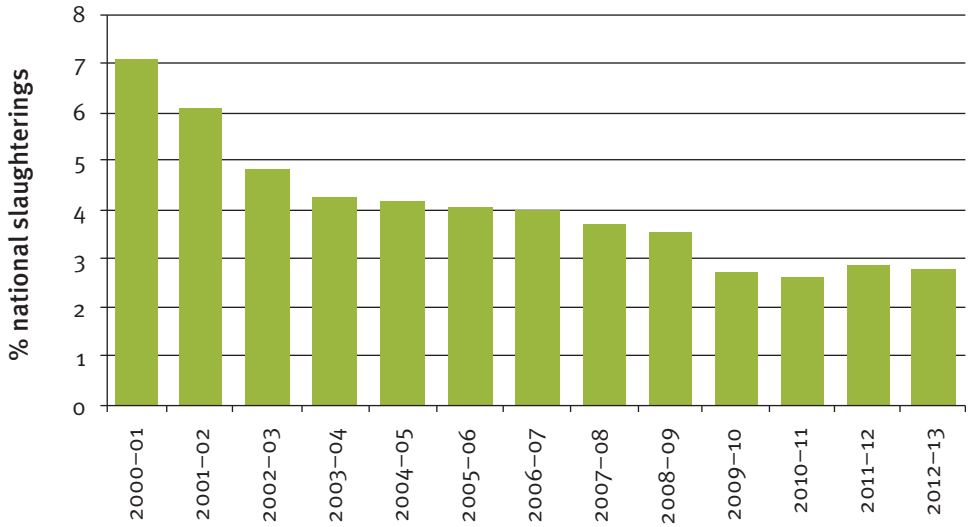


f forecast

Source: *Agricultural commodities*, Volume 4, Number 1, March quarter 2014, ABARES

According to unpublished slaughter data from the ABS, Queensland's share of national sheep and lamb disposals was 7.1 per cent in 2000–01. Since then, Queensland's market share has continued to decline, holding at around 4 per cent from 2003–2007 and then falling to current levels of approximately 2.8 per cent of national disposals (see Figure 6.10).

Figure 6.10 Queensland sheep and lamb slaughterings as a percentage of the national market



Source: ABS unpublished slaughter data; *Agricultural commodities*, various years, ABARES

Australian sheep and lamb meat exports have been steadily increasing since 2002–03. The ABARES forecasts that export volumes will continue to increase over the medium term as production grows. Queensland's fresh, chilled and frozen sheep meat export volumes have been increasing since 2006–07 and were valued at $59 million in 2012–13[9], which was an increase of 70 per cent since 2008–09.

Export increases are being driven by demand from the Middle East and China, with China being the third largest market for Australian lamb. China and other developing Asian economies are expected to stimulate further demand for Australian lamb exports over the medium term, as red meat consumption increases and incomes rise.

The ABARES forecasts lamb consumption to remain steady over the medium term at 9.3 kilograms per person. Domestic mutton consumption is also forecast to remain steady over the medium term at around 0.3 kilograms per person[10], implying slow trend growth in line with population growth.

9 Trade data – commodity and industry, Exports, 2014, OESR

10 *Agricultural Commodities*, Volume 4, Number 1, March quarter 2014, ABARES

Opportunities

- Over the medium term, the Middle East is likely to grow as an important destination for Australian lamb exports.
- Emerging south Asian markets, including China, are expected to provide a growing market for Australian and Queensland lamb exports.

Challenges

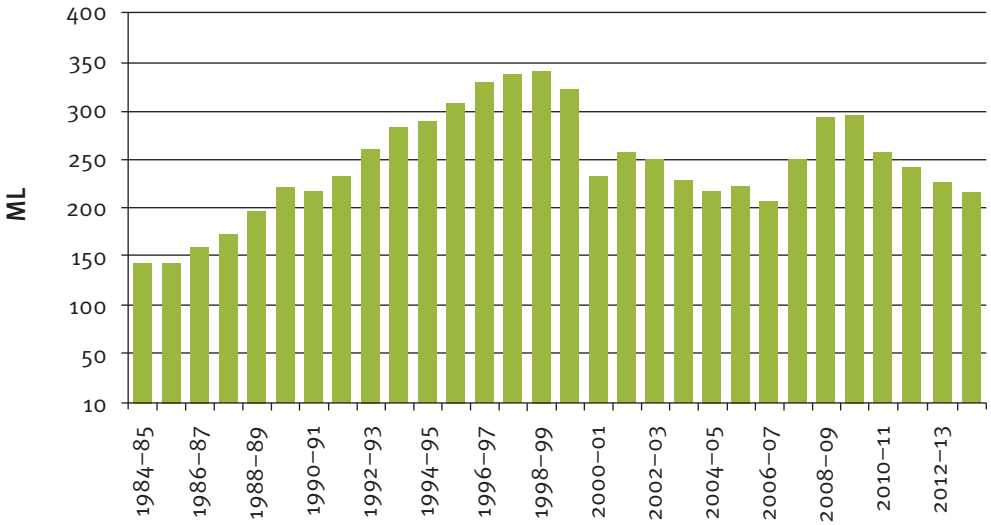
- There is increasing competition from substitute meats both domestically and internationally. Beef, pig and chicken meat compete with sheep and lamb meat.
- Ongoing competition from New Zealand for sheep meat export markets as the NZ–China free trade agreement disadvantages Australian sheep meat trade to China.
- Over the medium term, the Australian sheep live export trade relies on compliance with animal welfare standards and correct implementation of the Exporter Supply Chain Assurance System (ESCAS).

Milk

Past trends

Queensland's milk production GVP declined in the early 2000s, with a short-lived recovery in 2007 to 2009 before the declining trend resumed in subsequent years (see Figure 6.11).

Figure 6.11 Queensland GVP – dairy production



Source: QDPI&F (1997–98 to 2011–12); ABS (1997–98 to 2010–11); DAFF (2011–12 to 2013–14)

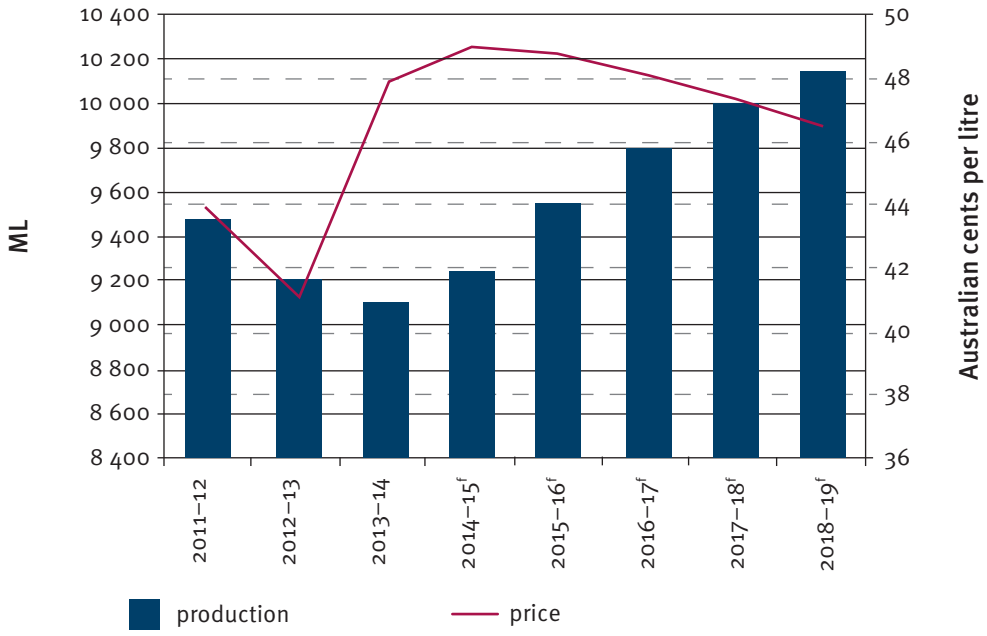
Forecasts

The Australian farm gate price for milk is forecast to increase by 16 per cent in 2013–14 to average around 47.7 cents per litre. Higher world prices forecast for dairy products will increase unit returns for Australian dairy exporters. Australian farm gate prices for milk are projected to fall slightly over the outlook period to reach around 46.5 cents per litre (in 2013–14 Australian dollars) in 2018–19.[11] Markets are expected to remain highly-competitive in the face of low growth in volumes and limited scope for price rises.

Australian milk production is forecast to decrease by 1 per cent in 2013–14 to 9.1 billion litres. Milk production in dairy regions, such as Queensland, that are more reliant on the drinking milk market is forecast to decline by around 2 to 4 per cent in 2013–14.

Over the medium term, Australian milk production is projected to rise to reach around 10.1 billion litres in 2018–19, reflecting further increases in milk yield per cow and to a lesser extent, increases in dairy cow numbers.[12] Significant improvements to water availability for irrigation in northern Victoria and southern New South Wales is expected to support further expansion of milk production in those regions.

Figure 6.12 Australian milk production and price



f forecast

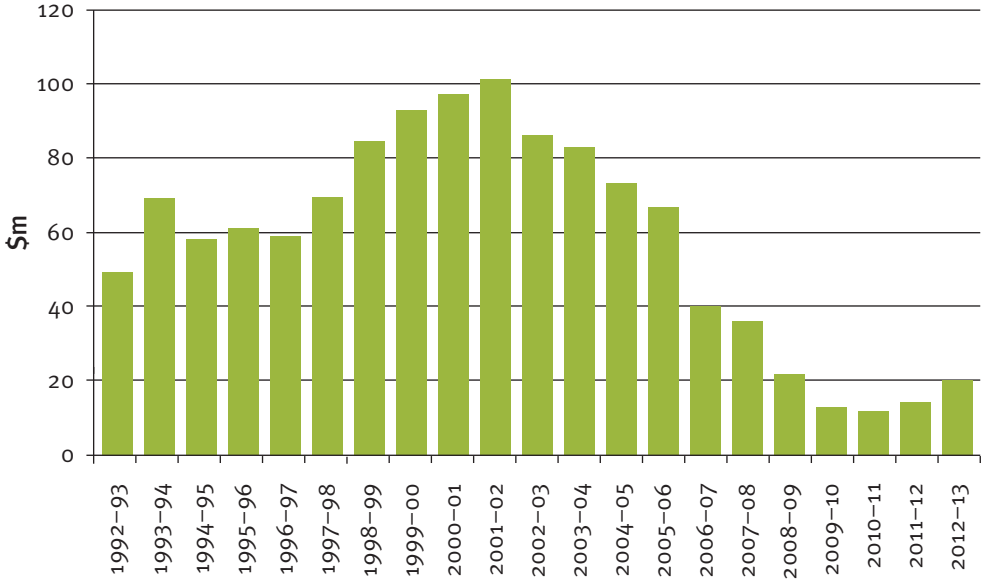
Source: *Agricultural commodities*, Volume 4, Number 1, March quarter 2014, ABARES

Due to reduced production over the past decade, the value of Queensland's overseas exports of dairy products has fallen significantly from just over $100 million in 2001–02 to just under $20 million in 2012–13 (see Figure 6.13).

11 *Agricultural commodities*, Volume 4, Number 1, March quarter 2014, ABARES

12 *Agricultural commodities*, Volume 4, Number 1, March quarter 2014, ABARES

Figure 6.13 Queensland dairy product exports from 2001–02 to 2011–12



Source: Trade data – commodity and industry, 2013, OESR

The total value of Australian dairy exports is forecast to decline by 2 per cent in 2013–14 to $2.2 billion, reflecting lower average world dairy product prices. Over the medium term, the total value of Australian dairy exports is projected to steadily rise to around $3.6 billion in 2018–19.

Australian exports of dairy products are concentrated in the Asian region, which accounted for around three-quarters of the total value of dairy exports in 2010–11. Japan is the most important market, accounting for 16 per cent of the value of dairy exports and importing just under half of Australia's total cheese exports.

Globally, demand for dairy products over the medium term is expected to be solid, led by China and South-East Asia. There is a strong supply response from all major exporting regions as favourable seasonal conditions prevail.

Over the medium term, world dairy product prices in real terms are projected to decline slowly yet still average around 20 to 30 per cent higher than average prices over the five years to 2006–07. Dairy products in developing countries are expected to provide some support to world dairy prices over the next few years. However, an expected increase in the supply of dairy products in the main producing and exporting countries in the second half of the projection period is expected to outpace the projected rise in demand.

Opportunities

- Retailer and consumer interest in supporting niche milk products, such as A2 milk, is expected to grow.
- Population growth and increasing living standards in Asia will create high-value dairy opportunities that could advantage the region.

Challenges

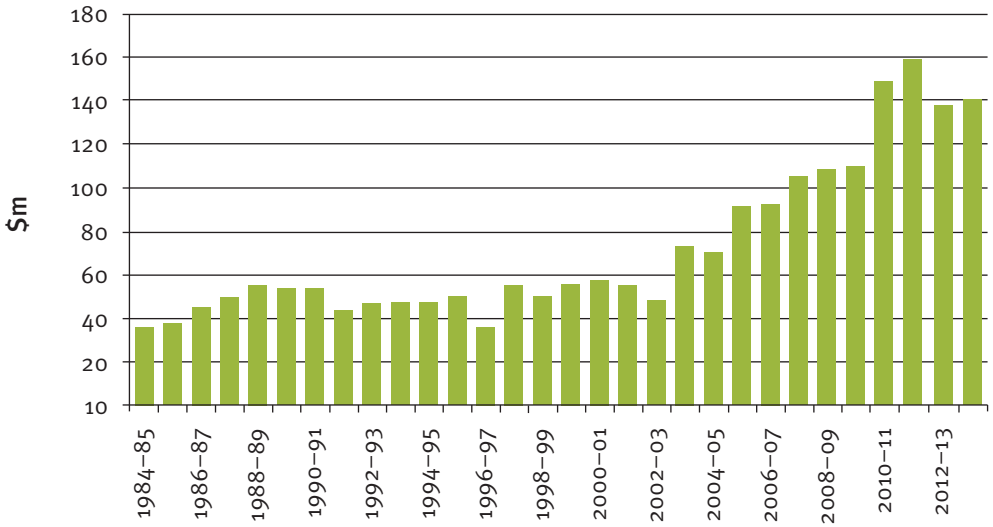
- Increasing input costs and increasing transport costs
- Water availability
- Effluent management
- Ongoing improvements in the competitiveness of interstate producers
- Increasing community scrutiny of livestock production systems and practices

Eggs

Past trends

Following a decade of rapid increases, the value of egg production in Queensland peaked in 2011–12. Despite slipping back somewhat, it still remains at historically high levels (see Figure 6.14).

Figure 6.14 Value of eggs produced in Queensland



Source: *Value of agricultural commodities produced*, Australia (various years), ABS, cat. no: 7503.0

The GVP increase reflects both the increasing production of eggs and, to a lesser extent, price increases. The higher than average local unit value may reflect the shift by Queensland egg producers towards higher-value egg production, such as free range.

Forecasts

According to the Queensland Egg Farmers Association and Queensland United Egg Producers, trends in Queensland egg production and prices are forecast to be similar to national trends over the coming five years.

National egg industry revenue is forecast to grow by 12 per cent over the five years to 2016–17 according to IBISWorld.[13] Industry consolidation is expected to lead to higher productivity, economies of scale and profitability. Greater demand for value-added eggs should mean higher farm gate prices and that a slight rise in consumption is forecast.

As health concerns over egg consumption have abated and prices for protein substitutes eventuate, egg prices should increase due to increased national consumption, growth in disposable incomes, and a shift towards higher value egg products such as free-range eggs.

Opportunities

- Safe food regulation of the egg market to improve food safety.
- Research into alternative foods to reduce bird production costs.
- The changing market structure from cage eggs to free range and organic eggs may provide some opportunities for existing producers to increase their market share.
- Research and development opportunities exist to improve food safety and examine alternatives to reduce reliance on antibiotics.

Challenges

- Land planning and placement of egg farms
- High cost of feed and capital expenditure for new animal welfare standards
- Environmental and natural resource issues associated with sustainable production systems
- Prices at the farm gate are expected to be negatively affected by increasing dominance of private-label eggs.
- The industry is expected to face increased regulatory and consumer demands regarding animal welfare, the environment and quality assurance. Any changes to regulations or consumer demand are likely to continue to put downward pressure on profit margins.

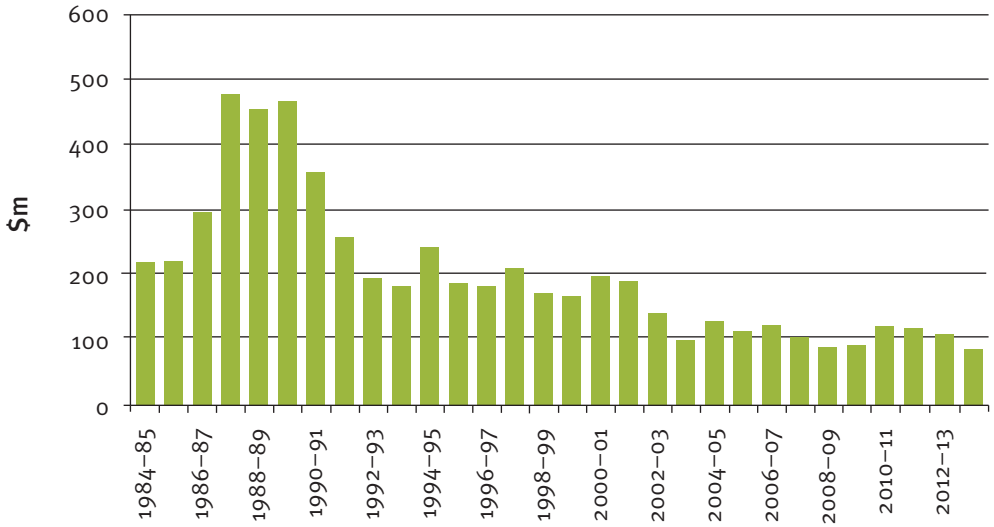
13 Outlaw, K 2012, *IBISWorld Industry Report A0142: Eggs farming in Australia*, IBISWorld, p.33

Wool

Past trends

The wool industry in Queensland has been through significant structural change over the last two decades, with sheep numbers falling dramatically since 1991. Sheep numbers are now approximately one fifth of what they were in 1991.[14] Many producers left the sheep industry in favour of cattle production, while others changed their use of sheep for wool production to meat production. Loss of industry infrastructure and increased dog predation accelerated these trends. Wool GVP has been broadly stable since 2003–04.

Figure 6.15 Queensland GVP – wool



Source: QDPI&F (1997–98 to 2011–12); ABS (1997–98 to 2010–11)

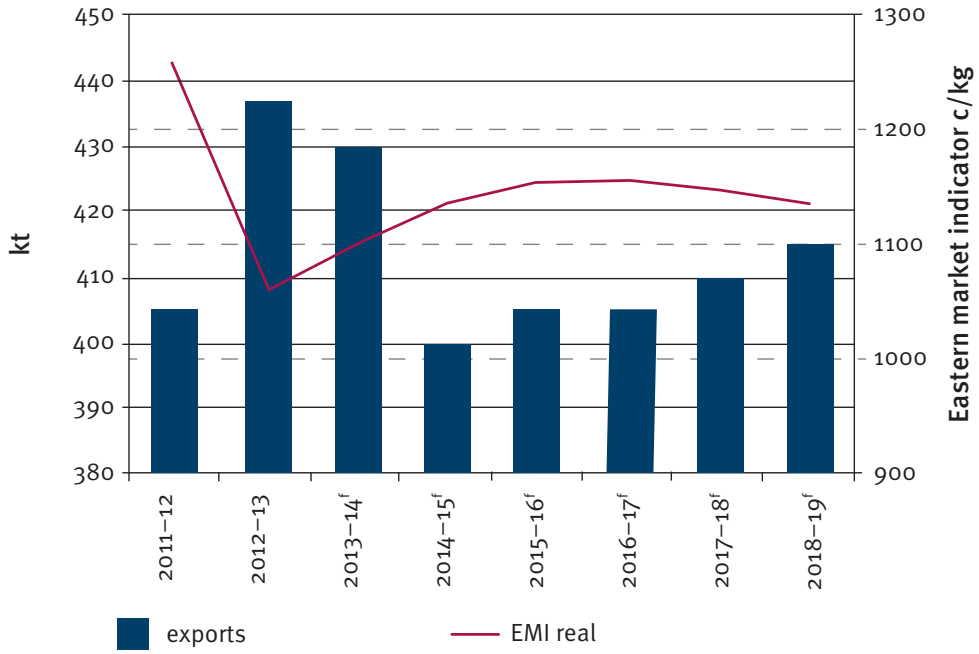
Forecasts

The ABARES forecasts that Australia's wool industry will grow steadily, with prices expected to peak at 1155 cents a kilo in 2015–16 and decline slightly in the following three years (see Figure 6.16).

Queensland wool production is expected to follow the national trend over the medium term with shorn wool production (greasy) forecast to increase gradually over the medium term. Other wool production is expected to remain stable.

14 Historical selected agriculture commodities by state (1861 to present), 2010–11, ABS, 7124.0

Figure 6.16 Australian wool industry forecasts – export quantity and price



f forecast

Source: *Agricultural Commodities,* Volume 4, Number 1, March quarter 2014, ABARES

The ABARES forecasts that the volume of wool exports will decline by 7 per cent in 2014–15 to 400 000 tonnes, in line with forecast decreases in Australian wool production. Wool exports are forecast to grow steadily to 415 000 tonnes in 2018–19, in line with expected growth in wool production. Increases in the AWEX eastern market indicator are expected to somewhat offset the forecast production decline from 2013–14 to 2014–15. As such, the value of Australian wool exports are forecast to decline less than the export volume, at 4.8 per cent in 2014–15.

The main substitutes for wool are synthetics, mainly polyester and acrylic, and other natural fibres such as cotton. Over the medium term, these alternative fibres pose the greatest risk to the wool industry due to continued investment in improving production capacity and fibre characteristics. From 1990 to 2012 synthetics increased their share of world fibre production from 40 to 61 per cent.[15] In 2012, wool—a niche fibre used in the production of luxury goods—constituted 1.3 per cent of the market.

Opportunities

- Rising market prices
- Gradual recovery of demand
- Product diversification based on quality and environmentally friendly labelling.
- Implications of wool production becoming a demand-driven, 'boutique' operation.

15 *Agricultural Commodities*, Volume 4, Number 1, March quarter 2014, ABARES

Challenges

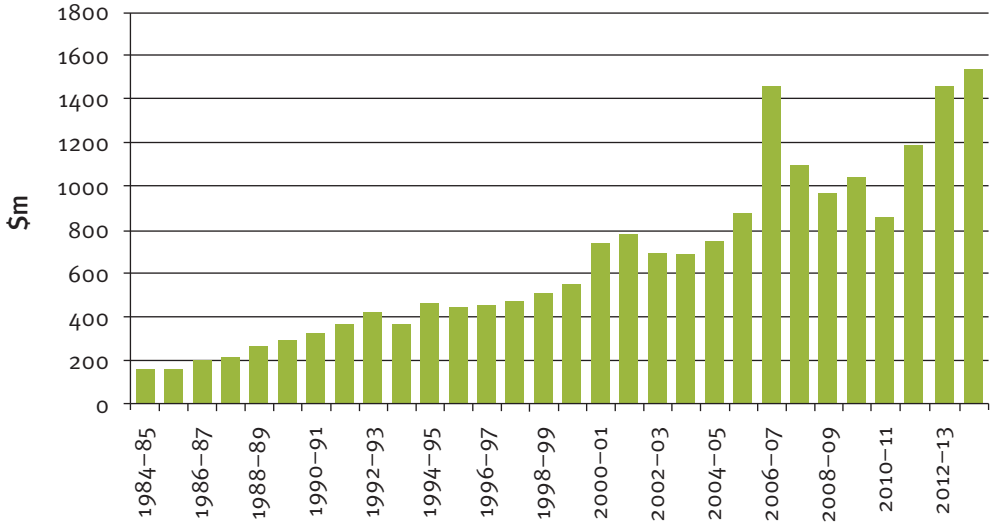
- Adopting new and innovative technologies, particularly those that require economies of scale.
- Raising the productivity and profitability of existing operators.
- On-farm diversification of those operators with diversified activities, for example sheep/beef and sheep/grain farms have, on average, enjoyed consistently higher productivity and profitability levels than specialist sheep operators.
- Deterioration of capital and infrastructure
- Management of wild dogs
- Long-term competition from synthetics

Fruit and nuts

Past trends

Fruit and nut GVP has been trending upwards for many years, albeit with some year-on-year variability reflecting seasonal conditions such as cyclones (see Figure 6.17).

Figure 6.17 Queensland GVP – fruit and nut production

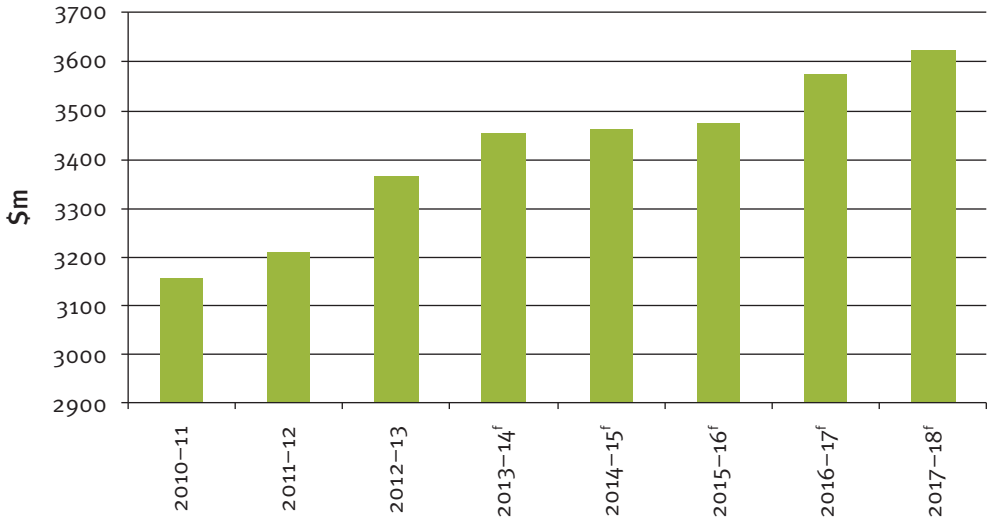


Sources: Value of agricultural commodities produced, Queensland, ABS, cat. no. 7503.3; Value of agricultural commodities produced, Australia, ABS, cat. no. 7503.0; Agriculture, Queensland, ABS, cat. no. 7113.3; unpublished ABS data; *Agtrends Update*, DAFF

Forecasts

The gross value of Australian fruit production is forecast to increase by 3 per cent in 2013–14 to $3.45 billion. Over the medium term to 2017–18, the gross value of the Australian fruit industry (excluding wine grapes) is projected to increase to approximately $3.6 billion (in 2012–13 dollars) (see Figure 6.18).

Figure 6.18 Forecast GVP – Australian fruit and nuts

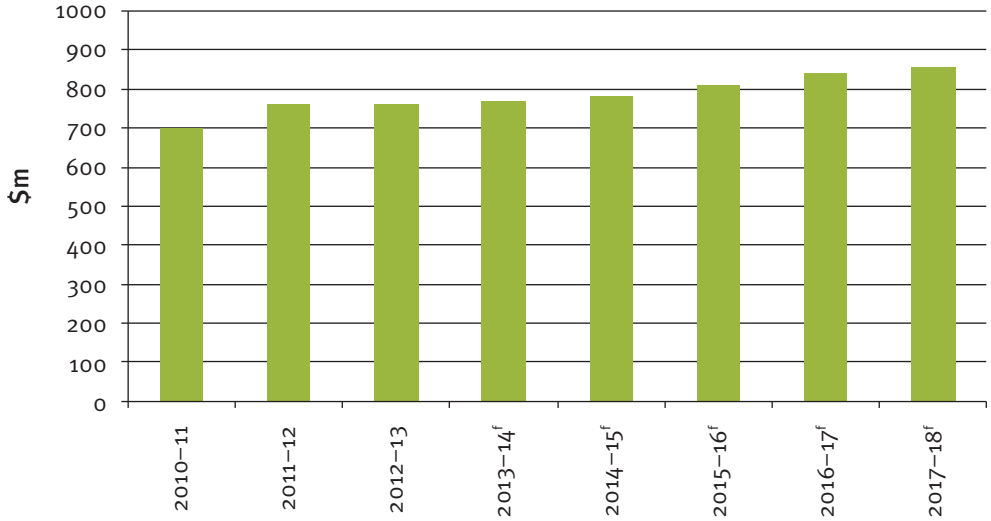


f forecast

Source: *Agricultural commodities*, March quarter 2013, ABARES

Australian fruit exports are projected to rise, increasing to around $577 million (in 2012–13 dollars) by 2017–18 (see Figure 6.19). Queensland is expected to follow this national trend with increasing exports over the medium term.

Figure 6.19 GVP – Australian fruit and nut exports



f forecast

Source: *Agricultural commodities*, March quarter 2014, ABARES

Over the past decade, two cyclones (Cyclone Larry in 2006 and Cyclone Yasi in 2011) affected banana production in northern Queensland, resulting in extremely high domestic banana prices for short periods. Producers have now recovered from Cyclone Yasi as yields are increasing and prices return to normal levels. Over the medium term to 2017–18, banana production is forecast to increase to around 325 000 tonnes, in line with a continuing increase in domestic demand and assumed favourable seasonal conditions.

Avocado production in Australia is projected to increase to 70 000 tonnes by 2016–17, compared with 52 800 tonnes in 2010–11. Australian avocado production is domestically oriented, with forecast exports in 2011–12 of only 2200 tonnes. The Australian avocado industry faces strong competition in the domestic market from New Zealand. Australia increased its import of avocados by 58 per cent in 2011 to a record 14 700 tonnes from New Zealand—which is the only country that currently meets Australia's quarantine requirements.

Mango production in Australia is projected to grow to 77 000 tonnes in 2016–17, compared with a forecast 63 000 tonnes in 2011–12, but production and fruit quality are likely to remain highly variable from year to year.

Opportunities

- There is potential for the growing areas of some crops to expand in Queensland, aided by reduced competition due to decreased production in the Murray-Darling Basin.
- Queensland is able to supply export and domestic markets all year round, or in some cases for some crops, earlier than other states and territories.
- Development of new markets, improved marketing, adoption of new technologies and improved management practices. For example, environmental and water quality management will provide growth opportunities for Queensland's fruit and nut industry.
- The emergence of new export markets and the expansion of value-added processes will increase demand for Queensland's fruit and nut industry.

Challenges

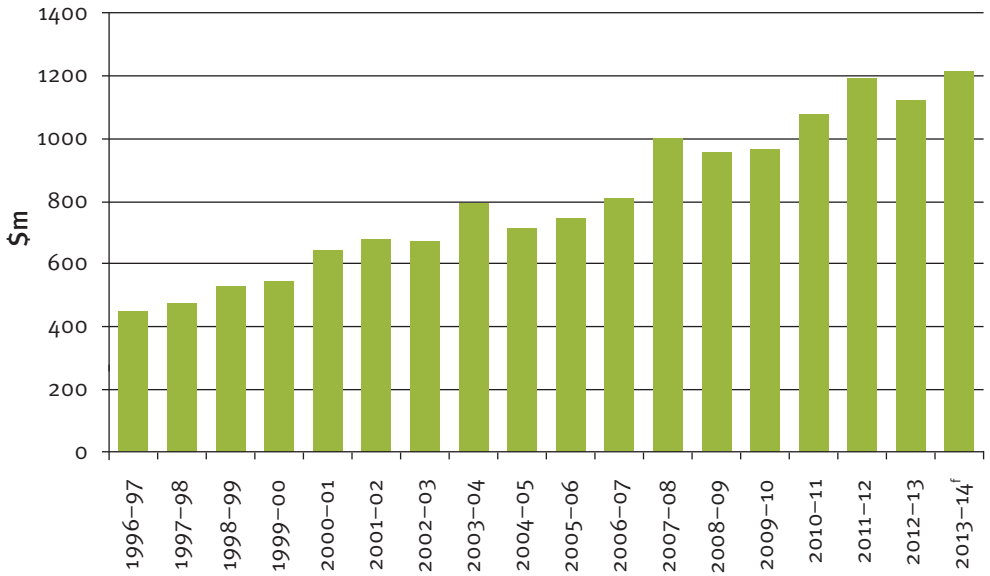
- Labour availability and efficiency
- Low market prices
- Pests and diseases
- Vulnerability due to concentrated production regions for some crops, for example banana production is vulnerable to natural disasters as more than 40 per cent of Australian production is in Far North Queensland.
- Potential import competition due to the possibility of more product meeting quarantine requirements.

Vegetables

Past trends

The GVP of vegetables in Queensland is also trending upwards (see Figure 6.20).

Figure 6.20 Queensland GVP – vegetable production



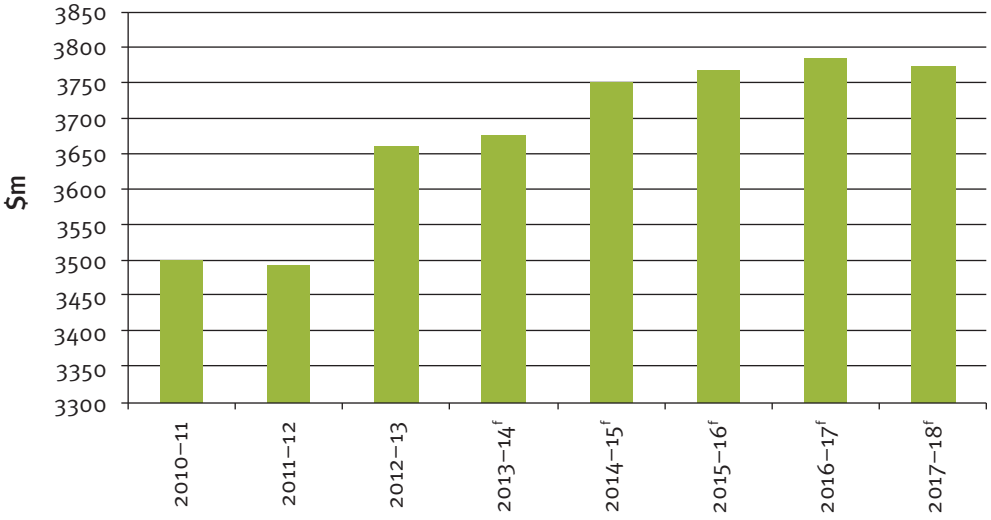
f forecast

Sources: DPI&F (1996–97 to 2011–12); ABS (1996–97 to 2010–11); DAFF

Forecasts

By 2017–18, the GVP of Australian vegetable production is projected to increase to $3.77 billion in real terms, compared with $3.65 billion in 2012–13 (see Figure 6.21).

Figure 6.21 Australian GVP – vegetable production in 2010–11 to 2017–18



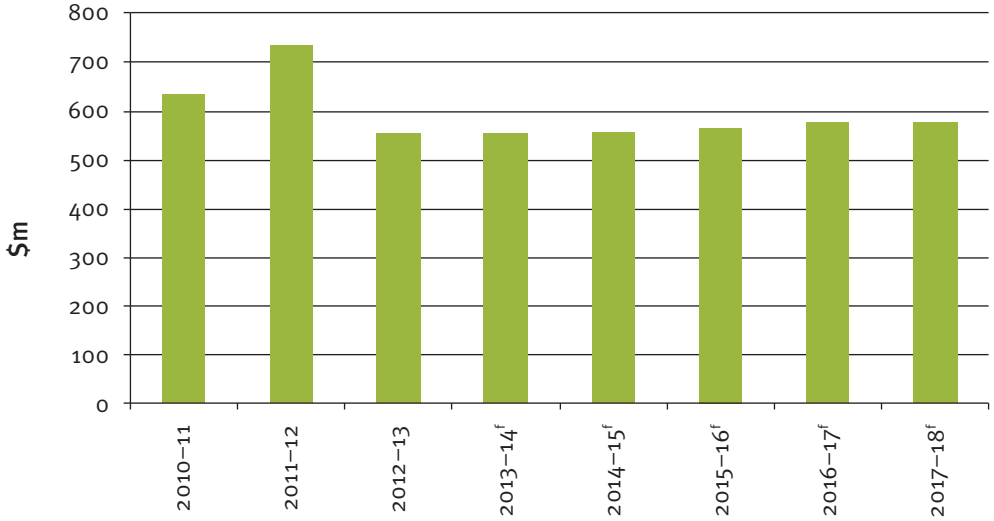
f forecast

Source: Agricultural commodities, ABARES

According to the ABARES, strong growth is projected in world demand for vegetables, driven by world population and income growth, particularly in India and China. The fastest growing food type over the last decade has been horticultural products, with vegetables being one of the top five products. World trade in vegetables has also experienced strong growth since 2000, as the increase in fresh vegetables has been significant, growing at an annual average of 7 per cent.

After a forecast decline of 22 per cent, the value of Australian vegetable exports is forecast to increase by 3 per cent in 2013–14 to $570 million, before rising marginally to $577 million (in 2012–13 dollars) in 2017–18 (see Figure 6.22). This increase reflects strong export demand for pulses, while exports of other vegetables are expected to remain relatively flat.

Figure 6.22 Australian GVP – vegetable exports in real terms (2011–12)



f forecast

Source: Agricultural commodities, March quarter 2013, ABARES

Opportunities

- Increases in export prices and demand can be achieved at the margin by:
  - improving access into export markets
  - differentiating products
  - improving quality.
- Increases in domestic demand through taste shifts may be possible through:
  - product differentiation
  - improved quality
  - packaging and partial processing
  - publicity about desirable attributes.

Challenges

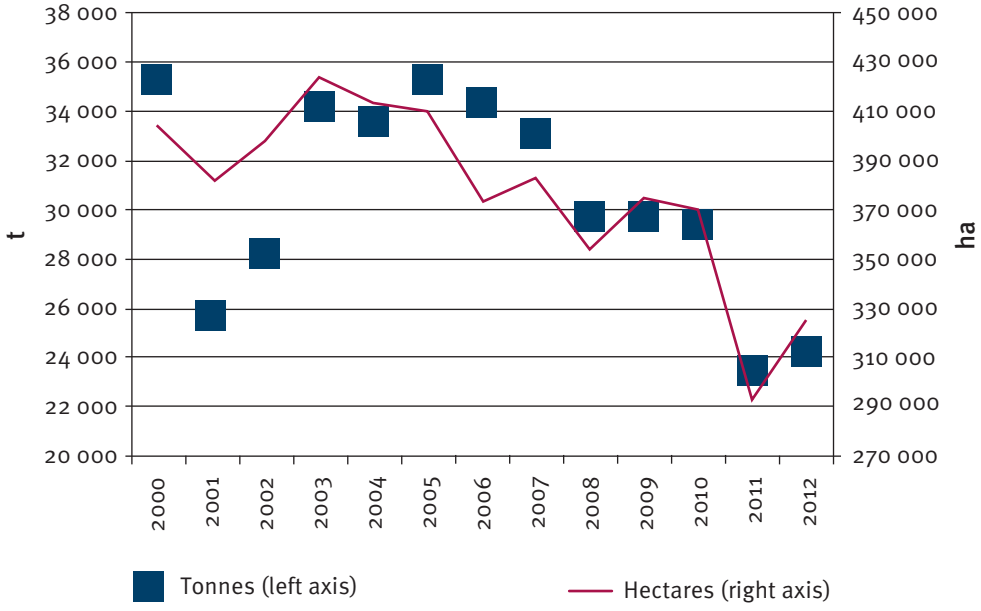
- Imports are increasing in some industries due to competitors meeting import barriers that keep quarantine risks out.
- Vegetable production remains highly-diverse and fragmented in some areas.
- Creating strategic alliances through greater coordination and engagement with producer associations and grower groups.
- Stronger relationships between research and commercial realities, resulting in transfer of deeper demand signals to researchers.
- Seeking greater productivity through capital intensive technologies.

Sugar

Past trends

Harvested cane area has been declining in Queensland between 2000 and 2012 (see Figure 6.23). Seasonal conditions affected harvested area year-to-year and had further impacts on the quality of the harvested cane.

Figure 6.23 Harvested sugar cane area and tonnage



The sugar price that Australian producers received increased after its 20-year low in 2003. Improving international sugar prices have counteracted the strength of the Australian dollar over the last decade, while the recent decline in the value of the dollar mitigated a drop in sugar prices.

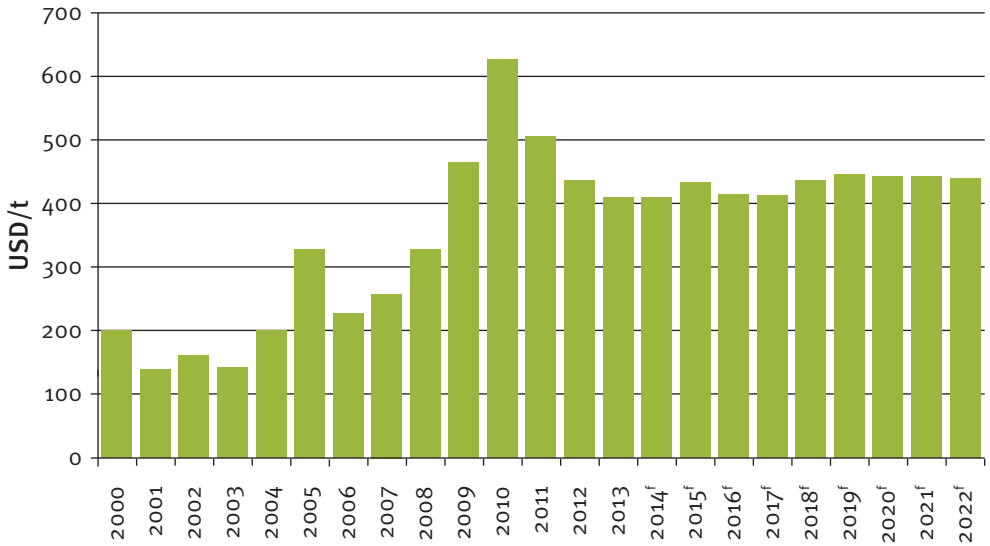
New ownership structures in the milling sector removed the uncertainty that prevailed for many years. End of compulsory single-desk marketing still left Queensland Sugar Limited (QSL) selling the large majority of Queensland's crop.

Forecasts

The OECD/FAO and the ABARES expect the global sugar market to be balanced over the medium term. Production is forecast to increase in Brazil, Mexico, Thailand, the European Union and Eastern Europe. Global sugar demand is forecast to grow by between 1.4 per cent (ABARES) and 1.9 per cent (OECD/FAO) per annum.

The ABARES expect high current international sugar stocks to shrink, due to demand driven by increasing incomes in developing countries and decreasing world exports. In addition to inherent market developments, crude-oil prices put an effective floor under those prices for sugar via Brazil's ethanol policy. Figure 6.24 shows international sugar prices since 2000 and projections to 2022.

Figure 6.24 International sugar prices



f forecast

Source: Agricultural Outlook 2013–2022, OECD/FAO

The ABARES expect that annual growth in cane production of 1.4 per cent will increase sugar production by 1.6 per cent per annum in the medium term. An Australian total of 4.7 million tonnes of sugar by 2018–19 would fall between the 2013–14 estimate and the 1997–98 record of 5.6 million tonnes.

Opportunities

- Adopting best management practices in farming and harvesting to improve efficiencies.
- Nearby Asian markets are creating the greatest increase in demand for sugar.
- The Gilbert-Flinders region is being considered as a potential new sugar production area.
- Realignment of Queensland's milling sector will remove long-standing uncertainties.
- Revitalised research and development with the creation of Sugar Research Australia.
- Better utilisation of by-products to improve profitability.
- Genetic engineering of cane plant to produce alternatives to dietary sugar.

Challenges

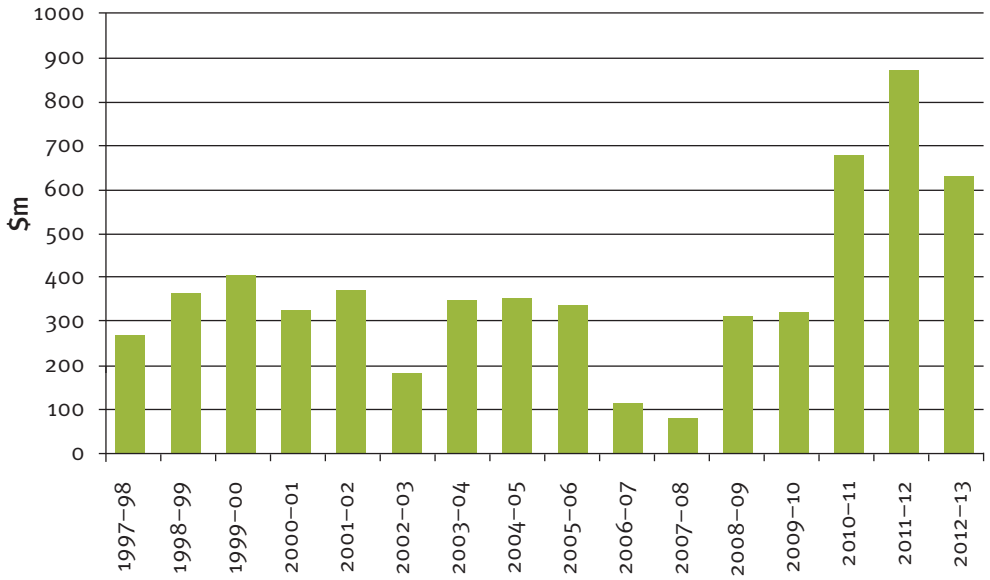
- Sugar is the most distorted international agricultural commodity market, mainly due to policies implemented by the USA and the European Union.
- High market volatility due to the small, residual, free market and national agricultural policies, for example in India and Russia.
- The growing negative nutritional image of sugar in developing countries is capping demand.
- Increasing market penetration by use of alternative sweeteners.
- Technological path dependence in the Queensland processing sector limits diversification options.

Cotton

Past trends

Queensland cotton production and GVP have increased significantly since 2007–08 (see Figure 6.25).

Figure 6.25 Queensland GVP – cotton production from 1997–98 to 2012–13



Sources: DAFF (1996 to 2014) and ABS (1996 to 2013)

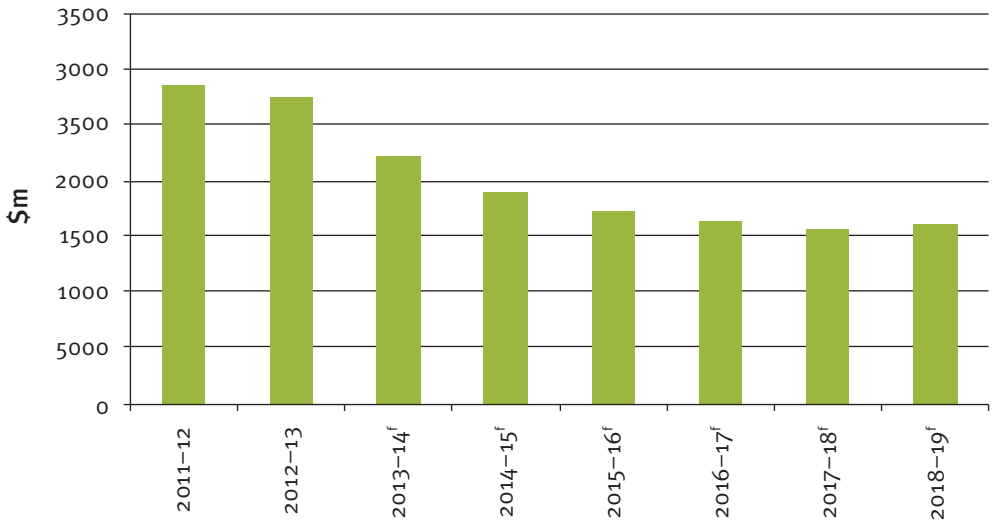
Most of Australia's cotton is exported. Over the past 20 years, Queensland cotton exports have varied from just over $200 million in 2007–08 to a record $1.6 billion in 2011–12 with an average of $612 million per annum.[16] This variability reflects cotton producers rapidly adapting to variable seasonal conditions.

16 Trade data – commodity and industry, 2013, OESR

Forecasts

The ABARES forecasts that Australian cotton exports will decrease to 729 000 tonnes by 2017–18 before increasing by 10 000 tonnes in 2018–19.[17] However, this figure is much larger than the five-year average to 2010–11 of 383 000 tonnes. From 2014–15 to 2018–19, ABARES forecast the Cotlook 'A' index price to increase by nearly 10 per cent. This price increase does not offset all of the forecast quantity reduction, and as such, the value of Australian cotton exports are expected to fall over the medium term (see Figure 6.26).

Figure 6.26 Value of Australian cotton exports in real terms



f forecast

Source: *Agricultural commodities*, March 2014, ABARES

Opportunities

- Australian cotton is recognised as equal only to Californian cotton, in terms of best quality cotton.
- Australia has the highest average yield of 1991 kilograms per hectare (kg/ha), with Brazil at 1433 kg/ha and Mexico at 1330 kg/ha. China is at 1265 kg/ha and the USA isat 985 kg/ha.
- There is potential for expansion of the cotton industry in northern Australia.
- The rising price of oil and oil-based inputs potentially bodes well for natural fibres such as cotton, at the expense of synthetics.

Challenges

- Engage in whole-of-Government policy and decision-making processes relating to water and resources.
- Potential competition from a range of countries, particularly developing countries located in central Asia and Africa.

17 *Agricultural Commodities*, Volume 4, Number 1, March quarter 2014, ABARES

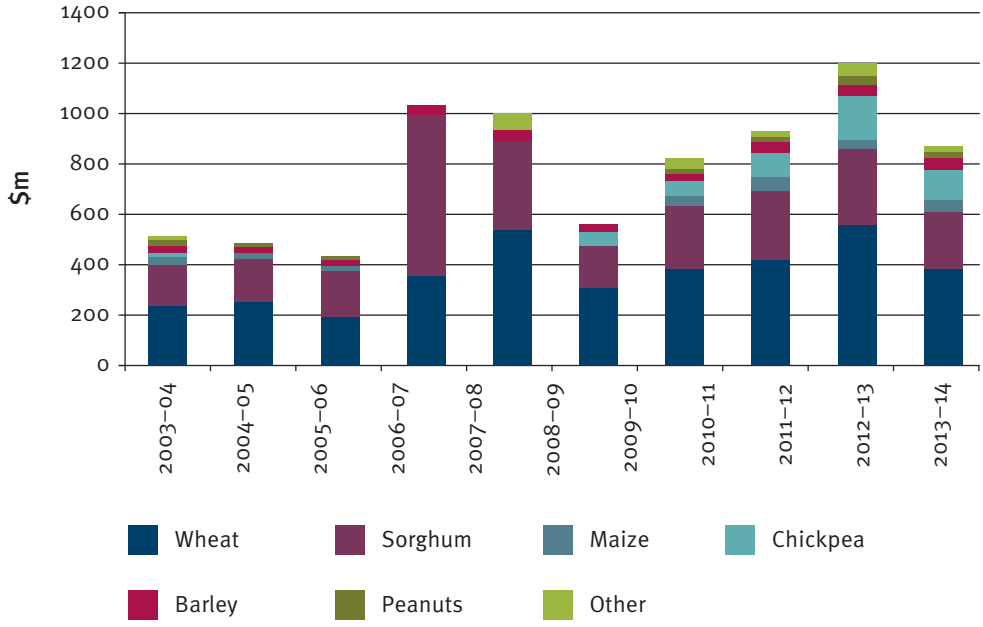
- Recognise and communicate the achievements of the industry to the general public in terms of environmental management (i.e. address the consumer perception that the cotton industry is detrimental to the environment).

Cereal grains

Past trends

The GVP of Queensland cereal grains over a ten-year period (from 2004–05 to 2013–14) was at its lowest point during 2006–07 at $431 million. It reached $1.19 billion in 2012–13 when favourable seasonal conditions boosted crop yields on average, coupled with relatively high global grain prices (see Figure 6.27). Average global and domestic grain prices rose overall in 2013–14 compared to 2012–13, due to tight domestic and global supplies. However, yields fell significantly due to widespread drought conditions in south and central Queensland.

Figure 6.27 Ten-year trend in Queensland GVP – cereals from 2004–05 to 2013–14



Sources: *Queensland's primary industries trends,* DAFF, Queensland Government

Forecasts

- Ten year historical data suggests that around 1.55 million hectares of Queensland land is sown for cereal crops per annum. Based on market prospect rankings derived by DAFF, and in conjunction with crop price forecasts[18], some switching has been projected in the area sown between crops. On that basis, here are some of the main projections for Queensland cereal grain production over the medium term to 2018–19:
  - Wheat production is projected to fall by 3 per cent, outweighing a 1 per cent increase in price. This will cause annual GVP to fall 2 per cent below the 10-year average to $351 million.

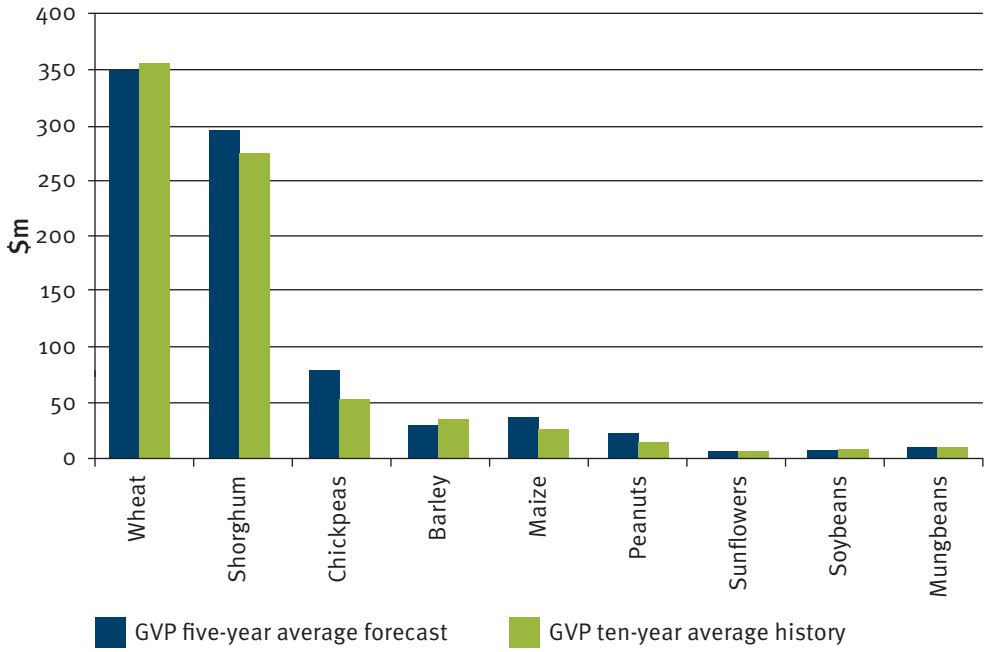
18 *Agricultural Commodities*, Volume 4, Number 1, March quarter 2014, ABARES

- Sorghum production is projected to fall by 2 per cent, outweighed by a 10 per cent increase in average price. This will generate an 8 per cent increase in average annual GVP to $296 million.
- Chickpea production is projected to increase by 27 per cent, coupled with a 17 per cent increase in price, taking GVP to an average of $166 million.
- Barley production is projected to fall by 3 per cent, coupled with a 9 per cent fall in price. This will reduce GVP to 11 per cent below the 10-year average to nearly $31 million.
- Maize production is projected to remain unchanged; however, there is a forecast 39 per cent increase in price above the 10-year average. GVP is estimated to increase proportionally to $35 million per annum.
- Peanut production is projected to increase by 28 per cent, coupled with a 21 per cent price increase. GVP will be up 56 per cent to $21 million per annum.
- Sunflower production is projected to increase by approximately one quarter, outweighed by a 22 per cent lower price than the 10-year average. This will reduce GVP by one per cent to $4.8 million.
- Soybean production is projected to increase by approximately 30 per cent, but with an equivalently lower price than the 10-year average. GVP is forecast to fall by 7 per cent to $6.9 million per annum.
- Mungbean GVP is forecast to lie 5 per cent below average at $10 million, with a projected 28 per cent increase in production, slightly outweighed by a lower than 10-year average price.

On the surface, some price differences between the past and the future seem dramatic; however, they reflect a return to normal market prices given some global grain prices have spiked in the last 10 years. Higher absolute prices, along with firm market demand, is projected to cause some switching from mainstream crops such as wheat, sorghum and barley into more minor but higher value crops such as sunflowers, soybeans, chickpeas, peanuts and mungbeans. Collectively, other cereals are projected to average around $22 million per annum. Projected total GVP of $834 million exceeds the 10-year average GVP of $782 million by 7 per cent.

These medium-term GVP projections assume average seasonal conditions with limited excess rainfall, drought and extreme temperature conditions. Crops such as maize, soybeans, mungbeans and peanuts are particularly water-sensitive. Drought conditions will impact on forecast values for these crops. Figure 6.28 compares the medium-term forecast with the historical ten-year average.

Figure 6.28 Five-year average forecast Queensland GVP – grain industries (2014–15 to 2018–19; $834m) compared to ten-year average GVP (2004–05 to 2013–14: $782m)



Opportunities

- China and Russia impose periodic export bans on wheat and coarse grains when domestic supplies are in deficit. When this occurs, global trade supplies are tightened, supporting global and domestic grain prices.
- Wheat exports increasingly consist of bagged and containerised quality wheats. For example, high protein wheats are sought for flat breads in the Middle East, and Australian Prime Hard wheat is highly sought for making alkaline, yellow noodles for Asian markets. Domestic grain suppliers need to understand the single wheat varieties and combinations of them, as well as the needs of export markets, in order to capitalise on those markets.
- To reduce transport and storage margins being added to the port price of grains, Queensland growers—particularly larger ones—are increasingly storing and transporting their own grain to port.[19]
- There has been a development of online selling of grain by growers, with stocks held then sold to obtain the best price, along the lines of share trading.
- The Grains Research and Development Corporation conducts crop research that can potentially lift yields for Queensland cereal growers through better crop farming technologies.[20]
- Embrace new and emerging technologies. For example, precision agriculture is a relatively new concept that is now being used to guide farm management and optimise farm outputs and inputs.

19 *The Australian Grains Industry, The Basics*, Price Waterhouse Coopers 2011, place of publishing unknown, viewed 4 March 2013, http://www.pwc.com.au/industry/agribusiness/assets/Australian-Grains-Industry-Nov11.pdf

20 The Grains Research and Development Corporation (GRDC) web page, Final Reports, viewed 4 March 2013, http://finalreports.grdc.com.au/final_reports.php?page_no=1&use_filters=true&action=&rule_id=0&collation_id=0&list=

Challenges

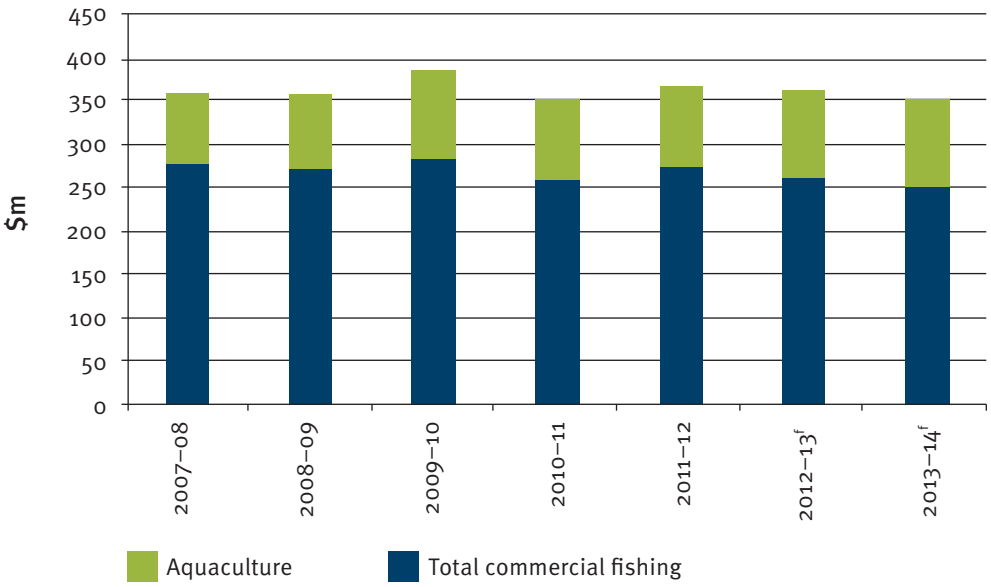
- Relatively low global stocks to use ratios for cereals, particularly for coarse grains, will help support grain prices, albeit with greater volatility. This makes farm cash flow less reliable and challenging for Queensland grain growers, particularly for those operating on tighter profit margins.
- International competitiveness remains a challenge with increased grain production expected from low-cost producers such as South America and Black Sea countries such as Kazakhstan and the Ukraine.
- The prices of farm inputs such as phosphate fertilisers, weed and pest control, transport, machinery and steel have increased significantly since 2007 and will impact on the profitability of grain growing.
- Biosecurity will continue to be an industry risk. Fungicide is used in the field and stored grain is fumigated to exterminate weevils before sale. Growers are under pressure by grain buyers increasingly demanding grain that is free of costly chemical residues.
- Managing seasonal variability

Fisheries

Past trends

The total GVP of Queensland fisheries has declined approximately 13 per cent from 2001–02 to 2011–12 (see Figure 6.29). Much of this has been caused by a decline in wild catch fisheries, which were worth 20 per cent less in 2011–12 than in 2001–02. However, the value of aquaculture increased by approximately 16.6 per cent over the same period.

Figure 6.29 Queensland GVP – fisheries

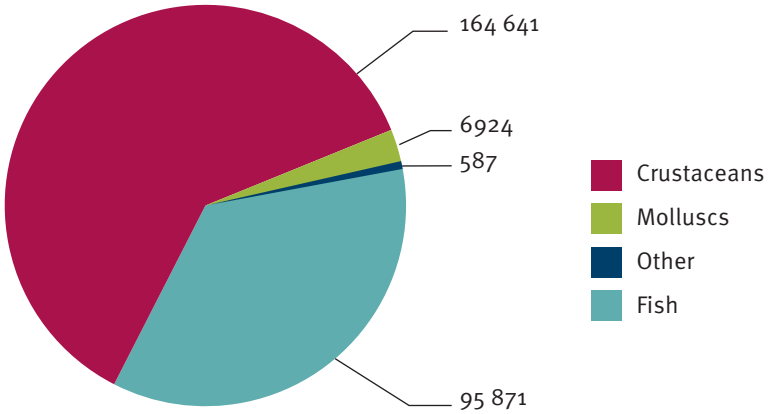


f forecast

Source: *AgTrends Update*, DAFF

The highest value fishery species in Queensland are prawns (both wild catch and aquaculture), crabs (wild catch), coral trout (wild catch) and barramundi (aquaculture). Figure 6.30 shows the breakdown of Queensland fisheries GVP by type—fish, crustaceans and molluscs.

Figure 6.30 Queensland GVP – fisheries (by type)



Source: ABARES, 2013

Queensland is a net exporter of fish products. Its largest export location is Hong Kong (68.8 per cent of total exports in 2012–13) followed by Japan (10 per cent) and the USA (7.6 per cent). Major import sources include New Zealand (30.8 per cent) and China (19.6 per cent). Table 6.1 shows the production, consumption, imports and exports for Queensland fisheries. The value of exports, imports and consumption has remained fairly stable over much of the period shown.

Table 6.1 Production, consumption, imports and exports for Queensland fisheries

Year	Queensland production GVP ($)	Imports ($)	Exports ($)	Domestic consumption ($)
2002–03	291 031 970	14 859 262	115 395 918	190 495 314
2003–04	306 432 030	13 901 793	93 141 504	227 192 319
2004–05	262 765 170	14 353 773	82 603 474	194 515 469
2005–06	285 179 140	12 634 872	78 656 997	219 157 015
2006–07	279 019 730	16 949 514	83 722 980	212 246 264
2007–08	283 456 380	16 119 749	75 212 887	224 363 242
2008–09	306 576 150	16 138 908	89 417 277	233 297 781
2009–10	321 792 140	17 109 423	83 509 926	255 391 637
2010–11	270 921 400	15 328 863	84 617 279	201 632 984
2011–12	268 023 080	14 525 409	76 951 863	205 596 626

Source: Trade data – Commodity and industry, 2013, ABARES/OESR

Forecasts

The value of Australian fisheries production is projected to increase by $50 million (2.1 per cent) to $2.45 billion (in 2012–13 dollars) over the medium term to 2017–18.

Queensland makes up a large proportion of Australia's prawn production (43 per cent in 2011–12); and prawn production accounts for 43 per cent of Queensland's total fisheries GVP. Real prices received by prawn producers are projected to decline, largely as a result of the continually high value of the Australian dollar and the strong competition in the domestic market from imported prawns. Therefore despite a forecast 8 per cent increase in production to 2017–18 the real value of prawn production is projected to fall by 4 per cent.

Opportunities

- Increasing global demand
- Increasing aquaculture production

Challenges

- Increasing competition from cheap imports
- Industry is of the firm opinion that Australian producers need to use marketing to differentiate their products from cheap imports for industry to be viable into the future.
- Possible impacts of increased irrigation in North Queensland.

Forestry and timber

Past trends

Queensland's forest-growing and first round processing sectors have experienced long-term structural changes over the last 20 years, resulting from the transition from predominantly native forest resources to plantation-grown resources. This has been driven by decreased access to native forests and through the shift from traditional native hardwood products to softwood products.

In recent times the industry has faced difficult local market conditions and competition pressures from imported products, which has been driven by the GFC and the high Australian dollar relative to other major currencies.

The domestic housing market, which generates the largest source of domestic demand (70 per cent of Queensland's sawn timber is used in residential construction), has been depressed for much of the period since the GFC.

Queensland is a net importer of manufactured wood products. Queensland imported $880 million of forest and timber industry products in 2010–11. Queensland's forest and timber industry imports have increased by more than $340 million over the last decade.

Queensland State forests and timber reserves have historically been a major source of timber, quarry resources and other forest products. These areas, along with sites of built infrastructure and resource exploration and development, have also been used for grazing, watershed protection, conservation, recreation, beekeeping and fossicking. State forests were originally designed to be multi-use tenures allowing for a broad range of activities; using permits, leases and mining tenements to authorise their use and manage competing or conflicting interests. Previous governments, through a number of policy decisions, transferred large areas of State forests to national parks or identified additional areas for transfer. However, 'Queensland's State forests: a multi-use tenure policy statement' was announced in December 2013, re-establishing the use of State forests and timber reserves for a broad variety of purposes, with no further transfers of State forests to national parks.

Forecasts

Economic growth is the main driver of global timber demand. Fast-growing East Asia is increasingly driving demand and sustaining prices.

Industry reports that global timber markets are strengthening and sawlog demand is increasing, with larger import volumes being recorded for China, Germany, Sweden, Finland and Canada.

Domestically, forecasts for the Queensland forest industry are closely linked to activity in the housing and construction sector. Indications are that the housing and construction sector is improving.

There are significant future market opportunities for timber and wood products in Queensland over the medium term. The projected population growth and associated housing demand has the potential to support a consistent increase in timber demand over the next 30 years.

Nevertheless, Queensland is a net importer of manufactured wood products and the trade deficit in those products is also projected to continue to grow, particularly as China and other Asian economies develop their own forestry and processing industries.

Opportunities

- Implementation of the *Queensland Forest and Timber Industry Plan* will help leverage Queensland's competitive advantage and support business and market growth.
- Queensland Government is committed to increasing the security of industry access to state-owned native forest resources and removing constraints on the use of state forests and timber reserves by the forestry industry.
- Timber and wood products could displace other building products that cannot match their environmental credentials.
- There are new market opportunities for the industry to produce bioenergy feedstock from forest products, processing residues and end-of-life wood waste.
- The future of the industry relies on continuing diversification and innovation, such as the progressive development and marketing of engineered wood products.

Challenges

- Small economies of scale continue to disadvantage the Queensland timber industry at the commodity end of the market.
- Uncertainty about the size and nature of future timber markets in Queensland.
- Low profitability and return on investment is constraining new investment in the industry.
- The persistently high Australian dollar is negatively impacting on the competitiveness of Queensland's forest and timber products.
- Ownership changes and business consolidation, particularly the 2010 sale of the Queensland Government's plantation estate, is changing the overall dynamics of the industry and increasing concentration of ownership.
- Substitute, non-renewable, building products such as steel, concrete and aluminium are displacing timber in a number of traditional market segments.
- Declining and fragmented forest and timber research and development capability.
- A low level of public awareness and understanding of the industry, particularly about the environmental benefits of wood products, has resulted in relatively poor community support for the industry.
- The industry is having difficulty attracting and retaining professional and skilled labour, particularly in those regions that have a strong mining industry presence.
- Declining availability of reliable and timely industry data is impeding industry planning, government policy decisions and private business investment decisions.
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Appendix

Table 7.1 Status of significant plant pests and diseases as at May 2014

Common name	Scientific name	Organism	Affects	Biosecurity program	*Emerging/ exotic/ notifiable
African citrus psyllid	*Trioza erytreae*	Insect	All cultivars of Citrus. Murraya (native and ornamental forms of mock orange or orange jasmine) and a range of ornamentals.	Surveillance	Exotic, notifiable*
Ash whitefly	*Siphoninus phillyreae*	Insect	Ornamentals and fruit crops	Surveillance	Emerging, notifiable*
Asiatic citrus psyllid	*Diaphorina citri*	Insect	All cultivars of Citrus. Murraya (native and ornamental forms of mock orange or orange jasmine) and Bergera koenigii (curry leaf). Also a range of ornamentals.	Surveillance	Exotic, notifiable
Banana freckle	*Phyllosticta musarum* and *Phyllosticta cavendishii*	Fungus	Severe infection results in yellowing of the leaf, which withers and dies.	Surveillance Eradication and control in the Northern Territory	Exotic, notifiable
Black sigatoka	*Mycosphaerella fijiensis*	Fungus	Bananas	Surveillance	Emerging , notifiable
Branched broomrape	*Orobanche ramosa*	Parasitic weed	Broadleaf crops, broadleaf weeds, native plants	Surveillance	Exotic, notifiable
Bunchy top	*Banana bunchy top virus*	Virus	Bananas	Surveillance	Emerging, notifiable
Citrus canker	*Xanthomonas axonopodis*	Bacteria	Citrus	Surveillance	Exotic, notifiable
Citrus fruit borer	*Citripestis sagittiferella*	Insect	Citrus and other plants in the Rutaceae	Surveillance	Exotic, notifiable*
Citrus greening (Huanglongbing)	*Candidatus liberobacter spp.*	Bacteria	Citrus	Surveillance	Exotic, notifiable
Citrus powdery mildew	*Oidium tingitaninum* and *O. citri*	Fungus	Citrus	Surveillance	Exotic, notifiable*
Citrus scab	*Elsinoe australis*	Fungus	Citrus	Surveillance	Exotic, notifiable*

Common name	Scientific name	Organism	Affects	Biosecurity program	*Emerging/ exotic/ notifiable
Citrus tristeza virus	Citrus tristeza closterovirus (CTV): mandarin stem pitting strains	Virus	Citrus	Surveillance	Exotic, notifiable*
Cocoa pod borer	*Conopomorpha cramerella*	Insect of the family Gracillariidae	Cocoa, rambutan and longan	Surveillance	Exotic, notifiable*
Electric ants	*Wasmannia auropunctata*	Ant	Environment	Eradication and control	Exotic, notifiable
European house borer	*Hylotrupes*	Insect	Seasoned pine timber	Surveillance	Exotic, notifiable*
Fire ants	*Solenopsis invicta*	Ant	Environment	Eradication and control	Exotic, notifiable
Fusarium head blight	Caused by *Fusarium species*	In wheat mainly Fusarium graminearum and F. pseudograminearum	Wheat and barley	No	Endemic and sporadic
Fusarium stalk rot	Caused by *Fusarium species*	Mainly Fusarium thapsinum and F. andyaze	Sorghum	No	Endemic and common
Giant African snail	*Achatina fulica*	Gastropod	Environment	Surveillance	Exotic, notifiable*
Grape phylloxera	*Daktulosphaira vitifoliae*	Insect	Grapes	Surveillance	Exotic, notifiable
Grapevine leaf rust	*Phakopsora euvitis*	Fungus	Grapes	Surveillance	Exotic, notifiable
Mal secco	*Phoma tracheiphila*	Fungus	Citrus	Surveillance	Exotic, notifiable
Mango leaf gall midge	*Prontarinia spp.*	Insect	Mangoes	Surveillance	Emerging, notifiable*
Mango leafhopper	*Idioscopus nitidulus* and *I. clypealis*	Insect	Mangoes	Surveillance	Emerging, notifiable
Mango malformation disease	*Fusarium mangiferae* and other *Fusarium spp.*	Fungus	Mangoes	Surveillance	Exotic, notifiable
Mango stem miner	*Spulerina isonoma*	Insect	Mangoes	Surveillance	Exotic
Mango weevil	*Sternochetus frigidus*	Insect	Mangoes	Surveillance	Exotic, notifiable

Common name	Scientific name	Organism	Affects	Biosecurity program	*Emerging/ exotic/ notifiable
Mediterranean fruit fly	*Ceratitis capitata*	Insect	Fruit and vegetables, esp. stone fruit	Surveillance	Exotic, notifiable*
Melon fly	*Bactrocera cucurbitae*	Insect	Fruit and vegetables, esp. cucurbits and beans	Surveillance	Exotic, notifiable
Melon thrips	*Thrips palmi*	Insect	Fruit and vegetables	Surveillance	Emerging
Myrtle rust	*Puccinia psidii*	Fungus	Complete host range not known; however, it has been identified on *Melaleuca, Syzygium* and *Eugenia* sp.	Surveillance	Emerging
Navel orangeworm	*Amyelois transitella*	Insect	Citrus, English walnuts, pistachio, almonds and grapes	Surveillance	Exotic, notifiable
Panama disease	*Fusarium oxysprorum f. sp. cubense* tropical race 4	Fungus	Bananas	Surveillance	Exotic, notifiable
Panama disease	*Fusarium species*	Fungus	Bananas	Control	Emerging
Papaya fruit fly	*Bactrocera papayae*	Insect	Fruit and vegetables	Surveillance and annual eradication from Torres Strait	Exotic, notifiable
Papaya ringspot	*Virus type P (PRSV-P)*	Virus	Papaya and cucurbits	Control	Emerging
Pierce's disease	*Xylella fastidiosa*	Bacteria	Grapes	Surveillance	Exotic, notifiable
Plum pox (sharka)	*Plum pox virus*	Virus	Stonefruit	Surveillance	Exotic, notifiable
Potato cyst nematode	*Globodera rostochiensis (Wall.) Skarbilovich*	Nematode	Potato plants and other members of the solanaceous plant family	Surveillance	Emerging, notifiable
Red banded mango caterpillar	*Deanolis sublimbalis*	Insect	Mangoes	Surveillance and control	Emerging, notifiable
Silverleaf whitefly	*Bemisia tabaci* biotype B	Insect	Range of ornamental and crop plants	Surveillance	Emerging
South African citrus thrips	*Scirtothrips aurantii*	Insect	Ornamental and fruit crops, esp. citrus	Surveillance	Emerging, notifiable
Southern red mite	*Oligonychus ilicus*	Insect	Range	Surveillance	Exotic, notifiable*
Spiralling whitefly	*Aleurodicus dispersus*	Insect	Range	Surveillance	Emerging

Common name	Scientific name	Organism	Affects	Biosecurity program	*Emerging/ exotic/ notifiable
Thrips and topovirus	*Thysanoptera: Thripidae*	Insect	Vegetables and fruit	Plant health pest and disease	Emerging
Vegetable leafminer	*Liriomyza sativae*	Insect	Common horticultural crops and ornamental plant species, esp. tomatoes, pumpkins and beans	Surveillance	Emerging notifiable
Yellow crazy ant	*Anoplolepis gracilipes*	Ant	Environment	Eradication and control	Emerging

* indicates that the pest must be reported to the Australian Chief Plant Protection Office (via Biosecurity Queensland) in order to meet the requirements of the Emergency Plant Pest Response Deed. All other pests marked as 'notifiable' must be reported to Biosecurity Queensland to meet the requirements of the *Plant Protection Act 1989*.

Table 7.2 Significant animal pests and diseases and their status as at May 2014

Common name	Scientific name	Affects	*Notifiable	**Exotic/Endemic/ Emerging
Aflatoxicosis		All animals		Endemic
African horse sickness		Horses	Notifiable	Exotic
African swine fever		Pigs	Notifiable	Exotic
Akabane		Mostly cattle		Endemic
Anthrax	*Bacillus anthracis*	Humans, livestock, horses	Notifiable	Endemic
Australian bat lyssavirus		Humans, bats	Notifiable	Endemic
Avian influenza (bird flu)	*Influenza virus* (family othomyxoviridae)	Birds	Notifiable	Exotic
Avian influenza (HPAI H5, H7)	*Influenza virus* (family othomyxoviridae)	Poultry	Notifiable	Exotic
Avian paramyxovirus		Pigeons	Notifiable	Exotic
Blue-green algae (cyanobacteria)		Animals, humans		Endemic
Bluetongue		Sheep, goats, deer, cattle	Notifiable	Exotic
Borna disease	Borna disease virus (Bornaviridae)	Horses, sheep	Notifiable	Exotic
Botulism	*Clostridium botulinum*	Humans, livestock		Endemic
Bovine ephemeral fever		Cattle, buffalo		Endemic
Bovine tuberculosis	*Mycobacterium bovis*	Cattle	Notifiable	Exotic
Bovine virus diarrhoea type 2		Cattle	Notifiable	Endemic
Brucellosis	*Brucella spp.*	Humans, animals	Some spp. Notifiable	Some species exotic (*B. abortus, B. melitensis*), some endemic (*B. suis*)
Buffalo fly	*Haematobia irritans exigua*	Cattle		Endemic
Campylobacteriosis	*Campylobacter fetus subsp venerealis*	Cattle		Endemic
Caprine arthritis encephalitis (CAE)		Goats		Endemic
Caseous lymphadenitis	*Corynebacterium pseudotuberculosis*	Sheep		Endemic

Common name	Scientific name	Affects	*Notifiable	**Exotic/Endemic/ Emerging
Cattle ticks	*Rhipicephalus microplus*	Cattle	Notifiable outside infected zone	Endemic
Chagas disease	*Trypanosoma cruzi*	Dogs, cats	Notifiable	Exotic
Classical swine fever	*Flaviviridae family*	Pigs	Notifiable	Exotic
Clostridial diseases	*Clostridium spp.*	All species		Endemic
Contagious agalactia	*Mycoplasma agalactiae*	Sheep, goats	Notifiable	Exotic
Contagious bovine pleuropneumonia		Cattle	Notifiable	Exotic
Contagious caprine pleuropneumonia		Goats	Notifiable	Exotic
Contagious equine metritis	*Taylorella equigenitalis*	Horses	Notifiable	Exotic
Contagious equine metritis		Horses	Notifiable	Exotic
Cysticercosis	*Cysticercus bovis* *C. cellulosae*	Cattle, pigs	 Notifiable	Endemic Exotic
Devil facial tumour disease		Tasmanian devils	Notifiable	Endemic
Dourine	*Trypanosoma equiperdum*	Horses	Notifiable	Exotic
Duck virus enteritis		Ducks, geese, swans	Notifiable	Exotic
Duck virus hepatitis		Ducks	Notifiable	Exotic
East coast fever		Cattle	Notifiable	Exotic
Enzootic bovine leucosis (EBL)		Cattle, buffalo	Notifiable	Endemic
Epizootic lymphangitis	*Histoplasma farciminosum*	Horses	Notifiable	Exotic
Equine encephalomyleitis		Horses	Notifiable	Exotic
Equine encephalosis	*Equine encephalosis virus*	Horses	Notifiable	Exotic
Equine herpesvirus 1		Horses	Notifiable	Endemic
Equine infectious anaemia (EIA)		Horses	Notifiable	Endemic
Equine influenza		Horses	Notifiable	Exotic
Equine piroplasmosis	*Babesia caballi and Theileria equi*	Horses, donkeys	Notifiable	Exotic
Equine viral arteritis (EVA)		Horses	Notifiable	Endemic

Common name	Scientific name	Affects	*Notifiable	**Exotic/Endemic/ Emerging
Foot-and-mouth disease	*Picornaviridae family*	Clovenhoofed animals (cattle, sheep, pigs, goats, deer, buffalo)	Notifiable	Exotic
Fowl cholera	*Pasturella multocida*	Poultry		Endemic
Getah virus	*Getah virus* (Alphasvirus)	Horses	Notifiable	Exotic
Glanders		Horses, donkeys	Notifiable	Exotic
Haemorrhagic septicaemia	*Pasteurella multocida*	Cattle, buffalo	Notifiable	Exotic
Heartwater	*Cowdria ruminantiaum*	Cattle, sheep, goats	Notifiable	Exotic
Hendra virus		Humans, horses, flying foxes	Notifiable	Endemic
Hydatid disease (hydatid cysts)	*Echinococcus spp.*	Humans, animals		Endemic
Infectious bursal disease		Poultry	Notifiable	Exotic
Infectious laryngotracheitis		Fowls, pheasants and turkeys	Notifiable	Endemic
Internal parasites	Various	Poultry		Endemic
Japanese encephalitis		Humans, pigs, horses, birds	Notifiable	Emerging
Jembrana disease		Cattle	Notifiable	Exotic
Johne's disease	*Mycobacterium paratuberculosis*	Cattle, sheep, goats, alpacas, llamas, camels, deer	Notifiable	Endemic
Kunjin virus		Horses		Endemic
Leishmaniosis		Any species	Notifiable	Exotic
Leptospirosis	*Leptospira spp.*	Humans, animals		Endemic
Listeriosis	*Listeria monocytogenes*	Humans, animals		Endemic
Louping ill		Sheep, humans, cattle, horses, pigs	Notifiable	Exotic
Lumpy skin disease		Cattle	Notifiable	Exotic
Maedi visna	*Lentivirus*	Sheep, goats	Notifiable	Exotic
Malignant catarrhal fever		Cattle	Notifiable	Endemic

Common name	Scientific name	Affects	*Notifiable	**Exotic/Endemic/ Emerging
Marek's disease		Poultry		Endemic
Melioidosis	*Burkholderia pseudomallei*	Humans, animals		Endemic
Menangle virus infection		Pigs	Notifiable	Endemic
Murray valley encephalitis	*Murray valley encephalitis virus (flavivirus)*	Horses		Endemic
Mycoplasmosis	*Mycoplasma gallisepticum*	Poultry (chickens and turkeys)		Endemic
Nairobi sheep disease	*Bunyavirus*	Sheep, goats	Notifiable	Exotic
Neospora caninum		Cattle, dogs		Endemic
Newcastle disease	*Paramyxoviridae family*	Birds	Notifiable	Endemic
Nipah virus		Pigs, humans	Notifiable	Exotic
Pest des petits ruminants		Sheep, goats	Notifiable	Exotic
Pestivirus		Cattle		Endemic
Pimelea poisoning (St George disease, marree disease)	*Pimelea trichostachya, Pimelea simplex, Pimelea elongata*	Cattle, horses		Endemic
Porcine enterovirus encephalomyelitis (Teschen)		Pigs	Notifiable	Exotic
Porcine myocarditis (Bungowannah virus infection)		Pigs	Notifiable	Endemic
Porcine reproductive and respiratory syndrome		Pigs	Notifiable	Exotic
Post-weaning Multi-systemic Wasting Syndrome (PMWS)	Porcine circovirus type 2	Pigs	Notifiable	Exotic
Potomac horse fever	*Neorickettsia risticii*	Horses	Notifiable	Endemic (causal organism present but no clinical disease)
Psittacosis (ornithosis)	*Chlamydia psittaci*	Humans, birds		Endemic
Pullorum disease	*Salmonella pullorum*	Poultry (chickens and turkeys)	Notifiable	Endemic
Pulmonary adenomatosis		Sheep, goats	Notifiable	Exotic

Common name	Scientific name	Affects	*Notifiable	**Exotic/Endemic/ Emerging
Q fever	*Coxiella burnetii*	Humans, animals		Endemic
Rabies	*Rhabdoviridae family*	Humans, animals	Notifiable	Exotic
Rift valley fever		Sheep, goats, cattle	Notifiable	Exotic
Rinderpest	*Paramyxoviridae family*	Cattle, African buffalo, giraffe, eland, kudu	Notifiable	Exotic
Salmonella abortusequi	*Salmonella abortusequi*	Horses	Notifiable	Exotic
Salmonellosis	*Salmonella spp.*	Humans, animals	Some spp. notifiable	Endemic
Screw-worm fly	*Chrysomya bezziana, Cochliomyia hominivorax*	Humans, animals	Notifiable	Exotic
Sheep pox and goat pox		Sheep, goats	Notifiable	Exotic
Sheep scab	*Psoroptes ovis*	Sheep	Notifiable	Exotic
Skin fluke infestation	*Neobenedenia sp*	Fish		Endemic
Sparganosis	*Sparganum mansoni*	Humans, dogs, cats		Endemic
Strangles	*Streptococcus equi subsp. equi*	Horses		Endemic
Surra	*Trypanosoma evansi*	Horses	Notifiable	Exotic
Swine influenza	*Swine influenza*	Pigs, humans	Notifiable	Some types endemic, some exotic
Swine vesicular disease	*Picornaviridae family*	Pigs	Notifiable	Exotic
Tetanus	*Clostridium tetani*	Humans, animals		Endemic
Tick fever	*Babesia bovis, Babesia bigemina and Anaplasma marginale*	Cattle		Endemic
Transmissible gastroenteritis		Pigs	Notifiable	Exotic
Transmissible spongiform encephalopathies	*Transmissible spongiform encephalopathies*	Cattle, sheep, goats	Notifiable	Exotic
Trichinellosis	*Trichinella spiralis*	Pigs, dogs, cats, horses	Notifiable	Exotic
Tuberculosis (TB)	*Mycobacterium bovis*	Cattle	Notifiable	Exotic

Common name	Scientific name	Affects	*Notifiable	**Exotic/Endemic/ Emerging
Tularemia	*Francisella tularensis*	Many	Notifiable	Unclear
Vesicular exanthema		Pigs	Notifiable	Exotic
Vesicular stomatitis	Vesiculovirus	Pigs, cattle, sheep, goats, camelids	Notifiable	Exotic
Warble fly myiasis	*Hypoderma bovis* and *H. lineatum*	Cattle, horses	Notifiable	Exotic
Wesselsbron disease		Sheep, goats, humans	Notifiable	Exotic
West Nile virus infection - clinical		Horses, birds, humans	Notifiable	Exotic
Aquatics				
Enteric septicaemia of catfish	*Edwardsiella ictaluri*	Catfish	Notifiable	Exotic
Necrotising hepatopancreatitis		Prawns	Notifiable	Exotic
Withering syndrome of abalone	*Candidatus enohaliotis californiensis*	Abalone	Notifiable	
Crayfish plague	*Aphanomyces astaci*	Crayfish	Notifiable	Exotic
Marteiliosis	*Marteilia refringens*	Bivalve molluscs	Notifiable	Exotic
Mikrocytosis	*Mikrocytos mackini*	Oysters	Notifiable	Exotic
MSX disease	*Haplosporidium nelsoni*	Oysters	Notifiable	
Perkinsosis	*Perkinsus marinus*	Bivalve molluscs	Notifiable	Exotic
SSO disease	*Haplosporidium costale*	Oysters	Notifiable	Exotic
Akoya oyster disease		Oysters	Notifiable	Exotic
Baculoviral midgut gland necrosis virus		Prawns	Notifiable	Exotic
Channel catfish virus disease (CCVD)		Fish	Notifiable	Exotic

Common name	Scientific name	Affects	*Notifiable	**Exotic/Endemic/ Emerging
Epizootic haematopoietic necrosis virus (EHN)		Fish	Notifiable	Exotic
Infectious haematopoietic necrosis virus (IHN)		Fish	Notifiable	Exotic
Infectious hypodermal and hematopoietic necrosis virus (IHHNV)		Prawns	Notifiable	Endemic
Iridovirosis (gill necrosis virus)		Oysters	Notifiable	Exotic
Red sea bream iridoviral disease		Fish	Notifiable	Exotic
Spring viraemia of carp virus (SVC)		Fish	Notifiable	Exotic
Taura syndrome virus		Prawns	Notifiable	Exotic
Tetrahedral baculovirosis	*Baculovirus penaei*	Prawns	Notifiable	Exotic
Viral haemorrhagic septicaemia virus (VHS)		Fish	Notifiable	Exotic
White spot syndrome virus		Prawns	Notifiable	Exotic
Yellowhead disease virus		Prawns	Notifiable	Exotic
Gill associated virus		Prawns		Endemic
Viral encephalopathy and retinopathy		Fish		Endemic

* Notifiable diseases

Some diseases are of such concern that you are legally required to report any sightings to Biosecurity Queensland. Notifiable in terms of the *Stock Act 1915* means that the person who identifies the condition must give notice to the nearest inspector of the existence or suspected existence of the disease. Similarly, under the *Exotic Diseases in Animals Act 1981*, every person having in his or her possession, or under his or her charge, an infected or suspected animal, carcass or animal product shall, as soon as possible after becoming aware of the existence of the infected or suspected animal, carcass or animal product, give notice thereof to the nearest inspector or the chief inspector by the quickest means of communication available to the person.

For aquatics, 'notifiable' refers to diseases notifiable under the *Fisheries Act 1994* in Queensland, not nationally or internationally. The notifiable list defines the diseases that cannot knowingly be translocated into Queensland, sold in Queensland or left in Queensland waterways.

** Exotic pests and diseases are those which are not present in Australia, or those which are present but not established and are under an official containment and/or eradication program.

Emerging pests and diseases are those which are present in Queensland but their presence is being monitored.

Endemic diseases are present in Queensland. They may be managed by accreditation, control or eradication programs.

Aquatics endemic or exotic pertains to Queensland, not Australia. There are other notifiable diseases that are not included on this list because their hosts do not occur in Queensland.

Table 7.3 Live cattle exports excluding breeding stock, 2003 to 2013

00119 Live bovine animals, (excl. pure bred breeding stock)			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	Indonesia	17 011 718	10 970 186
	Japan	12 235 978	4 631 405
	Malaysia	1 384 261	960 950
	Philippines	3 057 271	2 067 535
	Vietnam	1 324 495	255 036
Total		**35 609 228**	**19 289 397**
2004–05	Indonesia	12 409 857	7 686 818
	Japan	14 868 368	5 200 449
	Philippines	3 341 450	1 503 000
	Vietnam	1 259 603	389 991
Total		**31 879 278**	**14 780 258**
2005–06	Indonesia	9 144 527	5 347 705
	Japan	14 768 185	10 166 234
Total		**24 522 742**	**15 870 139**
2006–07	Indonesia	29 754 639	15 737 947
	Japan	13 105 211	4 470 130
	Malaysia	1 838 837	1 012 457
	Philippines	2 852 359	1 197 947
Total		**47 551 046**	**22 418 481**
2007–08	Indonesia	23 145 028	12 586 444
	Japan	13 907 905	4 642 541
	Malaysia	2 809 461	1 471 446
Total		**39 906 994**	**18 707 231**
2008–09	Indonesia	110 142 174	57 799 672
	Japan	10 265 153	3 649 854
Total		**120 493 727**	**61 505 276**
2009–10	Egypt	14 950 539	7 000 000
	Indonesia	80 464 368	46 545 301
	Japan	10 334 315	3 288 397
Total		**107 739 517**	**57 840 075**
2010–11	Egypt	11 239 747	5 775 000
	Indonesia	27 593 966	14 402 186
	Japan	1 263 350	240 274
Total		**40 326 246**	**20 598 858**

2011–12	Indonesia	19 555 169	9 319 175
	Japan	1 046 070	227 148
Total		**21 031 239**	**9 832 723**
2012–13	Indonesia	2 591 484	1 224 035
	Malaysia	1 625 000	910 000
Total		**4 468 484**	**2 185 007**

Note: Only countries that received more than $1 million in exports during that year are shown.

Table 7.4 Live pure bred bovine exports for breeding purposes, 2003 to 2013

00111 Live pure bred bovine animals, for breeding			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	China	2 412 500	800 000
	Indonesia	5 410 448	7 308 500
Total		**9 477 092**	**8 608 120**
2004–05	**Total**	**196 030**	**13 330**
2005–06	**Total**	**732 700**	**42 335**
2006–07	**Total**	**848 425**	**162 399**
2007–08	**Total**	**250 083**	**12 837**
2008–09	**Total**	**816 455**	**35 123**
2009–10	**Total**	**1 302 931**	**204 155**
2010–11	China	1 149 616	78 750
	Qatar	1 530 000	109 000
Total		**4 496 888**	**454 150**
2011–12	Japan	1 400 000	203 890
Total		**2 365 000**	**306 562**
2012–13	Japan	1 496 250	205 000
Total		**2 985 410**	**572 506**

Note: Only countries that received more than $1 million in exports during that year are shown.

Table 7.5 Exports of fresh or chilled meat of bovine animals (bone in), 2003 to 2013

01111 and 01121 fresh chilled and frozen bovine bone in			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	Republic of Korea	31 273 178	9 451 672
	Japan	4 008 993	900 441
	Canada	4 008 716	537 121
	United States of America	2 022 060	262 374
	Kuwait	1 668 409	476 405
	Saudi Arabia	1 634 768	470 897
	Indonesia	1 323 552	316 143
	Taiwan	1 146 515	200 511
	Other Asia-Pacific	2 678 882	767 532
	Other including Europe	177 318	62 617
	Other Middle East	110 897	6 390
Total		**50 053 288**	**13 452 103**
2004–05	Republic of Korea	70 039 158	18 196 930
	Japan	4 300 330	780 051
	United States of America	2 158 049	309 621
	Canada	1 901 812	280 146
	Taiwan	1 802 084	247 339
	Other Asia-Pacific	2 594 229	575 548
	Other including Europe	292 860	51 168
	Other Middle East	149 443	13 372
Total		**83 237 965**	**20 454 175**
2005–06	Republic of Korea	98 290 586	23 485 537
	United States of America	4 744 408	666 594
	Japan	1 756 663	275 319
	Singapore	1 330 686	266 073
	Jamaica	1 140 841	265 141
	Other Asia-Pacific	2 057 759	464 084
	Other including Europe	1 129 528	220 345
	Other Middle East	99 472	9 123
Total		**110 549 943**	**25 652 216**
2006–07	Republic of Korea	100 074 028	22 398 471
	United States of America	3 051 691	367 486
	Japan	1 750 341	376 286
	Singapore	1 591 062	978 404

01111 and 01121 fresh chilled and frozen bovine bone in			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Other Asia-Pacific	2 461 706	379 376
	Other including Europe	1 532 222	230 189
	Other Middle East	186 360	12 737
Total		**111 452 793**	**25 313 965**
2007–08	Republic of Korea	81 800 177	20 550 351
	Russian Federation	8 967 211	2 371 261
	Singapore	3 168 555	2 035 555
	Japan	2 843 759	366 091
	Indonesia	2 168 060	1 213 975
	United States of America	1 408 523	246 758
	Taiwan	1 155 199	181 263
	Canada	1 081 662	204 138
	Other Asia-Pacific	3 273 711	778 931
	Other Middle East	703 238	74 195
	Other including Europe	317 646	106 299
Total		**106 887 741**	**28 128 817**
2008–09	Republic of Korea	56 448 996	16 474 996
	Indonesia	3 230 859	2 309 897
	Russian Federation	2 839 058	524 841
	Japan	2 478 388	327 895
	Taiwan	1 564 056	261 786
	Singapore	1 470 878	760 199
	Hong Kong (SAR of China)	1 222 492	164 287
	United States of America	1 166 812	328 110
	Other Asia-Pacific	2 129 888	556 002
	Other including Europe	1 332 774	327 944
	Other Middle East	919 988	66 335
Total		**75 758 188**	**22 472 447**
2009–10	Republic of Korea	55 657 628	22 043 788
	Indonesia	2 781 733	1 854 427
	Japan	1 822 195	202 327
	United States of America	1 569 001	313 719
	Hong Kong (SAR of China)	1 514 412	191 298
	Singapore	1 332 398	689 042

01111 and 01121 fresh chilled and frozen bovine bone in			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Malaysia	1 237 719	440 068
	Russian Federation	1 236 045	131 614
	Italy	1 225 147	195 011
	Other Asia-Pacific	2 555 062	593 339
	Other including Europe	1 039 235	235 928
	Other Middle East	568 094	41 216
Total		**72 538 669**	**26 931 777**
2010–11	Republic of Korea	76 825 542	24 297 698
	Japan	4 001 515	651 928
	Indonesia	3 883 621	2 243 582
	Malaysia	2 463 741	953 452
	Russian Federation	2 403 464	202 313
	Italy	2 049 509	178 972
	China	1 816 520	394 593
	Singapore	1 495 503	628 656
	United States of America	1 367 965	277 035
	Taiwan	1 092 175	182 488
	Other Asia-Pacific	2 855 802	582 926
	Other including Europe	754 815	140 360
	Other Middle East	595 181	94 459
Total		**101 605 353**	**30 828 463**
2011–12	Republic of Korea	71 649 751	24 357 136
	Indonesia	3 615 374	1 721 782
	United States of America	3 508 901	728 439
	Japan	3 303 252	442 513
	Malaysia	2 951 522	1 361 935
	Singapore	2 372 112	1 131 251
	Russian Federation	1 630 284	112 422
	China	1 481 613	310 723
	Hong Kong (SAR of China)	1 257 727	210 300
	Italy	1 059 539	98 492
	Other Asia-Pacific	2 279 735	477 231
	Other including Europe	1 513 495	297 872
	Other Middle East	961 605	103 492

01111 and 01121 fresh chilled and frozen bovine bone in			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
Total		**97 584 910**	**31 353 588**
2012–13	Republic of Korea	65 557 532	21 678 181
	China	30 828 328	9 294 238
	United States of America	5 537 633	979 766
	Malaysia	2 626 042	1 132 874
	Singapore	2 280 652	850 297
	Saudi Arabia	2 001 599	156 699
	Hong Kong (SAR of China)	1 518 105	143 437
	Russian Federation	1 312 148	92 228
	Thailand	1 093 978	71 598
	Canada	1 043 023	260 948
	Other Asia-Pacific	4 185 839	1 028 658
	Other Middle East	1 133 440	77 522
	Other including Europe	817 605	144 506
Total		**119 935 924**	**35 910 953**

Note: Only countries that received more than $1 million in exports during that year are shown.

Table 7.6 Exports of fresh or chilled meat of bovine animals (boneless), 2003 to 2013

01112 & 01122 fresh chilled or frozen bovine boneless			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	Japan	1 145 862 491	222 856 137
	United States of America	763 720 407	209 275 230
	Republic of Korea	185 328 412	41 459 357
	Taiwan	80 574 882	19 337 773
	United Kingdom	27 421 391	3 698 923
	Canada	22 248 981	4 882 046
	Denmark	13 830 450	1 093 183
	Philippines	11 040 078	4 005 051
	Mexico	10 814 264	3 018 219
	New Zealand	10 268 183	2 142 435
	Other Asia-Pacific	43 126 433	11 244 923
	Other including Europe	4 197 562	1 323 922
	Other Middle East	3 658 185	648 765
	Other including South Americas	3 420 203	1 000 260
Total		**2 325 511 922**	**525 986 224**
2004–05	Japan	1 577 600 732	290 327 409
	United States of America	805 192 036	208 113 730
	Republic of Korea	207 226 855	42 044 442
	Taiwan	79 059 698	16 853 666
	United Kingdom	28 184 599	3 950 253
	Denmark	18 469 696	1 604 210
	Canada	17 845 008	3 843 919
	Hong Kong (SAR of China)	12 530 118	1 209 827
	New Zealand	8 029 760	1 659 776
	Singapore	7 971 643	821 429
	Mexico	7 331 081	1 947 876
	Other Asia-Pacific	23 999 082	7 218 658
	Other including South Americas	9 971 836	2 887 705
	Other including Europe	5 900 978	1 523 826
	Other Middle East	4 583 243	480 592
Total		**2 806 565 284**	**582 539 442**
2005–06	Japan	1 484 757 149	280 875 547
	United States of America	699 305 128	182 475 120
	Republic of Korea	290 767 362	59 468 094
	Taiwan	101 854 818	20 796 259

01112 & 01122 fresh chilled or frozen bovine boneless			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	United Kingdom	28 089 839	4 072 715
	Canada	20 122 681	4 710 069
	Hong Kong (SAR of China)	15 377 214	1 695 911
	Denmark	14 913 700	1 309 079
	Russian Federation	11 908 892	2 523 311
	Singapore	8 339 758	801 717
	Other Asia-Pacific	37 224 727	9 628 928
	Other including South Americas	10 784 098	2 748 995
	Other Middle East	5 225 387	367 969
	Other including Europe	4 733 381	744 838
Total		**2 733 404 134**	**572 218 553**
2006–07	Japan	1 409 611 195	280 124 013
	United States of America	695 920 012	174 106 587
	Republic of Korea	434 293 938	84 296 595
	Taiwan	87 953 534	20 511 968
	United Kingdom	32 384 055	4 175 468
	Canada	27 420 756	6 313 577
	Russian Federation	17 822 454	3 782 945
	Hong Kong (SAR of China)	16 087 883	1 793 807
	Denmark	15 073 985	1 324 158
	Malaysia	12 609 433	2 245 605
	Other Asia-Pacific	48 007 757	11 601 165
	Other including South Americas	15 728 486	4 134 464
	Other including Europe	10 213 405	1 433 792
	Other Middle East	6 384 248	404 308
Total		**2 829 511 141**	**596 248 451**
2007–08	Japan	1 283 846 861	260 817 504
	United States of America	510 726 111	128 735 838
	Republic of Korea	395 832 540	83 190 814
	Russian Federation	87 086 718	23 403 736
	Taiwan	71 667 986	18 793 163
	United Kingdom	32 418 926	3 690 609
	Canada	29 264 424	6 877 623
	Hong Kong (SAR of China)	20 334 340	2 468 492
	New Zealand	17 219 405	3 559 770
	Philippines	16 501 000	7 111 919

01112 & 01122 fresh chilled or frozen bovine boneless			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Other Asia-Pacific	58 818 108	12 110 621
	Other including Europe	44 377 179	5 101 947
	Other including South Americas	13 111 995	3 283 282
	Other Middle East	10 521 901	1 130 821
Total		**2 591 727 494**	**560 276 140**
2008–09	Japan	1 530 822 625	269 968 182
	United States of America	579 712 098	132 161 003
	Republic of Korea	305 020 399	62 520 634
	Russian Federation	92 013 912	21 827 727
	Taiwan	90 327 952	19 461 363
	Chile	55 823 706	8 099 608
	United Kingdom	38 656 936	4 013 638
	Philippines	34 326 166	10 293 103
	Indonesia	33 184 376	8 345 148
	Hong Kong (SAR of China)	28 865 419	4 499 838
	Other including Europe	88 799 003	12 655 232
	Other Asia-Pacific	72 341 712	13 122 884
	Other Middle East	23 513 063	3 113 700
	Other including South Americas	12 709 037	2 799 051
Total		**2 986 116 404**	**572 881 110**
2009–10	Japan	1 173 193 810	247 381 446
	United States of America	430 337 141	108 796 428
	Republic of Korea	323 761 338	68 928 776
	Taiwan	91 236 341	21 203 913
	Russian Federation	78 215 428	18 477 010
	Indonesia	43 915 478	11 272 548
	Philippines	36 980 569	15 667 330
	Hong Kong (SAR of China)	34 959 913	6 404 735
	United Kingdom	22 905 389	2 903 279
	Denmark	20 582 935	1 642 729
	Other Asia-Pacific	68 961 812	14 140 157
	Other including Europe	41 830 886	7 948 860
	Other Middle East	31 879 241	6 340 931
	Other including South Americas	20 790 717	4 425 519
Total		**2 419 550 998**	**535 533 661**

01112 & 01122 fresh chilled or frozen bovine boneless			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2010–11	Japan	1 179 528 053	251 097 594
	United States of America	414 797 137	94 264 530
	Republic of Korea	357 167 218	70 426 626
	Russian Federation	201 999 180	51 937 781
	Taiwan	99 378 140	21 385 687
	Philippines	54 135 276	17 956 088
	Indonesia	49 852 664	11 818 755
	Chile	42 759 782	8 057 687
	United Kingdom	41 456 464	4 774 785
	Hong Kong (SAR of China)	37 489 655	6 849 041
	Other Asia-Pacific	112 081 192	24 836 456
	Other including Europe	77 013 644	11 783 694
	Other Middle East	54 785 324	10 393 516
	Other including South Americas	10 601 121	1 843 056
Total		**2 733 044 850**	**587 425 297**
2011–12	Japan	1 083 082 123	231 141 200
	United States of America	513 892 674	119 220 690
	Republic of Korea	334 924 776	65 875 426
	Taiwan	144 819 316	27 622 186
	Russian Federation	134 466 954	32 340 095
	Chile	103 144 478	18 065 599
	Hong Kong (SAR of China)	49 670 296	8 454 979
	Indonesia	48 137 524	10 525 987
	Philippines	41 789 009	14 903 180
	United Kingdom	39 672 646	4 656 637
	Other Asia-Pacific	123 077 360	24 648 448
	Other including Europe	98 815 557	17 589 515
	Other Middle East	87 304 176	15 871 767
	Other including South Americas	18 355 141	2 706 355
Total		**2 821 152 030**	**593 622 064**
2012–13	Japan	1 041 883 025	214 955 007
	United States of America	548 695 846	119 264 276
	Republic of Korea	386 496 420	77 129 895
	China	226 672 510	51 111 080
	Taiwan	138 748 220	26 660 239

01112 & 01122 fresh chilled or frozen bovine boneless			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Russian Federation	79 884 776	16 488 523
	Chile	61 785 058	10 908 219
	Philippines	61 042 269	20 231 911
	United Kingdom	54 987 772	6 082 288
	Canada	42 362 291	10 252 029
	Other Asia-Pacific	165 265 169	29 243 891
	Other Middle East	125 609 372	22 976 789
	Other including Europe	79 029 603	10 561 752
	Other including South Americas	21 391 916	3 249 120
Total		**3 033 854 247**	**619 115 019**

Table 7.7 Exports of fresh or dried fruit and nuts (excluding oil nuts), 2003 to 2013

057 Fruit and nuts (excl. oil nuts), fresh or dried			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	Japan	19 482 403	3 820 508
	Hong Kong (SAR of China)	18 547 927	11 494 840
	United States of America	13 954 134	1 370 548
	Indonesia	8 743 053	6 645 970
	Netherlands	6 876 624	561 638
	Singapore	6 476 117	4 152 370
	New Zealand	6 311 346	5 184 279
	Taiwan	4 762 876	2 542 676
	Malaysia	2 737 873	1 719 574
	Germany	2 003 164	137 832
	Other including Europe	6 865 419	1 676 594
	Other Asia-Pacific	4 536 078	1 778 093
	Other Middle East	3 179 625	1 696 315
Total		**104 476 639**	**42 781 237**
2004–05	Japan	16 879 269	3 544 990
	Hong Kong (SAR of China)	15 357 240	9 575 223
	United States of America	10 365 803	922 893
	Indonesia	8 613 939	7 137 959
	New Zealand	7 563 997	5 925 154
	Singapore	6 305 629	3 864 470
	Taiwan	5 975 104	3 987 224
	Netherlands	4 197 524	383 931
	Germany	2 779 773	179 339
	Malaysia	2 687 080	1 847 781
	Other Asia-Pacific	9 765 308	3 198 744
	Other including Europe	8 803 216	1 393 504
	Other Middle East	4 457 342	2 345 606
Total		**98 850 328**	**42 850 589**
2005–06	Hong Kong (SAR of China)	16 921 552	7 638 696
	Japan	15 559 784	2 134 106
	New Zealand	13 259 241	6 407 723
	United States of America	9 501 850	818 192
	Belgium	6 117 162	375 379
	Singapore	5 561 239	2 880 080

057 Fruit and nuts (excl. oil nuts), fresh or dried			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	China	5 521 479	376 677
	Indonesia	5 407 508	4 365 075
	Taiwan	5 321 472	3 212 832
	Netherlands	3 741 474	325 014
	Other Asia-Pacific	6 419 533	3 217 296
	Other including Europe	5 987 116	1 086 683
	Other Middle East	5 111 768	2 901 000
Total		**104 431 178**	**35 738 753**
2006–07	Japan	15 842 172	2 039 973
	Belgium	13 916 052	1 074 619
	Hong Kong (SAR of China)	13 862 263	6 157 152
	United States of America	12 601 468	1 660 254
	China	10 993 425	1 573 615
	New Zealand	10 055 703	6 116 237
	Indonesia	6 410 111	3 864 752
	Singapore	6 300 612	3 054 072
	Germany	3 695 299	268 930
	United Arab Emirates	3 640 998	2 637 042
	Other Asia-Pacific	6 419 533	3 217 296
	Other including Europe	5 987 116	1 086 683
	Other Middle East	5 111 768	2 901 000
Total		**120 790 329**	**36 427 021**
2007–08	Hong Kong (SAR of China)	17 586 405	8 126 957
	United States of America	11 906 071	1 730 529
	Belgium	11 805 565	1 133 000
	China	11 713 621	2 656 892
	New Zealand	11 673 870	6 244 111
	Japan	10 335 215	1 761 328
	Germany	6 007 314	633 188
	Singapore	5 672 785	2 640 008
	Indonesia	4 415 718	2 746 339
	United Arab Emirates	3 534 485	2 540 644
	Other Asia-Pacific	10 280 404	4 497 578
	Other including Europe	7 592 980	1 411 027
	Other Middle East	3 196 967	980 714
Total		**115 405 148**	**37 046 632**

057 Fruit and nuts (excl. oil nuts), fresh or dried			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2008–09	New Zealand	13 591 950	6 531 809
	Hong Kong (SAR of China)	12 155 085	5 295 149
	Singapore	8 784 471	3 833 022
	Japan	8 152 897	2 200 530
	Germany	7 728 403	788 040
	United Arab Emirates	5 780 271	3 280 909
	Indonesia	5 323 296	3 305 861
	United States of America	4 716 321	572 982
	Thailand	3 735 811	930 448
	China	3 230 540	1 669 172
	Other Asia-Pacific	8 550 035	4 079 985
	Other including Europe	8 190 848	1 476 106
	Other Middle East	3 458 680	1 195 992
Total		**93 398 608**	**35 160 005**
2009–10	Hong Kong (SAR of China)	17 630 936	8 787 867
	New Zealand	16 050 353	6 448 830
	Singapore	7 851 985	3 944 087
	United Arab Emirates	7 032 611	4 481 159
	Japan	6 124 386	1 355 432
	Germany	5 940 593	574 146
	Indonesia	5 201 538	3 254 884
	Thailand	4 580 754	1 502 791
	Taiwan	3 840 277	2 802 467
	China	2 865 934	1 399 707
	Other including Europe	7 859 181	1 738 059
	Other Asia-Pacific	7 315 612	3 480 126
	Other Middle East	3 605 776	1 104 862
Total		**95 899 936**	**40 874 416**
2010–11	New Zealand	11 829 669	4 427 593
	Hong Kong (SAR of China)	11 412 390	4 537 743
	Japan	7 147 466	1 511 006
	Thailand	6 601 773	2 548 732
	United Arab Emirates	6 372 407	4 183 612
	Singapore	6 328 979	2 846 909
	Indonesia	5 908 847	3 269 152
	Germany	4 300 490	326 134

057 Fruit and nuts (excl. oil nuts), fresh or dried			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Taiwan	4 273 728	2 325 383
	United States of America	3 292 664	260 261
	Other Asia-Pacific	8 158 644	3 331 859
	Other including Europe	5 754 851	1 244 108
	Other Middle East	3 006 940	781 183
Total		**84 388 848**	**31 593 675**
2011–12	Hong Kong (SAR of China)	13 926 051	6 626 011
	New Zealand	11 012 975	4 383 142
	Indonesia	8 550 938	4 851 449
	Singapore	7 830 672	3 310 578
	United Arab Emirates	7 612 725	5 272 511
	Thailand	7 304 894	3 504 686
	Japan	7 196 821	1 560 351
	Papua New Guinea	3 333 325	2 023 741
	Germany	2 316 192	156 228
	Malaysia	2 305 957	820 964
	Other Asia-Pacific	7 601 018	2 961 693
	Other including Europe	5 039 367	1 370 129
	Other Middle East	2 338 448	929 075
Total		**86 369 383**	**37 770 556**
2012–13	Hong Kong (SAR of China)	15 191 861	6 423 789
	Thailand	9 237 271	5 058 825
	New Zealand	9 050 738	4 684 101
	Singapore	8 848 353	3 537 696
	United Arab Emirates	7 588 922	4 634 158
	Indonesia	7 370 930	4 489 188
	Japan	5 450 884	1 532 062
	Papua New Guinea	5 318 235	3 160 767
	Taiwan	3 574 862	1 967 943
	China	2 751 588	1 246 936
	Other Asia-Pacific	5 286 917	1 744 065
	Other including Europe	2 168 155	671 525
	Other Middle East	1 530 741	705 325
Total		**83 369 457**	**39 856 380**

Table 7.8 Exports of fresh, chilled, frozen or preserved vegetables, (including dried leguminous); roots, etc., nes, fresh, dried, 2003 to 2013

054 Vegetables, fresh, chilled, frozen or simply preserved (incl. dried leguminous); roots, etc., nes, fresh, dried			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	Republic of Korea	4 881 304	1 218 811
	Canada	2 599 815	362 269
	Japan	1 664 057	193 263
	United States of America	1 100 180	149 633
Total		**11 865 930**	**2 346 017**
2004–05	Republic of Korea	5 799 178	767 353
	Japan	1 419 931	244 344
	Canada	1 260 257	193 000
	United States of America	1 032 251	133 493
Total		**11 061 585**	**1 567 586**
2005–06	Republic of Korea	12 568 963	1 456 476
	United States of America	2 260 175	228 973
	Japan	1 262 887	126 536
	Singapore	1 183 885	124 738
Total		**18 857 617**	**2 144 926**
2006–07	Republic of Korea	13 264 343	1 537 968
	United States of America	2 316 029	229 360
Total		**19 032 315**	**2 223 650**
2007–08	Republic of Korea	10 536 540	1 756 214
	Japan	1 924 148	177 838
Total		**17 204 511**	**2 339 918**
2008–09	Republic of Korea	7 536 549	1 755 221
	Japan	1 545 473	124 704
Total		**13 437 463**	**2 295 569**
2009–10	Republic of Korea	5 439 195	171 121
	Italy	1 225 147	19 501
Total		**12 067 223**	**259 904**
2010–11	Republic of Korea	12 744 347	2 869 140
	Japan	3 445 306	507 807
	Italy	2 049 509	178 972
	Russian Federation	1 488 658	85 953
	Other Asia-Pacific	24 265 835	3 997 825
Total		**23 838 243**	**4 073 824**

054 Vegetables, fresh, chilled, frozen or simply preserved (incl. dried leguminous); roots, etc., nes, fresh, dried			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2011–12	Republic of Korea	13 761 072	3 054 075
	Japan	2 612 977	340 718
	United States of America	1 220 687	88 220
	Italy	1 038 540	96 787
	Russian Federation	1 014 965	66 946
	Other Asia-Pacific	3 909 596	338 150
Total		**24 833 245**	**4 083 498**
2012–13	China	17 283 019	3 409 770
	Republic of Korea	11 665 010	2 486 299
	United States of America	2 206 657	131 192
	Hong Kong (SAR of China)	1 035 452	53 665
	Other Asia-Pacific	2 986 570	230 920
	Other including Europe	1 244 669	100 470
Total		**37 285 836**	**6 455 526**

Note: Only countries that received more than $1 million in exports during that year are shown.

Table 7.9 Exports of milk, cream and milk-based products (excluding butter and cheese), 2003 to 2013

022 Milk and cream and milk products (excl. butter and cheese)			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	Hong Kong (SAR of China)	10 952 718	11 304 747
	Philippines	4 472 147	3 246 625
	Singapore	4 257 857	3 540 992
	Papua New Guinea	3 106 688	2 724 085
	Japan	1 762 263	639 758
	New Zealand	1 706 662	742 695
	China	1 685 176	1 635 094
	Indonesia	1 501 853	1 844 069
	Malaysia	1 370 990	1 580 150
	Samoa (American)	1 039 241	1 056 548
	Other Asia-Pacific	4 934 528	4 705 786
	Other including Europe	2 436 136	1 227 053
	Other Middle East	1 170 651	1 037 125
Total		**40 396 910**	**35 284 727**
2004–05	Hong Kong (SAR of China)	9 043 480	7 394 805
	Philippines	3 907 768	3 271 549
	Papua New Guinea	3 805 657	2 955 178
	Japan	3 770 190	1 227 965
	Singapore	2 644 913	1 960 775
	China	1 393 353	1 308 505
	Indonesia	1 346 308	1 429 277
	Other Asia-Pacific	5 036 892	4 452 447
	Other including Europe	1 248 289	1 000 148
Total		**32 942 621**	**25 657 518**
2005–06	Hong Kong (SAR of China)	9 992 150	8 318 802
	Japan	5 777 504	1 644 695
	Philippines	4 844 920	3 843 767
	Papua New Guinea	3 442 212	2 709 642
	Singapore	2 294 586	1 928 703
	Samoa (American)	1 706 595	1 633 901
	Indonesia	1 302 641	1 164 453
	Other Asia-Pacific	5 600 377	4 490 000
Total		**36 268 071**	**26 473 999**

022 Milk and cream and milk products (excl. butter and cheese)			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2006–07	Hong Kong (SAR of China)	9 998 293	8 169 207
	Philippines	4 230 274	2 367 146
	Papua New Guinea	4 157 375	3 354 634
	Japan	3 043 746	601 158
	Singapore	2 339 076	1 746 663
	Indonesia	1 095 710	733 999
	Other Asia-Pacific	4 383 025	2 853 845
Total		**30 539 287**	**20 377 017**
2007–08	Hong Kong (SAR of China)	8 606 611	7 283 700
	Philippines	5 391 940	2 240 747
	Papua New Guinea	4 980 779	3 712 427
	Singapore	2 435 645	1 562 443
	Japan	2 152 177	573 240
	Malaysia	1 065 250	317 340
	New Zealand	1 010 383	281 513
	Other Asia-Pacific	5 867 557	3 454 397
	Other including Europe	1 475 318	604 890
Total		**33 235 405**	**20 069 955**
2008–09	Philippines	3 514 778	1 437 355
	Taiwan	3 495 789	225 051
	United States of America	3 482 932	572 260
	Japan	2 540 311	746 819
	Singapore	1 859 216	586 439
	Papua New Guinea	1 347 781	799 480
	Other Asia-Pacific	4 136 971	1 517 081
Total		**21 157 277**	**6 010 106**
2009–10	United States of America	3 764 082	506 950
	Japan	2 352 392	625 402
	Singapore	1 266 075	363 925
	Papua New Guinea	1 026 599	632 971
	Other Asia-Pacific	3 794 905	1 374 832
Total		**12 281 704**	**3 514 690**

022 Milk and cream and milk products (excl. butter and cheese)			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2010–11	Japan	3 625 581	919 420
	United States of America	3 280 431	537 482
	Other Asia-Pacific	4 293 161	1 587 060
Total		**11 281 099**	**3 067 325**
2011–12	United States of America	4 208 827	669 805
	Japan	3 237 069	690 152
	Singapore	1 191 558	328 956
	Papua New Guinea	1 074 090	588 579
	Other Asia-Pacific	3 676 887	1 173 880
Total		**13 388 721**	**3 451 430**
2012–13	United States of America	5 135 856	1 274 090
	Japan	4 464 190	1 011 402
	New Zealand	3 888 967	1 716 300
	Papua New Guinea	1 328 804	733 616
	Singapore	1 298 869	339 842
	Other Asia-Pacific	2 895 044	795 974
Total		**19 011 730**	**5 871 224**

Note: Only countries that received more than $1 million in exports during that year are shown.

Table 7.10 Exports of cotton, 2003 to 2013

263 Cotton			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	Indonesia	131 405 944	61 501 330
	China	81 854 486	35 284 751
	Republic of Korea	58 509 408	26 575 823
	Japan	53 749 205	29 147 982
	Thailand	49 595 373	22 375 011
	Pakistan	42 052 271	21 633 864
	Italy	11 035 716	5 924 806
	Spain	6 743 241	2 940 955
	Hong Kong (SAR of China)	4 258 420	1 966 194
	India	3 577 589	1 863 004
	Other Asia-Pacific	6 752 947	3 129 007
	Other non Asia-Pacific	3 894 790	1 915 218
Total		**453 429 390**	**214 257 945**
2004–05	Indonesia	141 406 350	73 112 207
	China	82 500 612	41 761 660
	Republic of Korea	70 307 407	37 292 505
	Thailand	60 336 141	35 437 078
	Japan	50 300 091	29 120 100
	Pakistan	15 730 972	9 745 111
	Italy	11 323 699	6 206 946
	Malaysia	6 276 330	3 086 097
	Spain	3 746 458	1 991 635
	Taiwan	3 025 400	2 073 608
	Other Asia-Pacific	10 272 511	5 456 336
Total		**455 503 941**	**245 468 949**
2005–06	China	317 171 182	180 915 119
	Indonesia	121 815 652	71 620 694
	Thailand	78 947 520	47 624 958
	Republic of Korea	41 220 722	25 054 700
	Japan	34 858 831	21 874 842
	Italy	10 475 808	6 234 859
	Malaysia	9 447 403	4 812 973
	Pakistan	8 683 380	5 461 851
	Hong Kong (SAR of China)	6 780 791	3 902 186

263 Cotton			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Vietnam	4 083 444	2 401 219
	Other Asia-Pacific	8 248 230	4 947 202
	Other non Asia-Pacific	2 027 204	1 194 522
Total		**643 760 167**	**376 045 125**
2006–07	China	151 399 893	90 369 285
	Indonesia	118 131 014	67 999 252
	Thailand	59 765 669	35 144 057
	Republic of Korea	47 139 107	27 423 641
	Japan	34 652 515	22 177 754
	Pakistan	8 056 383	4 592 209
	Italy	6 651 468	4 429 139
	India	6 352 151	3 695 600
	Vietnam	4 737 213	2 807 656
	Malaysia	2 550 781	1 478 576
	Other Asia-Pacific	3 194 573	2 826 106
	Other non Asia-Pacific	2 745 665	1 832 421
Total		**445 376 432**	**264 775 696**
2007–08	China	100 086 399	56 539 225
	Indonesia	62 220 778	35 801 956
	Thailand	32 518 403	18 951 339
	Japan	25 781 424	16 281 721
	Republic of Korea	13 461 531	8 660 965
	Pakistan	4 917 027	2 663 167
	India	3 002 004	1 606 549
	Italy	2 957 272	1 798 869
	Switzerland	1 981 368	1 095 800
	Malaysia	1 715 644	1 011 160
	Other Asia-Pacific	2 694 677	1 570 375
Total		**252 318 862**	**146 451 129**
2008–09	Indonesia	128 875 345	63 463 342
	China	117 100 810	65 115 306
	Thailand	63 126 264	32 234 406
	Japan	26 967 976	14 439 150
	Republic of Korea	19 041 582	10 544 452

263 Cotton			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Malaysia	7 331 914	3 415 321
	Hong Kong (SAR of China)	3 402 883	1 999 134
	India	3 068 215	1 648 749
	Vietnam	1 411 064	839 210
	Bangladesh	1 058 493	482 740
	Other Asia-Pacific	1 270 987	669 784
Total		**372 831 632**	**194 955 830**
2009–10	China	163 790 594	87 084 328
	Indonesia	83 556 828	44 251 194
	Thailand	65 663 490	37 836 861
	Republic of Korea	35 542 572	18 898 102
	Bangladesh	20 918 324	9 221 281
	Japan	18 511 447	10 789 085
	Hong Kong (SAR of China)	13 537 741	6 503 094
	Pakistan	8 980 952	3 940 881
	Vietnam	7 636 292	3 992 805
	Taiwan	4 764 587	2 237 855
	Other Asia-Pacific	6 381 068	3 191 056
	Other non Asia-Pacific	1 132 246	773 792
Total		**430 416 141**	**228 720 334**
2010–11	China	283 723 087	113 519 137
	Indonesia	100 312 188	35 306 679
	Thailand	92 330 711	35 247 845
	Bangladesh	57 765 210	20 582 964
	Pakistan	49 562 901	12 854 569
	Republic of Korea	29 126 664	9 980 182
	Japan	20 823 077	7 905 986
	Vietnam	11 197 072	4 517 897
	Hong Kong (SAR of China)	9 737 540	4 676 950
	Turkey	7 959 137	2 485 901
	Other Asia-Pacific	17 913 049	6 494 538
	Other non Asia-Pacific	3 483 149	1 201 961
Total		**683 933 785**	**254 774 609**

263 Cotton			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2011–12	China	951 220 204	365 665 172
	Indonesia	121 278 587	42 619 963
	Thailand	107 956 263	34 547 745
	Republic of Korea	79 927 877	25 228 407
	Bangladesh	78 141 860	26 107 167
	Japan	34 465 473	10 092 310
	Vietnam	16 745 381	6 513 238
	Turkey	15 758 971	5 209 749
	Malaysia	9 142 480	3 867 399
	Taiwan	6 084 445	2 291 444
	Other Asia-Pacific	15 717 008	6 144 991
	Other non Asia-Pacific	3 373 149	1 173 200
Total		**1 439 811 698**	**529 460 785**
2012–13	China	776 790 352	378 191 035
	Indonesia	83 733 600	43 128 835
	Thailand	71 045 582	36 055 770
	Republic of Korea	67 187 090	32 685 912
	Bangladesh	44 221 026	21 884 123
	Pakistan	39 984 418	21 914 533
	Vietnam	25 730 946	13 322 480
	Hong Kong (SAR of China)	17 813 166	8 628 114
	Malaysia	13 474 714	6 843 499
	Japan	12 379 948	6 457 007
	Other Asia-Pacific	8 826 289	4 564 585
	Other non Asia-Pacific	4 732 542	2 884 972
Total		**1 165 919 673**	**576 560 865**

Note: Only countries that received more than $1 million in exports during that year are shown.

Table 7.11 Exports of sugar, 2003 to 2013

061 Sugars, molasses and honey			
Financial year	**Final destination**	**Value ($m)**	**Gross weight (kg)**
2003–04	Singapore	25 916 901	92 613 027
	United States of America	9 637 548	176 763 788
	New Zealand	6 108 780	68 684 203
	United Kingdom	4 683 862	1 049 870
	Indonesia	2 224 124	3 384 864
	Kiribati	1 679 316	3 903 242
	Canada	1 564 594	377 627
	Saudi Arabia	1 557 987	468 439
	Republic of Korea	1 410 213	14 552 604
	Fiji	1 025 771	2 432 650
	Other Asia-Pacific	8 100 608	41 356 821
	Other Middle East	1 624 919	406 266
	Other including Europe	1 570 212	35 783 689
Total		**67 104 835**	**441 777 090**
2004–05	Singapore	29 075 494	92 662 249
	United States of America	8 613 158	137 315 826
	New Zealand	7 779 206	96 910 086
	Republic of Korea	6 486 266	121 879 335
	Netherlands	2 976 322	43 990 562
	United Kingdom	2 966 110	880 722
	Taiwan	2 028 936	32 005 397
	Indonesia	1 914 720	2 473 177
	Saudi Arabia	1 788 194	706 133
	Fiji	1 554 590	3 184 106
	Other Asia-Pacific	7 456 359	16 895 828
	Other including Europe	2 596 691	1 507 839
	Other Middle East	1 489 885	331 209
Total		**76 725 931**	**550 742 469**
2005–06	Singapore	73 149 035	148 112 238
	Republic of Korea	15 844 624	127 155 646
	United States of America	15 669 268	130 323 640
	New Zealand	8 169 565	78 364 415
	Taiwan	8 116 834	66 674 433
	Fiji	3 219 375	5 232 735

061 Sugars, molasses and honey			
Financial year	**Final destination**	**Value ($m)**	**Gross weight (kg)**
	United Kingdom	2 728 504	732 737
	Saudi Arabia	2 450 399	877 071
	Germany	2 190 952	1 164 160
	Papua New Guinea	1 276 931	1 978 203
	Other Asia-Pacific	8 014 820	11 355 772
	Other including Europe	2 035 867	1 877 488
	Other Middle East	1 441 346	362 318
Total		**144 307 520**	**574 210 856**
2006–07	Singapore	59 626 255	136 965 602
	United States of America	19 390 806	161 318 405
	New Zealand	11 049 028	93 894 414
	Republic of Korea	9 409 127	80 278 324
	China	6 178 015	12 708 027
	Hong Kong (SAR of China)	4 686 305	9 158 667
	Fiji	3 297 204	5 851 489
	Taiwan	2 677 582	5 220 601
	Indonesia	2 258 710	3 364 832
	United Kingdom	2 030 760	458 357
	Other Asia-Pacific	9 512 865	13 446 906
	Other including Europe	5 942 369	6 185 572
	Other Middle East	3 196 593	2 003 639
Total		**139 255 619**	**530 854 834**
2007–08	Singapore	46 682 173	148 102 404
	New Zealand	21 190 211	175 509 545
	United States of America	4 942 506	60 720 419
	Hong Kong (SAR of China)	3 780 279	7 549 936
	China	3 775 588	9 178 582
	Israel	2 927 546	7 401 000
	Republic of Korea	2 528 368	33 306 898
	Bangladesh	1 888 122	3 541 374
	Fiji	1 704 048	3 341 290
	United Kingdom	1 428 518	312 622
	Other Asia-Pacific	7 292 561	32 932 889
	Other including Europe	3 428 831	3 809 912
	Other Middle East	3 002 664	1 141 916
Total		**104 571 415**	**486 848 787**

061 Sugars, molasses and honey			
Financial year	**Final destination**	**Value ($m)**	**Gross weight (kg)**
2008–09	Singapore	61 400 967	148 059 220
	New Zealand	17 740 604	158 462 846
	United States of America	12 191 692	101 070 404
	Hong Kong (SAR of China)	9 435 875	17 285 660
	Republic of Korea	6 945 277	38 503 829
	Papua New Guinea	3 627 798	5 905 560
	China	2 830 763	5 274 558
	Fiji	2 187 893	3 960 700
	Bangladesh	1 962 026	3 104 574
	United Kingdom	1 187 157	361 576
	Other Asia-Pacific	6 075 863	9 941 759
	Other including Europe	2 321 917	2 332 200
	Other Middle East	2 134 444	569 048
Total		**130 042 276**	**494 831 934**
2009–10	Singapore	82 580 833	166 534 966
	Republic of Korea	16 874 757	108 109 853
	New Zealand	10 889 325	76 446 283
	United States of America	10 161 233	63 390 150
	Fiji	3 696 161	4 864 912
	China	3 663 606	5 545 448
	Hong Kong (SAR of China)	3 158 527	4 942 622
	Indonesia	2 333 144	2 829 483
	Western Samoa	2 137 407	2 756 291
	Bangladesh	2 026 901	3 040 341
	Other Asia-Pacific	9 478 527	11 806 141
	Other including Europe	3 128 304	2 689 544
	Other Middle East	584 736	869 641
Total		**150 713 461**	**453 825 675**
2010–11	Singapore	92 003 326	167 498 288
	Republic of Korea	17 702 039	128 491 817
	New Zealand	16 270 069	101 807 090
	Hong Kong (SAR of China)	8 257 600	15 874 961
	China	8 252 893	12 906 597
	United States of America	7 044 336	65 623 310
	Republic of Myanmar	5 001 780	8 721 750

061 Sugars, molasses and honey			
Financial year	**Final destination**	**Value ($m)**	**Gross weight (kg)**
	Philippines	4 543 939	6 456 753
	United Kingdom	4 426 905	31 520 914
	Western Samoa	3 352 435	3 731 696
	Other Asia-Pacific	20 120 963	26 566 273
	Other including Europe	2 211 099	2 795 085
	Other Middle East	184 878	210 308
Total		**189 372 262**	**572 204 841**
2011–12	Singapore	90 368 807	148 069 896
	United States of America	15 894 384	181 401 445
	New Zealand	12 941 914	105 611 761
	Republic of Korea	9 855 522	107 796 824
	China	7 092 087	9 410 928
	Hong Kong (SAR of China)	6 580 246	8 934 943
	Spain	6 017 444	84 095 027
	Republic of Myanmar	4 437 726	6 315 750
	Fiji	3 053 714	3 537 799
	Papua New Guinea	2 557 390	2 184 872
	Other Asia-Pacific	11 414 571	13 617 005
	Other including Europe	4 444 520	27 965 651
	Other Middle East	184 878	210 308
Total		**174 852 165**	**699 093 748**
2012–13	Singapore	82 232 884	166 558 627
	Republic of Korea	12 405 237	78 021 512
	United States of America	12 271 472	141 612 283
	New Zealand	11 775 989	100 082 901
	Netherlands	4 015 673	43 000 000
	Hong Kong (SAR of China)	3 152 046	3 962 244
	China	2 783 591	3 400 680
	Fiji	2 359 322	3 233 486
	Bangladesh	1 802 588	2 804 823
	Morocco	1 368 642	1 853 910
	Other Asia-Pacific	6 442 800	7 550 316
	Other including Europe	2 144 026	1 728 476
	Other Middle East	193 840	151 847
Total		**143 175 662**	**554 375 328**

Table 7.12 Volume of sugar exported by Queensland Sugar Limited, 2009 to 2013

Year	Destination	Volume (kg)
2009	Indonesia	3 359 000
	Korea	566 000
	Malaysia	252 000
	Japan	155 000
	New Zealand	85 000
	USA	83 000
	Taiwan	77 000
Total		**4 577 000**
2010	Korea	1 200 000
	Indonesia	872 000
	Malaysia	509 000
	Japan	490 000
	New Zealand	195 000
	Taiwan	188 000
	USA	106 000
	China	47 500
Total		**3 607 500**
2011	Indonesia	784 000
	Korea	706 000
	Malaysia	380 000
	New Zealand	209 000
	Japan	165 000
	USA	89 000
	Taiwan	68 000
Total		**2 401 000**
2012	Korea	910 000
	Japan	379 000
	Indonesia	341 000
	Malaysia	300 000
	New Zealand	203 000
	USA	143 000
	Taiwan	102 000
	China	27 000
	Omnibus	23 500
	Europe	9 925
Total		**2 438 425**

Year	Destination	Volume (kg)
2013	Indonesia	639 000
	Korea	620 000
	Omnibus	509 000
	Malaysia	354 000
	Japan	259 000
	New Zealand	133 000
	Taiwan	80 000
	USA	63 000
	Europe	9 925
Total		**2 666 925**

Source: Data provided by Queensland Sugar Limited

Table 7.13 Exports of wheat, 2003 to 2013

041 Wheat (incl. spelt) and meslin, unmilled			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2003–04	(no country details)	116 778 727	0
	Malaysia	5 899 332	21 986 241
	Vietnam	5 087 909	30 135 610
	Thailand	2 100 312	36 388 450
	Republic of Myanmar	1 891 791	7 356 290
	Bahrain	1 627 052	6 475 290
	Other Asia-Pacific	1 671 318	292 823 401
	Other including Europe	1 545 522	22 445 400
	Other Middle East	454 000	118 612 050
Total		**137 055 963**	**536 222 732**
2004–05	(no country details)	149 115 757	0
	Vietnam	7 988 854	33 877 720
	Republic of Myanmar	5 410 082	23 038 470
	Malaysia	4 491 564	38 217 330
	United Kingdom	3 032 052	10 633 850
	Thailand	2 926 906	12 298 170
	Taiwan	2 709 347	11 418 770
	Italy	1 697 584	8 273 000
	China	1 206 582	5 107 190
	New Zealand	1 047 793	13 577 430
	Other Asia-Pacific	4 012 186	370 991 626
	Other including Europe	803 876	3 228 000
	Other Middle East	48 640	224 456 710
Total		**184 491 223**	**755 118 266**
2005–06	(no country details)	156 183 745	0
	Malaysia	7 647 050	29 427 290
	Vietnam	7 154 901	74 050 300
	Republic of Myanmar	5 391 566	21 955 514
	United Kingdom	3 990 874	13 226 220
	China	3 694 239	14 956 910
	Thailand	3 361 860	12 853 950
	Taiwan	1 802 076	7 470 360
	Singapore	1 572 894	6 265 890
	Papua New Guinea	1 012 378	21 571 400

041 Wheat (incl. spelt) and meslin, unmilled			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Other Asia-Pacific	1 241 913	311 291 600
	Other including Europe	606 383	114 101 000
	Other Middle East	0	168 081 000
Total		**193 659 879**	**795 251 434**
2006–07	(no country details)	96 613 874	0
	Vietnam	8 092 682	28 511 390
	Cambodia	3 380 179	12 975 770
	Republic of Myanmar	2 986 824	11 487 250
	Malaysia	2 853 697	10 671 885
	Thailand	1 046 666	10 760 910
	Other Asia-Pacific	2 189 249	257 524 420
	Other including Europe	716 329	2 390 720
	Other Middle East	13 501	83 535 280
Total		**117 893 001**	**417 857 625**
2007–08	Indonesia	40 857 454	87 527 170
	Taiwan	24 414 606	47 154 420
	No Country Details	19 912 235	0
	Vietnam	13 041 734	29 273 010
	Japan	12 561 818	44 602 640
	Malaysia	9 064 069	19 831 580
	Thailand	8 965 998	18 947 830
	Bangladesh	6 512 716	12 214 228
	Italy	3 232 426	5 020 000
	United Kingdom	2 669 661	4 117 925
	Other Asia-Pacific	5 298 509	35 344 531
	Other Middle East	2 863 057	14 741 180
	Other including Europe	1 518 553	2 127 000
Total		**150 912 836**	**320 901 514**
2008–09	(no country details)	90 304 870	0
	Indonesia	67 258 428	259 341 970
	Iraq	39 787 673	128 272 820
	Vietnam	32 261 007	113 763 430
	Taiwan	22 337 295	55 958 290
	Japan	21 900 080	70 330 500
	Thailand	16 479 132	56 610 525

041 Wheat (incl. spelt) and meslin, unmilled			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
	Malaysia	12 814 315	46 893 260
	Philippines	9 674 180	22 864 950
	Bangladesh	8 778 206	35 710 810
	Other Asia-Pacific	32 398 733	112 882 055
	Other Middle East	3 305 758	36 942 170
	Other including Europe	476 085	28 799 820
Total		**357 775 762**	**968 370 600**
2009–10	Indonesia	52 858 634	178 576 400
	Vietnam	50 771 671	183 415 544
	Japan	47 197 913	158 335 785
	China	39 394 586	125 860 780
	Iraq	36 026 618	127 488 000
	Thailand	20 911 574	68 546 070
	Bangladesh	20 339 698	71 741 840
	Egypt	19 954 135	73 900 000
	Malaysia	12 663 374	44 497 040
	New Zealand	11 472 543	35 067 560
	Other Asia Pacific	37 517 907	129 194 355
	Other including Europe	19 146 305	65 806 600
	Other Middle East	1 393 021	3 995 600
Total		**369 647 979**	**1 266 425 574**
2010–11	Indonesia	86 263 201	266 739 855
	Vietnam	48 288 051	160 999 135
	Japan	44 569 127	121 479 950
	Taiwan	30 111 984	81 931 620
	Thailand	27 961 489	89 609 510
	Malaysia	26 811 757	93 230 777
	Bangladesh	20 931 001	77 866 000
	New Zealand	19 059 610	45 814 840
	Egypt	17 141 079	48 509 800
	Bahrain	12 966 020	32 260 530
	Other Asia-Pacific	33 789 234	99 979 536
	Other including Europe	31 503 961	108 108 190
	Other Middle East	10 199 995	38 199 700
Total		**409 596 509**	**1 264 729 443**

041 Wheat (incl. spelt) and meslin, unmilled			
Financial year	**Final destination**	**Value ($)**	**Gross weight (kg)**
2011–12	Indonesia	114 882 378	393 249 730
	Japan	53 040 709	153 767 440
	Former Sudan (previously known as 'Sudan')	47 812 737	146 180 130
	Vietnam	45 343 701	156 311 750
	Philippines	28 829 816	110 438 470
	Egypt	27 541 468	86 246 670
	New Zealand	21 589 459	72 200 400
	Thailand	20 706 517	63 271 560
	Taiwan	20 432 022	69 536 370
	Mozambique	13 398 552	51 402 030
	Other Asia-Pacific	38 991 939	124 745 926
	Other including Europe	22 940 611	81 270 134
	Other Middle East	14 338 201	45 454 920
Total		**469 848 110**	**1 554 075 530**
2012–13	Indonesia	73 522 277	241 483 960
	Vietnam	72 146 060	218 861 050
	Japan	41 102 630	108 036 300
	Egypt	37 261 703	107 245 240
	Sudan	28 902 215	86 999 670
	Malaysia	27 826 298	88 557 018
	Iraq	22 779 847	78 000 000
	New Zealand	19 195 820	58 425 770
	Philippines	16 668 429	50 504 600
	Republic of Myanmar	16 169 322	48 121 770
	Other Asia-Pacific	46 442 366	137 056 951
	Other including Europe	33 193 556	101 247 360
	Other Middle East	19 690 193	59 530 690
Total		**454 900 716**	**1 384 070 379**

Note: Only countries that received more than $1 million in exports during that year are shown.

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