MEAT & LIVESTOCK AUSTRALIA MARKET INFORMATION

How are global and Australian sheepmeat producers performing?

Global *agri benchmark* network results 2020

agri benchmark

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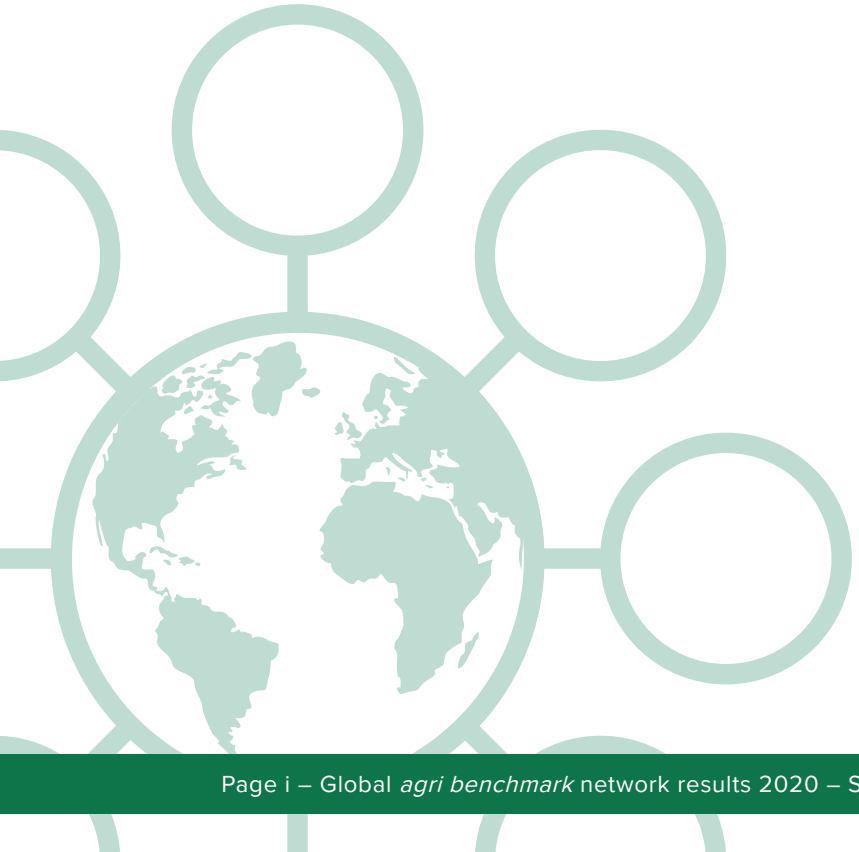

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Global sheep farm profitability

Globally, sheep enterprises remained highly profitable in 2019 due to strong demand, constrained supply and high prices (Figure 1) – both at the sheep enterprise and whole-farm level.

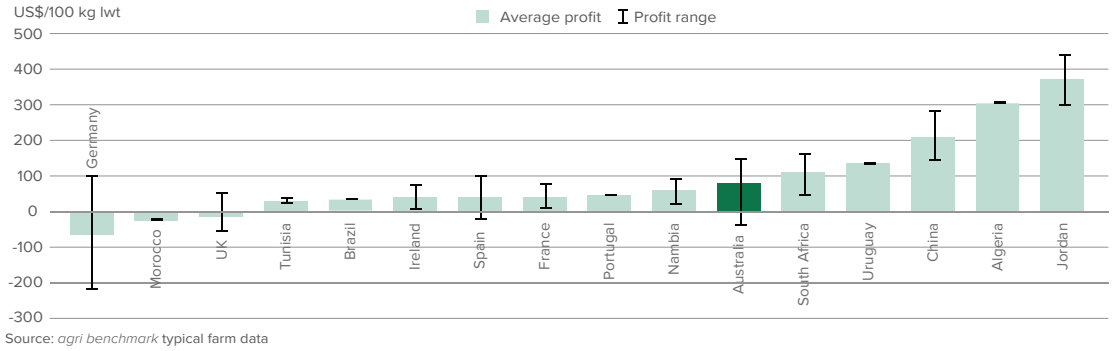
A majority of the 40 *agri benchmark* sheep farms across 16 countries were profitable in 2019 – 78% of farms were profitable medium-term, similar to the 80% in 2018 (covering cash costs and depreciation). The main exceptions were in Europe and North Africa – notably farms in the UK and Germany – reflecting low productivity, high labour costs, high depreciation costs and falling government payments (Figure 1).

The continued high global sheep farm profitability is due to high lamb and sheep prices, increased sheepmeat demand (particularly China imports) and constrained supply, especially in Australia, NZ, the EU and China.

Five of the six typical Australian sheep farms were profitable in 2019, though most were impacted by poor seasons. The three farms not in severe drought were among the most profitable, while the two NSW farms in severe drought had low profits or modest losses. Profits deteriorated on four of Australia's six sheep farms in 2019 (and another was stable).

The Australian result was still positive, especially considering the severity of the NSW drought and below-average conditions in Victoria and WA, assisted by the high lamb, sheep and wool prices on the back of strong demand for sheepmeat and wool, especially from China. The drought lowered lamb output and raised feed costs.

Figure 1: Medium-term profitability of the ewe enterprise 2019



Source: *agri benchmark* typical farm data

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 sheep branch currently has 17 member countries – covering over 55% of global sheepmeat production.

If you are unfamiliar with *agri benchmark*, please read the appendix to this report (page 18).

United Kingdom

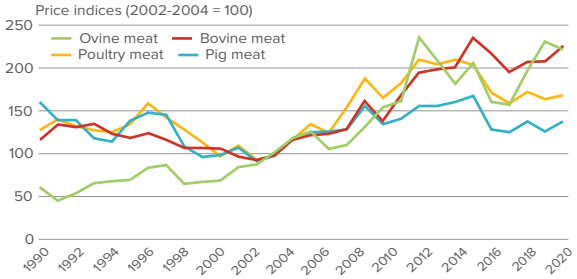
The price of lambs and sheep

The global FAO Export Ovine Price Index for sheepmeat has risen more than any other meat in the past 30 years (see Figure 2), as global supply growth has struggled to keep up with the ongoing lift in demand, particularly from China. In contrast to sheepmeat (and beef), global poultry and pig meat prices have fallen appreciably from their peak in the past five years, despite the impact of African Swine Fever (ASF) on global pig meat supplies.

The impressive rise in export sheepmeat prices (FAO) from 1990 to their 2011 peak (more than for any other meat) was composed of three distinct phases, each of around five years duration – rising in 1992–97, 2000–04 and 2007–11, with each jump more rapid than the last but with increased volatility. The extraordinary 2011 peak has been followed by a particularly volatile period, commencing with a 32% fall to 2015–16, followed by a 35% recovery to 2018. Sheepmeat prices stabilised at near record levels in 2019.

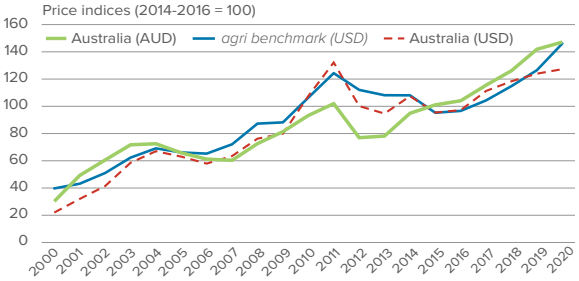
COVID-19 caused an average 4.4% decline in meat prices (FAO Export Meat Price Index) in 2020, due principally to the impact on global foodservice demand (see COVID section below). Hardest hit were sheepmeat (-6%) and poultry (-10%). Early 2021 has seen a full recovery in sheepmeat export prices (up 11% on the 2020 average) due to some recovery in demand and the post-drought fall in supply in Australia. Beef export prices have also recovered, while both pork and poultry are still well below 2019 pre-COVID levels (in part reflecting some recovery in pig meat supply).

Figure 2: FAO Global Meat Price Indicies
(based on US$ prices)



Source: FAO Food Indices

Figure 3: *agri benchmark* Global and Australian Lamb Price Indices



Source: *agri benchmark* cattle and sheep price indices

The new *agri benchmark* Global Producer Price Indices[1] for lambs (livestock prices) rose a further 10% in both 2019 and 2020 to record levels (see Figure 3) – driven by rises in Australia and Iran (in USD terms). The Global Index rose over 50% between 2017 and 2020, again led by significant rises in Australia and Iran, and increases throughout Europe (except Spain).

In Australia's case, lamb prices rose a further 5% in 2019 and 3% in 2020 (in USD), to approach their 2011 record – but in AUD terms prices rose 12% in 2019 and 4% in 2020 to over 40% above the 2011 peak. Australian prices have performed significantly better than the Global Index since 2011 due to the combination of strong China demand, a devaluing currency (until 2019) and falling lamb supplies (from 2017). This was boosted further in 2020 by restocker demand once the drought broke.

Australia

[1] *agri benchmark* has recently launched global price indices for finished cattle, weaner cattle, lambs and lambs and sheep. These represent average on-farm livestock 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.

Global COVID-19 impacts in 2020

The COVID-19 pandemic has impacted all aspects of life, including consumption habits, across all countries, and is unlike anything seen since the Second World War. For sheep industries, the main impacts are included below (compiled from *agri benchmark* member country feedback and a COVID-19 workshop held in conjunction with the *agri benchmark* Conference in June 2020).

On meat markets:

- A fall in foodservice sales due to lockdowns and social distancing regulations.
  - A larger decline in demand for lamb than for any other meat due to lamb's high price and greater reliance on foodservice channels globally.
  - Large range of negative 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.
  - Some compensatory growth in takeaway lamb sales from restaurants, cafes and fast food outlets.
  - Lower demand and price for higher-end lamb cuts globally.
- A substantial lift in retail sales of lamb and mutton as people ate more at home.
  - A commensurate lift in demand and price for lamb mince and lower-end cuts.
- Rapid growth in online sheepmeat sales.
- Overall, a decline in expenditure on sheepmeat and ovine carcase value due to lower consumer spending and the shift to cheaper cuts, meats and foods.

Logistical supply chain disruptions and costs:

- Logistical problems have been prevalent in some countries.
- Most disruptive have been cuts in processing capacity – though not a major impact in most countries and less prevalent in sheep than for cattle.
- Some disruption to ports, cuts in air freight availability and increased freight rates.

On sheep markets:

- Few significant restrictions on feed and livestock movements.
- Some temporary disruption to physical sheep and lamb markets in most countries.
- Sheep and lamb prices are generally down due to lower foodservice demand.
  - Initially including Australia, although the breaking of severe drought saw a full recovery as the year progressed.

On global trade:

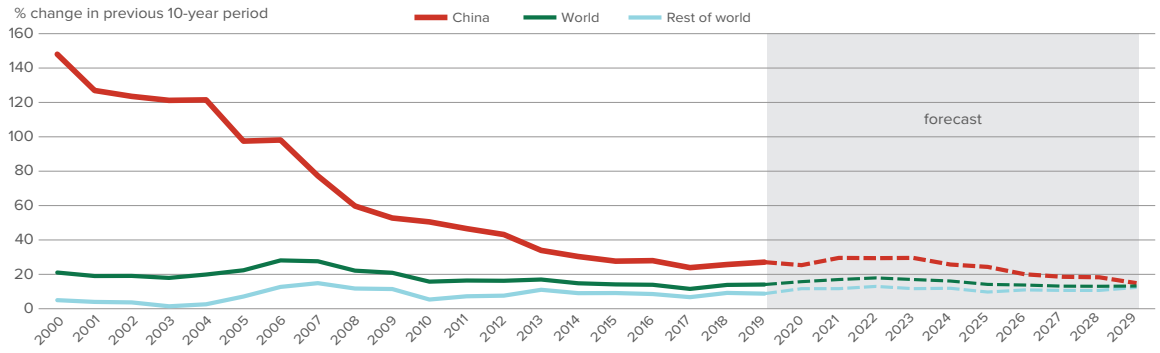
- Hard to generalise about the impact of COVID-19 on trade globally, as it has been disparate country-to-country.
- The impact on port activity (e.g. in China) appeared to have been temporary.
- There was a fall in air freight, as this had largely been carried in passenger planes – a major impact on lamb carcase sales to the Middle East.
- Sheepmeat exports dropped appreciably in 2020, with COVID-19 adding to the impact of lower lamb and mutton availability and problems with access to China.
- Both Australian lamb export quantity and value fell 6% in 2020, more than the 3% decline in lamb supply, with the Middle East particularly impacted by COVID-19 (reflecting foodservice and air freight disruptions plus the impact of falling oil revenues on demand and government supports), along with a range of small markets.
- Australian export quantity and value of mutton both fell by 24% in 2020, reflecting the 33% fall in mutton supply. COVID-19 prevented any rise in export prices and caused the decline to be reflected mainly in exports to the Middle East and a range of smaller markets.
- The biggest fall in both lamb and mutton exports was to China, but this was most likely related to trade access issues.

Sheepmeat production

Global sheepmeat production growth has slowed appreciably over the past 15 years, principally due to China, which accounted for an estimated 32% of production in 2019 (see Figure 5). Sheepmeat production in China was more than doubling every 10 years until 2005, but has since fallen to a 27% expansion in the 10 years to 2019 (FAO data). In contrast, growth in sheepmeat production in the rest of the world peaked at 15% in the 10 years to 2007, and has now stabilised at a rate of 9% every 10 years. Hence, total world sheepmeat production growth peaked at 28% in the 10 years to 2007, but has since halved to 14% in the last 10 years (to 2019).

The slowing in production growth is due to land, water and environmental constraints, made worse by severe droughts in key countries, most recently including Inner Mongolia (China), Australia, South America, Europe (Germany, Austria, France, Ireland and Spain), Africa (notably South Africa and Namibia) and Iran.

Figure 4: Global and China 10-year sheepmeat production growth

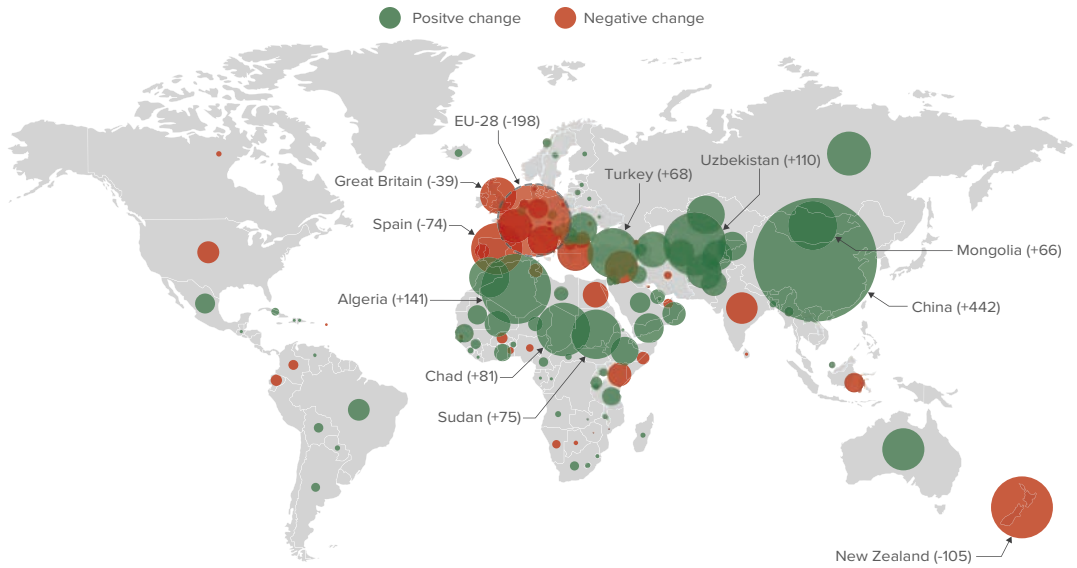


Source: OECD-FAO Agricultural Outlook database 2020-2029

Apart from China and Oceania, sheepmeat is largely produced in Central Asia, the Middle East and Africa – regions where sheepmeat and goatmeat are popular and a significant part of the diet and used for festivities, especially for middle-to-upper income consumers.

Over the 10 years to 2016-18, the largest absolute growth in sheepmeat production has been in China, followed by Central Asia, the Middle East and North Africa regions, led by Algeria, Uzbekistan, Chad, Sudan and Turkey. Growth in Australia's production has been small compared to that in China and MENA. There have also been notable declines in this 10-year period in EU countries, led by Spain and Great Britain, and in New Zealand (related to a shift into the dairy industry).

Figure 5: Change in sheepmeat production 2006–08 to 2016–18[2]



Source: *agri benchmark* calculations based on FAOStat. ( ) Brackets indicate change in '000 tonnes carcase weight

[2] Excludes goat meat.

OECD estimates that the accelerated growth in world sheepmeat production resulting from the recent high sheepmeat prices and profitability probably peaked at around 1.6% in 2020 and forecasts that it will remain around 1.4%/year in the short-term before falling back to 1% from 2026 onwards – enabled by intensification of production and especially the increased use of grain and other feed supplements. The pork shortage in China from ASF is also expected to incentivise increased sheepmeat production in China, as opportunistic producers, especially those in northern regions, seeking alternatives to raising pigs, respond to high prices.

Sheepmeat demand

Sheepmeat is a preferred food in Muslim and Hispanic populations around the world and is widely used for religious ceremonies. Elsewhere, it is generally a high-priced premium niche product in consumer diets, with the only major exceptions being in Australia and India, where it still accounts for over 10% of meat consumption.

China accounted for an estimated 34% of global sheepmeat consumption in 2019, due to the large population and as sheepmeat accounts for a relatively high 5% of protein in the diet. Other Asian and the Middle Eastern countries account for a further 31%, as sheepmeat and goatmeat are traditional foods throughout the Middle East, and in Muslim populations in Asia. Adding Africa (principally northern Africa), with 20% of consumption, and 85% of global sheepmeat consumption is in these three regions – China, elsewhere in Asia and the Middle East and North Africa.

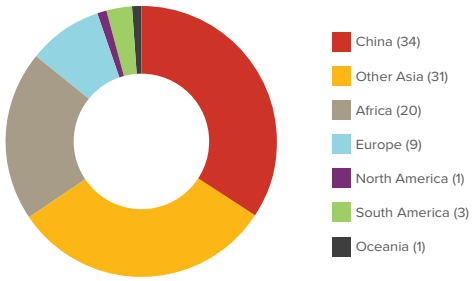
International demand growth for sheepmeat remains robust, driven by rising per person consumption in China and the Greater Middle East (including Pakistan and Turkey). Sheepmeat consumption in developing countries expanded by 2.2 million tonnes, or 21%, in the 10 years to 2019, and this growth would have been much greater if sheepmeat prices had not risen appreciably – in other words, if production had been able to keep pace with demand growth. In contrast, total consumption of sheepmeat in developed countries has fallen 1% in the last 10 years (faster per person), largely due to rising prices of sheepmeat relative to other proteins.

China dominates global sheepmeat consumption and consumption growth. The other major consumers are the EU and India. All three countries have import barriers to sheepmeat (high formal quota/tariff barriers in the EU but mainly informal or technical barriers in the case of China and India).

In individual countries, consumption growth will be determined by the interplay of internal supply/demand balance and import barriers. China's sheepmeat supply is unlikely to be able to match internal demand growth (food demand being the fastest consumer growth category), causing a need for increased imports and/or further rises in sheepmeat prices, which are already among the highest in the world. Local supply growth is not expected to come close to demand growth in the Middle East, again necessitating increased imports to satisfy demand and contain price rises.

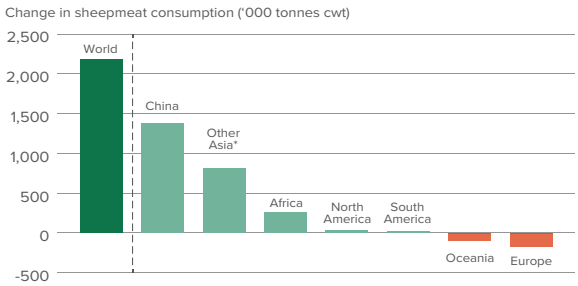
With supply expansion in Australia and New Zealand unlikely to meet the growing demand from China and the Middle East, sheepmeat will likely continue to be drawn away from other consuming markets, principally developed country markets such as the EU (EU consumption fell 154,000 tonnes, or 18%, in the 10 years to 2019).

Figure 6: Regional sheepmeat consumption shares 2019



Source: OECD-FAO Agricultural Outlook database 2020-2029. ( ) Brackets indicate % share

Figure 7: Regional consumption growth in 10 years to 2019

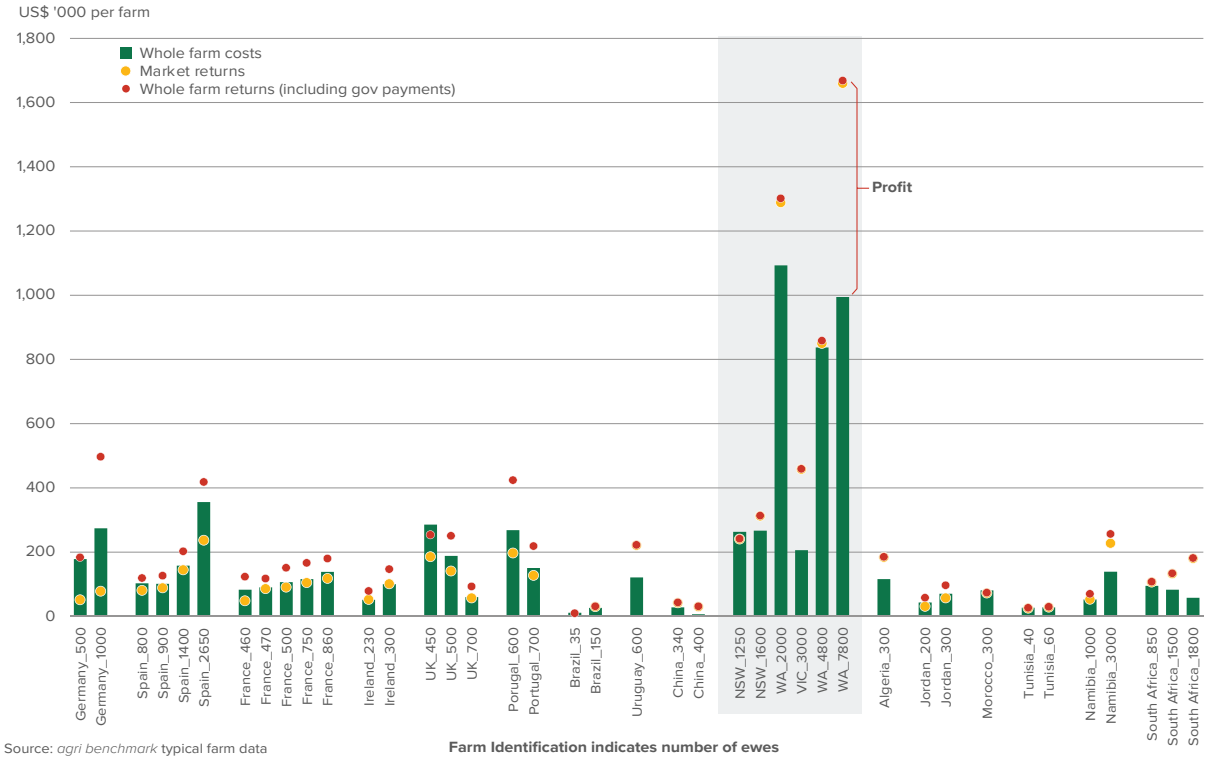


Source: OECD Agricultural outlook database. * Includes the Middle East

Global performance of sheep farms

Nearly all *agri benchmark* typical sheep farms made a profit in 2019 – 36 of the 40 farms from sixteen countries achieved both a short-term cash surplus (total returns minus cash costs) and medium-term profits (total returns minus cash costs and depreciation) (see Figure 8). For the 40 typical farms, as a group there was a small decline of 13% in the average medium-term profitability in 2019 compared to 2018.

Figure 8: Whole farm medium-term profitability for typical sheep farms



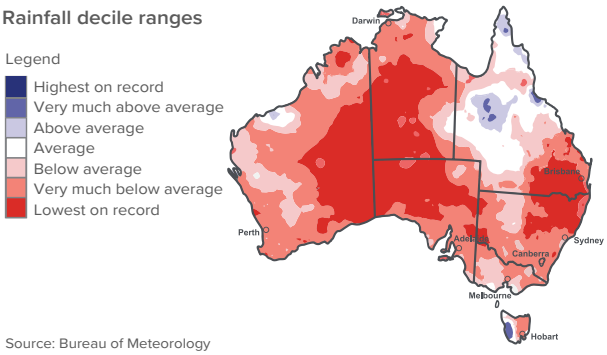
Source: *agri benchmark* typical farm data

Farm Identification indicates number of ewes

There was a large variation in the profit generated by the Australian farms. All except NSW_1600, located in the Northern Tablelands of NSW, managed to generate a medium-term profit, despite the tough seasonal conditions experienced in Australia by most farmers. This farm experienced a decline in profit compared to 2018 (Table 1), largely due to the conditions.

2019 proved to be one of the most challenging years on record for many Australian farmers. The rainfall decile map (Figure 9) generated by the Bureau of Meteorology demonstrates the extent of the poor conditions, with almost all the main sheep regions of southern Australia experiencing very much below average rainfall, and some the lowest rainfall on record.

Figure 9: Australian rainfall deciles 2019



Source: Bureau of Meteorology

Table 1: Profit difference (%) for Australian farms between 2018 and 2019

	NSW_1250	NSW_1600	WA_2000	VIC_3000	WA_4800	WA_7800
Short-term profit: Total returns less cash cost	-137%	-414%	-21%	-12%	-41%	-6%
Medium-term profit: Total returns less (cash cost + depreciation)	-207%	-34%	-34%	-13%	-69%	-5%

Source: *agri benchmark* typical farm data

Figure 10: Comparison of short- and medium-term profitability for Australian farms 2016 to 2019

Source: *agri benchmark* typical farm data

It is worth noting the stability in the medium-term profitability for these typical sheep farms in Australia. Figure 10 shows how for the last four years, these farms have generally made a medium-term profit. Many are mixed farming enterprises and have a level of diversification that contributes to whole farm profit (see Figure 11).

The general stability and above-average Australian farm profitability are derived from being one of the most efficient, diversified and low-cost producers of sheepmeat in the world – as reflected in Australia being one of only two major sheepmeat exporters in the world (along with New Zealand). The financial analysis below addresses the components that contribute to this strong position – the relatively low receipts, low costs and reasonable productivity (despite the relatively harsh conditions faced by most typical Australian farms).

China

The characteristics of the six typical Australian *agri benchmark* farms are outlined in Table 2, which includes information about their sheep enterprise.

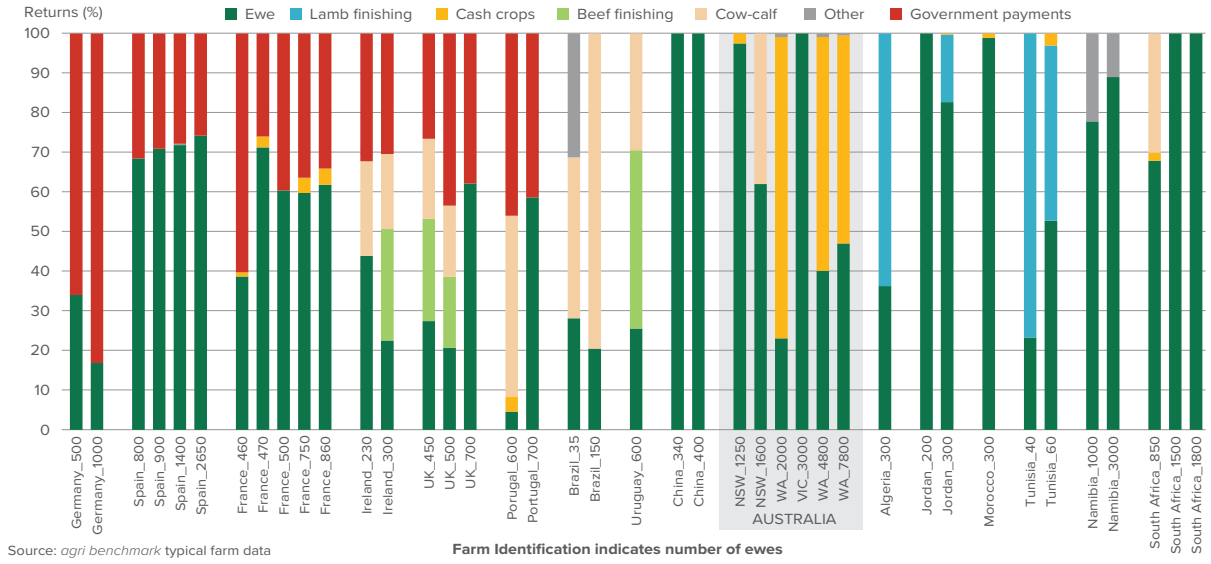
Table 2: Australian *agri benchmark* typical farm profile

	NSW_1250	NSW_1600	WA_2000	VIC_3000	WA_4800	WA_7800
Region	New South Wales	Northern Tablelands (NSW)	Northern agriculture region (WA)	Western Victoria	South West WA	South West WA
Production system	Grazing	Grazing	Grazing	Grazing	Grazing	Grazing
Climate	Mediterranean	Wet all seasons	Mediterranean	Mediterranean	Mediterranean	Mediterranean
Main growing season	Spring	September to February	April/May to October	April/May to October	April/May to November	April/May to November
Precipitation distribution	Even	All year summer dominance	Winter dominant	Winter dominant	Winter dominant	Winter dominant
Average annual precipitation	627	790	320	680	350–450	550–600
Relief	Undulating	Hill	Plains	Undulating	Plains	Undulating
Feed source	Pasture	Pasture and Forage oats	Pasture, Grain and Hay	Pasture, Hay and Forage Oats	Pasture and Grain/ Lupins	Pasture and Grain/ Lupins
Pasture (ha)	350	423	1,375	600	1,270	1,370
Ewes	1,250	950	2,080	3,000	2,805	6,218
Breed of ewe (F1)	Merino x Border Leister	Merino	Merino	Coopworth X	Merino	Merino
Breed of sire (% ewes mated)	Dorset Horn (100%)	Dorset (30%)	Poll Dorset (30%)	Dorset (100%)	Poll Dorset (30%)	Poll Dorset (25%)
Lambs sold as suckers (head)	219	169	84	1,648	0	1,358
Seasonal conditions for 2019	2019 was a drought year and in the lowest decile of rainfall. No stored moisture from previous year. Crops were grazed and not harvested. Dry winter and total failed spring. 302mm for the year. Good lambing as ewe condition managed well and drier winter.	2019 rainfall was 70% below annual average. Growing conditions were probably worse than reflected by rainfall because of higher temperatures and low pasture biomass. The stock numbers were reduced 70% for cows, 50% for ewes and no wethers were kept.	Started the season with no summer rainfall and very dry soil profile. A late break occurred in late June pre-empting a short growing season for pasture and increasing supplementary feed requirements.	The region experienced a very dry summer and autumn which required supplementary feeding early in the season at high feed prices. This was followed by a mild winter and a good spring. High lamb and mutton prices assisted to generate higher gross incomes.	Started the season with no summer rainfall and very dry soil profile. A late break occurred in late June pre-empting a short growing season for pasture and increasing supplementary feed requirements. The very dry spring conditions meant reduced biomass in pastures. Summer water resources are becoming problematic due to low number of rainfall events creating run-off into dams.	Started the season with no summer rainfall and very dry soil profile. A late break occurred in late June pre-empting a short growing season for pasture and increasing supplementary feed requirements. The very dry spring conditions meant reduced biomass in pastures. Summer water resources are becoming problematic due to low number of rainfall events creating run-off into dams.

Source: *agri benchmark* typical farm data

However, in Australia many of the sheep farms' whole farm income is from diversified sources such as cash crops or beef enterprises (multiple enterprises) (see Figure 11). In contrast, European countries are singularly focused and rely on government assistance with coupled and decoupled payments, shown as the red bars in Figure 11. Almost half the typical *agri benchmark* sheep farms are reliant on the ewe enterprise for more than 95% of their Gross Farm Income (GFI), including one Australian farm NSW_1250.

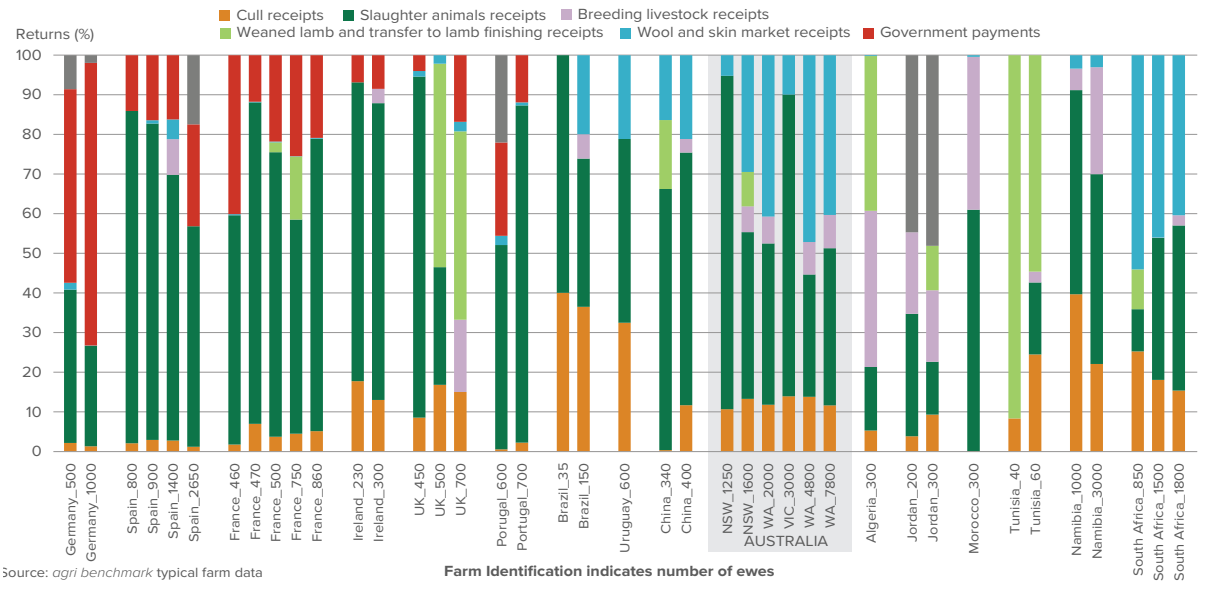
Figure 11: Composition of Whole Farm Gross Farm Income (GFI) for 2019



This report focuses on the performance of the sheep enterprise on global and Australian farms, identifying the factors that drive productivity and enable profitability.

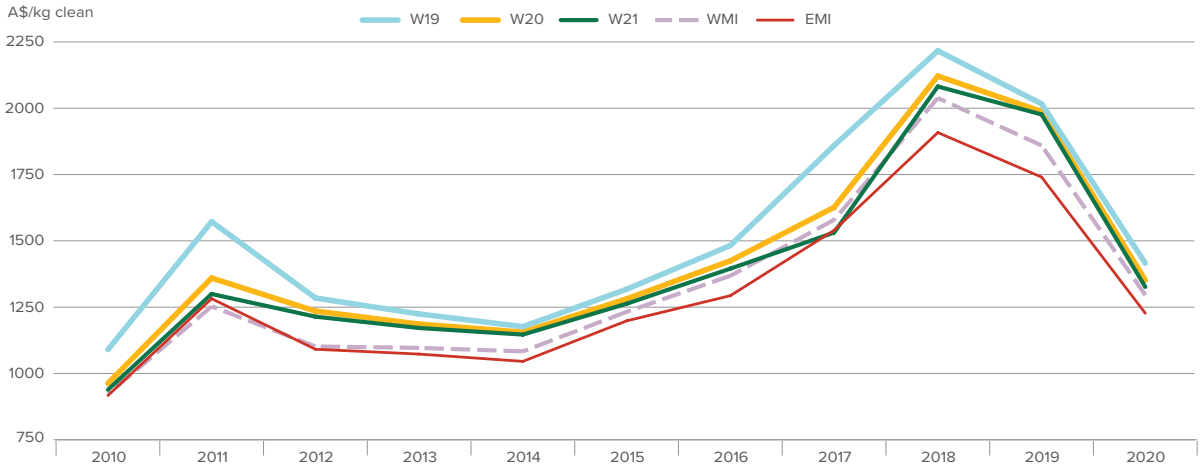
Levels of diversification may not be high for many of the farms without multiple enterprises, but diversification of income within the sheep enterprise exists and is illustrated in Figure 12. Many countries have slaughter receipts for culls and finished animals, receipts for weaned animals transferring into finishing facilities, some of which are on farm, and breeding animals. There is also a fibre component with wool and skins, and for some farms in South Africa and Australia almost 50 per cent of the enterprise income is generated from wool receipts (Figure 12).

Figure 12: Composition of sheep enterprise receipts for typical sheep farms



This level of diversification means that wool prices ($/kg wool) or meat prices ($/kg lwt) can drive profitability on Australian farms. In the last ten years wool prices have steadily increased, particularly in the five years before COVID-19 when prices were increasing rapidly, indicated in Figure 13.

Figure 13: Wool prices from 2010 to 2020 (Eastern Market Indicator – EMI and Western Market Indicator – WMI)[3]



Source: Australian Wool Exchange (AWEX)

This increase was influencing some farmers to decrease the number of ewes mated to terminal sires (crossbred meat breeds like Dorset or White Suffolk), and was also driven by improved Merino genetics that are resulting in young Merino wethers becoming more suited to the sheepmeat market. This scenario is more relevant to the Merino ewe flocks (WA_2000, WA_4800, WA_7800 and NSW_1600). However, if there is a sustained decrease in the wool price after COVID-19, producers are likely to alter flock structures and mate more ewes to a meat breed and/or decrease sheep numbers. The Merino ewe flock structure provides the opportuntity to respond to such changes in market conditions.

Global sheepmeat prices did not change significantly between 2018 and 2019. The average for the different classes of sheep in Table 3 show the prices remained relatively stable over the period. Prices in Algeria were three times higher than the average in 2019, they were also high in 2018.

Spain

[3] The primary Wool Market Indicator is the AWEX Eastern Market Indicator (AWEX-EMI), with support by three Regional Market Indicators (RMI – North, South and West) – the Eastern (EMI), Western (WMI) and three Sub Indicators are shown in figure 13. Sub Indicators known as Micron Price Guides (MPG's) are also published for each regional sale day. For example, W19 is wool at micron 19. All Indicators are expressed in Australian cents per clean kilograms.

Table 3: Average prices for 2019 and 2018 and minimum and maximum sheepmeat prices for different classes of sheep 2019

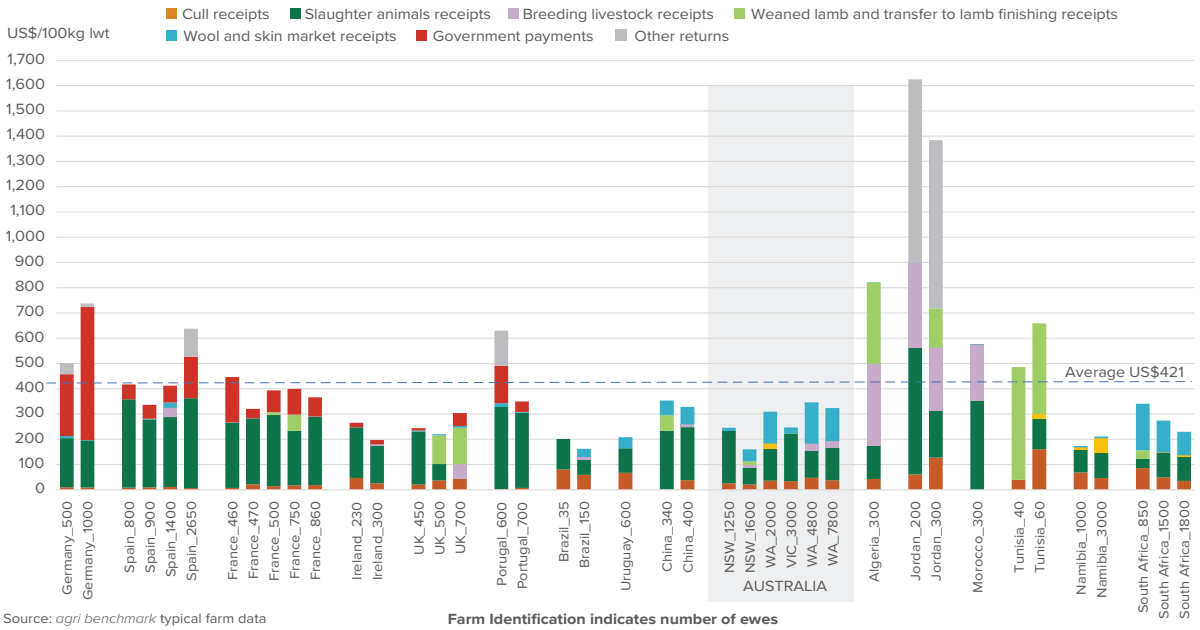
	Average 2019 US$/kg lwt	Average 2018 US$/kg lwt	Minimum in 2019 US$/kg lwt		Maximum in 2019 US$/kg lwt[4]	
Cull breeding ram	1.8	1.9	0.16	NSW_1600	5.6	JO_200
Cull ewes	1.7	1.6	0.30	FR_460	4.9	JO_200
Cull young ewes (x–12 months)	2.4	2.4	1.14	PT_600	2.9	CN_340
Cull young ewes (12–18 months)	2.3	2.1	1.12	DE_500	2.6	CN_340
Cull young ewes (>18 months)	2.1	1.9	0.34	DE_500	2.6	CN_340
Male lambs for slaughter at weaning	3.5	3.4	1.09	WA_7800	9.5	TN_60
Female lambs for slaughter at weaning	3.4	3.4	1.09	WA_7800	9.5	TN_60
Male lambs for slaughter later	3.0	3.1	1.31	BR_150	4.8	MA_300
Female lambs for slaughter later	2.9	3.0	1.02	WA_7800	4.1	ES_800

Source: *agri benchmark* typical farm data

Australia tends to receive the lowest prices in US$ per kg lwt (Table 3). When comparing total sheep enterprise returns in Figure 14, it is evident that Australian farms' total returns are low in comparison to other countries. The returns are also lower than the average of US$421 per 100kg lwt, however, the significantly higher returns received by Algeria in comparison to the other countries affects the results and increases the average.

The high sheep meat prices in Algeria and Jordan are reflected in Figure 14, where the total returns US$ per 100kg lwt are highest out of the 40 farms and 16 countries.

Figure 14: Total sheep enterprise return



Source: *agri benchmark* typical farm data

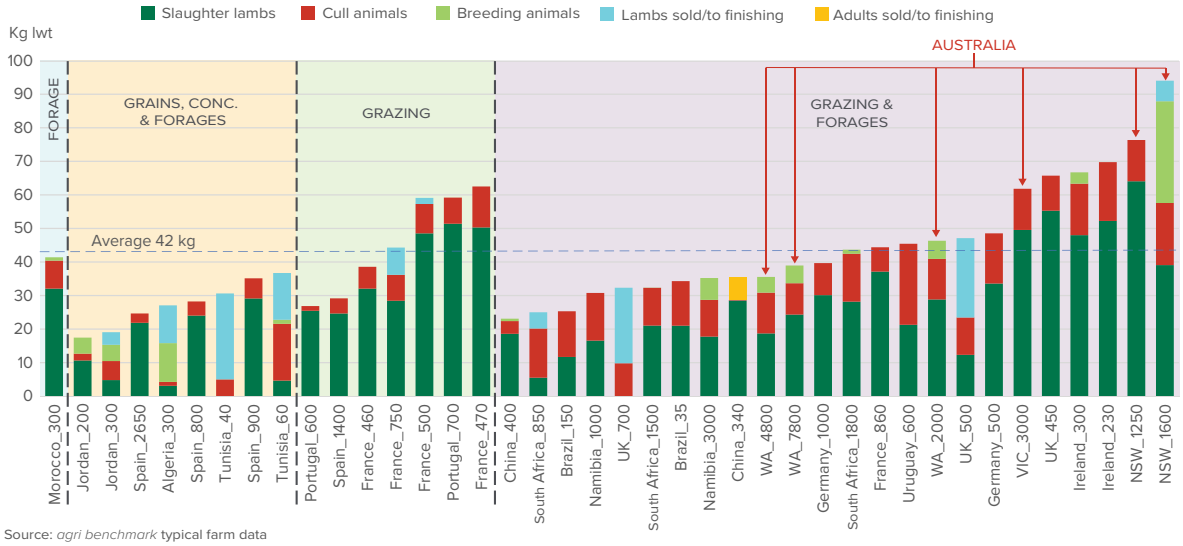
Farm Identification indicates number of ewes

Quantity of liveweight sold is the other part of the income equation. In Figure 15, total liveweight sold per ewe is presented and countries ranked according to the type of grazing system with the lowest to highest total liveweight sold per ewe. Australian farms are grazing systems despite supplements normally being fed in summer to early autumn when there is minimal pasture growth. Even during drought conditions, amounts fed in Australia are generally less than in the grains/concentrates and forage systems that exist in other countries.

Production of liveweight per ewe in Australia in 2019 varied from 36kg per ewe for WA_4800, to 96-kg for NSW_1600, with the latter selling breeding animals in response to drought. Kilograms of liveweight produced by Australian farms is often above the global average of 42-kg per ewe. Therefore, it seems that prices have a significant impact on total returns.

[4] Does not include Algeria where prices are three times higher than the average.

Figure 15: Total liveweight sold per ewe



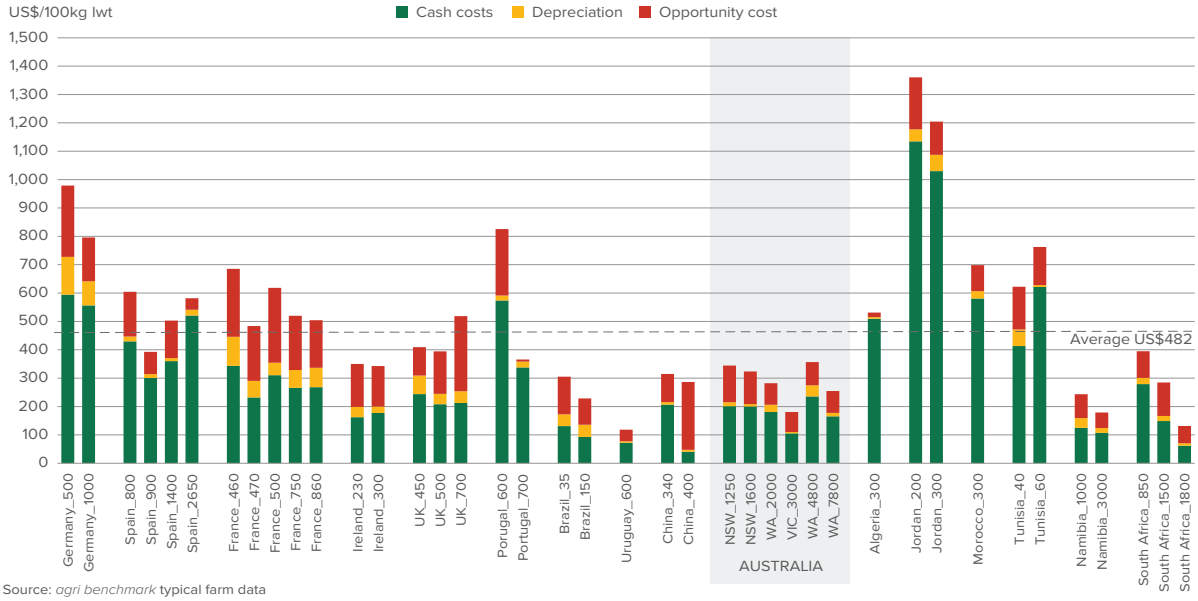
Source: *agri benchmark* typical farm data

The cost of production is examined below to understand the impact this has on achieving the levels of profitability for sheep production farms around the globe.

Costs of production

The average cost of production for the *agri benchmark* 40 farms is US$482 per 100kg lwt. Australian farms' cost of production is generally low in comparison to most global farms and in 2019, all were lower than the average outlined in Figure 16 and Table 4.

Figure 16: Total cost of production



Source: *agri benchmark* typical farm data

The cost of production in Jordan is almost three times the average, at $US1361 and $US1205 per 100kg lwt for Jordan_200 and Jordan_300, respectively. Feed is the highest component of their cash costs, at 64% for Jordan_200 and 72% for Jordan_300.

Tunisia, Morocco and some of the European farms, like the German farms and Portugal_700, also have high costs of production in comparison to the average (Figure 16).

Examining the cost of production in more detail for the Australian farms in Table 4, and comparing these costs to the average, it is apparent that VIC_3000 has the lowest cash cost component due to having the lowest feed costs (Figure 17). This farm reported the best seasonal conditions in spring (Table 2) and has the lowest total cost of production for all the Australian farms. Only Uruguay and one of the South African farms (S. Africa_1800) had cost of production lower than VIC_3000 (Figure 16 and Figure 17).

Table 4: Average cost of production for all 40 farms compared to Australian farms (US$ per 100 kg lwt)

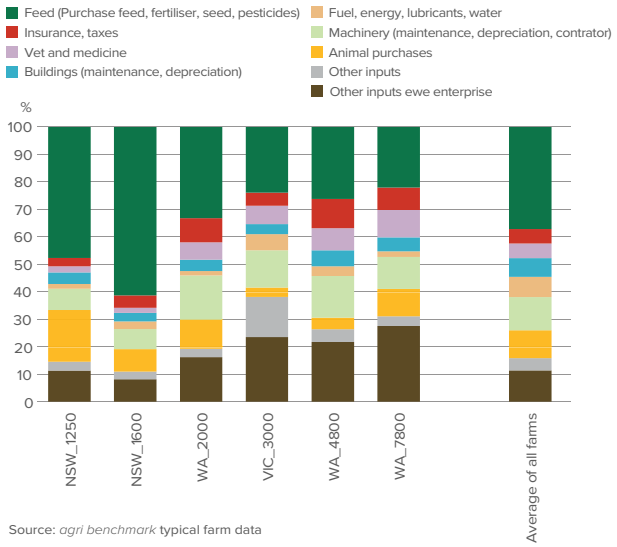
	US$/100kg lwt				Opportunity cost			
	Cash cost	Depreciation	Opportunity cost	Total	Labour	Land	Capital	Total
AU_1250	201	14	129	344	91	31	7	129
AU_1600	200	8	115	323	53	56	6	115
AU_2000	181	26	76	282	27	48	0	76
AU_3000	105	5	70	181	35	29	7	70
AU_4800	235	39	82	357	26	56	0	82
AU_7800	166	12	77	255	26	52	0	77

Source: *agri benchmark* typical farm data

The sheep enterprise costs in Figure 17 show some of the Australian farms had a high cost of feeding sheep in the 2019 drought conditions, especially the two farms in NSW where they also had to sell breeding stock to reduce numbers and manage feed requirements. When comparing the total cost of production by farming system, grazing systems generally have the lowest cost of production, except the two German farms, where their cost of production is high due to the cost of machinery and labour. The grains/concentrate and forage system has the highest cost of production, and includes countries like Jordan and Tunisia where feed costs are 68% and 86% of non-factor costs, respectively.

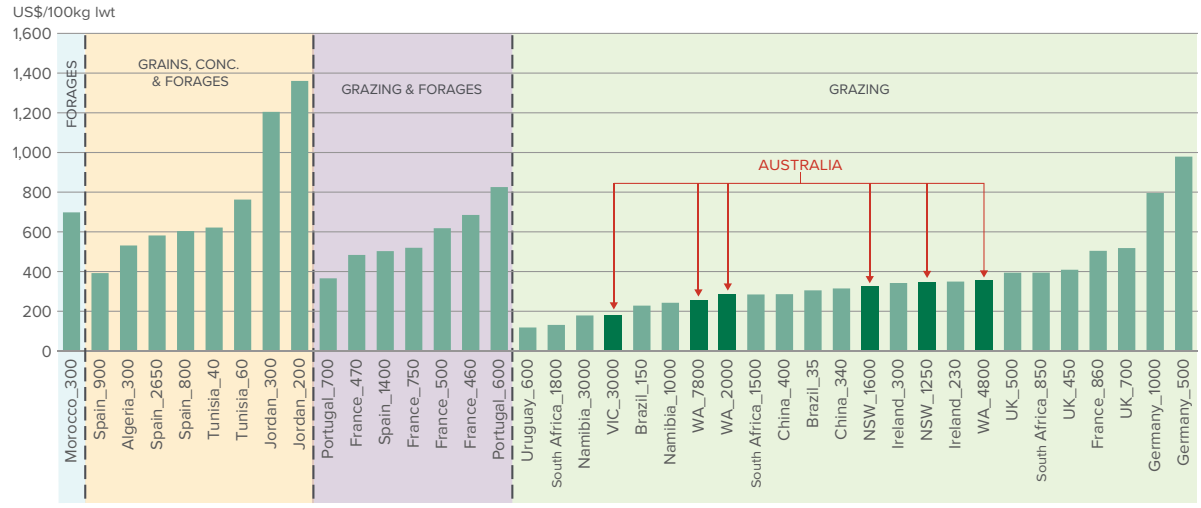
When comparing the total cost of production by farming system, grazing systems generally have the lowest cost of production, except the two German farms, where their cost of production is high due to the cost of machinery and labour. The grains/concentrate and forage system is the highest cost of production, and includes countries like Jordan and Tunisia where feed costs are 68% and 86% of non-factor costs, respectively.

Figure 17: Composition of enterprise costs for all 40 farms compared to Australian farms



Source: *agri benchmark* typical farm data

Figure 18: Total cost of production (US$ per 100kg lwt) ranked by farming system



Source: *agri benchmark* typical farm data

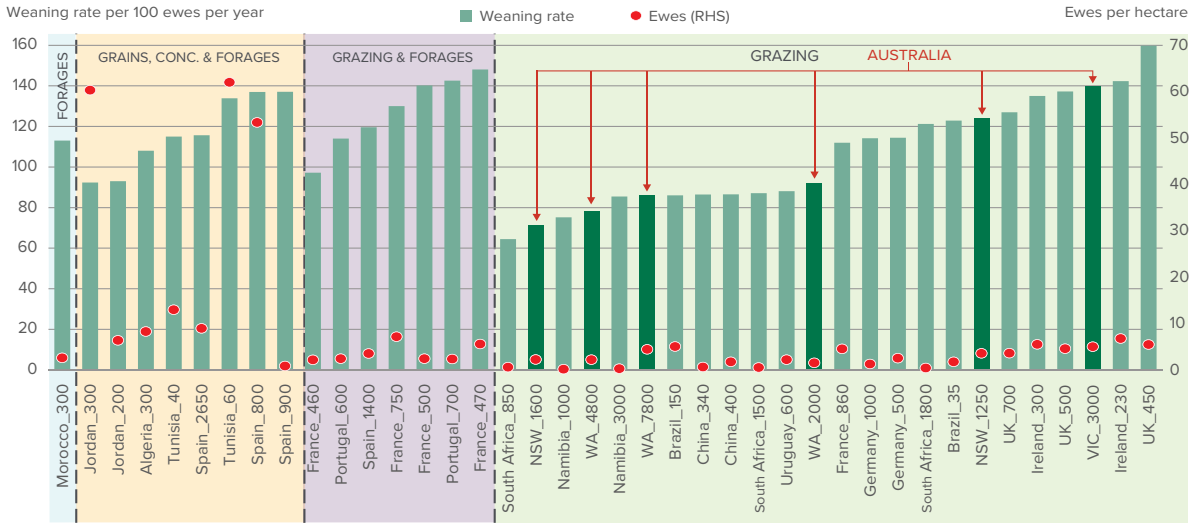
Comparing global sheep farm productivity

Productivity and efficiency are influenced by genetics and farming systems, which are often themselves influenced by environmental conditions. Production outcomes are measured using the productivity measures of weaning rates, weaning weights, lamb growth rates and lamb sale weights. These measures need to be examined in the context of the environment in which the sheep are managed and the grazing system.

Weaning rates are measured by the number of lambs weaned per 100 ewes per year. The grazing and forage system has the highest average weaning rate at 127%, grains/concentrates and forages at 116% and the grazing system at 106%. The grazing system also has the widest range of weaning rates, with the highest at 160% for the UK_450 farm and the lowest at 64% for South Africa_850.

The group of farms with weaning rates per 100 ewes per year less than 100% are generally in countries where environmental conditions create difficult grazing conditions, including four of the six Australian farms. NSW_1600 had lower-than-normal weaning rates at 71% due to drought conditions (in average seasonal conditions this would be expected to be near 80%).

Figure 19: Weaning rates (%) and ewes per hectare by farming system



Source: *agri benchmark* typical farm data

The number of ewes per hectare, shown as the dots in Figure 19, are more likely to be low when weaning percentages are low, both reflecting relatively harsh pasture system environments. In comparison, some farms with the grains/concentrates and forage system have high numbers of ewes per hectare because of the intensive nature of this system in countries like Tunisia and Jordan.

Columbia

Productivity and efficiency rely on good lamb growth rates, which means they can reach market weight sooner, therefore reducing total feed costs and animal health costs and lowering the risk of losses. Australian farms, except NSW_1600, have growth rates above the average of 232 grams per head per day for the grazing farms – see Table 5 and Figure 19.

Table 5: Average weaning weights (kg/head) and growth rates birth to weaning (g/head/day) by farming systems (range in parenthesis)

	Grains/conc and forages	Grains and forages	Grazing
Average weaning weights kg/head	19 (14-25)	27 (17-40)	31 (10-40)
Average weaning age (days)	81 (45-180)	77 (45-110)	123 (90-180)
Average growth rates birth to weaning g/head/day	211 (126-329)	301 (187-402)	232 (62-508)
Average sale weights per ewe (kg)	19 (9-29)	39 (25-51)	31 (10-64)

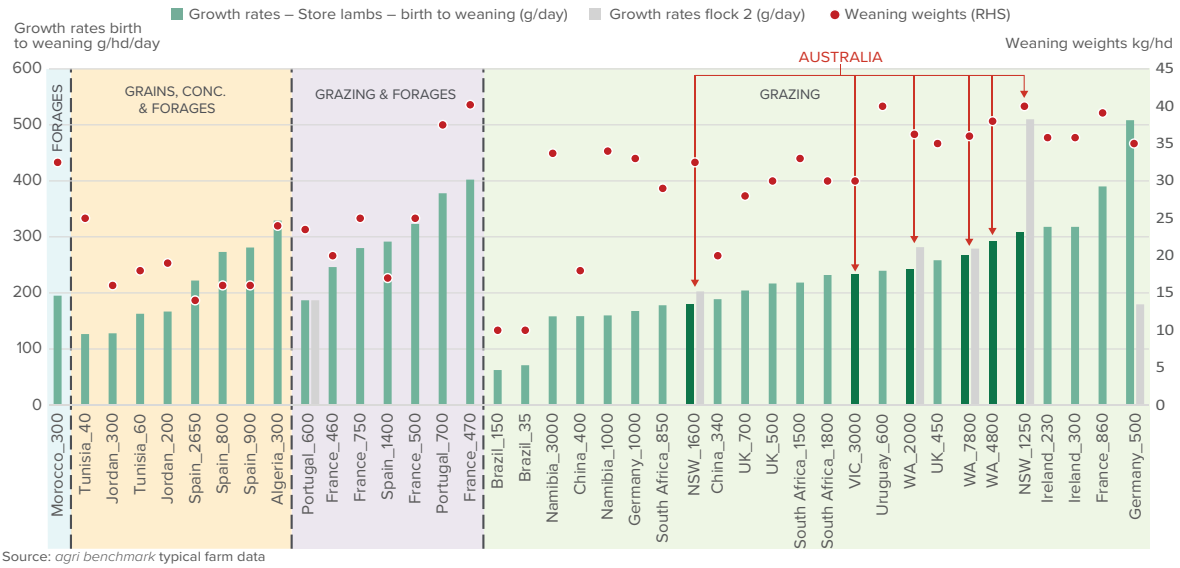
Source: *agri benchmark* typical farm data

The average weaning weights for the grazing system at 31kg per head are higher than either of the grains/concentrate and forage and grazing and forage systems – see Table 5, which is a function of the average weaning age (123 days). Average lamb growth rates for grazing systems at 232 g/head/day is higher than the growth rates for grains/concentrates and forages for two reasons:

There is a large variation in growth rates for grazing in comparison to the grains/concentrates and forages.

Germany_500 has growth rates of 508 g/head/day from grazing high quality pasture supplemented with grass silage, hay and oats, and this increases the average.

Figure 20: Store lamb growth rates (g/head/day) and weaning weights (kg/head)



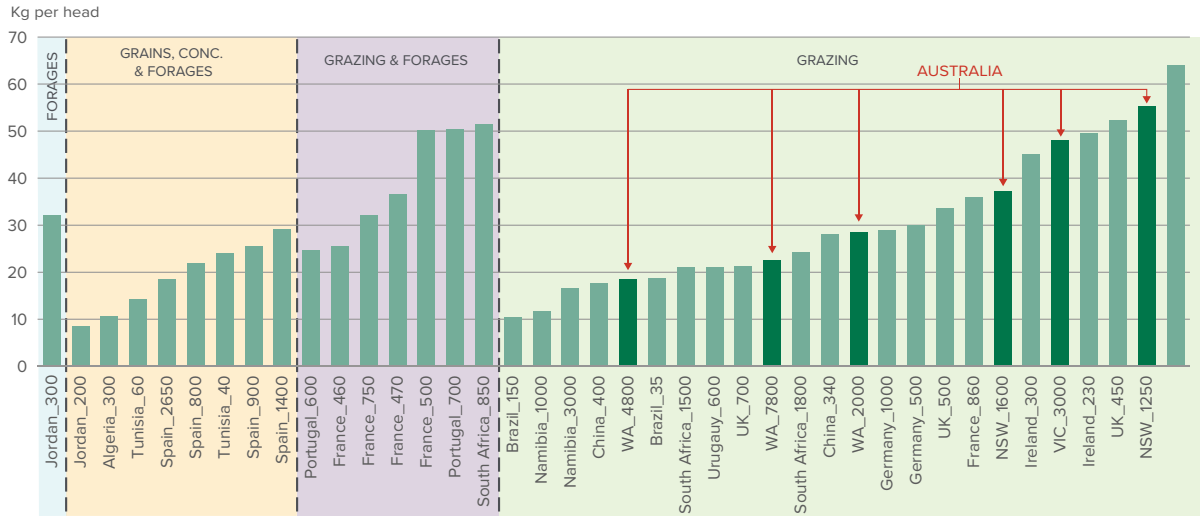
Source: *agri benchmark* typical farm data

Growth rates for flock 2 in Figure 20 is referring to a proportion of lambs with different genetics, like three of the Australian farms where they mate a proportion of their ewes (approximately 30%) to Merino rams for replacement ewes and wool production. The rest of the ewes are mated to a Poll Dorset ram to produce cross-bred lambs for meat production (refer to Table 2).

The growth rates for flock 2 refers to the growth rates for the crossbred lambs. The VIC_3000 farm is unusual, but typical for the region, as the farm focuses on meat production rather than wool (Figure 12), with Coopworth ewes – resulting in high weaning rates (Figure 19) and lamb sale weights per ewe (Figure 21) in comparison to the other Australian farms that have Merino ewes.

The varied growth rates for NSW_1250 farm is quite typical, where some lambs are sold at weaning and others are finished later by feeding grains and/or silage, sometimes in a confined area, to meet market specifications. This usually occurs mid-to-late summer when pastures have deteriorated, and do not provide enough energy to finish the lambs to meet market requirements.

Figure 21: Lamb sale weights per ewe



Source: *agri benchmark* typical farm data

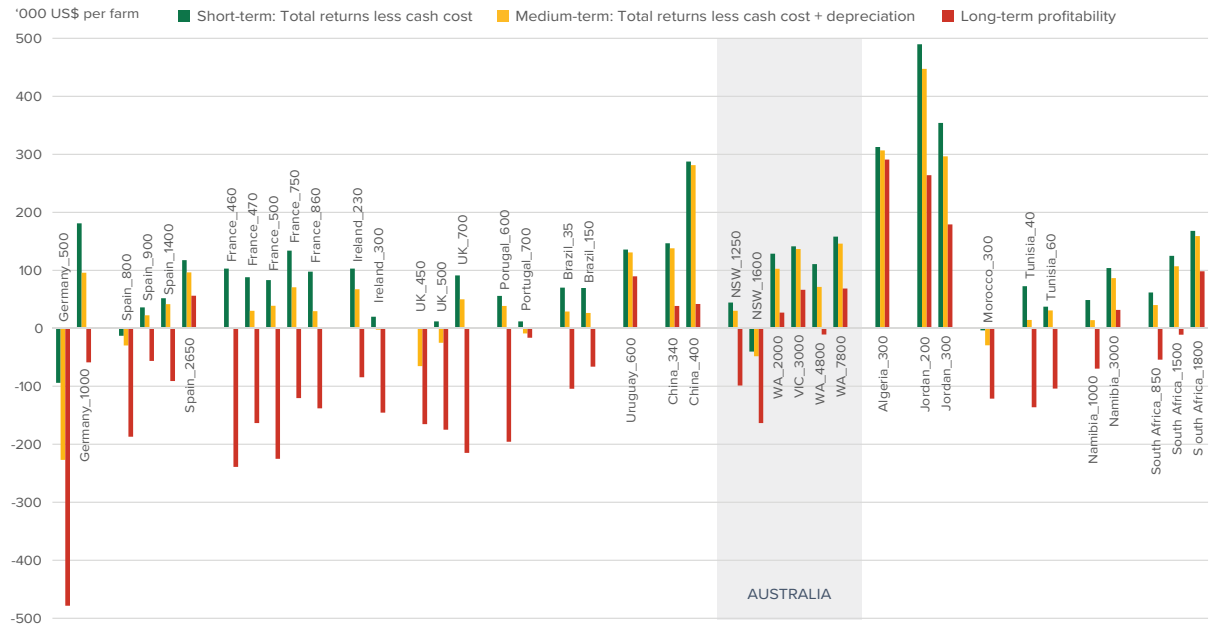
Lamb sale weights per ewe on the Western Australian (WA) farms (WA_4800, WA_7800 and WA_2000) are lower than the farms in NSW or Victoria, which is a function of the lower weaning rates (Figure 19), maintaining a self-replacing Merino flock and selling a portion of lambs as stores for other entities to finish – which is becoming a more typical practice and increasing in popularity in WA.

In summary

Most of the *agri benchmark* typical sheep farms achieved a short-term and medium-term profit, so many were able to generate enough revenue to pay for their enterprise costs and enough surplus to pay for depreciation, which meant they could replace machinery. However, only a few were profitable in the long-term where they could cover the opportunity costs of labour, land and capital (Figure 22).

The farms that were long-term profitable were Spain_2650, Uruguay_600, both farms in China, WA_2000, VIC_3000, WA_7800, the Algeria farm and the farms in Jordan and South Africa_1800 (Figure 22).

Figure 22: Short, medium and long-term profitability for 2019



Source: *agri benchmark* typical farm data

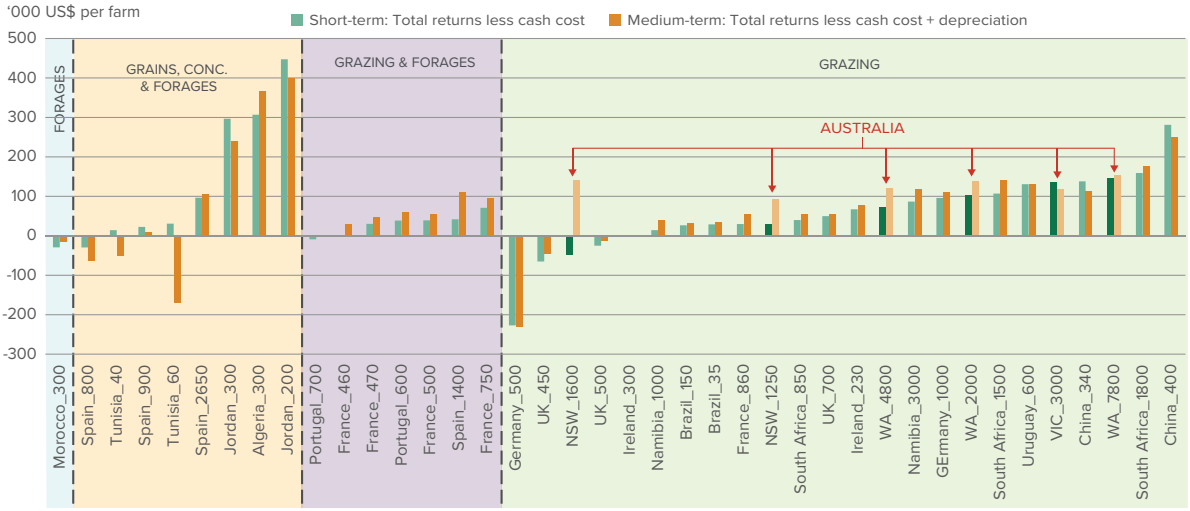
This was achieved either by high prices and high revenues (Figure 14) like on the farms in Algeria and Jordan, or low cost of production like on the farms in China, Australia, Uruguay_600 and South Africa_1800. The high cost of production in Europe offsets government payments for support, making it difficult to achieve long-term profitability.

Finally, examining medium-term profitability for 2019 compared to the previous year and looking at this through the lens of the production system, there was a mixed result, but overall, there was a decline in the average medium-term profitability.

For the grains/concentrates and forages system, there was an improvement in profitability from 2018 to 2019 – the average medium-term profitability increased from $US104 to $US148, whereas for the grazing systems, medium-term profitability decreased.

The average for grazing and forages decreased from US$66 to US$30, and the grazing system $US78 to $US57 – with falls in almost all countries bar China and Uruguay.

Figure 23: Medium-term profitability for 2019 and 2018 by production system



Source: *agri benchmark* typical farm data

Australian sheep farms

Australian sheep farms are large and diversified businesses in comparison to most countries represented in *agri benchmark*. They are sometimes impacted by dry seasonal conditions or droughts and 2019 was a year of drought for many. Yet despite these difficult seasonal conditions, most achieved short-term and medium-term profitability, except NSW_1600 where they were required to significantly change management practices to respond to severe drought conditions after managing dry conditions in 2018.

There are opportunities to improve productivity, for example weaning rates, but generally Australian sheep farmers are using their management skills to achieve internationally competitive labour productivity, growth rates, weaning weights and sale weights to achieve their short-term, medium-term and often long-term profitability. One of their strengths is economies of scale achieved with large farm sizes and resultant low operating costs per hectare.

Maintaining low cost of production and diversified enterprises on Australian farms remains vitally important to preserve the viability of the sheep enterprise, particularly as climate variability continues to be one of the main challenges. The results from the *agri benchmark* data indicate that Australian mixed farming operations are responding well to climate challenges and showing a high level of resilience.

Australia

Appendix 1

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. It is operated as an international network of research partners coordinated by the Thunen Institute – the German government rural research body. The sheep network has 16 member countries, covering 55% of world sheepmeat production and has been producing the results of comparative analysis over the last 8 years.

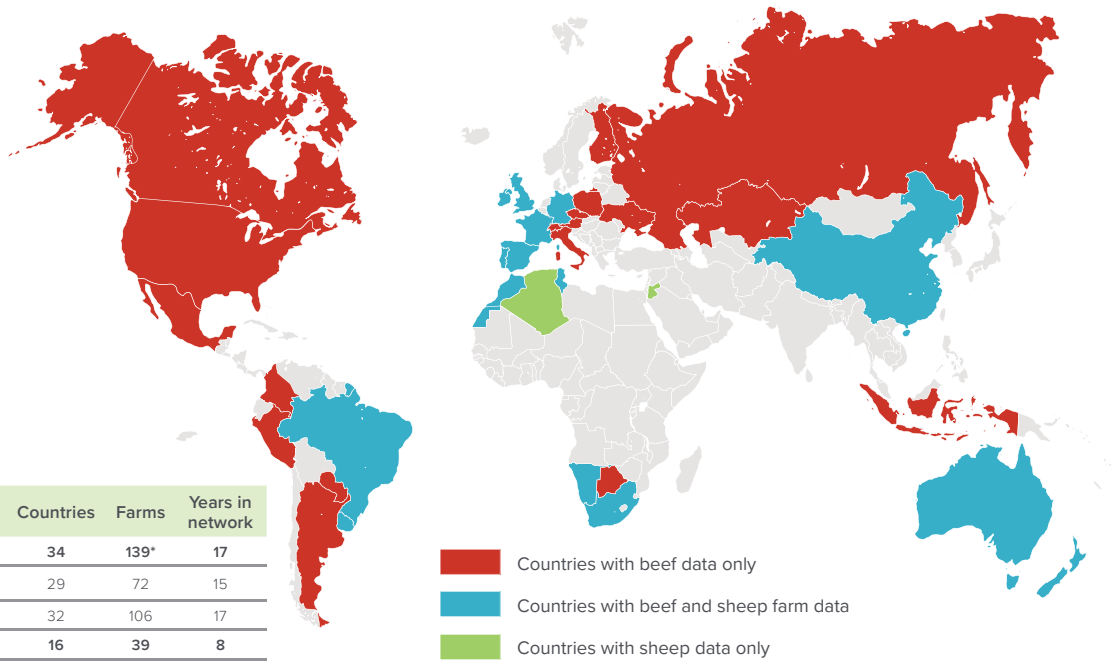
The core competence of the network is in analysing production systems, their economics, drivers and perspectives..

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; 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.

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 have both cow-calf and finishing

Source: *agri benchmark*

Within sheep, *agri benchmark* measures the sheep (or ewe) enterprise performance separately from (and together with) other outputs where the enterprise is diversified (in Australia typically with cropping and/or beef). Sheep enterprises are also often divided into those based on grazing; grazing and forages; grains, concentrates and forages; and forages alone.

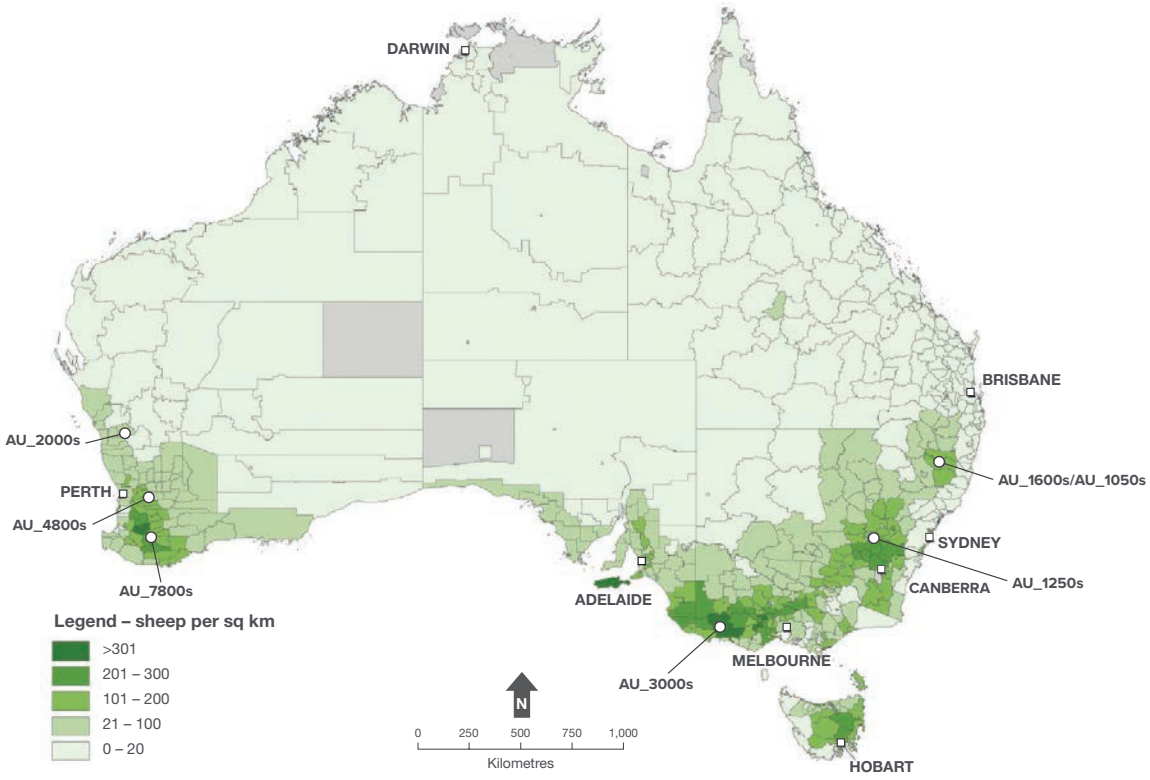
The farm-level results in this report are drawn from the collection of 'typical farm' data in each country, and subsequent analysis and research efforts of all member countries culminating in the 18th annual *agri benchmark* Conference (on-line), 15-17 June 2020.

A 'typical farm[5]' can be based on data for an actual farm judged to be typical of a key production system in a key region[6], 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 six typical sheep farms NSW, Victoria and WA.

Table A1: Australian *agri benchmark* typical sheep farms

Held (ewes)	Farm make-up
AU_1250s	(1250 ewes) – NSW slopes; Border Leicester X Merino ewes, Dorset rams; sheep + crops
AU_1600s	NSW Northern Tablelands; Merino ewes, Dorset & Merino rams; sheep + wool + cattle
AU_2000s	WA low rainfall; Merino ewes, Merino & Poll Dorset rams; sheep + crops
AU_3000s	Western VIC; Coopworth X Dorset self-replacing
AU_4800s	WA medium rainfall; Merino ewes, Merino & Poll Dorset rams; sheep + crops
AU_7800s	WA high rainfall; Merino ewes, Merino & Poll Dorset rams; sheep + crops

Figure A2: Location of Australian *agri benchmark* typical sheep farms and sheep density



Source: ABS and *agri benchmark*

[5] A preferred method compared to compiling data from a group of individual farms and ranking them according to the average, or above-or below- average which is argued as a futile exercise in farm business management economics (Sefton and Cox,2005; Ferris and Malcolm,1999;Mauldon & Schapper 1970).

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