MEAT & LIVESTOCK AUSTRALIA MARKET INFORMATION

How are global and Australian beef producers performing?

Global *agri benchmark* network results 2020

agri benchmark

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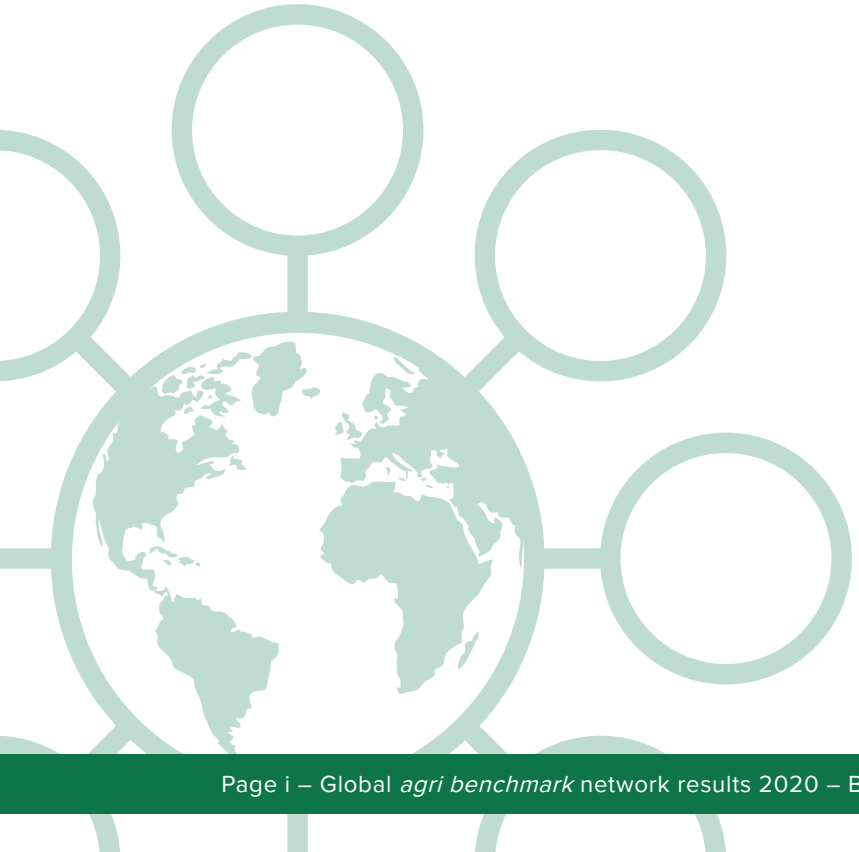

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Global *agri benchmark* network results 2020[1]

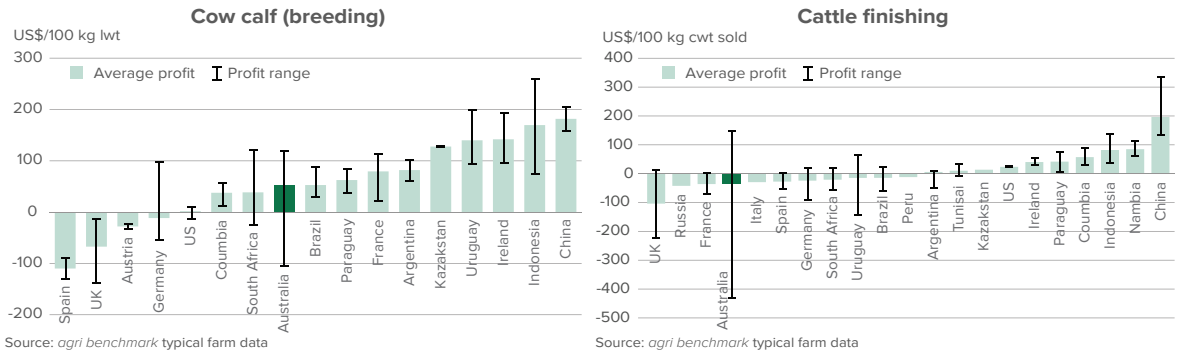
This report examines the global factors which underpin the observed farm results first, before going on to investigate the financial performance and productivity of the global farms in the network and understand how the Australian typical farms performed in comparison.

Global beef cattle profitability

Globally, beef cattle farms generally remained profitable (medium-term – covering cash costs and depreciation) in 2019 due to continuing high cattle prices and stable-to-lower costs. However, profits were commonly lower than in 2018, due in large part to the prevalence of severe drought across a number of continents.

The average medium-term profit[2] on *agri benchmark's* 'typical' beef cow-calf farms[3] fell in most countries in 2019, except in Argentina and Uruguay where they rose to be well above average (see Figure 1). Most cow-calf farms remained in profit in South America, Australia and China, but were making a loss throughout much of Europe (except in Ireland and France).

Figure 1: Medium-term profits *agri benchmark* farms 2019



In 2019, 67% of all *agri benchmark* cow-calf farms were profitable, down from 80% in 2018. Of these cow-calf farms, 78% of outdoor farms and 59% of winter barn farms (Northern Hemisphere) were profitable (including Government payments).

It is notable that all countries suffering a significant decline in cow-calf farm profits in 2019 had a high or medium-to-high water stress ranking in August 2019 (World Resources Institute, National Water Stress Ranking), including Australia, Indonesia, Germany, Spain, Portugal, South Africa and Namibia. Severe drought mainly has a negative impact on farm productivity and feed costs.

The South American countries that improved profits had a low (Brazil and Uruguay) or low-to-medium (Argentina) water stress ranking in 2019, following severe droughts in preceding years.

Of cattle finishing farms, 60% were profitable in 2019, down from 64% in 2018, while 61% of pasture-based farms, 64% of grain finishing farms and 58% of silage farms were profitable.

What is *agri benchmark*?

agri benchmark is a global, non-profit and non-political network of agricultural experts dedicated to lifting the productivity and viability of agricultural production across the globe through benchmarking farm performance. It is coordinated by the Thünen Institute – the German government rural research body – and has branches covering beef cattle, sheep, dairy, pigs, cash crops, horticulture, organic farming and fish. The cattle network currently has 34 member countries – covering over 75% of global beef production.

If you are unfamiliar with *agri benchmark*, please read the appendix to this report (page 26).

[1] 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-2020, though farm data is for the 2019 year.
[2] Medium term profitability = Gross Farm Income minus cash costs and depreciation.
[3] Cow-calf operations breed and sell beef calves into finishing systems for slaughter.

Cattle and input prices

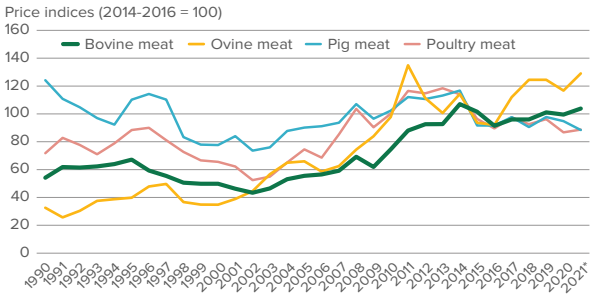
Cattle prices, which were already historically high, lifted further in 2019, principally due to the impact of African Swine Fever (ASF) on global protein supplies and the associated increase in Chinese import demand for all meats. Underpinning these record or near-record prices is rising demand for beef generated by population and income growth in developing countries, import liberalisation, pork shortage due to ASF and beef supply constraints.

In 2020, cattle prices (in USD) averaged slightly below those in 2019 – less than expected due to the lower USD and continued strong China demand. The fall was due to due to the impact of COVID-19 on economic growth, incomes and consumer spending; travel (locally and internationally); the restriction or even closure of foodservice operations in most countries and supply chain disruptions. The cattle price impacts of COVID-19 varied enormously across countries determined by the extent of the disease, government lockdown and social distancing measures, the extent and effectiveness of Government stimulation packages and the importance of the most-affected sectors of the economy, especially foodservice, international business travel and tourism.

Therefore, meat prices decreased overall in 2020, declining from March/April onwards, due mostly to the impact of COVID-19 on global foodservice demand. Beef and sheepmeat, being the dearer meats and most dependent on foodservice channels have been the most severely impacted (see Figure 2).

The *agri benchmark* Global Finished Cattle Price Index[4] was also higher in 2019, but still significantly below the 2014 record (see Figure 3) and remarkably similar to the FAO Bovine Meat Index (based export beef prices by major exporters).

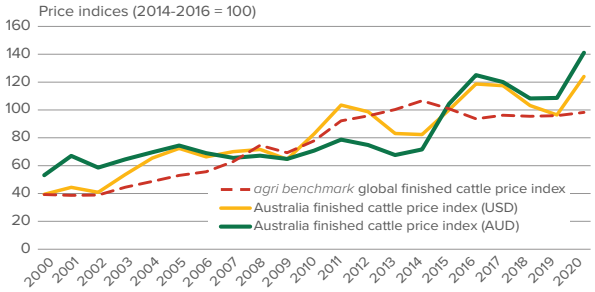
Figure 2: FAO Global Meat Price Indices (based on USD prices)



Source: FAO Meat Price Indices

* first two months of 2021

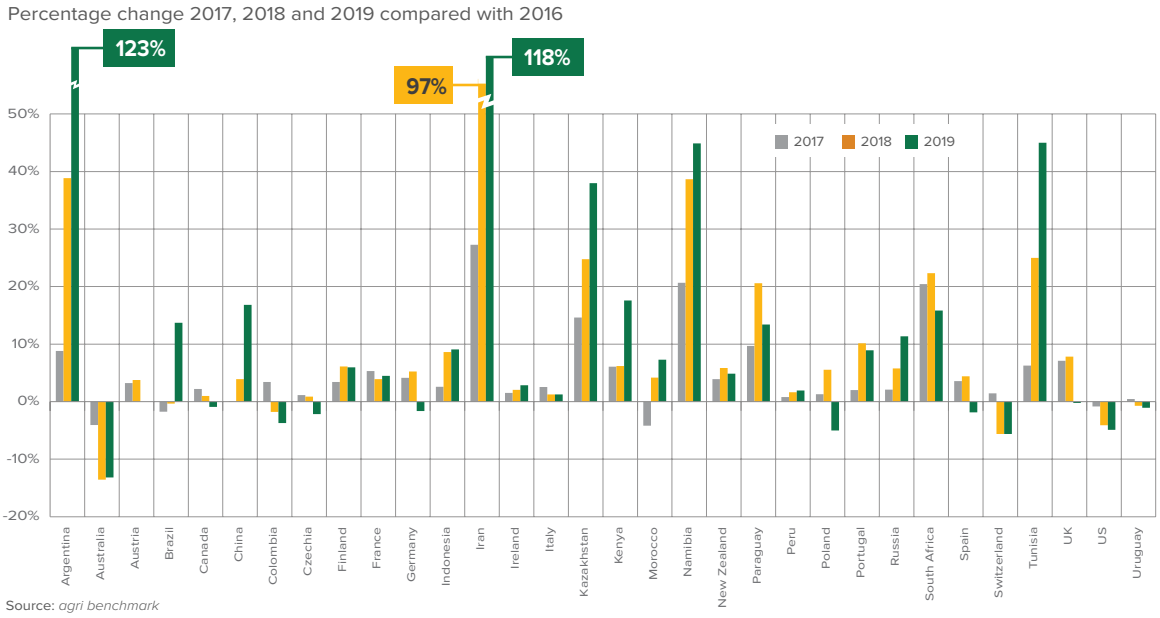
Figure 3: *agri benchmark* Global Finished Cattle Price Index and FAO Bovine Meat Index



Source: *agri benchmark* Finished cattle price index

Cattle prices expressed in local currencies rose in all countries in the three years to 2019, most notably in Argentina, Brazil and China. The only major exceptions were in Australia (due to drought impacts) and in the US (due to supply growth and lower feed costs).

Figure 4: Domestic cattle price movements 2016–19 (national currencies)



Source: *agri benchmark*

[4] *agri benchmark* The *agri benchmark* Global Finished Cattle Price Index represent average on-farm cattle prices collected by *agri benchmark* from all member countries, weighted using country production to produce global price indices. A short index description is available on the agri benchmark website at http://www.agribenchmark.org/agri-benchmark/news-and-results.html.

In a major divergence from the norm, Australian cattle prices have not followed global or US cattle and beef export prices over the past decade, due to the dominant influence of severe weather events on Australian supply and cattle prices. These events include:

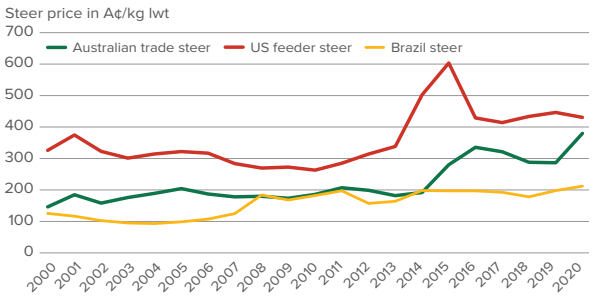
1. 2012–14 – severe drought kept Australian cattle prices low, at a time when the US prices were rising to a record on the back of stronger local and export demand, higher grain costs and moves to rebuild the US herd.
2. 2015–17 – the depleted herd and breaking of the drought caused Australian prices to rise to record levels, while US prices declined, largely due to rising local beef and meat supplies.
3. 2018–19 – Australian cattle prices declined again (though remained historically high) due to another severe drought, while US prices lifted as they were assisted by ASF from August 2018.
4. 2020 – Australian cattle prices increased and held at record levels as the drought eased and supplies fell, while COVID-19 lowered demand and the prices of US cattle (a combination of the foodservice closures, fall in economic activity and cut in processing capacity).

The 2018-19 drought was one of the most widespread and severe droughts ever recorded in Australia, covering over two thirds of Australia's surface area and with the majority of NSW, south-east Queensland and south-east SA (all major cattle areas) recording the lowest rainfall on record. This caused most beef cattle producers to turn off extra cattle (including breeding cows), leading to an unusually large 12% liquidation of the Australian cattle herd.

While Australian cattle prices predictably fell back from their record levels once the liquidation began, prices remained historically high throughout 2018 and 2019, another first for any severe drought period in Australia. These prices created a strong incentive for producers to buy feed or containment feed cattle prior to sale, maintaining condition, weights and carcase prices, but increasing farm costs, particularly for feed.

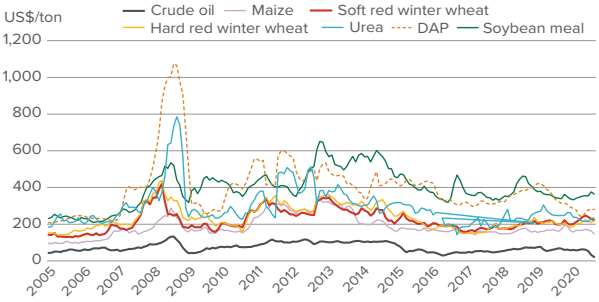
Globally, cattle farm input prices were generally stable or in decline in 2019, including for maize and oil (see Figure 6). The major exception to this was the increase in the cost of weaner cattle as input into finishing operations.

Figure 5 Australian, US and Brazil steer prices (in AUD)



Source: MLA's NLRS (Australia), Esalq/Cepea (Brazil), Steiner Consulting Group (US)

Figure 6 Cattle farm input prices



Source: The World Bank Global Economic Monitor
http://data.worldbank.org/data-catalog/global-economic-monitor

Australia

2020 global COVID-19 impacts

COVID-19 is an unprecedented event that has impacted all aspects of life, including consumption habits, around the world. The main impacts for beef and cattle identified by *agri benchmark* members at an online conference workshop in June 2020 are outlined below.

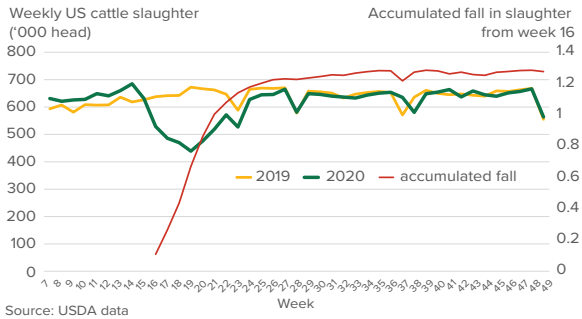
On meat markets:

- A fall in foodservice sales due to lockdowns and social distancing regulations.
  - Growth in takeaway beef sales from restaurants, cafes and fast-food outlets.
  - Large range of country-specific impacts on foodservice depending on the size and importance of the sector, the nature of foodservice outlets, severity and length of lockdowns/movement restrictions and social distancing regulations.
  - Lower demand and price for higher-end beef cuts globally.
- A substantial lift in retail sales of beef as people eat more at home.
  - a commensurate lift in demand and price for mince and lower-end cuts (e.g. chuck and round).
- Rapid growth in online beef sales.
- Overall, a decline in expenditure on beef and bovine carcase value due to lower consumer spending and shift to cheaper cuts, meats and foods.

Logistical supply chain disruptions and costs:

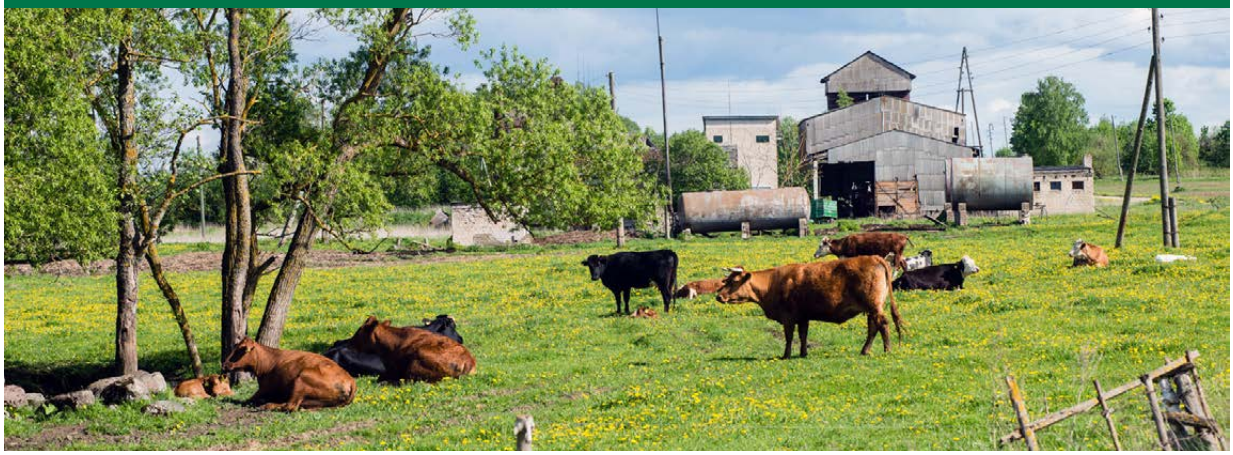
- Logistical problems have been prevalent in most, but not all, countries.
  - Much of this disruption is the reduction in processing capacity, identified to be most problematic in the US, Canada and some European countries, but of little impact in Australia.
- Some disruption to ports (increased freight rates) and significant reduction in air freight availability.
  - Accumulated cattle on farms and in feedlots in countries where slaughter capacity significantly reduced such as the US and Canada.
- The accumulated reduction in 2020 cattle slaughter in the US on 2019 slaughter since the COVID-19 processing disruptions began (week commencing 11 April 2020) stabilised by September at 1.3 million cattle, or an 8% fall, and remained at this level through to the end of 2020 (see Figure 7). If this backlog is to be cleared in the first half of 2021, it would take an increase of 8% in US cattle slaughter over that period (other things being equal), with US beef production up at least 6% (allowing for reduced weights as cattle are cleared), which would have a significant negative impact on US cattle prices. It could also imply a substantial temporary lift in US beef exports (and competition for Australian beef in Japan and Korea) – particularly if US consumer demand is weak at the time, as seems likely with potentially COVID-19 foodservice impacts continuing and reduced consumer incomes.

Figure 7: US cattle slaughter and accumulated fall post-COVID



Source: USDA data

Canada



On cattle markets:

- Some temporary disruption to physical cattle markets in most countries.
- Few significant restrictions on feed and livestock movements.
- Cattle prices generally down due to lower foodservice demand, especially severe where cattle processing capacity was disrupted.
  - The notable exception was in Australia, due to a big fall in cattle slaughter following the break of the severe 2018–19 drought and continued strong export demand.

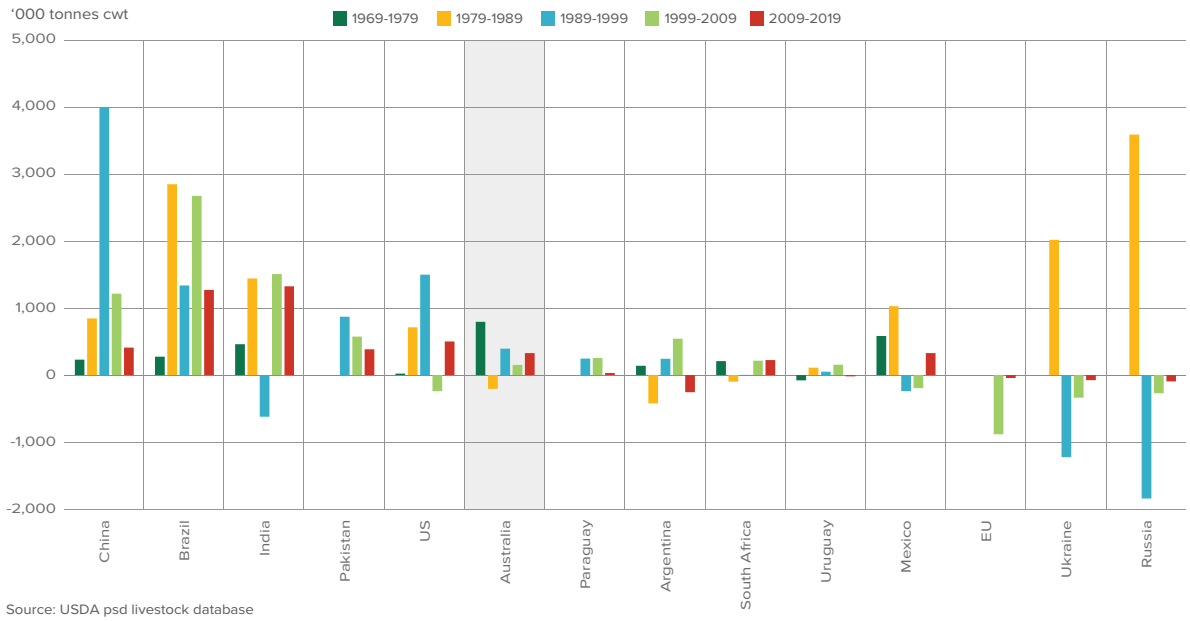
On global trade:

- Difficult to generalise about the impact of COVID-19 on trade globally, as it has been disparate country-to-country.
- Some fall in US exports due to supply disruptions but only a brief slowing in the growth of Brazilian beef exports.
- The impact on port activity (e.g. in China) appeared to have been temporary.
- There has been a fall in air freight as this had largely been carried on passenger planes.
- As at August 2020, the impact on Australian beef exports had been minor overall, with a 9% decline in export volume in line with the cattle and beef supply fall, but a 13% rise in value of exports (in part due to the export of more top end cuts displaced from the domestic foodservice market).

Global beef supply

Global beef supply growth slowed in the 10 years to 2019 (see Figure 8), most noticeably in South America, China and Pakistan. There were falls in production in some of the big producers, notably the EU and Russia, and only modest growth in the US, Mexico and Australia.

Figure 8 Beef production growth (last five decades)



Source: USDA psd livestock database

The explanation appears to lie principally in land, feed and environmental constraints, made worse by climate change – especially droughts in the Southern Hemisphere. The rise in global cattle and beef prices over the last 10-15 years has not yet had an appreciable impact on global beef supplies, with the only considerable expansion occurring in India and Brazil. Even the cyclical build-up in the US herd appears to have run its course.

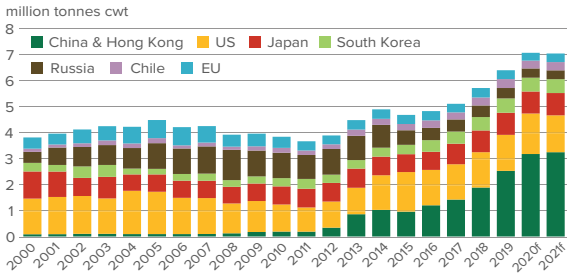
Common Agricultural Policy reforms are also still impacting production of both dairy products and beef in the EU, while foot-and-mouth disease outbreaks are further affecting supply in South Africa and Namibia.

2021 beef and cattle uncertainty

The *agri benchmark* Conference 2020 and OECD-FAO's 2020 agricultural projections again highlighted the strength of global beef and cattle markets and general positive profitability based on:

- income and population growth and urbanisation and the associated expansion in demand for beef in the growing middle-income segment of developing countries
- the global fall in pork supply due to ASF in east Asia (especially China)
- growing China import demand (see Figure 9)
- steadily falling Japan and South Korea beef tariffs
- resource and environmental constraints on beef supply growth.

Figure 9: Beef imports by the top seven importers



Source: USDA psd livestock database f: USDA forecast

However, COVID-19 has provided a most uncertain backdrop for all aspects of the global and local beef and cattle markets for the short- to medium-term. Without knowing when COVID-19 will be eradicated (or at least contained), it is almost impossible to accurately predict global beef demand trends in the next few years.

There is an expectation that most of the above impacts will recede in 2021, as:

a) as an effective vaccine is rolled out and businesses and people movement can return to normal; and

b) in countries without an effective vaccine cover, a sustainable compromise is reached between minimising deaths from COVID-19 and restoring economic activity.

An early rollout of the vaccines in the major economies could see economic growth rebound quickly in 2021 and beyond as per the recent IMF projections (IMF, World Economic Outlook Update, April 2021), while a slow rollout will have an on-going dampening effect on incomes and foodservice activity and so demand for beef and cattle.

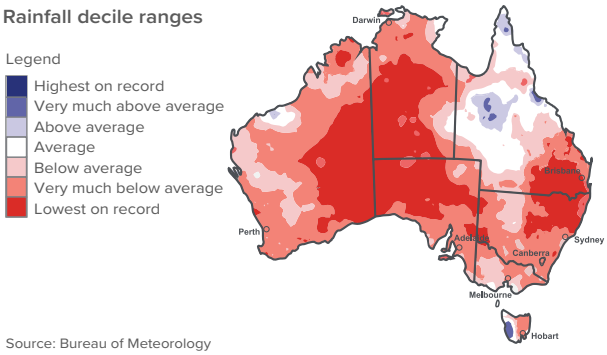
A further risk factor that has been increasing in recent years is the threat of a rebuilding of import barriers (both official and technical). Market liberalisation has been a major driver expanding global beef trade over the past 30 years (commencing with South Korea and Japan in the late 1980s and the GATT Uruguay Round Multilateral Trade Agreement in April 1994). However, there is now a high risk that the world will trend more towards farm subsidisation and protectionism supported by an increase in bilateral agreements.

Financial performance of beef cow-calf enterprises

Seasonal conditions dictated the financial performance of Australian farms in 2019, as much of the country experienced below-average rainfall, and in some areas, they received their lowest rainfall on record (see Figure 10).

Despite these conditions, the managers of the *agri benchmark* farms have adapted and responded to seasonal conditions and nearly all were able to achieve at least medium-term profitability[5].

Figure 10: Map of rainfall deciles 2019

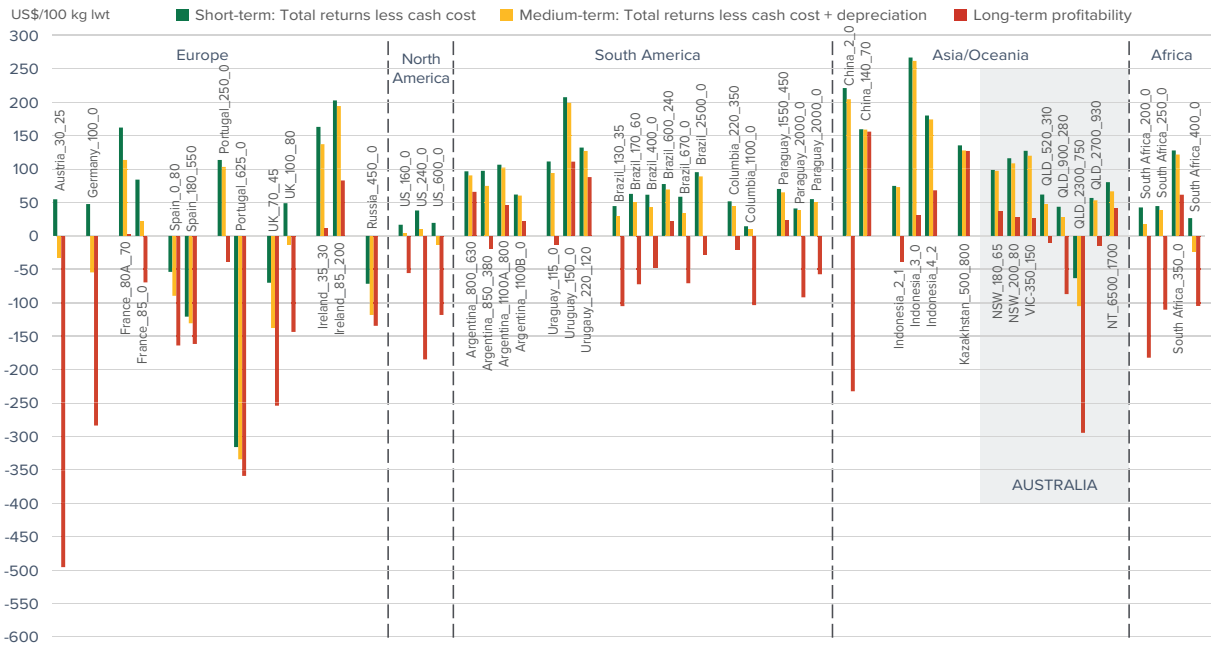


Source: Bureau of Meteorology

Ireland

[5] Medium-term profit: Total returns less cash cost and depreciation

Figure 11: Medium-term profitability of *agri benchmark* cow-calf farms



Source: *agri benchmark*

Many of the cow-calf beef farms were in areas suffering drought conditions, with some experiencing consecutive years of dry seasons. Consequently, the number of breeding cows has decreased from potential carrying capacity and the original farm numbers. The *agri benchmark* ID number specifies the number of breeding cows followed by the number being finished on the property, for example AU_900_280 originally had 900 breeding cows and 280 weaners that were finished on the property in a finishing facility. However, dry conditions have facilitated the reduction in breeding cows to 647. Table 1 specifies the numbers, location, and seasonal conditions for the *agri benchmark* farms in 2019.

Table 1: *agri benchmark* cow-calf farm locations, breeding cow numbers and seasonal conditions

agri benchmark farm ID	Location	Number of breeding cows 2019	Seasonal conditions
AU_6500_1700	Northern Territory	6,485	2019 saw one of the lowest rainfall years on record which was then followed by the latest onset to the start of the 2020 wet season in recorded history, many areas particularly in the south of the region saw a failed wet season. Grazing pressure increased on the already stretched watered areas as natural waters dried up. Consequently, a lower percentage of younger sale animals reached target weights and cow mortality rate increased.
AU_2300_750	Queensland Gulf	2,842	Severe flooding event increased mortality rates
AU_900_280	Queensland Burdekin	647	High mortality rates in 2018 due to severe drought that continued into 2019
AU_2700_930	Queensland Fitzroy	2,444	An annual average of 600 mm. In 2019, a below average rainfall of 458 mm, but distribution meant average conditions were reported.
AU_520_310	Queensland Darling Downs	626	A poor season with below average rainfall of 480 mm. An annual average is 650 mm.
AU_180_65	New South Wales Northern Tablelands	54	All dry cattle were either sold or agisted because of drought. Significantly lower rainfall with much of the region receiving only 30% of long-term average annual rainfall, coupled with max and min temperatures well above long-term average, meaning severe drought and water restrictions. Conditions deteriorated from March 2019 onwards.
AU_200_80	New South Wales Tablelands	180	A very dry start to the year, as drought conditions continued. Pasture growth responded well to rain in April and warm conditions. Drought management strategies included selling surplus cattle and early weaning of calves to reduce feed requirements. Fertilised pastures.
AU_350_150	Victoria Western District	350	The region experienced a very dry summer and autumn which required supplementary feeding early in the season at relatively high feed prices. This was followed by a mild winter and a good spring.

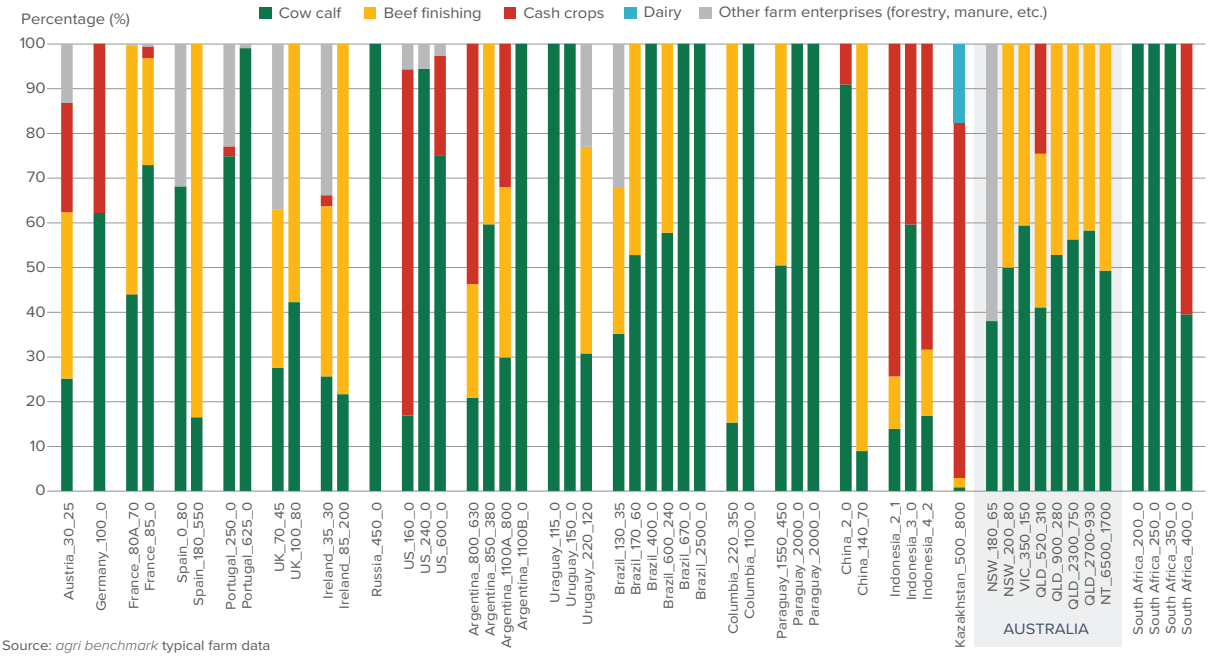
Financial performance for the *agri benchmark* farms is examined first by how these farms derive their returns and what factors influence their productivity to generate income from the cow-calf enterprise. Secondly, costs are analysed – *agri benchmark* separates costs into direct enterprise costs, overhead costs, paid labour, rents paid, interest paid and depreciation. Finally, the profitability of the typical cow-calf farms represented by the *agri benchmark* data is discussed.

Financial performance for farming businesses depends on the income that can be generated from the price received for a product multiplied by the amount produced, often referred to as yield. Profit is the amount remaining after costs are paid.

Cow-calf returns

The *agri benchmark* cow-calf farms are generally mixed farming enterprises and total returns are from a composition of enterprises. For many this includes beef finishing. Nearly all the Australian farms have a beef finishing enterprise (see Figure 12). Other enterprises include cash crops, dairy and other farm enterprises. For the farm NSW_180_65, this is a Merino sheep enterprise with wool sales.

Figure 12: Percentage composition of returns



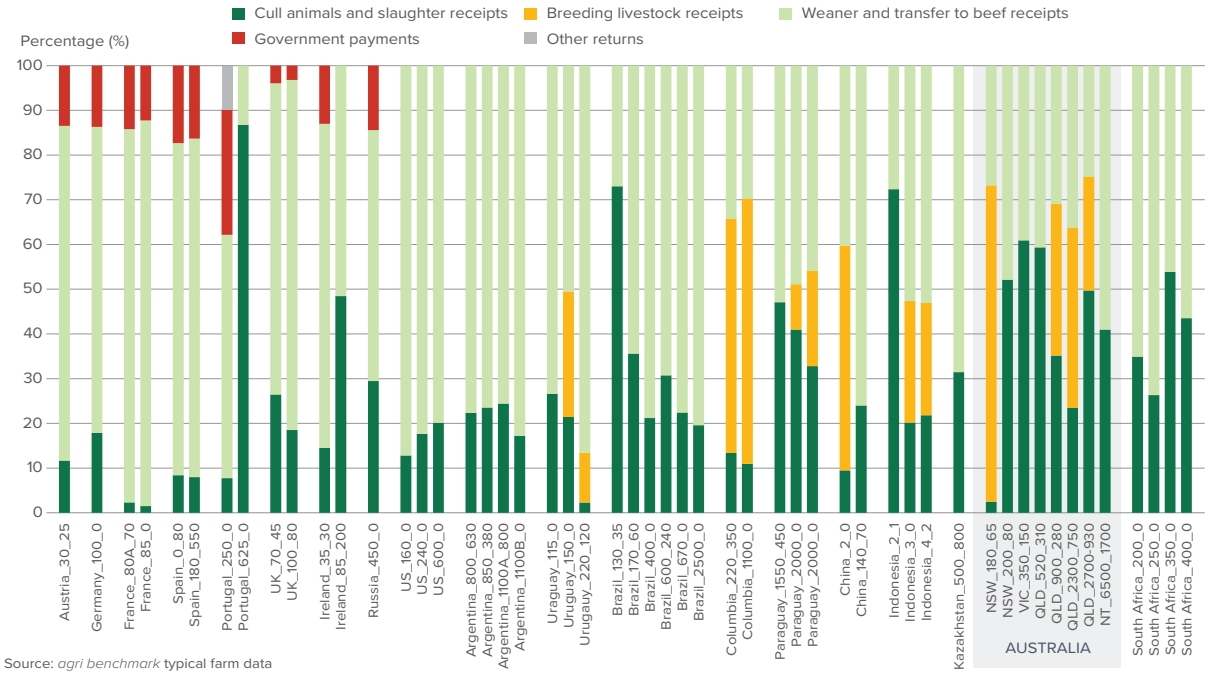
Source: *agri benchmark* typical farm data

By examining the returns from the cow-calf enterprise in more detail in Figure 13 and Figure 14, it is evident that returns are heavily reliant on income from weaner receipts. For 37 of the 53 countries, more than 50% of returns are from weaner receipts, often an internal transaction within the farm as most farms breed their own calves to finish. This cost is allocated to the finishing part of the business. Most of the Australian farms, except the farm in the Northern Territory, derived most of their income from cull animals and breeding stock in 2019 as they were reducing stock numbers to cope with severe drought conditions.

Indonesia, Uruguay, Columbia, Paraguay and China have farms that sell breeding cows to other farm enterprises, the only Australian farm this is typical for is QLD_2300_750.

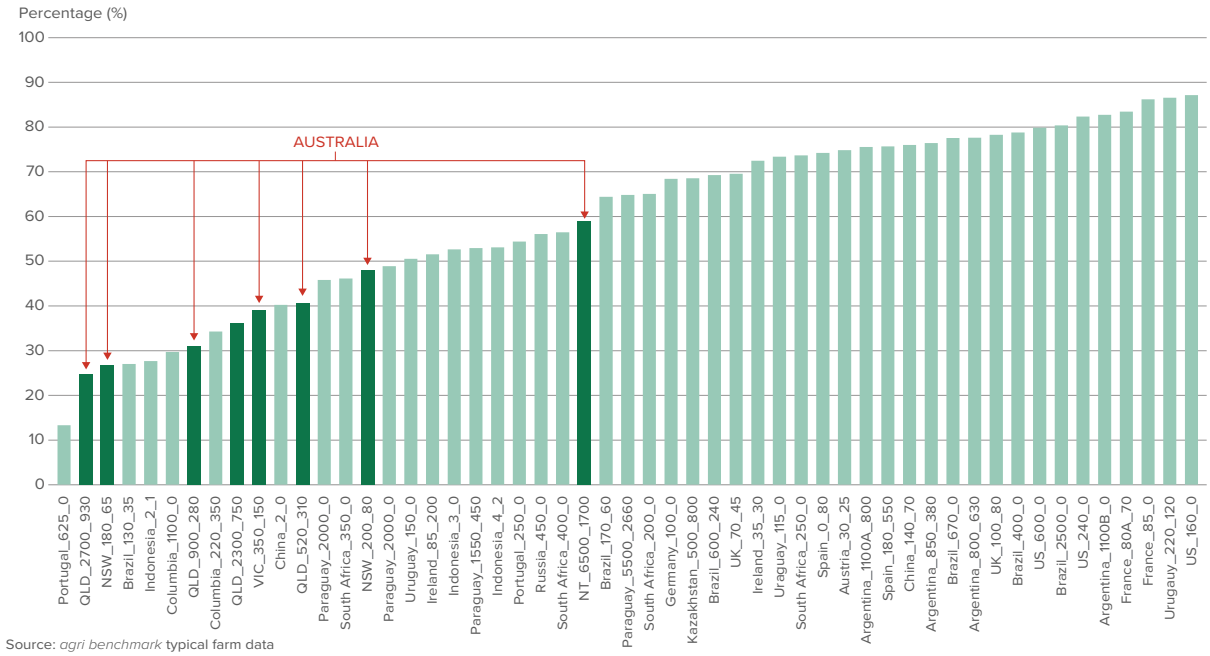
Paraguay

Figure 13: Percentage composition of returns from the cow-calf enterprise



Source: *agri benchmark* typical farm data

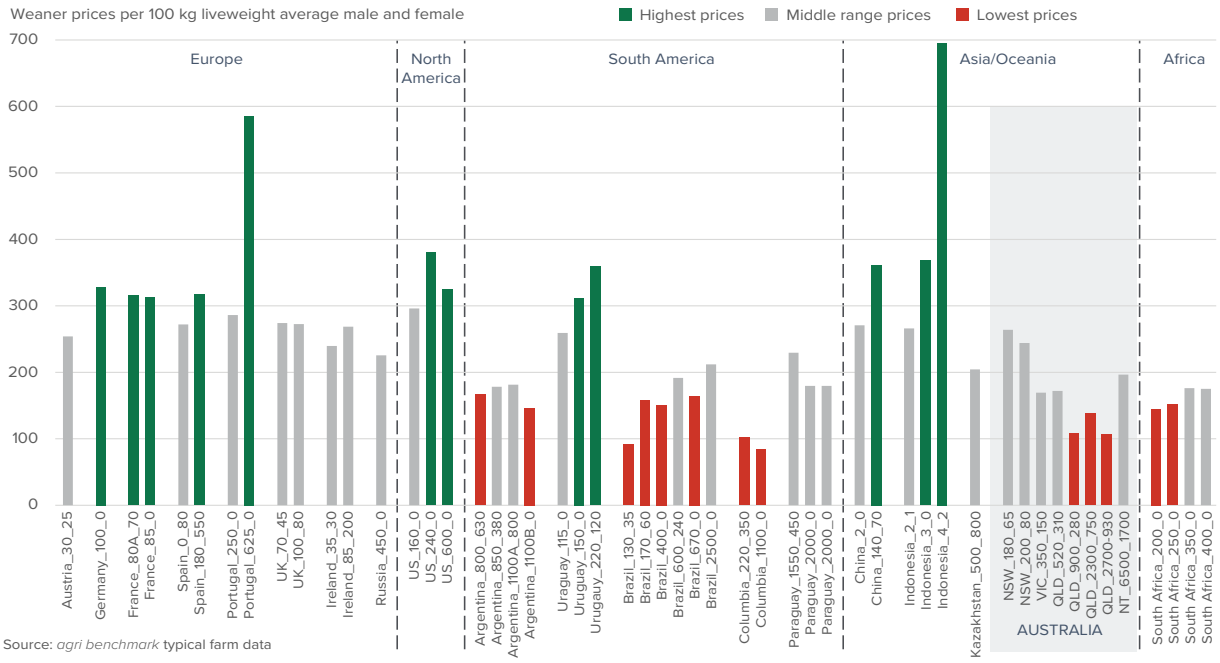
Figure 14: Percentage of weaner and transfer to beef finishing receipts



Source: *agri benchmark* typical farm data

As weaner income is more than 50% of the total revenue for the cow-calf enterprise, it follows that the weaner price has a strong influence on the total overall income and profit of the enterprise. The average prices for male and female weaners ranges from US$84 per 100 kg liveweight (lwt) in Colombia to US$785 per 100 kg lwt in Switzerland (not included in Figure 15).

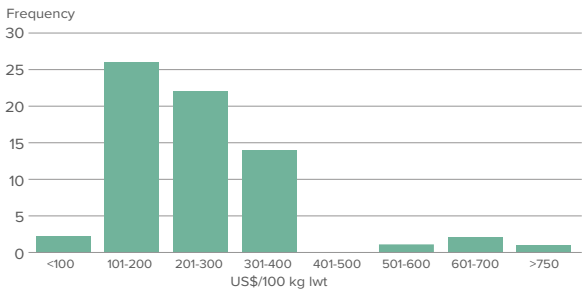
Figure 15: Weaner prices per 100 kg lwt average male and female



Source: *agri benchmark* typical farm data

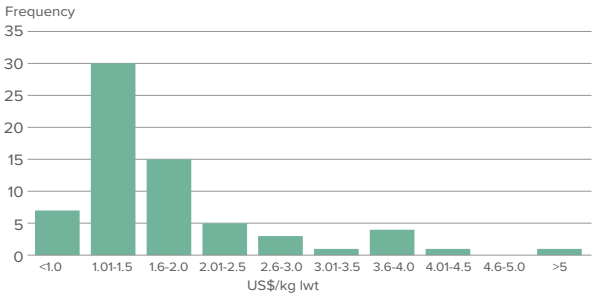
Australian weaner prices varied. Most were mid-range (see Figure 15), however, three of the four Queensland farms received prices for their weaners that were in the 25th percentile, a consequence of drought conditions and selling weaners early. Most countries receive prices between US$100 and US$400 per 100 kg lwt, Figure 16.

Figure 16: Frequency of weaner prices per 100 kg lwt average male and female



Source: *agri benchmark* typical farm data

Figure 17: Frequency of cull cow prices per kg lwt (US$)



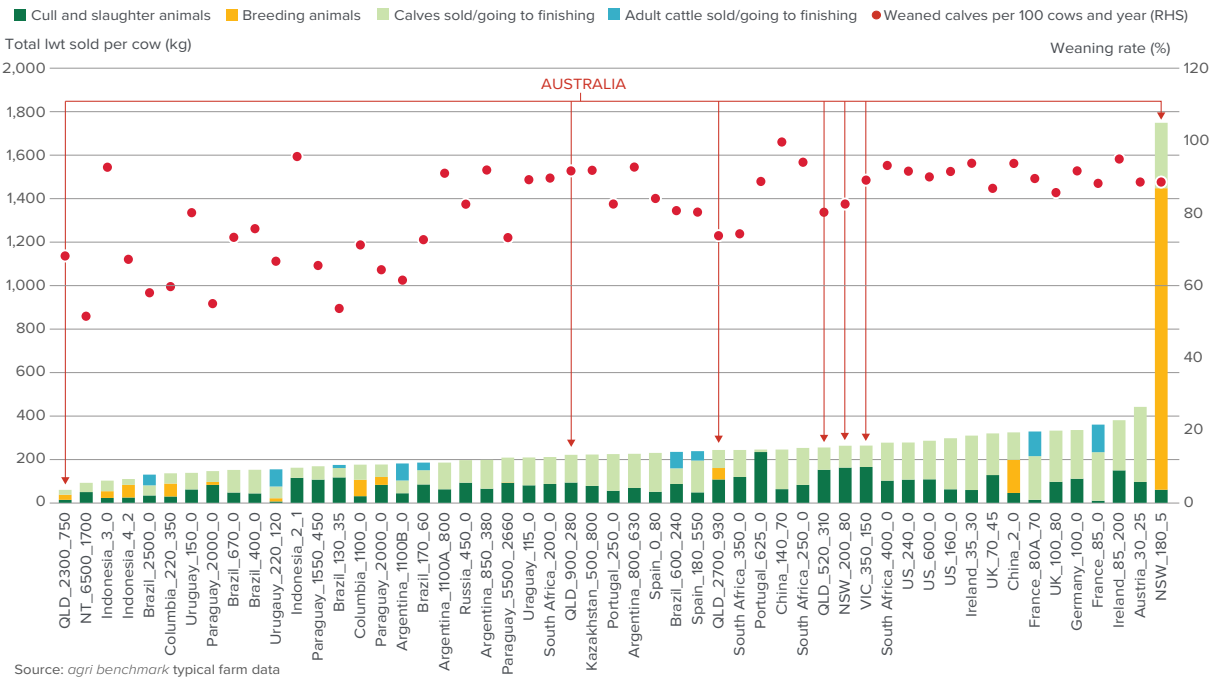
Source: *agri benchmark* typical farm data

Cull cow prices had significant influence on the Australian farms in 2019, as this was a large proportion of the returns to the enterprise, and for some farms it was nearly 60% of total enterprise income. Four Australian farms received cull cow prices between US$1.6 and US$2.0 per kg lwt and four between US$1.01 and US$1.5 per kg lwt, like most global farms.

Another component that effects the returns for the cow-calf enterprise, besides price, is the yield – total liveweight sold (kg) also related to the weaning rate (%).

Australia

Figure 18: Total liveweight sold per cow (kg) and weaning rate (%)

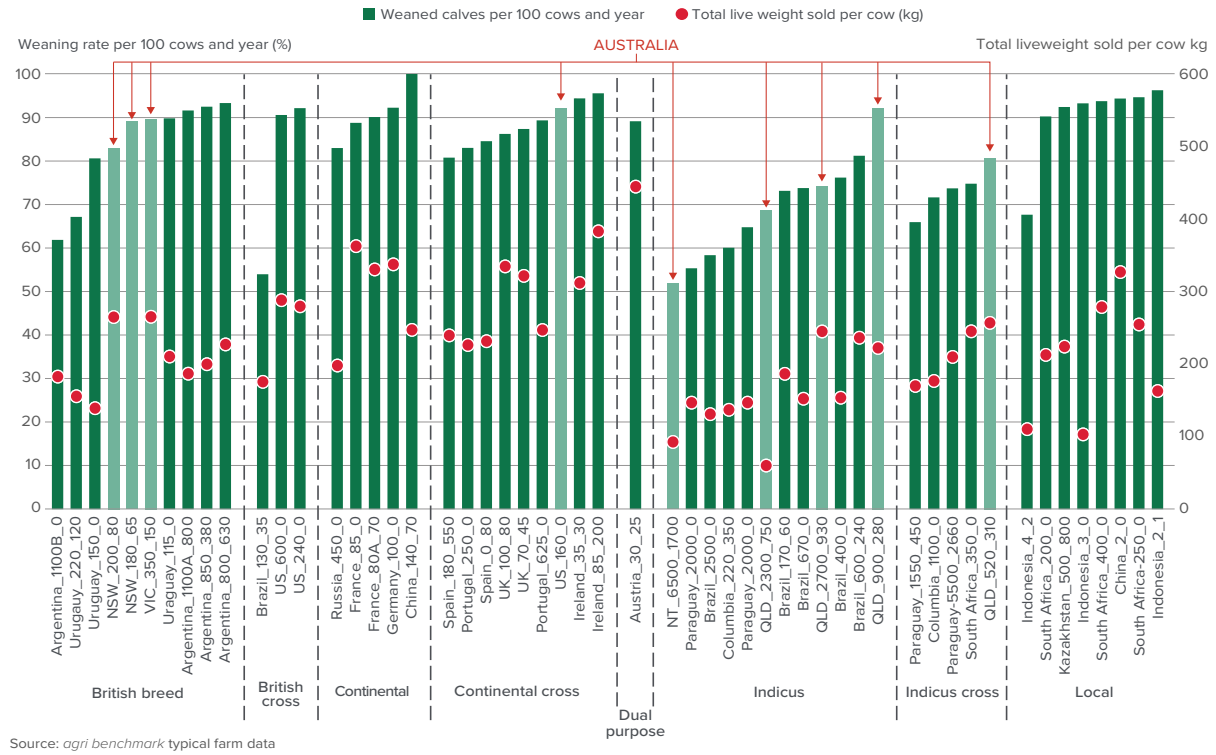


Source: *agri benchmark* typical farm data

With just a few exceptions, higher weaning rates above 80% are associated with total liveweight sold, but the Australian farms confused this relationship in 2019 due to high levels of cull and slaughter animals. For example, the Queensland farm in Fitzroy QLD_2700_930 had a weaning rate below 80% but total liveweight sales per cow above 200 kg due to the sale of breeding cows. The farm NSW_180_65 sold 1,756 kg lwt per cow which was a result of destocking and selling breeding cows.

The breed and farming system has a large influence on total liveweight sold (see Figure 19 and Table 2). The Indicus breed tend to have the lowest average weaning rates, mostly due to the environment they are located in and the fact they are often unmanaged. This breed is suited to low rainfall extensive systems and is often used in tropical environments for their ability to cope with the heat and frequently harsh conditions.

Figure 19: Number of weaned calves per 100 cows and year, and total live weight sold per cow



Source: *agri benchmark* typical farm data

The variation in the total liveweight sold for each breed category in Figure 19 in relation to the number of weaned calves per 100 cows is a product of management, indicating there is potential to improve productivity through management strategies for many farms. The continental breeds have the highest average total liveweight sold per cow at 294 kg, although the dual purpose was 443 kg (see Table 2). The Continental cross were next with 287 kg lwt.

Figure 19 clearly illustrates the variety of cow-calf farming systems within Australia, which reflects the varied climatic conditions experienced. The British breeds are used in the more Temperate and Mediterranean type climates in the southern half of Australia. The NSW and Victoria *agri benchmark* farms have British breeds, while the northern beef herd is predominantly Indicus and Indicus cross breeds to cope with the high temperatures and conditions.

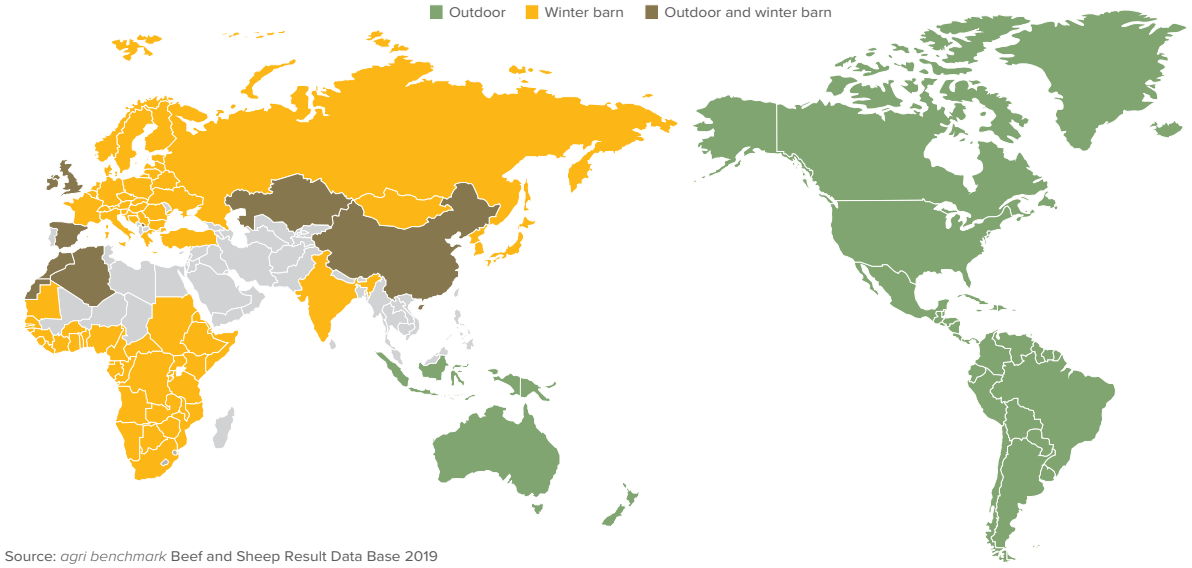
Globally, cow-calf operations are mostly pasture-based and silage, and for most countries, cows are kept outside all-year-round, although some are fed and housed in barns throughout the winter to avoid severe conditions and soil damage from pugging (see Figure 20).

Table 2: The average and range of total liveweight sold per cow by breed for selected *agri benchmark* farms

Breed	Average total liveweight sold per cow (kg)	Range in total liveweight sold per cow (kg)
British Breed	203	138–264
British Cross	247	175–287
Continental	294	197–361
Continental Cross	287	225–381
Dual purpose	443	443
Indicus	161	60–244
Indicus cross	211	169–256
Local	208	102–325

Source: *agri benchmark* typical farm data

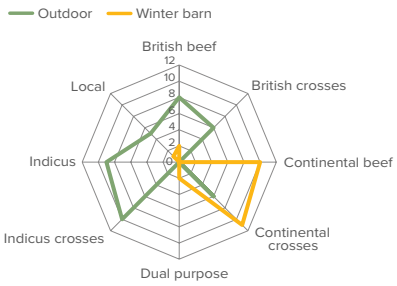
Figure 20: Distribution of global cow-calf farming systems



Source: *agri benchmark* Beef and Sheep Result Data Base 2019

The farming system and breed are related. The Continental breeds used in Europe are often housed in winter whereas the British breeds, their crosses and Indicus type breeds are used in outdoor systems. Figure 21 illustrates the number of farms using outdoor and winter barn systems and which breed. For example, 10 farms are using the Continental breed and have a winter barn system, and eight farms are using British breeds and an outdoor system.

Figure 21: Breed and farming system

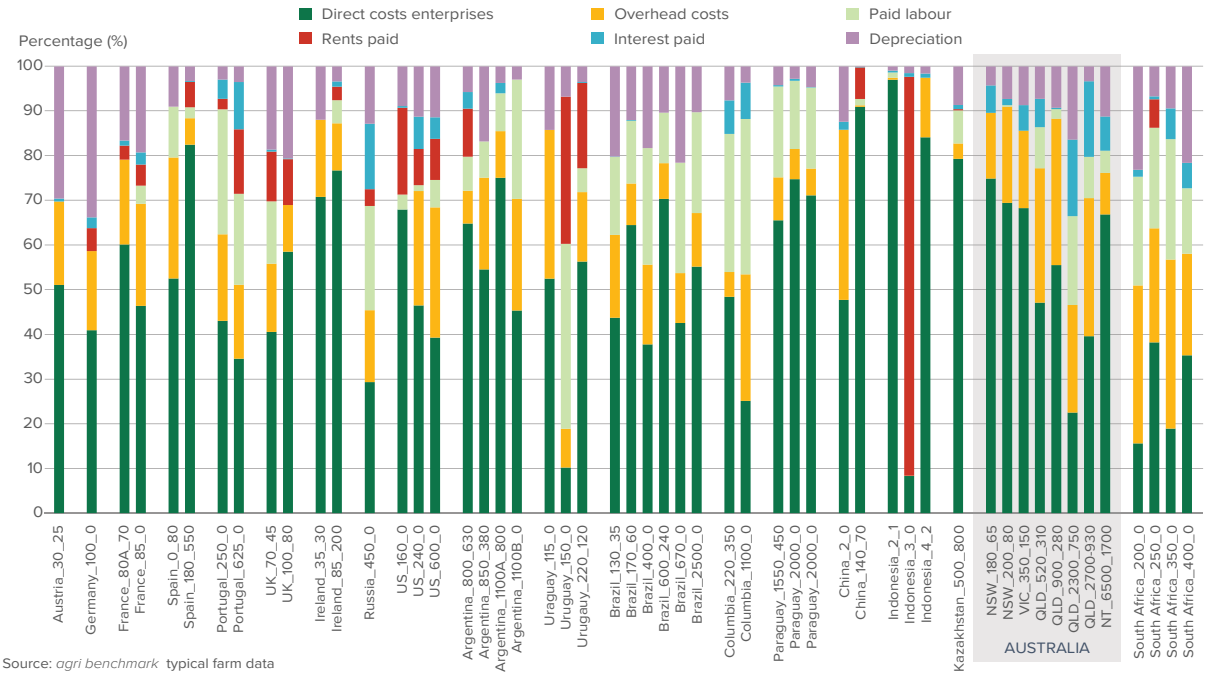


Source: *agri benchmark* typical farm data

Costs for the cow-calf enterprise

The cost structure for the cow-calf enterprise (figure 22) is separated into direct enterprise costs (another name for these is variable costs because they vary with each production unit produced – overhead costs which are fixed costs would generally exist even without any enterprise activity on the farm). Rents are paid for leasing land, and interest is the expense on borrowed funds. Straight line depreciation is calculated based on the initial value of machinery and its lifetime.

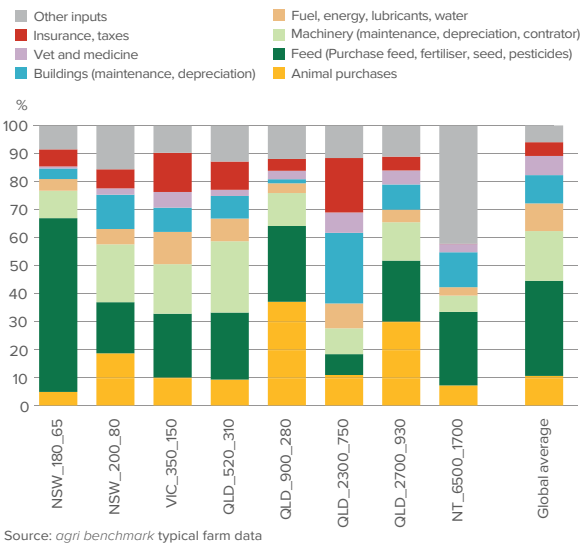
Figure 22: Percentage composition of the cost structure 1000 US$/farm



Source: *agri benchmark* typical farm data

The direct costs, also called non-factor costs, are the largest percentage of total costs for most of the Australian farms, although for QLD_2700_750 and QLD_2700_930 direct costs are less than 50% of total costs. Figure 23 details the non-factor costs further to show the percentage composition. The significant feed costs for NSW-180-65 are notable and a reflection of the dry seasonal conditions experienced in this region.

Figure 23: Percentage composition of non-factor costs for the Cow-Calf enterprise US$/100 kg lwt

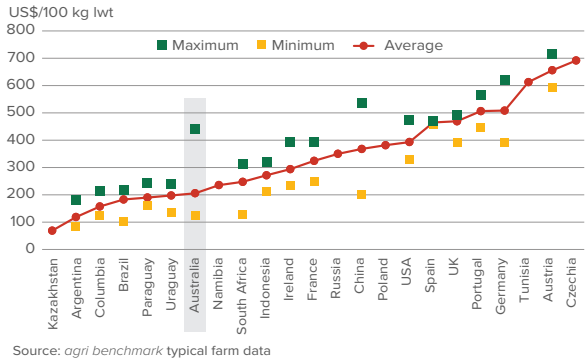


Source: *agri benchmark* typical farm data

Most countries produce beef for less than US$400 per 100 kg lwt (see Figure 24). This includes Australia, which has an average cost at US$203 per 100 kg lwt, however, there is a high degree of variation between the farms in Australia – the minimum cost is US$122 per 100 kg lwt and the maximum is US$438 per 100 kg lwt – in part a function of the severity (and variation) of the drought faced in 2019. South American countries and Kazakhstan cost of production on average is below US$200 per 100 kg lwt (see Figure 23). The US and European countries have high costs of production in comparison – above US$400 per 100 kg lwt.

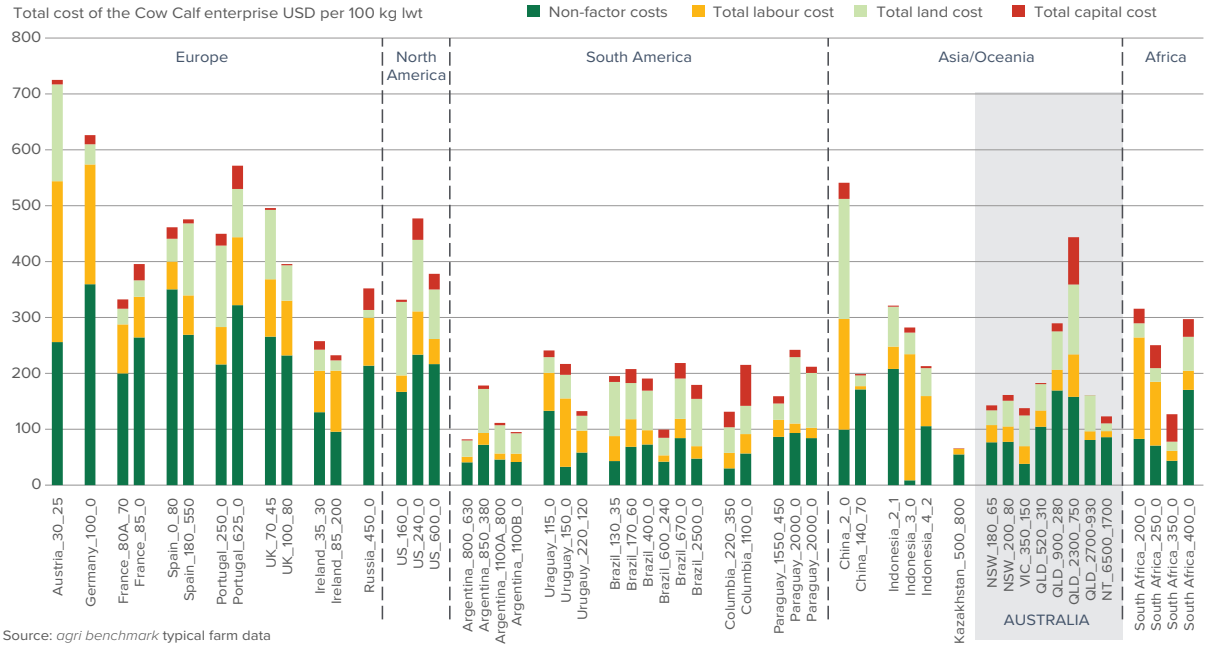
These figures are explained further by Figure 25, where it is evident the cost of production for South American countries is lower than others, as they generally have lower direct enterprise costs (although Paraguay are similar to Australia's), and their total cost of production is higher. Examining Figure 25 shows how most Australian farms' cost of production is below US$200 except two of the farms in Queensland.

Figure 24: Average cost of the cow-calf enterprise by factor and non-factor costs



Source: *agri benchmark* typical farm data

Figure 25: Total cost of cow-calf enterprise US$/100 kg lwt



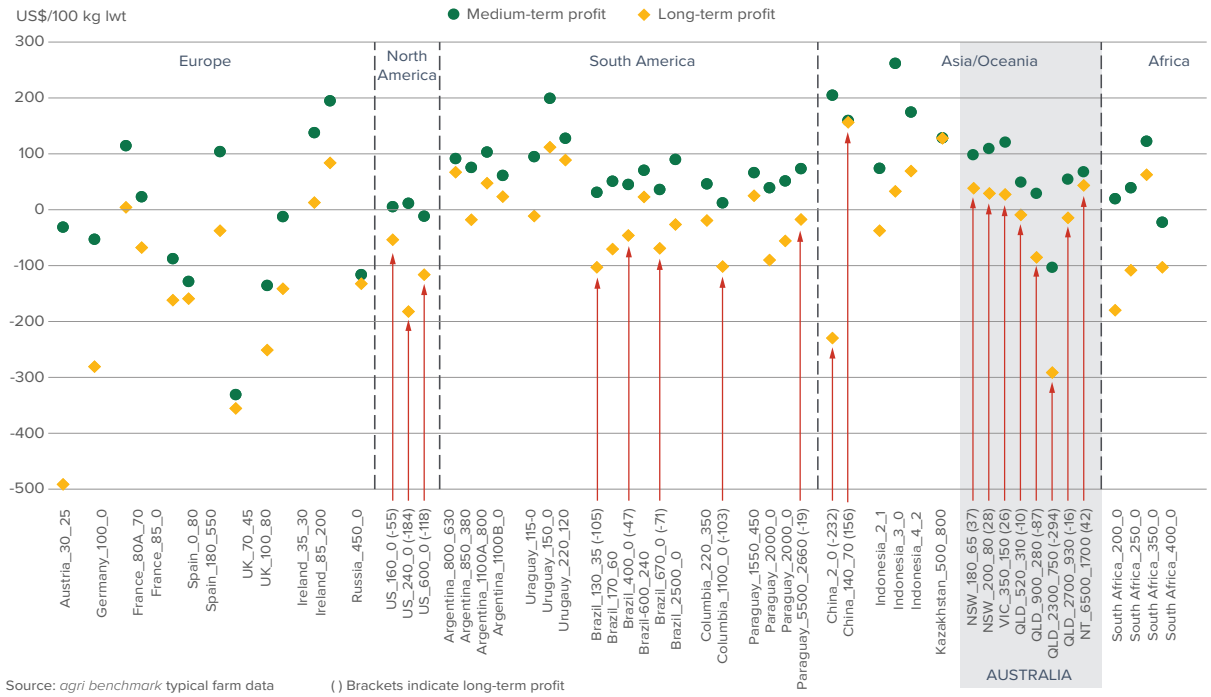
Source: *agri benchmark* typical farm data

Bringing all these figures together gives the ability to calculate and understand what has driven profitability for global beef farms. Returns from the cow-calf enterprise is generated from total liveweight sold multiplied by the price received per kg of liveweight ($ per kg lwt). Total liveweight produced is a function of the weights and body-condition of cows and weaning rates (%).

United Kingdom

The profitability results shown in Figure 26 are the total income (total liveweight sold x price in $ per kg lwt) minus the production costs. For medium-term profit, these costs include operating costs and depreciation. For long-term profit, the opportunity cost for land and labour is included in the cost of production.

Figure 26: Medium and long-term profit US$/100 kg lwt



Source: *agri benchmark* typical farm data ( ) Brackets indicate long-term profit

Many of the European countries do not obtain medium-term profitability, which is defined as Total Returns minus Cash Costs and Depreciation. Long-term profitability includes the Opportunity Cost of land and when this is included, all North American farms and twelve out of the nineteen farms in South America do not achieve a return on investment. Three of the four Argentina farms, one of the three farms in Uruguay, one farm in Brazil and one in Paraguay achieve long-term profitability.

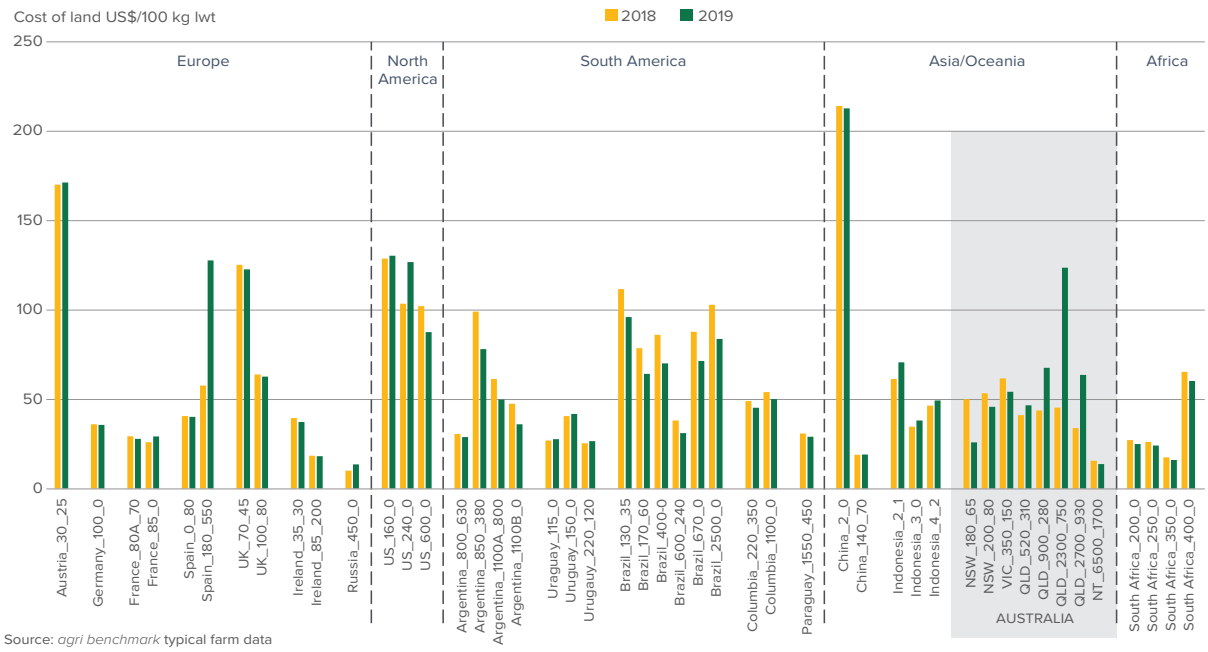
Farms in Australia are mixed. The property in Queensland Gulf did not generate enough income to achieve medium-term profitability, as this property suffered with severe flooding and high mortality rates. The other three Queensland properties achieved medium-term profitability despite severe drought conditions, but not long-term. This is not unusual, as global beef farms historically tend not to achieve long-term profitability, the high (and rising trend in the) value of land in relation to productivity results in this disparity but is a consequence of personal choices to continue farming for lifestyle and personal goals not always related to maximising financial outcomes.

The average opportunity cost of land[6] for the Australian *agri benchmark* farms in 2019 was 55 US$ per 100 kg lwt similar to average for the South American *agri benchmark* farms at 58 US$ per 100 kg lwt (figure 27). The cost for land is important to monitor as increasing competition from urbanisation and/or more profitable enterprises have the potential to cause beef production to move into increasingly marginal grazing and production country.

In NSW and Victoria, the cost of land decreased between 2018 and 2019, probably a reflection of the difficult seasonal conditions. Despite similar conditions in Queensland, the cost of land increased between the two years.

[6] Opportunity cost = interest on own capital + calculated rent on land + calculated cost of own labour.

Figure 27: Cost of land US$/100 kg lwt



Source: *agri benchmark* typical farm data

Notably, the cost of land in Australia is comparatively low, it is more than half the cost for the farms in the US and some farms in Brazil. Interestingly, the cost of land in Queensland has increased in the last twelve months on extensive properties running Indicus cattle and is now higher than the cost of land in NSW and Victoria, per 100 kg live weight.

Key findings for 2019-2020 *agri benchmark* cow-calf farms:

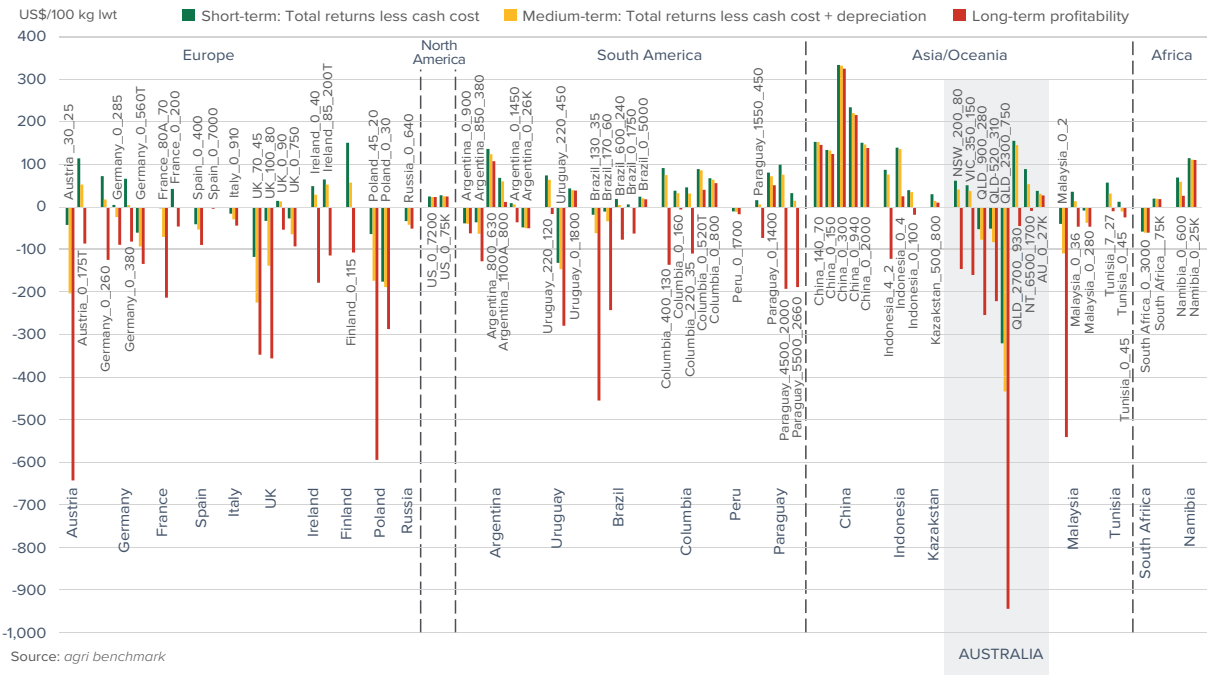
- There is significant variability between the cow-calf farming systems within Australia, reflected in a similar diversity in breeds and physical performance.
- There appears to be potential to improve productivity for Australian beef cow-calf farms, particularly as farms emerge from drought.
  - Severe drought conditions have affected Australian cow-calf performance and increased the vulnerability of beef farms' financial capacity, but they have adapted to circumstances and mostly managed to generate medium-term profitability in 2019.
- Severe drought and floods caused additional stock losses and forced extra culling of cows and early offloading of weaners in Queensland farms in 2019, impacting receipts and performance.
- The relatively low cost of production for beef farms is a key strength for their financial viability and global competitiveness in an export focused market.
- Herd rebuilding will be a priority in 2020 and 2021 as seasonal conditions improve.

Financial performance of global beef finishing farms

Profitability

There was a further deterioration in the financial performance of beef finishing farms in 2019 compared to 2018 and 2017. Nearly all farms achieved short-term (cash) profits in 2017, whereas by 2018 this decreased to 64% and in 2019 to 60%.

Figure 28: Short-, medium- and long-term profitability for beef finishing enterprises (100 kg/cwt sold)

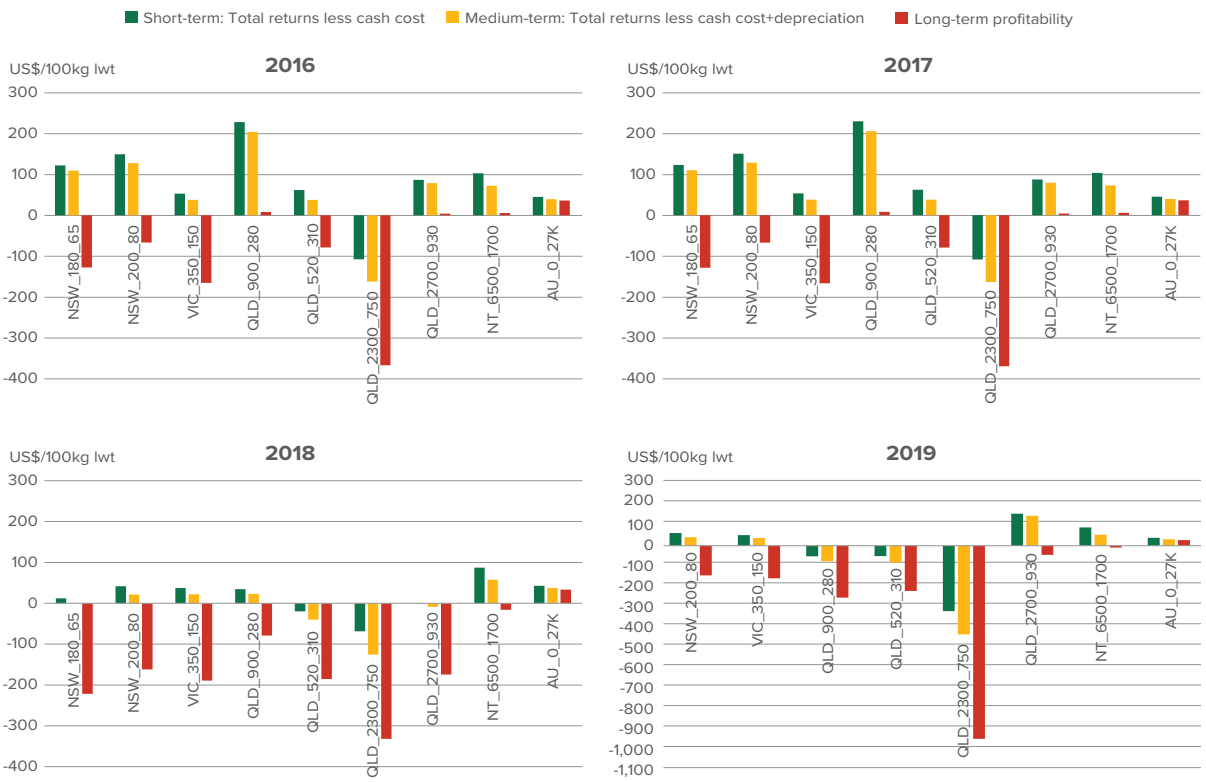


The performance of Australian farms was mixed. Only the specialised feedlot achieved long-term profitability. Four of the other farms achieved medium-term profitability, but three of the four Queensland farms only achieved short-term profitability – a reflection of the difficult seasonal conditions in 2019 with drought and flooding in these areas.

Figure 29 compares the results in farm performance of the beef finishing farms for the last four years. Note that NSW_180_65 was not included in the 2019 data because seasonal conditions were so severe they sold calves as weaners and did not finish any steers.

United States

Figure 29: Short-, medium- and long-term profitability for Australian beef finishing enterprises, 2016 to 2019 (US$/100kg lwt)



Source: *agri benchmark* typical farm data

Figure 29 provides an insight into the risk beef finishing farms are coping with in Australia, reliant on favourable seasonal conditions and prices they need to manage costs and achieve a profitable outcome. However, as 2019 demonstrates, circumstances can be such that profits are not possible. NSW and Victoria appear to be lower risk areas compared to the more extensive systems in Queensland. The Northern Territory farm and the specialised feedlot have consistently performed well in the last four years. Economies of scale partly explain these results, and for the feedlot more variables can be controlled so certainty of decisions help to generate profit.

Global beef finishing enterprises have a small amount of diversification in their income with other enterprises like cash crops, dairy and sheep. However, many are reliant on cow-calf income and finished beef, therefore they rely on a strong beef market for their gross farm income (GFI). 53 of the 73 farms (73%) in Figure 30 rely on a combined cow-calf and beef finishing income for more than 80% of their GFI, and for 85% of the farms 60% of their GFI is generated from combined cow-calf and beef finishing income.

The Australian farms are often wholly reliant on income from their beef enterprises, as the cow-calf enterprise supplies beef into the beef finishing enterprise. All except QLD_520_310 were completely reliant on beef income in 2019.

Spain

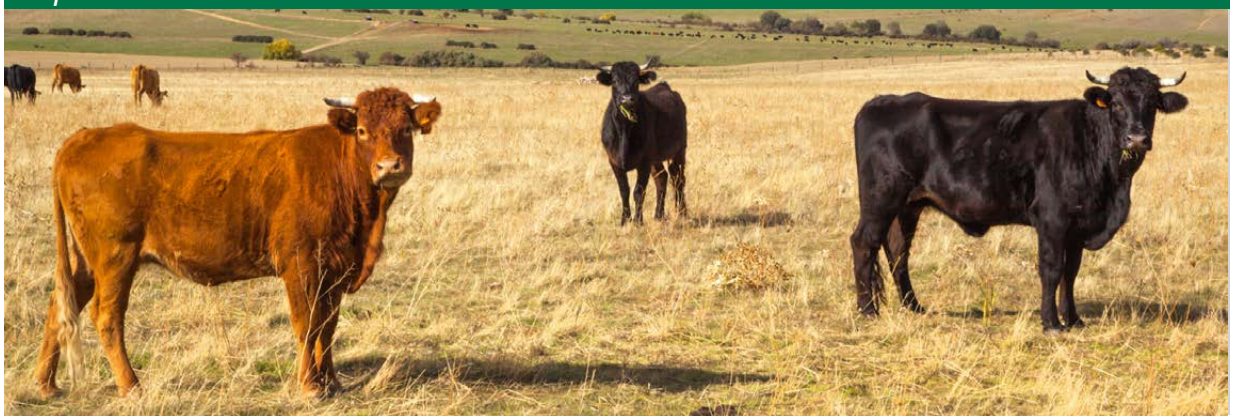
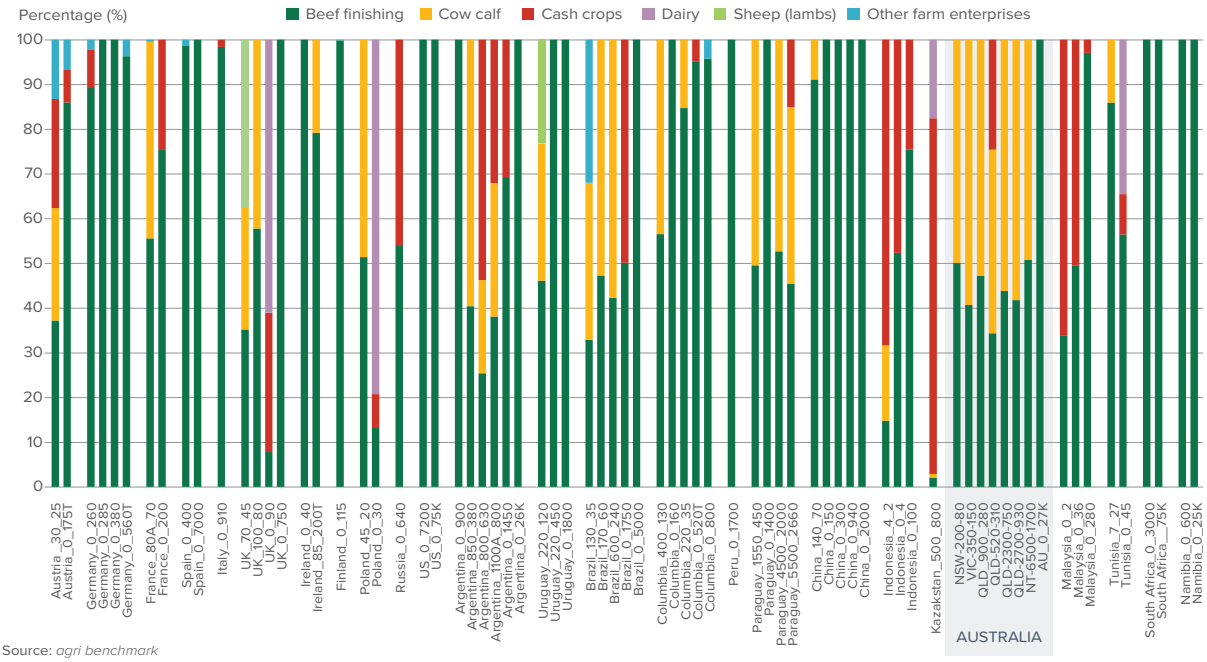


Figure 30: Composition of Gross Farm Income (GFI) for beef finishing enterprises (%)



Source: *agri benchmark*

This reliance on income from cow-calf and beef finishing enterprises means that the performance of these enterprises drive whole farm performance. Strong beef prices, managing costs and improving productivity are required to achieve medium-term profitability and therefore a sustainable business future. Gross Farm Income (GFI) has to pay for direct enterprise costs and depreciation allowing for regular plant and equipment replacement. Long-term profitability, often much more difficult to achieve, means there is a surplus to cover the opportunity cost of labour, land and capital. The factors that drove profitability are examined below in more detail.

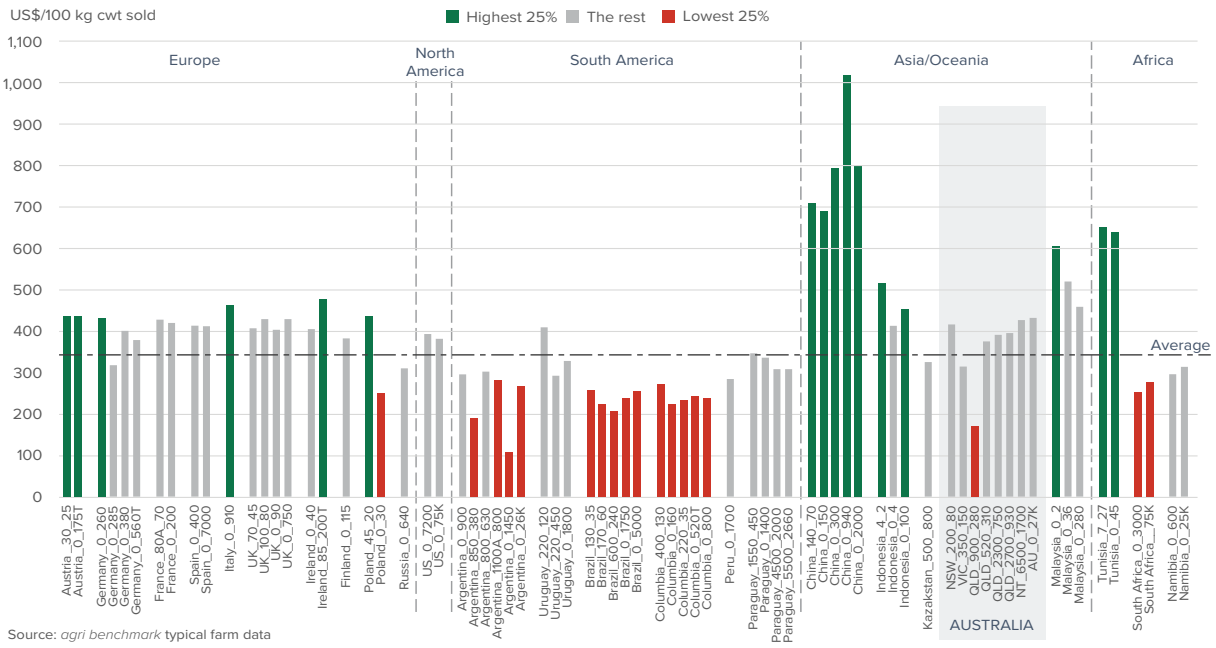
France

Prices received

Despite relatively high prices in historical terms for beef, the average beef price received by the *agri benchmark* farms decreased by 10% between 2018 and 2019, from US$428 to US$387. The prices received by most Australian farms fell in line with this trend, with 2018 prices above US$400 per 100 kg carcase weight (cwt), whereas in 2019 these decreased, and most farms received prices less than US$400 per 100 kg cwt. The average price received for the eight Australian farms was US$364 per 100 kg carcase weight. These prices were similar to North America and generally higher than the South American countries which continued the trend since 2014. Prior to this, Australian beef prices were generally lower than those in North America. Despite having the lowest prices (Figure 30), several South American farms achieved long-term profitability (Figure 31), mostly due to their low cost of production, discussed in the following section.

For a number of consecutive years, Chinese farms have achieved outstanding profitability (Figure 28), driven partly by the high prices received for product sold, with an average of US$800 per 100 kg carcase weight between the five Chinese farms (Figure 31), well above the US$387 global average.

Figure 31: Beef prices for 2019 (US$/100 kg carcass weight)

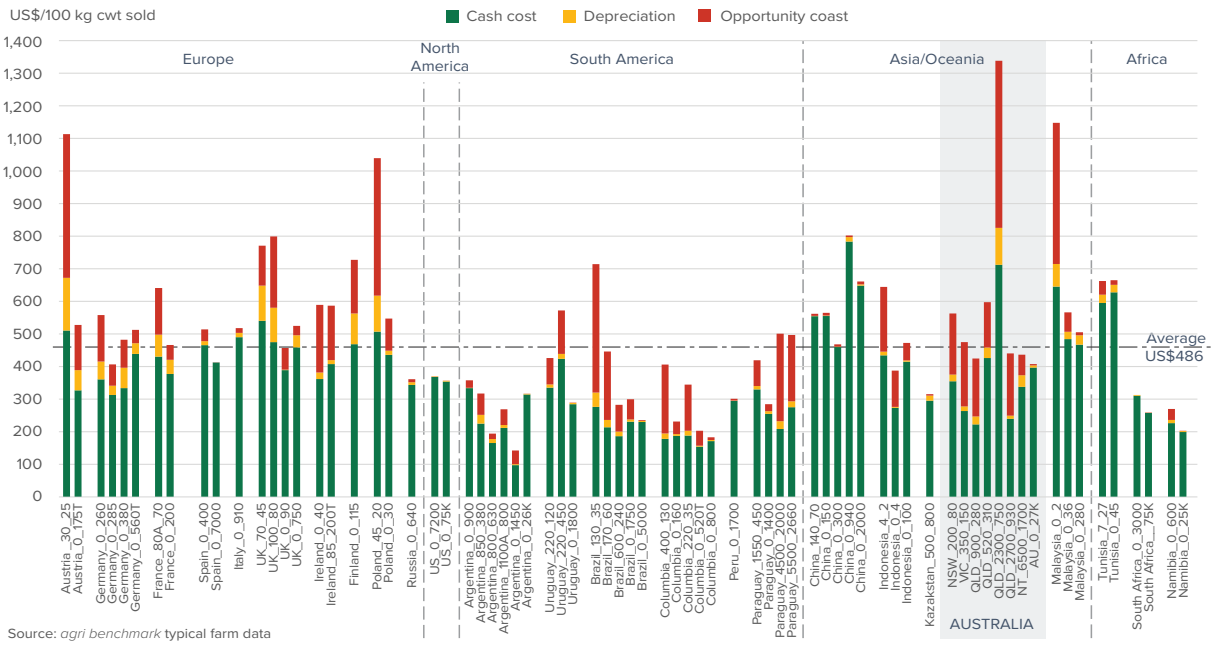


Source: *agri benchmark* typical farm data

Cost of production

The average global cost of beef production on-farm, including opportunity cost for labour, land and capital, was US$486 per 100 kg cwt (see Figure 32).

Figure 32: Total cost of production for agri benchmark farms 2019 US$/100 kg carcase weight)



Source: *agri benchmark* typical farm data

Total cost of production for nearly all of the Australian beef finishing farms was generally below the global average, with the notable exception being QLD_2300_750 in the Northern Gulf – its cost of production was the highest in the data set and is a consequence of losses due to flood and low returns, resulting in the increased cost of production per kg of cwt sold.

Table 3 shows cost of beef production including depreciation and opportunity cost – the average and individual Australian, USA, Brazil and Argentina farms. The variation in opportunity cost between the Australian farms is evident and high compared the US farms, which is 0 US$ per 100 kg cwt sold. Brazil is high in relative terms, and Argentina's opportunity cost low.

Table 3: Cost of production (US$/100 kg cwt sold) for Australia's farms compared to the average for all farms and the average for farms in US, Brazil and Argentina

	NSW_200_80	VIC_350_150	QLD_900_280	QLD_520_310	QLD_2300_750	QLD_2700_930	NT_6500_1700	AU_0_27K	Average for 73 farms	Average for USA	Average for Brazil farms	Average for Argentina farms
Total cost	561	473	423	595	1,333	438	434	406	486	361	394	265
Cash cost	353	262	221	424	710	238	336	395	362	359	226	223
Depreciation	21	14	25	32	113	10	35	7	25	2	90	9
Opportunity cost	187	197	177	139	511	190	63	4	100	0.24	150	32
Opportunity cost	187	197	177	139	511	190	63	3.8	100	0	393	32
Labour	64.9	60.8	51.4	27.4	49.9	15.2	12.2	2.4	55	0	29	22
Land	101.1	119.8	104.2	109.8	333.6	174.8	35.6	0.0	56	0.1	99	26
Capital	21.0	16.2	21.3	1.4	127.4	0.0	15.0	1.5	17	0.2	21	20

Source: *agri benchmark* typical farm data

An explanation of the characteristics and production systems of the Australian farms are shown in Tables 4 and 5 to assist with explaining the performance results. The diversity in stocking rates and size of properties is outlined in Table 4. The Queensland and Northern Territory properties are large in size, with low stocking rates measured by livestock unit per hectare of forage area, especially in comparison to the farms in NSW and Victoria.

Further details about the physical characteristics of the farms and their production systems, including breed and main feed base, are given in Table 5. Bos Taurus (British type breeds) are more suited to the NSW and Victoria environmental conditions, whereas the Bos Indicus breeds like the Doughtmaster and Brahman are more suited to the dry, hot conditions in Northern Australia.

Table 4: Stocking rate and land use (ha) for Australian farms

	NSW_200_80	VIC_350_150	QLD_900_280	QLD_520_310	QLD_2300_750	QLD_2700_930	NT_6500_1700	AU_0_27K	Average for 73 farms	Lowest	Highest
Stocking rate (LU/ha forage area)	0.32	0.52	0.07	0.14	0.01	0.06	0.01	321.00	240	0.01	15,231
Land use in hectares	175	224	5,035	1,550	31,855	9,298	74,608	18	2,341	0	74,608

Source: *agri benchmark* typical farm data

Australia

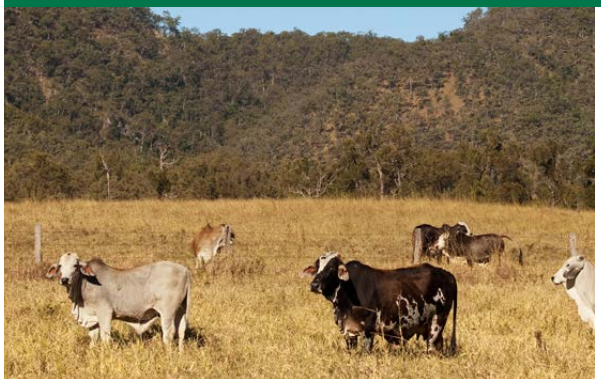


Table 5: Physical and environmental characteristics of the Australian agri benchmark finishing farms

	NSW_ 200_80	VIC_ 350_150	QLD_ 900_280	QLD_ 520_310	QLD_ 2300_750	QLD_ 2700_930	NT_ 6500_1700	AU_ 0_27K
Region	New South Wales Southern Tablelands	Victorian Western Districts	Burdekin Queensland	South East Queensland	Northern Gulf, Queensland	Fitzroy	Sturt Plateau, Northern Territory	NSW
Natural region	Tablelands	Tablelands	Brigalow	Darling Downs	Rangelands/ open woodlands	NW of Rockhampton	rangelands/ open woodlands	Slopes
Relief	Hills and river flats	Hills and Flats	Plains	Undulating	flood plains	flat to undulating	plains	plains
Prevailing soils	Clay loam	Silty clay loam	Medium loam	Medium loam	Clay	Silty clay	Sandy clay loam	Medium loam
Climate	Mediterranean	Mediterranean	Tropical wet and dry (savanna)	Moist subtropical mid-latitude climates	Tropical wet and dry (savanna)	Dry winters	Tropical wet	Dry summers
Main growing season	Spring	May–October	December–March	September-March	November-April	Summer Autumn	November-April	May-November
Average annual precipitaction (mm)	930	650	500	650	513	600	700	555
Precipitation distribution	Slight winter predominance	May–August	December–March peak	November to March	pre-summer drought, main period Nov-Mar	Summer Autumn	pre-summer drought, main period Nov-Mar	Uniform
Elevation (metre's)	850	420	267	340	123	230	100	500
Average annual temperature(°C)	5.6-19.7	6.6-17.9	13.2-28.7	11.2-24.2	18.2-31.7	15.4-30.5	19.5-34.5	14.5-30.9
Production system	Pasture	Pasture	Pasture	Pasture	Pasture	Pasture	Pasture	Feedlot
No. and type of beef cattle sold per year (average season)	82 steers	149 steers	278 steers	250 steers, 36 heifers	713 steers	761 steers	1610 steers	21 758 steers
Breeds	British	Angus	Bos indicus	Simmental * Drought-master	Red Brahman	Brahman	Brahman	British
Other activities	Cow-calf	Cow-calf	Cow-calf	Cow-calf	Cow-calf	Cow-calf	Cow-calf	–
Origin finishing cattle (Own or purchase)	Own	Own	Own	Own	Own	Own	Own	Purchase
Category of animals (FIN)	Weaners	Steers	Weaners	Weaners	Weaners	Weaners	Weaners	Back-grounders
Main feed sources	Pasture	Pasture, hay + oaten grain	Pasture, minerals, supplements	Pasture, silage + grains	Pasture, hay, cottonseed	Pasture + concentrates + minerals	Native pasture, hay	Grains + cottonseed + pasture silage + hay

Source: *agri benchmark* typical farm data

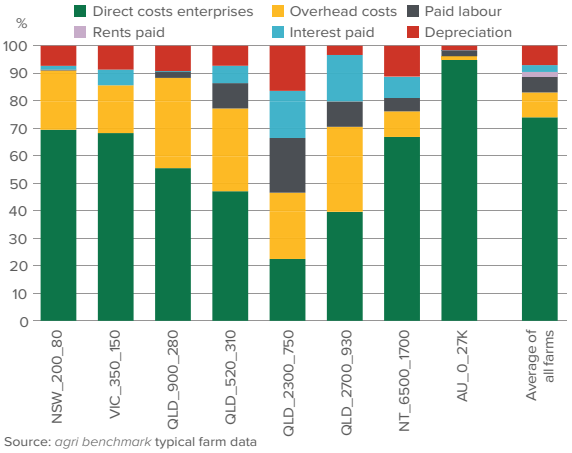
Direct enterprise costs are the largest proportion of total costs for the beef finishing farms, as is the case with other farms in the data set. The direct costs for the Queensland farm in the Northen Gulf were low for 2019 because they had fewer number of head. Overhead costs are the next largest cost for beef finishing farms (see Figure 33).

A breakdown of the composition of direct costs in Figure 33 shows that the main two costs are livestock purchases (Figure 34a) and feed costs (Figure 34b).

Livestock purchases are the largest cost for the beef finishing enterprise, as nearly all Australian farms transfer calves from the cow-calf entrprise to the beef finishing enterprise (see Table 5). In 2019, NSW_180_65 sold all their calves at weaning due to ongoing drought, so are not included in the finishing farms data set.

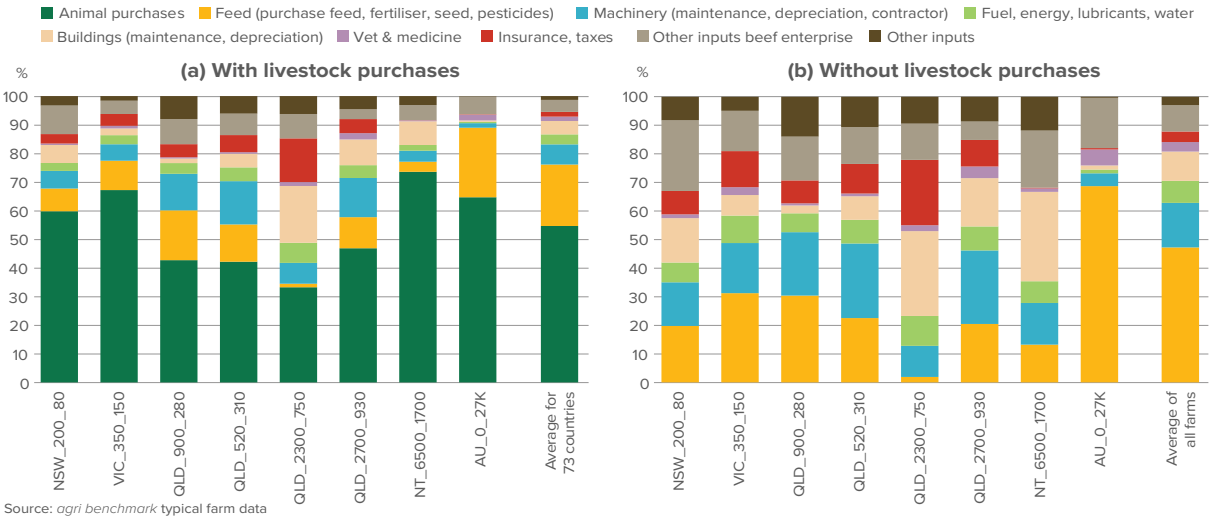
Feed costs are one of the largest costs for the finishing system, which is clearly illustrated in Figure 34b. The type of production system and cost of production are linked. In Figure 34, the average cost of production for grain finishing in a feedlot tends to be the lowest cost of production on average, at US$400 per 100 kg cwt compared to finishing on pasture (US$504) or silage (US$576).

Figure 33: Expense contributions to cost of production (%) for Australian farms compared to the average



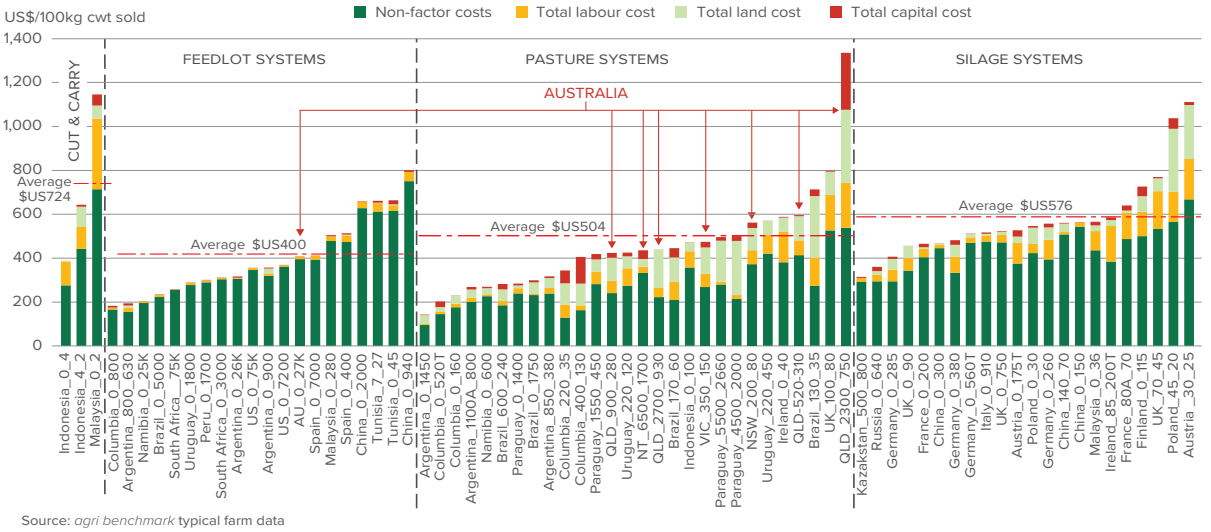
Source: *agri benchmark* typical farm data

Figure 34: Percentage composition of direct costs for Australian farms compared to the average with (a) and without (b) livestock purchases



Source: *agri benchmark* typical farm data

Figure 35: Total cost of production for different finishing systems (US$ per 100 kg cwt sold)



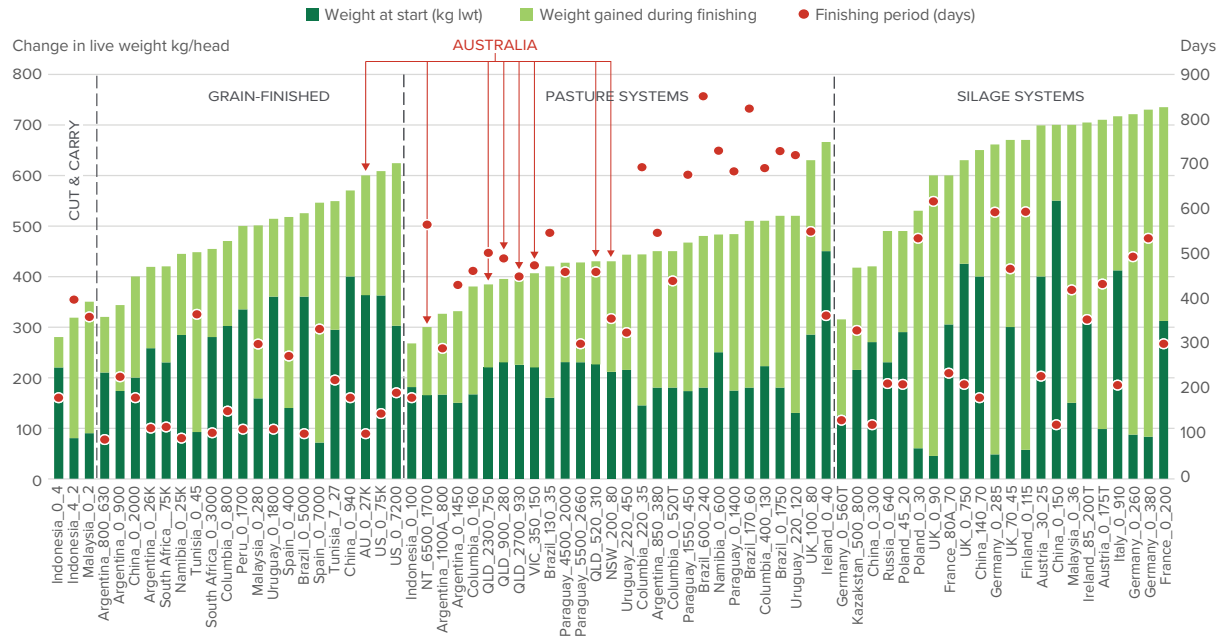
Source: *agri benchmark* typical farm data

However, the variation within systems is high. Pasture has the highest level of variation compared to finishing on grain or silage and some countries achieve a lower cost in a pasture system than the grain system. Generally, however, the grain system is more cost effective, and achieves better weight gain, which is discussed in the next section.

Improving productivity

Beef finishing systems aim for high growth rates to improve efficiency – the faster an animal increases liveweight and converts fodder to liveweight, the more efficient the system.

Figure 36: Start weight, weight gain and finishing period for the different production systems



Source: *agri benchmark*

The data in Figure 36 is summarised in Table 6 showing the average number of days for each finishing system, the average weight at the start of finishing and the average weight gained.

Germany

Table 6: Average number of days to finish, weight at the start (kg lwt), finished weight (kg lwt) and average daily weight gain (g/hd/day) by finishing system and average weight gained (kg lwt) (range in brackets)

Production system	Average number of days to finish (days)	Average weight at the start (kg lwt)	Average finished weight (kg lwt)	Average daily weight gain (g/head per day)	Average weight gained (kg lwt)
Cut and carry	313 (180-398)	130 (80-220)	316 (280-350)	573 (333-722)	186 (60-260)
Grain-finished	174 (87-366)	259 (71-400)	489 (320-624)	1,388 (758-1975)	230 (110-474)
Pasture system	238 (300-824)	205 (130-450)	442 (267-666)	467 (243-702)	238 (86-390)
Silage system	381 (120-617)	236 (45-550)	616 (315-735)	1,158 (615-1466)	381 (150-647)
Australian Farms	**Number of days to finish (days)**	**Weight at the start (kg lwt)**	**Finished weight (kg lwt)**	**Daily weight gain (g/head per day)**	**Weight gained (kg lwt)**
NT_6500_1700	565	165	300	262	135
QLD_2300_750	503	220	384	243	164
QLD_900_280	490	230	395	337	165
QLD_2700_930	450	225	400	389	175
VIC_350_150	475	220	406	398	186
QLD_520_310	460	226	430	443	204
NSW_200_80	356	211	430	633	219
AU_0_27K	100	363	600	1,975	237

Source: *agri benchmark* typical farm data

The Australian farms' pasture finishing systems has an opportunity to improve productivity by decreasing the number of days it takes to finish and increasing daily weight gain, which may also add more weight to the finished animal. However, Australia's environmental conditions are variable and often difficult to manage, with 2019 seasonal conditions showcasing how difficult it can be with drought and floods.

In summary

- Australian beef finishing financial performance deteriorated further (but remained historically high) in 2019, having been heavily influenced by severe drought and floods across the majority of finishing systems.
- Resilience and continued high cattle prices helped nearly all Australian *agri benchmark* finishing systems maintain some short-term profits in 2019, though medium-term results were mixed and only the feedlot returned a long-term profit.
- Finished cattle prices fell in most countries in 2019, including in Australia, though Australian output prices remain on a par with those in North America and are now well above those in South America.
- Most pasture-based Australian *agri benchmark* beef farms achieved better medium-term profits from the cow calf section of the business than the finishing component in 2019.
  - This probably reflects the extra receipts to cow-calf from culling breeders, extra feed costs in finishing and high weaner cattle prices relative to finished prices (unusual in drought years).
- There is a much greater diversity of beef finishing systems in Australia than exists elsewhere, resulting in a wider range of farm performance.
- The extensive nature of the large properties in the north of Australia means they have an ability to achieve large profits through economies of scale but also large losses, therefore they have a relatively high risk factor, with 2019 a classic year to show the level of risk.
- Economies of scale are important to achieve profitable levels, especially in these extensive systems due to the low stocking rates.
- Australian beef finishing farms are almost fully reliant on the beef enterprise for their income, unlike most others around the world that have significant other income, often from cash crops or dairy.
- Improvements in calving % and gaining weight in the finishing systems is an opportunity for the industry to improve productivity, and therefore profitability, in both the Bos taurus and Bos indicus systems, keeping in mind 2019 was a very dry year.
- Generally, the data shows how farmers adapted well and fed their animals because prices supported this management practice.

Appendix

What is *agri benchmark*?

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. It is operated as an international network of research partners coordinated by the Thünen Institute – the German government rural research body. The cattle network has over 34 member countries, covering 75% of world beef production and has been producing the results of comparative analysis over the last 17 years.

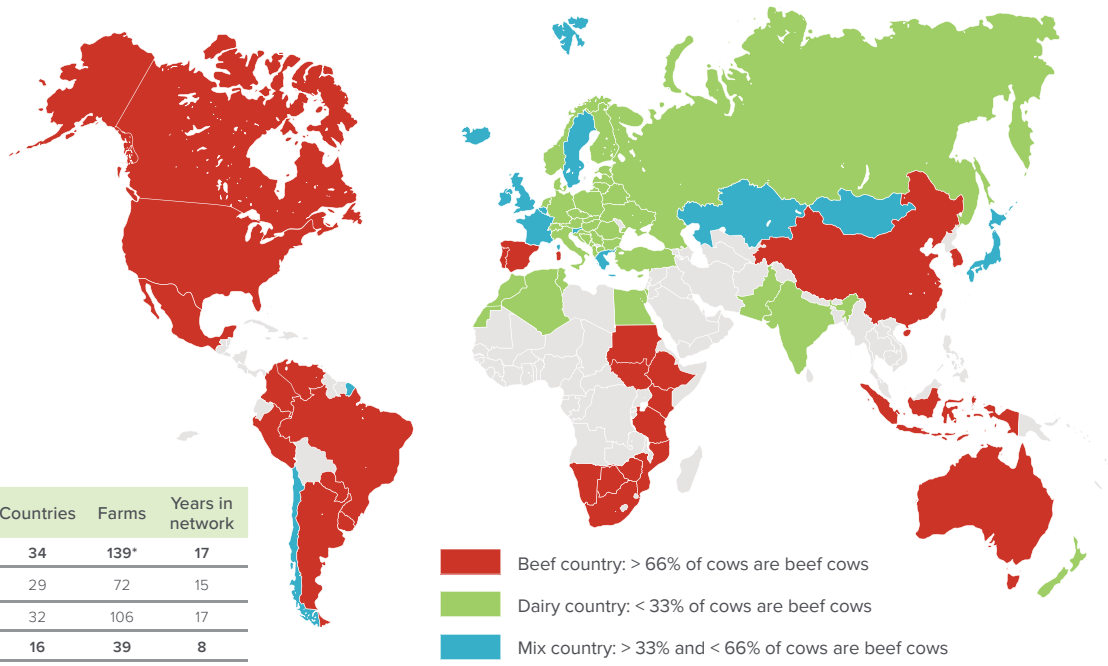
The core competence of the network is in analysing production systems, their economics, drivers and perspectives.

agri benchmark aims to assist:

- producers to better align future production through analysis of comparative performance and positioning;
- non-profit organisations (NGOs, international organisations) to monitor global agricultural challenges;
- public and industry institutions to better plan research, farm policy and programs and make their case
- 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.

Figure A1: Countries in the *agri benchmark* beef and sheep network



2019	Countries	Farms	Years in network
Beef	**34**	**139***	**17**
Cow-calf	29	72	15
Finishing	32	106	17
Sheep	**16**	**39**	**8**

*39 of these farms ave both cow-calf and finishing

Source: PSD/FAS/USDA Online, Eurostat National stistics, own estimations

Within cattle, it covers both breeding and finishing enterprises (cow-calf and cattle finishing). *agri benchmark* 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).

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 18th annual *agri benchmark* Conference (on-line), 15–17 June 2019.

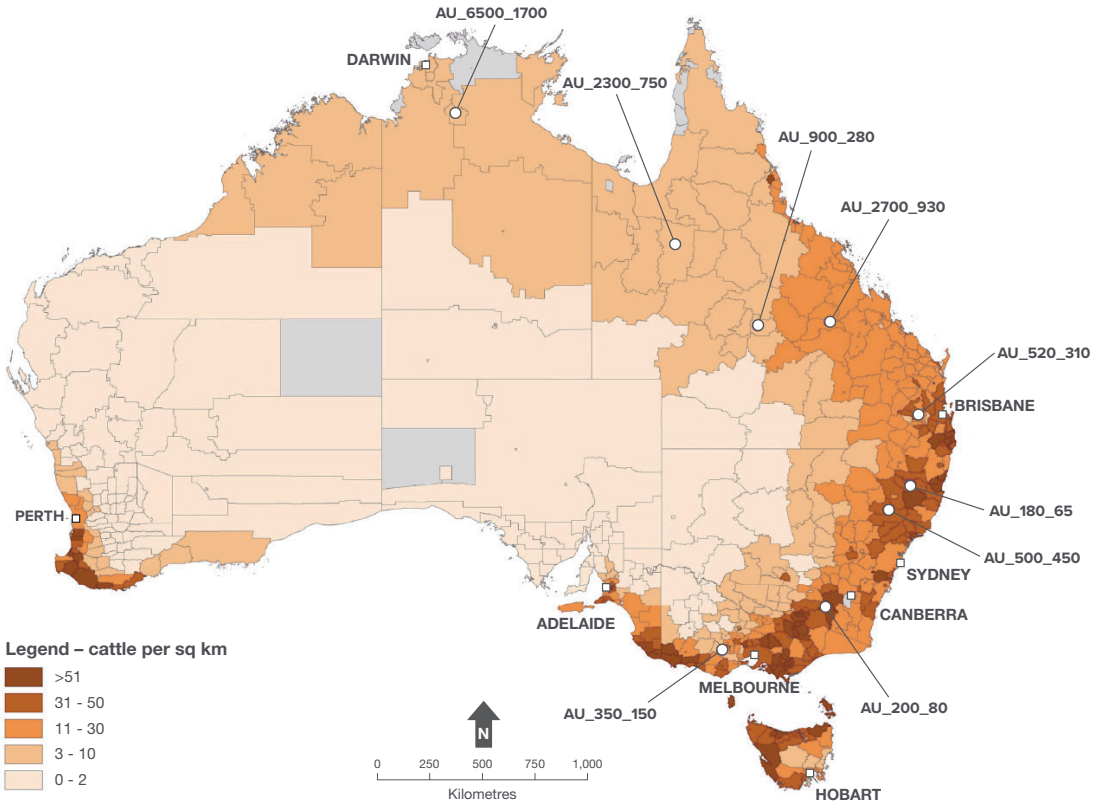
A 'Typical farm' can be based on data for an actual farm judged to be typical of a key production system in a key region[7], or 'engineered' by local producers and experts to be typical (using annual data drawn from farms in the key production regions). In Australia, data was collected for nine typical beef farms in Queensland, the Northern Territory, NSW and Victoria (see Figure A2 and Table A1).

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

Table A1: Australian *agri benchmark* typical beef 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 A2: Location of Australian *agri benchmark* typical beef farms and cattle density



Source: ABS and *agri benchmark*