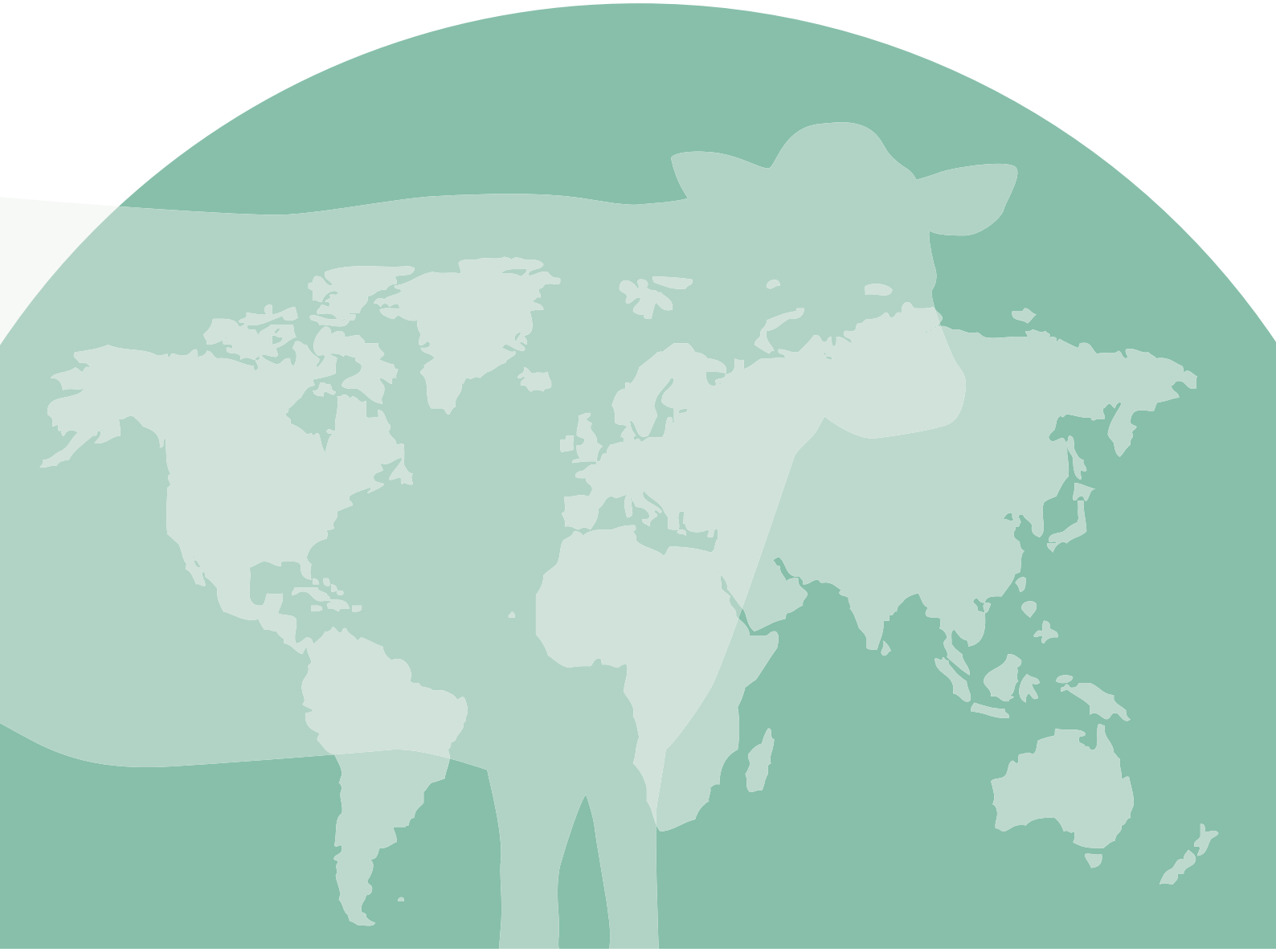
MEAT & LIVESTOCK AUSTRALIA MARKET INFORMATION

How are global and Australian beef producers performing?

Global *agri benchmark* network results 2017



agri benchmark

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Highlights

Beef cattle

- Both global food and beef prices are now well below their extraordinary peaks of 2011. The latest global projections and 2017 *agri benchmark* Conference confirmed that these 2011 peaks are not likely to be revisited within the next 10 years.
- In fact, the 2017-2026 OECD-FAO projections are more pessimistic than in previous years, with food prices expected to fall slowly in real terms over the next 10 years, but with much less volatility than over the preceding decade.
- Underpinning this forecast is a view that import demand growth in China will be more subdued, grain inventories will remain high (keeping prices lower than the past decade and more stable) and growth in beef supply will be faster than recent years.
- However, the outlook can still be described as favourable for beef producers, as prices are expected to remain well above levels prior to 2010 (immediately before the global price spike) and the beef to grain price ratio is expected to increase.
- The 2017 *agri benchmark* Conference also highlighted the growing uncertainty facing beef markets globally, from growing protectionism (led by the US), Brexit, the political and economic instability in South America and climate change.
- 2016 witnessed an unusual divergence between global cattle prices, with prices falling in major northern hemisphere beef countries, due largely to rising North American supplies and a dairy cull in Europe, while prices rose in the southern hemisphere (across South America, Oceania and South Africa), following the impact of recent severe droughts and, in the case of South America, currency devaluation, economic problems, cost inflation and turmoil.
- Of all countries, Australia saw the most rapid rise in cattle prices in 2016, following the recent extreme 3-year drought.
- Few countries can boast long-term profitability in beef production at present.
- A second year of increasing beef prices further improved results for Australian farms in 2016, compared to 2015 levels, whereas globally, profitability fell marginally for most countries.
- While cow-calf enterprises were generally profitable in 2015 and 2016, cattle finishing was not, although it has continued to improve from 2014 levels.
- Typical Australian beef farms achieved the highest levels of profitability since 2006 and were mostly profitable on both a short- and medium-term basis in 2016, but only four of the nine systems being monitored were profitable in the long-term – given Australia's relatively high opportunity costs[1] of land, infrastructure and labour.
- Northern Australian beef systems have moderate to low calf weaning rates and cow herd productivity, when compared with similar systems globally.
- Australia achieves moderate-to-high weight gains in southern farming systems, but low gains in the extensive northern systems.
- Overall, Australia remains an efficient beef producer, with a moderate cost of production, and has higher overall levels of profitability, due to increased returns and beef prices in 2016 – which is in contrast to the majority of the world.

[1] Opportunity cost" of a resource is the value of the next-highest-valued alternative use of that resource. In *Agri benchmark* opportunity costs are measured as the relevant alternative use of own production factors like labour (family working hours* wage for qualified local labour); land (own land * regional land rents) and capital (non-land equity* long-term government bonds interest rate). In theory, for farm businesses to be profitable and sustainable in the long-term they must achieve satisfactory rates of return relative to other investments.

Introduction

This report presents the *agri benchmark* network's perspectives on recent global beef developments, the economics and drivers facing producers around the world, farm profitability (globally and in network countries) and views on likely future developments and challenges.

It then asks the question how competitive are Australian beef producers and what are the main areas where our productivity differs from other countries?

The analysis and perspectives are as of mid-2017, though farm data is for the 2016 year.

What is *agri benchmark*?[2]

agri benchmark is a global, non-profit and non-political network of agricultural economists, advisors, producers and specialists in key sectors of agricultural value chains. The cattle network has over 30 member countries, covering 70% of world beef production and has been producing the results of comparative analysis over the last 14 years.

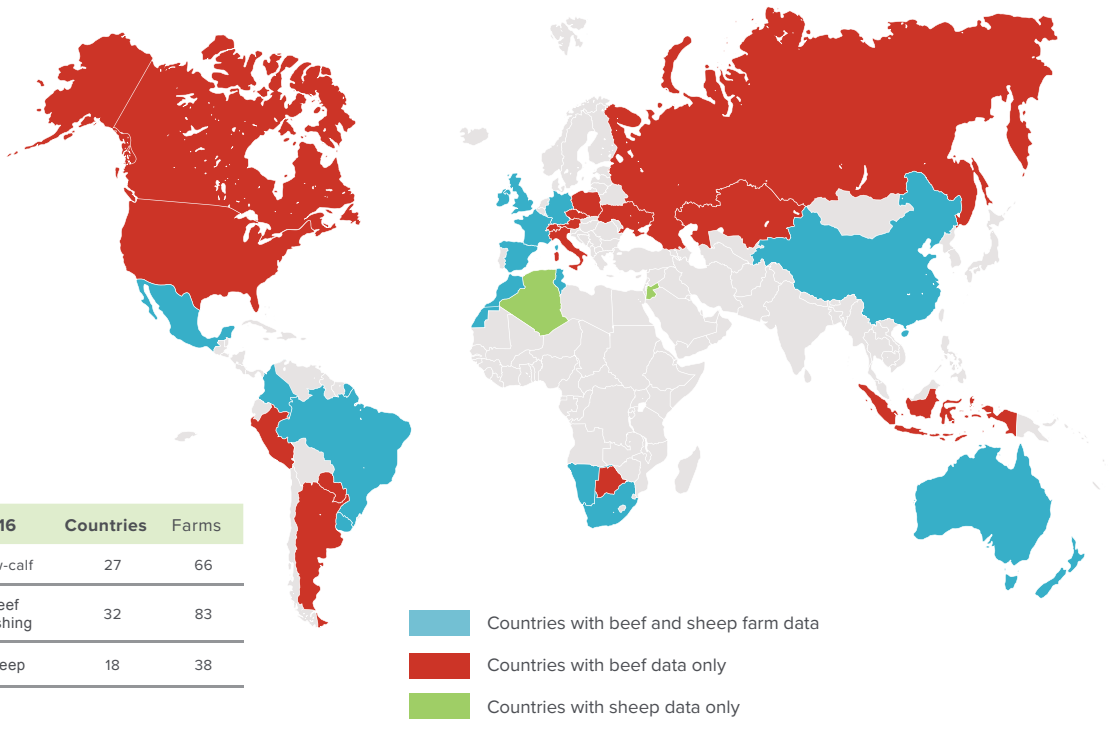
The core competence of the network is in analysing production systems, their economics, drivers and perspectives.

***agri benchmark* aims to assist:**

- producers and their organisations to better align future production through analysis of comparative performance and positioning;
- non-profit organisations (governments, NGOs, international organisations) to monitor global agricultural challenges; and
- agri-businesses to operate successfully through in-depth understanding of markets and customers.

agri benchmark has branches covering beef cattle, sheep, dairy, pigs, cash crops, horticulture, organic farming and fish. Within cattle, it covers both breeding and finishing enterprises (cattle cow-calf, cattle finishing). It is also unique in being able to separately measure the performance of breeding and finishing operations even on joint breeding/finishing enterprises. Furthermore, it measures beef enterprise performance separately from (and together with) other outputs where the enterprise is diversified (in southern Australia typically with some cropping and/or sheep).

Figure 1: Countries in the *agri benchmark* beef and sheep network



2016	Countries	Farms
Cow-calf	27	66
Beef finishing	32	83
Sheep	18	38

[2] See http://www.agribenchmark.org/home.html

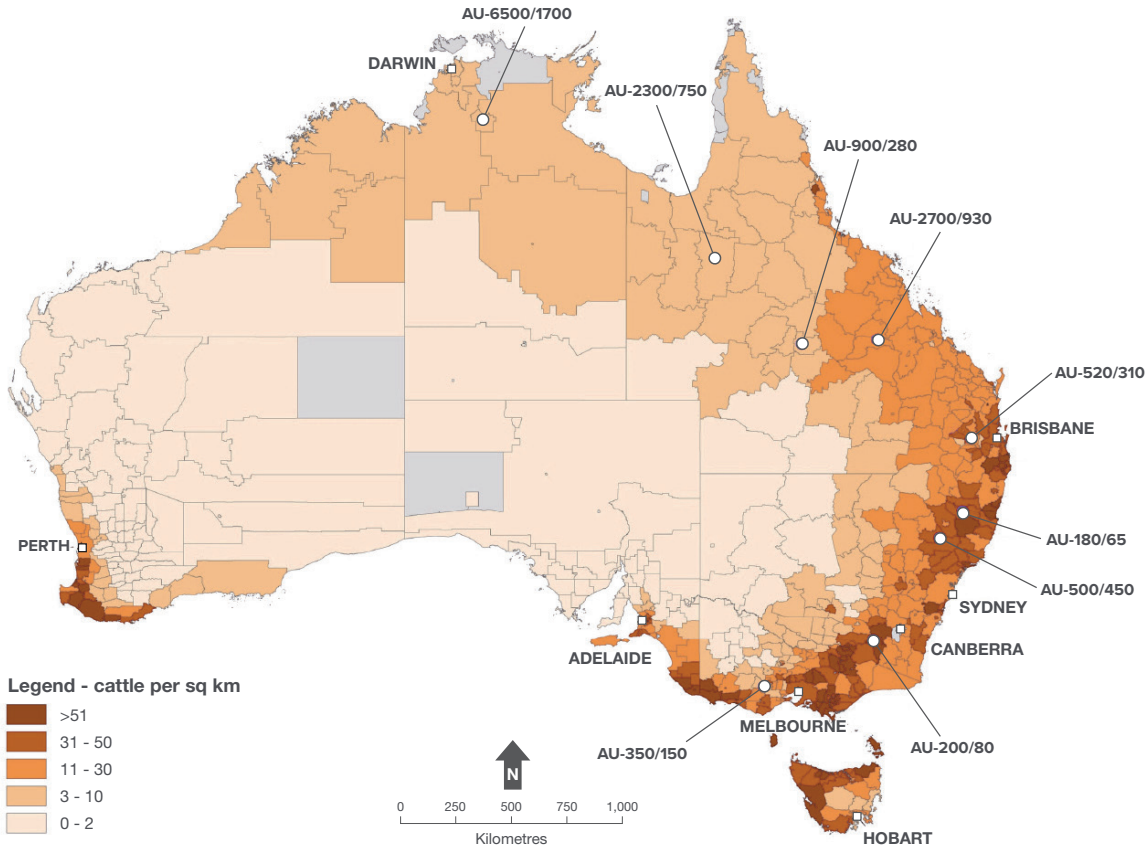
The farm-level results in this report are drawn from the collection of 'typical farm' data in each country, and subsequent analysis and research efforts of all member countries culminating in the 15th annual *agri benchmark* Conference in Saskatoon, Canada, 17-23 June 2017.

A 'typical farm' can be based on data for an actual farm judged to be typical of a key production system in a key region[3], or 'engineered' by local producers and experts to be typical (using annual data drawn from farms in the key production regions). In Australia data was collected for nine typical beef farms in Queensland, the Northern Territory, NSW and Victoria.

Table 1: Australian *agri benchmark* typical cattle farms

Held/Sold (Cows/Steers)	**Farm make-up**
AU 180/65	(180 Cows held/65 steers sold) – northern tablelands NSW; Angus + sheep + wool; pasture feed base
AU 200/80	southern tablelands NSW; British breed; pasture feed base
AU 350/150	western districts Vic.; Angus; pasture, hay, oaten grain feed based
AU 900/280	central Qld; Bos Indicus; pasture, mineral supplements feed base
AU 520/310	south east Qld; Simmental X Droughtmaster; cattle + crops; pasture feed base
AU 6500/1700	Northern Territory, Bos indicus; live export; pasture, mineral supplements feed base
AU 500/450	northern slopes NSW; Charolais X Angus; pasture, hay, sorghum feed base
AU 2700/930	central Qld, Bos indicus; cattle + crops; pasture, oats grazing feed base
AU 2300/750	Qld Gulf, Bos indicus; pasture, mineral supplements feed base

Figure 2: Location of Australian typical cattle farms and beef cattle density



[3] Such individual farm data is further 'typified' where necessary by replacing farm individual particularities by prevailing characteristics, figures, technologies and procedures.

Global price and cost trends

2015 had featured a rapidly rising USD, which exacerbated falls in global costs and prices in USD, but rises in costs and prices when expressed in local currency terms. In contrast, currency fluctuations had less influence on developments in

2016, replaced by the impact of the global fall in dairy product prices and a sharp fall in the US cattle market.

Food and meat prices

Global food prices in USD doubled in the 10 years to 2011, but have been highly volatile over the past 15 years (see Figure 3). Currency volatility, especially the USD, has played a significant part in this, as has fluctuating crop harvests (and inventories) and growth in food demand and imports in developing countries, led by China.

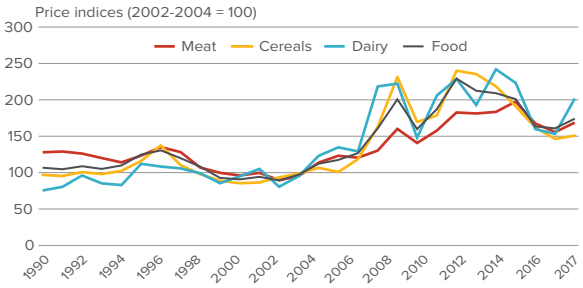
While cereal prices peaked in 2011, dairy product and meat price peaks were typically lagged by 2-3 years (as livestock production takes time to adjust to changes in grain input costs) – peaking in 2013 and 2014, respectively.

Global food prices reached a low point in 2016, but were still 50% higher than prior to 2004. Since mid-2016 prices have mounted a significant recovery (in USD), especially for dairy products, followed by meat and, to a lesser extent, cereals.

The 21% decline in global meat prices (in USD) between 2014 and 2016 was led by sheepmeat, pig meat and poultry declining 25%, while beef fell 17%.

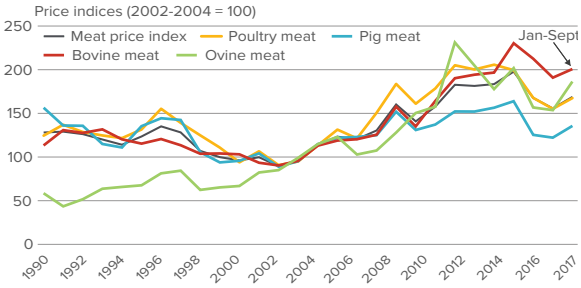
2017 has seen an unexpected recovery in meat prices globally, led by sheepmeat (21% rise) with beef up 5% and the other meats 8-11% higher (FAO global food price indices). This has been led by price rises in North America.

Figure 3: FAO global food price indicies (based on USD prices)



Source: FAO Food Indices

Figure 4: FAO global meat price indicies (based on USD prices)



Source: FAO Food Indices

Global cattle price trends

There was an unusual divergence in global cattle price movements in 2016 (*agri benchmark* farm results), with prices in the vast majority of northern hemisphere countries declining, while in the southern hemisphere cattle prices generally rose.

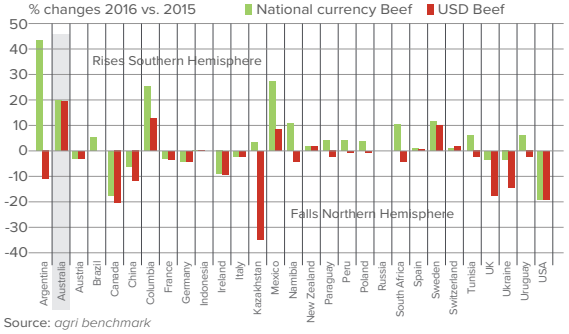
The fall in northern hemisphere prices was led by the US and Canada, caused by increasing beef and meat supplies, following rapid herd expansion and record grain supplies in 2014 and 2016. In Europe, the common factor was the dairy crisis, with low dairy product returns and the end of the EU milk quota scheme causing extra culling (slaughter) of dairy animals.

The common factor in the rise of cattle prices in the southern hemisphere was lower supplies following the recent long El Niño event that caused severe drought conditions in key cattle countries of South America, Australia and Africa.

The price rise was particularly large (in local currency terms) in Central and South American countries, as currency devaluations against the USD and economic and political problems and cost inflation added to the post-drought impact on cattle prices – with the biggest rises in Argentina, Mexico and Columbia. In Argentina, cattle prices have also been assisted by the recent removal of export restrictions and other regulations.

In USD terms, Australia cattle prices rose the most of any country in 2016, due to the rapid decline in supplies, strong restocker demand after the end of the severe 3-year drought and little change in the AUD/USD exchange rate (while most other currencies fell further).

Figure 5: Cattle sale price movements in 2016 in *agri benchmark* countries



Source: *agri benchmark*

Cattle price forecasts

OECD-FAO projections

OECD-FAO note that record production and abundant stocks (especially of cereals) has heralded a period of lower food prices and probably less volatility. All commodity prices are now well off their recent peak levels (OECD-FAO Agricultural Projections 2017-2026, July 2017).

OECD-FAO see demand growth for food in the coming 10-years being much lower than in the last 10, as reflected in the following statement.

"Over the Outlook period, demand growth is projected to slow considerably. The primary sources of growth in the last decade were first the People's Republic of China, where rising meat and fish demand caused the consumption of feed to grow by almost 6% per year, and second the global biofuel sector, where the use of feedstock inputs grew by almost 8% per year. The replenishment of cereal stocks by 230 Mt over the last decade also augmented demand. These recent drivers are not anticipated to support markets in the same way over the medium term, and no other sources to replace them are foreseen."
(OECD-FAO Agricultural Projections 2017-2026 Executive Summary page 1)

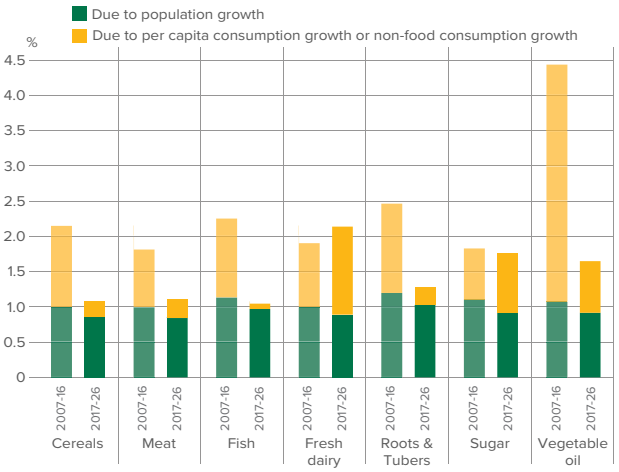
While global demand for meat is still expected to expand steadily, dietary preferences and import access limitations are likely to limit growth. Most of the added calories and protein is expected to come instead from vegetable oil, sugar and dairy.

Within the meat sector, poultry is projected to contribute around half of all supply and consumption growth in the next 10 years.

Despite these surprisingly pessimistic demand projections, the OECD-FAO stated:

"The outlook for the meat market remains relatively favourable for producers. Feed grain prices have declined and assuming stable weather are set to remain low for the projection period." (OECD-FAO Agricultural Projections 2017-2026 page 110)

Figure 6: Annual growth in consumption of key commodity groups



Source: OECD FAO Agricultural Outlook 2017-2026

United Kingdom

Prices across food commodities are projected to fall in real terms in the next 10 years, except for dairy – a significantly more pessimistic view than in the 2016 and 2015 OECD-FAO Agricultural Projections which favoured a small upward trend, especially for meats. The main reason for this change appears to be the reassessment of the role to be played by Chinese demand.

In the case of both meat and cereals, OECD-FAO projects real prices to return to the average of the 1995-2005 period by 2026 – in contrast to the higher (but more volatile) prices of the 2005-2015 period. This would still imply more favourable returns to producers than in the 1995-2005 period, due to growth in farm productivity over the period (reduced costs in real terms).

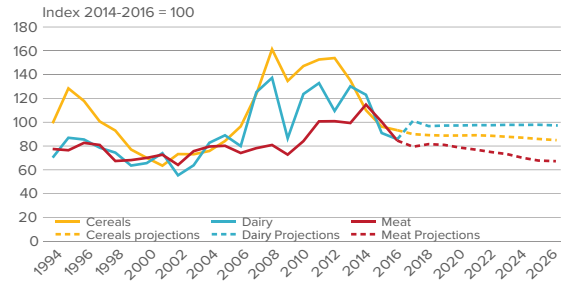
In contrast, dairy products are predicted to rise gradually in real terms, leaving them well above those of the 1995-2005 period, but well below the higher (but volatile) prices in the 2005-2015 period.

OECD-FAO expects some short-term rebound in meat price, particularly beef, from the lower 2016 levels, though this lift appears to have already arrived in 2017.

In the medium-term, beef prices are projected to fall steadily (from a high base both historically and relative to other meats) under pressure from rising global beef supplies, led by the growing herds in North America and South America (and in the face of only slow demand growth and assuming no further trade liberalisation).

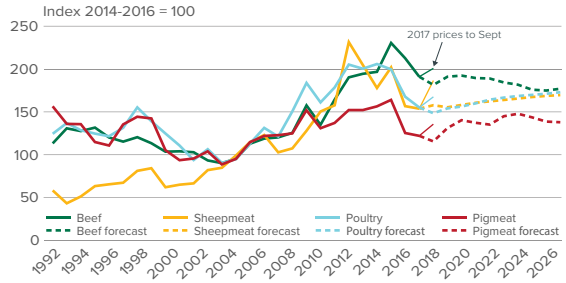
However, the nominal prices of all other meats are projected to rise steadily over the coming 10 years, especially for sheepmeat and poultry.

Figure 7: OECD-FAO food price projections (in real terms)



Source: OECD-FAO Agricultural Outlook 2017-2026

Figure 8: OECD-FAO Meat Price Projections (nominal)



Source: OECD-FAO Agricultural Outlook 2017-2026

USDA medium-term projections

USDA's Agricultural Projections to 2026 released in February are essentially in line with the new OECD-FAO ones summarised above – in predicting a short-term bounce in cattle prices followed by a gradual decline, under pressure from rising beef (and total meat) supplies and with the benefit of continued low grain costs.

USDA Agricultural Projections to 2026, February 2017

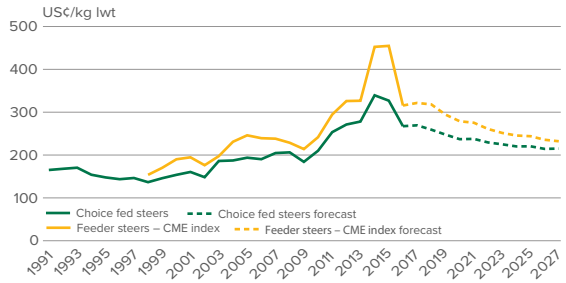
"Beef production is expected to increase early in the forecast period as the herd expansion of 2015 and 2016 results in an increased availability of slaughter cattle. However, the downward trend in the cattle-feed-price ratio reduces production growth over the 2018-26 period. Increased slaughter weights support production gains. Overall, production levels are expected to rise at 1 percent per year, increasing from 25 billion pounds in 2016 to almost 28 billion by 2026."

Forecast US cattle prices bottom out this year (with a further 11% fall), before recovering 10% for 2018 and 2019. Despite only slow growth in US beef supplies (or of other meats) beyond 2018, and steadily rising demand for beef, USDA projects cattle prices to drift lower over the 2020 to 2026 period (even in nominal terms).

One development that is possibly contributing to the negative shift in both the USDA and OECD-FAO projections is the extent of recent falls in cattle prices. The decline in US cattle prices since the 2014 peak, of over 20% was larger than USDA had anticipated (based on beef production growth of only 10%) This may have enticed the USDA to radically lower their short-, medium- and long-term expectations for US beef prices in their 2016 projections, on the assumption that prices had simply overshot market fundamentals. This disproportionate price response to supply has been carried further in the new 2017 projections – with an 11% fall in cattle prices forecast in 2017 in response to only a 4% rise in beef production.

The USDA's alterations to long-term cattle price projections are puzzling, as cattle price projections for 2024 are now 32% lower than they were in the 2015 projections while the beef production projection is only 5% higher than previously projected for 2024. No explanation has been given for the more pessimistic cattle price outlook, and projections for the normal culprits, crop prices and production of other meats, have not been significantly altered.

Figure 9: US Livestock price projections (nominal)



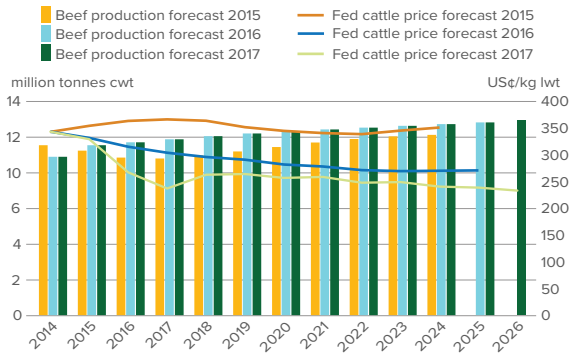
Source: USDA Agricultural Projections to 2026, February 2017

USDA is now projecting from 2016 to 2026:

4% expansion in the US cattle herd
11% growth in US beef production
13% fall in US fed cattle prices

Due to further falls in grain costs and faster-than-expected supply build-up.

Figure 10: Comparison of USDA projections 2015, 2016 and 2017



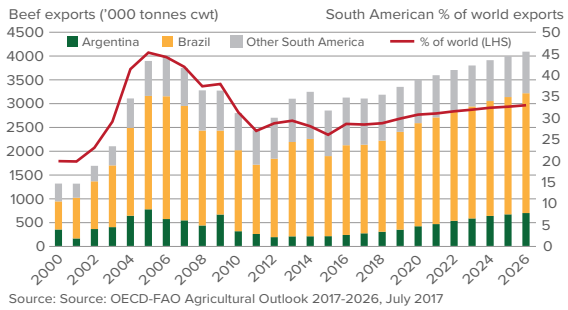
Source: USDA Long-Term Projections, February 2015, 2016 and 2017

Other major developments highlighted

South American beef supply uncertainty

2017 *agri benchmark* Conference participants highlighted the extraordinary uncertainty facing future South American beef supply, especially in Brazil and Argentina – suppliers that are expected to feature prominently in beef export growth over the coming 10 years.

Figure 11: Projected South American beef exports



Source: Source: OECD-FAO Agricultural Outlook 2017-2026, July 2017

Most South American beef exporting countries have long suffered from economic and political problems and severe weather events. In 2017, these problems are all most evident in Brazil, where a meat scandal has rocked the political system and led to major meat export plants being temporarily banned by major overseas markets. This has come on top of a major and long-lasting economic recession, a depreciating currency and high inflation. In addition, the cattle herd is just starting to recover from another severe drought. These events, combined, make it difficult to predict whether the Brazilian herd can respond quickly to the current high cattle prices (assisted by the low currency).

In Argentina, while economic problems continue (especially rising costs) the political climate has become much more favourable for cattle producers, resulting in the removal of beef export levies and other restrictions on the industry. High cattle prices (also assisted by currency depreciations) have now provided an incentive to rebuild herds and reportedly cattle are going back onto the Pampas. However, the response is expected to be moderated by the recent severe drought, rising costs (including imported feeds following recent devaluations) and competition for land from cropping (which has also benefited from the removal of export levies and other restrictions).

OECD-FAO is predicting that Argentina will re-emerge as a major beef exporter in the coming 5-10 years – with a predicted 19% expansion in cow numbers in the next 10 years, a 624kt (or 24%) lift in beef production and 463kt growth in Argentina's beef exports (treble that of 2016).

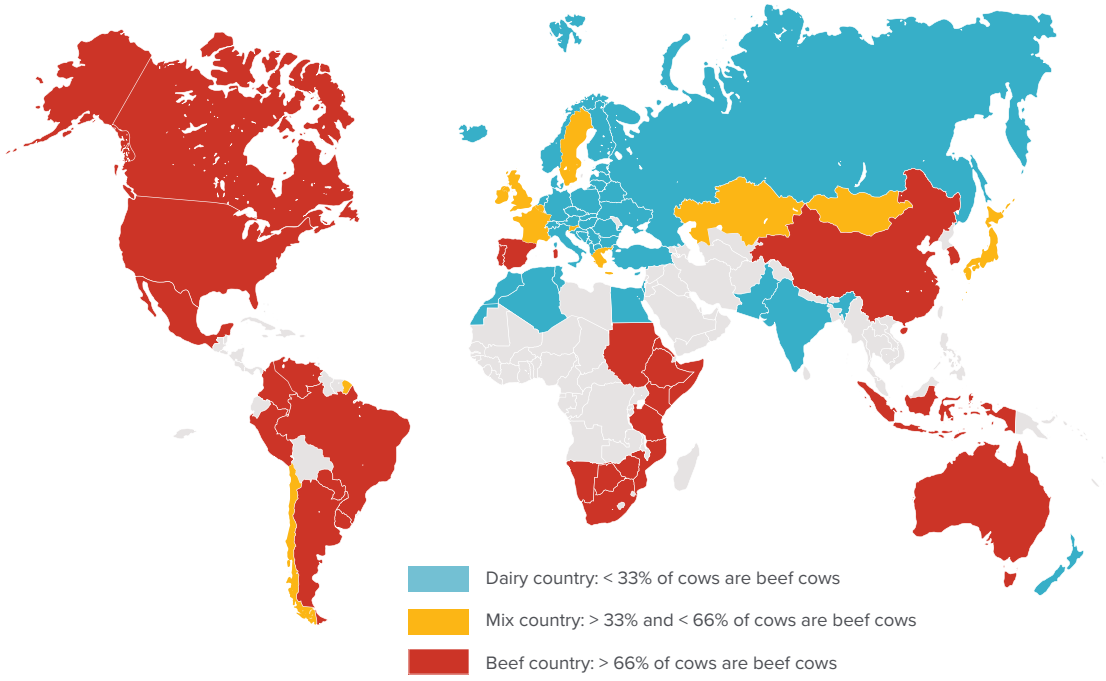
Other beef exporting countries of South America have also been impacted by the recent severe El Niño event, reducing herds and short-term supply – although in some cases (e.g. Colombia) it brought floods rather than drought.

Beef impacts from the "global dairy crisis"

Global dairy product prices fell sharply in 2014 and 2015 as a result of a fall in China demand, Russia's ban on imports from several countries and an increase in supply from key exporters. In the EU, the impact of the Russian import ban and increased supply from New Zealand, Australia and the US was compounded by the elimination of EU milk quotas.

This sudden change from dairy being a generally attractive enterprise to an unprofitable one, had impacts on beef supplies in many countries. These impacts were distinctly different between countries depending on the relative role played by beef cattle and dairy cattle in beef supply.

Figure 12: Beef and dairy countries



In countries where the dairy herd is the main source of beef, including the majority of Europe and NZ, it generally led to the culling of additional dairy cows and calves, adding to short-term beef supply, but at the cost of future dairy and beef supplies. This was the principal impact throughout Europe.

In countries where the herd is mixed or the beef herd dominates, it tended to have little impact, or increased the interest in raising beef cattle over dairy enterprises.

NZ, where 66% of the herd is dairy, provided a good example of both impacts, as extra dairy cattle were killed while extra beef cows and calves were retained – the long-term conversion of beef/sheep farms into dairy farms halted temporarily.

The 'dairy crisis' appears to have been short-lived, as dairy product prices have recovered over half of the ground lost in 2016 and the first half of 2017 (see Figure 3 above) – a rise of 40% in world butter prices and 56% in whole milk powder prices on 2016. This recovery was triggered by a fall in dairy production in Australia, NZ, Argentina and the EU, strong demand and the public purchase of EU stocks through the EU intervention program. This is also being assisted by a renewal of consumer demand for butter and dairy fat over substitute products in developed countries.

This is likely to lead to an eventual rise in beef supply emanating from the dairy herd but cause dairy to replace beef cattle in countries where they compete closely for available land (e.g. New Zealand).

Beef market access uncertainty

Another cause for concern and source of heightened global trade uncertainty featured at the 2017 *agri benchmark* Conference was trade access barriers and threats.

In particular, Brexit is of immense concern to beef producers in both the UK and Ireland and to major beef exporters to the EU and UK – especially from South America, New Zealand and Australia. The UK is the dominant market for Irish beef and the loss of access would be devastating for the local industry. Brexit has already caused a major slump in Irish beef prices as a result of the associated major devaluation in the UK pound against the Euro. No doubt this will be a major issue highlighted at the 2018 *agri benchmark* Conference scheduled for Galway, Ireland in June.

Other new trade access issues featured at the 2017 Conference included the US withdrawal from the Trans-Pacific Partnership agreement negotiations (TPP), Trump's threats to NAFTA, US access to China, Brazil's entry into the US and bans on Brazilian beef following the meat scandal. The threats to NAFTA have already contributed to Mexico granting greater access to imported Australian and New Zealand meats (although new trade is yet to materialise) and Canada's exploration of export opportunities to reduce their reliance on the US.

Combined, the renewed push towards protectionism in key countries (led by the US) and rejection of multilateral agreements in favour of bilateral free trade agreements, threatens to reverse the gains of the past 30 years in the global beef trade from liberalisation.

India's ban on cattle slaughter

On 30 May 2017 the Indian government attempted to ban the cattle and buffalo trade for slaughter, as cattle are sacred to Hindus who make up 80% of the Indian population. The slaughter of beef cows and their progeny and consumption of cattle beef was already banned in 20 of the 29 Indian states. The matter is now before the courts – the Supreme Court of India had rejected a petition for a nation-wide ban on Holy Cow slaughter on 27 January 2017.

As Indian buffalo beef supplies around 20% of the global exports (the largest exporter in 2016), any prolonged disruption would have a major impact on world trade, with Brazil and Australia seen as the main beneficiaries. However, it would also be expected to lead to a large black market in Indian carabeef to East Asia destinations, led by Vietnam/ China and Indonesia.

Without this national ban, OECD-FAO predicts a 275kt (cwt) or 16% rise in Indian beef exports over the next 10 years (to 2026), similar in absolute terms to that expected by Australia and the US/Canada combined (but well short of the 630kt and 430kt increases predicted for Brazil and Argentina, respectively).

Other country snippets

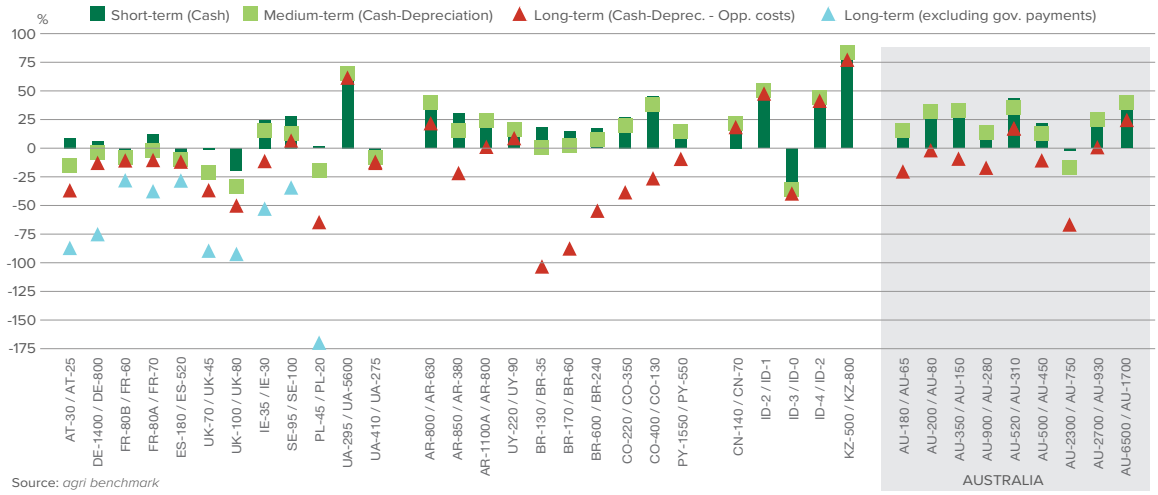
- Falling beef consumption and production in Russia.
- China's beef market is in balance (stable prices) as production and import growth matches slowing consumption growth. The Chinese Government has launched a program of subsidies for herders in pastoral regions.
- Following severe drought, both South African and Namibian beef supplies are down (and prices up) as herds are being rebuilt (mirroring events in Australia).
- Land costs (in USD) are on the rise in Southern Hemisphere countries and in Eastern Europe, but falling in the remainder of the EU countries and stable in Russia and in North America.
- Labour costs (in USD) are rising generally (especially in Argentina, South Africa and the UK) but notably stable in China and Russia.

Global performance of beef farms

Few countries can boast long-term profitability on cattle enterprises at present. Even when net income from other sources or enterprises on the same farm (such as from crops, sheep and wool) are counted to yield a whole farm profit[4], only some beef farms in the Australia, Argentina, Uruguay, China, Kazakhstan, Ukraine and Indonesia made a profit, without government payments, in 2016. This represents a year-on-year improvement since 2012. European beef farms tended to make medium- and long-term losses, which become significantly more severe with the exclusion of government payments. In South America results were mixed, with all countries achieving short-term profits, but only the Uruguay farm and some of the Argentinian farms making medium- and long-term profits. Some farms in Indonesia, China and Kazakhstan also achieved long-term profits. In Australia, all farms achieved short-term profits, and all but one (Qld Gulf – AU_2300_750) achieved medium-term profitability, with four of the nine achieving long-term profitability in 2016.

While cow-calf enterprises have generally been profitable in most countries, beef cattle finishing has not been as profitable over recent years due to the high cost of weaners and feed.

Figure 13: Whole farm profit margins for farms with combined beef cattle breeding and finishing components[5]



Source: *agri benchmark*

How efficient are Australian beef producers?

Cow-calf enterprises

Stocking rates of cow-calf enterprises

Northern Australian cow-calf systems have relatively low stocking rates, on a par with similar rangelands of Montana and Kansas (US), Alberta (Canada), and semi-Kalahari Bosveld (South Africa). However, southern Australia's higher rainfall systems maintain high stocking rates and land productivity similar to the European and the more intensive South American systems.

Weaning rates (calves per 100 cows)

The majority of the world's cow-calf systems tend to maintain similar reproductive rates at around or above 90 calves per 100 cows. However, north Australian systems maintain reproductive rates similar to comparable extensive cattle systems in South America (Brazil, Colombia, Paraguay and Uruguay) and Africa, which range from 50 to 80 calves per 100 cows. Southern Australian systems tend to perform comparably to European, North American and more intensive South American (Argentina, Uruguay) systems. Depending on the feasibility, costs and benefits of change, this is likely to be an area for further improvement in northern Australia.

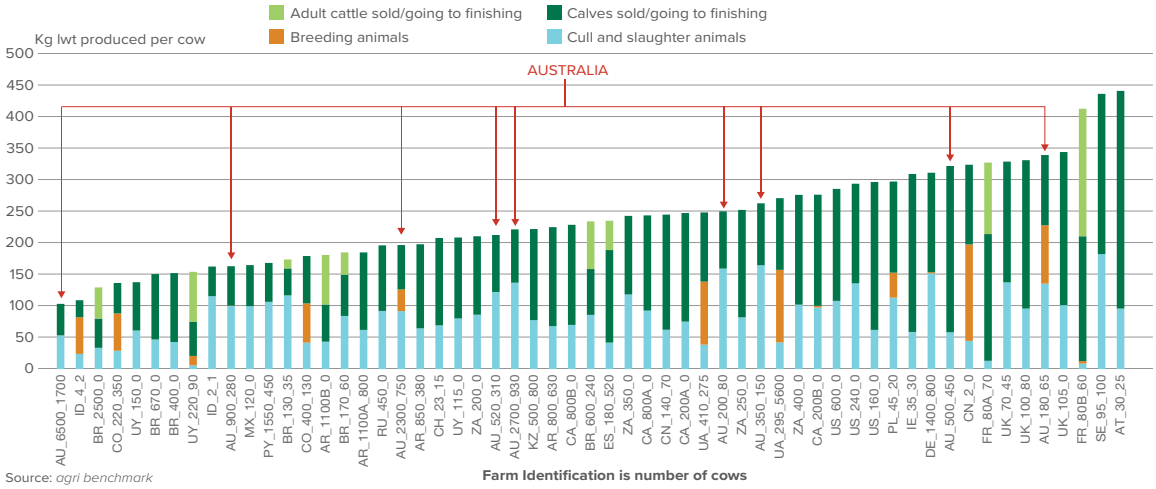
[4] Beef farm enterprise income refers to income attributed to the beef cattle component of a farm. Similarly, beef cow-calf enterprise income and beef finishing enterprise income refer to income specifically attributed to the beef cow-calf and beef finishing components of the farm (calculated separately, even when combined on the same farm, such as occurs in the typical Australian pasture farms). Whole farm profit refers to the combined income from all enterprises undertaken on the farm, including for example, cropping or sheep, net of the costs of operation.

[5] Net profit margin on a whole farm basis is profit as a percentage of gross income from all income sources (including crops, wool and lamb). Short-term profit is where income (from sales and coupled government payments) covers all cash costs (including interest and family wages), medium-term profit allows additionally for depreciation, and long-term profit allows for the opportunity costs of land and other capital invested. Opportunity costs on capital such as land, is calculated using a market leasing rate in each country.

Total live weight produced per cow

This ranges from 100-480 kgs globally (kg live weight (lwt) produced per cow per year) – weaners are the main part for most systems, with culled adults being the second most important contributor. The performance of Australian systems spans the entire data set and is quite diverse, ranging from 104kg to 340kg lwt. The most northern Australian systems (AU_6500_1700, AU_2300_750 and AU_900_280) performance is comparable to other rangelands based systems and the cut & carry systems of Indonesia at around 100-200kg lwt per cow (most of which is the sale of cull females). This could potentially be an area for significant improvement. The most southern Australian systems (AU_180_65, AU_500_450 and AU_350_150) have performance comparable to that achieved in Europe and some North American systems of 250-350kg lwt per cow. This indicator is driven by genetic capacity, mature size of the breed, nutrition, reproductive rates, generation interval, growth rates and turn-off weights.

Figure 14: Total kg live weight produced per cow



Source: *agri benchmark*

Weaner and cull cow prices

Overall, Australian weaner prices are similar to those elsewhere in the pasture-based systems of the southern hemisphere (Colombia, Paraguay, Brazil), higher than those received in southern Africa (Namibia and South Africa), but still around 30% lower than prices in Argentina, Uruguay, North America (Canada and US) and the EU; and around 60% of the prices received in China and Indonesia. In 2016, Australian weaner prices continued to climb from the lows of 2014. In 2016 cull cow prices increased in Australia and were often similar to those received in North America, Europe and Asia, and higher than those received in of South America and Africa.

Total cow-calf returns (revenue)

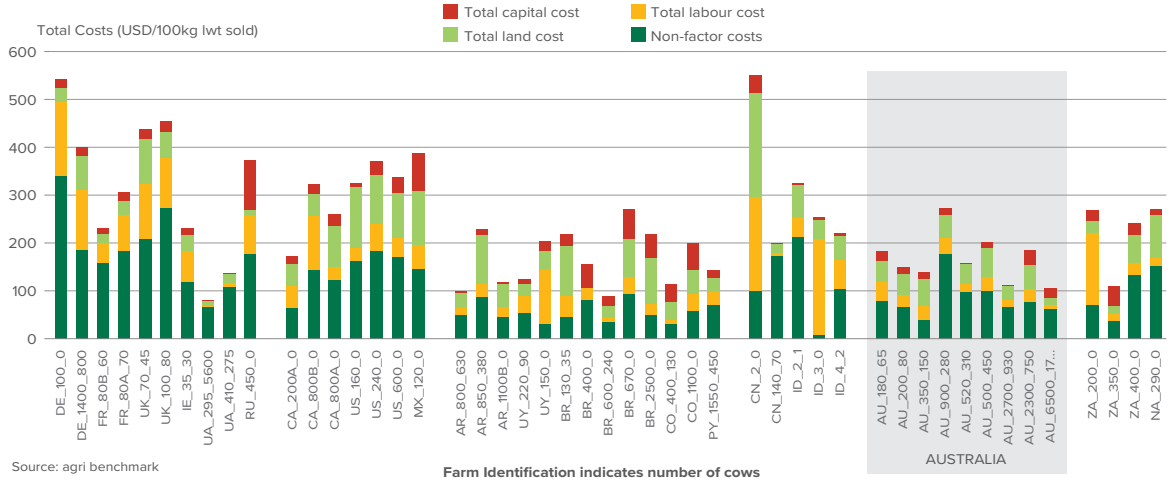
In 2016, Australia had moderate and comparable total revenue (returns) from cow-calf operations to that achieved in Argentina and Uruguay. This is an increase from 2015 levels, due to a combination of significantly higher weaner and cow prices and moderate production levels (weaning rates and production per cow). Some countries in South America, Africa and the Ukraine maintained noticeably lower returns, whereas the US, Canada, Asia and Europe maintained higher returns. European countries maintained some of the highest returns through additional government payments (both coupled and de-coupled).

Total cost of cow-calf production

Most Australian systems maintain a comparably low total cost of production in cow-calf systems similar to comparable systems in South America, some Canadian, Ukrainian and South African typical cow-calf systems. The exception in the Australian data is AU_900_280 (Central Qld) which had high animal purchases (replacing breeders) in 2016. Many of the northern Australian systems were increasing their herd size during 2016 after being significantly reduced during the drought of 2013-2015. Globally, on average, the cost of production has increased from lows achieved during 2015, in part due to exchange rate movements. Generally, North and South American, Asian and African systems have all continued to reduce their cost of production by around 5%, whereas European systems have increased their cost of production by 20% from 2015 levels. Australian systems, on average, maintain the lowest total cost of production, with southern systems being relatively stable and northern systems experiencing a general increase due to non-factor costs such as purchasing replacements, feed, machinery and infrastructure maintenance.

In most countries non-factor costs[6] make up 30-60% of the total cost of production, and Australia tends to have similar cost structures to that of the North and South Americans. Most European countries maintain total costs of production around two times higher than that for the low cost countries like Australia.

Figure 15: Total cost of cow-calf production (US$ per 100kg live weight sold)



Labour costs and productivity

Labour costs in Australia are amongst the highest in the world, but have declined since 2013 in US dollar terms. Australia's average wages paid for employed staff in 2016 was around US$20/hour, with the opportunity cost of family labour around US$22/hour. European countries averaged $14/hour (excluding Ukraine and Russia @ $1-4/hour), North American countries averaged $19/hour (excludes Mexico @ $1/hour) and South American/African countries averaged $7/hour. Asian countries average $1/hour.

However, taking into account the productivity of the labour (labour costs per 100kg lwt beef produced), the contribution of labour costs to the production of beef from Australian cow-calf systems is similar to or lower than that achieved in the most cost-efficient African, Asian, South and North American systems, where labour is relatively cheap. European, small scale Asian systems and some South African systems have high labour costs due to low productivity per unit of labour input.

[6] Non-factor costs include all the operating costs of the enterprise, both variable and allocated fixed costs.

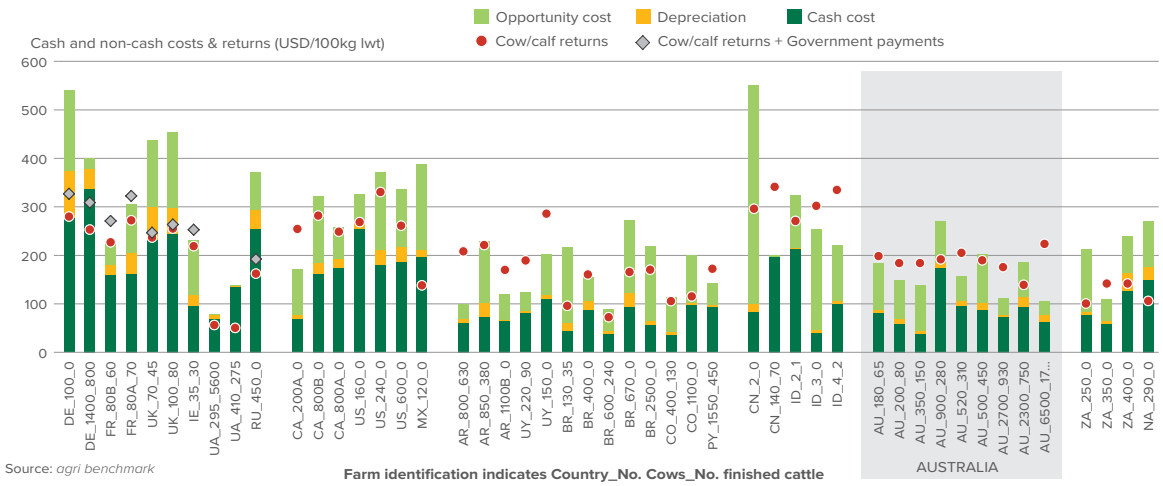
Total costs, returns and profitability of cow-calf production in 2016

The South American and most Australian systems, and some Ukrainian, Asian, Canadian and South African, maintain the lowest cash costs and total costs. Most cow-calf systems are producing short- and medium-term profits (enterprise returns less cash costs and depreciation), but only 40% of analysed typical farms are yielding long-run profits (enterprise returns less total costs). Notably, the majority of these exist in South America, Asia and Australia.

Six of Australia's nine pasture-based farms achieved long-run profits from the cow-calf portion of their operations in 2016. With total returns increasing by around 30% (and over 60% since 2014) and total costs being maintained (particularly in southern systems), the profitability of Australian systems was again at a record high since 2006.

Generally, European systems are high cost systems and most were not capable of maintaining medium-run profits in 2016, although some achieve short-run profits. With additional income provided by government payments (coupled payments), some covered cash costs and depreciation.

Figure 16: Costs, returns and profitability of cow-calf production 2015 (US$ per 100kg live weight sold)



In comparison...Australian cow-calf systems have:

- More diversified whole farm systems (maintaining both cow-calf and finishing systems within the same business)
- Moderate to low weaning rates and moderate to low productivity per cow, especially in northern systems which have comparatively low reproductive rates, extended generation intervals, lower growth rates and turn-off weights.
- Increased revenues due to slightly higher weaner prices and significantly higher cull cow prices, with another 30% improvement in total returns from 2015 to 2016.
- Southern Australian systems have maintained their cost of cow/calf production since 2015.
- Northern Australian systems have generally increased their cost of cow/calf production since 2015.
- 2016 was the most profitable year since 2006, with all Australian systems achieving short- and medium-run profits during 2016, and all but 3 systems achieving long-run profitability, which has been a year-on-year improvement since 2013.
- High labour productivity (kg lwt produced per hour of labour input) compensates for high wage rates (although the differences in the cost of wages are reducing, which is in part due to exchange rate movements).

Cattle finishing enterprises

There was minimal improvement in beef cattle farm finishing enterprise profitability in 2016 across almost all countries.

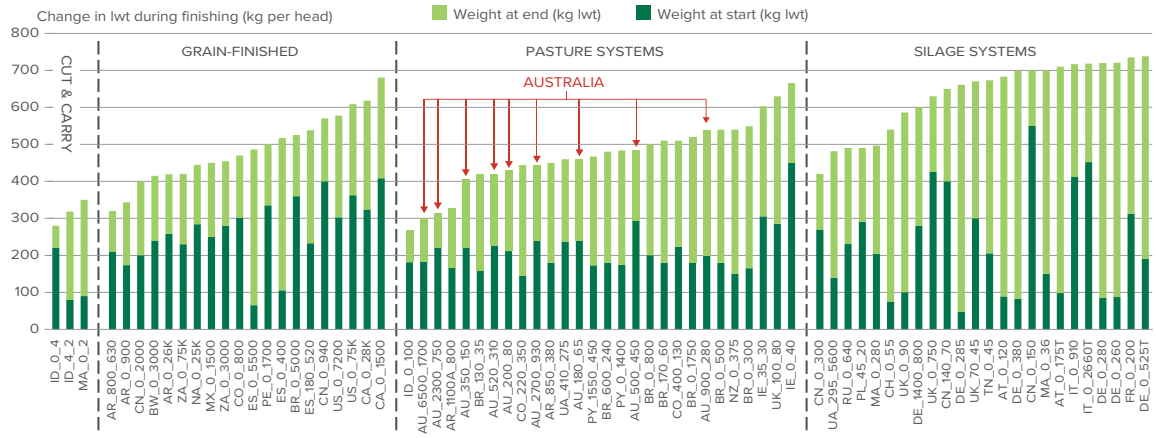
While beef finishing farms in almost all countries made short-term (cash) profits in 2016, few achieved mid-term profits (covering cash costs and depreciation), and even less achieved long-term profitability (do not cover the opportunity cost of inputs).

Live weight gains during finishing phase

Data indicates that many European systems (predominantly silage/grain based) have long finishing periods and high final weights (600-720kg finished live weight) with very low comparable starting weights in some systems (~ 100kg lwt or less). These cattle come from dairy herds and are either Holstein or dual purpose breeds, like Fleckvieh.

Australian systems are similar to South American, African and UK systems, which have similar total weight gains in finishing (400-540kg finished live weight) and similar entry weights (200-300kg lwt). South American systems tend to be in-between (150-200kg lwt at entry with around a 450-500kg finished weight). In all these countries, the majority of feeder cattle come from specialist cow-calf operations, hence animals are often older and heavier when they enter the finishing process. Some Australian and South American systems on pastures are characterized by long finishing periods of 500-1,000 days, especially under more rangeland conditions.

Figure 17: Change in live weight during finishing (kg



Source: *agri benchmark*

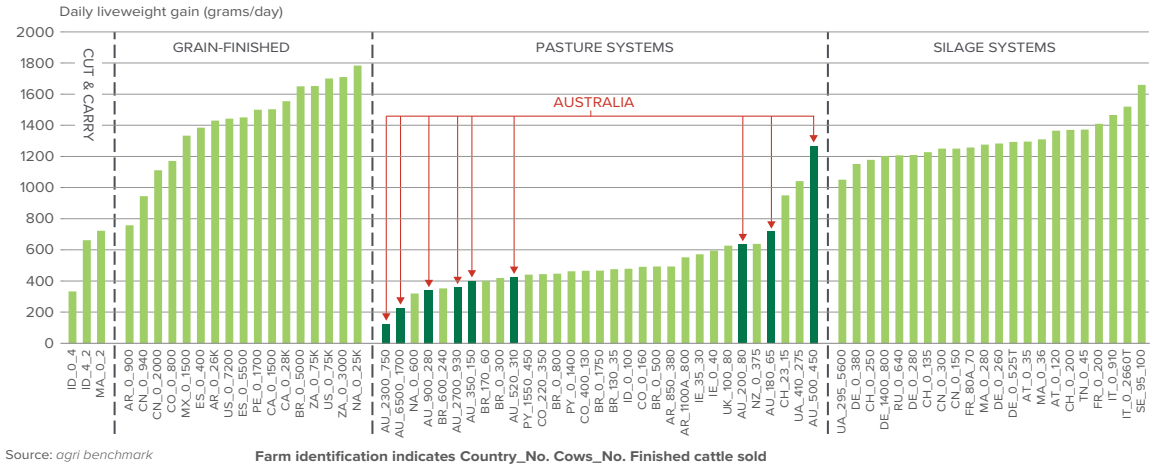
Farm Identification indicates Country_No. Cows_No. finished cattle sold

Daily and net weight gain

There is a clear reflection between the daily weight gains observed in the data and the observed changes in live weight and the extent of the finishing period. As would be expected, most feedlot weight gains exceed those achieved in pasture and silage systems. Notably, around 80% of the European silage based systems achieved similar or higher weight gains than the lowest performing feedlots from China, Argentina and Colombia.

Australia's pasture based systems had very mixed results for 2016, with the best pasture based systems rank 1st (AU_500_450, NSW northern slopes), 4th (AU_180_65, NSW northern tablelands) and 6th (AU_200_80, NSW southern tablelands) when compared to other pasture systems on daily weight gain. Northern Australian systems continue to record some of the lowest weight gains (AU_2300_750, Qld Gulf; AU_6500_1700, NT) and are similar to weight gains achieved in South American and African systems.

Figure 18: Daily Live weight gain (grams/day)



Source: *agri benchmark*

Farm identification indicates Country_No. Cows_No. Finished cattle sold

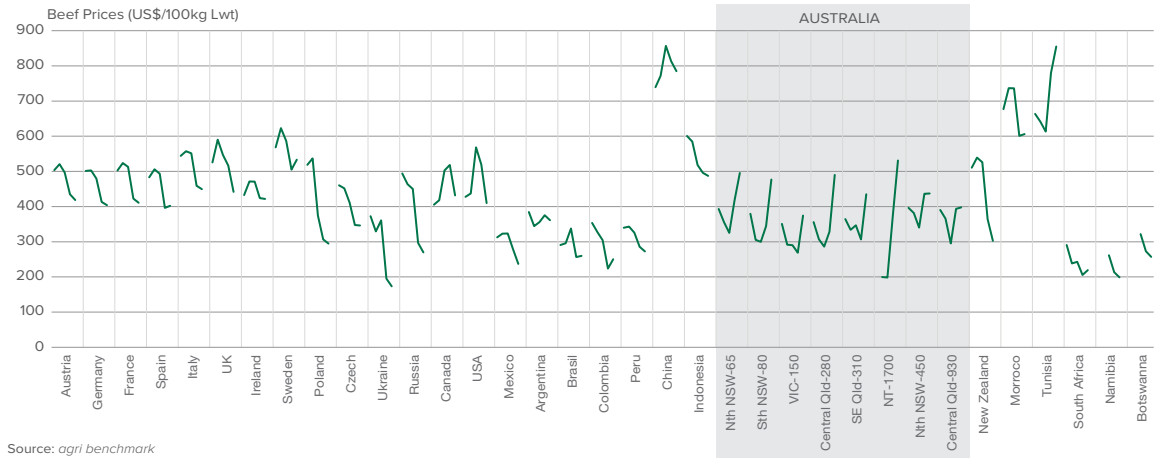
Comparison of beef prices from 2012 to 2016

Beef carcass prices generally ranged between US$200 and US$500/100kg cwt across the globe in 2016, with the exception of closed or protected markets (through both tariff and non-tariff trade barriers), such as China, and MENA countries, especially Morocco and Tunisia. China experienced another small decline in beef prices from the highs of 2014.

European beef prices generally decreased further from 2012-2014 levels and are relatively consistent internally and higher than South American prices (due to high import barriers). Non-EU countries, such as Ukraine, Russia and Poland, have all experienced significant falls in beef prices since 2014.

Canada and the USA both experienced a peak in beef prices during 2014, which have now reduced to levels similar to Europe. Southern Africa and South American pasture-based systems continued to record a decline in beef prices (in US$), and received some of the lowest prices. Similarly, New Zealand experienced another significant reduction in beef prices since 2014, to a level of around US$300/100kg cwt. Australian beef prices have been the exception, with most typical farms experiences rising prices since 2014, with significantly higher prices received in 2016. In the case of four of the Australian systems, these farm-gate prices in 2016 were US$100 higher than those received in Europe, at around US$500/100kg cwt.

Figure 19: 2012-2016 beef prices received (US$/100kg lwt sold)



Source: *agri benchmark*

Costs of finishing

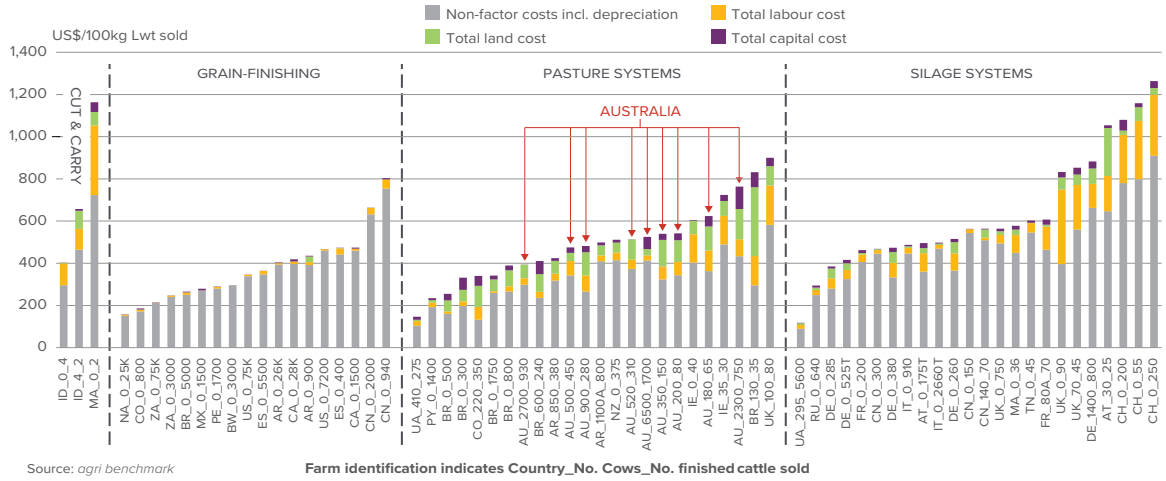
The high US$ and drought have generally raised the cost of Australian beef production in recent years (especially in 2013 and 2014), in US$ terms and relative to farms in the Americas and Europe. Most Australian systems again experienced an increase in their total costs of finishing in 2016.

For the majority of the world's finishing systems it costs around US$4-$6 per kg live weight sold in 2016. This represents an increase on 2015 costs. The lowest cost finishing systems exist in the Ukraine, southern Africa and most South America systems. With the recent increase in costs, Australian systems (at a simple average of US$5.40) are comparable to the lower cost European and North American finishing systems. The highest cost systems continue to occur in Europe (Germany, Austria, Ireland, Poland and the UK), Asia (China and Indonesia) and Morocco. New Zealand notably maintained a moderate cost of finishing in 2016 due to recent increases in the cost of purchasing backgrounder cattle (dairy beef).

Total costs and farm rankings

In 2016 the majority of grain and pasture based finishing systems tended to have lower costs than silage systems. Although some finishing experienced a decline in total costs, the majority of typical farms experienced an increase in costs from 2015 levels. Non-factor costs dominate in each finishing system (of which 30-70% is the cost of transferred/ purchased livestock, with this figure being around 70-85% for grain finishing systems), although land, capital and labour contribute more significantly within pasture and silage systems per unit of output.

Figure 20: Total average long-run cost of production (US$/100kg liveweight sold)



Source: *agri benchmark*

Farm identification indicates Country_No. Cows_No. finished cattle sold

The entirely pasture based Australian systems had mixed outcomes for the total costs of finishing (in US$) in 2016. For some systems, the costs increased due to a rise in the cost of transferred/purchased livestock, whereas others had a marked decline in the cost of feeding, or a combination of the two. Overall costs were generally much lower in the more extensive Queensland properties (with Bos indicus cattle) than the more intensive southern states of NSW (with Bos Taurus cattle) and Victoria. Costs on the large but remote NT and Queensland gulf properties were high in 2016.

Finishing costs, returns and profitability

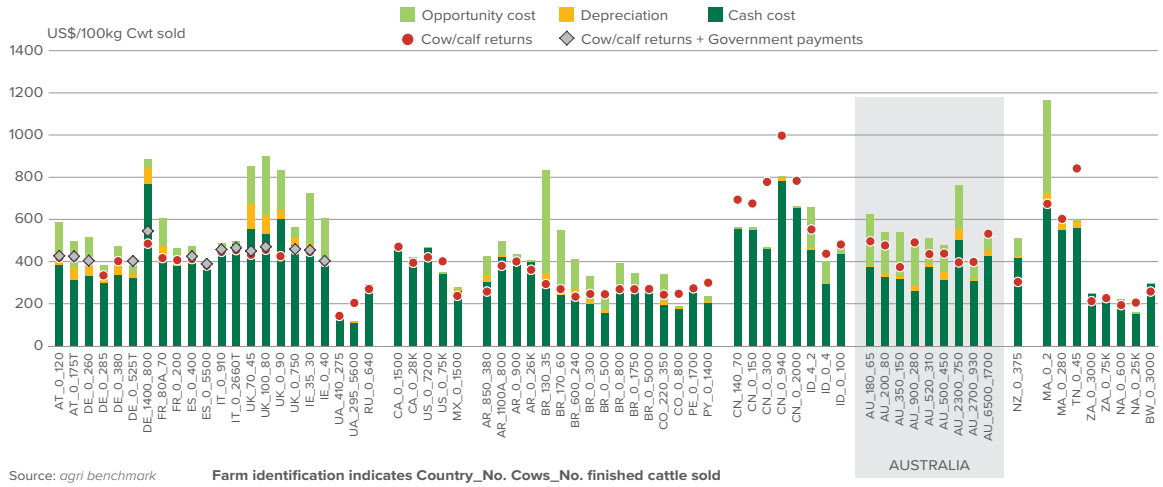
The majority of beef finishing systems around the world did not generate high enough returns to cover total costs of production in 2016 (long-run costs, including cash, depreciation and opportunity costs) and, in many cases, did not cover medium-term costs of production (cash costs + depreciation), but most managed to break-even against short-term (cash costs) costs.

Around half of the South American systems cover their short- and medium-run costs, with only a few covering opportunity costs and generating long-run profits. All finishing systems in China and Tunisia continue to generate long-run profits, although experiencing both increases in costs and reductions in returns from 2014 levels. The only other systems to do so are US and Namibian feedlots (US 75k and Namibia 25k respectively), a Ukraine system and a small herd system in Indonesia (Indo 4). In New Zealand the finishing system did not maintain short-run profitability (did not cover cash costs) in 2016.

Of Australia's nine pasture-based finishing systems analysed, eight covered both short- and medium-term costs in 2016, with three farms (Central Qld, AU_900_280 and AU_2700_930, plus NT AU_6500_1700) covering opportunity costs (achieving long-term profit). Only one farm (Qld Gulf AU_2300_750) did not cover their cash costs and did not achieve short-term profitability. Southern finishing systems generally only achieved medium-term profitability. Australian finishing systems, although most maintain relatively moderate cash costs of production and depreciation costs tend to have high opportunity costs (mainly land and infrastructure, and to a lesser extent family labour).

It is also noticeable that in Europe, even with the remaining low levels of government payments (coupled payments), beef finishing systems for the most part did not produce short- or medium-run profits, unlike cow-calf systems (which receive higher levels of government payments).

Figure 21: Cattle finishing costs, returns and profitability in 2016 (US$/100 lwt)



Source: *agri benchmark* **Farm identification indicates Country_No. Cows_No. finished cattle sold**

In comparison...Australian beef finishing systems have:

- Moderate to high weight gains in southern beef systems, but low weight gains in northern beef systems, mainly due to their feed base (with northern performance comparable to pasture/rangeland based South American and African systems).
- Received above average prices when compared globally, which are now around US$100/100kg cwt higher than most European prices. Most countries experienced a reduction in beef prices between 2014 and 2016 (excluding Australia and Tunisia, where prices have increased for their second year in a row).
- Moderate costs of production, with returns that generally covered the medium-run costs of production – which outperforms most beef finishing systems in the world (excluding China and the Ukraine).
- Returns that improved again in 2016 from 2013-2014 levels – which is the opposite to most beef finishing systems around the world.
- High land, infrastructure and labour opportunity costs, which tend not to be fully covered through beef returns.
- Lower levels of profitability than the cow/calf component of the whole farm beef production system – a consistent relationship over the last 5 years.

Canada