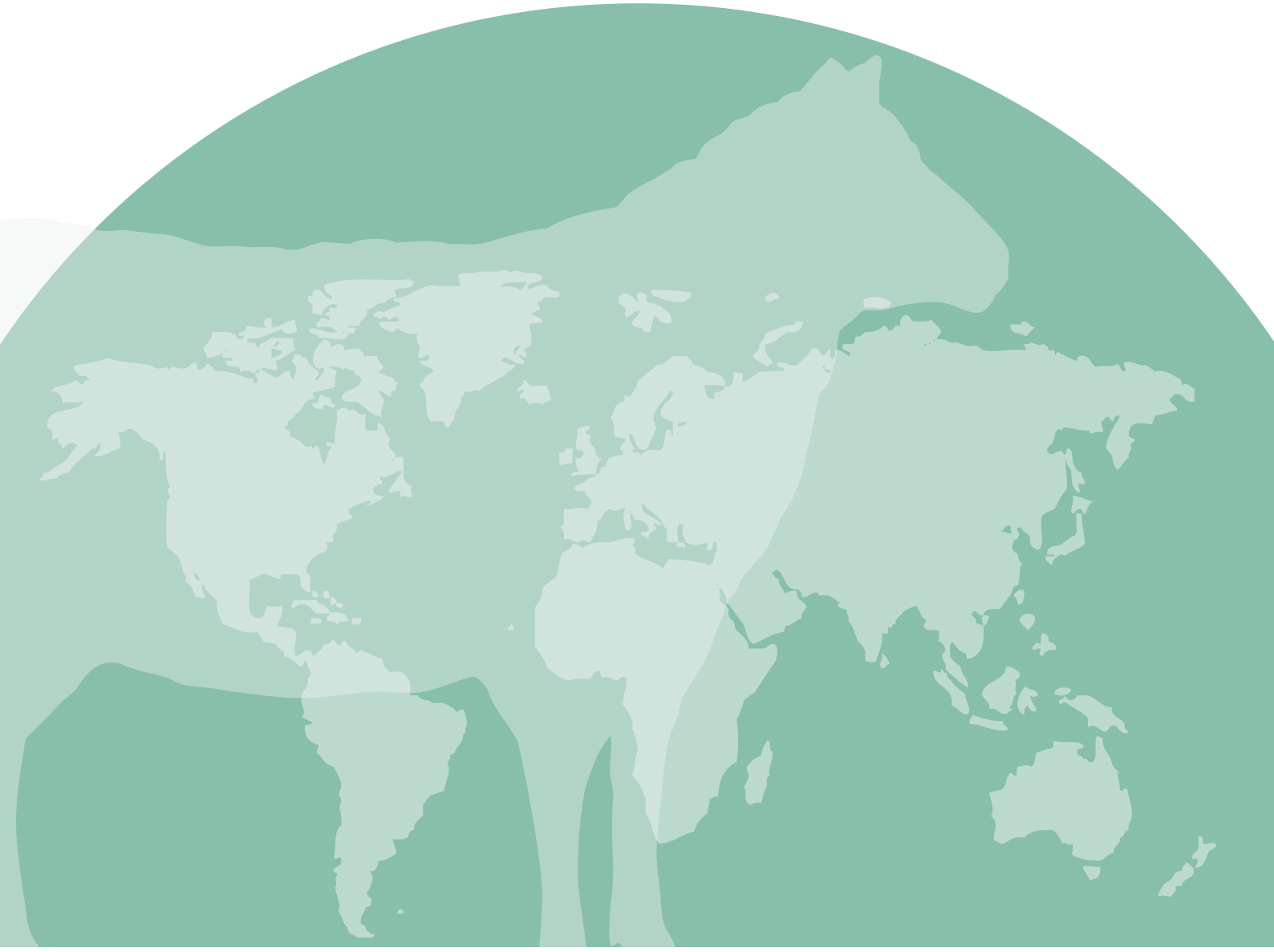
MEAT & LIVESTOCK AUSTRALIA MARKET INFORMATION

How are global and Australian sheepmeat producers performing?

Global *agri benchmark* network results 2017



agri benchmark

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Commissioned by Meat & Livestock Australia

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Highlights

Sheepmeat

- Both global food prices generally and sheepmeat prices are now well below the extraordinary peaks of 2011 and latest global projections and the 2017 *agri benchmark* Conference confirmed that these peaks are not likely to be revisited within the next 10 years.
- In fact, the 2017-2026 OECD-FAO projections are more pessimistic than previous years, with food prices expected to fall slowly in real terms over the next 10-years, but with much less volatility than over the preceding decade.
- However, the outlook can still be described as favourable for sheepmeat producers, as prices are expected to remain well above levels prior to 2010 (immediately before the extraordinary price spike).
- Underpinning these forecasts is a view that import demand growth in China and the Middle East will be more subdued, grain inventories will remain high (keeping meat prices lower than the past decade and more stable) and growth in beef and sheepmeat supply will be faster than recently.
- However, sheepmeat consumption growth will continue to be dominated by China, Africa and South-Central Asia (centred in India).
- The 2017 *agri benchmark* Conference also highlighted the current uncertainty in the global trade outlook caused by unpredictable import demand growth in China and the Middle East as well as new market access issues, particularly Brexit and the rise in protectionism (led by the US).
- Within this more subdued and uncertain sheepmeat trade outlook, Australia holds a unique place, being one of only two major exporters, and the only one expecting significant supply growth.
- Furthermore, the source of the current trade uncertainty, particularly Brexit, could improve Australia's small access to the UK and EU.
- Sheep farms globally continue to make profits at the whole farm level, and in some countries this is related to the level of diversification or government support.
- Australian and New Zealand sheep farms achieve comparable profits globally in the medium-term.
- In 2016, all of the typical sheep flocks analysed in Australia covered short- and medium-term costs at the enterprise level, with four of them also covering long-term costs, with the remainder contributing to, but not fully covering opportunity costs.
- Sheep farms globally have generally experienced declining costs (in US$) since 2013, especially for feed grains and fuel, which in part reflects exchange rate movements against the US$.
- In Australia, total returns to the sheep enterprise only (not counting returns from other outputs of the farm such as crops or cattle) for the eastern typical farms experienced increased returns across most categories in comparison to 2013, 2014 and 2015.
- Australia tends to have similar ewe and lamb losses to most other regions of the world, with the exception of South Africa, Brazil and France which are notably higher.
- Australian farms tend to have lower weaning rates than European countries, especially in Merino based systems, and maintain similar weaning rates to more rangeland or less-developed production systems where nutrition and/or genetics may be constraints.
- Australian systems generally maintain above average growth rates for animals being sold or slaughtered at weaning, which is comparable to most global regions, including Europe and NZ.
- Australian sheep production systems produce the heaviest lambs globally, especially within grazing based production systems.
- All Australian systems achieve cash costs of <US$2.40/kg lwt of sheepmeat produced. Globally, only farms from Uruguay, Colombia, South Africa, Namibia, China, Brazil and NZ have total costs <US$2/kg lwt. Grazing based systems are the least expensive for producing sheepmeat.
- Australian labour costs are over 10 times higher than China, European, African and South American countries, and 50% higher than NZ. This is counteracted by Australian sheep systems producing 5-10 times more sheepmeat per hour of labour input than the rest of the world.
- Australian farms maintain a low total cost of meat production, with New Zealand, Uruguay, Colombia, Namibia, and some farms in China, Brazil and South Africa also maintaining low total costs.

Introduction

This report presents the *agri benchmark* network's perspectives on recent global sheepmeat 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 sheepmeat producers and what are the main areas where our productivity differs from other countries?

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

What is *agri benchmark*?[1]

agri benchmark is a global, non-profit and non-political network of agricultural economists, advisors, producers and specialists in key sectors of agricultural value chains. The sheep network has 40 farms in 19 member countries, covering 55% of world lamb production and has been producing the results of comparative analysis over the last 6 years.

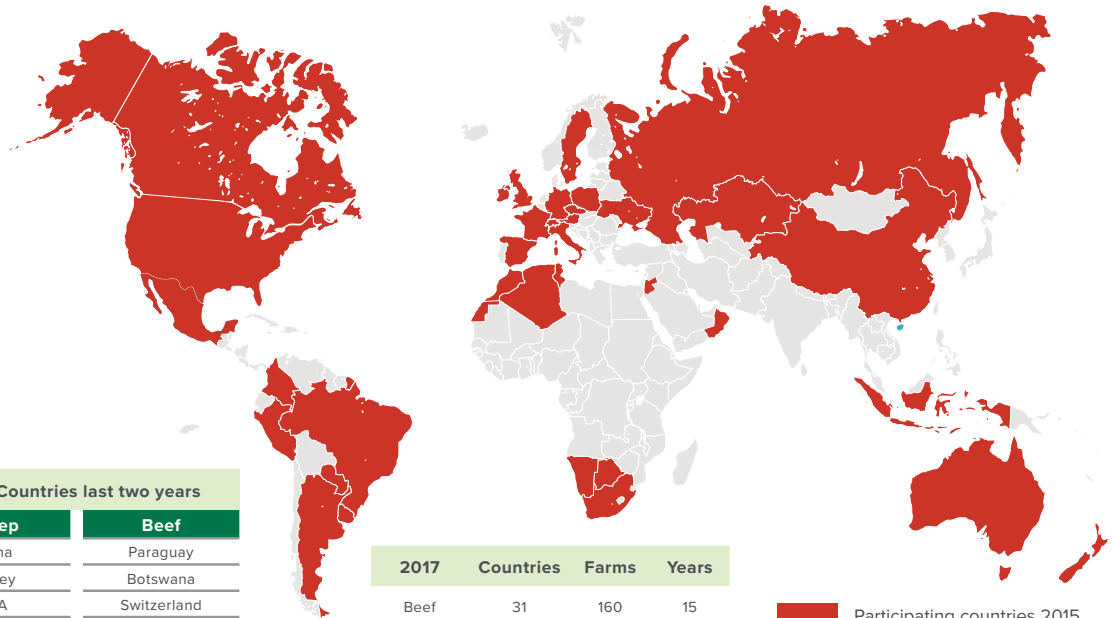
The core competence of the network is in analysing production systems, their economics, drivers and perspectives.

agri benchmark aims to assist:

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

agri benchmark has branches covering beef cattle and sheep, dairy, pigs, cash crops, horticulture, organic farming and fish. Within sheep, it covers breeding and finishing enterprises (ewes and lamb/sheep finishing). It is also unique in being able to separately measure the performance of the breeding and finishing operations even on joint breeding/finishing farms. Furthermore, it measures sheep enterprise performance separately from (and together with) other outputs where the farm business is diversified (in Australia typically with some cropping, but often also other enterprises such as cattle).

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



New Countries last two years	
Sheep	**Beef**
China	Paraguay
Turkey	Botswana
USA	Switzerland
Colombia	
Jordon	

2017	Countries	Farms	Years
Beef	31	160	15
Sheep	19	40	6

Source: agri benchmark

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

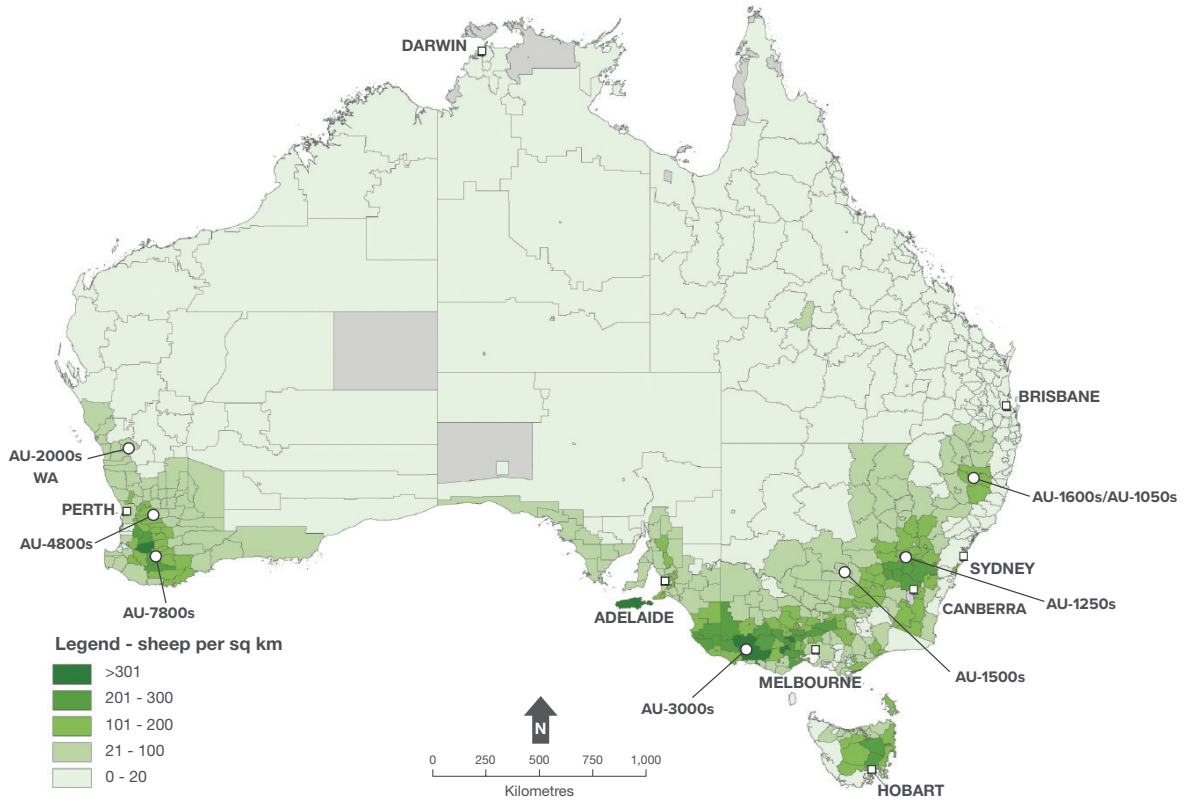
The farm-level results in this report are drawn from the collection of 'typical farm' data in each country, and subsequent analysis and research efforts of all member countries culminating in the 15th annual *agri benchmark* conference in Saskatoon, Canada, 17-23 June 2017.

'Typical farms' are farms 'engineered' by local producers and experts to be typical of a country's main sheep production systems, using annual data drawn from farms in the key production regions. In Australia data is collected for seven typical sheep farms across NSW, Victoria and WA.

Table 1: 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 1500s	NSW south western plains; Merino ewes, White Suffolk rams; sheep + crops
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 2: Location of Australian *agri benchmark* typical sheep farms and sheep density



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Global price and cost trends

Food and meat prices

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

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

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

The 21% decline in global meat prices (in US$) between 2014 and 2016 was led by pig meat (-25%), sheepmeat (-24%), and poultry (-22%) declines, while beef fell 17%.

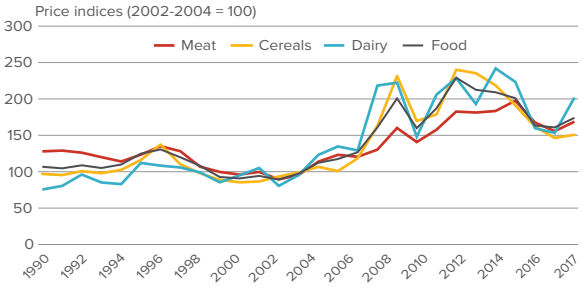
2017 has seen an unexpected recovery in meat prices globally (to September), led by sheepmeat (21% rise) with the other meats 5%-11% higher (FAO global food price indices). This has been led by price rises in North America.

Global sheep price trends

Sheep prices in US$ terms also fell in recent years, having peaked in 2011 in most countries. The main exceptions were in China, the Middle East and some African countries.

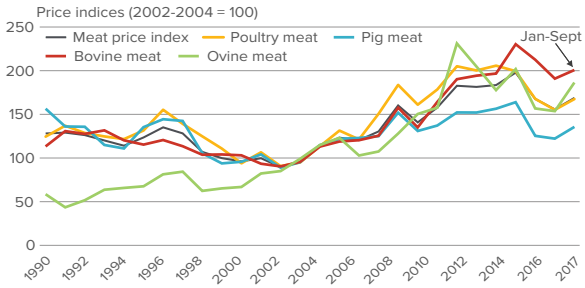
However, sheep prices in local currency terms rose significantly in 2016 for most countries (see Figure 6), especially in Australia, Mexico, Uruguay and South Africa. Notable exceptions were in the UK and Spain.

Figure 3 FAO monthly cereal, meat and food price indices



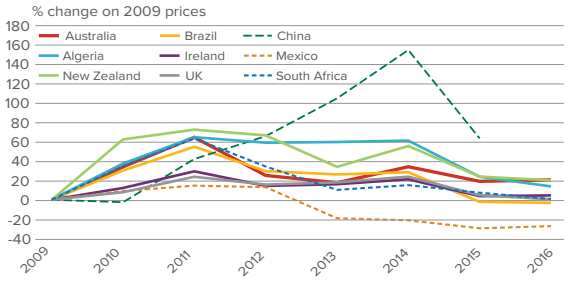
Source: FAO Food Indices

Figure 4 FAO monthly meat price indices



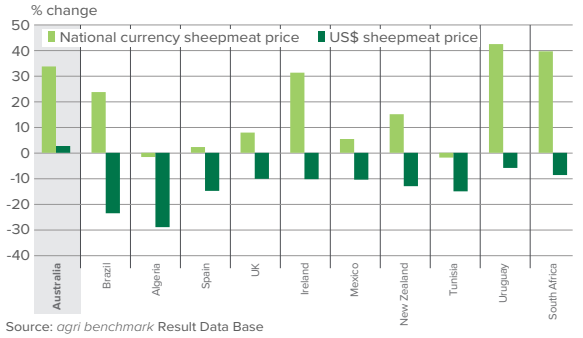
Source: FAO Food Indices

Figure 5: Sheep prices in US$: *agri benchmark* farms



Source: *agri benchmark*

Figure 6: Sheepmeat price changes in US$ and national currency from 2014 to 2015



Source: *agri benchmark* Result Data Base

OECD-FAO sheepmeat projections

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

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

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

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

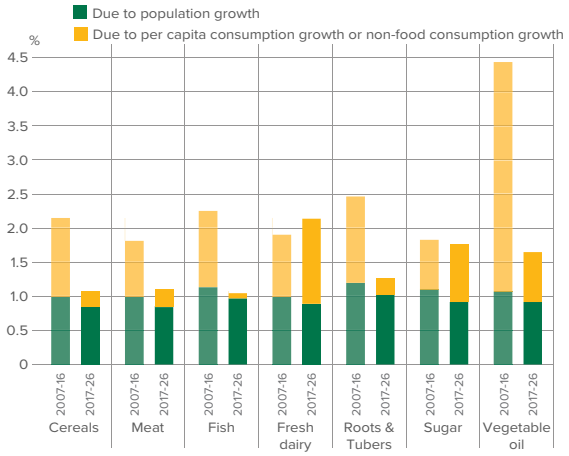
Within the meat sector, poultry is projected to contribute around half of all supply and consumption growth in the next 10 years.

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

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

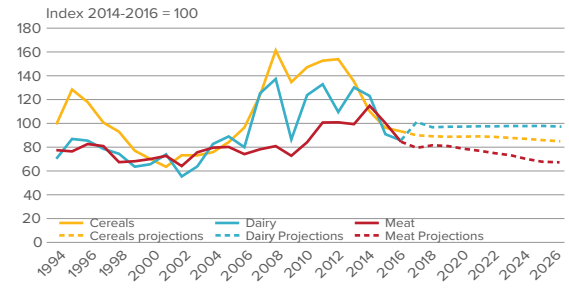
Prices across food commodities are projected to fall in real terms in the next 10 years, except for dairy – a significantly more pessimistic view than in the 2016 and 2015 OECD-FAO Agricultural Projections which favoured a small upward trend, especially for meats. The main reason for this change appears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

Figure 7: Annual growth in consumption of key commodity groups



Source: OECD FAO Agricultural Outlook 2017-2026

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



Source: OECD-FAO Agricultural Outlook 2017-2026

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

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

What sets sheepmeat apart from other meat proteins globally is its unique supply situation. Global sheepmeat prices are being kept high by supply constraints caused by the relationship with prices of other commodities from the animal (such as wool and milk); competition for grazing land and land use transitions to other enterprises (particularly grain and dairy); urbanisation and environmental considerations, especially land degradation (as sheep are often found on more arid or marginal agricultural land).

Since 2012, however, sheepmeat production growth has improved relative to other meats and OECD-FAO now expect this to continue out to 2026. This is because the price of sheepmeat and sheep farm profitability has risen sufficiently relative to competing enterprises (particularly cropping) to entice faster growth in flocks and production than for other meats.

OECD-FAO expects sheepmeat production to grow 2%/year over the coming 10 years, faster than in the previous 10-year period – encouraged by favourable prices and profitability. Supply growth is expected to be led by China (37% of the total growth), Africa (31%) and India/Pakistan/Bangladesh (8%), with Australia contributing 5% and NZ 1%.

With faster supply growth and weaker import growth expected in China and the Middle East (especially in the short-term), sheepmeat prices are expected to rise only slowly in nominal terms, and fall modestly in real terms. However, in 2026 sheepmeat prices in real terms are still expected to be above levels prior to 2010 and around 50% higher than in the 1995-2005 period – favourable for producers, especially with on-going productivity gains (reducing costs), and better than price trends for other meats and cereals.

Sheepmeat consumption growth over the next 10 years is again expected to be dominated by China (38% of total growth), Africa (30%) and India/Pakistan/Bangladesh (7%), with Europe contributing 3% and Australian 1%.

Amongst the protein sources, sheepmeat faces the brightest demand prospects, as it is a product preferred by consumers in the fastest growing population centres and ethnic groups – particularly with Muslims and Hispanics and in the Middle East and Africa. Also, it suffers from no religious taboos and, unlike beef, has not encountered major disease or food safety incidents, such as BSE, SARS or E Coli.

Also, it has only a 4-5% share of global meat consumption, and in many markets is a small niche product, potentially better able to withstand high prices.

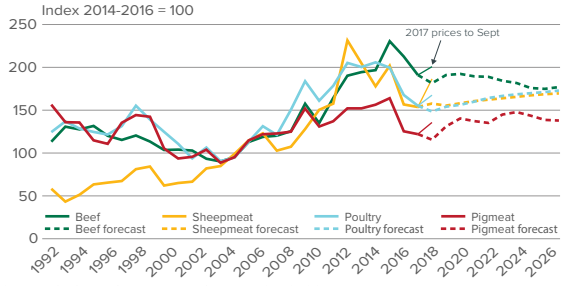
Global sheepmeat exports are projected to continue rising in the next decade, driven by import demand in developing countries, especially China and the Middle East. The 10.5% rise forecast for the 10 years to 2026 compares with only 3.4% in the decade to 2016, but 20% in the decade to 2006.

In 2016, only an estimated 9.1% of global sheepmeat production was traded and this is in long-term decline as production and consumption in both China and Africa rises faster than imports (in absolute terms) – with local consumption growth mainly satisfied by expansion in local production rather than imports. In 1996, 10.5% of production was traded and by 2026 this proportion is projected to fall to 8.3%.

Australia is projected to overtake New Zealand as the largest sheepmeat exporter this year, and expand a further 109kt or 26% between 2016 and 2026. With a further shift from sheep to dairy in New Zealand, sheepmeat exports are forecast to fall slightly to 2026. The only other significant exporters with forecast rises are Sudan, India and Ethiopia, but even combined their growth (65kt) is well short of Australia's.

The only countries expected to have a substantial increase in sheepmeat imports are the EU (36kt net increase) and Saudi Arabia (34kt), with only a 10kt rise projected for China (due to expansion in local supplies and slower demand growth) and Malaysia (7kt) – though other Middle East countries (not specifically covered in the OECD-FAO projections) are also likely to experience sheepmeat import growth (especially the UAE).

Figure 9: OECD-FAO Meat Price Projections (nominal)



Source: OECD-FAO Agricultural Outlook 2017-2026

Other major developments highlighted

Sheepmeat market access uncertainty

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

In particular, Brexit is of immense concern to sheep producers in both the UK and Ireland as well as to Australia and New Zealand, as major sheepmeat exporters to the EU and UK.

Around 40% of UK sheepmeat is exported and 90% of these exports are to the EU, so the possible imposition of major quota/tariff and technical barriers on access between the EU and UK would likely lower UK sheepmeat prices and farm returns and raise those in the EU. The UK is also a major market for exports of Irish lamb and this could be diverted to the EU. Also, both UK and Irish sheep farmers are dependent on CAP farm subsidies and a likely fall in subsidies could severely impact incomes.

The ultimate impact on Australian sheepmeat exports will depend on the Australian and New Zealand bilateral access negotiations with both the UK and EU, and also on the internal sheepmeat price impacts caused by the reshaping of intra-Europe trade flows and government supports cause by Brexit.

Other new trade access issues featured at the Conference included the US withdrawal from the Trans-Pacific Partnership (TPP) agreement negotiations and Trump's threats to NAFTA. The threats to NAFTA have already contributed to Mexico increasing access to Australian and New Zealand meats.

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

However, the renegotiation of access to the UK and EU brings with it the possibility of redressing the historical inequity in access that New Zealand and Australia have with these high priced markets – with a potential substantial increase in demand for Australian sheepmeat.

Other country snippets

- China's high prices and government supports are fuelling renewed but slow growth in the national sheep flock (about 1%/year) and production. The Chinese government has introduced a new pastoral region subsidy program aimed at raising herder's incomes while also enhancing grassland recovery (50% of money is to set aside land from grazing). There has also been consumer resistance to the high sheepmeat prices in China.
- UK lamb crop has risen but has been slower to finish, while a falling UK£ has helped exports to the rest of Europe and reduced imports from NZ – prices on UK markets have fallen.
- Spanish sheepmeat consumption remains low but exports (to elsewhere in EU and Middle East region) are increasing.
- Following severe drought, both South Africa and Namibia sheep supplies are down (and prices up) as herds are being rebuilt (mirroring events in Australia).
- There has been no evidence of growth in South American sheep flocks, held back by recent droughts, rising costs as well as economic and political problems.
- Jordon has removed sheep import bans, lowering prices and causing losses to local producers.

China

Global performance of sheep farms

Whole farm profitability ('000 US$)

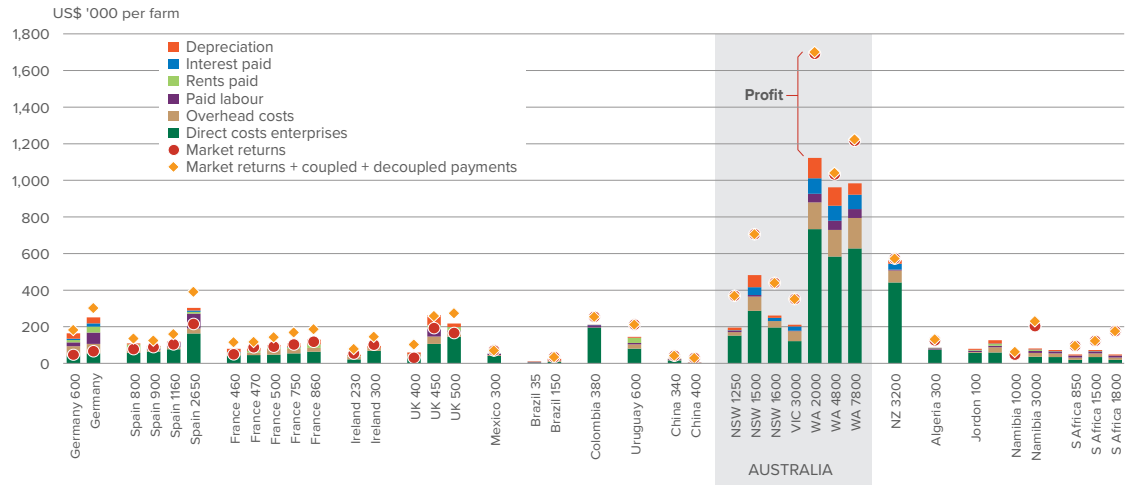
All but 3 of the 38 typical farming systems (across 18 countries) managed to make a profit at the whole farm level[2], although this is partly dependent on other enterprises or non-farm returns (coupled and non-coupled government payments).

On a whole farm profit basis (medium-term profitability), Australia's 'typical' sheep farms were the most profitable (in US$ terms), predominantly due to their scale and incomes received from other enterprises (crops and beef). In absolute terms, and similar to 2014 and 2015, the most profitable farms globally were from Western Australia (AU-2000 and AU-7800), followed by other Australian farms in the South West Slopes and New England of NSW (AU-1500 and AU-1600). Notably, the New Zealand farm, NZ-3000, achieved a loss for the first time in 2016.

Australian sheep farms generally maintain higher levels of absolute profitability due to the diversification of the typical mixed farming systems and their scale. In 2016, cropping returns in particular, especially in the WA systems, were generally above average due to favourable yields. Notably, AU-2000 has achieved significant profits over the last two years due to high cropping income.

On average, European farms achieved a net profit margin of -53% without government payments in 2016 (without payments, only the Irish farms and one French farm was profitable), but with payments achieved an average net profit margin of 26% (with all but one UK farm generating a profit), whereas Australian farms averaged 31%. On average, this represents another small improvement in EU profitability and a steadying of Australian farm profitability when compared to 2015, although some individual farms have experienced significant changes.

Figure 10: Whole sheep farm profitability ('000 US$)



Source: *agri benchmark*

Farm Identification indicates number of ewes

Sheep flock profitability (US$/100kg lwt)

When the 2011 to 2016 profitability of the sheep flock is examined, without taking into account income from other enterprises on the same farm or farm level government payments, the global economic performance is generally positive (better than for beef cattle) in the short- and medium-terms.

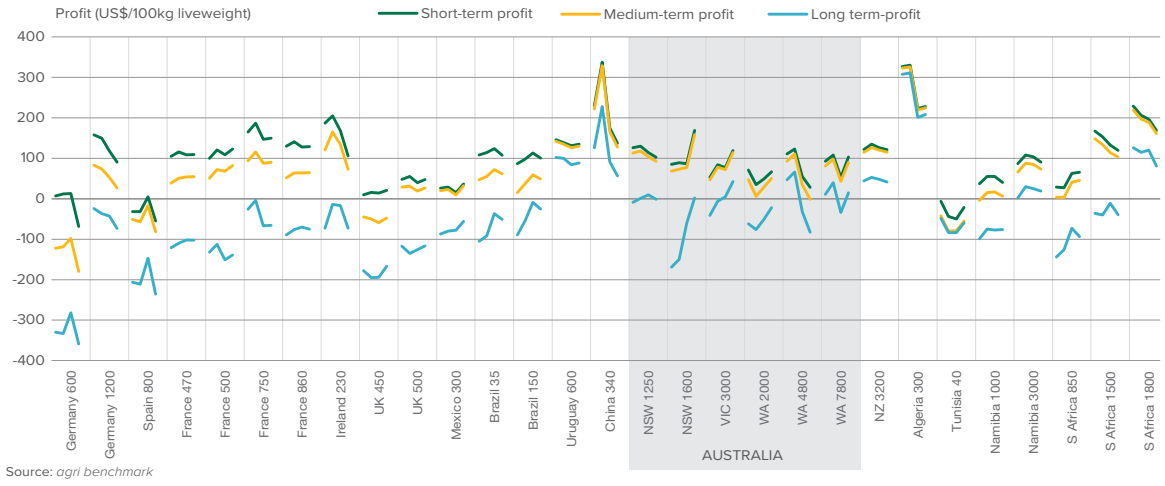
Many countries, even with significant government payments (excludes de-coupled payments), are not profitable in the longer-term. The exception to this is Uruguay, New Zealand, China, and some systems in Australia and Africa. The profitability of sheep flocks in many other parts of the world has trended downwards since 2011, particularly in Germany, Spain, China, Uruguay, Algeria, and some systems in France, Australia and South Africa. However, other farms like many of the South American, French, UK, Australian and African systems have been increasing in profitability.

2 Sheep farm enterprise income refers to income attributed to the sheep component of a farm. Whole farm profit refers to the combined income from all enterprises undertaken on the farm, including for example, cropping or cattle, net of the costs of operation.

In 2016, all of the typical sheep flocks analysed in Australia covered short- and medium-term costs (includes depreciation), with four of them (NSW-1600, NSW-1250, VIC-3000 and WA-7800) covering long-term costs (opportunity costs), with the remainder contributing to, but not fully covering opportunity costs. For the majority of Australian systems (excluding WA-4800 and WA-7800) this has improved from 2011 to 2016.

- Profitability is analysed by comparing total returns with three cost levels – cash costs (short-term), then adding depreciation (mid-term) and then adding opportunity costs (long-term).
- Mid-term profitability in 2016 was lower than the year before in both the German farms, Spain, Ireland, Brazil, China (after a dramatic increase in 2014, it is now achieving the lowest levels of profitability since 2011), two Australian farms, New Zealand, Namibia and two of the South African farms.
- Based on short- to medium-term profitability, the majority of sheep farms can easily continue to operate in the short- to medium-term and cover their cash costs and costs of replacing plant and equipment (which is notably higher in European and Brazilian systems). The exceptions to this is one of the German farms, the Spanish farm, one of the UK farms, and the Tunisian farm.

Figure 11: Time series of short, medium and long term profitability from 2011-2016 (US$/100kg lwt)[3]



Source: *agri benchmark*

[3] Short-term profit is where income (from sales and coupled government payments) covers all cash costs (including interest and paid wages), medium-term profit allows additionally for depreciation, and long-term profit allows for the opportunity costs of family labour, land and other capital invested. Opportunity costs on capital such as land, is calculated using a market leasing rate in each country and region.

How efficient are Australian sheepmeat producers?

Total returns (US$/100kg lwt)[4]

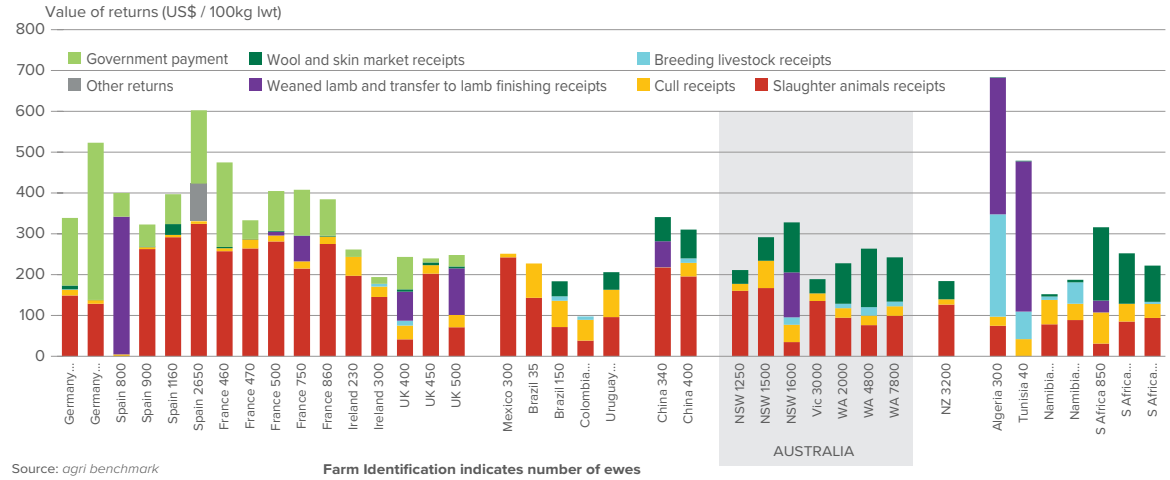
Australian sheep systems are diversified in comparison to the rest of the world, with wool and cropping being major sources of additional income. The majority of Australian systems are in mixed farming zones, which also represent areas of highest sheep production and flock sizes. Wool income, which has increased from 2013 levels, is only a significant contributor to income in Australia, NZ, China, Uruguay and South Africa. Other countries, like the UK, NZ and Uruguay, also commonly maintain diversification with cattle enterprises.

Australian and NZ typical sheep farms are the largest by global standards, having from 2 to 8 times higher total returns (revenue) from the business.

There is large global variation in total returns (revenue) per 100kg lwt sold. Most of the sheep systems in the EU countries receive significant amounts of government payments. These are either Whole Farm Payments (United Kingdom), Livestock Payments or a combination of the two.

In Australia, the total sheep enterprise returns for the eastern typical farms increased across most categories in comparison to 2013, 2014 and 2015. For the Australian Merino dominant typical farms (AU-1600, AU-2000, AU-4800 and AU-7800) wool returns made up 40-50% of total returns, which is only matched by the South African farms. Notably, the New Zealand typical farm has experienced a halving of its total sheep returns compared to 2015, primarily due to lower slaughter animal receipts.

Figure 12: Total sheep enterprise returns (US$/100kg lwt)



Source: *agri benchmark*

Farm Identification indicates number of ewes

[4] Total sheep enterprise returns include all returns of the sheep enterprise: cull and slaughter animals, breeding returns and store lambs, wool returns and level government payments.

Total liveweight sold per ewe (kg lwt per 100kg ewe lwt)[5]

Generally Australian systems with a primary lamb production focus produce above average amounts of live weight per ewe. The highest production per ewe in grazing based production systems came from VIC-3000 which is based on a self-replacing meat breed flock. This was followed by one UK system and two dedicated lamb producing flocks, NSW-1250 and NSW-1500, all of which exceed most meat producing flocks in Europe. The distribution of the other Australian typical sheep farms across the grazing based production systems, relates to the balance between the proportion of Merino and breeds for meat production, with the lowest ranked Australian system, NSW-1600, being predominantly based on a fine wool Merino flock with only a small proportion used for first-cross lamb production.

Low levels of production per hectare tend to come from regions with lower rainfall and rangelands environments (China, Brazil, Jordon, Namibia, South Africa and some parts of WA). Moderate to high productivity occurs in higher rainfall regions across Europe, Australia and NZ. Very high land productivity occurs in systems in Mexico and Tunisia, where animals are housed.

Comparatively, Australian farms found in lower rainfall zones of WA are also similar to Uruguay, China, and also parts of Europe (Spain and Germany). The higher rainfall farms found in south west WA, western Victoria and central NSW have comparable land productivity to European, UK and NZ systems.

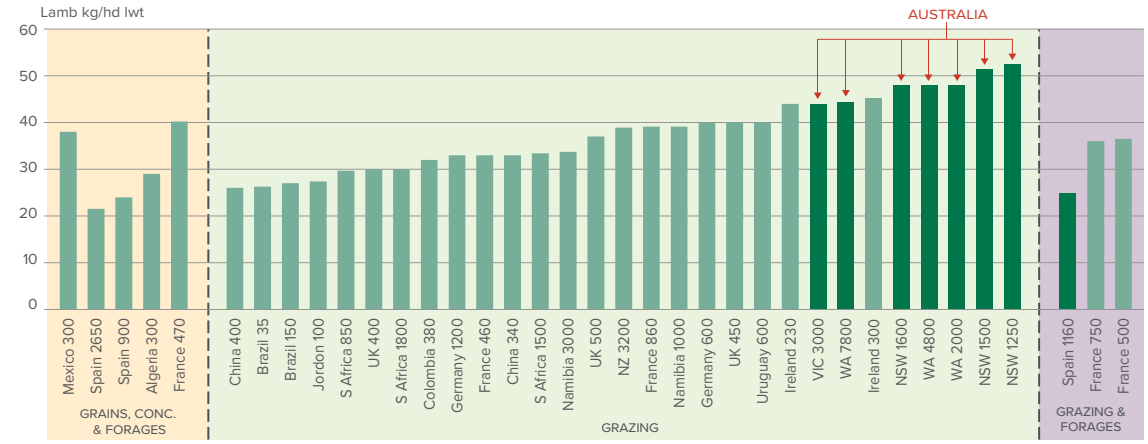
Figure 13: Total liveweight sold per 100kg ewe liveweight (kg)

Source: *agri benchmark*

Lamb carcass weights

Australian sheep production systems tend to produce the heaviest lambs globally, especially within grazing based production systems. Only typical farms from Ireland produced lambs to a weight heavier than or equivalent to some of the Australian farms. Markets and processors in some countries are preferring lighter carcass weights (for example, less than 21.5kg cwt in the UK) to meet demands from consumers on serving and cut sizes.

Figure 14: Lamb slaughter weight for different production systems)



Source: *agri benchmark*

[5] Total sheep enterprise returns include all returns of the sheep enterprise: cull and slaughter animals, breeding returns and store lambs, wool returns and level government payments.

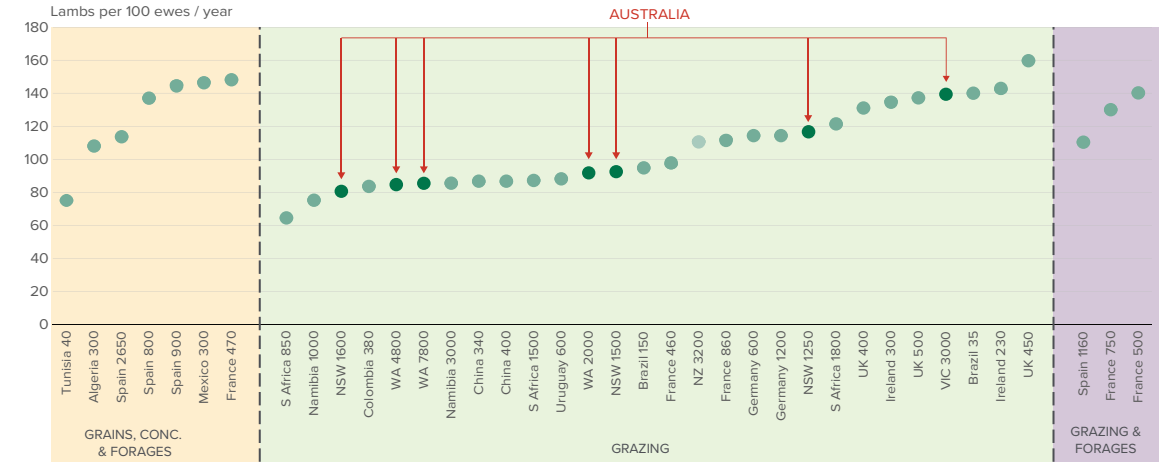
Losses of ewes (annual) and lambs (birth to weaning)

Australia tends to have similar ewe and lamb losses to most other regions of the world, with the exception of South Africa, Brazil and France. In South Africa this is predominantly caused by predators, particularly the Jackal, in Brazil, the rangelands systems under which they run[6], and in France, due to their intensive multiple lambing systems, high proportions of multiple births, and a shift in focus on to meat production with reduced emphasis on mothering ability. Ewe losses globally tends to vary between 1% to 7%, while lamb losses vary from 1%-17%, with Australian systems maintaining ewe and lamb losses at 3% to 6%.

Weaning rates

European farms tend to have higher weaning rates than Australian farms, primarily due to more prolific breeds in addition to nutrition (supplementary feeding), or as occurs in France and Spain, multiple lambing's per annum. Australian farms tend to maintain similar weaning rates to more rangeland or less-developed production systems where nutrition, mortalities and/or genetics may be constraints. This, more than likely, presents the area of greatest opportunity for Australian production systems, depending on the cost-effectiveness of increasing weaning rates, although flocks from higher rainfall regions (VIC-3000 in western Vic) or flocks designed for lamb production (NSW-1500 and NSW-1250) achieve comparable weaning rates to the representative European and NZ systems. Notably, one Australian typical farm, VIC-3000 achieves the highest weaning rate, and although having the lowest slaughter weight for sold lambs, maintains the highest lamb and sheepmeat production per 100kg of ewe liveweight.

Figure 15: Weaned lambs per 100 ewes per year



Source: *agri benchmark*

Farm Identification indicates number of ewes

[6] Poor feed or lower nutrition and slower growth rates all lead to higher mortality rates, and lower reproduction rates as well.

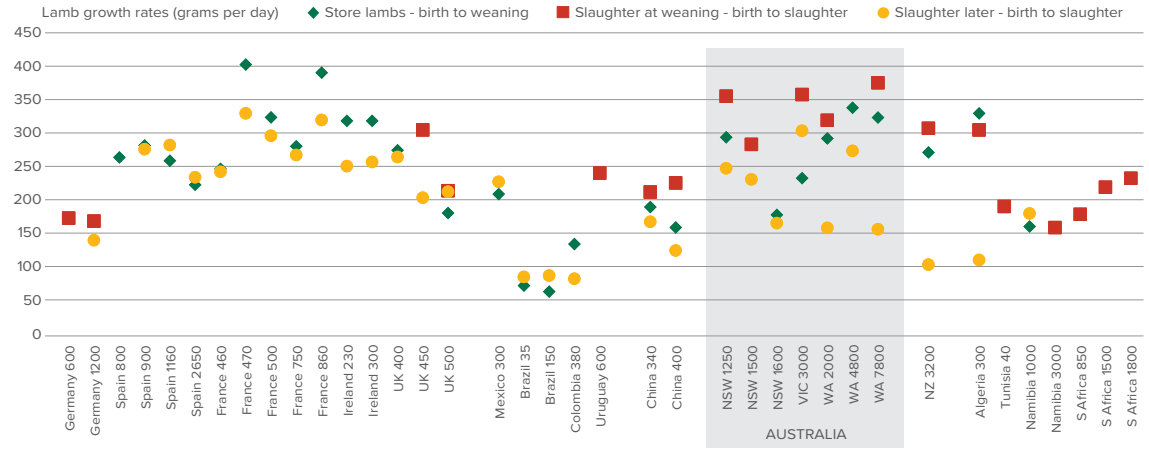
Lamb growth rates

Lamb growth rates on typical Australian farms varied significantly, though Australian systems generally maintain above average growth rates for animals being sold or slaughtered at weaning – comparable to most global regions, including Europe and NZ.

However, for lambs grown out beyond weaning (slaughtered later), Australian growth rates are mixed but still on average above those in NZ, Brazil and Colombia (but below those in the more intensive European meat lamb production systems). Feed quality (and quantity) and genotype also strongly influence growth rates, which is highlighted when comparing average lamb growth rates across different categories of sheep production systems. Generally, Germany, China, and the African and South American countries have the lowest lamb growth rates.

Overall, mean global weaning age was around 90-150 days, with values ranging from 45-60 in Spain (due to very light slaughter weight markets), Mexico, and Algeria (due to lamb finishing systems); and up to 180 days in Germany (due to on-farm lamb finishing) and Namibia (nutritional and management constraints).

Figure 16: Lamb growth rates for store and slaughter lambs: from birth to weaning or slaughter (g lwt/day).



Source: *agri benchmark*

Farm Identification indicates number of ewes

Cash and total costs[7] of meat production

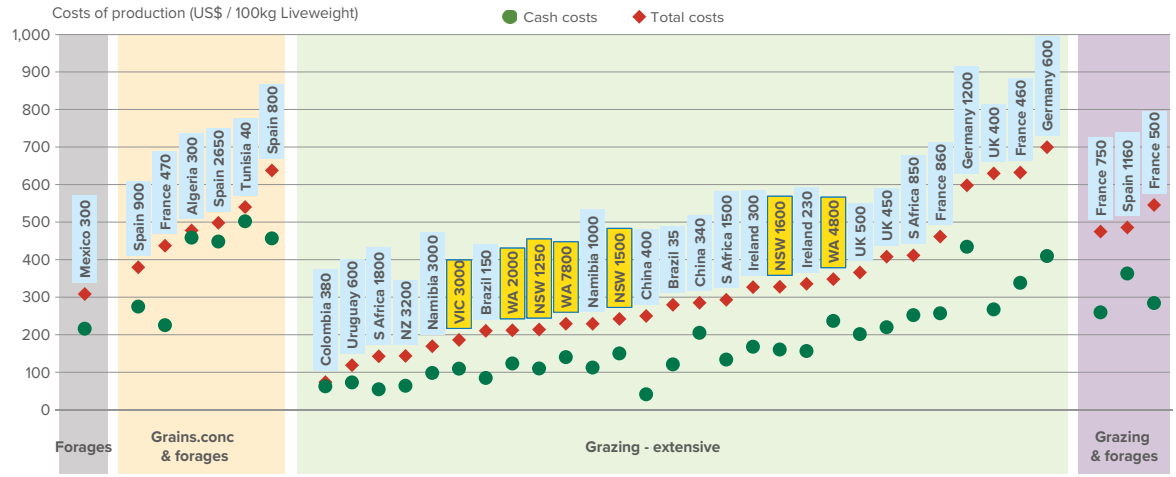
It is noticeable that many countries have well over US$2/kg lwt cash costs. All Australian systems achieve cash costs of <US$2/kg lwt, except for WA-4800 with a cash cost of $2.37/kg lwt. Notably, the only systems that achieve cash costs of <US$2/kg lwt are based on extensive grazing systems, while all other sheepmeat production systems (based on grains and forages) are higher cost.

The changes in total costs of sheepmeat production across the world from 2012 to 2016 were mixed, but overall costs have declined globally. This in part reflects exchange rate movements against the US$. Costs generally fell in China, Europe and across MENA countries by 11%, Mexico and Uruguay by 16%, South Africa by 26% and NZ by 13%. In Australia the average total cost rose by 2% after experiencing reductions in the preceding 3-4 years (averaging a reduction of 6% per annum since 2012). In the eastern Australian sheep farms, costs rose by 4% to 9% on 2015 levels, whereas in WA, total costs for WA-2000 and WA-7800 declined by 20% and 10% on 2015 levels. The typical farm WA-4800 experienced a 23% increase in total costs primarily due to a large increase in non-factor costs[8] from pasture improvement and slightly lower production.

[7] The cash or non-factor costs represent largely variable costs directly associated with the enterprise. Feed and machinery are the dominant non-factor costs in Europe, with feed costs predominating everywhere else, except AU, NZ, CN UY and NA. Other inputs to ewe enterprises are directly allocated cash costs, such as enterprise specific wages (shearing, marking etc), and these represent major costs to Australian systems. Animal purchase costs are also important in AU-1250 due to being a non-self-replacing system (i.e. buys replacement ewes). Total long-run costs allow for depreciation and opportunity costs (including labour, land and capital).

[8] 'Non-factor' costs are all costs bar the 'factor costs' of labour, land and capital.

Figure 17: Cash and total long-run costs of sheepmeat production under different production systems (US$/100kg lwt)



Source: *agri benchmark*

Labour costs and productivity

Labour costs in Australia are amongst the highest in the world, but have declined since 2013 in US dollar terms. Australia's average wages paid for employed staff is around US$25/hour, with the opportunity cost of family labour around US$28/hour. Labour costs in China and European countries averaged $2/hour and $13/hour respectively, whereas South American and African countries averaged $2/hour. New Zealand's labour costs have also declined to around $16/hour.

Taking into account the productivity of the labour, the contribution of labour costs to the costs of producing sheepmeat in Australian sheep systems is amongst the lowest in the world, even when compared to countries with very low absolute labour costs. In terms of labour productivity, Australian and New Zealand sheep systems produced 50-80kg liveweight per hour of input, compared to around 10kg Lwt/hour for European systems and generally less than 10kg Lwt/hour for most South American, African and Chinese systems.

This results in Australia and New Zealand having some of the lowest labour costs per amount produced ($43 and $22/100kg Lwt respectively) when compared with Europe ($133/100kg Lwt), China ($78/100kg Lwt) and South America ($56/100kg Lwt). Only the MENA and African countries achieve similar labour costs per amount produced.

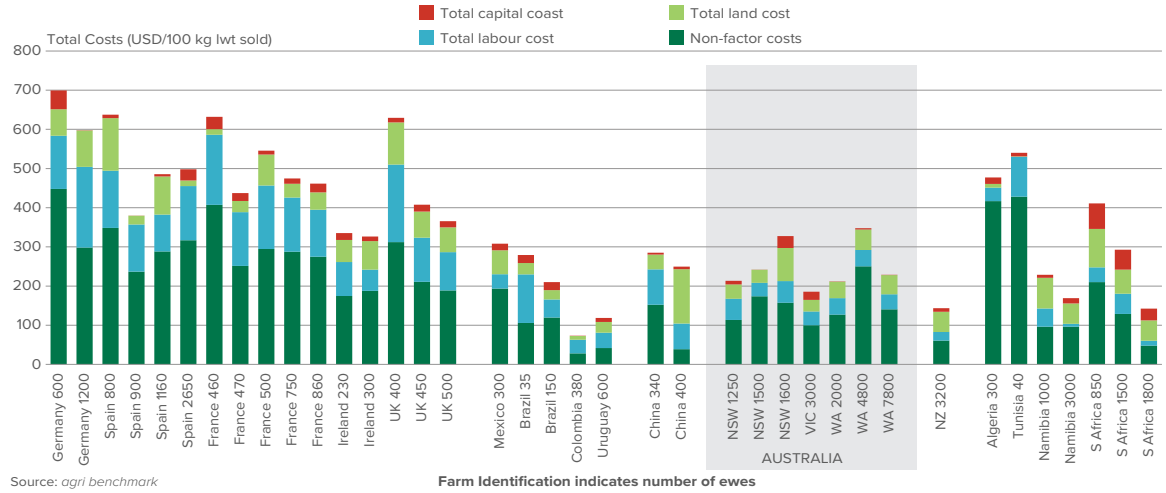
Total costs[9] of meat production (US$/100kg lwt)

Overall, Australian farms maintain a low total cost of meat production, with non-factor costs being the largest contributor to total costs. New Zealand, Uruguay, Colombia, Namibia, and some farms in China[10], Brazil, and South Africa also maintain low total costs. In most countries, 50%-60% of costs are the non-factor costs or the operational costs of running the enterprise. Feed and machinery represent the largest non-factor costs in European and some South African systems, with feed being the predominant cost in Spain and MENA countries, and animal purchases in some Chinese and Australian systems being the major non-factor cost. It is quite mixed for all other parts of the world.

[9] Total costs include all allocated whole farm costs, as well as opportunity costs for labour (family labour), land and capital used. This represents a long-run cost of production. For capital, land and labour costs it includes opportunity costs of land, non-land assets and family labour.

[10] In China, land cost is difficult to estimate due to farmers maintaining only the right of use for 30 years, whereas renting usually only occurs for 12 months at a time.

Figure 18: Total costs of sheepmeat production (US$/100kg lwt)

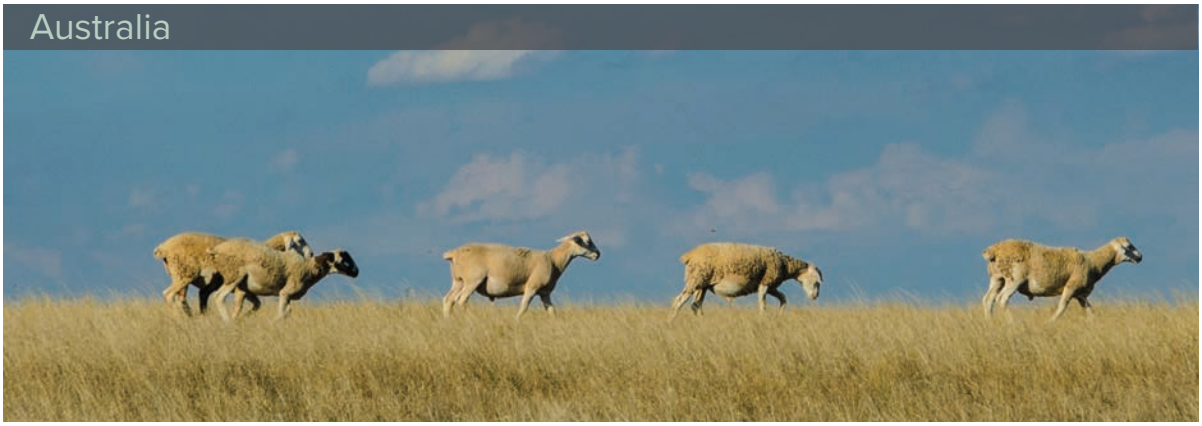


Source: *agri benchmark*

Farm Identification indicates number of ewes

In comparison…Australian sheep systems have:

- Moderate losses, mortalities and wastage in the system
- Moderate to low reproductive efficiency – with potential for further improvement through nutritional management and genetics – if economic to do so in Merino based flocks
- High lamb carcass weights that exceed most other parts of the world
- Moderate-to-high meat production efficiency, especially from meat focused systems
- Above average growth rates for animals sold or slaughtered at weaning
- High labour costs, but maintain excellent labour productivity which makes Australia competitive in terms of labour costs per amount produced
- Moderate sheep returns, which have increased from 2013 to 2015 levels, with wool returns being a major driver in Merino based systems
- Maintained low total costs of production which have tended to decline year-on-year from 2012 to 2015, but have slightly increased in eastern systems in 2016, and continued to fall in some WA systems
- Exchange rate movements against the US$ having a role in driving costs of production
- Good and continuing sheep enterprise profitability across most Australian systems in the short- and medium-term, which is in alignment with global trends



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