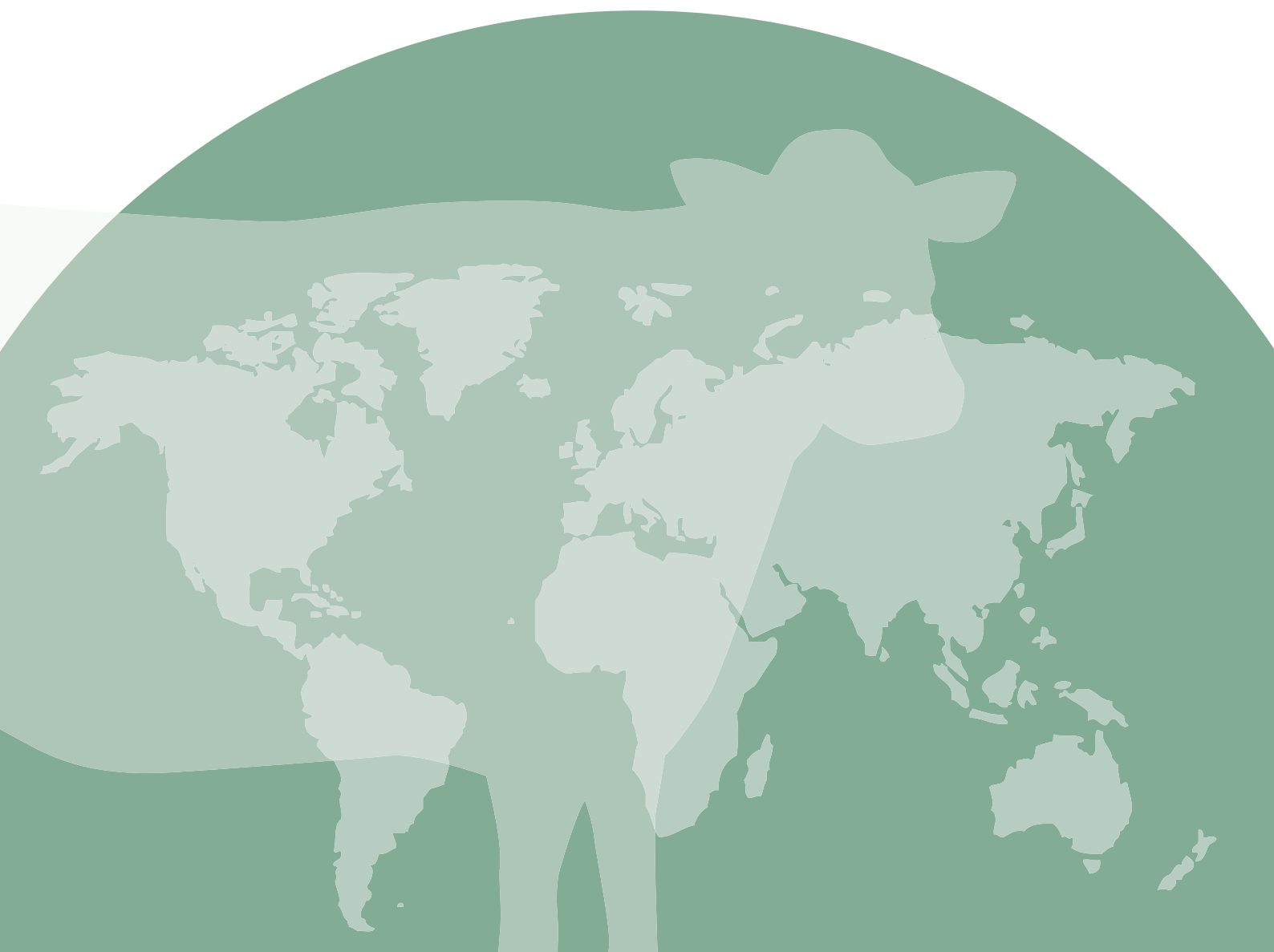


How are global and Australian beef producers performing?

Global *agri benchmark* network results 2018



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Highlights

Beef cattle

- Global food and beef prices fell back from their record levels in the 2011-2014 period to reach a near-term low point in 2016 (still around 50% higher than levels prior to 2004). However, 2017 saw a partial recovery which has been consolidated in 2018. The FAO beef price index in the first seven months of 2018 was around 10% above its 2016 low and a similar distance below its 2014 peak. This reflects strong demand (including in the US and emerging Asia) and was despite of rising US supplies.
- The latest global OECD-FAO projections and 2018 *agri benchmark* Conference suggest that the latest rally in beef prices will be short-lived and replaced with a slow fall in nominal prices (more significant in real terms) over the next six years as US supply initially grows and is followed by Brazil, Argentina and Australia.
- Global beef production is on the rise, following a period of favourable prices and profitability. Hence, cattle prices and profits are easing, especially within the cattle finishing segment.
- However, the Australian cattle herd has fallen an estimated 6% since the global beef price peak in 2014, due to a series of severe widespread droughts. Hence, while Australian farms still had a relatively low cost of production in 2017, cattle prices and cattle farm profitability were high relative to other countries (including the US and Europe), boosted by producer efforts to start rebuilding (again halted by drought in 2018).
- Beef supply chain sustainability was again a front-line issue at the 2018 *agri benchmark* Conference. This is hardly surprising given the Conference was held in Ireland, where there have been considerable efforts to lift and promote sustainability, encouraged by its growing importance within EU CAP payments to producers.
- Notable within this was the increasing importance being placed on animal welfare and a consumer preference for grassfed beef (which dominates Irish and Australia production).
- Global beef trade has been steadily expanding over the past 20 years, driven by import demand growth in Asia (China, Japan, South Korea and Indonesia), the Middle East, Germany and the Netherlands.
- The OECD-FAO is predicting a slowdown in global beef trade growth in the coming decade, due to weaker beef demand growth generally and slower import growth in China. Asia is still seen as the key growth region, but with Vietnam and the Philippines expected to feature, rather than China. Other projected meat import growth regions are the Middle East, Africa and possibly Russia.
- Beef market access was again a major concern of network countries at the 2018 *agri benchmark* Conference, heightened by the US trade tariff war with China, Turkey and elsewhere and ongoing trade threats (particularly towards Mexico and Canada), Russian beef import bans, Brexit, regional trade deals, and the proliferation of bilateral trade deals recently struck or in the pipeline.
- Combined, the renewed push towards protectionism in key countries (led by the US) and rejection of multilateral agreements in favour of bilateral trade agreements, threatens to reverse the gains in the global beef trade from liberalisation of the past 30 years and further distort beef trade flows.
- Most *agri benchmark* beef farms were short- and medium-term profitable in 2017, covering cash costs and depreciation. However, as is normally the case, few countries can boast long-term profitability in beef production – i.e. they are unable to cover opportunity costs.
- A second year of high beef prices improved results for Australian farms in 2017 when compared to 2015 levels, whereas globally, profitability fell marginally for most countries.
- 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 2017, and four of the nine systems being monitored were profitable in the long-term – despite Australia's relatively moderate operating costs and high opportunity costs of land, infrastructure and labour.
- Most cow-calf enterprises have continued to be profitable since 2015. Cattle finishing only maintained profitability in 2017, especially in northern systems, whereas southern systems have suffered reduced profitability caused by increased costs of production.
- Northern Australian beef systems have moderate to low calf weaning rates and cow herd productivity, when compared with similar systems.
- Australia achieves moderate weight gains in southern farming systems, but low gains in extensive northern systems.
- Overall, in 2017 Australia experienced moderate costs of production, but achieved higher overall profitability due to the higher returns and beef prices, which is the opposite to trends in the majority of major beef producing countries.



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, 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-2018, though farm data is for the 2017 calendar 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 75% of world beef production and has been producing the results of comparative analysis over the last 16 years.

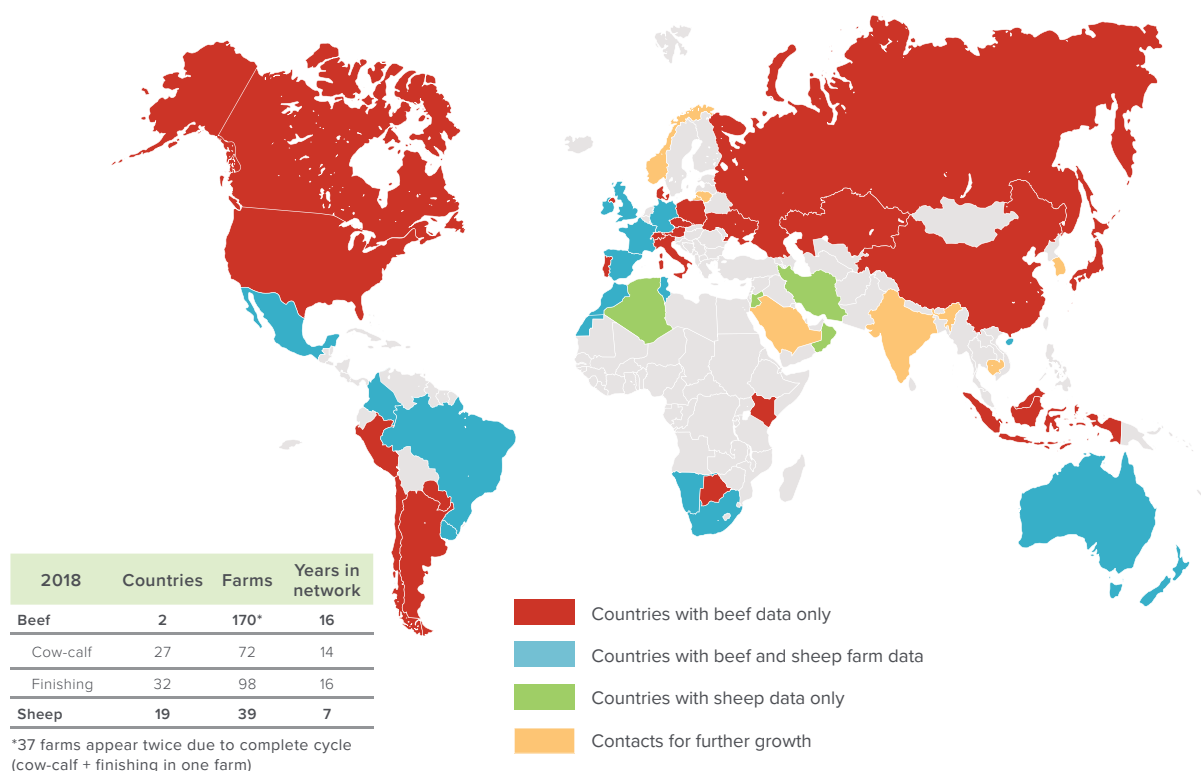
The core competence of the network is in analysing production systems, their economics, drivers and perspectives.

***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 (cow-calf and 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 cropping and/or sheep).

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



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

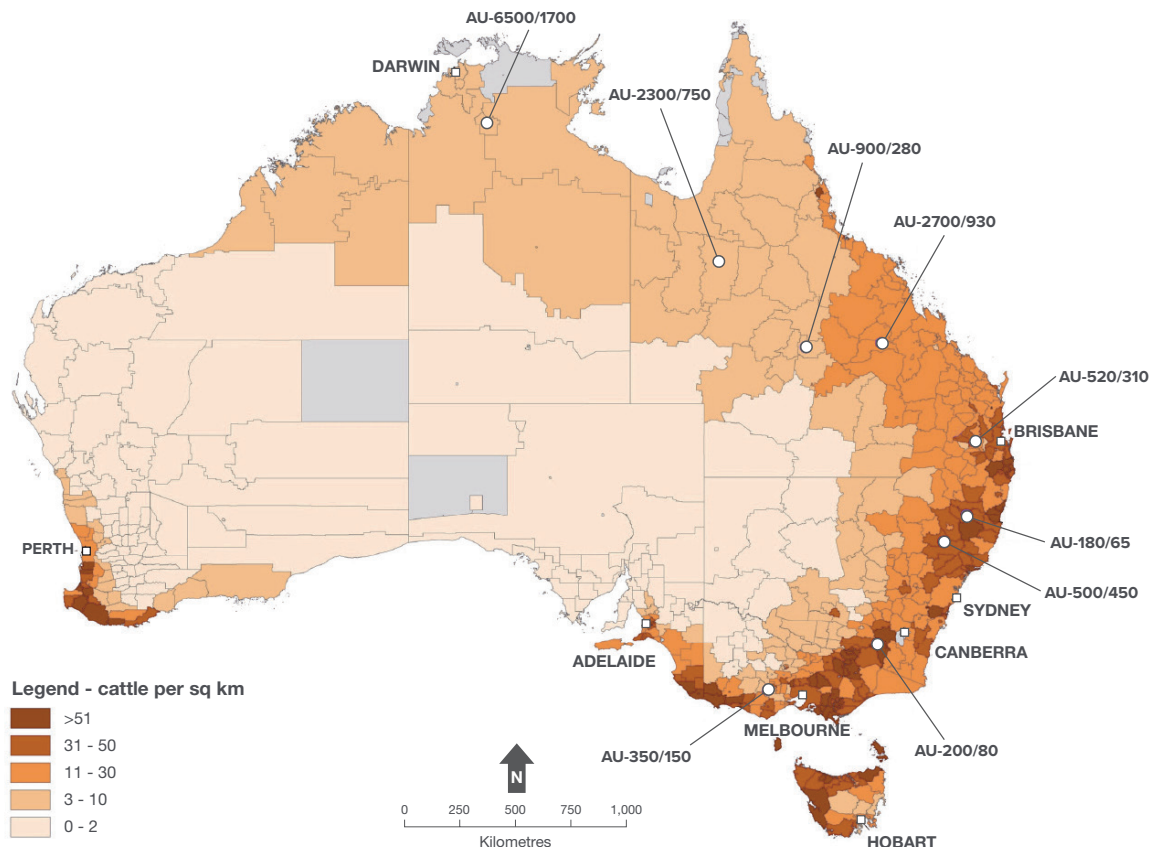
The farm-level results in this report are drawn from the collection of 'typical farm' data in each country, and subsequent analysis and research efforts of all member countries culminating in the 16th annual *agri benchmark* conference in Galway, Ireland, 15-20 June 2018.

A 'Typical farm' can be based on data for an actual farm judged to be typical of a key production system in a key region² 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 *agri benchmark* typical cattle farms and beef cattle density



Source: ABS data, MLA *agri benchmark*

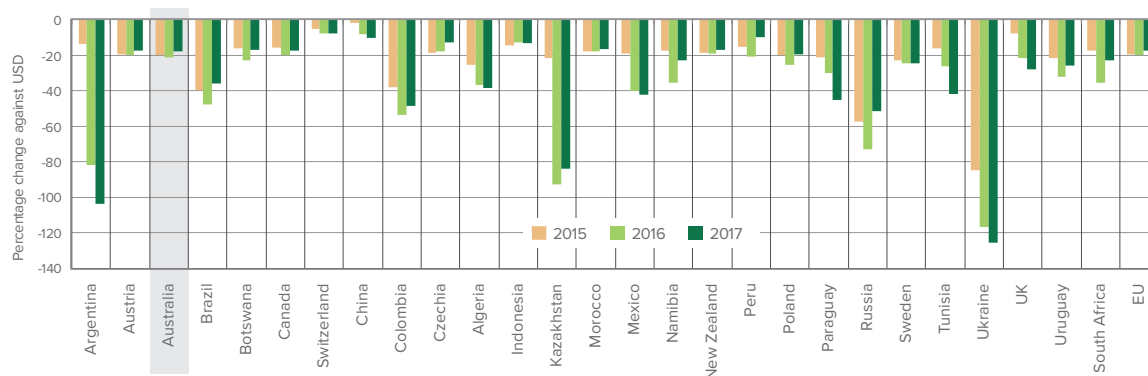
² Such individual farm data is further 'typified' where necessary by replacing farm individual particularities by prevailing characteristics, figures, technologies and procedures.

Global price and cost trends

Currency movements

The US dollar (USD) rose appreciably in 2015 and 2016 (see Figure 3) – by 20-40% against most currencies but even higher against those in South America – exacerbating falls in global food and beef farm prices in USD terms since their 2011-2014 peaks. However, when expressed in local currency terms, farm output and input prices rose. Currency fluctuations had less influence on developments in 2017, except notably for further falls in the UK pound and Argentine peso.

Figure 3: Change in currencies against the USD since 2014



Source: oanda.com and agri benchmark

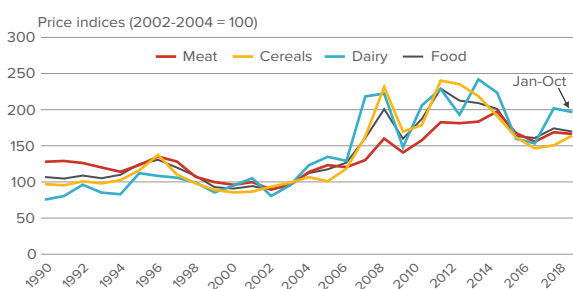
Food and meat prices

Global food prices (in USD) doubled in the 10 years to 2011 and have been highly volatile over the past 15 years (see Figure 4). 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.

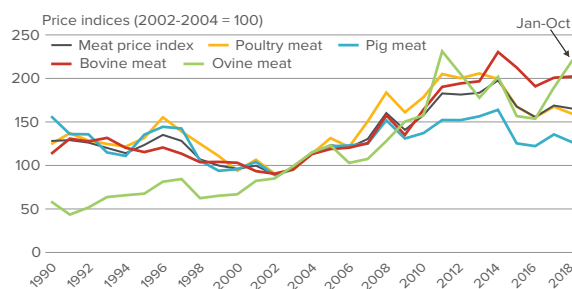
Global food prices reached a low point in 2016 but were still 50% higher than prior to 2004. Since mid-2016, prices have mounted a significant recovery (in USD), especially for dairy products.

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



Source: FAO Food Indices

Figure 5: FAO global meat price indices (based on USD prices)



Source: FAO Food Indices

All meat category prices rose in 2017, and red meat prices continued to recover in the first seven months of 2018 (helped by some weakening in the USD), while pig and poultry meat prices lost most of the 2017 gains.

In the first seven months of 2018, beef prices were 10% above the recent 2016 low and within 9% of the year peak in 2014. The FAO sheepmeat price index was the standout, having risen 44% from 2016 to the first seven months of 2018, leaving prices within 4% of the phenomenal peak in 2011. However, this partly reflects the fact that this price index is based on a New Zealand export lamb price only. While Australian prices have also mirrored this trend, sheepmeat prices elsewhere have not, notably in Europe, North America and China.

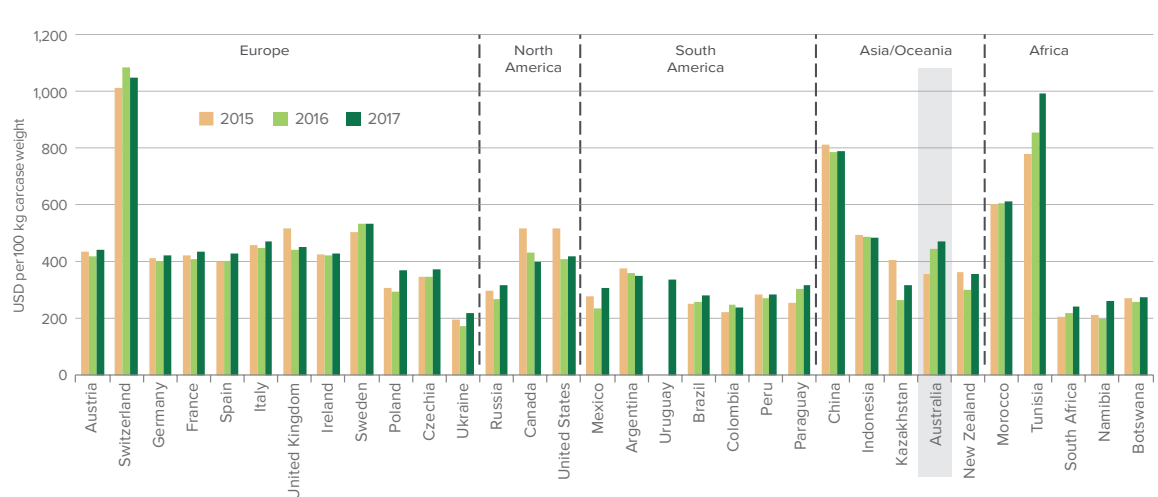
In contrast to the red meats, poultry and pig meat prices only rose 5% and 3% between 2016 and 2018 (first seven months) leaving 2018 prices still 20% and 23% off their respective peaks (in 2013 and 2014).

Global cattle price trends

Using *agri benchmark* farm data, finished cattle (beef) prices were stable-to-higher in most countries (in USD) in 2017, led by stabilisation in prices in the US. There were notable rises in China and Indonesia as supply struggled to match ongoing demand growth and in Brazil and Argentina assisted by low currencies. *Agri benchmark* farm prices also rose in Australia (on lower post-drought supplies), Germany and Mexico in 2017.

Australian cattle prices were relatively high during 2017 (in USD terms), and importantly were above those in North America, New Zealand and much of Europe.

Figure 6: Cattle sale prices 2015 to 2017 in *agri benchmark* countries



Source: *agri benchmark*



Cattle price forecasts

OECD-FAO projections

The OECD-FAO in its latest Agricultural Outlook report (2018 to 2027, released in July 2018) stated:

“Global agricultural production is growing steadily across most commodities, reaching record levels in 2017 for most cereals, meat types, dairy products and fish, while cereal stock levels have climbed to all-time highs ...”

(Press Release 3 July³).

The Outlook projects that the weakening of global demand will persist over the coming decade, sapped by declining population growth, flat levels of per capita consumption for staple foods and slowing demand growth for meat products. At the same time, continuing productivity improvements in agriculture and fisheries is projected to result in a 20% rise in agricultural production over the coming decade.

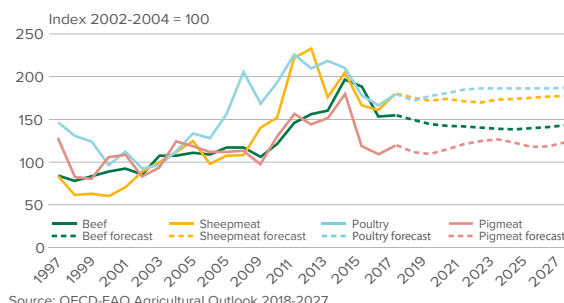
Beef production in developing and transition countries is projected to be 21% higher in 2027 than in the base period (average 2015 to 2017), with these countries accounting for 75% of the additional beef produced (mainly from Argentina, China, Brazil, Pakistan and Turkey). In developed countries, production is projected to be 9% higher by 2027 compared to the base period, with virtually all this increase coming from the United States – while expansion in Australia, Brazil and Mexico has been delayed and is expected to subsequently slow.

With slowing demand growth and rising supplies, prices of main agricultural commodities are expected to fall in real terms over the coming decade.

In the short-term, OECD-FAO projects beef prices to decline due to ample beef supply from North America following the recent rapid herd rebuild. In line with the expansion of output in key production regions, nominal bovine meat prices are expected to decline until 2024. However, as the beef cow herd declines and production growth rate slows, prices are expected to start to increase towards the end of the projection period.

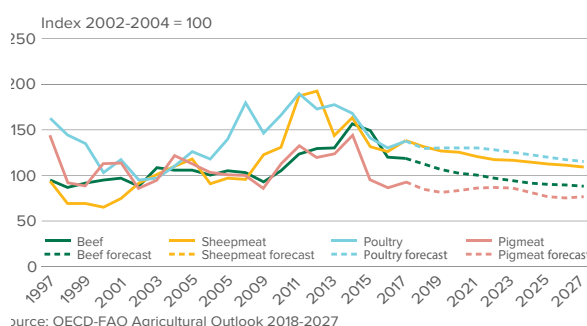
The OECD-FAO projected nominal price fall for beef is in contrast to other meats that essentially hold in nominal terms over the decade. This reflects the expected beef supply build-up in North and South America, with demand growth slowing but still better than for poultry and pork. This is due to the expected growth in demand in developing countries. “Lower product prices have contributed to making poultry and pig meat the meat of choice for consumers in developing countries but rising income levels allow those consumers to diversify meat consumption, gradually consuming more of the more expensive meat varieties such as beef and lamb.” (OECD-FAO Agricultural Outlook 2018-2027, page 150).

Figure 7: OECD-FAO meat price projections (nominal)



Source: OECD-FAO Agricultural Outlook 2018-2027

Figure 8: OECD-FAO meat price projections (in real terms)



Source: OECD-FAO Agricultural Outlook 2018-2027

Spain



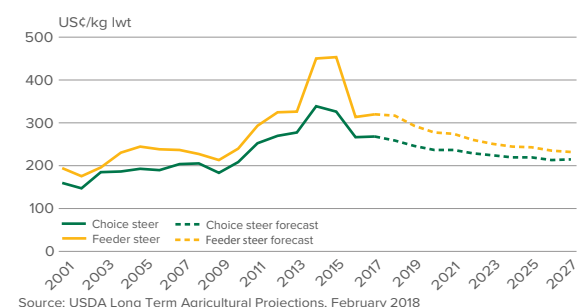
³ <http://www.fao.org/news/story/en/item/1143705/icode/>

USDA projections

USDA's Agricultural Projections to 2027 released in February 2018 are essentially in line with the OECD-FAO ones summarised above. USDA reports that favourable returns at the start of the projection period (assisted by a high cattle-to-feed price ratio) and robust domestic and export demand (despite a rising USD) should provide the incentive for continued growth of the US livestock sector over the next ten years.

The cattle herd build up has been faster than anticipated, resulting in the recent beef price falls. Further supply growth as the herd expansion phase ends is expected to see cattle prices fall further (even in nominal terms) beyond 2018.

Figure 9: USDA Cattle price projections 2018 to 2027 (nominal)



Global beef supply

Global beef production is on the rise, following a period of favourable prices and profitability. Hence, cattle prices and profits are easing, especially within the cattle finishing segment – the cattle-to-feed cost ratio is still favourable but falling (see Figure 10).

The recent spike in cattle prices globally (peaking in 2014 in most countries) plus falling grain costs have been largely responsible for triggering a new global cattle cycle. However, a sequence of severe weather events has delayed the herd build up in many important production regions, notably in the Southern Hemisphere. Hence, while the cattle herd build-up in the US is probably past its peak, and beef supplies are rising, herds in the Southern Hemisphere are just starting to rebuild, constraining short-term beef supplies.

Australia is a good example, as drought continues to prevent the cattle herd expansion and cattle prices have not eased appreciably (at least not until the re-emergence of drought in 2018). In 2017 *agri benchmark* farm results, this was reflected in high Australian farm cattle prices and profitability relative to almost all other *agri benchmark* countries.

The average Australian farm cattle price (output price) in 2017 was higher-than-average on the *agri benchmark*'s global beef supply curve (amongst European costs and close to China) and even above North America, New Zealand and some typical European farms (see Figure 11).

Over the past decade (2004-06 to 2014-16) beef production has risen most in China, Brazil, Australia, Turkey, Pakistan, Uzbekistan, Mexico and the African continent. Over the coming decade, the US and Argentina are expected to be major additions to this list, with China, the US, Brazil and Argentina providing the bulk of the global beef supply growth.

The main beef production declines are occurring in Europe (except for the UK and Ireland) and this is expected to continue over the coming decade.

Figure 10: Beef-to-feed price ratio

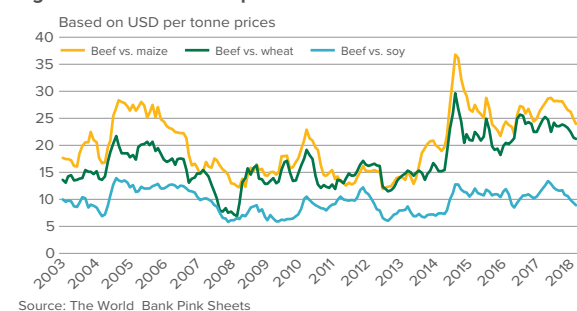
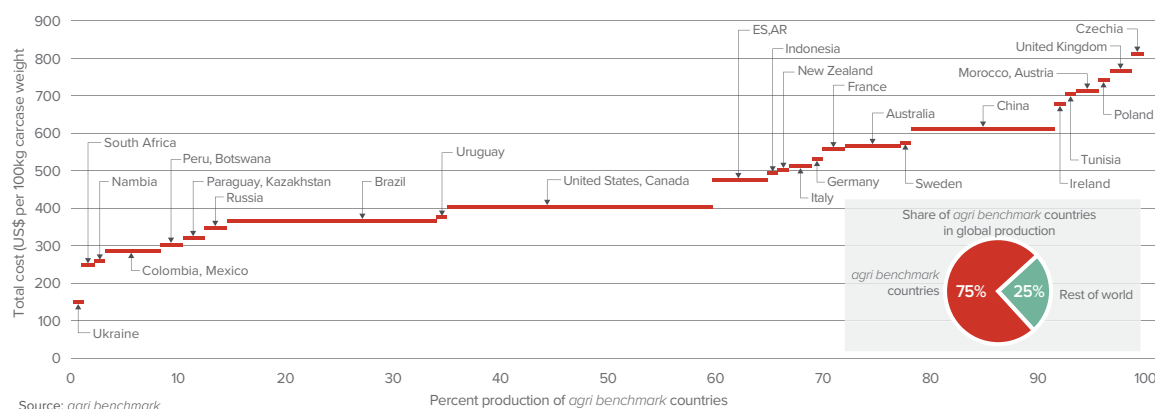


Figure 11: Global beef supply curve (*agri benchmark* countries)



Another major issue raised at the Conference was the ongoing political and economic instability in key South American supplier countries, especially Brazil and Argentina. Both countries are projected (by OECD-FAO) to be amongst the top four for beef supply growth and top three for beef export growth in the coming decade. Hence, further disruption could have a significant negative impact on global beef supplies, while a period of stability (and favourable weather) could see supplies rise even faster than currently anticipated.

Beef production sustainability

Beef supply chain sustainability and animal welfare were again front-line issues at the 2018 *agri benchmark* Conference⁴.

Environmental restrictions are having significant negative impacts on cattle production in many countries, including recent policy changes in China and New Zealand. This year's Conference contained a number of contributions in this field, notably a presentation by Ernesto Reyes entitled *Recent approaches for assessing sustainability at different levels*, addressing progress in defining sustainability and measuring on-farm environmental sustainability and animal welfare.

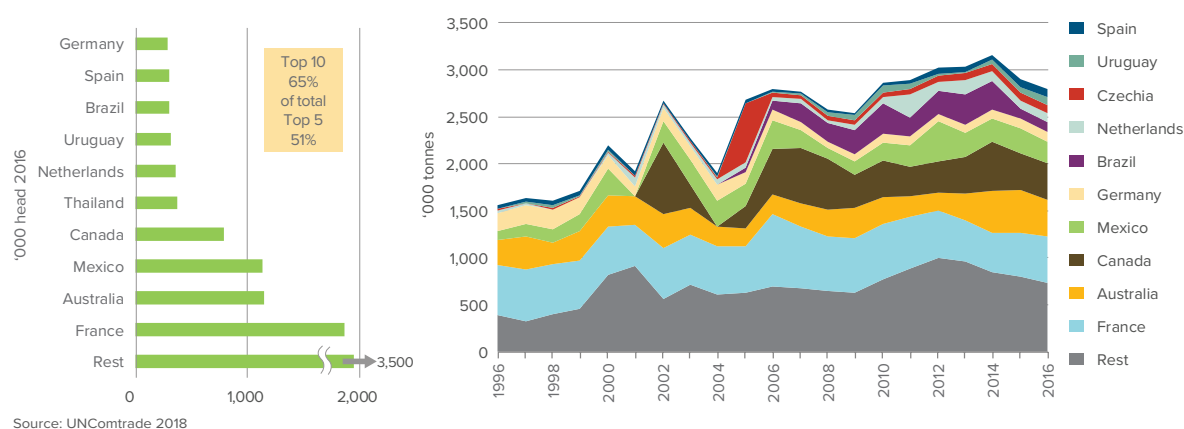
Another presentation by Kevin Kilcline (Ireland Agriculture and Food Development Authority) entitled *Assessing GHG emissions across the Irish sheep meat value chain* covered the progress in measuring the carbon footprint on Irish beef farms.

Results of a global consumer survey on sustainability were presented to the Conference by Michael Maloney (Director of Origin Green) of the Irish Food Board. Along with other contributions to the Conference, this presentation highlighted a growing consumer trend towards grassfed beef attributed mainly to sustainability concerns.

Within the social sustainability sphere (sustainability is commonly divided into environmental, social and economic segments), the issue of animal welfare is growing in importance, as live cattle trade expands worldwide.

This issue is receiving increased attention globally. In Europe it is being elevated by the growth in trade from EU countries to Turkey, the Middle East and North Africa.

Figure 12: Global live cattle trade



A feature of beef farming that is common to almost all countries is the large difference in profitability and cost of production from the top performing producers to the bottom performers, the impact of an aging farmer demographic on productivity and the need for better farmer training/extension.

The impact of emerging technologies on beef producers

Claus Deblitz, coordinator of *agri benchmark* beef and sheep, raised the 'sleepers' issue of recent fundamental scientific innovations that are likely to revolutionise farming – notably genome editing (altering DNA), artificial intelligence, blockchain (supply chain information technologies) and alternative proteins.

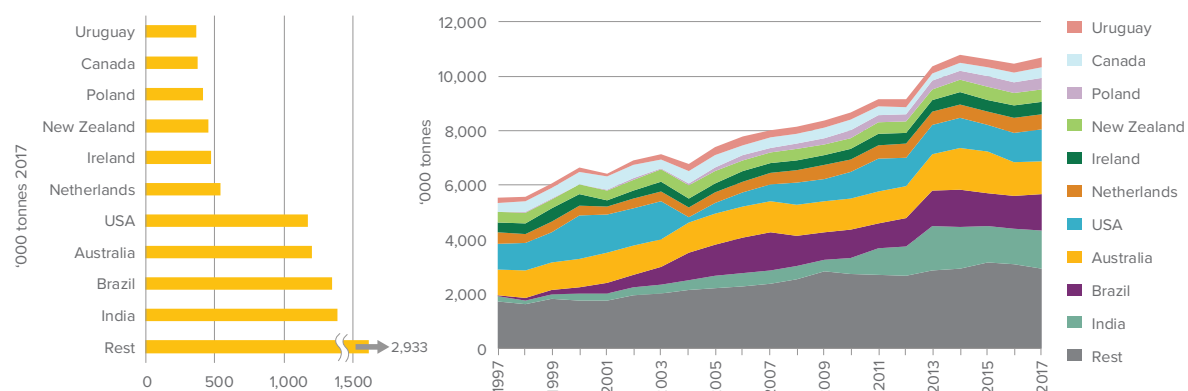
Some of these technologies have the potential to greatly enhance production efficiency but will require changes to traditional farming. These changes will probably challenge the place of smaller scale, older and part-time farmers. Alternative protein sources like insects, aquaculture and clean meat rather constitute a threat to the present way of livestock farming. Feeding insects as a protein source to animals could offer a new pathway for feed protein supply.

⁴ See 2018 *agri benchmark* Conference Global Forum presentations by: Ernesto Reyes, *agri benchmark*, *Recent approaches for assessing sustainability at different levels*; Kevin Kilcline, Ireland Agriculture and food development Authority, *Assessing GHG emissions across the Irish sheep meat value chain*; Michael Maloney, Irish Food Board, *Origin Green*

Beef trade

Global beef trade has been steadily expanding over the past 20 years (see Figure 13), driven by import demand growth in Asia (China, Japan, South Korea and Indonesia), the Middle East, Germany and the Netherlands. Increased exports have principally been supplied by India (to China and Vietnam), Australia (to Asia and the Middle East), the US (to Japan and Korea) and the UK/Ireland (to Germany and elsewhere in Europe). Notably, Brazil was not amongst the main export growth countries over the past decade, due to a combination of trade access issues, competition from grain for land, cattle disease outbreaks, import restrictions and political/economic problems.

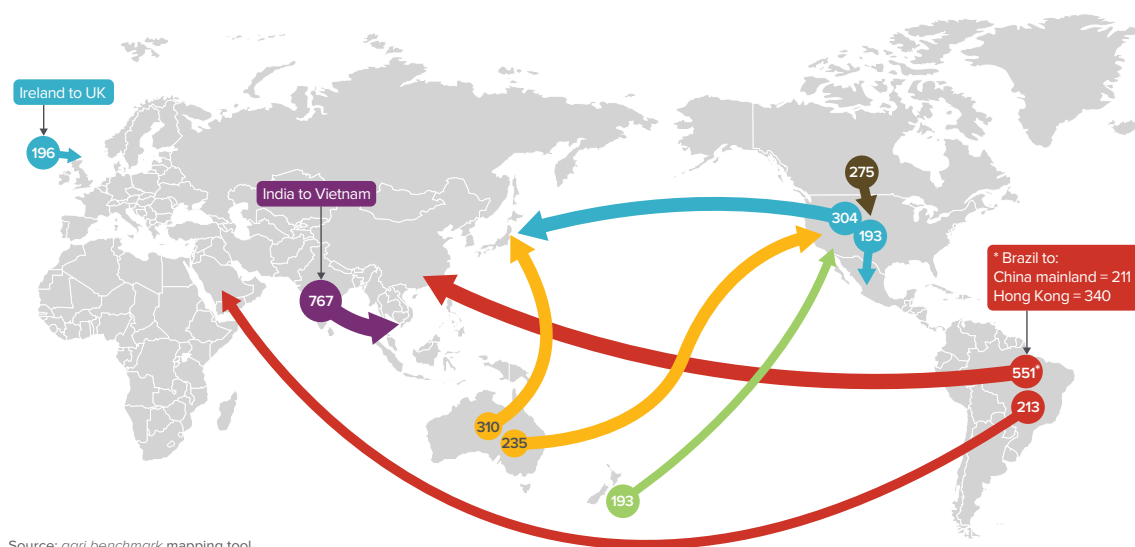
Figure 13: Global beef exports



Source: UNComtrade 2018

Figure 14 illustrates the major beef trade flows in 2017. Australia has two major trade flows to the US and North Asia, the US to North Asia and Mexico and Brazil to China/Hong Kong and MENA. All other major exporters have only one primary trade flow – India to China, and Canada and New Zealand to the US.

Figure 14: Major beef trade flows 2017 ('000 tonnes)

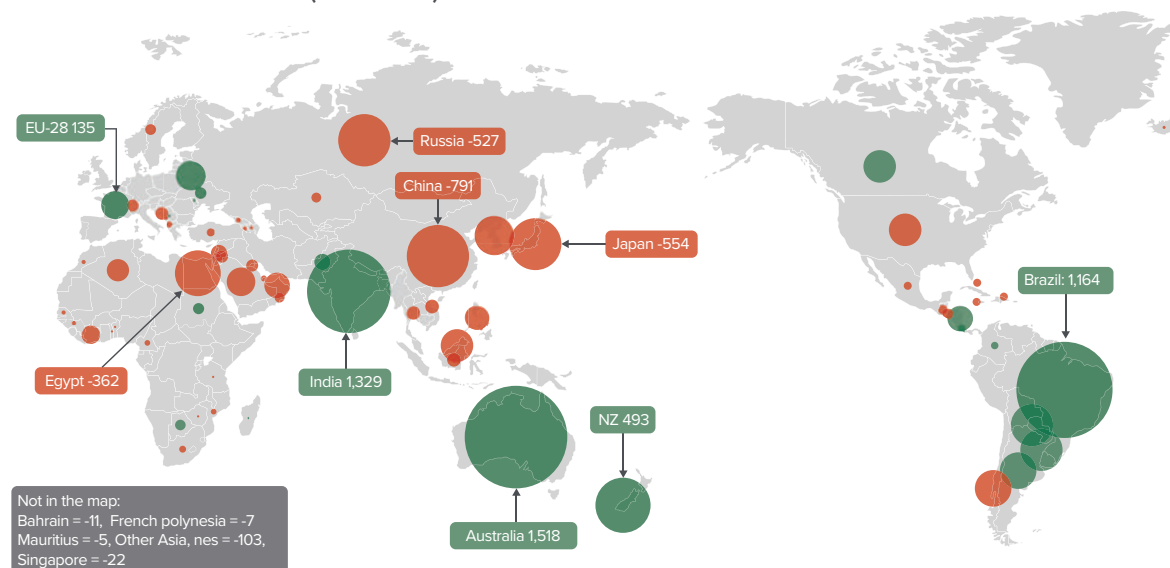


Source: agri benchmark mapping tool

Given that some of the main beef producing and exporting countries are also large beef importers, it is useful to look at net beef trade (beef exports less imports), as in Figure 15. Australia was clearly the largest net export of beef in 2015, followed by India and Brazil while the main net importers were China, Japan and Russia – in the US and EU beef exports and imports roughly balanced and, hence, net trade is small.

A relatively minor shift in the beef demand/supply balance in any of the five large consumer/producer countries – the US, China, Brazil, Russia and the EU – would (market access allowing) have a substantial impact on world trade and on dedicated beef exporters such as Australia.

Figure 15: Beef trade balance 2015 ('000 tonnes)



Source: *agri benchmark* mapping tool

The OECD-FAO is predicting a slowdown in global beef trade growth in the coming decade, due to slower beef demand growth generally and smaller import growth in China. Asia is still seen as the key growth region, with Vietnam and the Philippines mentioned as countries likely to greatly increase imports of meat. Other projected meat import growth regions are the Middle East and Africa. Russia could also feature if it were to lift the ban on imports from US, Australia and other countries, though increased Government support for beef production seems likely to limit the expansion in imports of beef.

Beef market access uncertainty

Beef market access was again a major concern of network countries at the 2018 *agri benchmark* Conference, heightened by US trade threats (especially against China, Turkey, Mexico and Canada), the Russian beef import bans (although it recently re-granted access to some Brazilian plants), Brexit, regional trade deals (such as the Regional Comprehensive Economic Partnership or RCEP) and the proliferation of bilateral trade deals recently struck or in the pipeline (following the failure of global multilateral efforts).

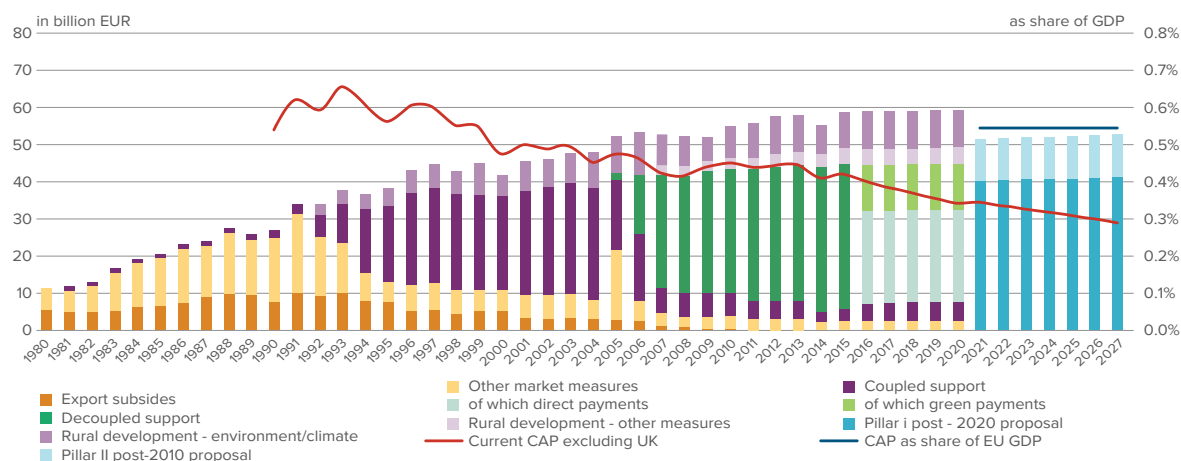
Combined, the renewed push towards protectionism in key countries (led by the US) and rejection of multilateral agreements in favour of bilateral trade agreements, threatens to reverse the gains from trade liberalisation over the past 30 years and further distort beef trade flows. Beef trade is already one of the most distorted commodity trades due to the widespread use of formal and informal (technical) trade barriers.

One presentation to the 2018 Conference, given by Koen Dillen (European Commission) entitled *EU trade policy: What's in it for the beef sector*, provided an insight into the EU's trade approach. EU projections have total EU beef production declining faster than consumption over the next 10 years, reducing exports (currently mainly consisting of low-priced beef, offal and live cattle) and lifting imports (mainly high-priced beef cuts). While the projected change in EU beef trade is not large in percentage terms, it would take around 200,000 tonnes of beef off the world market over the next 10 years, which would be significant.

Dillen also outlined the evolution of CAP payments since 1980 (see Figure 16) from export subsidies and coupled supports (encouraging production) to no export subsidies, decoupled support (less disruptive to world markets) and rural development payments – including a major shift towards environment payments and climate action. While the total EU CAP budget has risen almost 5-fold since 1980, its percentage of EU GDP has fallen from over 0.6% in the early 1990s to less than 0.4% today and is budgeted to fall to 0.3% by 2027.

The proposed CAP plans for 2020 and beyond have an increased emphasis on environment and climate action; generational renewal (support for young farmers); attracting investment in agriculture and research, innovation and training.

Figure 16: EU CAP payment evolution



Source: Koen Dillen (European Commission) agri benchmark presentation: *EU trade policy: What's in it for the beef sector*

The EU have recently completed FTAs with Japan (beef tariff to fall from 38.5% to 9% in 16 years) and Canada (given a 50,000-tonne access to the EU) and are in the process of negotiating FTAs with Australia, New Zealand, Mercosur and the UK (Brexit).

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 South America, New Zealand and Australia. The UK is the dominant market for Irish beef and the loss of access would impact 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.



Global performance of beef farms

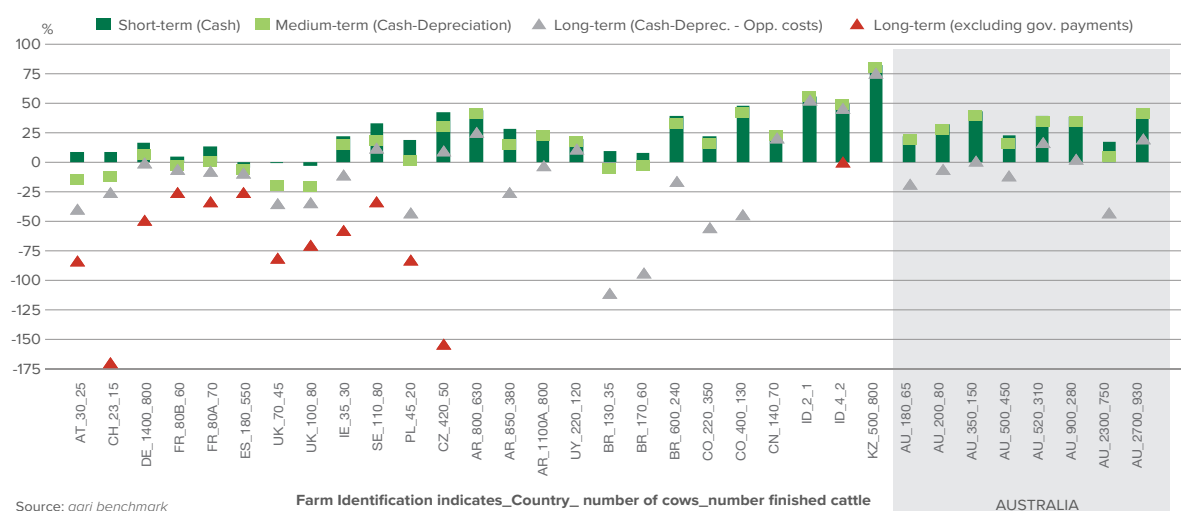
Few countries can boast long-term profitability on cattle enterprises at present. Even when net income from other sources or enterprises on the same farm (such as from crops, sheep, wool etc) are counted to yield a whole farm profit⁵, only some beef farms in the Australia, Argentina, Uruguay, China, Kazakhstan, Ukraine and Indonesia made a profit, without government payments, in 2017.

In Australia, all farms achieved short- and medium-term profits, with four of the nine achieving long-term profitability in 2017.

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 long-term profits. Indonesia, China and Kazakhstan farms also achieved long-term profits.

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 17: Whole farm profit margins for combined cow/calf and beef finishing enterprises⁶



⁵ 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.

⁶ 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.

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

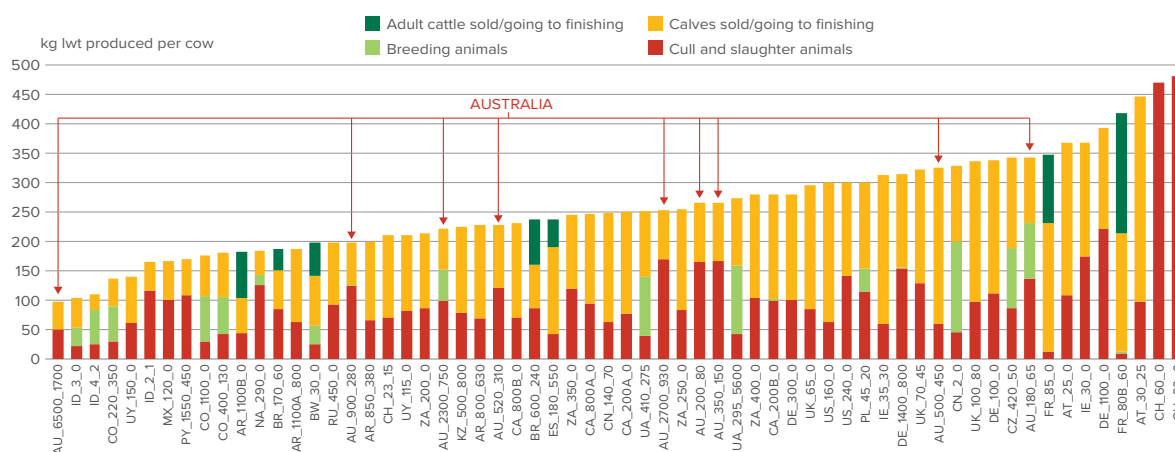
This ranges from 100-480 kgs globally (kg live weight (lwt) produced per cow per year) – weaners are the main part for most systems, with culled adults being the second most important contributor.

The performance of Australian systems spans the entire data set and is quite diverse, ranging from 97kg to 341kg lwt in 2017. Performance of the most northern Australian systems (AU_6500_1700, AU_2300_750 and AU_900_280) is comparable to other rangeland-based and cut & carry systems of Indonesia, at around 97-197kg lwt per cow (most of which is the sale of cull females). While heavily dependent upon environment and seasonality, 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.

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



Source: agri benchmark

Farm Identification indicates_Country_ number of cows_number finished cattle

Weaner and cull cow prices

Overall, Australian weaner prices are similar to those elsewhere in the pasture-based systems of the southern hemisphere (Argentina, Uruguay, Paraguay, Brazil), marginally higher than those received in southern Africa (Namibia and South Africa), but still around 20-30% lower than prices in North America (Canada and US) and the EU, China and Indonesia. In 2017, Australian weaner prices continued to climb from the lows of 2014. With a further rise in cull cow prices in 2017, Australian prices were similar to those received in North America, Europe and Asia, and higher than those received in South America and Africa.

United States



Total cow-calf returns (revenue)

In 2017, 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 and 2016 levels, due to a combination of higher weaner and cow prices and moderate production levels (weaning rates and production per cow). Some countries in South America (Colombia, Brazil), Africa, Mexico 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 payments).

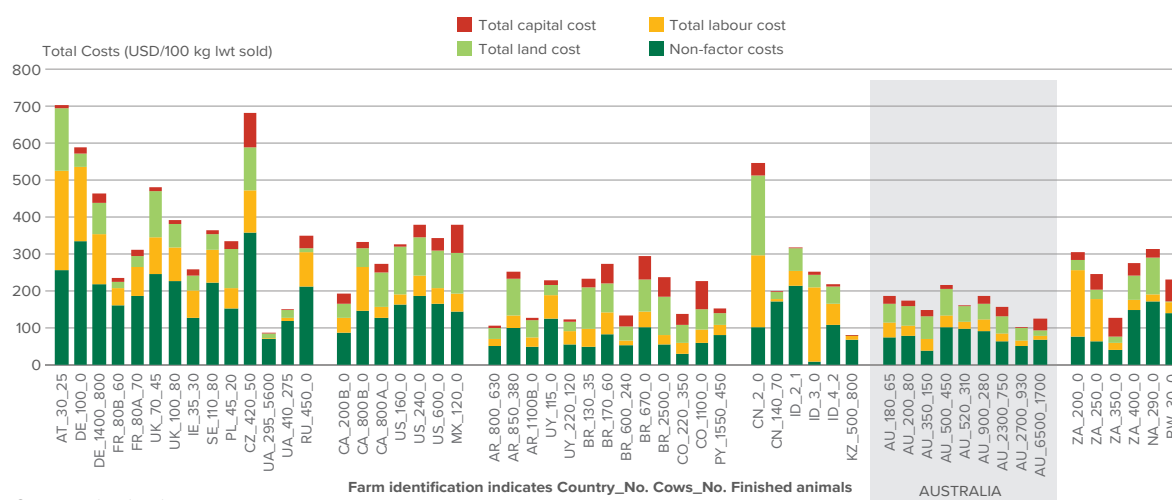
Total cost of cow-calf production

Most Australian systems maintain a comparably low total cost of production in cow-calf systems – similar to comparable typical cow-calf systems in South America, some Canadian, Ukrainian and South African. The exception in the Australian data is AU_500_450 (north west NSW) which continued to have high animal purchases (replacement breeders) in 2017. Many of the northern Australian systems were increasing their herd size during 2016 and 2017 after being significantly reduced during the drought of 2013-2014. Generally, southern Australian systems have been relatively stable in their costs while northern systems experienced a mixed response to changing feed conditions and non-factor input costs.

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 had all further reduced their cost of production in 2017, by around 5%, whereas European systems have increased their cost of production by another 10-20% from 2015 levels.

In most countries, non-factor costs⁷ 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 to three times higher than that for low cost countries like Australia.

Figure 19: Total cost of cow-calf production (US\$ per 100kg live weight sold)



⁷ Non-factor costs include all the operating costs of the enterprise, both variable and allocated fixed costs

Labour costs and productivity

Labour prices 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 2017 was around US\$21/hour, with the opportunity cost of family labour around US\$23/hour.

European, North American and South American/African countries averaged \$15/hour (excluding Ukraine and Russia at \$1-\$4/hour), \$19/hour (Canada averages \$22/hour, excludes Mexico @ \$1/hour), and \$6/hour, respectively. Asian countries averaged \$1/hour.

However, taking into account labour productivity (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 African, Asian, South and North American systems, where labour is cheaper. European, small scale Asian systems and some South African systems have very high labour costs due to low productivity per unit of labour input.

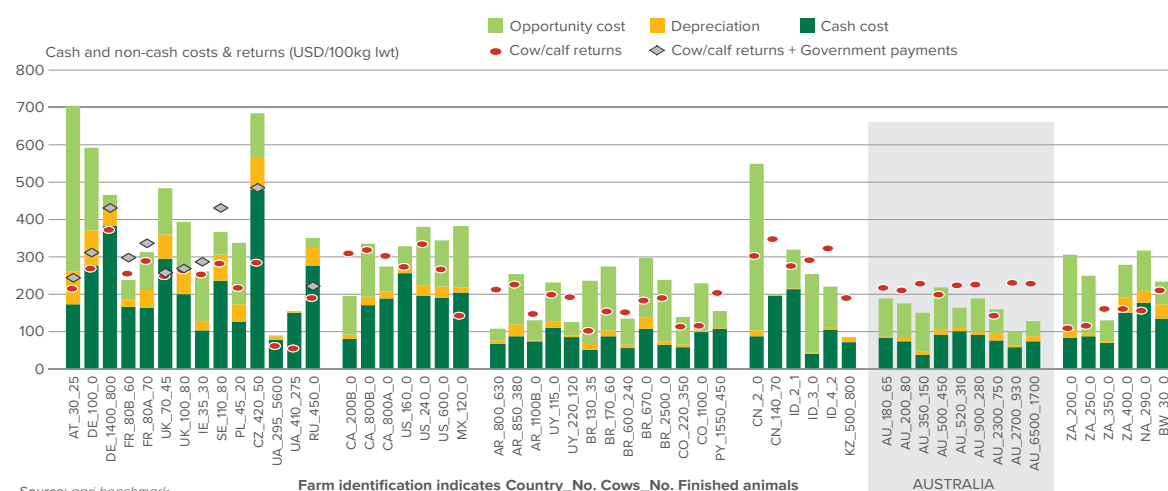
Total costs, returns and profitability of cow-calf production in 2017

The South American and most Australian systems, and some Ukrainian, Asian, Canadian and South African systems, 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 38% of analysed typical farms are capable of producing long-run profits (enterprise returns less total costs). Notably, the majority of these exist in South America, Asia and Australia.

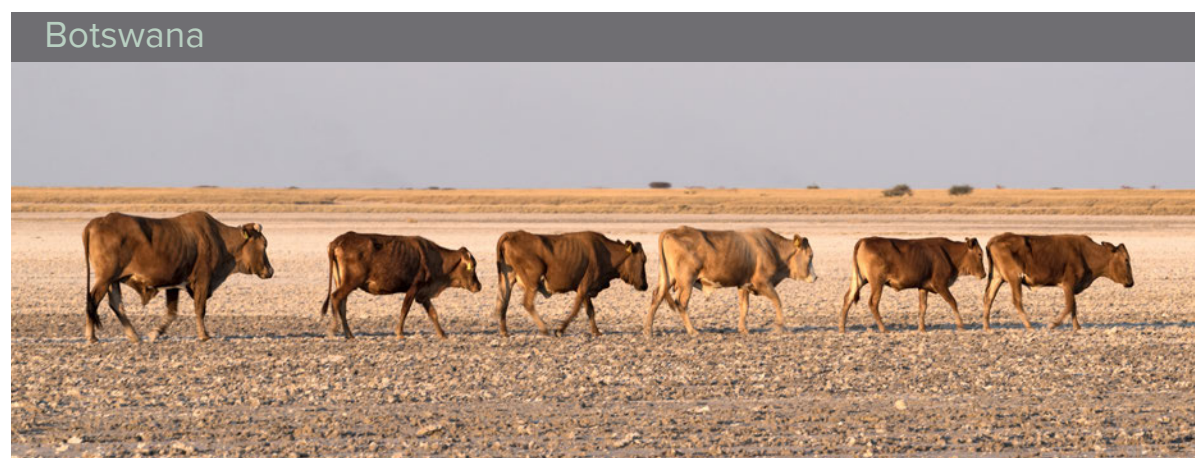
Seven of Australia's nine pasture-based farms achieved long-run profits from the cow-calf portion of their operations in 2017 – a rare achievement. With total returns increasing by over 10% for the third time since 2014 and total costs being maintained (particularly in southern systems), the profitability of Australian systems is 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 2017, although some achieve short-run profits. With additional income provided by government payments (coupled payments), some cover cash costs and depreciation.

Figure 20: Costs, returns and profitability of cow-calf production 2017 (US\$ per 100kg live weight sold)



Source: agri benchmark



In comparison...Australian cow-calf finishing 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, and lower growth rates and turn-off weights.
- Increased revenues due to slightly higher weaner and cull cow prices, with another 10% improvement in total returns from 2016 to 2017, on top of the 30% increase from 2015 to 2016.
- Maintained their cost of cow/calf production since 2015 in the case of southern systems.
- Generally increased their cost of cow/calf production since 2015 in northern systems, but tends to be much more variable.
- Had the most profitable year since 2006, with all Australian systems achieving short- and medium-term profits during 2017, 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 wage costs are reducing, which is in part due to exchange rate movements).

Cattle finishing enterprises

There was some improvement in beef cattle farm finishing enterprise incomes in 2017 across almost all countries.

While beef finishing farms in almost all countries made short-term (cash) profits in 2017, 70% of them achieved mid-term profits (covering cash costs and depreciation), but less than 20% of them achieved long-term profitability (do not cover the opportunity cost of inputs).

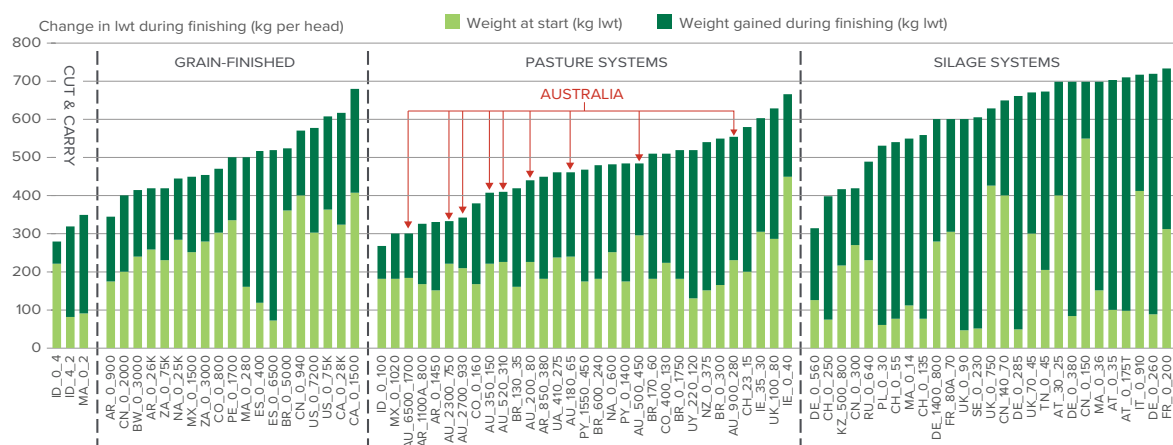
Live weight at start and end of finishing phase

European systems (predominantly silage/grain based) have long finishing periods, high final weights (600-740kg finished live weight) and very low comparable starting weights in some systems (~ 100kg lwt or less). These cattle predominantly come from dairy herds and are either Holstein or dual purpose breeds, like Fleckvieh.

Australian systems are similar to African and UK systems, with similar total weight gains in (400-550kg finished live weight) and 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 regions, 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, especially under more rangeland conditions.

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



Source: agri benchmark

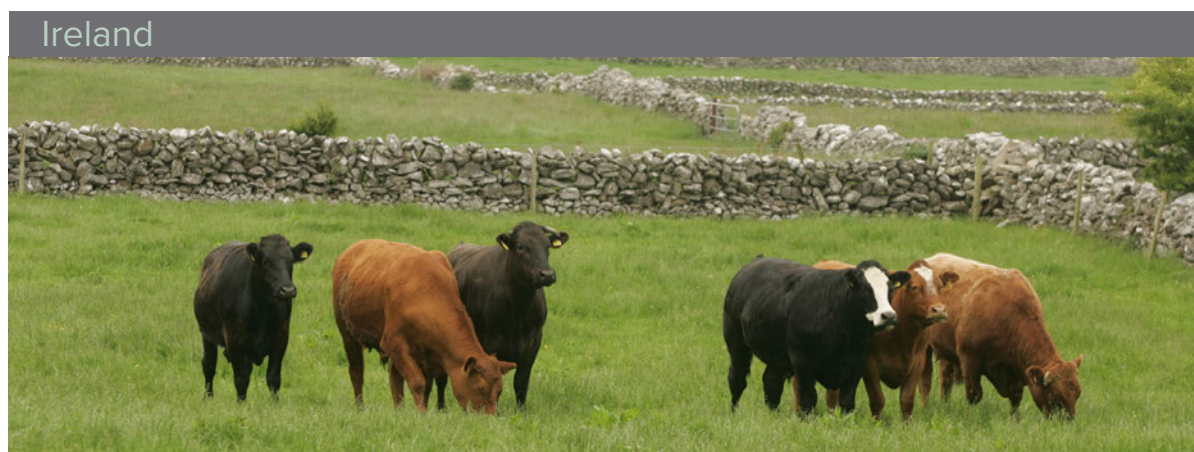
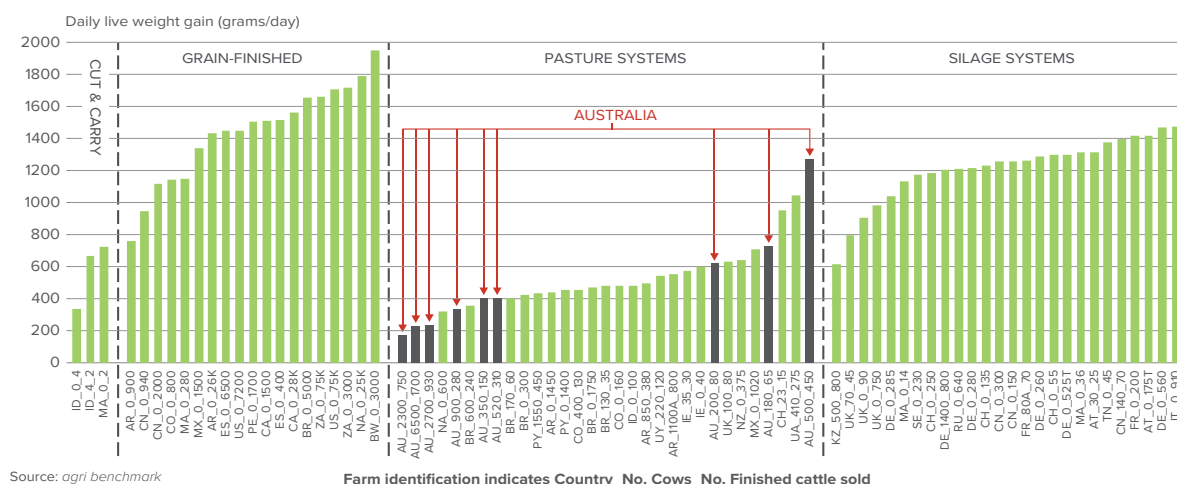
Farm Identification indicates Country_No. Cows_No. finished cattle sold

Daily and net weight gain

There is a clear relationship between daily weight gains and changes in live weight and finishing period. As would be expected, most grain-finished weight gains exceed those achieved in pasture and silage systems. Notably, around 70% of the European silage-based systems achieved similar or higher weight gains than the lowest performing feedlots from China, Argentina and Colombia.

Australian pasture-based systems had very mixed results in 2017, as the best pasture-based systems rank 1st (AU_500_450, NW NSW), 4th (AU_180_65, NSW northern tablelands) and 8th (AU_200_80, NSW southern tablelands) when compared to other pasture systems. Northern Australian systems continue to record some of the lowest weight gains (AU_2300_750, Qld Gulf; AU_6500_1700, NT), similar to those in South American and African systems.

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



Comparison of beef prices from 2012 to 2017

Beef carcass prices generally ranged between US\$240 and US\$520/100kg carcass weight (cwt) across the globe in 2017, 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).

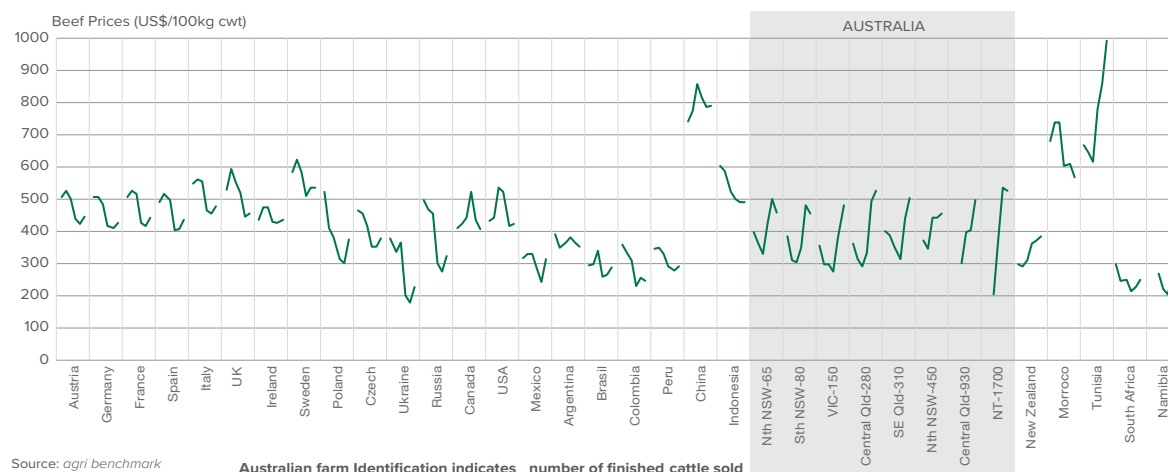
Beef cattle prices generally fell further in 2017, with Australian beef the exception – most typical Australian farms maintained the higher beef prices of 2016 in 2017. For all of the Australian systems, farm-gate prices were US\$50-100/100kg cwt higher in 2017 than those received in the US and Europe, at around US\$480-500/100kg cwt.

Canada and the USA beef cattle prices have fallen considerably from the peak during 2014, and in 2017 were similar to those in Europe. European beef prices generally increased from the lows of 2016, are relatively consistent internally and higher than South American prices (maintained by import barriers) – with the exception of non-EU countries, such as

Ukraine, Russia and Poland, who all experienced some recovery in 2017 from significant falls in beef prices since 2014.

China experienced a small reversal of recent falls in beef prices from the highs of 2014. Southern Africa and South American pasture-based systems receive some of the lowest prices with generally small changes in beef prices during 2017. New Zealand prices recovered around \$1/kg cwt during 2017 after significant reductions in beef prices since 2014 to a level of around US\$400/100kg cwt.

Figure 23: 2012–2017 beef prices received (US\$/100kg cwt sold)



Costs of finishing

The high A\$ and drought generally raised the cost of Australian beef production in the years preceding 2017 (especially in 2013 and 2014), relative to farms in the Americas and Europe (in US\$ terms), and the total costs of finishing rose further in 2017 for most Australian systems.

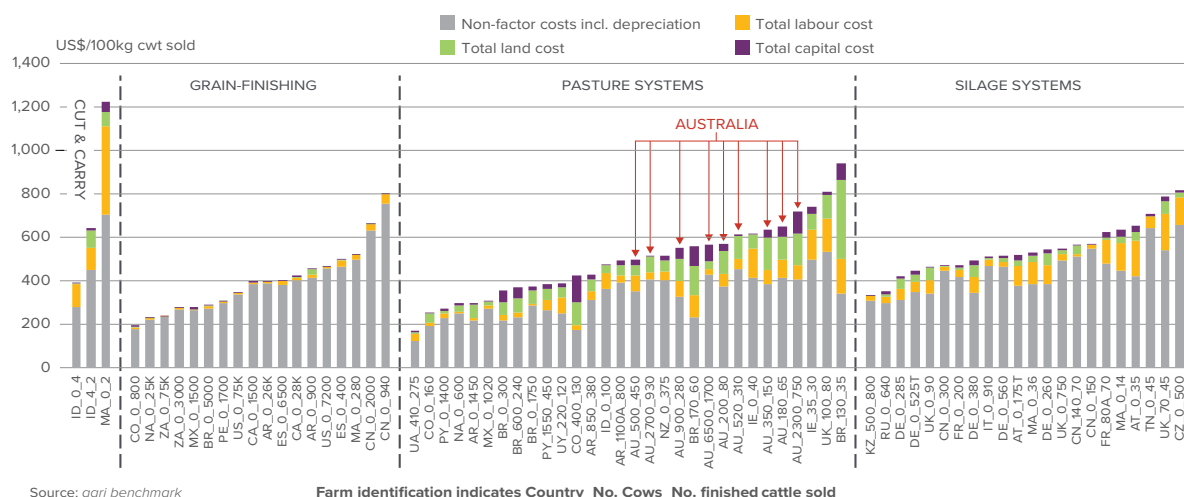
For the majority of the world's finishing systems it cost US\$4-\$6 per/kg carcass weight sold to finish cattle in 2017, an increase on 2016. The lowest cost finishing systems exist in the Ukraine, southern Africa and South America.

With the recent increase in costs, 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, Ireland, Poland and the UK), Asia (China and Indonesia) and Morocco. New Zealand notably maintained its moderate cost finishing system in 2017 due to recent increases in the cost of purchasing backgrounder cattle (dairy beef).

Total costs and farm rankings

In 2017, the majority of grain- and pasture-based finishing systems tended to have lower costs than silage systems. There are a further six European based silage finishing systems (not shown below) that have total costs ranging from from US\$0.97-\$1.59/kg cwt. Although most finishing systems experienced a decline in total costs from 2016, the majority of typical farms maintained higher costs than 2015 levels. Non-factor costs dominate 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 24: Total average long-run cost of production (US\$/100kg carcass weight sold)



Australia pasture based systems had mixed outcomes for the total costs of finishing (in US\$) in 2017. For the southern Australian systems, costs increased due to the higher cost of transferred/purchased livestock although feeding costs reduced marginally. However, in northern beef systems total costs declined due to increased outputs and costs remaining relatively constant.

Finishing costs, returns and profitability

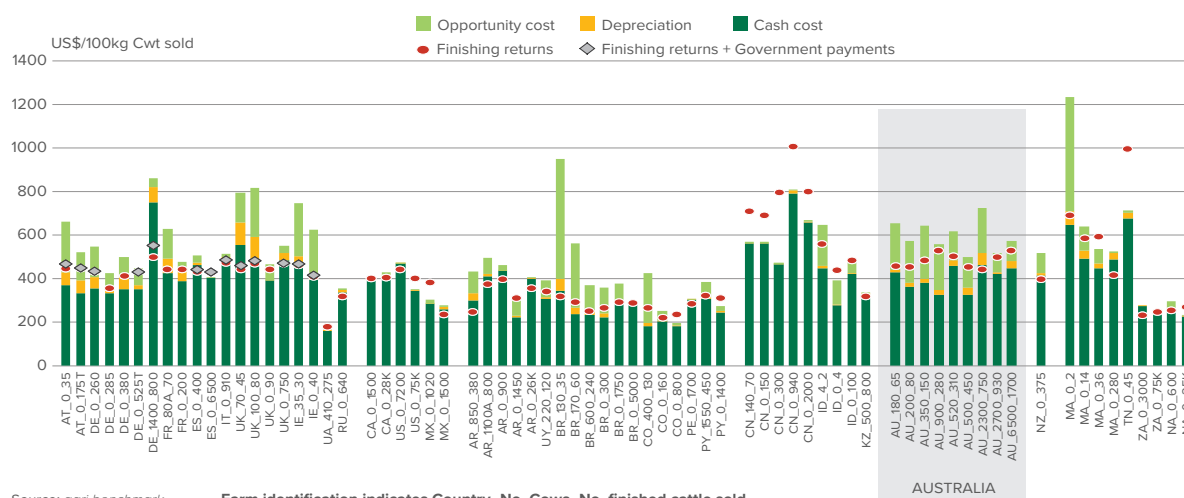
The majority of beef finishing systems around the world did not generate high enough returns to cover total costs of production in 2017 (long-run costs, including cash, depreciation and opportunity costs) and, in many cases, did not cover medium-term costs of production (cash costs plus depreciation), but most managed to break-even against short-term (cash) costs.

Around two thirds of the South American systems covered their short- and medium-term costs, with only three of the 19 systems covering the opportunity costs and generating long-term profits. All finishing systems in China and Tunisia continue to generate long-term profits, although the profitability of China farms fell between 2014 and 2017, with both increases in costs and reductions in returns. The only other systems to generate long-term profits are some US, Canadian, Mexican and Namibian feedlots (US 75k, CA 1500, MX 1500 and NA 25k respectively), a Ukraine system and small-holder systems in Indonesia and Morocco. For the second year in a row, the New Zealand finishing system did not maintain short-term profitability (did not cover cash costs) in 2017.

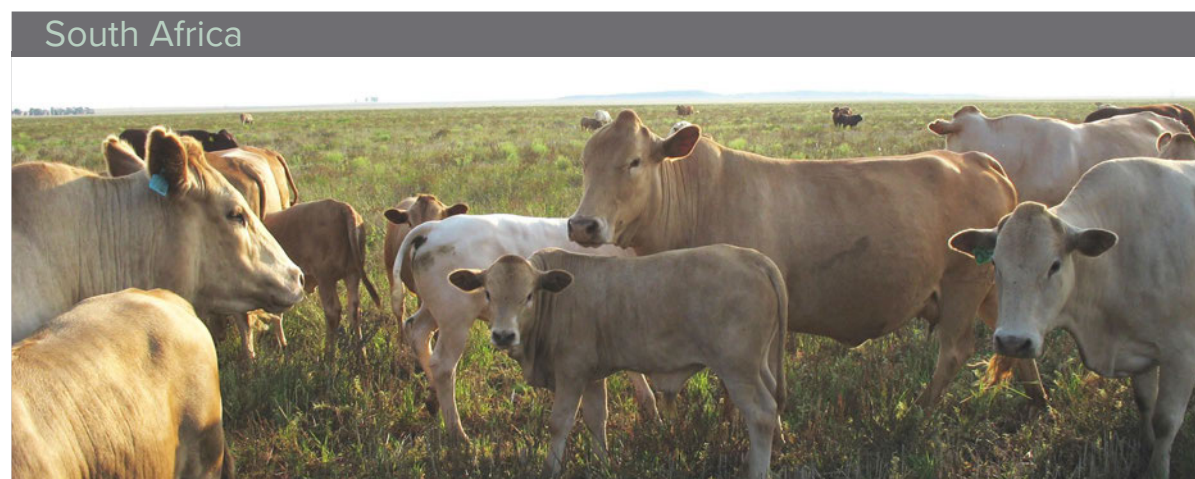
Of Australia's nine pasture-based finishing systems, eight covered both short- and medium-term costs in 2017, with no finishing systems covering opportunity costs (achieving a long-term profit). Only one farm (QLD Gulf AU_2300_750) did not cover cash costs and not achieve short-term profitability for the second year in a row. Although most Australian finishing systems maintain relatively moderate cash costs of production and depreciation costs, they tend to have high opportunity costs (mainly land and infrastructure, and to a lesser extent family labour).

In Europe, even with remaining levels of government payments (coupled payments), most beef finishing systems did not produce medium-term profits (unlike cow-calf systems which also received higher levels of government payments).

Figure 25: Cattle finishing costs, returns and profitability in 2017 (US\$/100 cwt)



Source: agri benchmark



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 feed (with performance comparable to pasture/rangeland based South American and African systems). Australian grass-based finishing systems, and other grazing systems around the world, have notably lower levels of weight gains when compared to silage and grain-finishing systems.
- Received above average prices when compared globally, around US\$50-100/100kg cwt higher than prices in North America and most European prices. Most countries experienced a reduction in beef prices between 2014 to 2017 (excluding Australia and Tunisia).
- Moderate costs of production when compared with all finishing systems, but above average when compared to other grazing based finishing systems in 2017.
- Return which generally covered the medium-term costs of production – out performing most beef finishing systems in the world (excluding China and Tunisia).
- Slightly lower returns than levels achieved in 2016, but still higher than those from 2013-2014 levels – 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 6 years.

Australia



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