



**Feed Grain
Partnership**

Australian Feed Grain Supply and Demand Report 2018

Prepared by: JCS Solutions

October 2018



Feed Grain Supply & Demand Report 2018

A report for the

Feed Grain Partnership

October 2018

Prepared by John Spragg



JCS Solutions Pty Ltd

15 Pine Grove Road

Poowong North Vic 3988

Phone: 03 5659 9256

Mobile: 0402 831 843

Email: jspragg1@optusnet.com.au

JCS Solutions Pty Ltd makes no representation about the information contained in this document. It is provided as is without express or implied warranty of any kind. JCS Solutions Pty Ltd disclaims (to the full extent allowable by the Law) all warranties with regard to this information, including all implied warranties as to the accuracy of the information. JCS Solutions Pty Ltd shall not be liable for any damages whatsoever including any special, indirect or consequential damages resulting from loss of profits, whether in an action in contract, negligence or otherwise arising out of or in connection with the information contained in this document. Neither JCS Solutions Pty Ltd nor any of its employees or agents warrants that the information within this document is error-free.

Contents

1. EXECUTIVE SUMMARY	4
2. INTRODUCTION	5
3. AUSTRALIAN GRAIN PRODUCTION	5
3.1. Total Grain Production	5
3.2. Wheat Production	7
3.3. Barley Production.....	9
3.4. Oat Production.....	10
3.5. Sorghum Production	12
3.6. Triticale Production.....	13
3.7. Rice Production	14
3.8. Lupin Production	14
3.9. Field Pea Production	15
3.10. Canola Production.....	15
3.11. Other Oilseed Production	16
4. GRAIN END USE.....	18
4.1. Domestic versus export use volumes	18
4.2. Wheat use in Flour Milling & Ethanol	18
4.3. Barley Use in Malt Production	19
4.4. Oilseed Crushing	20
4.5. Grain Use in Animal Feeding.....	22
4.5.1. Feed Demand Outlook 2018/19.....	23
4.5.2. East versus West Grain Availability and Use.....	24
4.5.3. Feed Volume Change over Time	25
4.5.4. Beef Sector	27
4.5.5. Dairy Industry.....	30
4.5.6. Poultry Meat	33
4.5.8. Layer Industry	36
4.5.9. Pig Production	38
4.5.10. Sheep.....	41
4.5.11. Aquaculture.....	42
4.5.12. Horse Industry.....	42
5. REFERENCES	43

1. EXECUTIVE SUMMARY

This report identifies the continued growing demand for feed grain by the Australian livestock sector. In contrast the 2018/19 year will see a decline in grain production on the east coast where 82% of livestock feeding takes place.

For 2018/19 it is forecast that the domestic market, including feed, flour, malt and retained seed for sowing, will require 14.8 MMT of grain (excluding canola), of this 11.9 MMT will be used on the east coast. Based on ABARES September 2018 Crop Report, the east coast will have a 1.1 MMT grain deficit. With continued dry weather, grain crops being cut for hay or grazed and frost events, the actual crop will be lower than ABARES forecast. For every tonne the crop drops, this grain use has to be supplied from SA, WA or overseas. Additionally for any grains exported from the east coast during 2018/19 an equivalent volume will need to be transported into the east coast market to replace the volume needed for domestic demand use. With tight grain stocks the east coast market will remain in a grain deficit situation until there are drought breaking rains for either the 2018/19 summer crop or the following 2019 winter crop.

The projected grain crops in WA and SA will provide surplus grain to meet east coast demand. There are higher grain costs to ship grain from west to east and this will have a self-limiting impact on demand. The beef feedlot and dairy industries in particular are projected to limit production based on grain feeding. The pig industry is also predicted to show a small decline due to lack of profitability. The chicken meat and layer industries are anticipated to remain at similar production levels.

The availability of alternate raw materials such as cereal milling and food processing by-products are limited in supply. There will be some increase in imported raw materials such as soybean, palm kernel and copra meals. For the beef and dairy industries, the feed grain supply limitation is compounded by extremely high hay costs and reduced pasture production from dry weather and irrigation water access.

Grain production (excludes canola) and use 2017/18 and 2018/19 based on ABARES September Crop Report data.

	East Coast 17/18	West Coast 17/18	East Coast 18/19	West Coast 18/19
Grain production	15,220,000	19,439,000	10,829,000	20,485,000
Feed grain use	8,720,000	1,845,000	8,040,000	1,850,000
Flour grain use	2,754,000	277,000	2,783,000	277,000
Malting grain use	735,000	190,000	790,000	190,000
Seed retained	293,000	596,000	293,000	596,000
Total grain use	12,502,000	2,908,000	11,906,000	2,913,000
Surplus	2,718,000	16,531,000	-1,077,000	17,572,000

Source: Production ABARES, use JCS Solutions estimates

2. INTRODUCTION

The Feed Grain Partnership (FGP) was established in 2007 to integrate and identify collaborative Research and Development initiatives across participating R&D funding agencies involved with the feed grain and livestock supply chain.

Members of the FGP are:

- Australian Eggs
- Meat and Livestock Australia (MLA)
- Grains Research and Development Corporation (GRDC)
- Agrifutures Australia
- Australian Pork Limited (APL) & Pork Co-operative Research Centre (Pork CRC)
- Dairy Australia (DA)
- Stock Feed Manufacturers Council of Australia (SMFCA)

The FGP seeks to generate information relating to the production and use of Australian feed grains. A critical aspect of the FGP work is to better understand the use of grain by the livestock industries and gaps in supply and demand. Since 2008 FGP has funded work looking at grain supply for the domestic market end users and issues relating to value adding these grains via livestock into meat, milk and eggs.

This report commissioned by the Feed Grain Partnership is written to provide an update report on grain production and feed grain demand since the last report written in October 2016. The update looks at trends in production and potential impact on the domestic grain market.

3. AUSTRALIAN GRAIN PRODUCTION

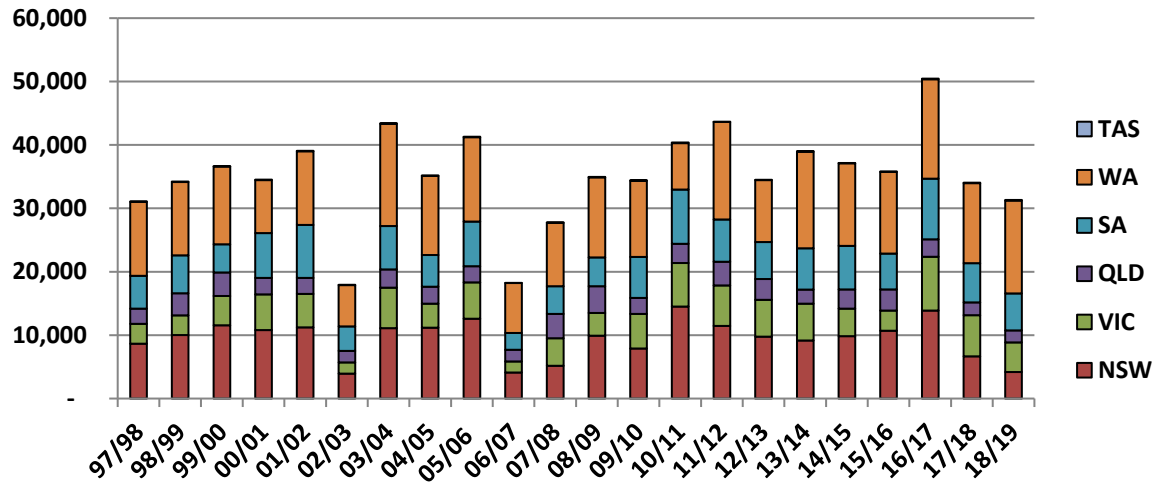
3.1. Total Grain Production

Lower rainfall across the eastern states will result in Australian grain production for 2018/19 being below average. The ABARES September 2018 Crop Report has forecast the 2018/19 winter and summer crops at a combined 31.2 MMT, this excluding canola and cottonseed (Figure 1). The ABARES forecast notes the need for timely rainfall in early spring being critical to the ongoing crop development in many cropping regions in the eastern states (including South Australia) because of low levels of soil moisture. Based on the Bureau of Meteorology weather forecasts and other climate models, the outlook is for continuing below average rainfall that is highly likely to result in the winter crop falling below ABARES forecast for the three eastern states. Following the ABARES report release, late season frosts are reported to have had negative impact on crop production in WA and parts of Victoria. As dry conditions have continued, and with high hay prices, there are large areas of cereal and canola crops being cut for hay. Additionally with better than average prices for beef and lamb some producers are electing to graze crops.

ABARES forecast for the summer crop is equal in size to the previous 2017/18 crop in both area planted and yield. With the sorghum planting period commencing, lack of rainfall is limiting sowing and without greater rainfall the sorghum area could be lower than forecast. Should there be a turn

in the season and sufficient rain falls in Qld and northern NSW, the area planted to sorghum could jump significantly as there are larger fallow areas due to the poor winter cropping outcome. Thus the 2019 summer crop remains reliant on weather and rainfall.

Figure 1. Total grain production (excluding canola) by state 1997/98 - 2018/19 ('000 tonnes)



Source: ABS Agricultural Commodities and ABARES Crop Reports

For the first time in many years, WA will produce more grain than the east coast. Together with SA, the major demand regions in Qld, NSW and Vic are reliant on the shipment of grain from interstate.

The drought impact in NSW and Qld is seen in 58.9% and 39.8% declines in grain production respectively (Table 1). Unless the sorghum crop reaches prior year production levels, this decline will be even more dramatic. Winter cereal grain production will be put under more pressure as growers opt to cut crops for hay or graze crops for livestock production. In stark contrast WA is forecast to increase by 10%.

Production in Vic and SA is mixed with the Mallee and northern SA regions being affected by dry weather. In contrast some of the Western Vic and South East SA regions have had ample rain and like WA could produce above average yielding crops.

Table 1. Total grain production by state ('000 tonnes) 2018/19 versus previous 5 year average

Tonnes	2018/19 ABARES Forecast	Prev. 5 year ave.	2018/19 change
NSW	4,189	10,184	-58.9%
VIC	4,668	5,101	-8.5%
QLD	1,882	3,124	-39.8%
SA	5,830	6,306	-7.6%
WA	14,655	13,252	10.6%
TAS	90	70	29.3%
TOTAL	31,174	38,018	-18.0%

Source: ABS Agricultural Commodities and ABARES Crop Reports for winter cereal crop and summer crop volumes

The greatest decline against the five year average is in wheat production (Table 2), with this being a 58% and 50% reduction in NSW and Qld respectively. Barley production is forecast to decline by only 2%, this being due to the largest production states in SA and WA, being less affected by the east coast drought.

Table 2. Total grain production by crop ('000 tonnes) 2018/19 versus previous 5 year average

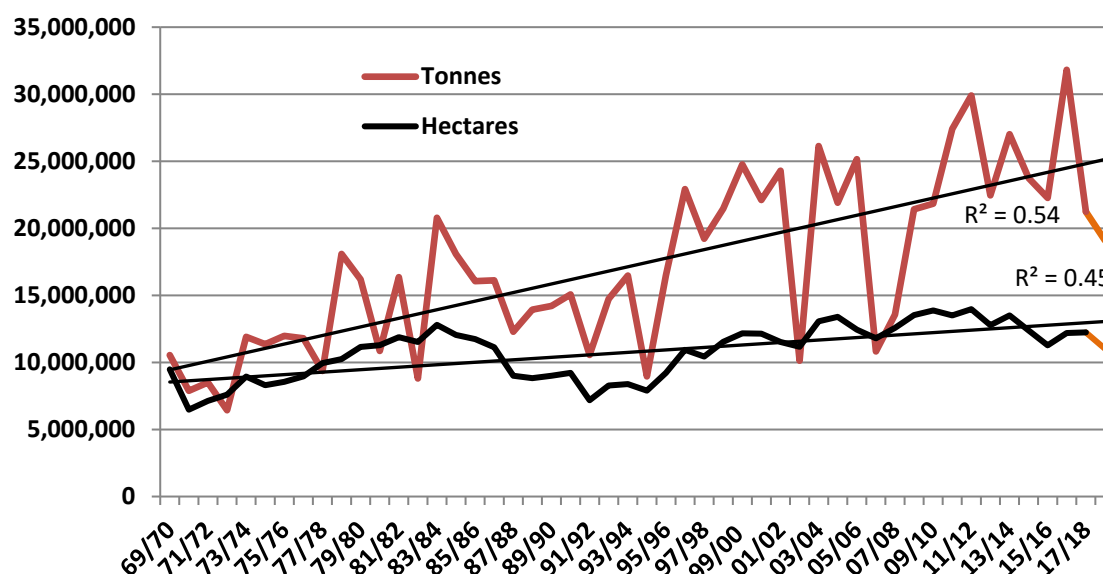
Tonnes	2018/19 ABARES Forecast	Prev. 5 year ave.	2018/19 change
Wheat	19,097	24,841	-23.1%
Barley	8,327	8,499	-2.0%
Oats	1,049	1,227	-14.5%
Sorghum	1,559	1,952	-20.1%
Maize	385	426	-9.6%
Lupins	549	633	-13.2%
Peas	208	270	-23.0%
Total	31,174	38,021	-18.0%

Source: ABS Agricultural Commodities and ABARES Crop Reports,

3.2. Wheat Production

Following the record 31.8 MMT wheat crop in 2016/17, there has been a drop in production with the 2018/19 crop forecast set at 19.1MMT by ABARES. This production level if it occurred would still be above that seen in most years prior to 1995 (Figure 2). The area planted to wheat production is shown to have declined from a peak of 14 million hectare in the 2009 to 2012 period to 11-12 million hectares over the last four years. The more rapid rise on tonnes relative to hectares identifies increasing wheat yield being achieved over time.

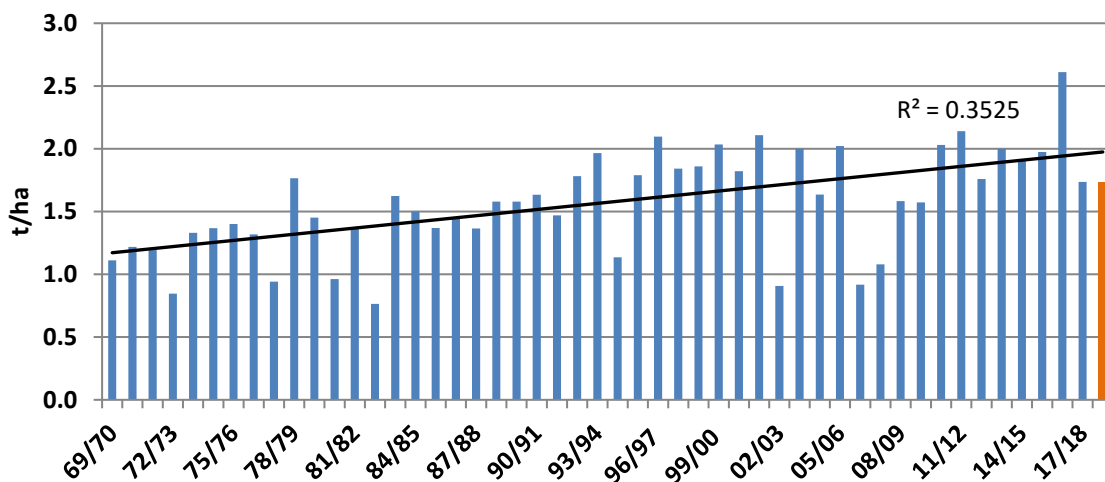
Figure 2. Wheat Production 1969/70 – 2018/19 (tonnes and hectares)



Source: ABS Agricultural Commodities and ABARES Crop Reports

The 2016/17 record wheat crop is seen in Figure 3 where an average yield of 2.6 t/ha was achieved. In contrast, for 2018/19 ABARES forecast wheat yield while averaging 1.7 t/ha, in NSW and Qld this will only be 1.2 and 1.1 t/ha respectively. During the 2002/03 and 2006/07 drought years, wheat yield was only 0.7 t/ha. Based on the lack of timely rainfall in early spring, it is highly likely that ABARES forecast yield will not be achieved. Together with a lower area harvested as crops are cut for hay and grazed, it is felt that the Australian east coast wheat crop has considerable downside. Frost events in WA and northern Vic and continued dry weather after ABARES September report was released has put further pressure on the wheat crop outlook. Some industry commentary suggests the actual 2018/19 wheat crop will be more like 17-18 MMT.

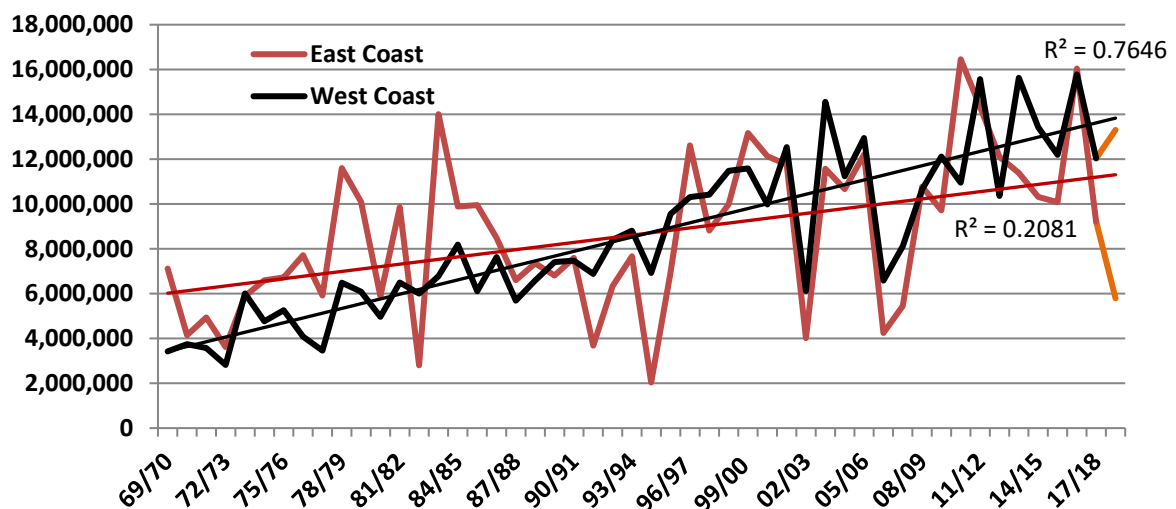
Figure 3. Wheat Yield 1969/70 – 2018/19 (t/ha)



Source: ABS Agricultural Commodities and ABARES Crop Reports

The trend for wheat production expansion occurring in WA and SA at a faster rate than that on the east coast continues (Figure 4). The 2018/19 wheat crop will see a far greater difference, with the east coast producing less than 30% of Australia’s wheat. This is a long term trend that has significant relevance to the location of major wheat demand industries.

Figure 4. Wheat grown east (Qld, NSW and Vic) versus west (SA and WA) 1969/70 to 2018/19

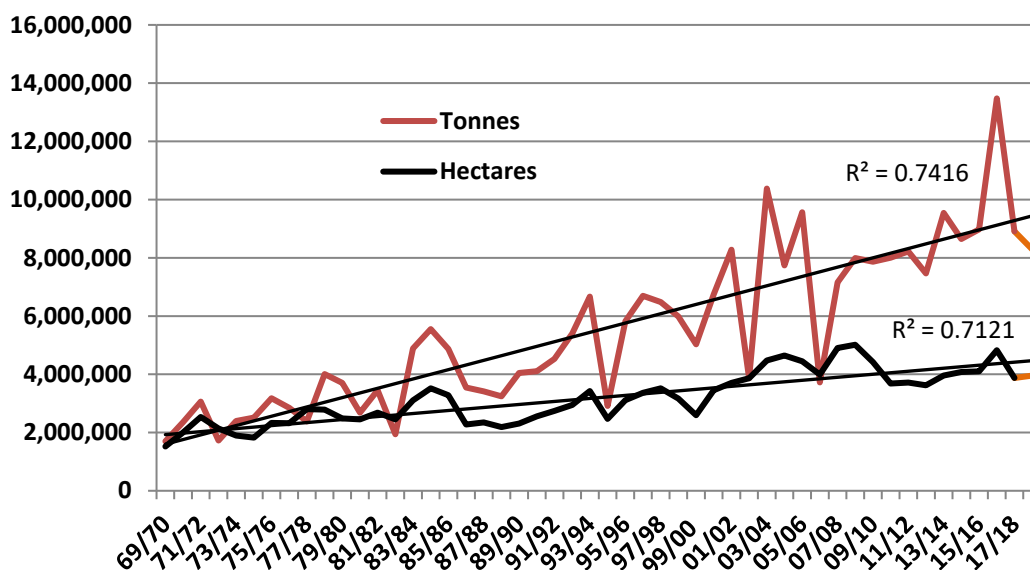


Source: ABS Agricultural Commodities and ABARES Crop Reports

3.3. Barley Production

Barley production for 2018/19 although affected by the east coast drought is forecast by ABARES to be 8.3 MMT and the seventh largest barley crop on record (Figure 5). Similar to wheat, the increase in barley production is occurring at a faster rate than barley cropping area. There is potential downside in the 2018/19 barley crop figures as dry conditions have continued on the east coast and some crops are being cut for hay.

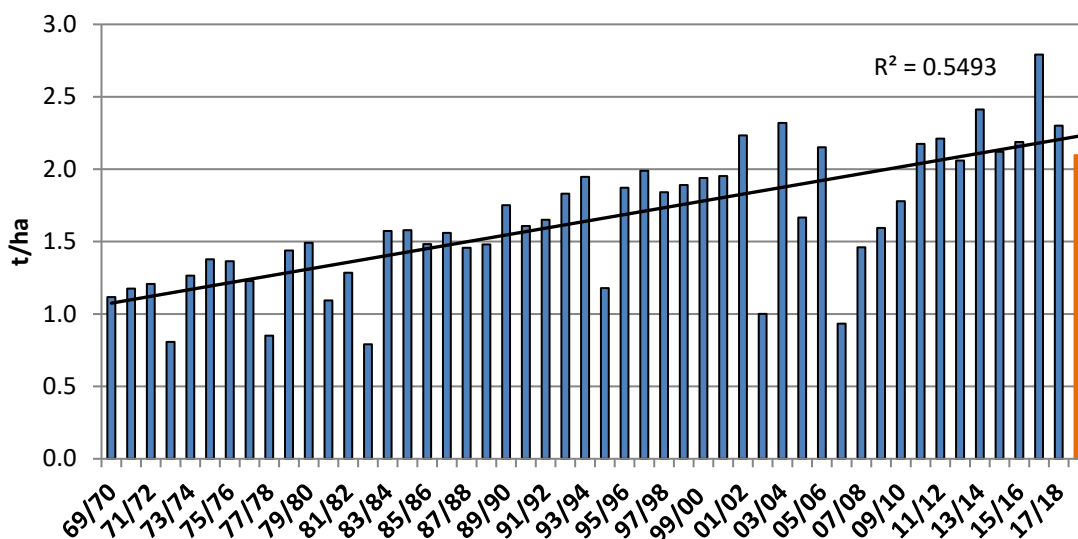
Figure 5. Barley Production 1969/70 – 2018/19 (tonnes and hectares)



Source: ABS Agricultural Commodities and ABARES Crop Reports

The forecast 2018/19 average barley yield at 2.1 t/ha is only marginally below the long term trend line (Figure 6). The rate of increase in barley yield is faster than that seen in wheat production.

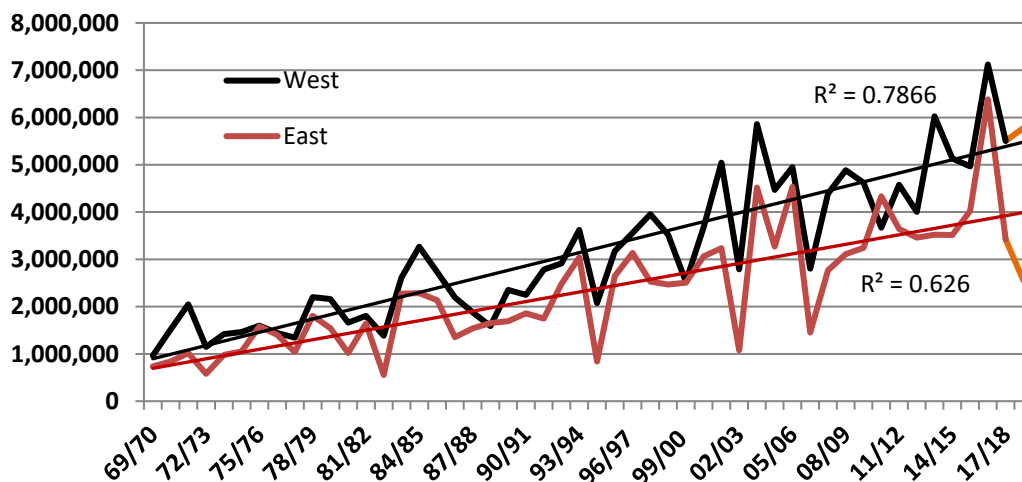
Figure 6. Barley Yield 1969/70 – 2018/19 (t/ha)



Source: ABS Agricultural Commodities and ABARES Crop Reports

The volume of barley grown on the east coast has been growing at a slower rate than WA and SA. Figure 7 shows the divergence of volumes as the WA and SA barley production becomes more significant relative to the east coast.

Figure 7. Barley grown east (Qld, NSW and Vic) versus west (SA and WA) 1969/70 to 2018/19.



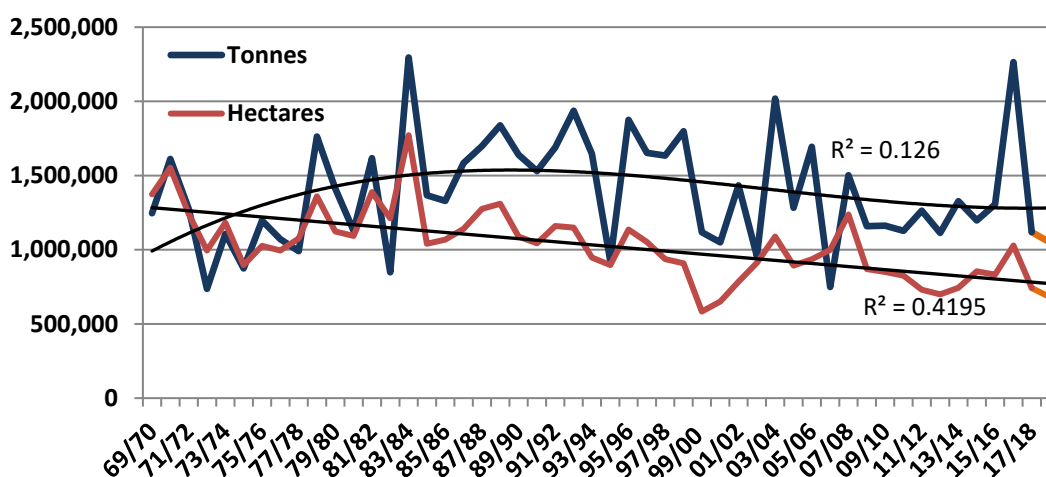
Source: ABS Agricultural Commodities and ABARES Crop Reports

3.4.Oat Production

Oat production in 2018/19 is very difficult to predict and ABARES forecast of 1.0 MMT could be substantially lower subject to weather conditions leading into harvest. Due to the east coast shortage of fodder and resulting high prices, there is expected to be crops that will be cut for hay. With ongoing dry conditions, grain growers with oat crops may consider the risk of hay cutting is less than taking the crop through to harvest.

Figure 8 identifies the stagnant production volume and long term trend in declining area planted to oats.

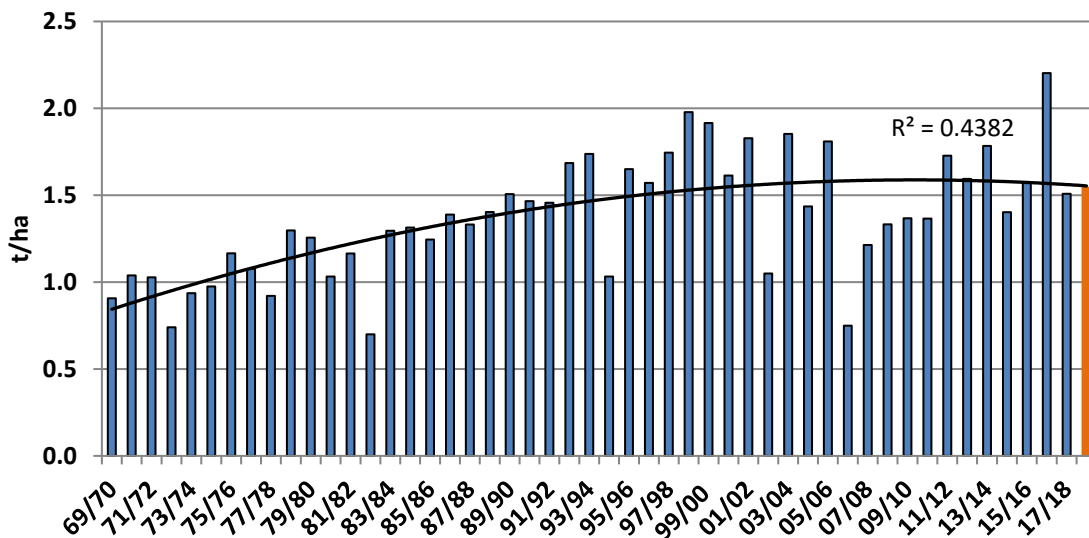
Figure 8. Oat Production 1969/70 – 2018/19 (tonnes and hectares).



Source: ABS Agricultural Commodities and ABARES Crop Reports

Figure 9 illustrates the plateau in oat yield since the mid 1900's. The record 2016/17 oat cropping year is clearly seen with an average 2.2 tonnes/ha.

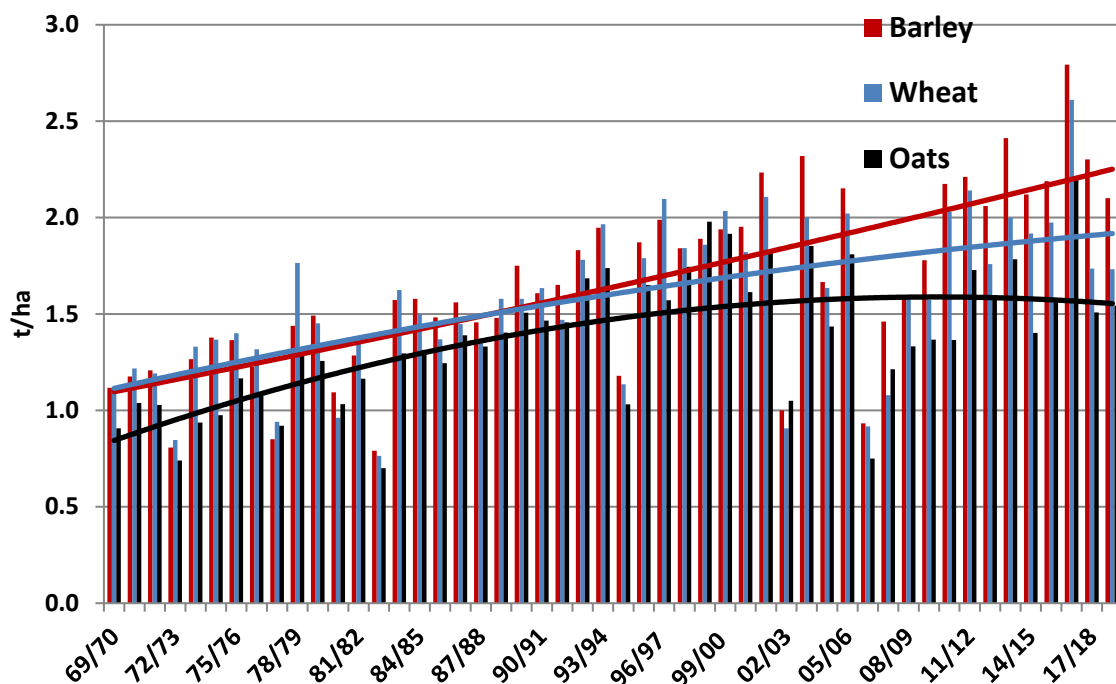
Figure 9. Oat Yield 1969/70 – 2018/19 (t/ha)



Source: ABS Agricultural Commodities and ABARES Crop Reports

The yield comparison between wheat, barley and oats since 1969/70 is shown in Figure 10. Updating the dataset to include yields for 2016/17, 2017/18 and forecast 2018/19 has shown the widening gap between wheat, barley and oat crop yields.

Figure 10. Wheat, barley and oat yield 1969/70 – 2018/19 (t/ha)

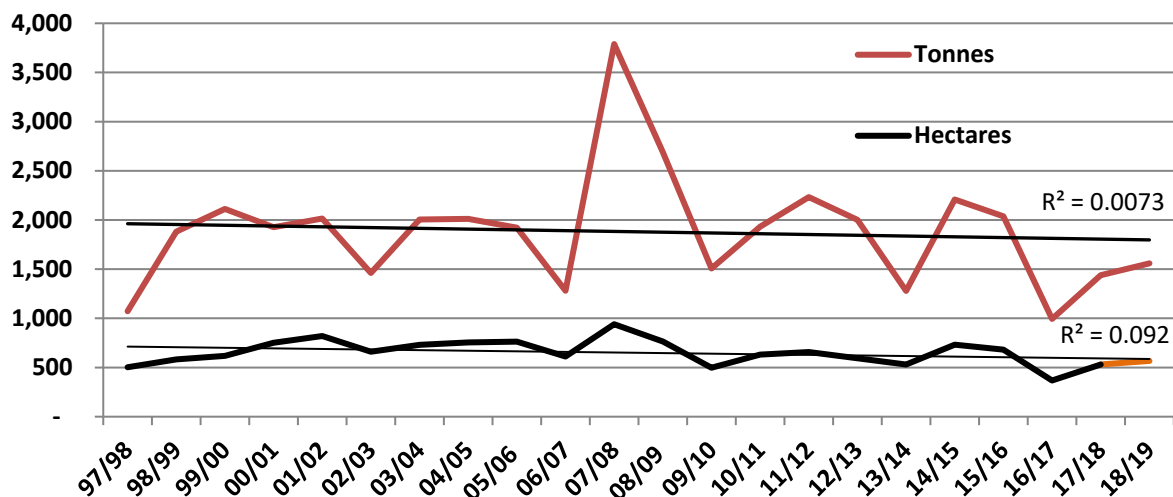


Source: ABS Agricultural Commodities and ABARES Crop Reports

3.5.Sorghum Production

Figure 11 identifies the high yielding and larger area planted to sorghum in 2007/08 year. This high production year followed a drought year and demonstrated how northern grain growers can produce larger volumes of sorghum following dry winter cropping years. For the 2018/19 sorghum crop, ABARES has forecast 1.6MMT, this being just below the longer term trend line. The area planted to sorghum varies little from year to year and has not been increasing over time.

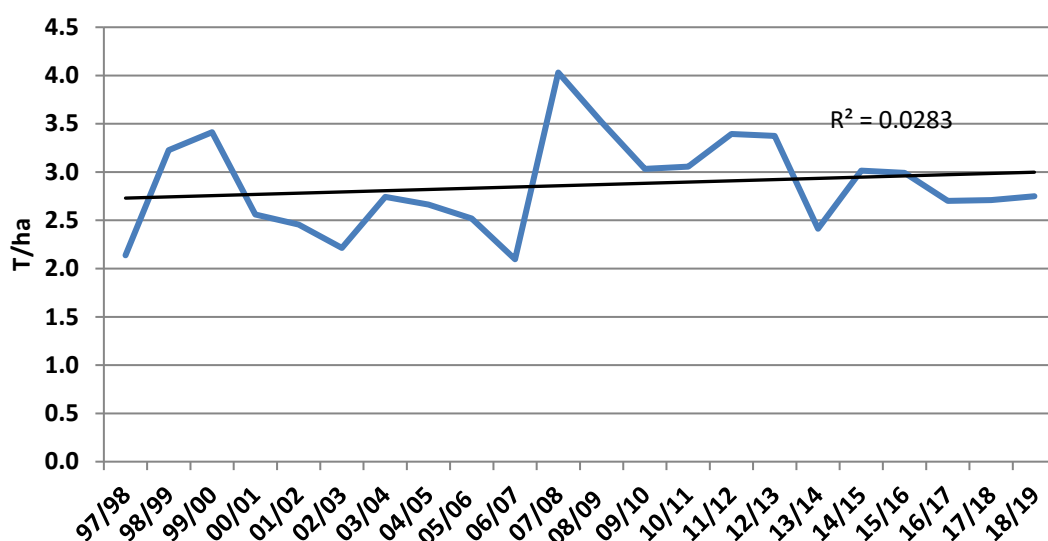
Figure 11. Sorghum production 1997/98 – 2018/19 ('000 tonnes and hectares)



Source: ABS Agricultural Commodities and ABARES Crop Reports.

Sorghum crop yield has shown little increase remaining around 3 tonnes/ha. Figure 12 shows the potential for higher sorghum yielding crops as occurred in 2007/08 due to more favourable growing conditions.

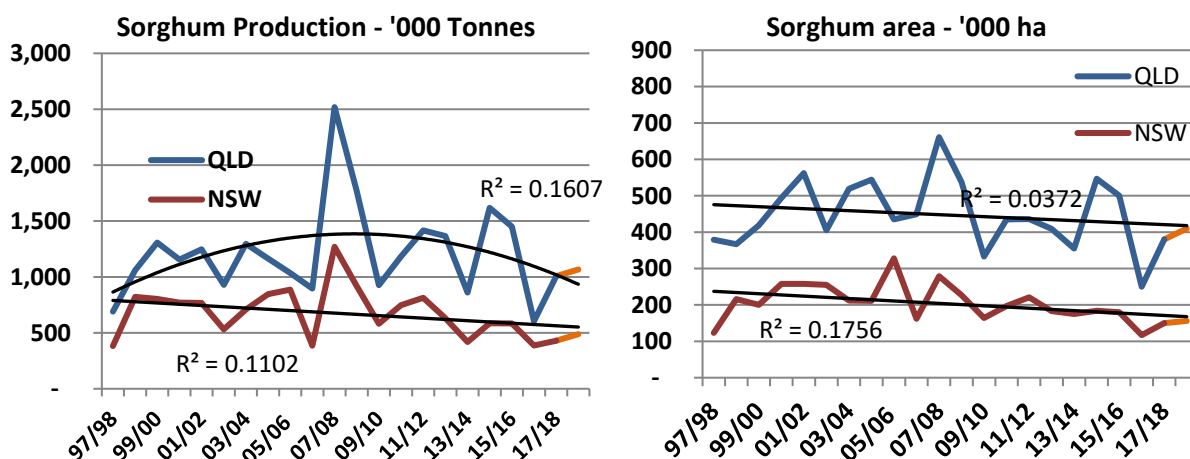
Figure 12. Sorghum yield 1997/98 – 2018/19 (T/ha)



Source: ABS Agricultural Commodities and ABARES Crop Reports.

Prior to 2016/17 there was a trend for Queensland to have an expanding production of sorghum. The last two years has seen a smaller Qld sorghum crop with the 2018/19 crop forecast to again be below prior years. In NSW there has been a declining area planted and tonnes produced. (Figures 13 and 14).

Figures 13 and 14. Sorghum production Qld and NSW 1997/98 – 2018/19 ('000 tonnes and hectares)

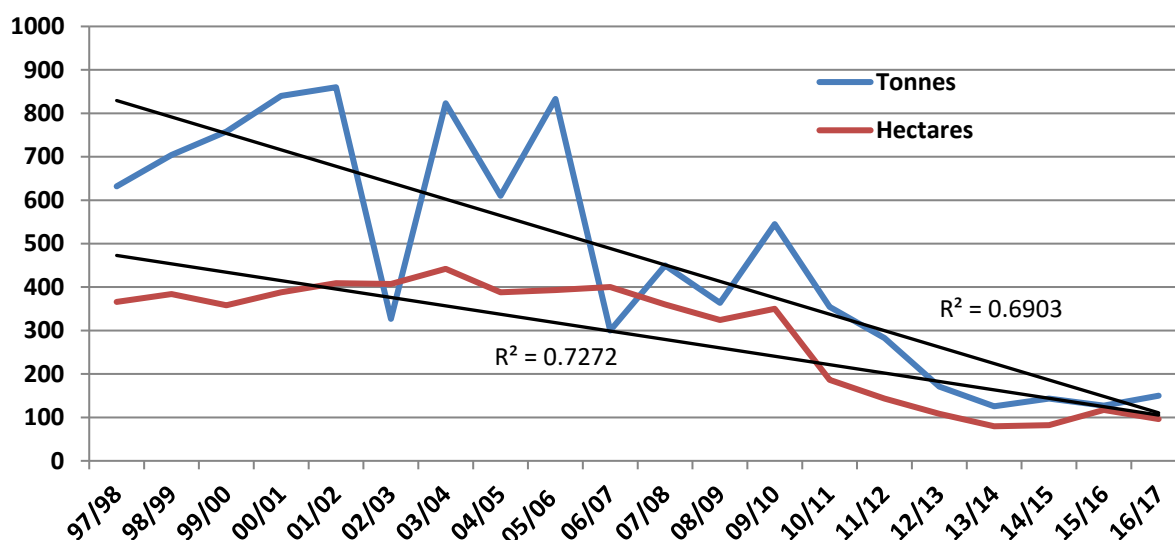


Source: ABS Agricultural Commodities and ABARES Crop Reports.

3.6. Triticale Production

Updating triticale production data to 2016/17 reconfirms the demise of triticale as a cereal grain. With only 150,000 tonnes grown across Australia in a bumper high yielding year demonstrates the lack of share triticale holds. There is no ABARES forecast for triticale production for 2017/18 and 2018/19 due to the small size of the crop.

Figure 15. Triticale Production 1997/98 – 2018/19 ('000 tonnes and hectares)



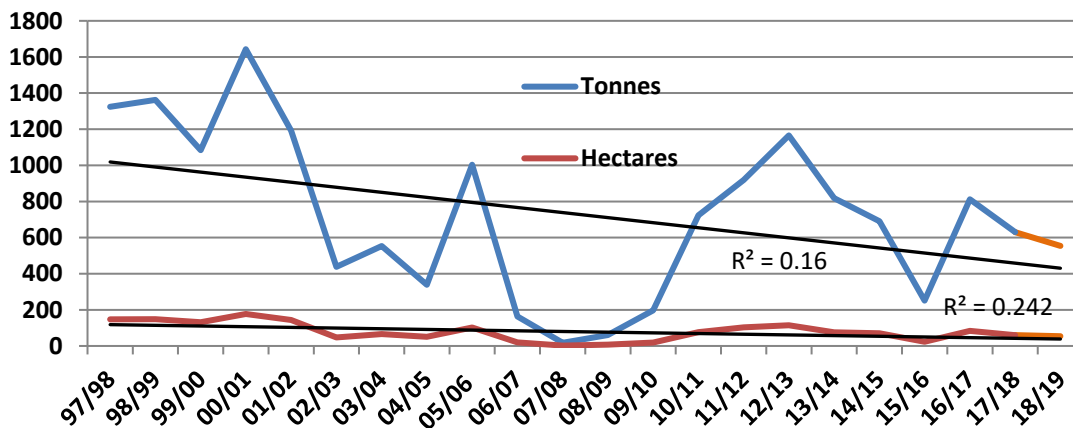
Source: ABS Agricultural Commodities and ABARES Crop Reports.

3.7. Rice Production

The rice crop is important to the stockfeed industry as it supplies quantities of rice milling by-products including rice hulls, pollard and broken rice. ABARES is forecasting the 2018/19 rice crop at 554,000 tonnes which is in line with average production over recent years. (Figure 16). The actual area planted will depend on irrigation water availability and crop economics based on the projected rice grain price.

There has been some expansion in rice production on the North Coast NSW. This is however a small volume relative to the Riverina production area.

Figure 16. Rice production 1997/98 to 2018/19 ('000 tonnes and hectares)

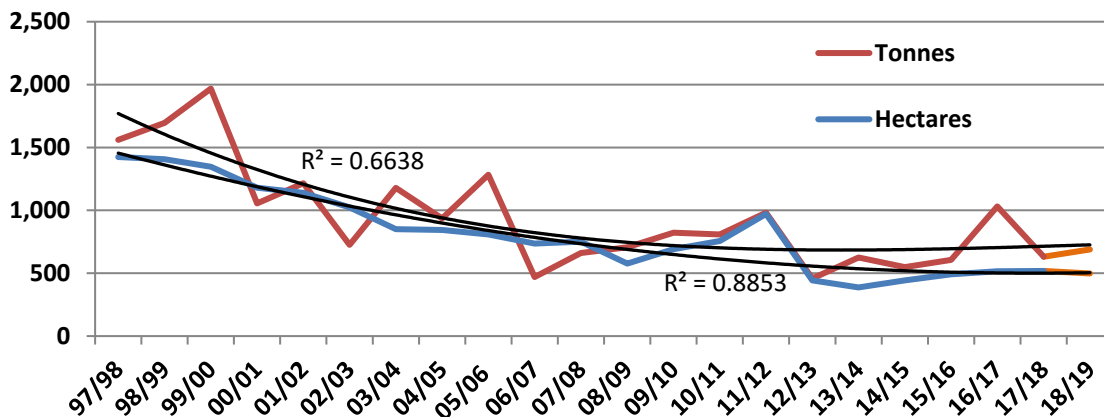


Source: ABS Agricultural Commodities and ABARES Crop Reports.

3.8. Lupin Production

The decline in lupin production has stabilised with Figure 17 showing the volume being steady at around 700,000 tonnes being produced from 700,000 hectares. Only 12% of the lupin crop is grown in the eastern states and as such it has become a minor crop for feed grain supply into the east coast market.

Figure 17. Lupin production 1997/98 - 2018/19 ('000 hectares and tonnes)

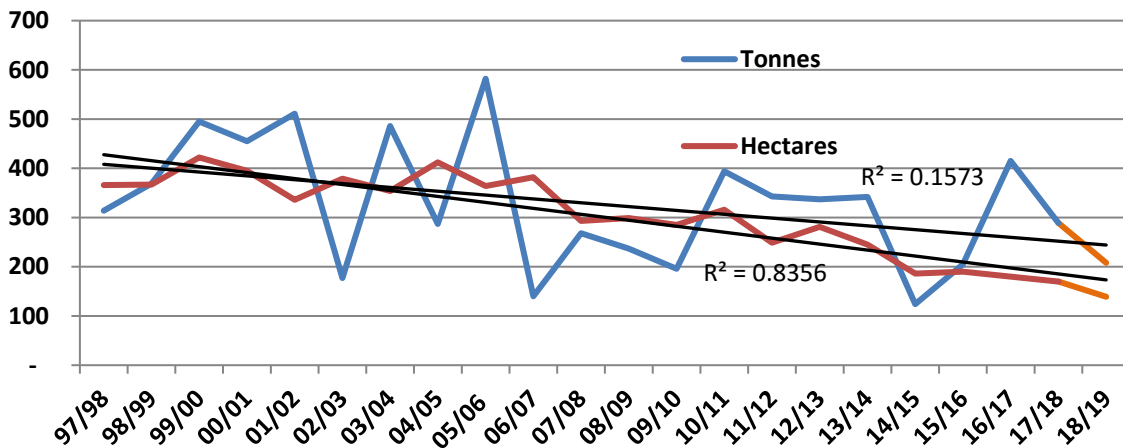


Source: ABS Agricultural Commodities and ABARES Crop Reports.

3.9. Field Pea Production

The area planted to field peas shows a consistent decline, with ABARES forecasting the 2018/19 crop to come from only 139,000 hectares. With dry growing conditions, the actual area harvested may be considerably lower (Figure 18). The tonnes of field peas harvested jumps around significantly from year to year due to the highly variable crop yield.

Figure 18. Pea production 1997/98 - 2018/19 ('000 hectares and '000 tonnes)

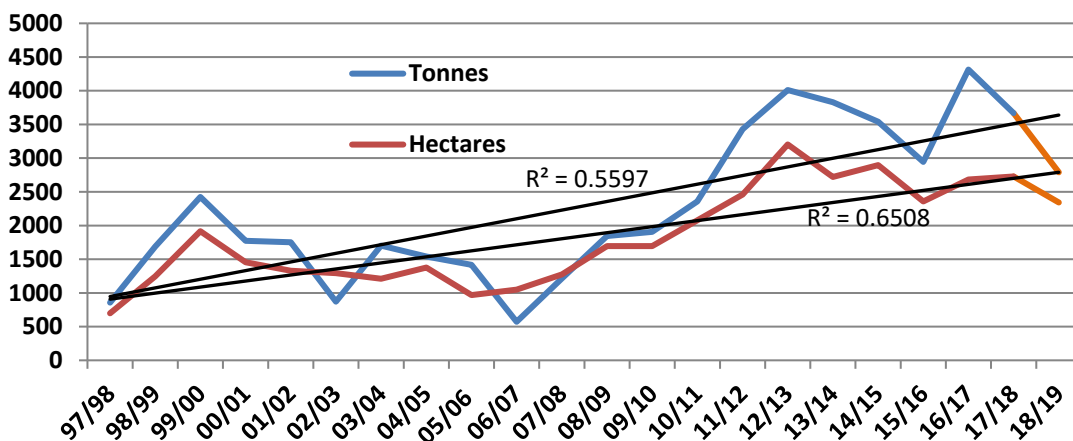


Similar to lupins, the field pea crop has shrunk on the east coast with less than 100,000 forecast for 2018/19. The limited availability has resulted in field peas not being considered for use by the majority of stockfeed manufacturers.

3.10. Canola Production

Canola production is a growing part of Australia’s cropping program as seen in Figure 19. The 2018/19 crop is forecast at 2.8MMT, of which the majority is being grown in SA and WA. The east coast crop has been affected by lack of rainfall and reduced planting area. Some canola crops being cut for hay that will reduce ABARES forecast.

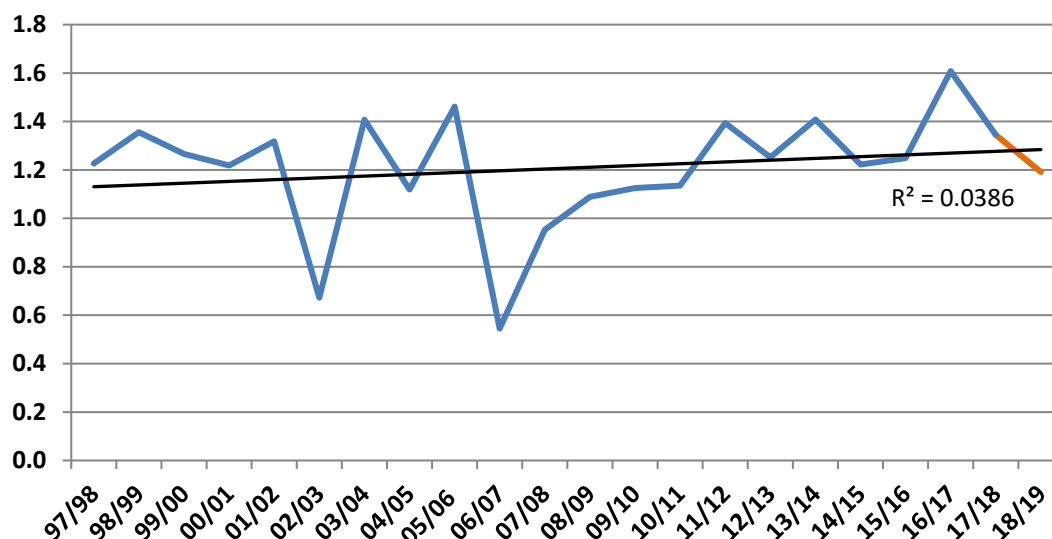
Figure 19. Canola production 1997/98 - 2018/19 ('000 hectares and '000 tonnes)



Source: ABS Agricultural Commodities and ABARES Crop Reports.

Canola yield remains at the 1.2 tonne/ha level, although the 2016/17 year demonstrated the considerably higher yields that can be achieved with more favourable growing conditions (Figure 20).

Figure 20. Canola yield 1997/98 to 2018/19 (T/ha)

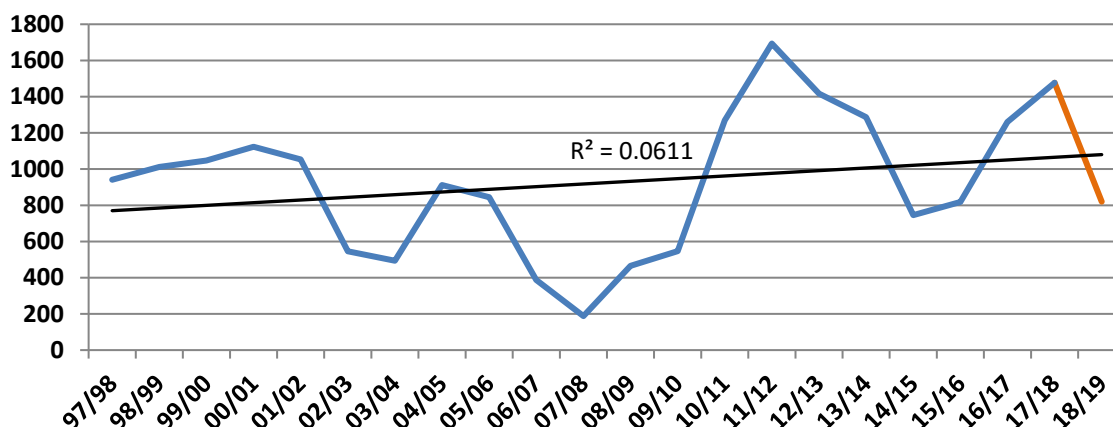


Source: ABS Agricultural Commodities and ABARES Crop Reports.

3.11. Other Oilseed Production

The Australian cotton crop is directly affected by irrigation water availability, as well as rainfall for dryland cotton production. ABARES is forecasting a decline in production for 2018/19 to 800,000 tonnes (Figure 21). While this would take account of a lower rainfall outlook, this remains considerably higher than the 200,000 to 500,000 tonne crops achieved during the 2002/03, 2006/07 and 2007/08 drought years.

Figure 21. Cottonseed production 1997/98 to 2018/19 ('000 tonnes)

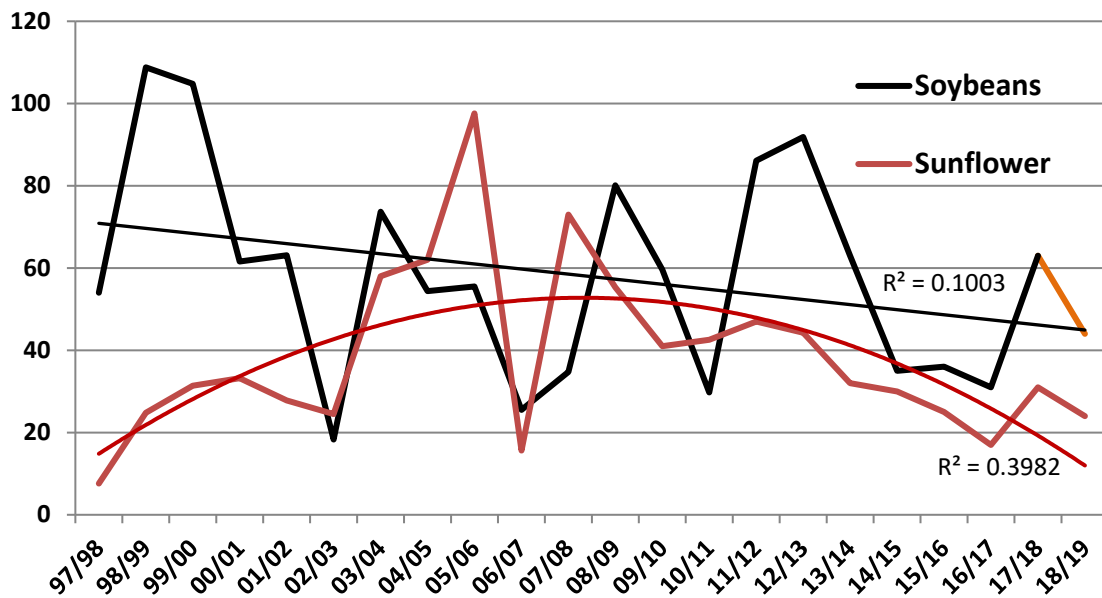


Source: ABS Agricultural Commodities and ABARES Crop Reports.

Figure 22 shows the volume of soybean and sunflower crops. The volume of soybeans grown is small relative to the large volume of soy bean meal imported to Australia. From year to year there is significant variation in the volume of soybeans being grown.

Sunflower production is seen to have increased through the early 2000's, but in more recent years has declined. The volume of sunflower seed is small and limited to use in human consumption, birdseed and specialty horse feeds.

Figure 22. Soybean and sunflower production 1997/98 to 2018/19 ('000 tonnes)



Source: ABS Agricultural Commodities and ABARES Crop Reports.

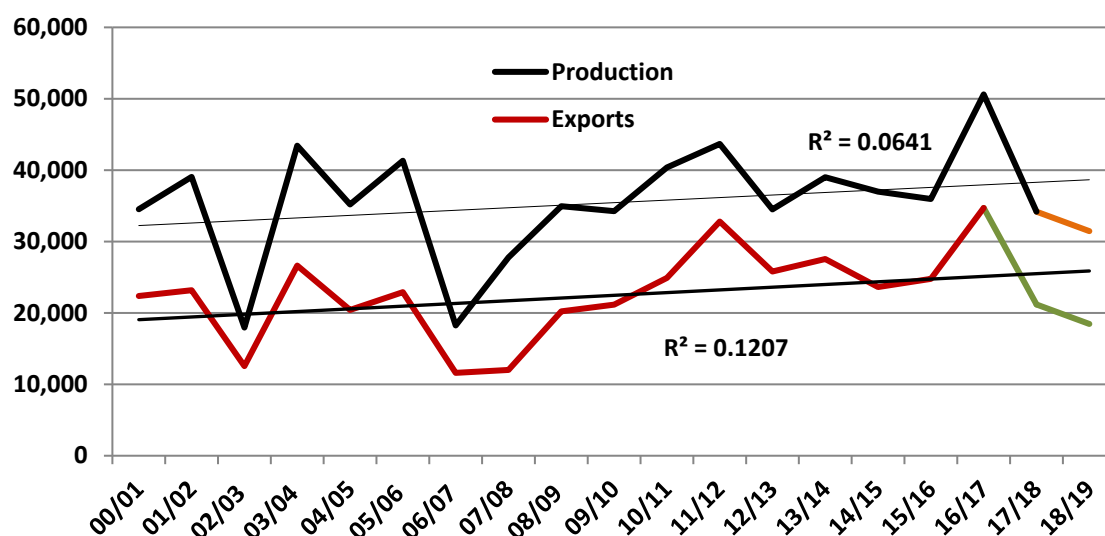
4. GRAIN END USE

4.1. Domestic versus export use volumes

The volume of grain exported reflects surplus stocks where production exceeds domestic demand. Although the grains industry acknowledges Australia as a grain exporting country, the domestic feed market views this as exports only occurring based on there being a surplus after domestic demand is satisfied. Figure 23 illustrates the consistent gap between production and exports being domestic use. Across the last 18 years domestic grain use has averaged 13MMT or 37% of production. Most year's there are ample grain supplies to meet domestic demand. However the 2002/03, 2006/07 and 2007/08 drought years can be seen as providing considerably less grain surplus for export.

For 2018/19 the expected drop in export grain volumes can be seen. Any further crop decline below the ABARES forecast, as well as higher than average domestic use, will see less grain moving into the export market. There is some market commentary that the actual 2018/19 grain exports may fall to around 10 MMT, or equivalent to what occurred in the previous drought years.

Figure 23. Grain Production and Exports 2001/02 to 2018/19, excludes canola and cottonseed ('000 tonnes)

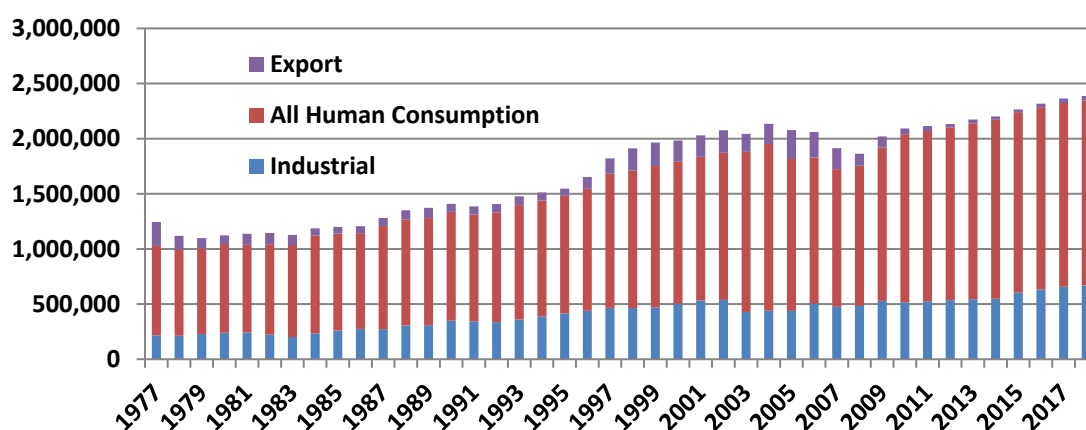


Source: ABARES Crop Reports

4.2. Wheat use in Flour Milling & Ethanol

Flour milling data shown in Figure 24 includes ABS collected production volume through to 2009. After 2009 there has been no official statistical data collected and reported. From 2009, the previous available data has simplistically been extrapolated to account for Australian population growth. Figure 24 shows flour production to be in the order of 2.4MMT. Based on milling extraction rates this equates to around 3.2MMT of wheat being milled.

Figure 24. Australian flour production 1977 – 2018 (tonnes)



Source: 1977 – 2009 Flour Millers’ Council (ABS), 2010-2014 export flour ABARES, human consumption JCS Solutions estimate based on domestic population growth, industrial JCS Solutions estimate.

The flour millers provide a stable domestic wheat demand base. The largest flour mills are located in NSW and Victoria. The advantage to the stockfeed industry is in the supply of flour milling by-products known as millrun or millmix. The volume of millmix available is related to the volume of wheat milled and the efficiency or milling extraction rate. Based on typical extraction rates, the volume of millmix produced is around 690,000 tonnes/annum. The more typical feeds utilising millmix are dairy and beef, poultry breeder and pig feeds.

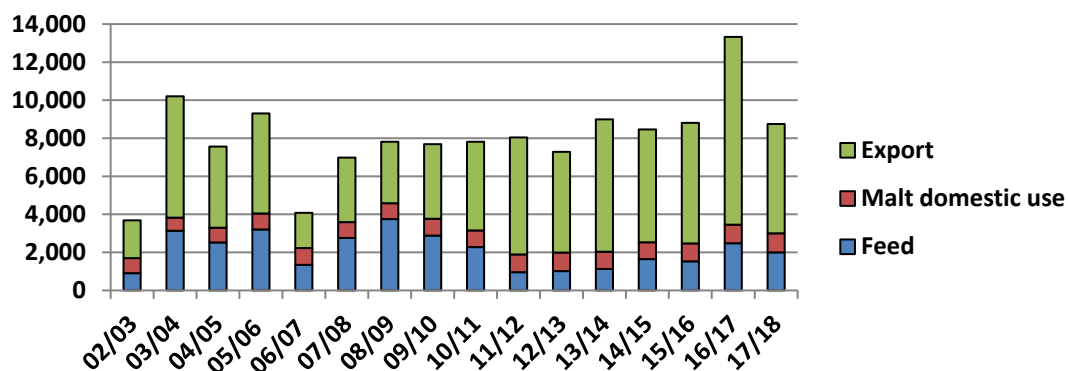
The Flour milling volumes above includes wheat milled for ethanol production. In addition whole sorghum is processed in Queensland for ethanol production. This represents around 200,000 tonnes of sorghum use annually.

4.3. Barley Use in Malt Production

Total use of barley in Australia for malting is 1 MMT per annum and around 220,000 tonnes of this is used in domestic brewing, the balance of malt produced is exported (Barley Australia 2018). Malt production capacity has been expanded with new capacity being commissioned in Geelong Victoria increasing barley use by a potential 200,000 tonnes.

Figure 25 shows the split in barley destination between domestic feed, malt and export. From year to year the volume of barley used in domestic animal feeding varies due to supply and price relative to other feed grains. The record 2016/17 crop resulted in a significant jump in both barley exports and domestic feed use.

Figure 25. Barley Use in Domestic Feed, Malt and Exported Surplus 2002/03 – 2017/18 ('000 tonnes)



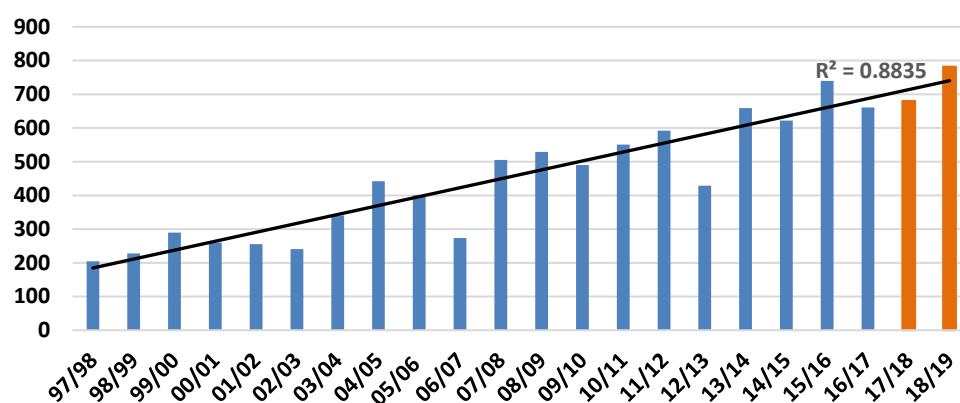
Source: ABARES Crop Reports

4.4.Oilseed Crushing

Canola has become the largest volume oilseed crop processed in Australia. There is over 1 MMT of canola seed crushed with further processing capacity expansion happening to increase production. The meal component derived from canola oil production represents around 700,000 tonnes. It is predicted with the drought demand for protein meals and increased crushing capacity the quantity of canola meal produced will almost reach 800,000 tonnes in 2018/19 (Figure 26). The last 20 years has seen an average 12% per year growth in canola meal production. The capacity for the oilseed crushing industry to expand canola crushing and supply the resulting meal into the market is seen to be due to a number of factors, these being:

- Growth in livestock feed demand
- Increased use of canola meal in dairy feeding
- Price attractiveness relative to imported soybean meal
- Decline in use of animal protein meals in poultry and pig feeds
- Increased confidence in canola meal use and higher inclusion rates in feed
- Exports of canola meal, mainly to New Zealand
- Decline in other oilseed crops and the volume of meals available. This includes a drop in the domestic crush for sunflower, soybean and safflower.

Figure 26. Canola Meal Production 1997/98 – 2018/19 ('000 tonnes)

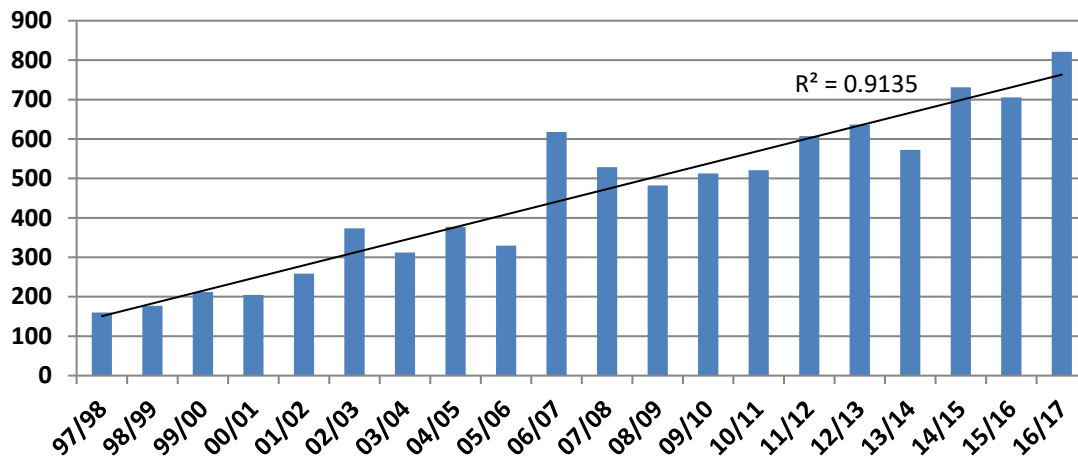


Source: Derived from ABARES Crop report data, 2017/18 and 2018/19 JCS Solutions estimate

Cottonseed crushing capacity generates 100 - 120,000 tonnes of meal annually. The economics of crushing cottonseed is impacted by the price availability of cottonseed relative to supply for cattle feeding, both feedlots and drought feeds.

The importation of soybean meal has continued to grow with 2016/17 import figures exceeding 800,000 tonnes (Figure 27).

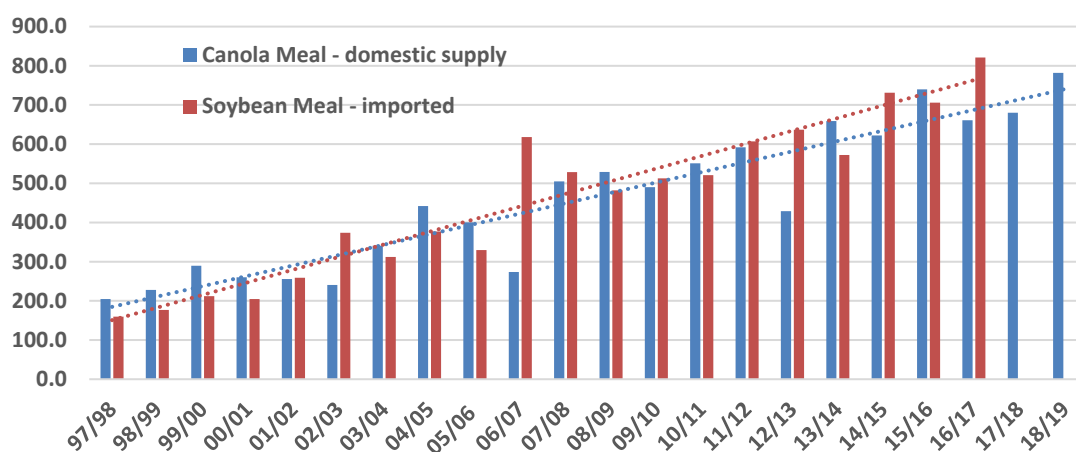
Figure 27. Soybean meal imports 1997/98 to 2016/17 ('000 tonnes)



Source: ABS

The importation of soybean meal has grown at a rate equivalent to the increase in canola meal availability from Australian crushing plants as shown in Figure 28. The large volume of soybean meal being imported provides further opportunity for Australian grown and supplied vegetable protein sources.

Figure 28. Imported soybean meal and domestic canola meal supply 1997/98 to 2018/19 ('000 tonnes)

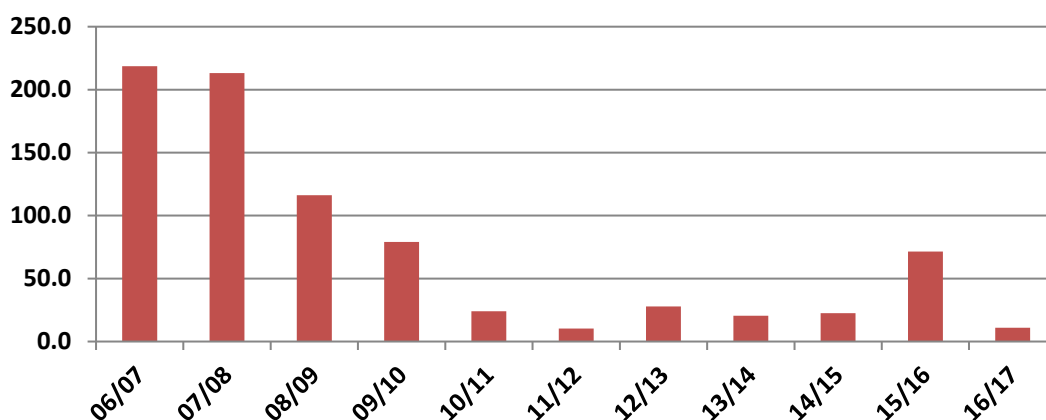


Source: ABARES - domestic canola seed use extrapolated to meal supply, ABS import data

The importation of palm kernel meal and commodities such as copra meal are influenced by increased demand during drought years. The large amounts of palm kernel meal imported during

the 2006-2008 drought period is seen in Figure 29. It is expected that similar quantities will be imported through 2018/19 due to drought demand and high domestic grain and protein meal prices.

Figure 29. Palm Kernel meal imports 2006/07 to 2016/17



Source: ABS Import data

4.5. Grain Use in Animal Feeding

The feeding of livestock is by far the largest domestic market for Australian grain. The 2017/18 year is estimated to have required the use of 10.5 MMT of grain. This figure includes an estimated 500,000 tonnes of grain used for drought feeding grazing sheep and cattle. The balance of raw material use in animal feeding is made up of milling by-products, protein meals, fats, molasses, minerals and premix additives.

Total feed use for 2017/18, excluding on farm drought feeding, as shown in Table 3 is 13.5MMT. The 2017/18 year has seen high levels of feeding across most livestock sectors. The beef feedlots have held record cattle numbers on feed. The intensive poultry and pig operations have also been operating at the top end of their production capacity.

The three east coast states use 79% of the feed, this equating to around 8.3MMT of grain.

The data within table 3 includes the following:

- Poultry Meat – largely chicken but also includes duck, turkey and minor poultry species and breeding flocks to support these industries.
- Layer – egg production including commercial layer farms and an estimate of “backyard” laying hen feed consumption.
- Pig – commercial piggery operations.
- Dairy – the concentrate based component of dairy cow intake - excludes pasture, hay and silage.
- Beef – largely feedlot ration intake, plus stud cattle feeds and live cattle export feeds.
- Sheep – lamb feedlot intake, supplementary feeds for breeding stock and live sheep export feeds.
- Horse – breeding, performance and leisure feeds.
- Aquaculture – manufactured feeds for salmon, trout, prawn, barramundi species, excludes wet pilchard feeds for tuna feeding.
- Other – includes specialty feeds for other species such as goat, alpaca, ostrich, emu, laboratory animals, zoos, etc.

Table 3. Feed use by industry sector and state (tonnes/annum) 2017/18

	NSW	Vic	Qld	SA	WA	Tas	Total
Poultry Meat	1,185,000	597,000	629,000	623,000	198,000	29,000	3,261,000
Layer	312,000	274,000	281,000	35,000	81,000	15,000	998,000
Pig	291,000	298,000	382,000	415,000	237,000	9,500	1,632,500
Dairy	259,000	1,696,000	174,000	142,000	145,000	212,000	2,628,000
Beef	1,225,000	232,000	2,159,000	100,000	156,000	41,000	3,913,000
Sheep	80,000	56,000	16,200	37,600	118,000	1,000	308,800
Horse	168,000	112,000	113,000	24,000	19,300	6,700	443,000
Aquaculture	5,000	2,000	20,000	6,000	6,000	125,000	164,000
Other	40,000	57,000	23,000	10,000	15,000	45,000	190,000
TOTAL	3,565,000	3,324,000	3,797,200	1,392,600	975,300	484,200	13,538,300

Source: JCS Solutions estimates

4.5.1. Feed Demand Outlook 2018/19

The challenge for Australia is to meet market demand for grains during a year of crop failure and reduced supply on the east coast. There are various scenarios that could play out, these being:

The starting position is for the east coast to hold low grain stocks and grain is already moving from WA and SA into the east coast market to meet demand. The actual grain stocks are however unknown by the wider market due to no mandatory grain stock reporting mechanism.

The potential use of grain by the livestock industries will be impacted through limited grain availability and volatile supply prices. The level of this impact will vary across each of the livestock sectors. The following is seen to be relevant:

Chicken Meat and Egg Production – potentially the least likely to reduce grain use with higher costs. This reflects the higher feed conversion efficiency of poultry together with the potential for some cost recovery from wholesale and retail market sale prices. During previous droughts, the production of chicken meat and eggs have not varied greatly and also reflects supply to the domestic market.

Pig production – the industry is already losing money and higher grain prices are having an impact with some smaller producers deciding to exit production. It is highly likely that continued dry weather and high grain costs will force a reduction in pig production. This is however likely to only be in the order of 5 to 10%. At the present time there is an oversupply of pig meat and a correction is required to reduce pig meat production, thus allowing pig meat prices to rise and hopefully get pig producers back into a positive trading situation.

Beef Feedlots – the cattle on feed at over 1 million head at 30 June 2018 cannot be sustained with high grain and fodder costs. If it does not rain grain will remain expensive. If it does rain store cattle will become expensive and unavailable. In either situation there is projected to be a major drop in beef feed lotting grain use over the 2018/19 year.

Dairy – for 2018/19 there will be a further decline in cow numbers, both through farmers culling heavily and the exit of some farms. Added to this is an anticipated reduction in grain feeding rates. The only thing that will turn this around is drought breaking rain that reduces grain prices dramatically.

Livestock Industry Grain Use

The 2017/18 year saw a 750,000 tonne increase in feed grain use (Table 4), driven largely by the beef feedlot sector and use of grains in supplementary feeding sheep and cattle. It is possible that the level of grain feeding on sheep and cattle properties has been even greater as producers have endeavoured to hold onto breeding stock.

There are two scenarios for 2018/19 both of which result in a reduction in grain use for livestock feeding.

Scenario 1 Remains Dry

For continuing dry weather, it is forecast there will be a drop in grain use as high prices ration use. This will be most apparent across the beef feedlot and dairy sectors. If it remains dry, grain use is predicted to decline by 6% to 9.9 million tonnes. The level of decline will not be as great as some commentary suggests as the more intensive feed use sectors are unable to suddenly drop production volumes.

Scenario 2 Drought breaking rains and 2019 summer crop success

There will be a larger drop in feed grain use should drought breaking rains occur, with less cattle and sheep being fed in feedlots and supplementary feeding on farm ceasing.

Table 4. Grain use scenarios for livestock feeding

16/17	17/18	Scenario 1 DRY 18/19	Scenario 2 RAINS 18/19
9,750,000	10,500,000	9,900,000	8,800,000

Source: JCS estimates

4.5.2. East versus West Grain Availability and Use

The significant limitation for 2018/19 is that the major grain production volume is in SA and WA, while the major domestic demand is in the eastern states. Table 5 identifies that the beef, dairy, layer and poultry meat industries are largely based in the eastern states. The pig industry has 40% of its production in SA/WA.

Table 5. Feed use East versus West Coast - tonnes

	Total	% of Total	East Coast	West Coast	East %
Poultry Meat	3,261,000	24.1%	2,440,000	821,000	74.8%
Layer	998,000	7.4%	882,000	116,000	88.4%
Pig	1,632,500	12.1%	980,500	652,000	60.1%
Dairy	2,628,000	19.4%	2,341,000	287,000	89.1%
Beef	3,913,000	28.9%	3,657,000	256,000	93.5%
Sheep	308,800	2.3%	153,200	155,600	49.6%
Horse	443,000	3.3%	399,700	43,300	90.2%
Aquaculture	164,000	1.2%	152,000	12,000	92.7%
Other	190,000	1.4%	165,000	25,000	86.8%
TOTAL	13,538,300	100.0%	11,170,400	2,367,900	82.5%

Source: JCS estimates

Equating feed production to feed grain use, and taking account of flour milling, malt production and retained seed provides an east coast grain use in 2017/18 12.5 MMT. Against east coast grain production of 15.2 MMT, this shows the relative tight supply as grain has been exported and grain stocks run down. Based on ABARES 2018/19 east coast grain production of 10.8MMT, against a forecast grain use of 11.9 MMT, this results in a 1.1 MMT deficit. There is ample grain within WA and SA, based on ABARES production for these states where there should be surplus of over 17 MMT (Table 6).

As already discussed, it is felt that ABARES September crop forecast for the east coast is now overstated. For every 1 MMT drop in the actual east coast crop, this has to be supplied from WA and SA. Added to the deficit is the export of any grain from the east coast that will need to be replaced by other grain.

Table 6. Grain production and use 2017/18 and 2018/19

	East Coast 17/18	West Coast 17/18	East Coast 18/19	West Coast 18/19
Grain production	15,220,000	19,439,000	10,829,000	20,485,000
Feed grain use	8,720,000	1,845,000	8,040,000	1,850,000
Flour grain use	2,754,000	277,000	2,783,000	277,000
Malting grain use	735,000	190,000	790,000	190,000
Seed retained	293,000	596,000	293,000	596,000
Total grain use	12,502,000	2,908,000	11,906,000	2,913,000
Surplus	2,718,000	16,531,000	-1,077,000	17,572,000

Source: Production ABARES, use JCS Solutions estimates

4.5.3. Feed Volume Change over Time

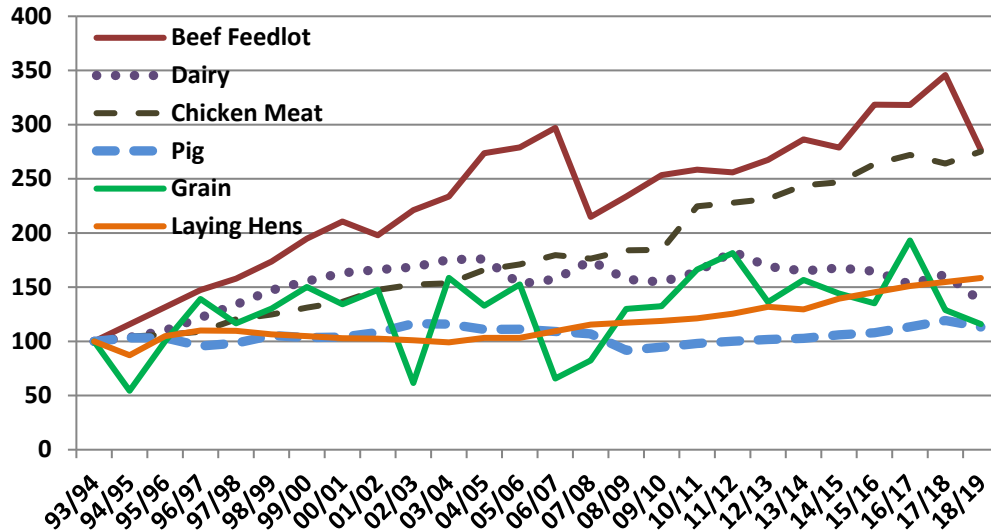
The relative rate of increase of the major livestock industries is shown in Figure 30. This data has been compiled by JCS Solutions from published production data and provides an indexed growth rate (base year 1993/94) to demonstrate the relativity between livestock industries and the grains industry. Growth has been defined in volume production terms as follows:

- Grain – wheat crop tonnes
- Chicken Meat – tonnes
- Laying hens – flock size
- Beef Feedlot – number turned off
- Pig Meat – tonnes
- Dairy – tonnes grain use (cow herd number X kg grain/lactation)

The 2018/19 figures are estimates based on predicted changes due to the impact of high grain prices and feeding. The beef feedlot and chicken meat industries have been expanding at a similar rate. The dairy industry has fallen from a previous peak. It is forecast that the pig industry will decline due to operation. The egg industry has expanded over the last ten years and is expected to continue this trend.

The grains industry is seen to be far more variable as it is exposed to the variables of seasonal growing conditions. While the 2016/17 bumper cropping year illustrates the grains industries production potential, the 2018/19 year demonstrates its equal capacity to fail in drought years.

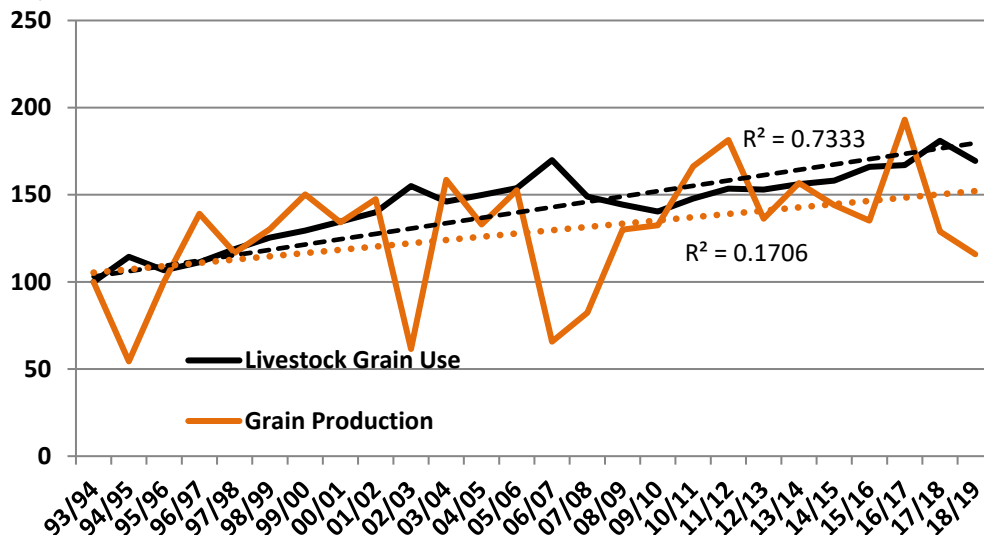
Figure 30. Industry growth 1993/94 to 2018/19, indexed from 1993/94



Sources: Derived from ABS, ALFA, Dairy Australia, AECL

Feed grain use by the domestic livestock industries, as shown in Figure 31, is compared against wheat production. The impact of drought years are clearly seen and becomes more significant when this impacts the eastern grain growing states.

Figure 31. Australian domestic livestock feed grain use and wheat production, indexed from 1993/94



Sources: ABS, Dairy Australia and JCS Solutions estimates

4.5.4. Beef Sector

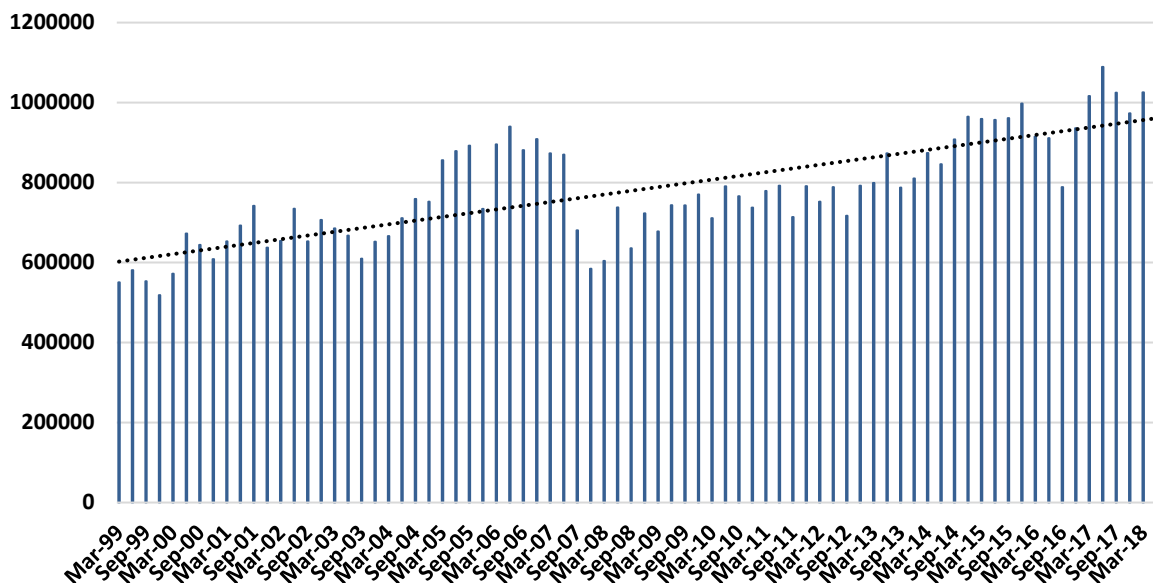
Beef Feedlots

The strength of the beef feedlot sector is seen in Figure 32, with a new record of 1.12 million cattle on feed during the April to June 2018 quarter. Following a significant drop in cattle feeding during the September 2016 quarter, cattle numbers have rebounded strongly. Cattle on feed numbers increased in all states apart from WA. ALFA (2018) reports that the unprecedented numbers of cattle on feed was due to the continued demand for quality Australian beef and the deteriorating seasonal conditions.

Feedlots are operating at 86% utilisation, thus there is limited ability to place additional cattle on feed. The feedlot cattle numbers for 2018/19 will be impacted by the seasonal conditions. Continuing dry in NSW and Queensland will provide store cattle at favourable prices for feeding. The offsetting factor is escalating grain costs and the need to import grain from WA and SA through the Brisbane and Newcastle ports and transport cost to inland feedlots. Access to fibre in the form of hay, silage and cottonseed is a further limiting factor.

Should the season break with widespread rainfall across northern Australia, there is expected to be a reduced availability of store cattle and feedlot activity will decline. This situation occurred following the 2006/07 drought period. Figure 32 shows that from the peak in mid-2006, cattle on feed numbers fell by 36% over the following 12 month period. This will occur again and the current high cattle on feed numbers will fall significantly. The unknown is when will drought breaking rain occur?

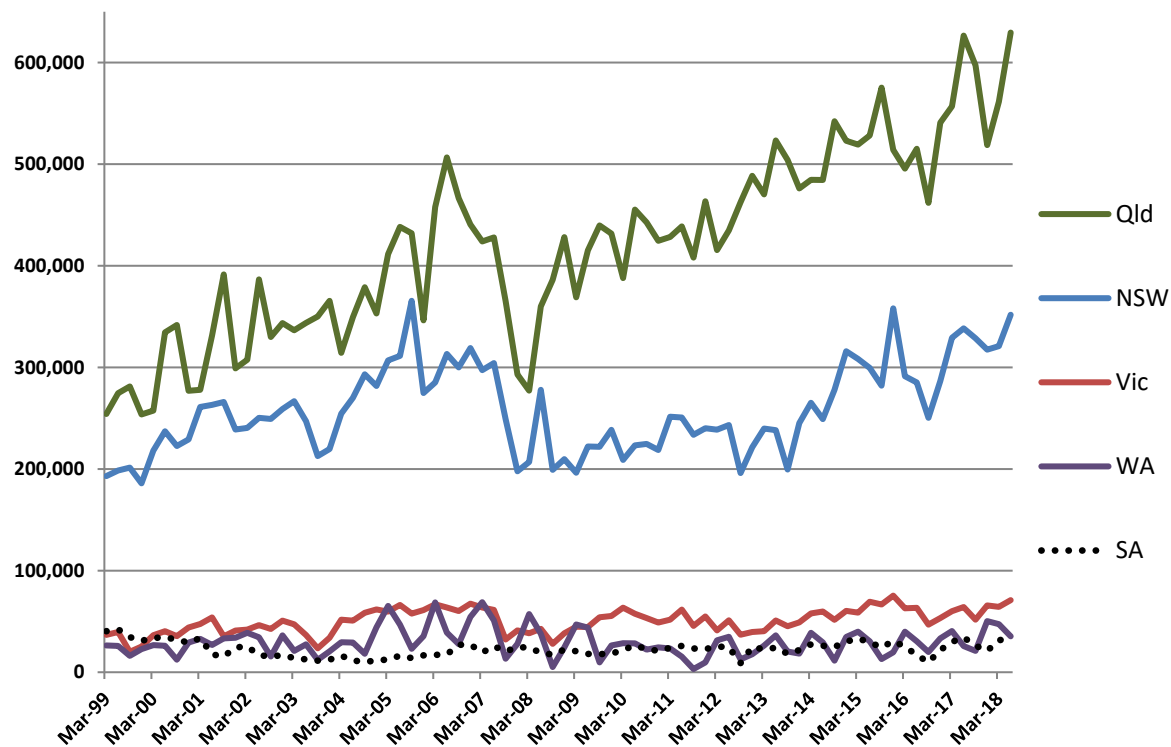
Figure 32. Cattle on feed, national quarterly data 1999-2018 (head)



Source: ALFA/MLA Quarterly Feedlot Surveys

The share of cattle on feed (Figure 33) shows the dominance of Qld and NSW. Both states have been increasing cattle numbers. The other states operate at much lower feeding numbers with SA and WA having seasonal swings in numbers on feed.

Figure 33. Number of feedlot cattle on feed by state 1999-2018 (head)



Source: ALFA/MLA Quarterly Feedlot Surveys

Beef Supplementary Feeding

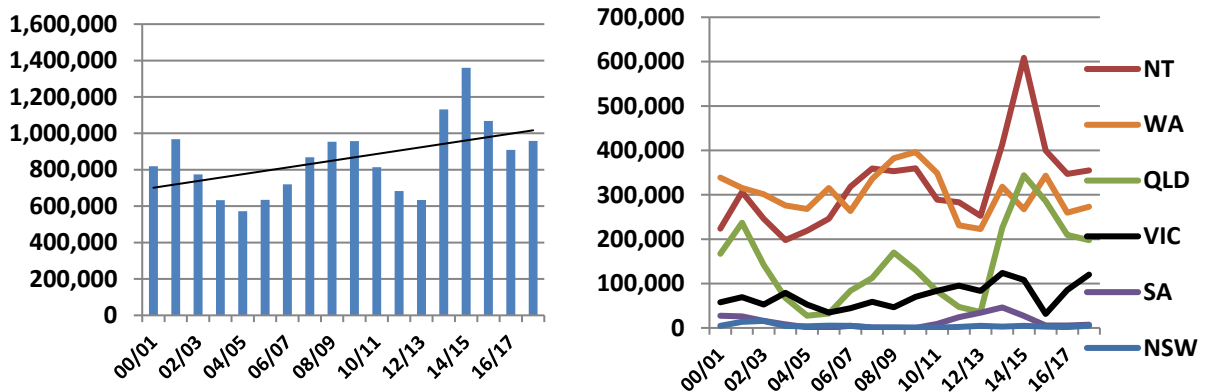
The 2017/18 year has seen growing demand for supplementary beef feeds. More favourable beef prices initially supported opportunity feedlots. Further feed volume was utilised in maintaining breeding stock. The second half of the year has seen escalating grain prices that has limited further increased feeding volumes and placed pressure on producer’s supplementary feeding breeding cows. Additionally, the shortage of hay and high prices has led to some producers looking to utilise manufactured feeds and by-products as a means of securing feed supply.

As drought conditions have widened in Qld and NSW, there has been a growing demand for drought feeds in pelleted, loose mash and liquid feeding form.

Live Cattle Export Feeds

The number of cattle being exported live has come off the 2013 to 2016 period when exports exceeded one million head. The Northern Territory and Western Australia have remained significant in export numbers from the northern shipping ports of Darwin, Broome, Wyndham and Port Headland, as well as Fremantle in south western WA. Growth in export cattle numbers from Queensland is seen with over 200,000 head being exported from the state during the last two years.

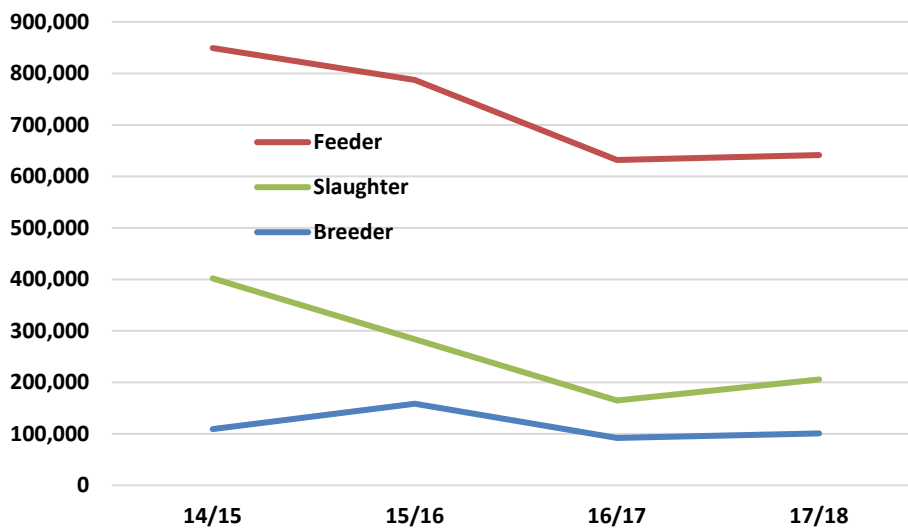
Figures 34 and 35. Live cattle exports from Australia and by state 2000/01 – 2017/18 (no. head)



Source: Department of Agriculture & Water Resources

Figure 36 provides the numbers of cattle exported for either breeding, feeding or slaughter end use. Feeder cattle exported to Indonesia is the major market destination, with lesser numbers of feeder cattle being shipped to the Philippines, Indonesia, Vietnam, Turkey, Israel and Russia. Cattle ready for slaughter are largely being exported to South East Asian countries and China. Breeding cattle are being exported to many countries. Cattle transported by air represent around 1% of total export numbers and are seen to be breeding animals exported in smaller numbers.

Figures 36. Live cattle exports from Australia for end use purpose 2014/15 - 2017/18 (no. head)



Source: Department of Agriculture & Water Resources

The export of live cattle presents feed supply opportunities for Australian stock feed manufacturers. This includes pre-feeding to condition cattle to feed prior to ship loading. The average shipping times vary from 6-7 days for cattle shipped to Indonesia from northern Qld, NT and WA ports to 16-25 days for cattle shipped from Fremantle, Adelaide and Portland.

Most feed for cattle shipped from Northern Australia is supplied from Indonesian feed mills, there are some feed manufactured in the Northern Territory. Cattle pre-feeding and shipping feeds from

Fremantle, Adelaide and Portland are supplied from local feed mills with capability to meet the feeding specifications.

Table 7. Number of voyages, voyage and discharge days and cattle numbers to major destination regions during 2016.

Parameter	ME/N Africa	SE Asia	NE Asia	Mexico	SE Europe	Total
Voyages (No.)	28	271	35	1	12	347
Cattle (No.)	72,721	861,074	102,487	6,677	86,846	1,129,805
Voyage days (Ave.)	17.8	8.0	17.3	22.0	24.7	10.3
Discharge days (Ave.)	4.3	1.5	0.8	3.0	2.0	1.7

Source: MLA 2017

4.5.5. Dairy Industry

Milk production in 2017/18 increased by 3.3% over the previous year. While this was a positive for the industry, the longer term trend as shown in Figure 37 is for milk production to be in decline. Based on lower milk production in July-August 2018, the full year outlook is for a further drop in national production. Figure 37 includes a forecast 4% fall in production that will result in the milk volume being below 9 billion litres for the first time in ten years. The industry has been confronted by a number of years of uncertainty and negative influence from unstable global milk prices and milk processor pricing disorder.

The confidence of dairy farmers in the dairy industry, as reported by Dairy Australia in their Dairy Australia's National Dairy Farmer Survey (NDFS) 2018 dairy survey, is at a low level. This survey conducted in February to March, will have been made worse as the impact of drought and rapid jump in feed and fodder prices have eroded farm margins. To this is added the failure of some larger corporate dairy investments that had been seen as offering potential industry expansion funding.

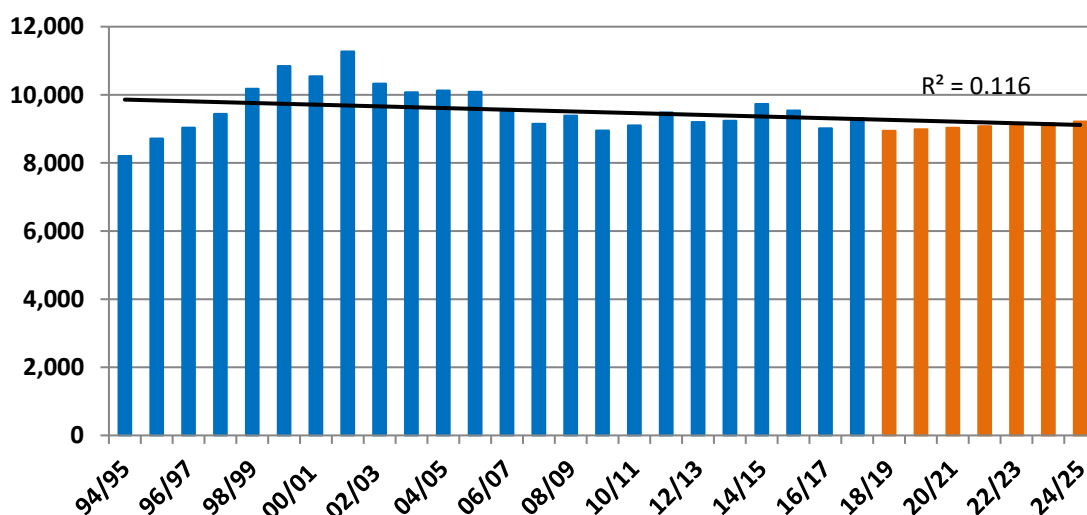
It is reported that dairy farmers have been actively culling cows with a higher number of cows sold through the 2018 winter months. This action is to remove lower producing cows as feed is expensive and cull cow meat prices remain reasonable.

The positive side is seen in an increase in farm gate milk prices, this occurring as step-up prices after 2018/19 opening prices were announced. Higher prices are seen to be both due to better global prices and milk processor needing to compete for market share of milk supply. A significant change has occurred in the dairy industry as farmers have become more mobile in switching their milk supply between processors. Dairy Australia reported in its farmer survey that around 17% of farmers responding to the survey had changed milk processor in the past 12 months, and a further 14% were in the process of considering it. While the milk processing sector continues to expand with further capacity being installed, there is a high level of competition to secure milk volume. While this to date

has seen farmers switching between suppliers, it has not resulted in any significant industry milk production expansion.

The dairy industry remains in a state of uncertainty. Milk production is forecast to increase by a modest 0.5%/year over the period 2019/20 to 2024/25. There is little to suggest the industry will grow at any faster rate and there is potentially more reason to suggest it may continue to contract as per the longer term trend.

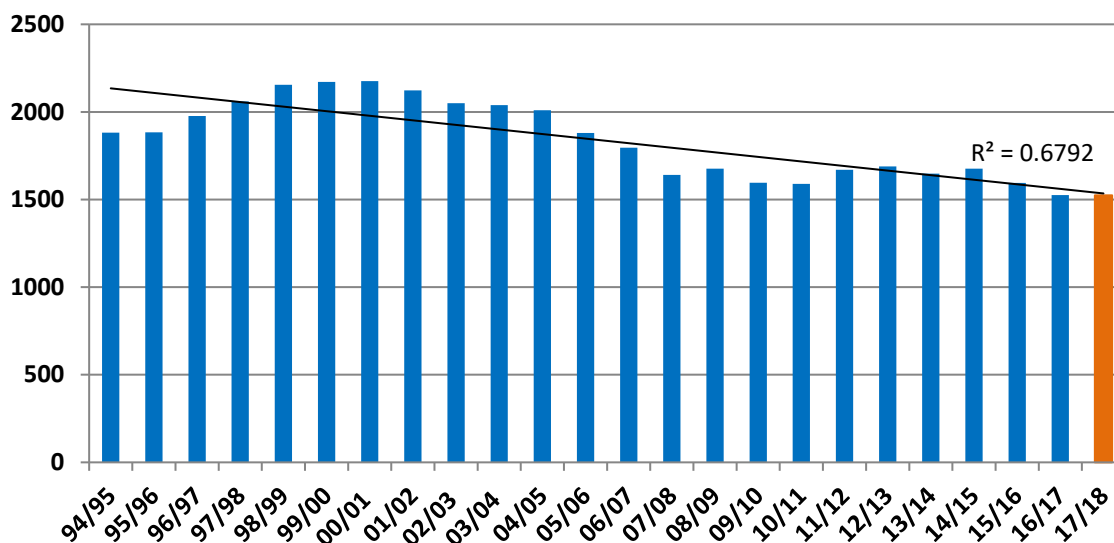
Figure 37. National milk production 1994/95 to 2024/25 ('000 litres)



Source: Dairy Australia 1994/95 to 2017/18, 2018/19 to 2024/25 JCS Solutions forecast

The number of dairy cows over the last 20 years has been in decline, falling from 2.1 million cows in 2000 to 1.52 million in 2016/17. The shape of the change in cow numbers as shown in Figure 38 closely resembles total milk production as in Figure 37. Obviously the number of cows in the national dairy herd directly relates to total potential milk yield. It can be seen that the decline in cow numbers has however been at a faster rate than the decline in milk production. The fall in total milk production has been reduced due to increasing milk production per cow.

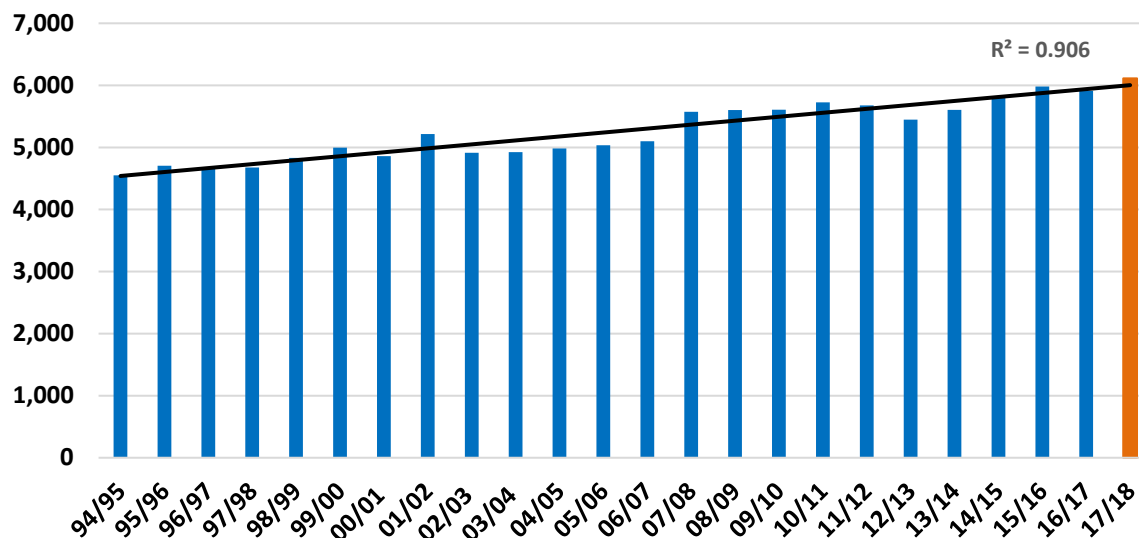
Figure 38. National dairy herd, number of cows ('000)



Source: Dairy Australia 1994/95 to 2017/18, 2017/18 JCS Solutions forecast

Milk production per cow has shown a steady increase from only 4,500 litres in 1994/95 to exceed 6,000 litres/cow in 2017/18. This increase is an average 1.5% per year. The positive increase in milk production is the result of improved genetics and nutrition, as well as other factors such as herd health, production systems and management. The average 6,000 litres is however well below the genetic potential of modern dairy cows and provides considerable opportunity for further production growth.

Figure 39. Milk yield per cow per year 1994/95 to 2017/18 (litres)

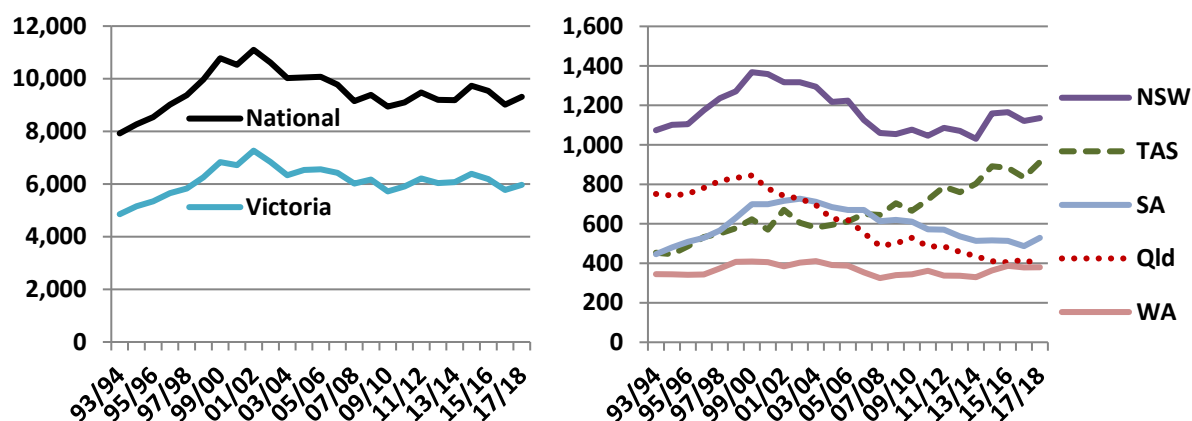


Source: Derived from Dairy Australia and ABS data, 2017/18 JCS Solutions forecast

Total milk production is most significantly impacted by what happens in the Victorian dairy industry where 2/3 of milk is produced. The 2018/19 outlook is for falling production in the Western Districts and Gippsland. Production in Northern Victoria has not dropped as much year to date but this is likely to come under pressure with high grain prices and water irrigation availability.

The Queensland and NSW dairy industries have been hard hit by drought reducing pasture production and high grain and fodder costs. Both states are likely to see a drop in milk production through 2018/19. Dairy farmers in SA and WA have been less affected by drought and hopefully production will be stable in these states.

Figures 40 and 41. Milk production by state 1993/94 to 2017/18 (billion litres)



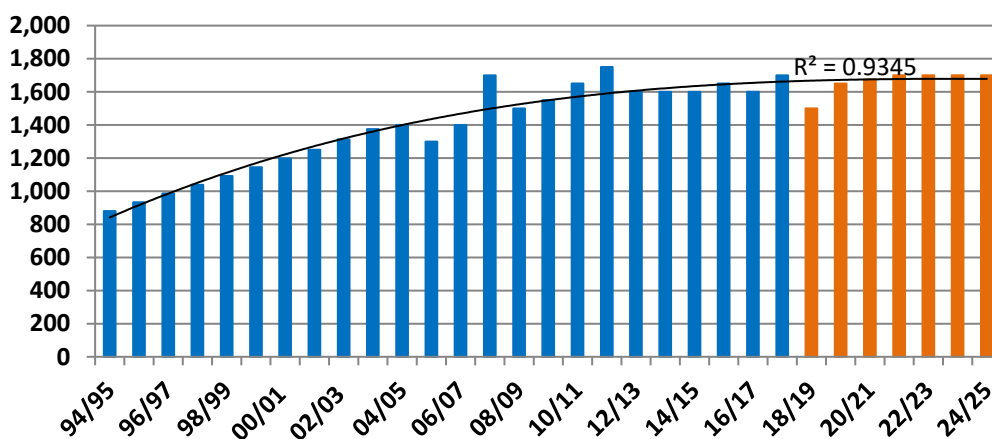
Source: Dairy Australia

Feed grain use by the dairy industry is greatly affected by the concentrate feeding rate. Figure 42 identifies the increase in feeding rates through to around 2010. Since this time period the average feeding rate has been in the range 1.5 to 1.7 tonnes/cow/lactation.

For 2018/19 concentrate feeding is forecast to decline on the back of expensive grain and feed prices. There is industry feedback that higher prices have started to force dairy farmers to cut back on feeding rates. It is expected that once grain supply and prices return to less inflated levels the feeding of concentrates will return to a higher level.

The further rationalisation of the industry and fall out of older farmers and smaller herds by default tends to remove lower intensive farms that have operated at lower feeding rates. As herd size increases there is a corresponding move to feeding higher levels of concentrates. Thus even though total cow numbers decline, the total concentrate feeding declines less. The higher concentrate feeding rates align with higher per cow milk yield.

Figure 42. National average grain/concentrate intake 1994/95 to 2024/25 (kg/cow/annum)

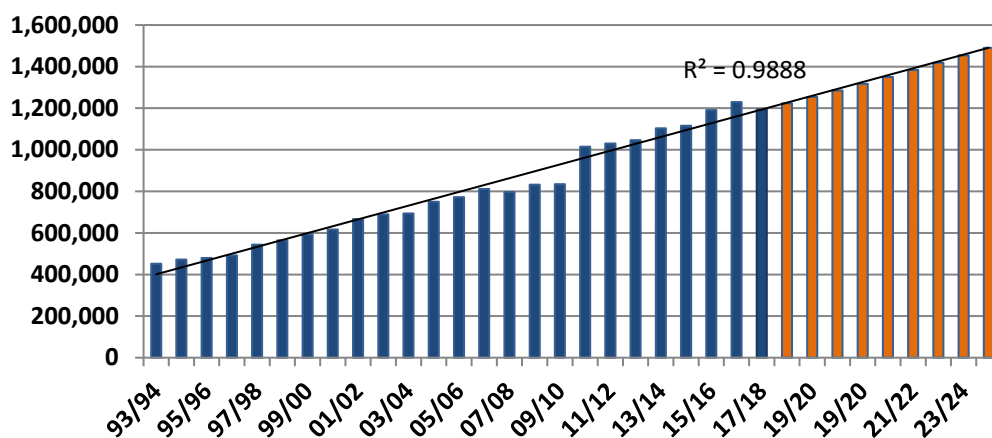


Source: Dairy Australia 1994/95 to 2014/15, 2015/16 to 2024/25 JCS Solutions projection

4.5.6. Poultry Meat

The 2017/18 year saw the first annual reduction in chicken meat production for ten years. The reduction was 2.9% (Figure 43). Based on historic industry growth, chicken meat production is forecast to reach 1.5 million tonnes in 2024/2025.

Figure 43. Australian Chicken Meat Production 1993/94 to 2024-25 (tonnes)

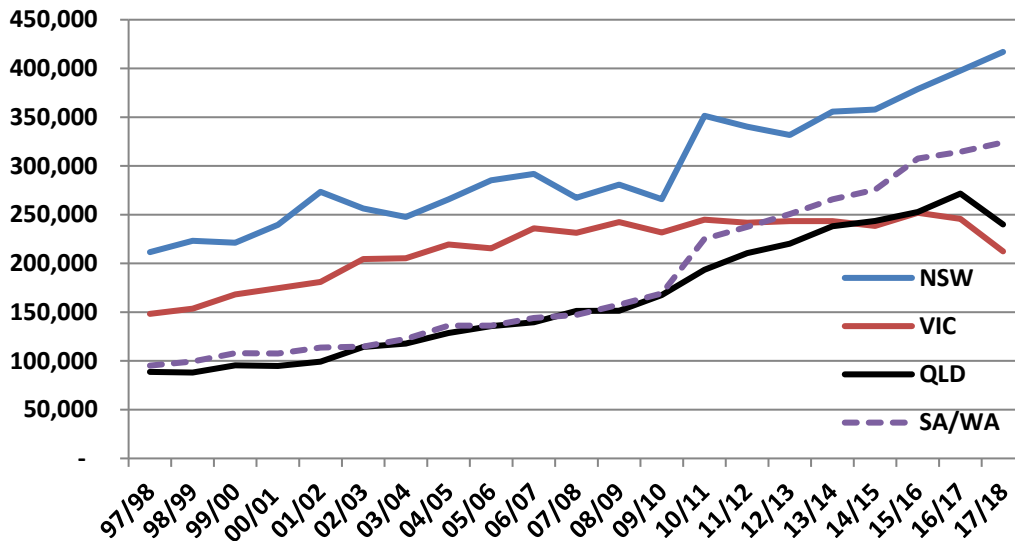


Source: ABS 1993/94 – 2017/18, 2018/19 to 2024/25 JCS Solutions data predictions

A change in the production base of the chicken meat industry is taking place and reflected in the state meat volumes. Figure 44 shows the decline in production in Queensland and Victoria, while NSW and SA/WA production has increased.

What Figure 44 does not show is the movement of production within NSW. The expansion of growout farms in Griffith and Tamworth is replacing old farms and shedding in the Sydney, Southern Tablelands and Hunter regions. The two major producers have been rationalising production centres and focusing their capital expansion to targeted Australian regions.

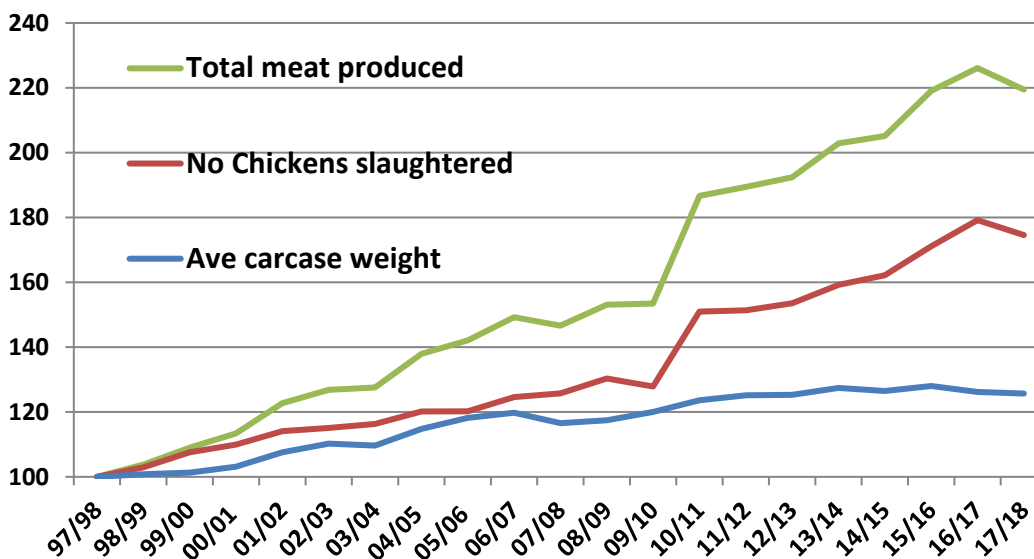
Figure 44. Chicken meat production by state 1997/98 to 2017/18 (tonnes)



Source: ABS

Figure 50 illustrates the relative increase in chicken meat production and the number of chickens slaughtered. It is seen that bird size at slaughter has remained constant over the last 7-8 years.

Figure 50. Relative increase in total chicken meat produced, number of birds slaughtered and average carcase weight 1997/98 to 2017/18. Data indexed to 100 at 1997/98.



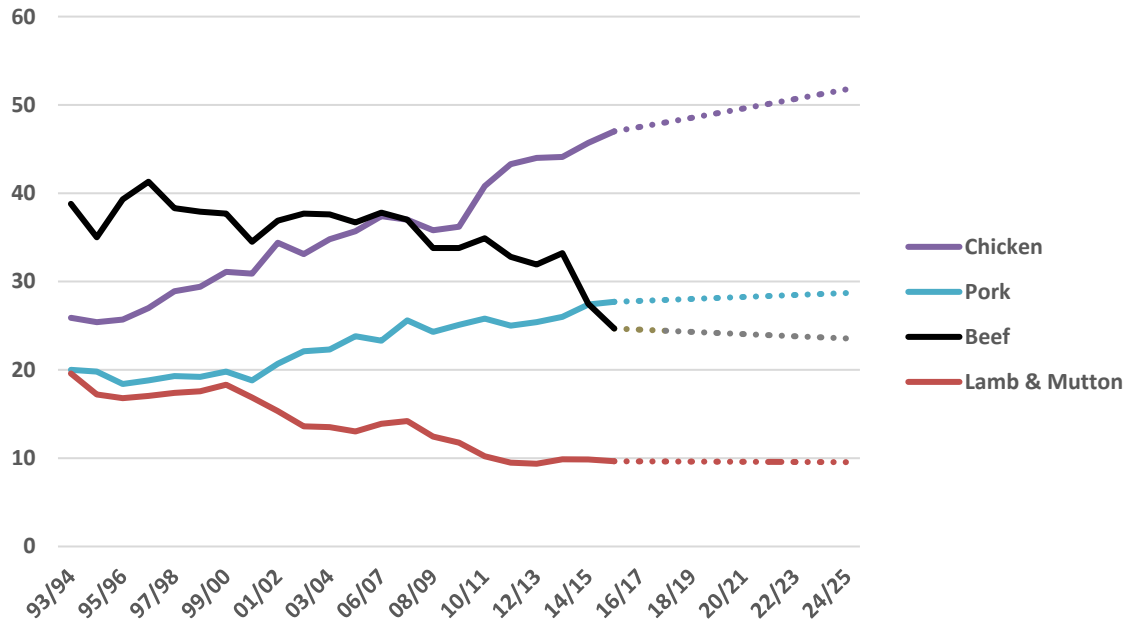
Source: Derived from ABS data

Chicken Meat Consumption

ABS data on meat consumption was last released for the 2015/16 year. Figure 51 shows consumption in kg/person with this forecast through to 2024/25. The forecast is using the previous 13 year trend in consumption for chicken and pork, flat lamb/mutton and a slower decline in beef. In 2015/16 chicken meat had reach 47kg/person. Using the prior annual increase of 1.1% per annum, chicken meat consumption would hit 51.8 kg by 2024/25. As discussed within the 2016 report, it is anticipated that a consumption ceiling will be reached, and as identified by Gidley-Baird (2016), this consumption plateau is around 45 kilograms per year in Western countries. It is yet to be seen if the Australian consumption pattern will similarly stay around the 2015/16 47kg or continue to grow beyond 50kg/person.

The increase in chicken meat as a food item has come at the expense of beef, lamb and mutton. The recent years higher cost of beef and lamb is in contrast to a flat chicken meat price and fall in pork prices since their peak in 2016.

Figure 51. Meat consumption 1993/94 to 2024/25 (kg per person annually)

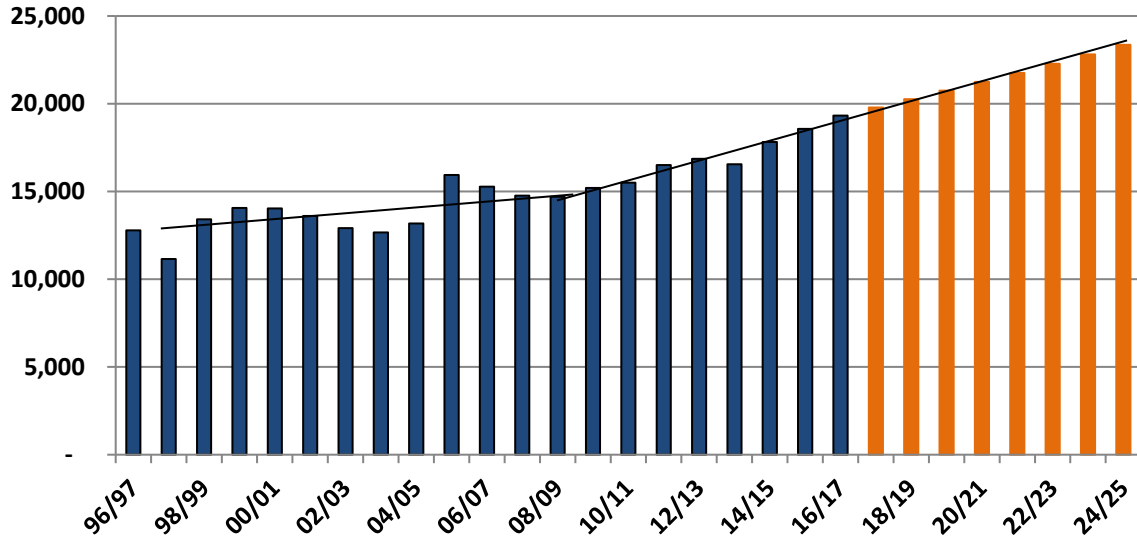


Source: ABS 1993/94 to 2015/16, JCS Solutions trend forecast 2016/17 to 2024/25

4.5.8. Layer Industry

The Australian egg industry has been undergoing a growth phase as consumption of eggs has been increasing more rapidly than population growth. Figure 52 shows that over the last eight years the laying hen flock has increased by an average 3.9% per year. The flock is likely to exceed 20 million hens in the 2018/19.

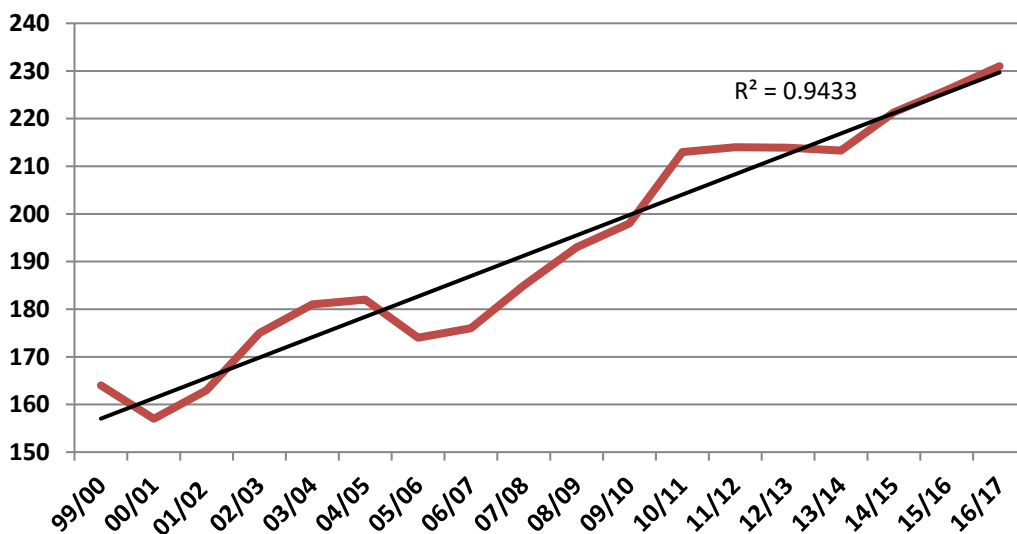
Figure 52. Australian Laying Hen Flock 1996/97 to 2024-25 (000's)



Source: 1996/97 -2006/07 ABS, 2007/08 – 2016/17 AECL, 2017/18 – 2020/21 JCS Solutions data predictions.

Figure 53 shows the rise in egg consumption with this reaching 230 eggs per person in 2016/17. This is a remarkable growth rate and is a credit to the egg industry and its promotion of eggs as a healthy food choice.

Figure 53. Egg consumption 1999/00 to 2016/17 (eggs/person/year)

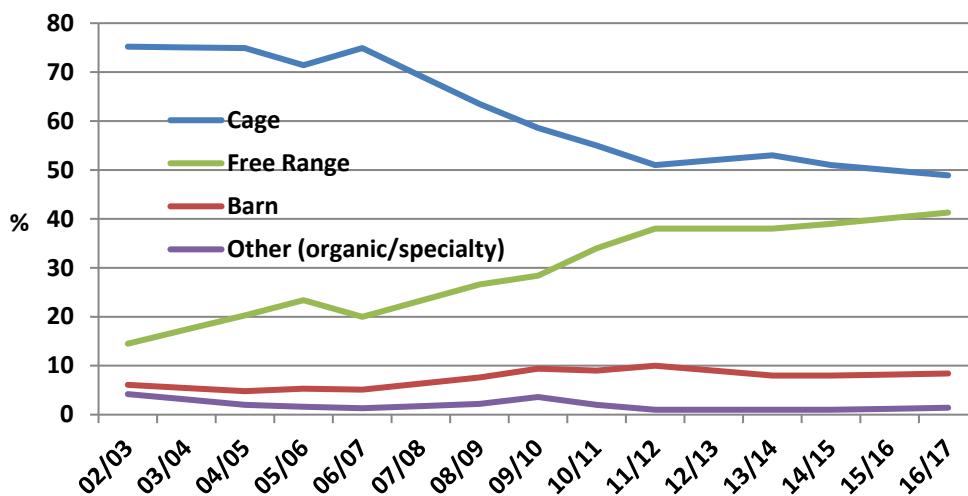


Source: AECL

Traditional cage egg production continues to decline, falling below 50% of eggs produced for the first time in 2016/17 (Figure 54). Free range production has shown the greatest growth and a final decision on the definition of free range has provided some industry certainty allowing further farm development to proceed. Although barn laid production remains below 10%, some major expansion projects are taking place that is likely to see this system replacing some of the older cage layer production capacity.

The market swing to free range eggs is seeing the growth in smaller scale farms and new industry entrants in non-traditional egg producing regions. Due to their location and less feed conversion efficient systems, this is resulting in the growth in layer feed demand across regional Australia. Some feed mills are benefiting through a renewed demand for layer feeds.

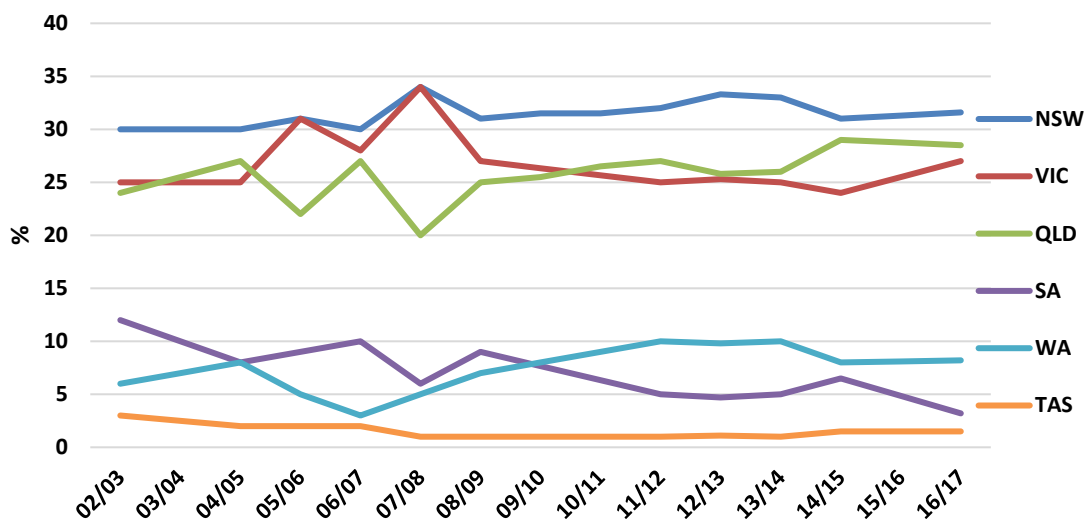
Figure 54. Retail egg sales by production system 2002/03 to 2016/17 (%)



Source: AECL retail survey data

The location of egg production by state remains reasonably stable as shown in Figure 55. While Queensland has shown an increasing trend, it is South Australia that has experienced a declining egg production base.

Figure 55. Egg Production by State (% share)



Source: AECL

4.5.9. Pig Production

The Australian pig industry increased meat production by 10.5% over the two year period 2016/17 and 17/18 (Figure 56). This was far greater than the average 2% annual growth experienced over the 2008 to 2016 period. The jump in production is suggested by Spencer (2018) to be due to three factors, these being:

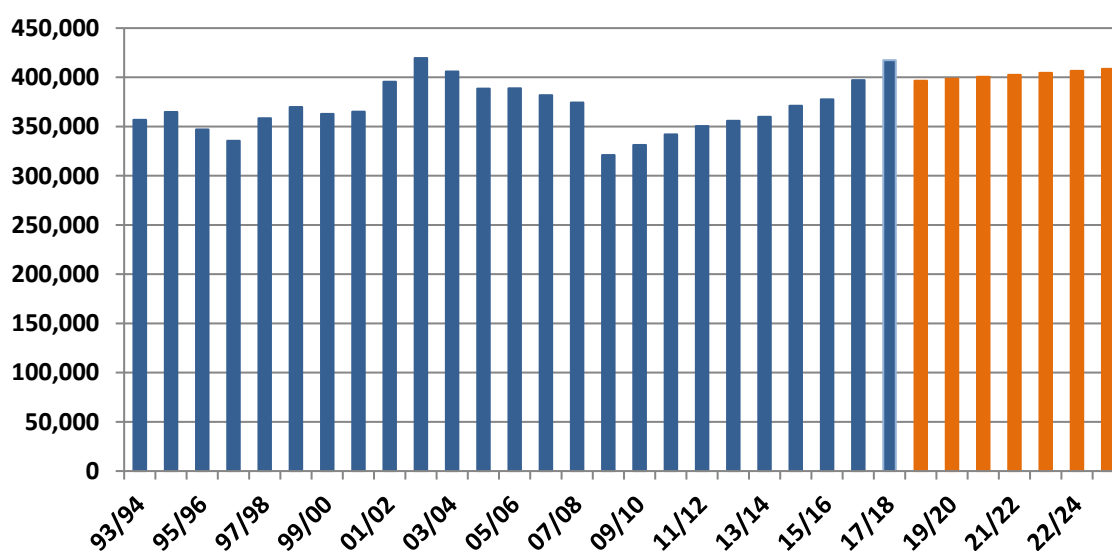
- 50% increased productivity seen in the number of pigs sold per sow per year
- 25% increased sows in the breeding herd
- 25% increased pig carcass weights.

Together with increased production, there was seen to be a slowing in pig meat demand through the August 2015 to August 2016 period. The level of pig meat imports through the last four years has remained relatively stable. Although there is some commentary that there has been an increase in cooked products that may not be picked up within import statistics.

During a 12 month period from late 2015, the pig industry was experiencing record prices of \$3.70-3.90/kg for baconer pigs and the cost of feed grain was low at \$210 to \$260/tonne. The high prices lasted for just over 12 months and were followed by a rapid 35% decline. Pig meat prices have fallen to a low \$2.60/kg and feed grain prices have risen to \$380-400+/tonne. Pig producers in Queensland and Northern NSW have been the worst impacted through higher grain costs. In August 2018, it has been reported that some pig producers are losing \$30 to \$50/pig sold.

There are already some smaller producers who have exited the industry and a correction in terms of pig meat production is expected for 2018/19. A decline in pig meat production for the next year reflects previous pig industry contraction as the industry swings between under and over supply. Figure 56 includes a forecast 5% reduction for 2018/19, followed by a more modest 0.5% annual pig meat production increase through to 2024/25.

Figure 56. Australian Pig meat production 1993/94 to 2024/25 (tonnes)

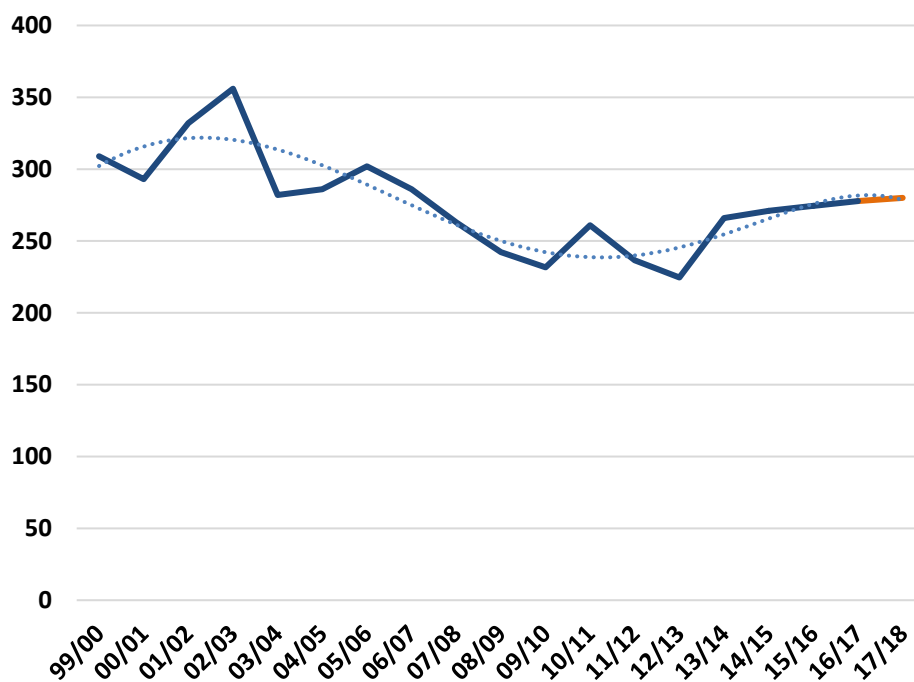


Source: ABS 1993/94 to 2017/18, JCS Solutions data prediction 2017/18 to 2024/25

ABS data on the sow breeding herd, as shown in Figure 57, shows the increase in sow numbers after the bottom point of 225,000 sows in 2013. The increase in pig meat production is seen to be a function of three key factors:

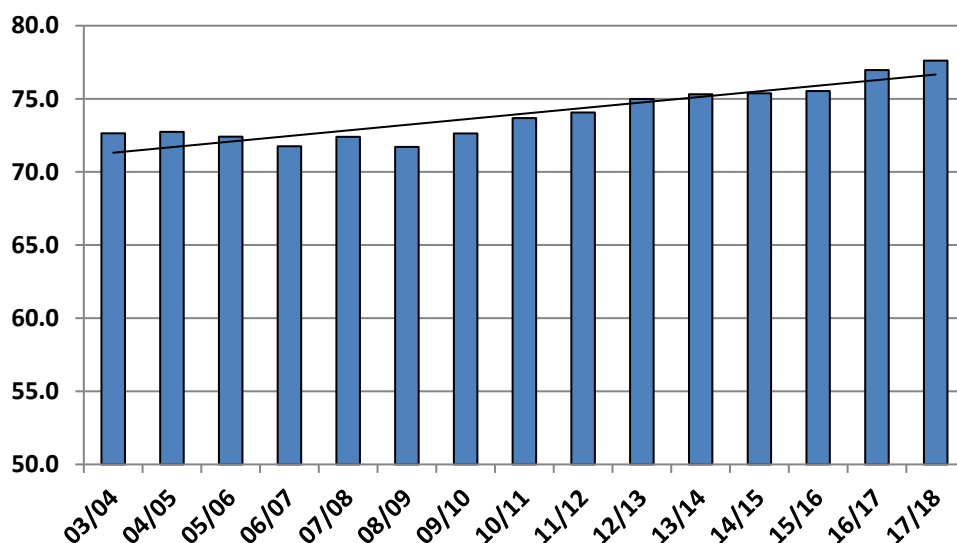
- Increased sow breeding herd.
- Increased pig carcass weights, based on ABS data the average carcass had increased to 77.6kg (Figure 58).
- Increased breeding and growout efficiency lifting meat produced from each breeding sow.

Figure 57. Australian Breeding Herd Number of Sows 1999/00 to 2017/18 ('000s)



Source: ABS, 2017/18 JCS Solutions estimate

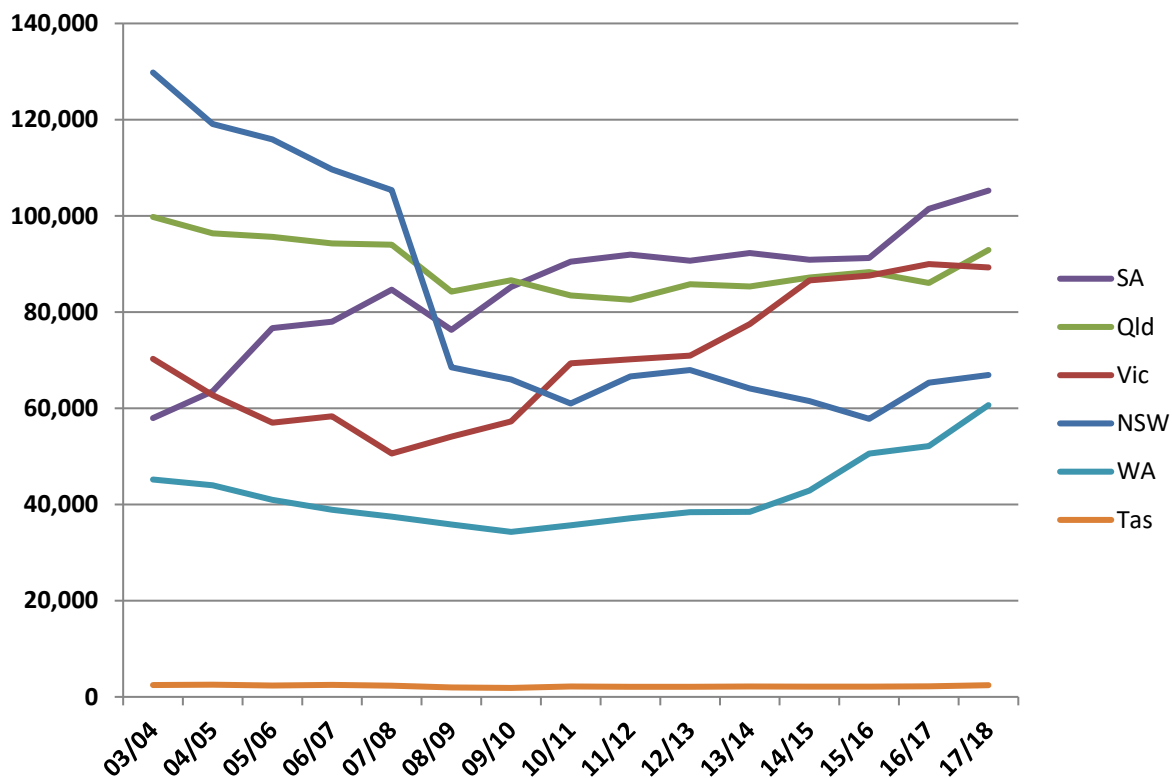
Figure 58. Average Carcass Weight 2003/04 to 2017/18 (kg/pig carcass weight)



Source: Derived from ABS data

The shift in the location of pig meat production is seen in Figure 59. South Australian production has increased further and is now the leading pig production state. NSW in the space of ten years has moved from the largest production state to now being fourth. Western Australia although remaining in fifth place has seen significant expansion over the last four years.

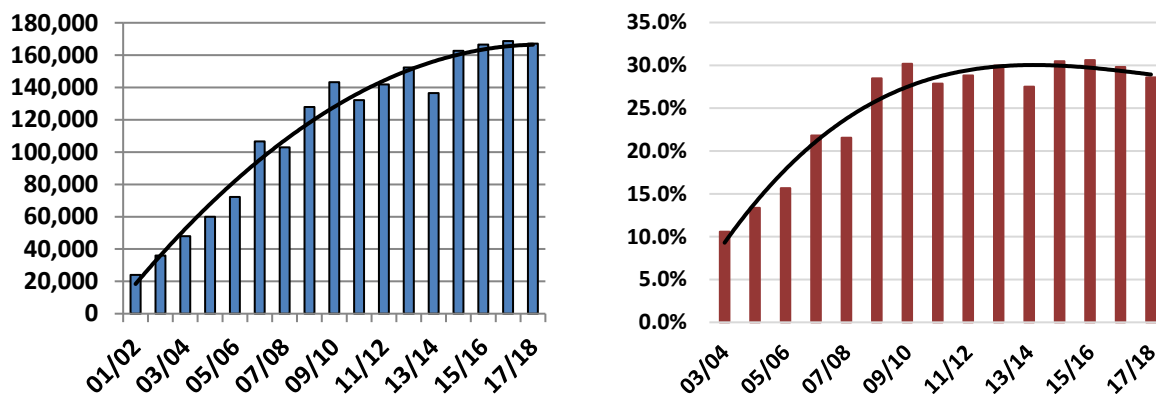
Figure 59. Pig meat production by state 1993/94 to 2017/18 (tonnes)



Source: ABS

Reported pig meat imports would seem to have stabilised at around 160,000 tonnes as shown in Figures 60 and 61. For the last decade this equates to around 30% of total pig meat use in Australia.

Figure 60. Pig meat imports 2001/02 to 2017/18 (tonnes) **Figure 61 Imported pig meat as a % of total (domestic plus imports) 2003/04 to 2017/18**



Source: ABS

4.5.10. Sheep

The 2017/18 year has seen record lamb and wool prices. There has been renewed interest in feeding sheep in the following areas:

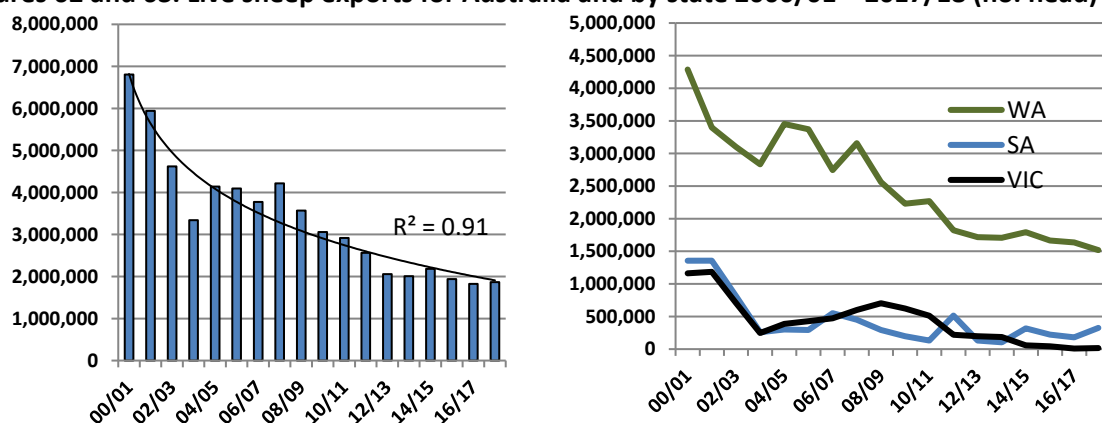
- Lamb feedlotting – to meet market demand requirements. Lamb prices have been sufficient to justify the purchase of lambs for feedlot feeding.
- Opportunity lamb feedlotting – by producers to optimise lamb growth and meet market requirements.
- Supplementary feeding lambs – used to fill pasture feed gaps to optimise lamb finish.
- Supplementary feeding breeders – looking to maximise ewe breeding performance.
- Drought feeding – lack of grazing and the need to feed breeding ewes under drought conditions.

Many feed mills have targeted the sheep market with the supply of dedicated lamb feedlot, supplementary and drought feeds. This has allowed mills to diversify their business and secure additional opportunity business, with the expectation this volume will disappear with drought breaking rainfall and lower lamb and wool prices.

Live sheep export

The greatest demand for sheep feeds is in supplying feed for prefeeding and shipping of live sheep. The number of live sheep exported from Australian ports has been at 1.8 million head for each of the last two years. Figure 62 shows the significant decline in sheep exports, down from the 6.8 million head exported in 2000/01. Western Australia is the main export state providing 80 to 90% of sheep exported. Victorian sheep exported has declined to a low of only 15,700 sheep in 2017/18. Exports from SA increased for 2017/18.

Figures 62 and 63. Live sheep exports for Australia and by state 2000/01 – 2017/18 (no. head)



Source: Department of Agriculture & Water Resources

The long term trade in live sheep is under pressure due to events in 2018 where an exporting company has had their licence cancelled and pressure applied to other companies. Exports to the Middle East during summer heat periods are being reviewed. Activists are ramping up pressure to

have Australian ban live sheep exports. Whether this is implemented has become as much a political as trade or welfare issue.

4.5.11. Aquaculture

The aquaculture industry uses a relatively small volume of grain and is included to account for this.

Due to the level of competition in the aquaculture industry and limited number of companies, there is limited publically released data on the volume of aquaculture produced within Australia.

The Tasmanian Salmonid Growers Association states salmon production is currently 63,000 tonnes. This was stated to be 47,000 tonnes in 2016. It is known the Tasmanian industry has been expanding rapidly and this calls for a growth in salmon feeds. This expansion is illustrated by the present construction of two new aquafeed mills in Tasmania, these to compete with the existing locally based milling site.

The Australia prawn industry has been hit by White Spot Virus, initially being found in Queensland in December 2016. A white spot disease restricted area extends from Caloundra to the NSW border. Prior to detection, the Australian industry was free of this prawn disease that has had devastating impact in overseas production regions.

Trout farming is based in the Snowy Mountains and Victorian Alpine regions. The requirement is for the supply of cold water. The trout industry has declined with less favourable high summer temperatures and resulting water temperature increases having a significant negative effect on production.

Barramundi production has been a growing market with freshwater inland farms being built. The largest operation is in the Northern Territory.

The Southern Bluefin Tuna industry in South Australia commenced in 1991. Since its start, it has relied on feeding baitfish (pilchards or sardines) to tuna kept in sea cages. Although there has been large expenditure spent on the development of manufactured feeds, the majority of tuna are still fed baitfish. Fresh caught sardines represents 80% of bluefin tuna feeding, the remainder is imported as frozen fish. A total of around 75,000 tonnes of baitfish is used in Bluefin tuna feeding. A small quantity of manufactured feeds are in use.

4.5.12. Horse Industry

Since the last FGP report, there is no known published statistical data on horse numbers in Australia. Historic reports put the Australian horse population at 800,000 to 900,000 horses, this excluding wild horses. Without the availability of any data limits the ability to project estimated feed use volumes and trends in the industry.

5. REFERENCES

APL 2017, *Australian Pork Limited Annual Operating Plan Summary 2017/2018*.

Australian Bureau of Agricultural and Resource Economics and Sciences, ***Australian Crop Report***, September 2018.

Australian Bureau of Statistics 2016-17, ***7121.0 Agricultural Commodities***.

Australian Bureau of Statistics June 2018 ***7215.0 Livestock Products Australia***.

Australian Egg Corporation Limited 2017, ***AECL 2017 Annual Report***.

Australian Lot Feeders Association 2018, ***ALFA/MLA National Accredited Feedlot Surveys***

Department of Agriculture & Water Resources ***All Livestock Exports*** dataset

Dairy Australia, 2018, ***Latest Production and Sales Statistics***

Previous FGP Feed Grain Supply and Demand Reports are available on the FGP website

http://www.feedgrainpartnership.com.au/fgp_activities/information_sharing_supply_and_demand_analysis/

Spencer, A 2018, ***What the statistics tell us – Australian Pork Newspaper Vol 22 No. 8 August 2018***.