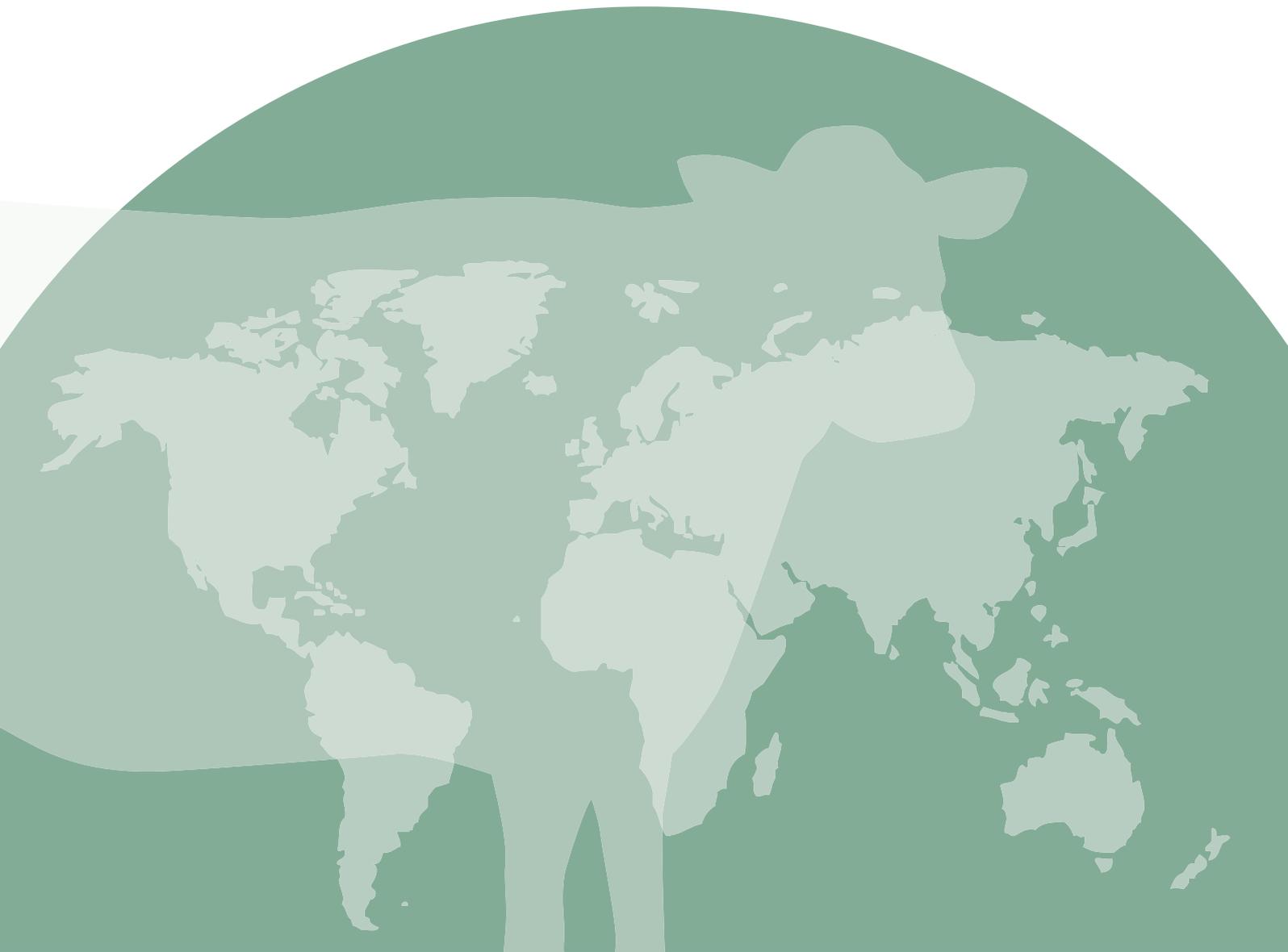


How are global and Australian beef producers performing?

Global *agri benchmark* network results 2016



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Highlights

Beef cattle

- Global beef prices were generally on the decline into 2015 in USD terms, but rose in local currency terms, which highlights the effect of a rising USD.
- In 2015, Australian cattle prices rose appreciably, partly catching up on earlier global price rises, following the impact of the prolonged 2012-2014 drought (cattle oversupply) and a high A\$.
- Few countries can boast long-term profitability in beef production at present, though higher beef prices improved results for Australian farms in 2015, whereas globally, profitability fell marginally for most countries.
- This, together with continued climate volatility (especially drought) and growing resource and environmental constraints, suggests that global beef supply response will be moderate, and are unlikely to lead to a major beef price over-correction (as earlier global cattle production and price cycles have).
- While cow-calf enterprises were generally profitable in 2015, cattle finishing was not, although it had improved 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 2015, but only two of the eight systems being monitored were profitable in the long-term – given Australia's relatively high opportunity costs of land and labour.
- Australia has moderate to low calf weaning rates and cow herd productivity, compared with similar systems.
- Australia achieves moderate-to-high weight gains in southern farming systems, but low gains in extensive northern systems.
- Overall, Australia remains an efficient beef producer, with a moderate to low cost of production.

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-2016, though farm data is for the 2015 year.

What is *agri benchmark*?¹

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 90% of world beef production and has been producing the results of comparative analysis over the last 13 years.

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

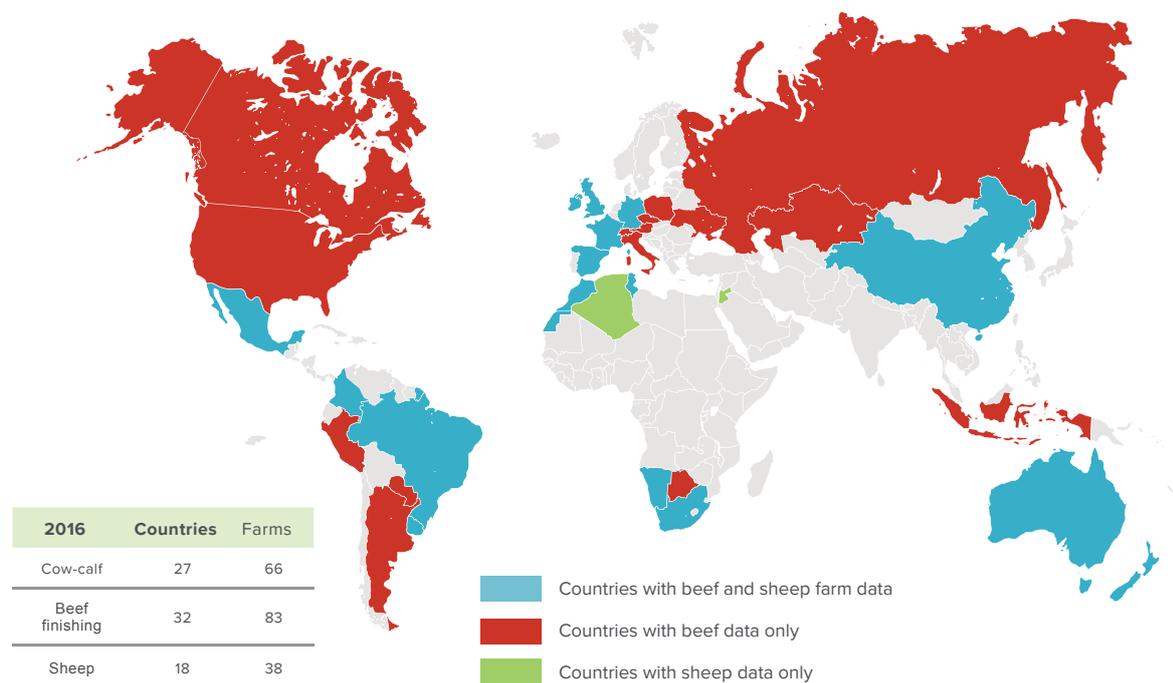
agri benchmark aims to assist:

- 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 and sheep, dairy, pigs, cash crops, horticulture and organic farming. Within cattle, it covers breeding and finishing enterprises (cattle cow-calf, cattle finishing). It is also unique in being able to separately measure the performance of the breeding and finishing operations even on joint breeding/finishing farms. 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).

¹ See <http://www.agribenchmark.org/home.html>



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


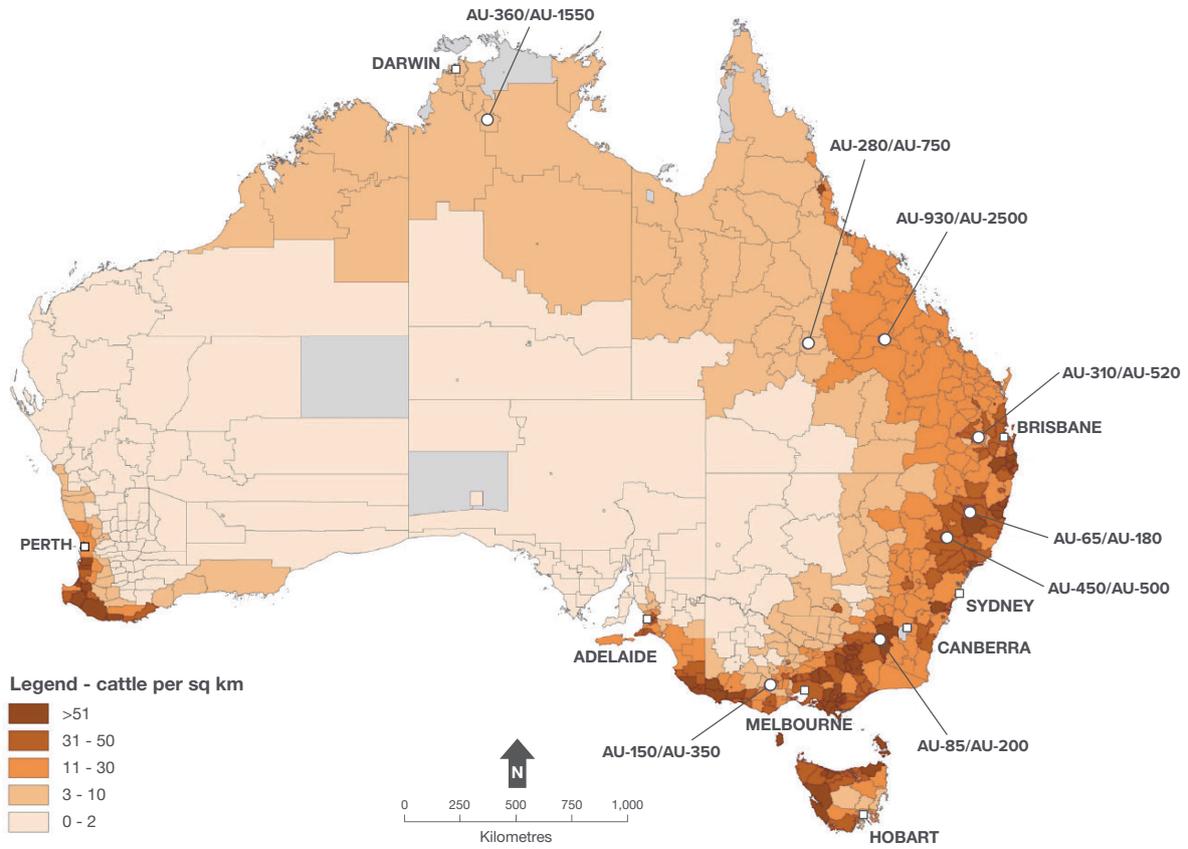
The farm-level results in this report are drawn from the collection of 'typical farm' data in each country, and subsequent analysis and research efforts of all member countries culminating in the 14th annual *agri benchmark* conference in Córdoba, Spain, 8-16 June 2016.

'Typical farms' are farms 'engineered' by local producers and experts to be typical of a country's main cattle production systems, using annual data drawn from farms in the key production regions. In Australia data was collected for eight 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 65/180	(180 Cows held/65 steers sold) – northern tablelands NSW; Angus + sheep + wool; pasture feed base
AU 85/200	southern tablelands NSW; British breed; pasture feed base
AU 150/350	western districts Vic.; Angus; pasture, hay, oaten grain feed based
AU 280/750	central Qld; Bos Indicus; pasture, mineral supplements feed base
AU 310/520	south east Qld; Simmental X Droughtmaster; cattle + crops; pasture feed base
AU 360/1550	Northern Territory, Bos indicus; live export; pasture, mineral supplements feed base
AU 450/500	northern slopes NSW; Charolais X Angus; pasture, hay, sorghum feed base
AU 930/2500	central Qld, Bos indicus; cattle + crops; pasture, oats grazing feed base

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



Global price and cost trends

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.

Food prices peaked in 2011, corresponding to the high in cereal prices, with dairy product and meat price peaks 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.

Even after the fall from 2011 to 2016, food prices remain 50% higher than prior to 2004.

With the falls in grain costs commencing in 2012, and subsequent falls in other costs, led by fuel, fertiliser and interest, plus a sharp rise in the USD, meat prices began to decline significantly in 2015 (in USD terms), with further falls in 2016.

The 23% decline in global meat prices (in USD) since 2014 (first eight months of 2016) has been led by pig meat and sheep meat with 28% declines, followed by poultry 23% and beef 18%.

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

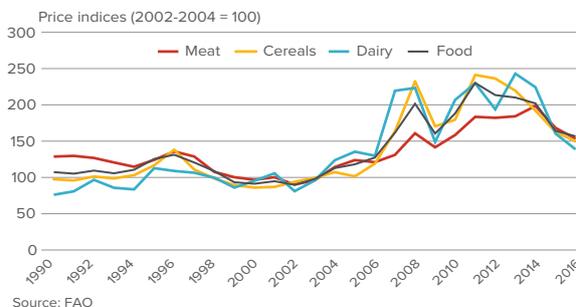
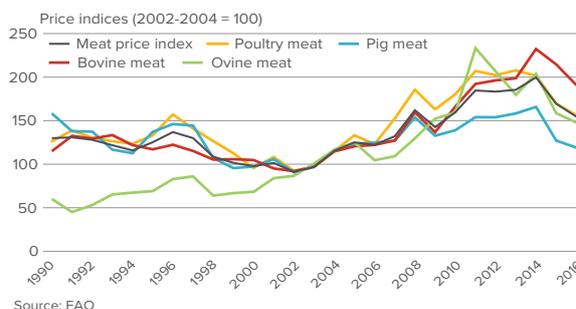


Figure 4: FAO global meat price indices (based on USD prices)



Global cattle price trends

Globally, cattle prices fell significantly in 2015 in USD terms, but rose in local currency terms in most countries, reflecting the substantial rise in the USD during that year (see Figure 5). This needs to be kept in mind when interpreting the *agri benchmark* farm results for 2015, as the base currency used is USD.

The largest currency devaluations in 2014 and 2015 (see Figure 6) were in South American countries, Russia and the Ukraine, while China and the UK did not devalue against the USD over the two year period.

Apart from the Ukraine, Australia had the largest rise in cattle sale prices in local currency terms in 2015 followed by South American countries, New Zealand, Russia and Canada, but with only small rises in European countries. The only countries to suffer a (small) fall in prices in local currency terms were China and the UK, as their currencies rose against the USD.

Figure 5: Currency changes against the USD

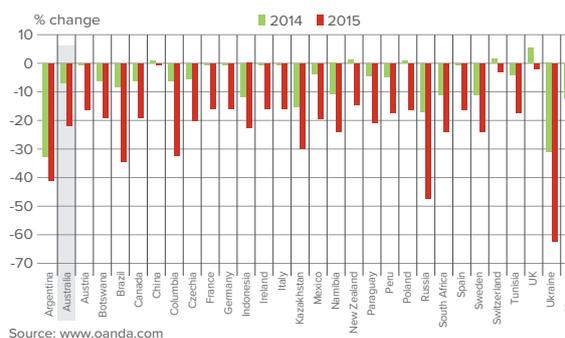
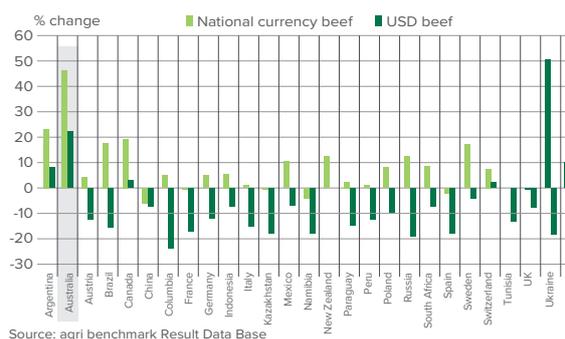


Figure 6: Cattle sale price movements in 2015 in *agri benchmark* countries



Cattle price forecasts

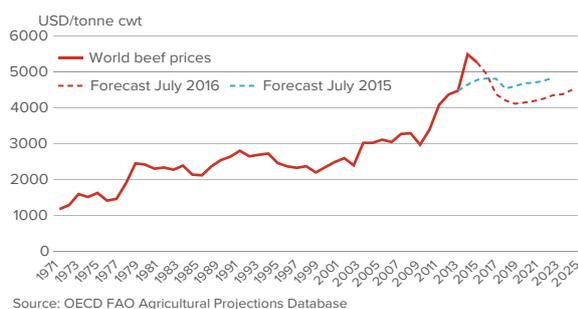
Changes in projections

- The past year marks a significant short- to medium-term turning point in cattle production and price trends. The previous decade featured a tightening demand/supply situation – attributed essentially to the industrialisation and urbanisation in the mass population countries of China, India and Indonesia and trade liberalisation (especially by China). The supply response to the high beef prices, low grain costs and resultant high cattle profitability has been quicker than previously anticipated, commencing in 2015 in North America and soon to be followed by South American suppliers.
- Hence, both USDA and OECD-FAO have significantly lowered their projected global and US prices for the next 10 years from what they had in 2015 – basically lowering price forecasts by 10%-20% (in USD terms).
- Also, while OECD-FAO has kept the pattern of a fall in prices initially followed by a partial recovery, USDA has changed to an ongoing fall levelling off by 2025 but not recovering.
- Both the USDA and OECD-FAO give the main price drivers as low grain prices and beef supply build-up, especially in the US. However, it is not clear why USDA still have prices in decline beyond 2020, when supply build-up has virtually ended by then (with little change to their chicken and pig meat production forecasts).
- Cattle prices over the 2016-2025 period are still projected to be much higher than those in the previous decade.
- In the longer-term (beyond 2020) the latest cyclical growth in beef and meat production will have ended, allowing the underlying positives – growing middle class demand in China and elsewhere in Asia, liberalisation in trade access (especially to China, Japan and Korea) and growing production constraints from limited resources (especially land), environmental restriction and climate change – to restore a steady rise in nominal prices.

OECD-FAO demand and price projections

- The latest OECD-FAO projections for the 2016-2025 period² (released in July 2016) states that “*Meat prices fell in 2015 from recent record levels, in both nominal and real terms. During the projection period, prices will in general increase slightly in nominal terms due to slow economic growth, and trend moderately downwards in real terms, though the actual path will differ depending on the type of meat. Nominal bovine meat prices will decline until 2020 in line with an expansion of output in key producing areas of the world. In the period that follows, however, increases in feed costs will slow down production growth, putting upward pressure on beef prices.*” (Meat section, page 1)
- While the new OECD-FAO projections still have beef prices consolidating at a level well above prices prior to 2010, beef prices start from a peak in 2014 that is 2-3 years earlier and 18% higher than previously expected (see Figure 7).
- Consequently, the price decline is also much larger, falling 25% between 2014 and 2019 (instead of only 6% predicted previously) before gradually rising again. This represents a fall of 17% from forecast 2016 levels.
- These price projections are around 10% lower than previously expected, due to the lower grain prices and more rapid response in global beef supplies.

Figure 7: OECD FAO Beef price projections 2016-2025



² OECD FAO Agricultural Outlook 2016-2025, <http://www.oecd.org/publications/oecd-fao-agricultural-outlook-19991142.htm>



USDA price forecasts

- This major downward revision to the global projected prices by OECD-FAO largely mirrors those in the latest USDA cattle price projections to 2025 (see Figure 8).
- Following the 2014 global beef price spike and relatively low grain prices, competition is starting to build from both the US and Brazil. US cattle and beef prices fell appreciably in 2015 and 2016, leading to falls in US cuts prices to Japan and Korea.
- Consequently, the US long-term projections (USDA) have changed markedly in the past year, though the underlying story remains the same – rising herd and beef production and falling cattle prices, with prices remaining at a much higher level than pre-2010.

However, the new expected price plateau in the US is significantly lower than projected previously (see Figure 9). USDA is now projecting an 8% expansion in the US cattle herd between 2016 and 2025, 13% growth in beef production and an 18% fall in fed cattle prices (14% below 2016 forecast levels).

US beef production is already rising, two years earlier than anticipated (was previously expected to reach a low in 2017), and is now forecast to be 12% higher than previously forecast by 2017 and 2018 and 6% in 2024. Hence, forecast cattle prices are much lower – not surprised in short-term, but by 2023 production is only 6% up on previous forecast but price forecasts have been adjusted 20% down.

Figure 8: USDA livestock production and price projections

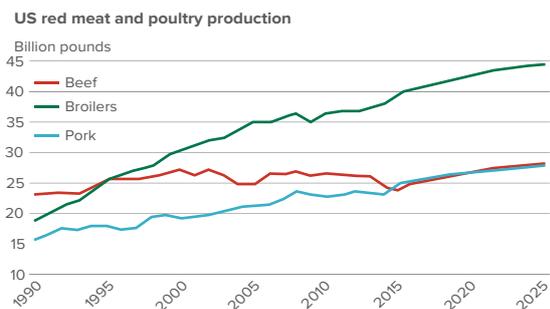
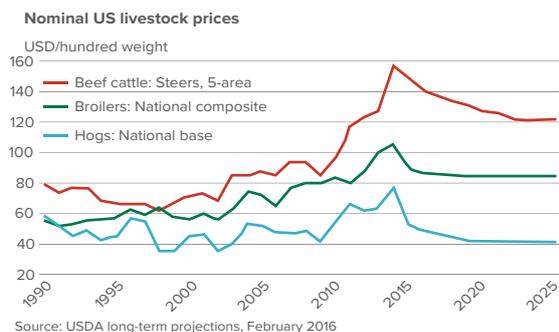
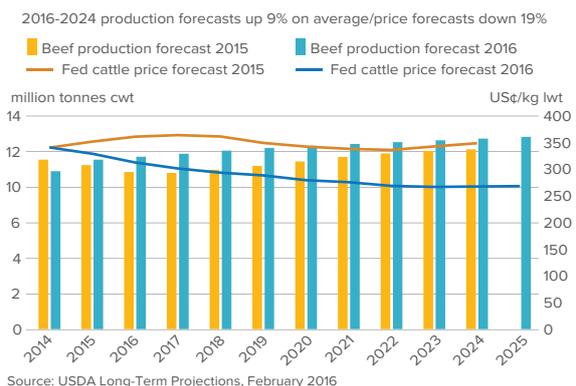


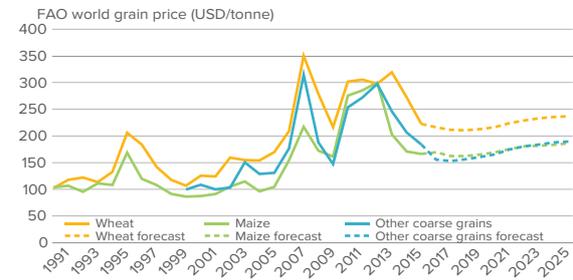
Figure 9: USDA change to production and price projections



Grain prices

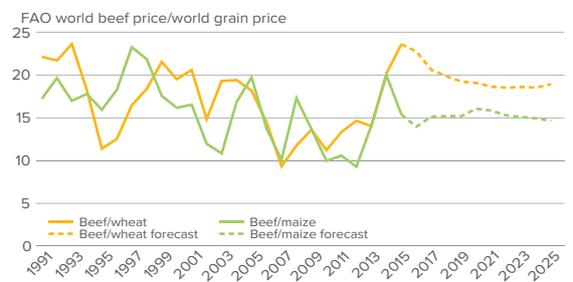
- Global grain prices have fallen further than expected in the past 2-3 years, including a 30% decline in wheat prices and 44% in maize prices. This completes a most volatile decade and takes crop prices back to levels a decade earlier but still 50-60% above the more stable levels in the 1990-2005 period.
- Main reasons for the latest declines are abundant supplies (including a record global harvest in 2014), slower demand growth, large grain stocks, lower oil prices and a strong USD.
- OECD-FAO is projecting crop prices to remain under pressure in the short-term due to a continuation of sluggish world economic growth, large grain stocks, low oil prices and a strong USD. Prices are projected to rise in nominal terms, but decline in real terms in the medium- to long-term, leaving prices well below the past decade but over 50% higher than in the preceding 1990-2005 period.
- The sharp beef price rise in the 2012 to 2014 period and falling grain costs helped to lift the beef-to-grain price ratio considerably, enhancing the profitability of cattle finishing and enticing herd rebuilding.
- The subsequent fall in beef prices in 2015 was large enough to drop the beef to maize price ratio back towards average levels recorded over the past 15 years.

Figure 10: OECD-FAO grain indices



Source: OECD-FAO grain indices

Figure 11: OECD-FAO beef to grain price ratio



Source: OECD-FAO grain indices



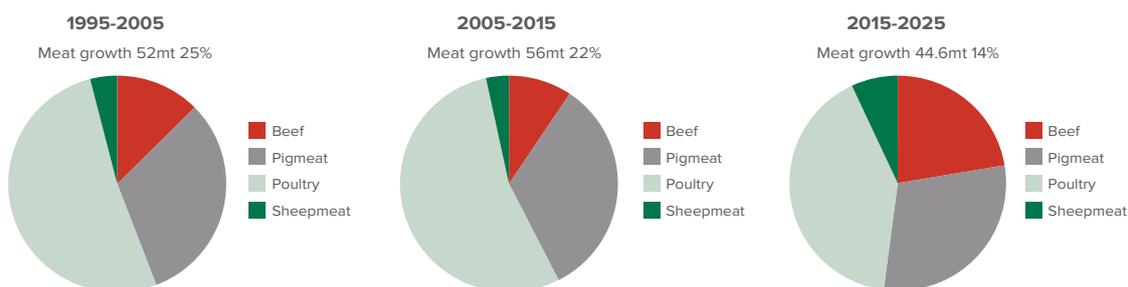
Ireland



Global meat supply

- Global meat production growth continues to slow, constrained by tightening land, water and feed constraints plus environmental, food safety and animal welfare considerations. Meat production is only expected to expand by 14% in the coming 10 years (to 2025), down from 22% and 25% in the previous two decades (2005 to 2015 and 1995 to 2005, respectively) (OECD-FAO, July 2016).
- In a major turnaround, the fastest growth in the next 10 years is expected to be in sheep meat and beef.
 - With the recent boost in sheep profitability and continuing growth in demand, sheep meat production is forecast to expand 22% in the next 10 years, above the 15% and 20% increases in the preceding 10-year periods, respectively – the fastest percentage production rise of all the meats.
 - High beef profits and lower grain prices also sees beef production predicted to rise 15%, up from 8% and 12%, in the preceding two 10-year periods, respectively.
 - Growing productivity and environmental constraints are expected to lower poultry production growth to 16% (from 37% and 48% in the preceding two decades) and pig meat to 11% (from 19% and 20% in the preceding decades).
- Hence, the share of beef in total meat production is expected to remain at the 2015 level of 22% in 2025, and sheep meat grow slightly from 4.8% to 5.1% (still relatively small).
- Hence, red meats are predicted to account for a large 29% of total global meat supply growth in the next 10 years (up from 17% and 12% in the preceding decades), still behind pig meat with 30% and poultry with 41%.

Figure 12: Growth in world meat production



Source: OECD-FAO Agricultural Outlook Database July 2016



World beef supply

- The major change in the *agri benchmark* conference in 2016 was on the supply side, with a combination of high beef and sheep meat prices (in local currency terms), contained costs, especially for grains and fuel, a boost to industry programs and easing import restrictions in a number of key countries suggesting a likelihood of faster growth in global beef and sheep meat supplies in coming years. This was particularly the case for the US, Russia, China, Mexico, Brazil and Argentina.

Table 2: OECD-FAO forecast meat production growth

	Beef (cwe)	Pigmeat (cwe)	Poultry meat (rtc)	Sheepmeat (cwe)	Total meats
2025 on 2015 change '000 tonnes	9,966	13,263	18,274	3,100	44,604
% change	15%	11%	16%	22%	14%
Share of growth	22%	30%	41%	7%	
2015 on 2005 change '000 tonnes	5,266	18,514	30,318	1,898	55,996
% change	8%	19%	37%	15%	22%
Share of growth	9%	33%	54%	3%	
2005 on 1995 change '000 tonnes	6,526	16,420	26,932	2,080	51,958
% change	12%	20%	48%	20%	25%
Share of growth	13%	32%	52%	4%	
Meat share 1995	27%	40%	27%	5.1%	100%
Meat share 2005	24%	39%	32%	4.8%	100%
Meat share 2015	22%	38%	36%	4.6%	100%
Meat share 2025	22%	37%	37%	4.9%	100%

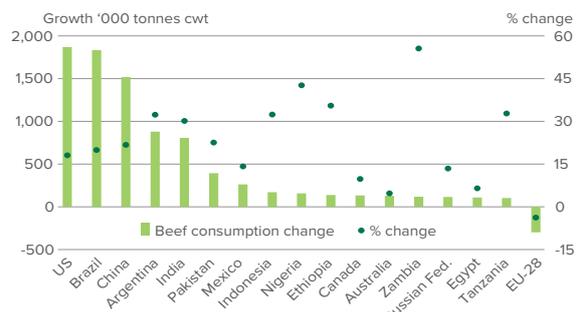
Source: OECD-FAO Agricultural Outlook Database 2016-2025

- This is backed up by the latest OECD-FAO projections, with a prediction of 15% growth in beef supplies in the next 10 years (to 2025), up from 8% in the last decade (2005-2015) and 12% in the previous one (1995-2005). Developing countries are again expected to contribute the dominant share of growth in beef supplies, up 7.7 million tonnes or 20% (after a 17% growth in the 2005-2015 period and 34% growth in the decade before).
- The main growth in developing countries is expected to be in Latin America (up 18% compared with only 5% in the preceding 10-year period), mainly in Brazil, despite the expectation of continued political and economic turmoil. In addition, the recent lifting of the export bans and other reforms in Argentina are expected to see its production recover by 32% after falling 14% in the previous 10 years.
- Asia is the other developing region to contribute substantially to beef supply growth in the coming 10 years – with China's renewed support for the industry resulting in a rise of 22%, similar to the preceding decade, and India up 30% (compared with a 14% rise in the 2005-2015 period and 6% in the preceding 10 years).
- However, the main production shift is in developed countries, which are also expected to register beef supply growth in the next 10 years – of 2.26 million tonnes or 8%, compared with falls of 1% in the 2005-2015 period and 6% in 1995-2005. The majority of this growth is expected to be in the US of 18% (compared with a fall of 6% in the 2005-2015 period), with some growth also in Mexico and Australia.
- The recent huge government investment in the industry in Russia is expected to result in a 6% growth in beef production, compared with an 8% decline in the previous 10 years and a fall of 34% in the 1995-2005 period.
- Notably, EU beef production is predicted to decline 4%, similar to the fall in the preceding 10 year period (with a 13% fall in the 1995-2005 period). Recent research by *agri benchmark* and the contributions from the many EU countries represented at the 2016 Conference indicates that recent CAP reforms are likely to reduce beef production further.
- The Conference again highlighted the negative impact of recent widespread severe weather conditions (climate change?), especially in South America, Australia and South Africa. The repeat of such conditions in the next decade could see beef production growth much lower than predicted by the OECD-FAO.



- Other challenges for beef supply raised at the 2016 *agri benchmark* Conference included:
 - Methane emissions
 - Water use
 - Low feed conversion rates
 - Land use changes
 - Animal welfare

Figure 13: Forecast beef production growth 2016-2025

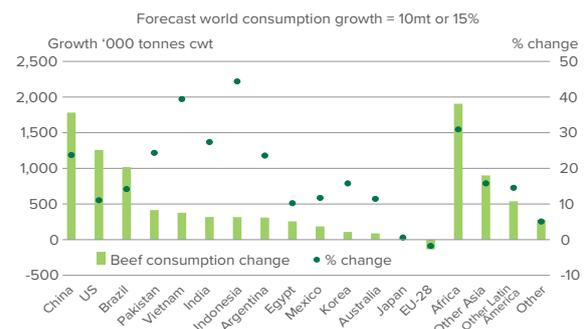


Source: OECD-FAO Agricultural Outlook Database 2016-2025

Beef consumption

- Recent high prices for both beef and sheep meat, especially relative to pork and poultry, has seen beef and sheep meat consumption decline in almost all developed countries, while consumption continues to rise in many developing countries of Asia and the Middle East.
- World beef consumption per person declined 2% in the last 10 years (following a 3% fall in the preceding decade (1995-2005)). The falls in the last 2-3 years have been concentrated in the North America, Latin America, Oceania and Russia, partially offset by rises in Asia, North Africa and Turkey.
- Beef consumption per person in developed countries fell 10% in the last 10 years following a 5% fall in the previous 10 years. Major declines were seen in the US (-18%), Europe (-10%), Australia (-16%) and New Zealand (-8%).
- In addition to production falls following reductions in CAP assistance, European countries report negative impacts of health concerns (carcinogenic research claims), vegetarian/flexitarian trends and laboratory meat substitutes as impacting negatively on beef consumption.
- In contrast, beef consumption in developing countries rose 9% in the last 10 years, led by Asia – with rises of 28% in China, 6% in Japan, 58% in South Korea, 48% in Indonesia and 295% in Vietnam. All these Asian countries benefited from rising underlying food demand (except Japan) and an easing in import barriers over the 10 years.
- The Middle East also saw large consumption rises, such as a 34% jump in per person consumption in Saudi Arabia and 145% in Turkey – again a combination of population and income driven demand rise and market liberalisation.
- Some developing regions did not see growth in per person consumption, particularly Latin America (down 1% with a 5% fall in Argentina due to government policies) and Sub Sahara Africa (down 6%).
- Beef consumption also declined 5% in Russia, with government restricting imports and 53% in India as carabeef was diverted to export markets.
- With lower beef prices and increased production growth expected in the coming decade, beef consumption per person is predicted by OECD-FAO to rise by 4% worldwide. Developed countries are expected to average consumption growth of 4% and developing countries of 7%.
- The big percentage rises are forecast to be in Asia (13% overall with 21% in China, 25% in India, 31% in Indonesia and 17% in Vietnam). With the ongoing reductions in tariffs, beef consumption in South Korea is forecast to rise 12% and Japan by 4%. Modest rises are also forecast for the US (4%) and Latin America (3%), but with no significant rise in Mexico or Europe.
- In total, beef consumption is forecast to grow by 10mt or 15% in the coming 10 years, up from 10% in both the 2005-2015 and 1995-2005 periods.
- Of this beef consumption growth, 70% is forecast to occur in Asia, Africa, the US and Brazil.
- However, given ongoing (if slower) population growth, the big consumption countries of China, the US and Brazil along with regions of Africa, other Asia and other Latin America are expected to dominate total beef consumption growth over the next 10 years (see Figure 14).

Figure 14: Forecast beef consumption growth

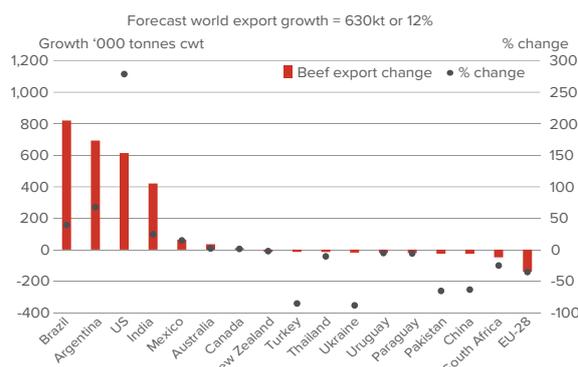


Source: OECD-FAO Agricultural Outlook Database 2016-2025

Beef trade

- World beef trade continues to expand, driven by growing demand and the lowering of import barriers in Asia. The OECD-FAO forecasts a further 2.2 million tonne, or 21% growth, in world beef imports in the coming 10 years, compared with 3.3 million tonnes (44%) and 1.3 million tonnes (21%) in the previous two 10 year periods.
- Again the beef import growth is expected to be mainly in Asia, especially to Vietnam (311kt or 39% growth), China (260kt or 46%), Indonesia (150kt or 79% growth) and South Korea (73kt or 20% assisted by falling import tariffs).
- Africa is also expected to be a growing market, with a 600kt expansion or 60% (up from 370kt and 100kt in the previous two 10 year periods).
- Notably, the US market is not forecast to expand significantly (up only 3% or 56kt), and nor is Japan (up 1% or 7kt).
- Beef export growth is expected to come principally from Brazil (up 823kt or 39%), the US (up 700kt or 68%), Argentina (up 616kt or 280% following the recent lifting of export bans and other industry restrictions) and India (up 317kt or 15%).
- In contrast, Australia's exports are predicted to rise by only 34kt in the next 10 years or 2% (after rising 490kt and 255kt in the previous two 10 year periods).

Figure 15: Forecast growth in beef exports 2015 to 2025



Global performance of beef farms

Few countries can boast long-term profitability on cattle enterprises at present, even though beef prices rose to record highs during the 2013-2014 period, with recent global falls reducing the price closer to median long-term trends. Even when net profit from other sources or enterprises on the same farm (such as from crops, sheep, wool etc) are counted to yield a whole farm profit³, only some beef farms in Australia, Argentina, Uruguay, China, Kazakhstan, Ukraine and Indonesia made a profit, without government payments, in 2015. 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. Results were mixed in Australia, Brazil, Argentina, and Colombia.

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

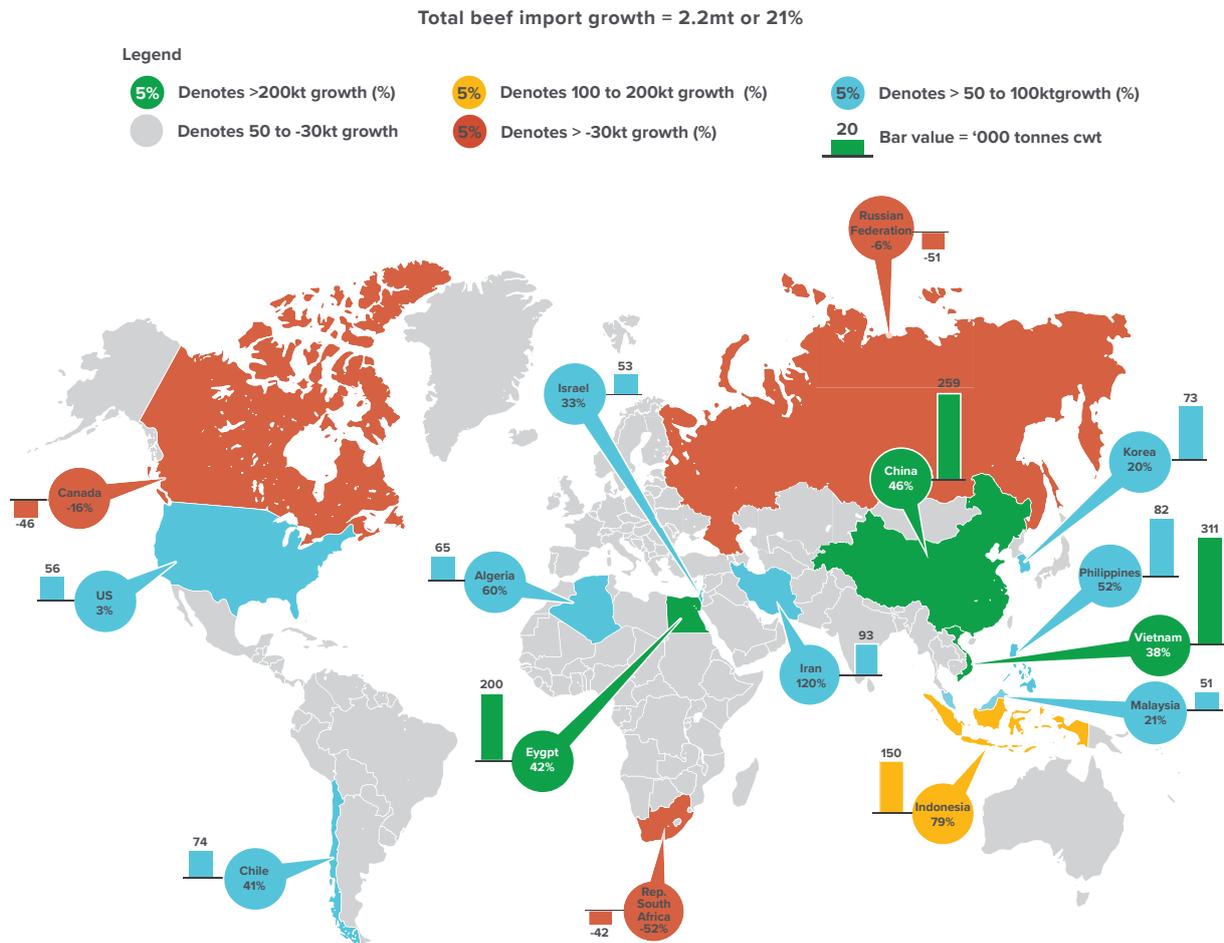
Colombia



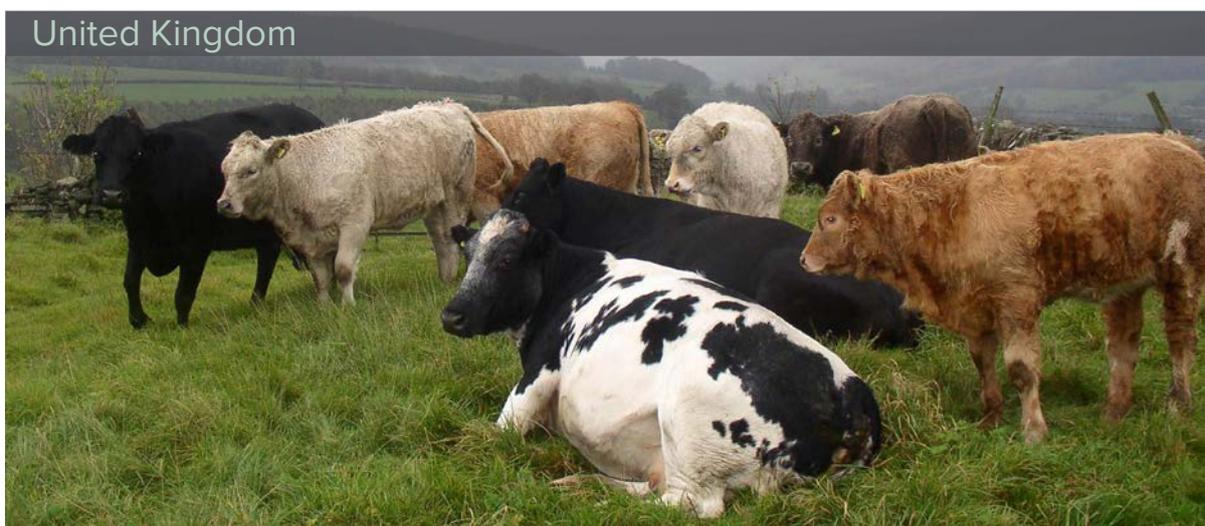
³ Whole farm profit refers to the combined returns from all enterprises undertaken on the farm, including for example, cropping or sheep, net of the costs of operation. Beef farm enterprise returns refers to returns attributed to the beef cattle component of a farm. Similarly, beef cow-calf enterprise returns and beef finishing enterprise returns refer to returns 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).



Figure 16: Projected 10-year beef import growth from OECD-FAO (2015 to 2025)



Source: OECD-FAO Agricultural Outlook Database July 2016



Pasture-based beef farm profitability

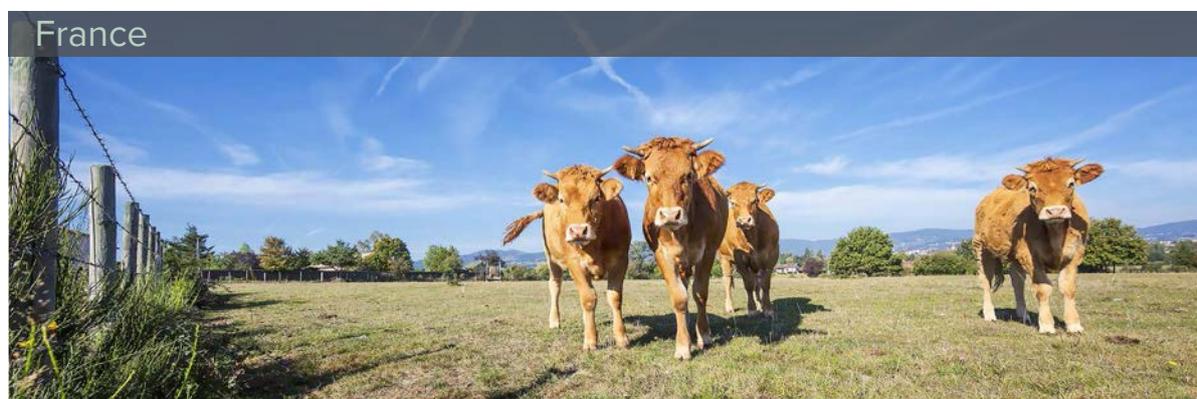
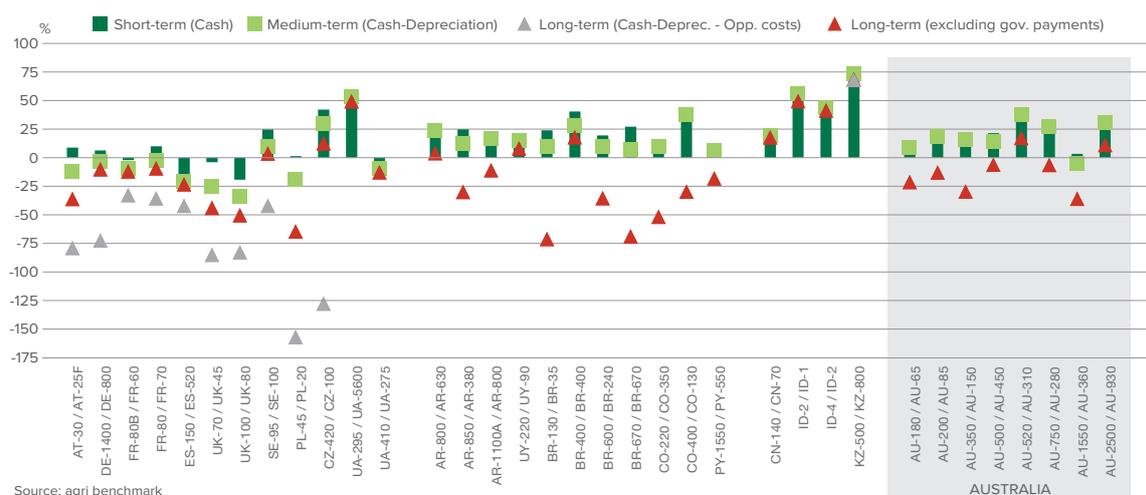
In 2014, with much of the north Australian cattle herd being affected by drought (depressing cattle prices for all producers), the 'typical' Australian beef cattle pasture-based farms monitored by *agri benchmark* (all of which have both cow-calf and finishing operations) were mostly profitable in the short-term⁴, with around half profitable or breakeven in the medium-term, but all unprofitable in the long-term. This situation changed significantly in 2015, which generally occurred due to a concurrent reduction in the costs of production (effects of drought reducing) and an increase in beef prices (but still not up to global levels).

There is, however, a large variation in the performance of the Australian 'typical' beef grazing farms, with the main determinants appearing to be farm size, location (drought severity) and cost efficiency. Two of the eight Australian *agri benchmark* farming systems being monitored experienced long-term profits. Generally, long-term profitability improves as farm turnover increases and costs are kept relatively low, with the largest Queensland farm (turning off 930 cattle) and another South-East Queensland farm (turning off 310 cattle) both returning a good long-term profit in 2015.

In 2015, all of the Australian systems achieved a short-term profit margin, and all but one achieved medium-term profits (only the NT farm did not produce a medium-term profit). This is a significant improvement on 2014, and subject to the severity of drought during late 2015 and early 2016, is expected to improve further in 2016 due to current cattle prices.

Globally, however, recent reductions in price are expected to further reduce cow/calf and beef finishing profitability from the levels achieved in 2014 and 2015.

Figure 17: Whole farm profit margins for combined cow/calf and beef finishing enterprises⁵



⁴ Short-term profit is where returns (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.

⁵ Net profit margin on a whole farm basis is profit as a percentage of gross returns from all income sources (including crops, wool, lamb etc).

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.

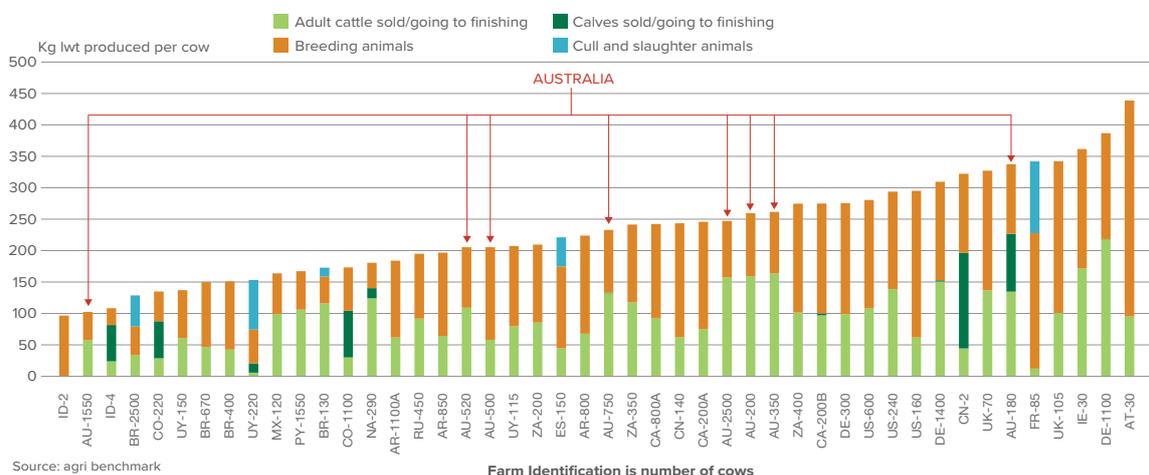
Weaning rates (calves per 100 cows)

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, 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 costs and benefits of change, this is likely to be an area for further improvement in northern Australia.

Total live weight produced per cow

Beef production per cow 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 is in the middle and is quite diverse, ranging from 210kg to 340kg lwt, with the exception of the northern Australian system (AU-1550 northern live export) that is comparable to other rangelands based systems and the cut & carry systems of Indonesia at around 104kg lwt per cow (most of which is the sale of cull females). This could potentially be an area for significant improvement. This indicator is driven by genetic capacity, mature size of the breed, nutrition, reproductive rates, generation interval, growth rates and turn-off weights.

Figure 18: Total kg live weight produced per cow



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, Namibia and South Africa), but 30-40% lower than prices in Brazil, Argentina, Uruguay and the EU; and around half the prices received in China and Indonesia. In 2015, Australian prices recovered partly from the lows of 2014, but continued to be only 40% of those received in North America (Canada and US). Cull cow prices in Australia tend to be similar to those of South America and Africa, but are only 20-35% lower than those received in North America, Europe and Asia.

Total cow-calf returns⁶

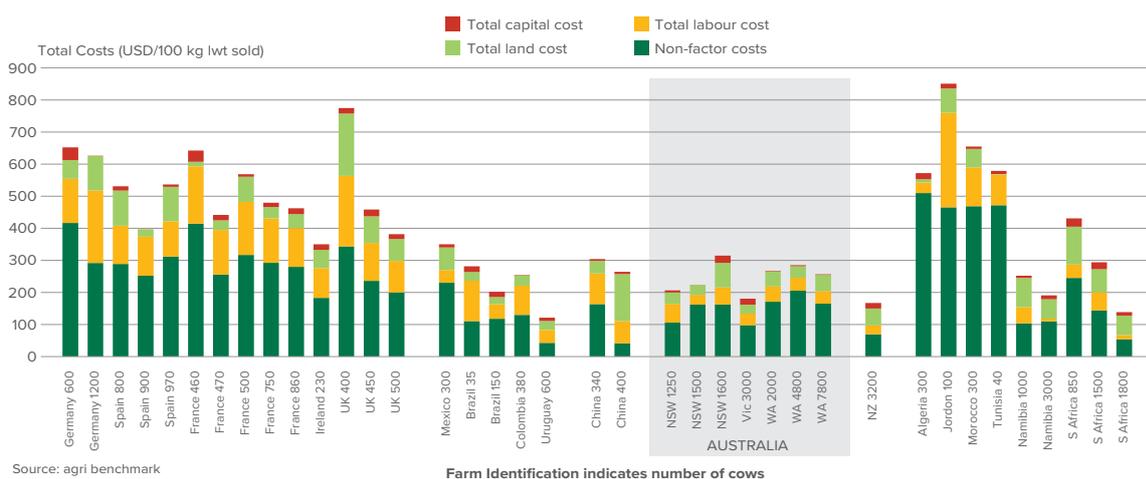
In 2015, Australia had comparably low total returns from cow-calf operations, due to a combination of significantly lower weaner and cow prices and moderate production levels (weaning rates and production per cow). Some countries in South America and Africa maintained similar returns, whereas the US, Canada, Asia and Europe maintained higher returns. European countries also maintain higher returns through additional government payments (both coupled and de-coupled payments).

Total cost of cow-calf production

Australia maintains a comparably low total cost of production in cow-calf systems, but similar to comparable systems in South America, some Canadian and South African typical cow-calf systems. The exception in the Australian data is AU-500 (North-West Slopes NSW) which had high animal purchases (replacing breeders) and feeding costs in 2015. Globally on average, the cost of production has declined from 2013 to 2015, in part due to exchange rate movements. Australian systems, on average, maintain the lowest total cost of production, and the ongoing decline in total cost of production has occurred across both northern and southern Australian beef production systems from 2014 to 2015. Only European and African systems have had similar declines, whereas North and South American systems have generally not changed.

In most countries non-factor costs 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 2-3 times higher than that for the low cost countries like Australia.

Figure 19: Total cost of cow-calf production (USD 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 2015 is around USD19/hr, with the opportunity cost of family labour around USD21/hr. European countries averaged USD15/hr (excluding Russia @ USD4/hr), North American countries USD19/hr (Canada averages USD21/hr, excludes Mexico @ USD1/hr), and South American USD7/hr. 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 American and North American systems, where labour is cheaper. European systems have high labour productivity costs due to low productivity per unit of labour input, whereas Canada has similar labour costs and lower productivity than most Australian systems.

⁶ Total returns include all returns specific to the cow-calf enterprise, such as cull and slaughter animals, breeding animal returns and calves/weaners sold or transferred to finishing and government payments.



Total costs, returns and profitability of cow-calf production in 2014

The South American and Australian systems, and some Asian and South African, maintain the lowest cash costs and total costs. Most cow-calf systems are capable of producing short- and medium-term profits (enterprise returns less cash costs and depreciation), but only a few producers are capable of producing long-run profits (enterprise returns less total costs including opportunity costs).

Six of Australia's eight pasture-based farms achieved long-run profits from the cow-calf portion of their operations in 2015. With total returns increasing by around 30% in Australia from 2014 levels and total costs declining, the profitability of Australian systems is at a record high since 2006. Only Canadian, US and some systems in South America, Asia and Africa cover their opportunity costs.

Generally, European systems are high cost systems and most were not capable of maintaining medium-term profits in 2015, although some achieve short-run profits. With additional returns provided by government payments (coupled payments), most cover cash costs and depreciation.

Figure 20: Costs, returns and profitability of cow-calf production 2015 (USD 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.
- Lower revenues due to significantly lower weaner prices (30% lower than South America and only a third of prices received in North America) and cull cow prices, although there has been a 30% improvement in total returns from 2014 to 2015.
- Australian systems have continued to reduce, year-on-year, the cost of cow/calf production, which is in part due to exchange rate movements.
- 2015 was the most profitable year since 2006, with all Australian systems achieving good short- and medium-term profits during 2015, and all but 2 systems achieving long-term profitability, which has been a year-on-year improvement since 2013.
- High labour productivity (kg lwt produced per hour of labour input) to compensate 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

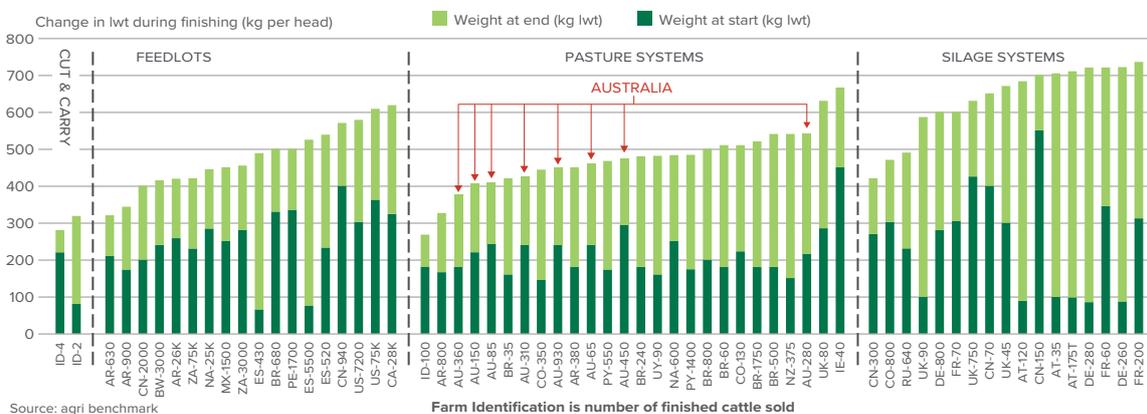
There was some improvement in beef cattle farm finishing enterprise profits in 2015 across almost all countries. While beef finishing farms in almost all countries made short-term (cash) profits in 2015 (one exception being eastern Australian farms in drought) and medium-term profits (covering cash costs and depreciation), few made a long-term profit (do not cover the opportunity cost of inputs).

Liveweight at start and weight at end of 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). 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 500-1000 days.

Figure 21: Change in live weight during finishing (kg)

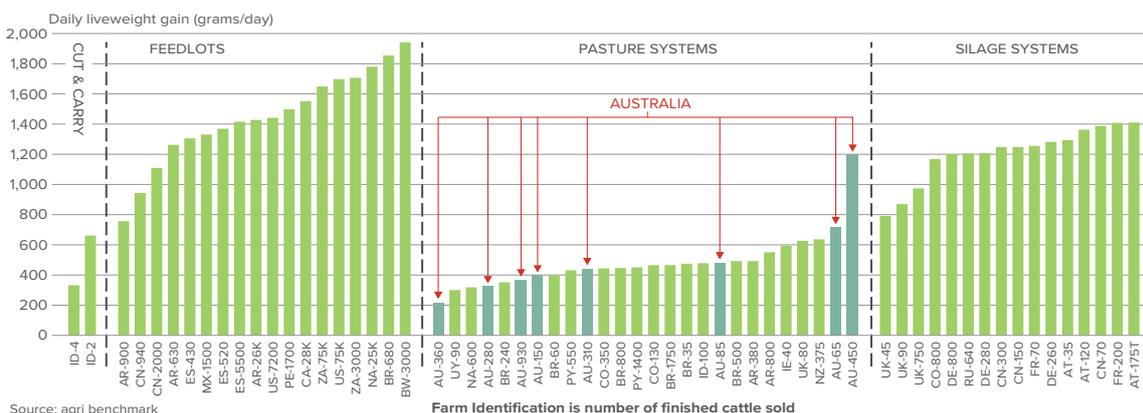


Daily and net weight gain

There is a clear reflection between the daily weight gains observed in the data and the observed changes in liveweight 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 and Argentina.

Our pasture based systems had very mixed results for 2015, as our best pasture based systems rank 1st (AU-450, NSW NSW), and 2nd (AU-65, NSW northern tablelands) when compared to other pasture systems on daily weight gain. In contrast, northern Australian systems continue to record some of the lowest weight gains (AU-360 & AU-280) and are similar to weight gains achieved in South American and African systems.

Figure 22: Daily Live weight gain (grams/day)



Comparison of beef prices from 2012 to 2015

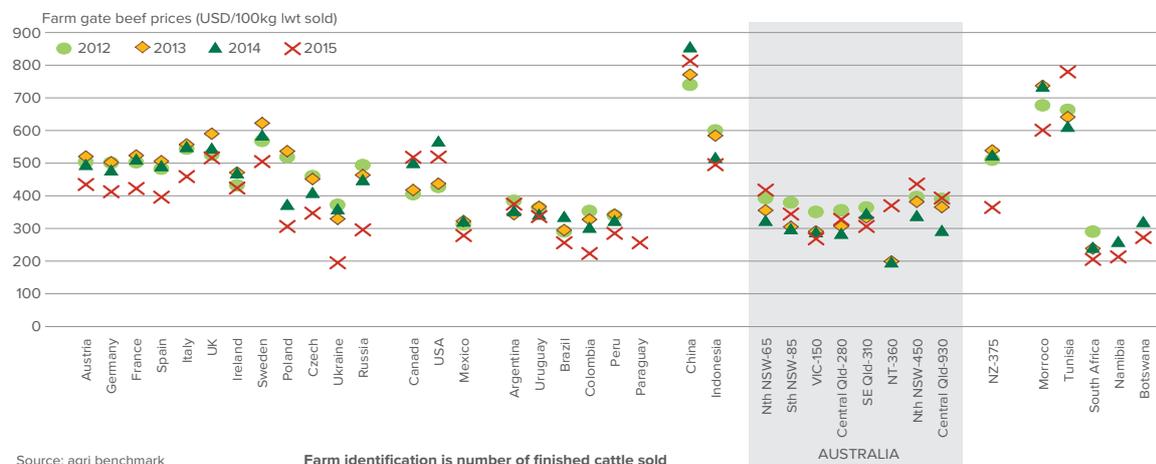
Beef carcass prices generally ranged between USD200 and USD500/100kg cwt across the globe in 2015, with the exception of closed or protected markets (through both tariff and non-tariff trade barriers), such as China and Indonesia, where China experienced a small decline in beef prices from 2014 highs.

European beef prices generally decreased again from 2012-2014 levels and are relatively consistent internally and higher than southern hemisphere prices (as European prices are maintained by import barriers), with the exception of non-EU countries such as Russia and the Ukraine.

Canada and the USA have both experienced significant increases in beef prices from 2013 to 2014, and they have largely been maintained into 2015.

Australia, southern Africa and South American pasture-based systems receive some of the lowest prices (reflecting lower costs and, in Australia’s case, drought and cattle over-supply), although there has been some significant increases from 2014 levels for the northern Australian system (NT-360).

Figure 23: 2012-2015 beef prices received (USD/100kg lwt sold)



Source: agri benchmark

Farm identification is number of finished cattle sold

Costs of finishing

Although a high A\$ and the drought have generally raised the cost of Australian beef production in recent years (2013 and 2014), in USD terms, relative to farms in the Americas and Europe, in 2015 most Australian systems experienced a significant reduction in the total costs of finishing with either a concurrent rise in prices or similar returns being achieved.

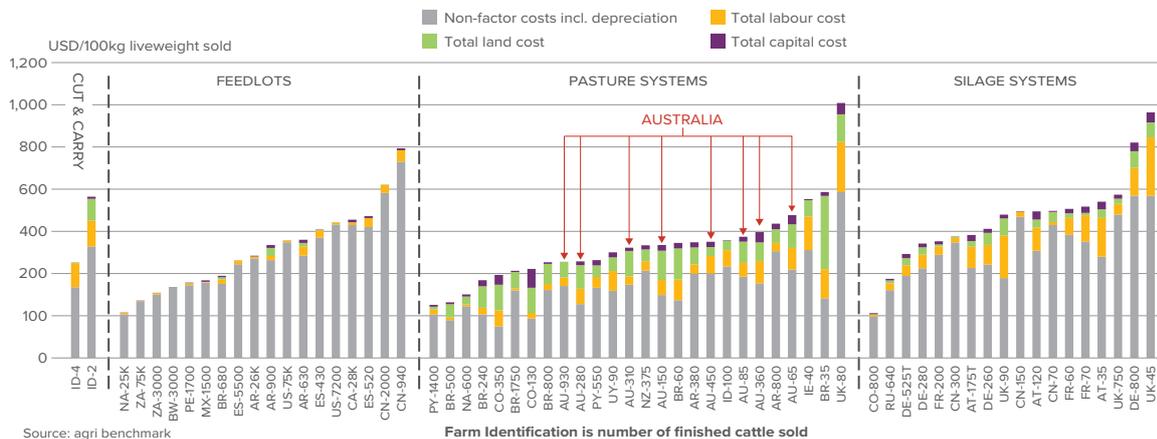
For the majority of the world’s finishing systems it costs around USD4-6 per kg live weight sold in 2015. This represents a slight reduction on 2014 costs. The lowest cost finishing systems exist in Africa and South America. AU-930 and AU-280 (both Central Qld systems) maintain comparably low costs (similar to South America and African systems), whereas the other Australian systems are comparable to the lower cost European and North American finishing systems. The highest cost systems continue to occur in Europe (Germany, Austria and the UK) and Asia (China and Indonesia). New Zealand notably moved from a low to a moderate cost finishing system in 2015 due to recent increases in the cost of purchasing backgrounder cattle (in USD).



Total costs and farm rankings

In 2015, the majority of feedlot and pasture based finishing systems tended to have lower costs than silage systems, although they are now only marginally lower when compared to 2013 and 2014. Non-factor costs dominate in each finishing system (of which 30-70% is the cost of transferred/purchased livestock), although land, capital and labour contribute more significantly within pasture and silage systems per unit of output.

Figure 24: Total average long-run cost of production (USD/100kg liveweight sold)



Source: agri benchmark

The Australian systems, all pasture based, had mixed outcomes for the total costs of finishing (in USD) in 2015. 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.

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 2015 (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. For the majority of beef finishing systems, profitability has generally improved year-on-year since 2013.

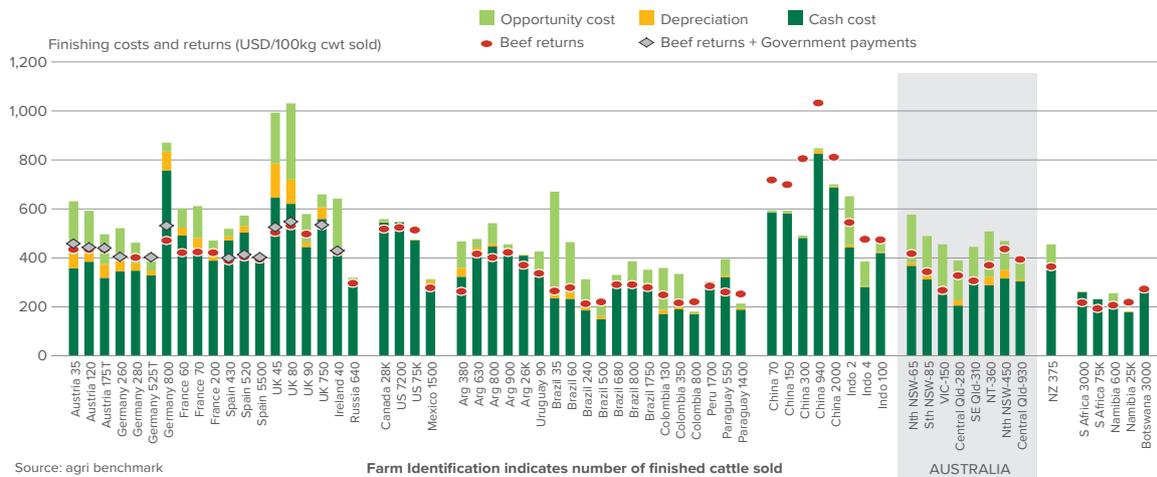
Around half of the South American systems cover their short- and medium-run costs, with only a few covering the opportunity costs and generating long-run profits. All finishing systems in China continue to generate long-term profits, although experiencing both increases in costs and reductions in returns from 2014 levels. The only other systems to do so are US and Namibian feedlots (US 75k and Namibia 25k, respectively), and a small herder system in Indonesia (Indo 4). In New Zealand the finishing system maintained a short- to medium-term breakeven position.

Of Australia's eight pasture-based finishing systems analysed, seven covered both short- and medium-term costs in 2015, which is an improvement on 2013 and 2014 performance, however, only one farm (Central Qld 930) covered total costs (inclusive of opportunity costs). This is due to both comparably lower beef prices, and higher costs of transfers/purchased livestock for most systems in 2015. Although most Australian finishing systems maintain relatively low-moderate cash costs of production and depreciation costs, they have high opportunity costs (mainly land and, to a lesser extent, family labour).

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



Figure 24: Cattle finishing costs, returns and profitability in 2015 (USD/100kg cwt 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, partly due to drought, but mainly due to their feed base (with performance comparable to pasture-based South American and African systems).
- Received below average prices when compared globally, again reflecting a low cost base and the continuing impact of drought and an over-supply of cattle into 2015. Most countries experienced a slight reduction in beef prices between 2012-2013 and 2015, in USD (excluding the US, Canada and China, where higher prices have been maintained).
- Low-to-moderate costs of production, with returns that generally covered the medium-run costs of production – which out-performs most beef finishing systems in the world (excluding China).
- Returns that improved marginally in 2015 from 2013-2014 levels – which is opposite to most beef finishing systems around the world.
- High land and labour opportunity costs, which tend not to be covered through beef returns.
- Lower levels of profitability than the cow/calf component of the whole farm beef production system – a consistent observation over the last four years.

Brazil



Signs of new investment in beef farms

The significant lift in global beef prices since 2011, together with further falls in prices of competing enterprises (especially cropping and dairy) has triggered moves to rebuild global cattle herds, notably in North America, South America, China and Australia. While the South American response seems slow in emerging (partly due to drought and economic/political problems), reduced soya bean profitability is seeing some land switched towards forage production for increased on-farm feeding for beef production.

In contrast, the initial US response has been more rapid than expected.

However, the quick decline in beef prices in 2015 and 2016 (in USD), a lack of long-term beef farm profitability globally (despite the recent price lift), continued climate volatility (especially drought) and growing resource and environmental constraints, suggests that a major cattle production and price cycle is unlikely. Furthermore, the latest EU CAP reforms (especially reduced single farm payments in favour of per hectare and 'green' payments) seem likely to continue the long-term reduction in EU cattle herds and production.

However, this issue needs close monitoring, as major positive beef price shocks like that experienced since 2010 have, in past decades, triggered disruptive cycles of around 10-year duration (especially in the US) – with natural biological production lags eventually causing beef supply to over-correct, leading to a major beef price slump. It is notable that neither the OECD-FAO nor USDA is expecting a major cyclical oversupply to develop this time.

