Feed Grain Supply & Demand Report 2013-14

A report for the

Feed Grain Partnership

July 2014

Prepared by John Spragg

JCS Solutions Pty Ltd
32-34 Grantham Crescent
Berwick Vic 3806
Phone: 03 9769 7027
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.
6.3. Regional Grain Supply and Demand Commentary ................................................................. 59
  6.3.1. Northern & Central Queensland ......................................................................................... 59
  6.3.2. Southern Queensland ........................................................................................................ 60
  6.3.3. North Eastern NSW .......................................................................................................... 61
  6.3.4. Western NSW .................................................................................................................. 62
  6.3.5. Sydney Newcastle NSW .................................................................................................... 63
  6.3.6. Central NSW ................................................................................................................... 64
  6.3.7. Murray & Northern Vic .................................................................................................... 65
  6.3.8. Melbourne & Gippsland Vic ............................................................................................. 66
  6.3.9. Western Districts Vic & SE SA .......................................................................................... 67
  6.3.10. Adelaide, Mid North & Murraylands SA ........................................................................... 68
  6.3.11. Eyre Peninsula & Northern SA ....................................................................................... 69
  6.3.12. South West WA .............................................................................................................. 69
  6.3.13. Central & Eastern WA .................................................................................................... 70
  6.3.14. Tasmania ....................................................................................................................... 71
7. REFERENCES ............................................................................................................................ 73
1. EXECUTIVE SUMMARY

Since 2008, there has been an increase in the production of cereal grains in Australia, this coming from increasing yield of wheat and barley the two major crops grown. Canola production has increased and has become the third major grain crop grown in Australia. The planted area of sorghum, oats, triticale and lupins has declined. Crops intentionally grown for human consumption have been growing in production area and volume, while those more closely linked to feed end use have been declining. The last six years have been more favourable years with respect to rainfall and crop yield, with 2006/07 being the last year when the winter crop was drought affected. The current 2013/14 summer crop has been reduced due to lack of rainfall, with a resulting grain supply shortfall in Qld and northern NSW.

Domestic animal feed use for 2013/14 is projected to be 12.2MMT, this being a high demand year and reflects:

- Record numbers of beef feedlot cattle on feed
- Improved milk prices and farmers increasing feeding rates
- Chicken meat production continuing to grow
- Stable pig meat production
- Decline in layer flock numbers largely due to disease impact.

Total Australian domestic grain use is estimated to be 12.6MMT, animal feeding is by far the largest user at 8.8MMT. Flour milling uses 2.8MMT of wheat and malt production 1MMT of barley.

This report identifies average year supply and demand, with this broken down into regional analysis. The grain market is however dynamic and responds to highly variable seasonal supply changes and shifting surplus and deficit scenarios. The major application for the information provided in this report is for the FGP to assess longer term trends in grain supply and livestock demand and actions that can be taken to take advantage of the mutually beneficial relationship between the FGP partner industries.

The following key points are made for the FGP to further consider:

- The swing by grain growers away from dedicated feed grains and swing to wheat, barley and canola.
- The high likelihood that triticale will disappear as a crop and its loss as a dedicated feed grain.
- A significant decline in lupin production, for most east coast regions lupin production and supply has become a niche crop, with a lack of volume for larger end users.
- Field peas have declined in production volume and no longer provide volumes for end users to include in feed rations in many regions.
- Canola production and availability of canola meal has increased with greater use in animal feeding.
- There has been a continuing increase in the importation of soybean meal, over 630,000 tonnes imported this last year, and the lack of supply of alternate Australian vegetable protein meals to change this trend.
- Southern Qld as the largest feed grain demand region is subject to tight supply and demand situations. During drought periods the region is highly exposed to grain supply shortage.
- Sydney/Newcastle and Melbourne/Gippsland regions have major grain deficits and rely on access to grain and efficient transport from other surplus regions.
- The growth in South Australian chicken meat and pig production is seen to be in part due to favourable grain supplies.
- Expansion in chicken meat production taking place in northern NSW around Tamworth and Griffith.
- There has been failure in stimulating any increase in grain production within the Gippsland and Tasmanian regions where there are large and increasing grain deficits.
- Benefits exist in WA intensive livestock production from a large grain surplus.
3. 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 Egg Corporation Limited (AECL)
- Meat and Livestock Australia (MLA)
- Grains Research and Development Corporation (GRDC)
- Rural Industries Research and Development Corporation (RIRDC) – Chicken Meat Program
- 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 better understanding 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 aimed at two key areas:
1. Provide an update report on grain production and feed grain demand since the last report written in February 2012. This is assessing trends in production and potential impact on the domestic grain market.
2. Revisit the regional supply and demand mapping work completed in February 2008. This report looks at changes in the supply and demand of feed grains split down to regional data. Over the last 6 years there have been changes in both grain production volumes and shifts in the crops being grown in each region. There have been similar changes in livestock industry production with both development of new livestock farming enterprises and closure of less efficient and older operations.
4. AUSTRALIAN GRAIN PRODUCTION

4.1. Total Grain Production

The 2013/14 cropping year has provided above average cereal grain production (Figure 1). Graincorp and CBH in providing an overview of the 2013/14 wheat crop highlighted the better than expected yields in WA and above average protein levels in Queensland and Northern NSW. Table 1 identifies above average production in WA, SA and Vic with below average production in Qld and NSW.

Although Qld and NSW cereal crops were 30% and 19% respectively below the 5 year average (Table 2) due to dry growing conditions, the larger WA and SA wheat crops compensated in total tonnes.

Figure 1. Total grain production (excluding canola) by state 1997/98 - 2013/14 (‘000 tonnes)

Table 1. Total grain production by state (‘000 tonnes) 2013/14 versus previous 5 year average

<table>
<thead>
<tr>
<th></th>
<th>2013/14</th>
<th>Prev. 5 year ave.</th>
<th>2013/14 change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>8,736</td>
<td>10,732</td>
<td>-18.6%</td>
</tr>
<tr>
<td>VIC</td>
<td>6,275</td>
<td>5,633</td>
<td>+11.4%</td>
</tr>
<tr>
<td>QLD</td>
<td>2,347</td>
<td>3,361</td>
<td>-30.2%</td>
</tr>
<tr>
<td>SA</td>
<td>7,775</td>
<td>6,449</td>
<td>+20.6%</td>
</tr>
<tr>
<td>WA</td>
<td>15,417</td>
<td>11,389</td>
<td>+35.4%</td>
</tr>
<tr>
<td>TAS</td>
<td>67</td>
<td>69</td>
<td>-2.9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>40,539</td>
<td>37,633</td>
<td>+7.8%</td>
</tr>
</tbody>
</table>

Source: ABS Agricultural Commodities and ABARES Crop Reports
Table 2. Total grain production by crop (’000 tonnes) 2013/14 versus previous 5 year average

<table>
<thead>
<tr>
<th>Tonnes</th>
<th>2013/14</th>
<th>Prev. 5 year ave.</th>
<th>2013/14 change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>27,012</td>
<td>24,605</td>
<td>9.8%</td>
</tr>
<tr>
<td>Barley</td>
<td>9,545</td>
<td>7,908</td>
<td>20.7%</td>
</tr>
<tr>
<td>Oats</td>
<td>1,249</td>
<td>1,165</td>
<td>7.2%</td>
</tr>
<tr>
<td>Sorghum</td>
<td>1,102</td>
<td>2,072</td>
<td>-46.8%</td>
</tr>
<tr>
<td>Triticale</td>
<td>400</td>
<td>395</td>
<td>1.3%</td>
</tr>
<tr>
<td>Maize</td>
<td>336</td>
<td>401</td>
<td>-16.2%</td>
</tr>
<tr>
<td>Lupins</td>
<td>625</td>
<td>755</td>
<td>-17.3%</td>
</tr>
<tr>
<td>Peas</td>
<td>270</td>
<td>330</td>
<td>-18.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40,539</strong></td>
<td><strong>37,633</strong></td>
<td><strong>7.8%</strong></td>
</tr>
</tbody>
</table>

Source: ABS Agricultural Commodities and ABARES Crop Reports

Wheat and barley production represents the major cereal grains grown. Figure 2 illustrates from a national perspective the relative smaller volume of other cereal crops.

Figure 2. Total grain production by crop 1997/98 - 2012/13, excludes canola (’000 tonnes)

Source: ABS Agricultural Commodities and ABARES Crop Reports

There has been a trend for the proportion of wheat, barley and canola area harvested to increase, while other grain crops have declined. Since 1997/98, Figure 3 shows the combined area of other grains (triticale, oats, sorghum, lupins, peas and maize) has declined from 20% down to only 10% of the Australian cropping area. There has been a doubling in the area planted to canola and consistent proportions of wheat and barley area harvested.
Looking at the other grains in more detail (Figure 4), the production of triticale and lupins as dedicated feed grains have declined dramatically. The change in area planted for each of four crops is:

- Triticale: -2.60% change/year
- Lupins: -4.11% change/year
- Sorghum: +0.19% change/year
- Oats: +0.07% change/year

While triticale and lupins have declined, there has been no growth in the area planted to oats or sorghum over the last 15 years.
4.2. Wheat Production

The 2013/14 wheat crop at 27MMT provided the third largest Australian wheat crop and the sixth consecutive year where national wheat production exceeded 20MMT. Wheat planting area at 13.5Mha was 3.4% below the record 2011/12 cropping year. Figure 5 identifies the continuing growth trend for Australian wheat production.

Figure 5. Wheat Production 1969/70 – 2013/14 (tonnes and hectares)

![Wheat Production Chart](chart1.png)

Source: ABS Agricultural Commodities and ABARES Crop Reports

Figure 6 shows that wheat yield for 2013/14 is projected by ABARES to have been 2.0 tonnes/ha. The plateau in wheat yield commencing in the 1990’s is continuing. Even making allowance for drought years, there is evidence to suggest that advances in yield have slowed and capacity to deliver a significant jump in yield is in question. Looking over a longer time period and using 10 year average production data, Figure 7 identifies the plateau in yield occurring over the last 10-15 years.

Figure 6. Wheat Yield 1969/70 – 2013/14 (t/ha)

![Wheat Yield Chart](chart2.png)

Source: ABS Agricultural Commodities and ABARES Crop Reports
The 2013/14 wheat production year was seen to provide significant differences in fortune between the east coast (Qld, NSW and Vic) and the two west production states (SA and WA). Figure 8 shows the decline in east coast wheat production in providing only 42% of the wheat grown in Australia in 2013/14, with this being in line with the longer term trend.

Although Qld had the greatest decline in wheat production in 2013/14, the impact on the national wheat crop was less significant. Poor production years in WA and NSW have the greatest impact on national wheat supply (Figure 9).
4.3. Barley Production

Barley production for 2013/14 (Figure 10), like wheat, is the third largest production year. The increase in production is the result of increased yield rather than increased area planted.

Source: ABS Agricultural Commodities and ABARES Crop Reports
ABARES crop report is predicting the 2013/14 barley crop to have provided a record yield at 2.4t/ha (Figure 11). The last four years higher yield has reversed a previous declining barley yield trend.

**Figure 11. Barley Yield 1969/70 – 2012/13 (t/ha)**

![Barley Yield Chart](chart.png)

Source: ABS Agricultural Commodities and ABARES Crop Reports

### 4.4. Oat Production

The area of oats harvested has shown a continuing declining trend with the 2013/14 oat crop being grown on 744,000 hectares (Figure 12). The last six years has supplied 1.1 to 1.2 MMT, this is well below the 1.8 to 2.0 MMT grown in the 1980 to 2000 period.

**Figure 12. Oat Production 1969/70 – 2013/14 (tonnes and hectares)**

![Oat Production Chart](chart.png)

Source: ABS Agricultural Commodities and ABARES Crop Reports
Oat yield (Figure 13) has shown a similar flattening to that seen in wheat. However there may be some issues with ABS data collection, and segregation of oats grown for hay versus grain production. The production of oats for fodder markets places differing demands on oat breeders to that seen for grain production.

**Figure 13. Oat Yield 1969/70 – 2012/13 (t/ha)**

![Oat Yield Chart](source)

Source: ABS Agricultural Commodities and ABARES Crop Reports

The yield comparison between wheat, barley and oats over the last 46 years is shown in Figure 14. It would seem that over the last 10-15 years, the rate of increase in barley yield has been ahead of both wheat and oat production.

**Figure 14. Wheat, barley and oat yield 1969/70 – 2012/13 (t/ha)**

![Yield Comparison Chart](source)

Source: ABS Agricultural Commodities and ABARES Crop Reports
4.5. Sorghum Production

ABARES in their June Crop Report has further reduced the size of the 2013/14 sorghum crop, to be only 1.1MMT. This is the lowest sorghum crop since 1997/98 (Figure 15). Below average rainfall during the northern wet season resulted in a decline in both planted area, down 22%, and yield down 31%, from the previous five year average. Late summer rain was received too late to have any significant influence on the sorghum production volume for 2014. In viewing sorghum crop data, it is seen that apart from two years 2007/08 and 2008/09, production is typically around 2MMT. The 2007/08 year was characterised by a jump in area planted and record yield.

Figure 15. Sorghum production 1997/98 – 2013/14 (’000 tonnes and hectares)

[Graph showing sorghum production from 1997/98 to 2013/14]

Source: ABS Agricultural Commodities and ABARES Crop Reports.

Sorghum crop yield (Figure 16) has shown an increasing weak trend, although this is greatly influenced by available rainfall.

Figure 16. Sorghum yield 1997/98 – 2013/14 (T/ha)

[Graph showing sorghum yield from 1997/98 to 2013/14]

Source: ABS Agricultural Commodities and ABARES Crop Reports.
Growth in sorghum production is coming from Qld, with NSW production showing a small decline (Figure 17). It is seen that the additional volume in Qld is driven by planted area rather than increasing yield.

**Figure 17. Sorghum production Qld and NSW 1997/98 – 2013/14 (‘000 tonnes and hectares)**

Source: ABS Agricultural Commodities and ABARES Crop Reports.

### 4.6 Triticale Production

As a dedicated feed winter cereal crop and not normally exported, triticale has played a role in meeting a portion of the domestic feed market demand. However Figure 18 shows the decline in production volume and more significant decline in planted area.

**Figure 18. Triticale Production 1997/98 – 2013/14 (‘000 tonnes and hectares)**

Source: ABS Agricultural Commodities and ABARES Crop Reports.

The future of triticale production is in serious doubt as crop yield has been falling relative to barley and wheat yields (Figure 19). Based on triticale’s lower market price, there needs to be a yield advantage over wheat and barley. The lack of any yield advantage and decline in funding for triticale breeding would appear to be resulting in falling planted area, with this trend highly likely to continue.
Unfortunately for the domestic stockfeed industry, triticale has moved from being a reliable source of feed grain to an unreliable and almost niche market crop. Due to the lower available volume, many feed manufacturers have ceased to use triticale and are not able to utilise less frequently offered small parcels of grain.

**Figure 19. Triticale yield relative to wheat and barley yield 1997/98 – 2013/14**

![Graph showing triticale yield relative to wheat and barley yield 1997/98 – 2013/14](image)

Source: ABS Agricultural Commodities and ABARES Crop Reports.

**4.7. Rice Production**

Rice is primarily used for human consumption. Through the milling process there are significant volumes of broken rice, rice pollard and rice hulls that are used by the stockfeed and livestock industries. The last 3-4 years has seen a recovery in production volume (Figure 20) following 2006 to 2009 where reduced irrigation water availability decimated the industry. The closure of rice mills was required with milling contracting to Leeton during the drought years. With larger crop volumes, there has been the reopening of milling capacity at Deniliquin in 2011 and Coleambally in 2012.

**Figure 20. Rice production 1997/98 to 2013/14 (‘000 tonnes and hectares)**

![Graph showing rice production 1997/98 to 2013/14](image)

Source: ABS Agricultural Commodities and ABARES Crop Reports.
4.8. Lupin Production

The decline in lupin production is seen within Figure 21. Outside of WA, the volume of lupins being grown has dropped to the point where lupin use for animal feeding is now considered as an unreliable and inconsistent supply commodity. There remains demand for lupins, especially in the Victorian dairy feed market, limited supply has however resulted in other protein meal sources being utilised.

Figure 21. Lupin production 1997/98 - 2013/14 ('000 hectares and tonnes)

Source: ABS Agricultural Commodities and ABARES Crop Reports.

For the three east coast states, where the majority of livestock feeding occurs, in 2013/14 there was only 84,000 tonnes of lupins grown (Figure 22). The majority of lupin production is occurring in WA and SA.

Figure 22. Lupin production East and West 1997/98 - 2013/14 ('000 tonnes)

Source: ABS Agricultural Commodities and ABARES Crop Reports.
4.9. Pea Production

The area of peas planted is showing a continued decline with only 250,000 hectares planted in 2013/14 (Figure 23).

**Figure 23. Pea production 1997/98 - 2013/14 (‘000 hectares and ‘000 tonnes)**

With higher quality peas being exported for human consumption, the volume available for animal feeding is becoming less significant. More peas are grown in SA and WA than the three eastern states (Figure 24).

**Figure 24. Pea production East and West 1997/98 - 2013/14 (‘000 tonnes)**

Source: ABS Agricultural Commodities and ABARES Crop Reports.
4.10. Canola Production

Canola is by far the largest oilseed crop grown in Australia. The 2013/14 canola crop is reported by ABARES to have been 3.76MMT; this is below the 3.9MMT reported by the AOF in June 2014. The area planted to canola has shown a rapid rise (Figure 25), while crop yield has averaged just under 1.2t/ha. The effects of seasonal conditions on canola production is seen in highly variable yield (Figure 26), with 2002/03 and 2006/07 drought years reducing yield to 0.6-0.7 T/ha.

Due to the supply of canola across NSW, VIC, SA and WA, canola has become the major crop grown for oil production with the supply of meal being used in larger quantities domestically and a small surplus amount of meal being available for export. Domestic canola meal production is estimated to reach 550,000 tonnes in 2014; this rise is due to increased crushing capacity.

A recent trend is for whole canola seed to be used in chicken meat feeds, with access to off grade (lower oil and higher protein) seed being of value as a stockfeed raw material.

**Figure 25. Canola production 1997/98 - 2013/14 (‘000 hectares and ‘000 tonnes)**

Source: ABS Agricultural Commodities and ABARES Crop Reports.

**Figure 26. Canola yield (T/ha)**

Source: ABS Agricultural Commodities and ABARES Crop Reports.
Industry commentary makes reference to a shift in Western Australian lupin production to canola. Figure 27 identifies this trend with a significant decline in lupin planted area and a corresponding increase in canola planted area.

**Figure 27. WA lupin vs canola planted area (’000 hectares)**

![Graph showing lupin and canola planted area](source: ABS Agricultural Commodities and ABARES Crop Reports)

4.11. Other Oilseed Production

The Australian cotton crop provides larger quantities of cottonseed for supply as a feed ingredient to beef feedlot and dairy cattle feeding in both the domestic and export markets. Seed is also crushed supplying cottonseed meal for largely domestic use with some meal also meeting export market destination. The impact of drought on dryland cotton and reduced availability of water for irrigated crops is seen in the decline in production through 2002 to 2004 and 2006 to 2008. The 2013/14 crop has been reduced due to dry weather and reduced irrigation water availability (Figure 28). Expansion of production into southern NSW, with cotton ginning capacity, has provided additional volume with potential for further expansion in the coming years.

In addition to meal supply, cottonseed crushing also supplies hulls to the livestock industries. The beef feedlots are the major users of available cottonseed hulls.

**Figure 28. Cottonseed production 1997/98 to 2013/14 (’000 tonnes)**

![Bar chart showing cottonseed production](source: ABARES)
The other oilseed crops are grown in much smaller volume. Figure 29 shows the considerable variation from year to year in soybean, sunflower, safflower and peanut production. In the late 1990’s the soybean crop was over 100,000 tonnes, less favourable seasonal conditions, plant disease and agronomic factors resulted in a significant decline in production, with 2011 – 2013 seeing production return to over 80,000 tonnes. The 2014 crop is reported by AOF to be 62,000, with increased production in the Riverina/northern Victoria compensating for reduced dry weather production in Qld and northern NSW. Soybean demand is driven by human consumption milling, with additional soybeans being used for full fat soybean production and supply to the stockfeed industry. There is a major shortfall in soybean meal supply, with 636,000 tonnes being imported in 2012/13 to meet the growing demand for animal feeding.

Sunflower production is seen to be highly variable with 98,000 tonnes being grown in 2005/06, while production in 2014 will be less than 5,000 tonnes due to dry growing conditions in Qld and Nth NSW. This year sunflower seed is being imported to meet human consumption and birdseed demand. The low production years supply almost no sunflower seed for oilseed crushing.

Safflower as a crop has been in decline, falling from 30,000 tonnes grown in the late 1990’s and early 2000’s to less than 5,000 tonnes in recent years. The reduced volume is largely meeting birdseed and human consumption requirements with almost no volume available for oilseed crushing and safflower meal supply.

The production of peanuts has also been in decline, from around 40,000 tonnes to 18 – 23,000 tonnes in recent years. The reduced supply has resulted in a drop in peanut oil production and reduced supply of peanut meal for animal feeding.

Linseed (also known as flaxseed) production was reported by ABARES as being in the range 6 – 12,000 tonnes through until 2001/02 when production reporting ceased. Linseed is largely supplying birdseed demand. There is potential for an increase in demand for human health flax seed and oil products that could see a rise in production volume.
4.12. Drought Frequency and East versus West

Dry seasonal growing conditions is seen as the major factor affecting cereal crop yields. Utilising national wheat yield data from 1870/71 to 2013/14, with each year’s yield compared to the previous ten year average yield, the years that provide either the greatest reduction or increase in yield can be seen in Figure 30. There are more above average years, this being influenced by rising crop yield over time. During major drought years, wheat yield drops by over 50% of the previous 10 year average. During less significant droughts, average yield declines by 25 to 50%.

Figure 30. Annual national wheat yield variation (%) from the previous ten year average

Rainfall data (BOM) published since 1901 has been used, with southern wet season rainfall\(^1\) plotted against wheat yield variation (Figure 31). As expected, it is seen that the wettest growing season years have provided the highest yield increase. The greatest drop in wheat yield has occurred in the years where less than 200mm rainfall has been recorded in the southern growing season.

Figure 31. Wheat yield variation (%) from previous 10 year average versus Southern Wet Season rainfall (mm)

---

\(^1\) BOM definition of southern wet season are the months April to November (inclusive).
The effects of dry growing conditions can vary between the three east coast states and WA/SA production areas. In comparing the variation in crop yield between east and west (Figure 32), it is seen there is a trend for either increased or decreased yield to occur in the same year in both the east and west. The years where drought has greatly reduced east coast wheat yield are seen to also be years where WA and SA wheat yield has also been reduced. Similarly the years where east coast yield has shown the greatest jump (bumper crop yield years) have also tended to result in increased WA and SA wheat yields. A drought in eastern Australia is not normally compensated with an above average yield in the two western states.

**Figure 32. Comparison between east (Qld, NSW, Vic) and west (WA, SA) wheat yield variation**
5. GRAIN END USE

5.1. Domestic versus export use volumes

Over recent years, Australian grain production volumes have continued to provide a large 25 – 30 MMT exportable grain surplus (Figure 33), this volume excludes canola and cottonseed. Based on ABARES Crop Reports wheat and barley are the major export grains with 2012/13 exports of 18.6MMT wheat and 5.2MMT barley. Sorghum exports in 2011/12 and 2012/13 increased to 0.95 and 1.1 MMT respectively, this will decline significantly with the smaller 2013/14 crop being dry weather affected.

Figure 33. Grain Production and Exports 2000/01 to 2013/14, excludes canola and cottonseed ('000 tonnes)

Source: ABARES Crop Reports, 2013/14 export volume JCS estimate

Wheat exports when expressed as a percentage of production are historically in the range 60-80% (Figure 34). Data for the two most recent years 2011/12 and 2012/13 have both exceeded 80%. The current export year 2013/14, although providing a lower volume of wheat produced on the east coast, has provided larger quantities of surplus wheat in WA and SA that is available for export. Due to the dry season in Qld and Northern NSW and the smaller sorghum crop, grain is being shipped into Brisbane to meet stockfeed demand.

Figure 34. Percentage of the Australia wheat crop exported

Source: ABARES Crop Reports
Figure 35 identifies the larger and more consistent volume of wheat exported from WA and SA. During drought years, east coast wheat exports decline to less than 1.2MMT and it is only during larger production years such as 2011/12 where east coast exports approach those from WA and SA.

Figure 35. Wheat exports from east coast and WA/SA 2001/02 to 2011/12 (’000 tonnes)

Source: AGEA

There has been increasing containerisation of freight for export grains. In 2011/12 AGEA reported 2.6MMT of wheat being exported in containers. This has shown the greatest increase on the east coast and is suggested (ARA 2011) to be due to:

- The utilisation of container freight capacity at east coast ports;
- Economies of scale and greater operational efficiency by combining grain freight with the larger intermodal freight market;
- Circumventing some of the antiquated storage infrastructure that services grain rail freight;
- Decreasing the centrality of storage infrastructure in controlling the grain freight supply chain and subsequently increase competition in the provision of logistics and transport services for grain;
- Increase rail operator’s capacity to service grain freight, allowing them greater flexibility in the utilisation of their assets; and
- Greater access to Asian markets that have ports that cannot handle bulk commodities.

During drought years there is a reduced surplus of wheat and coarse grains after the domestic grain market requirements are met. Domestic use as a proportion of total production jumps from 30 - 40% in normal production years, to 50 - 60% in drought years as shown in Figure 36. While domestic demand for feed, flour, malt and retained seed are relatively consistent year to year, variation in production supply volumes directly affect export volumes.

Figure 36. Percentage of the grain crop used domestically versus production volume (’000 tonnes) 1997/98 – 2012/13, drought years identified

Source: ABARES
5.2. Grain use in Flour Milling & Ethanol

There is a lack of published data available on Australian flour production, with ABS data collection ceasing in June 2009. It is estimated that current flour production is 2.2MMT, with this requiring the milling of 2.7MMT of wheat. Flour for human consumption through baking is the largest demand, followed by industrial use for starch and ethanol production (Figure 37). Export of flour has declined and represents a minor portion of flour milling production.

Figure 37. Australian flour production 1977 – 2014 (tonnes)

![Australian flour production 1977 – 2014 (tonnes)](chart)


The flour milling industry supplies millmix to the Australian stockfeed industry. Based on typical flour extraction rates, the volume of millmix produced is around 540,000 tonnes/annum. The majority of this millmix is produced in the three eastern states, with NSW being the major state supplying over 60% of the volume available.

5.3. Barley Use in Malt Production

Total use of barley in Australia for malting is 800k to 1 MMT per annum and around 200,000 tonnes of this is used in domestic brewing, the balance is exported. The domestic market demand is consistent from year to year, while export malt sales can vary depending on competing global suppliers.

Figure 38 shows the split in barley destination between domestic feed, malt and export. ABARES crop reports in 2011 ceased to provide data for barley use in domestic malt production. Data from 2011/12 to 2013/14 is based on best estimates assuming domestic malt production has remained relatively consistent.
On average 70% of the Australian barley crop is used for animal feeding, either in domestic or export markets. Figures 38 and 39 identify the larger barley cropping years, where higher volumes of barley are used in animal feeding. In these years due to increased supply, barley is priced more competitively relative to wheat, with this encouraging higher barley use in feed rations.

Malting plants generate between 2.5 to 4% of the barley processed as malt combings. Annually there is around 30,000 tonnes of malt combings that are used in animal feeding as a 25% protein ingredient.
5.4. Oilseed Crushing

The domestic canola oilseed crushing industry has been expanding with new crushing capacity being built in the last two years. It is estimated that over 900,000 tonnes of canola seed is being crushed annually, with this supplying 550,000 tonnes of canola meal for the feed market. With the additional meal supply, export market opportunities are being pursued by the Australian oilseed crushing companies.

Cottonseed crushing capacity generates 90 - 120,000 tonnes of meal annually. Additional smaller volumes of sunflower, safflower and linseed meals are also produced.

The vegetable protein meal import and export data (Figure 40) demonstrates the significance of imported soybean meal to the Australian stockfeed and livestock industries. Other meal imports include palm kernel and copra meals. During drought years, 2002/03, 2006/07 and 2007/08, the jump in imports of other meals is seen. The majority of this increase is palm kernel meal imported for cattle feeding; with the dairy industry being the largest user. During these drought years, cottonseed meal exports decline to less than 10,000 tonnes due to increased domestic demand. During non-drought years ABARES reports that cottonseed meal exports are in the range 30 - 60,000 tonnes. It is also of note that the production of canola meal has increased, with larger export volume commencing from 2009/10. In 2012/13 canola meal exports reached 43,000 tonnes. It is anticipated that for the 2013/14 year there will be drop in cottonseed and canola meal exports due to the dry conditions in Qld and northern NSW and strong demand for cattle feeding requirements.

Figure 40. Vegetable protein meal exports and imports 1997/98 to 2012/13 (‘000 tonnes)
5.5. Grain Use in Animal Feeding

Feed use is dependent on the numbers of animals being fed and estimates of total feed use in Australia rely on livestock statistical data. Australia has no government published statistics for animal feed use. The data below is provided by JCS Solutions based on available livestock data in terms of animal numbers or meat produced. Assumptions relating to feed conversion efficiency and feed intake have been made to calculate a projected feed use by industry sector and state.

Total Australian predicted annual feed use for 2013/14 is 12.2 million tonnes. Table 3 shows the split between states and livestock sectors. The data includes both compound/manufactured and mixed on site feed volumes. The data excludes pasture, hay and silage intake for dairy, beef, sheep and horse feeding. Also excluded is potential grain use in drought feeding of sheep and cattle.

Victoria has the largest feed demand due to the large volume of dairy feeding that takes place in addition to a strong poultry meat sector. Queensland is close behind with strong demand for beef feedlot rations. New South Wales has a spread of industry demand sectors with poultry meat and beef feedlots being the largest. SA has seen increasing volumes of chicken meat and pig feeds. WA has an even demand of feed across each livestock sector including live sheep export feeds. Tasmanian feed use has been growing on the back of increasing dairy cattle feeding.

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

<table>
<thead>
<tr>
<th></th>
<th>NSW</th>
<th>Vic</th>
<th>Qld</th>
<th>SA</th>
<th>WA</th>
<th>Tas</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry</td>
<td>954,890</td>
<td>713,264</td>
<td>592,707</td>
<td>460,991</td>
<td>191,761</td>
<td>28,801</td>
<td>2,942,415</td>
</tr>
<tr>
<td>Meat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Layer</td>
<td>272,071</td>
<td>197,721</td>
<td>201,629</td>
<td>36,731</td>
<td>76,588</td>
<td>8,597</td>
<td>793,336</td>
</tr>
<tr>
<td>Pig</td>
<td>288,550</td>
<td>292,021</td>
<td>349,136</td>
<td>317,889</td>
<td>150,484</td>
<td>8,595</td>
<td>1,406,675</td>
</tr>
<tr>
<td>Dairy</td>
<td>432,180</td>
<td>1,965,668</td>
<td>214,830</td>
<td>193,725</td>
<td>117,600</td>
<td>187,005</td>
<td>3,111,008</td>
</tr>
<tr>
<td>Beef</td>
<td>880,621</td>
<td>198,707</td>
<td>1,849,842</td>
<td>86,420</td>
<td>123,221</td>
<td>37,139</td>
<td>3,175,950</td>
</tr>
<tr>
<td>Sheep</td>
<td>18,609</td>
<td>34,351</td>
<td>1,980</td>
<td>14,078</td>
<td>103,348</td>
<td>1,188</td>
<td>173,554</td>
</tr>
<tr>
<td>Horse</td>
<td>122,650</td>
<td>82,405</td>
<td>82,725</td>
<td>20,016</td>
<td>16,076</td>
<td>5,536</td>
<td>329,409</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>5,000</td>
<td>2000</td>
<td>40,000</td>
<td>5,000</td>
<td>1,500</td>
<td>85,000</td>
<td>136,500</td>
</tr>
<tr>
<td>Other</td>
<td>36,995</td>
<td>36,093</td>
<td>21,456</td>
<td>9,781</td>
<td>14,382</td>
<td>2,617</td>
<td>121,323</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3,011,567</td>
<td>3,520,230</td>
<td>3,354,306</td>
<td>1,144,630</td>
<td>794,960</td>
<td>364,477</td>
<td>12,190,170</td>
</tr>
</tbody>
</table>

Source: JCS Solutions estimates

The data within table 3 includes the following:

- Poultry Meat – largely chicken but also includes duck, turkey and minor poultry species.
- 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, stud cattle feeds and live cattle export feeds manufactured within Australia.
• Sheep – lamb feedlot intake, supplementary feeds for breeding stock and live sheep export feeds.
• Horse – 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.

Feed Volume Change over Time

The change in volume of feed used by each of the five major livestock use industries is shown in Figure 41. Total feed use has increased from 9.5 MMT in 1999/00 to 12.2 MMT in 2013/14. More detailed discuss for each livestock sector is provided in the following sections.

Figure 41. Feed use by industry sector by year 1999/00 to 2013/14 (tonnes/annum)

Source: JCS Solutions estimates

Raw Material Use

Based on “typical rations” for each industry sector, Figure 42 provides an estimate of the raw materials used in Australian animal feeds.

• Grain is the major raw material used and represents 8.8MMT of the total 12.2MMT of feed used. Grains in use include the cereal grains; wheat, barley, sorghum, triticale, oats and maize; legumes and pulses; lupins, field peas and faba beans; and whole oilseeds including canola seed. Grain use varies across Australia and each industry sector based on availability, cost and nutrient content.
• Vegetable protein meals include soybean, canola, cotton, sunflower, safflower, peanut, copra, linseed and palm kernel meals as well as full fat soybean meal and soybean protein concentrates.
• Animal protein meals are limited to inclusion in monogastric feeds and include meat, blood, fish, poultry and feather meals. Milk and whey powders are used in pig feeding as well as calf milk replacers.
• Fats and oils include tallow and poultry oil, acid oils and vegetable oils.
• Millmix or millrun is a significant raw material source from the flour mills.
Other co-products include rice pollard, oat offal, maize gluten, malt combings and by-products from cereal milling such as splits and gradings.

Roughage is largely used in beef feedlot and horse feeds and includes whole cottonseed, hulls, straw, hay and chaff.

Molasses is more commonly used in beef, dairy and horse feeds.

Macro minerals includes; limestone, salt, feed phosphates, urea and other macro minerals.

Premix includes; vitamins, trace minerals and other feed additives.

**Figure 42. Raw Material use in Australian Feeds (%)**

The relative rate of increase of the major livestock industries is shown in Figure 43. 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 chicken meat industry is seen to provide the most consistent growth. The beef industry has returned to feeding numbers equivalent to that seen in 2006/07. Dairy industry feed use has plateaued and is subject to seasonal milk prices and grain cost driving feeding rates. The layer and pig industries have shown a relatively flat level of growth and consequent feed demand. Refer to later sections of this report for additional commentary for each livestock sector.
Feed grain use by the domestic livestock industries as shown in Figure 44 is compared against wheat production. It is seen that the growth in feed grain use has been increasing at a faster rate than wheat production. This is however affected by the three drought years where wheat production was significantly reduced. Within non-drought years there is ample grain to meet domestic feed demand and the growth in wheat production in tonnes available is keeping pace with growth in livestock feeding demand.

Figure 44. Australian domestic livestock feed grain use and wheat production, indexed from 1993/94

Sources: ABS, Dairy Australia and JCS Solutions estimates
Total Australian domestic grain use is estimated to be 12.9MMT, animal feeding is by far the largest user at 8.8MMT. Flour milling uses 2.8MMT of wheat and malting 1MMT of barley. Retained seed provides the balance of domestic requirement.

The 2013/14 grain season has seen the sixth consecutive year of Australia producing a large grain surplus, exceeding 19MMT (Figure 45). What is not seen is the location of the surplus, with WA and SA producing larger wheat and barley crops, while Qld and northern NSW have been in grain deficit due to smaller crop size and higher feed demand from drought conditions.

![Figure 45. Grain use by sector 1993/94 - 2009/10 (tonnes)](chart)

Sources: JCS Solutions derived from published industry data

5.5.1. Beef Sector

**Feedlot Sector**

The Australian beef feedlot sector has shown strong numbers of cattle on feed, with ALFA survey data showing a jump in cattle on feed to reach 874,000 head in the Jan-Mar 2014 survey (Figure 46). This number is equivalent to the number of cattle being fed in 2006 and 2007 during the last major drought years. The current dry conditions in Qld and Northern NSW is reported by ALFA to have provided an “influx of cheaper drought affected cattle as well as a heightened demand for Australian beef overseas”.

In addition to the ALFA accredited feedlots, it is estimated that an additional 10% of cattle are finished through smaller non accredited opportunity feedlots.

Since 2006/07, the number of accredited feedlots has declined from 650 to around 420-450, however feedlot capacity has declined by less
than 2%. In effect there has been a decline in smaller feedlots and the larger operations have increased their capacity. The jump in cattle on feed has resulted in the feedlot sector running at 79% capacity utilisation.

**Figure 46. Cattle on feed, national quarterly data 1999-2014 (head)**

The share of cattle on feed (Figure 47) shows a continued trend for Qld to dominate. Cattle on feed in southern NSW is supported through the re-opening of some feedlot capacity.

**Figure 47. Number of feedlot cattle on feed by state 1999-2013 (head)**

Due to more favourable profitability, there is currently some interest in new beef feedlots. This is mainly in the owner operator sector running up to 5,000 head capacity. This potential expansion is most likely to occur within the traditional feedlot regions.
Cattle on feed are at record levels with many feedlots operating at capacity. Together with the dry conditions in Qld and Northern NSW, there are large numbers of cattle entering the slaughter chain. Moving forward there is likely to be a shortage of suitable store cattle for feed lotting. Any improved feeding conditions would result in retention of breeding stock and a herd rebuilding phase.

**Beef Supplementary Feeding**

To make up for low levels of nutrients in pastures, supplementary feeding of minerals and protein is practised. During the dry season, where there is ample dry pasture available, supplementary feeding is used to support cattle production and increase stocking rates. Cattle are able to better utilise the available pasture. While the majority of supplementary feeding is used to maintain cattle, there is a growing use of supplements to increase cattle performance.

Supplementary feeding is also used to keep growing stock on a rising plane of nutrition, with animals being sold into the beef feedlot sector.

In addition to mineral supplements, molasses is in common use in Qld and Northern NSW to provide supplementary energy during periods of feed shortage. In southern Australia supplementary feeding with grain or grain based pelleted feeds is also practiced.

**Live Cattle Export Feeds**

Live cattle exports are either beef cattle exported from northern Australia and WA or dairy heifers exported from south eastern Australia. The drop in cattle exports from WA, NT and Qld during 2011 due to the government imposed ban on exports to Indonesia is seen in Figures 48 and 49. In the first four months of 2014, MLA has reported record numbers of cattle being exported; April exports totalled 170,435 head, which is more than double last year’s level.

**Figures 48 and 49. Live cattle exports for Australia and by state 2001 - 2013 (no. head)**

Feed is used for both prefeeding in Australia and on board transport ships. Cattle exported from Northern Australia have access to imported feeds from Indonesia. Cattle exported from other ports utilise feeds manufactured in Australia. The greatest number of cattle are on short shipping trips to Indonesia and Malaysia where minimal quantities of feed are required on ship. Longer shipping of dairy heifers from south east Australia to China and other countries require greater quantities of on board feed.

MLA data identifies for 2013 that cattle exported were 85% feeder/slaughter, 9% dairy breeders and 5% beef breeders.
### 5.5.2. Dairy Industry

The dairy industry has seen two contrasting years, with the National Dairy Farmers Survey identifying in 2012/13 that 33% of farmers had negative farm cash incomes. For 2013/14 79% of dairy farmers are forecast to make a profit. Lower milk prices in 2012/13, national average 40.2c/litre, resulted in a 3% drop in milk production, for 2013/14 based on the first ten months production data, production has been held stable at 9.2 billion litres. For 2013/14 milk prices are averaging 50.25c/litre. Figure 50 shows the decline in milk volume since it peaked in 2001/02.

Presented are two differing scenarios, either optimistic or pessimistic. The optimistic scenario includes a 13% increase in milk volume over the next four year period. This increase is above Dairy Australia’s initial forecast for 2014/15 for national volumes to reach 9.3 to 9.4 billion litres, an increase of around 2% on the expected 2013/14 season total. The pessimistic projections are based on a continuing decline in milk volume over the next four years. Business leaders from milk processing companies are calling for an increase in milk volume, whether the dairy farmer response to lift production volumes occurs will depend on favourable milk price incentives.

![Figure 50. National milk production 1994/95 to 2018/19 (‘000 litres)](source: Dairy Australia 1994/95 to 2012/13, 2013/14 Dairy Australia Jul-Apr extrapolated to full year, 2014/15 to 2018/19 JCS Solutions data two scenarios)

For the Australian dairy industry to increase milk production by at least 10% or one billion litres, there will need to be a prolonged period of more favourable milk prices. Data from the 2014 Dairy Situation Outlook May Update identifies an improvement in overall farmer sentiment and increased optimism about operating profits with this being translating into increased confidence to invest on farm. Confidence to increase on farm investment has increased notably since 2013 with 62% now feeling confident compared to 42% last year. With this increased confidence, 51% intend to invest capital on farm in the year ahead. There is a strong correlation between dairy farmer confidence and farmgate milk prices as shown in Figure 51. In addition to milk prices, other factors influencing farmer confidence include seasonal conditions and input costs. To achieve longer term dairy industry expansion through increasing milk volume, dairy farmers will need to see a more prolonged period of high milk prices.
The 2014 Dairy Situation Outlook May Update identifies dairy cull cow sales volumes (year-to-date) are 9% lower than at the same time last year, and 13% below the 5-year average. In addition ABS figures report live dairy cattle export volumes (year to date) are 12% lower than at the same time last year to March. This data would suggest dairy farmers are looking to increase cow numbers through reduced culling rates and holding more heifers in response to higher milk prices.

Figure 51: Correlation between dairy farmer positive confidence and farmgate milk prices in the year survey is conducted

![Graph showing correlation between dairy farmer positive confidence and farmgate milk prices](image)

Source: derived from Dairy Australia data

Dairy Australia identifies there is significant capital investment underway, particularly in the milk processing sector. Tasmania is highlighted as a growth region with the development of new farms supported through the increased availability of irrigation water. Figures 52 and 53 identifies that Tasmania has almost doubled milk production over the last 20 years.

Production in Vic, NSW, SA, Qld and WA after increasing in the late 1990’s has been declining over the last ten years. Over the next 1-3 years, Victorian milk production is forecast to increase, however this will depend on seasonal conditions and pasture availability. In contrast the non-exporting states of Qld, NSW, SA and WA are forecast by Dairy Australia to not see any significant increase in milk production.

Figures 52 and 53. Milk production by state 1993/94 to 2013/14 (billion litres)

![Graph showing milk production by state](image)

Source: Dairy Australia

The total dairy herd has stabilised at around 1.6 million cows since 2007/08. Due to a continuing trend for declining numbers of dairy farms, the herd size has been spread across fewer farms, with average herd sizes increasing. The change in average herd size is shown in Figure 54. In the years
2005/06 to 2012/13 average herd size has increased from 213 to 258 cows per herd, an average herd size increase of 3.0% per year. WA, SA and Tas have larger herds and Qld average herd size is smaller than other states.

**Figure 54. Average herd size for each state 2005/06 to 2012/13 (number of cows per herd)**

![Graph showing average herd size for each state from 2005/06 to 2012/13.](image)

*Source: Dairy Australia*

Milk production in terms of litres/cow/lactation remains low relative to global production and cow genetic potential. Production per cow declined to 5,525 litres/cow in 2012/13. Figure 55 shows the relatively slow increase in milk production per cow since 1994/95. The last six years has shown a flat production level per cow.

**Figure 55. Milk production (litres/cow/lactation)**

![Graph showing milk production from 1994/95 to 2012/13.](image)

*Source: Dairy Australia data.*

The long term trend is for the number of dairy farmers to reduce, with this set to continue. The 2014 Dairy Situation Outlook May Update identifies that 7% of dairy farmers surveyed identify themselves as being in a winding down phase. With more confidence in the industry, the question is whether
these farmers will sell to a new owner willing to operate as a dairy farm or if the property is lost from dairy production.

Based on previous years, new farm entrants and expanding herd sizes have allowed the total herd size to remain stable at around 1.6 million cows. That is, new operators and expanding herd size have compensated for those exiting the industry. There has been no net growth in the number of cows being milked. Based on a continuing stable dairy herd size, to achieve the growth in national milk volume previously shown in Figure 45, milk yield per cow has to rise significantly. Any decline in the herd size will require a larger jump in milk yield per cow to lift national milk production. To lift national milk production by around 10% or one billion litres, there has to be a significant increase in milk yield per cow.

With higher herd size and increased stocking rates, additional feed for milk production has to come from increased efficiency of pasture utilisation and increased use of bought in feed.

Figure 56 identifies that in 2012/13 average grain/concentrate feeding rates declined to 1,600 kg/cow/annum. While the long term trend has been for rising grain/concentrate use, there would appear to be some plateauing of feeding rates. It is of note that the plateau in grain/concentrate feeding rates corresponds with a plateau in milk production per cow. During 2009/10, the decline in feeding rates coincided with higher grain prices. During 2012/13 lower feeding rates were the result of reduced dairy farm profitability due to lower farmgate milk prices. For 2013/14 an increase in consumption is predicted, this view is supported from feed mill commentary relating to manufactured feed volumes and higher feeding rates coinciding with an average milk price over 50c/litre. Farmers have increased feeding in response to higher milk prices as they seek to take advantage of the opportunity to increase farm income and profitability.

The potential for higher feeding rates is significant for Victorian and Tasmanian dairy farmers as average grain/concentrate feeding is in the range 1.3 to 1.7 tonnes/cow/annum. The demand for dairy feeds in Tasmania has been rapidly increasing with mainland feed mills manufacturing larger volumes of feed for delivery to Tasmanian dairy farms.

In WA, QLD, NSW and SA, feeding rates are in the order of 1.8 – 2.1 tonnes/cow/annum. Some larger herds having a greater reliance on bought in feed are using 3.0 tonnes/cow/annum.

The export of Australian manufactured dairy feeds to New Zealand is growing in significance. The benefits of using supplementary dairy feeds in New Zealand’s lower cost pasture based production system is being recognised through the rapid growth in export volumes. This is occurring even though these dairy concentrate feeds cost considerably more than that in Australia due to shipping and distribution costs.
The combination of increasing herd size and increasing intake per cow has resulted in a large change in the quantity of concentrates purchased by the typical dairy farm. Figure 57 shows the rapid increase in individual farm concentrate use within Victoria, tripling from less than 150 tonne in 1999 to over 440 tonnes per farm in 2012.
5.5.3. Poultry Meat

The Australian chicken meat industry continues to steadily expand with meat production exceeding 1MMT annually since 2010/11 (Figure 58). Chicken meat now makes up one-quarter of Australian meat production, up from 18 percent 10 years ago. ABARES is projecting Australian chicken meat production to continue to rise with its share of Australian meat production increasing to 28% by 2018-19.

Figure 58. Australian Chicken Meat Production (tonnes)

Looking at the longer term trend in chicken meat production, since the mid 1960’s, the consistent nature of the industry’s growth is clearly seen (Figure 59). There is no time period when the industry has undergone a significant decline. It can also be seen that the rate of growth has increased over the last ten years.

Figure 59. Australian chicken meat production 1965 to 2013 (tonnes/3 month period)

---

2 The ABS data shows an unrealistic jump in production from 2009/10 to 2010/11. It is believed that production through the prior three years has been under reported.
NSW and Vic are the traditional major states for chicken meat production is seen in Figure 60. ABS only reports a combined production figure for SA, WA and Tas. Over the last four years, production in NSW and Victoria has plateaued with production growth occurring in South Australia and Queensland. Expansion projects have commenced in Griffith and Tamworth and the next 2-3 years will see a jump in the number of chickens grown in NSW. South Australian is also seen to be undergoing further growth in broiler production.

Figure 60. Chicken meat production by state 1997/98 to 2013/14 (tonnes)

The increase in chicken meat production is a function of both increasing numbers of birds grown through the construction of new farms and an increase in the liveweight of each bird grown. Figure 61 provides the relative indexed growth of these three based on 1997/98 being represented by 100. It can be seen that approximately 2/3 of the growth has come from growing out more birds and one third has been derived from increasing bird carcase weight.

Figure 61. Relative increase in total chicken meat produced, number of birds slaughtered and average carcase weight 1997/98 to 2012/13
The progress the chicken meat industry has made in growing more meat per bird, illustrated in the following photographs, showing the larger bird size at 42 days and an illustrated cross section of the bird carcase and breast meat at this age. These improvements have been delivered through a combination of improved genetics, nutrition, management, housing and disease control.

Photos: Broiler chickens at 42 days of age using genetics and feed nutrition from 50 years ago, 30 years ago and present day

Chicken Meat Consumption

Chicken is Australia’s most consumed source of meat protein. RIRDC (2014) identifies that 95% of chicken meat produced in Australia is consumed domestically and exports are dominated by low value cuts such as edible offal and chicken feet. ABARES points to the competitive pricing of chicken meat as the main factor for this growth. Over the five years to 2012-13, chicken was on average 21 percent cheaper than pork, 22 percent cheaper than beef and 45 percent cheaper than lamb.

ABARES identifies there is an “ongoing increase in domestic consumer demand for chicken meat, as chicken meat retail prices remain below prices of alternative meats. The CPI index of relative

Source: Cutait 2014

Chicken meat touches the lives of most Australians on an almost daily basis, with 90 per cent of the population eating chicken meat at least once a week, and a third of us eating it three or more times a week (ACMF.)
changes in meat prices over time show the competitive position of chicken meat (Figure 62). Over the past two decades, the prices of other meats have risen relative to chicken meat and this is reflective of the strong productivity growth achieved in the chicken meat industry, having increased feed efficiency and shortened time it takes for chickens to reach their ideal slaughter weight.”

From 2012-13 through to 2017-18, per capita consumption (currently at 44.6 kg) is forecast to grow to 47.1 kg (ABARES 2013).

**Figure 62. Australian consumer price index, meats**

![Graph showing Australian consumer price index for meats from 1995 to 2014.](image)

Source: ABARES Agricultural Commodities 2014.

**Free Range versus Conventional Shedding**

Growth in production and demand for free range chicken meat has been increasing over the past five years (currently approximately 15% of the total market) and this trend is expected to continue (RIRDC). Chicken meat companies are increasing their free range production capacity to meet the promotional push from supermarkets and consumer demand.

Free-range broilers are less efficient converters of feed into saleable meat and generally have higher mortality than conventionally-reared poultry. In a study conducted by Durali (2012 and 2013), day old chicks from the same donor flock were placed simultaneously on free range and conventional farms located within a 1.5 km diameter from each other. The birds were given identical diets and performance measured at regular intervals. This study showed an average 119 gram lighter live body weight per bird in a free range system as compared to conventional on day 35. Mortality was seen to be 3.7% higher and growth rate 2.5% slower for free range birds. FCR corrected to 2.45 kg on 12 grow-out batches showed an average 10-12 point increase in FCR.

As the industry moves to producing a higher proportion of birds under free range systems, this will result in additional feed and grain being required due to lower feed conversion efficiency.

**Turkey, Duck and Quail**

Feed demand for turkey, duck and quail feeding is largely concentrated in NSW, Vic and SA. These other poultry meats represent less than 5% of the volume of chicken meat consumed in Australia.
5.5.4. Layer Industry

Growth in the Australian laying hen flock is shown in Figure 63. For 2013/14 there is a projected decline in hen numbers, principally due to the avian influenza outbreak and bird culling disease response that occurred in Young NSW in October 2013. Other factors have also had an impact on hen numbers with the flock size projected as having declined by 4% over the preceding 12 months. The decline in laying hens has been seen with reduced supplies of eggs to supermarkets and consumers.

Figure 63. Australian Laying Hen Flock (000's)

![Graph showing Australian Laying Hen Flock (000's)](image)


Figure 64 shows the rise in egg consumption as we have embraced eggs as a healthy food choice, supported through egg industry promotional campaigns.

Figure 64. Egg consumption (eggs/person/year)

![Graph showing Egg consumption (eggs/person/year)](image)

Source: AECL
The significant change occurring in egg production systems is shown in Figure 65, with cage eggs declining from 75% of retail eggs in 2006/07 to only 50% in 2011/12. This trend will have continued in the last two years as both major supermarkets have made policy decisions to stock and promote free range eggs in preference to cage eggs. The challenge for the layer industry and its supply chain partners is to produce enough free range eggs to meet the supermarket marketing intentions. At the same time, layer framers that have invested in new cage shedding that meets new welfare code cage production standards, need time to gain a return on their investment. It is of note that while retail sales of free range eggs have been increasing, the sale of organic and other specialty eggs claiming added nutritional benefits have not increased in market share.

The move to free range egg production, like that for chicken meat, is expected to result in increased feed intake and lower feed conversion efficiency in laying hens. There is also a known increase in hen mortality rates with free range. While the extent of these differences is yet to be fully quantified in Australia, it is anticipated that this will result in an added increase in feed use by the layer industry. The maintenance requirement of a laying hen is approximately 60-65% of the total energy requirement. Compared with laying hens kept in cages, the maintenance requirement in alternative systems is higher due to the increased activity of the hens. It has been calculated at +10% for hens producing barn eggs and +15 % for hens using free range (Lohmann Information Guide).
5.5.5. Pig Production

Since 2008/09 there has been a steady increase in Australian pig meat production (Figure 66). ABS data indicates that the increase has not come from an increase in sow numbers and there has not been any major new piggery investment. The increase in meat production is coming from increased productivity with more pigs being sold per sow and an increase in the average carcase weight (Figures 67 and 68).

Figure 66. Australian Pig meat production 1993/94 to 2014/15 (tonnes)

Source: ABS, 2013/14 extrapolated from ABS 10 month data, 2014/15 JCS Solutions data prediction

Figures 67 and 68. Pigs slaughtered/sow and average carcase weight 1999/01 to 2012/13

Source: Derived from ABS data

South Australia has seen the greatest increase in pig meat production while NSW has shown a large drop over the last ten year period (Figure 69). The other states have been more consistent in pig meat production volume.
Each year Australians consume around 23.5kg of pork per person; this is made up of 8.5kg of fresh pork and 15kg of processed ham products such as bacon and smallgoods.
5.5.6. Sheep

The majority of the sheep industry is reliant on the use of pasture grazing for breeding stock and finishing lambs up to slaughter. Apart from drought periods, the amount of grain utilised by the sheep industry is relatively low.

**Lamb Feedlot Sector**

Due to export demand for consistent supply of lamb to meet market specifications, intensively finishing lambs in feedlots has become a specialised component of the prime lamb industry in Australia. Lamb feedlots are generally located in the wheat/sheep regions of southern NSW, Victoria, SA and WA. In good seasons they source most of their sheep from surplus young stock within the region.

In 2007 about 14% of all lambs sold in Australia were finished in a feedlot, this coincided with a drought year. In recent years the level of lamb feedlot activity has fluctuated with seasonal conditions, meat prices and grain cost. Feedlot operation permits continued lamb growth during drought conditions when quality pasture feed is unavailable, and it allows breeders to increase stocking rates. The lamb feedlot sector however remains a smaller player in terms of Australian feed grain use.

During 2013/14, there has been added lamb feedlot activity in Qld and southern NSW due to poor seasonal conditions. Across Vic, SA and WA, beneficial autumn rains have provided more ample grazing conditions with less lamb feedlot interest.

**Supplementary Feeding**

The sheep industry utilises supplementary feeds for breeding stock. Feeds are required for stud and sale rams and ewes, additional feeding of commercial ewes around and after lambing. In addition during drought years, sheep producers utilise grain and manufactured feeds for survival and production feeding due to limited pasture availability.

**Live sheep export**

The number of live sheep exported from Australia has been in decline (Figures 71 and 72) with 2013 dropping below 2 million head. This decline has occurred in all three major exporting states WA, SA and Vic.

With the declining number of sheep being exported, there has been an equivalent decline in export sheep feeds. The specification of these feeds calls for higher fibre and lower grain content. In WA and SA, this provides significant feed volume demand for feed manufacturers with manufacturing capability. The use of grains is low in these export feeds.

In addition to sheep, there is 60-100,000 live goats exported annually. The majority of these goats come from NSW and SA.
5.5.7. Aquaculture

The Australian aquaculture industry produces over 75,000 tonnes of product annually and the growth of the industry is shown in Figure 73. In 2010–11 ABARES reported that aquaculture products comprised 43% of Australian seafood production (edible and non-edible) by value and 32% by weight. The top five aquaculture species are identified as salmonids, tuna, pearl oysters, edible oysters and prawns.

**Figure 73. Volume of Australian aquaculture production 1992–93 to 2010–11 (tonnes)**

Salmon provides the greatest manufactured feed demand volume followed by trout, prawns and barramundi. Tuna farming largely utilises pilchards together with some manufactured feeds. Feed manufacture is limited to specialised feed manufacturing mills with equipment designed to manufacture the types of aquafeeds required.
Grain remains a lesser component in aquafeeds, although work has taken place looking at the value of pulses and vegetable protein sources to replace fish meal use.

### 5.5.8. Horse Industry

The contribution of the horse industry to the Australian economy has been estimated to be over $6.2 billion a year (Source RIRDC). While racing and associated activities (breeding and gambling) contribute a little over half, horse businesses, equestrian and breed events and the maintenance of horses are very large industries in themselves.

The horse feed market is highly segmented across breeding, racing, eventing and leisure. This is then overlayed with various breed and horse society elements.

Australia is reported by ABS to have 1.2 million horses; there are, however, no accurate horse statistics maintained. When wild horses are excluded there are estimated to be 876,000 domesticated horses as detailed in Table 4.

**Table 4: Horse Numbers within each State**

<table>
<thead>
<tr>
<th></th>
<th>NSW</th>
<th>Vic</th>
<th>Qld</th>
<th>SA</th>
<th>WA</th>
<th>Tas</th>
<th>NT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brood mares</td>
<td>25,531</td>
<td>19,005</td>
<td>15,130</td>
<td>2,910</td>
<td>3,665</td>
<td>2,494</td>
<td>26</td>
<td>69,000</td>
</tr>
<tr>
<td>Foals/Yearlings</td>
<td>28,391</td>
<td>21,134</td>
<td>16,825</td>
<td>3,236</td>
<td>4,076</td>
<td>2,773</td>
<td>29</td>
<td>76,728</td>
</tr>
<tr>
<td>Total Breeding</td>
<td>53,922</td>
<td>40,139</td>
<td>31,955</td>
<td>6,145</td>
<td>7,741</td>
<td>5,267</td>
<td>56</td>
<td>145,728</td>
</tr>
<tr>
<td>Racing</td>
<td>16,281</td>
<td>12,119</td>
<td>9,648</td>
<td>1,855</td>
<td>2,337</td>
<td>1,590</td>
<td>169</td>
<td>44,000</td>
</tr>
<tr>
<td>Equestrian</td>
<td>180,198</td>
<td>134,138</td>
<td>106,788</td>
<td>20,536</td>
<td>25,870</td>
<td>17,602</td>
<td>1,867</td>
<td>487,000</td>
</tr>
<tr>
<td>Pleasure</td>
<td>74,003</td>
<td>55,088</td>
<td>43,855</td>
<td>8,434</td>
<td>10,624</td>
<td>7,229</td>
<td>767</td>
<td>200,000</td>
</tr>
<tr>
<td>Total</td>
<td>324,404</td>
<td>241,484</td>
<td>192,246</td>
<td>36,970</td>
<td>46,573</td>
<td>31,689</td>
<td>2,858</td>
<td>876,728</td>
</tr>
</tbody>
</table>

Source: Total Australian numbers from RIRDC Horse Report for breeding, racing and equestrian. Pleasure and individual state breakdown estimated by JCS Solutions.

Breeding studs are spread through Australia; some of these are larger studs with well developed breeding facilities. Racing horses are trained either in city based stables or country training properties and transported to race meetings. Both the breeding and racing segments of the industry are high users of feeds. The equestrian segment is based on owners with fewer horses with capacity to spend proportionately larger amounts on individual horse feeding requirements. The pleasure market includes pony club and leisure riders. Feeding rates vary greatly depending on the level of work being undertaken and stocking density with urban based agistment requiring additional bought in feed.

Manufactured feeds are estimated to provide 70% of horse concentrate feeding needs, the remainder supplied in the form of whole and rolled grains, co-products such as bran, protein meals and supplements. Most feeds are supplied in packaged form, with access to the reseller network being essential.
5.5.9. Other Feeds

The stockfeed industry manufactures various other grain based feeds for species such as goats, alpacas, camels, emus, ostrich, rat and mouse, rabbit, zoo animals and birdseed mixes.

In addition the petfood industry utilises grain, milling by-products and protein meals in the manufacture of dog and cat foods.

6. REGIONAL SUPPLY & DEMAND MAPPING

6.1. Regional Grain Production

This report updates the regional supply and demand mapping that was provided in the 2008 report (Spragg 2008). The following section looks at the supply of grain within each region and the changes that have occurred over the intervening period. This grain supply data is compared with changes in feed grain use across the domestic users in each region.

Australia has been split into 14 regions. These regions are similar to the 13 regions used by ABARES within their Regional Feed Grain Supply and Demand Model, with the inclusion of Tasmania as a fourteenth region.

ABS data has been used to divide cereal grain production into regional figures. ABS releases grain production for wheat, barley, sorghum, triticale, oats and maize with statistical data reported allowing regional grain totals to be collated. ABS has not provided more detailed data for triticale and maize in 2007/08 and 2009/10 and estimates based on other grains yield and area has been used for these years.

Tables 5 and 6 provide average annual production comparisons between the years 1999/00 to 2004/05 and 2007/08 to 2011/12 for each of the supply regions. More recent 2012/13 data, broken down into statistical areas, has not been released by ABS at the time of this report being written.
Table 4. Grain production\(^3\) by region 5 year average 2007/08 to 2011/12 (‘000 tonnes)

<table>
<thead>
<tr>
<th>Region</th>
<th>Barley</th>
<th>Sorghum</th>
<th>Maize</th>
<th>Oats</th>
<th>Triticale</th>
<th>Wheat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern &amp; Central Qld</td>
<td>7</td>
<td>353</td>
<td>45</td>
<td>1</td>
<td>0</td>
<td>313</td>
<td>719</td>
</tr>
<tr>
<td>Southern Qld</td>
<td>146</td>
<td>1,210</td>
<td>164</td>
<td>9</td>
<td>0</td>
<td>1,232</td>
<td>2,761</td>
</tr>
<tr>
<td>North Eastern NSW</td>
<td>470</td>
<td>805</td>
<td>66</td>
<td>24</td>
<td>7</td>
<td>1,569</td>
<td>2,941</td>
</tr>
<tr>
<td>Western NSW</td>
<td>196</td>
<td>50</td>
<td>13</td>
<td>56</td>
<td>6</td>
<td>1,612</td>
<td>1,933</td>
</tr>
<tr>
<td>Sydney Newcastle NSW</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Central NSW</td>
<td>558</td>
<td>10</td>
<td>66</td>
<td>159</td>
<td>58</td>
<td>2,616</td>
<td>3,467</td>
</tr>
<tr>
<td>Murray &amp; Northern Vic</td>
<td>1,793</td>
<td>2</td>
<td>27</td>
<td>255</td>
<td>106</td>
<td>3,621</td>
<td>5,804</td>
</tr>
<tr>
<td>Melbourne &amp; Gippsland Vic</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>15</td>
<td>29</td>
</tr>
<tr>
<td>Western Districts Vic &amp; SE SA</td>
<td>344</td>
<td>0</td>
<td>2</td>
<td>60</td>
<td>14</td>
<td>510</td>
<td>930</td>
</tr>
<tr>
<td>Adelaide, Mid North &amp; Murraylands SA</td>
<td>1,146</td>
<td>0</td>
<td>0</td>
<td>44</td>
<td>39</td>
<td>1,770</td>
<td>2,999</td>
</tr>
<tr>
<td>Eyre Peninsula &amp; Northern SA</td>
<td>599</td>
<td>0</td>
<td>0</td>
<td>36</td>
<td>2</td>
<td>1,798</td>
<td>2,435</td>
</tr>
<tr>
<td>South West WA</td>
<td>1,857</td>
<td>0</td>
<td>0</td>
<td>550</td>
<td>35</td>
<td>5,294</td>
<td>7,736</td>
</tr>
<tr>
<td>Central and Eastern WA</td>
<td>660</td>
<td>1</td>
<td>2</td>
<td>19</td>
<td>4</td>
<td>2,357</td>
<td>3,043</td>
</tr>
<tr>
<td>Tasmania</td>
<td>28</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>3</td>
<td>23</td>
<td>61</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>7,814</strong></td>
<td><strong>2,432</strong></td>
<td><strong>388</strong></td>
<td><strong>1,220</strong></td>
<td><strong>278</strong></td>
<td><strong>22,740</strong></td>
<td><strong>34,872</strong></td>
</tr>
</tbody>
</table>

Source: ABS

\(^3\) Regional data utilises ABS published Shire statistical data
### Table 5. Grain production by region 6 year average 1999/00 to 2004/05 (‘000 tonnes)

<table>
<thead>
<tr>
<th>Region</th>
<th>Barley</th>
<th>Sorghum</th>
<th>Maize</th>
<th>Oats</th>
<th>Triticale</th>
<th>Wheat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern &amp; Central Qld</td>
<td>15</td>
<td>419</td>
<td>105</td>
<td>0</td>
<td>1</td>
<td>295</td>
<td>835</td>
</tr>
<tr>
<td>Southern Qld</td>
<td>199</td>
<td>747</td>
<td>74</td>
<td>8</td>
<td>2</td>
<td>977</td>
<td>2,007</td>
</tr>
<tr>
<td>North Eastern NSW</td>
<td>331</td>
<td>676</td>
<td>50</td>
<td>24</td>
<td>3</td>
<td>1,413</td>
<td>2,497</td>
</tr>
<tr>
<td>Western NSW</td>
<td>149</td>
<td>53</td>
<td>6</td>
<td>66</td>
<td>6</td>
<td>1,430</td>
<td>1,708</td>
</tr>
<tr>
<td>Sydney Newcastle NSW</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Central NSW</td>
<td>526</td>
<td>4</td>
<td>115</td>
<td>236</td>
<td>179</td>
<td>2,981</td>
<td>4,042</td>
</tr>
<tr>
<td>Murray &amp; Northern Vic</td>
<td>1,472</td>
<td>6</td>
<td>20</td>
<td>357</td>
<td>329</td>
<td>3,179</td>
<td>5,363</td>
</tr>
<tr>
<td>Melbourne &amp; Gippsland Vic</td>
<td>9</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>28</td>
</tr>
<tr>
<td>Western Districts Vic &amp; SE SA</td>
<td>200</td>
<td>0</td>
<td>1</td>
<td>79</td>
<td>23</td>
<td>256</td>
<td>560</td>
</tr>
<tr>
<td>Adelaide, Mid North &amp; Murraylands SA</td>
<td>1,003</td>
<td>0</td>
<td>0</td>
<td>54</td>
<td>101</td>
<td>1,347</td>
<td>2,504</td>
</tr>
<tr>
<td>Eyre Peninsula &amp; Northern SA</td>
<td>1,000</td>
<td>0</td>
<td>0</td>
<td>58</td>
<td>25</td>
<td>1,929</td>
<td>3,013</td>
</tr>
<tr>
<td>South West WA</td>
<td>1,252</td>
<td>1</td>
<td>0</td>
<td>466</td>
<td>33</td>
<td>5,615</td>
<td>7,367</td>
</tr>
<tr>
<td>Central and Eastern WA</td>
<td>536</td>
<td>2</td>
<td>1</td>
<td>35</td>
<td>7</td>
<td>2,030</td>
<td>2,611</td>
</tr>
<tr>
<td>Tasmania</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>9</td>
<td>23</td>
<td>68</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>6,718</strong></td>
<td><strong>1,909</strong></td>
<td><strong>382</strong></td>
<td><strong>1,397</strong></td>
<td><strong>722</strong></td>
<td><strong>21,489</strong></td>
<td><strong>32,618</strong></td>
</tr>
</tbody>
</table>

Source: ABS

---

4 Regional data utilises ABS published Shire statistical data
Changes in grain production

The first production period includes the 2002/03 drought year; the second production period includes the drought affected 2007/08 year (Figure 74). Total grain production increased by an average 2.2MMT per year between the two time periods. As discussed earlier, there has been a general increase in the production of wheat, barley and sorghum and decline in oats and triticale.

Figure 74. Total grain production for the two comparison periods 1999/00 to 2004/05 and 2007/08 to 2011/12.

6.2. Regional Grain Demand

For each of the 14 regions, grain demand has been split into the following:

- Flour – wheat used in Australian flour milling for baking, noodles and starch applications, includes wheat conversion to ethanol.
- Malt – Australian barley malting operations for both domestic and export brewing operations.
- Feed – used by Australian feed manufacturers, feedlots and home-mix operators.
- Export – grain surplus to domestic requirements, this varying with grain availability.
- Seed – retained for subsequent planting.

The demand data has been derived from both available published data and market information sourced by JCS Solutions. It should be noted that some regions cross state boundaries and where this occurs state demand data has been modified to generate regional data. The demand for grain use in livestock farming is complex and needs to account for the region within which feed is
manufactured rather than where feed is consumed or animals are slaughtered. For example, feed is transported between states and this analysis tries to take account of this volume movement.

This analysis has excluded grain demand by the beef and sheep grazing sectors due to its very seasonal nature and capacity to jump from minimal grain volumes during favourable grazing to significant volumes during droughts.

Additional grain is used by other end users such as oat and maize millers, breakfast cereal processing and petfoods. No attempt has been made to try and capture these smaller volumes within the regional supply and demand analysis. These other uses are considered as minor relative to the major grain use sectors included within the analysis.

Grain demand analysis has been limited to the cereal grain component of animal feeds; there is no inclusion of pulses, legumes or other feed ingredients.
6.3. Regional Grain Supply and Demand Commentary

6.3.1. Northern & Central Queensland

**Grain Supply**

Summer cropping of sorghum and maize are the major crops grown. There has been a decline in the volume of maize from over 100,000 tonnes to less than 50,000 tonnes produced annually. Wheat production has remained consistent in the region.

**Grain Demand**

Feed is the only significant domestic demand within the region with no flour or malt production. The major grain use is in beef feedlots through central and northern Queensland. Rockhampton is a centre for beef industry activity with demand for supplementary feeds, these based on mineral and molasses feeding systems.

The Atherton Tablelands provides a focal point for feed manufacture for a major broiler operation supplying northern Qld. The demand for dairy feeds to Atherton farmers has been declining with falling number of farmers.

**Supply & Demand Balance**

The region has a 372,000 tonne surplus of grain that in an average year is either exported from Mackay and Gladstone Ports. During dry years when southern Qld has a production shortfall, grain moves into the Darling Downs and Brisbane demand areas.
6.3.2. Southern Queensland

Grain Production

The region includes the Darling Downs with its reliable grain production base. The ABS data indicates that average grain production for 2007/12 increased by 755,000 tonnes or 38% compared to the 1999/05 period. The increase has been spread across wheat, sorghum and maize. The volume of barley has declined. The effect rainfall has on grain production is seen in the drop in volume for 2013/14. The longer trend has been for increasing grain supply.

The region’s capacity to grow a large sorghum crop provides a significant advantage for the feed and livestock industries in sourcing both summer and winter grains.

Grain Demand

The region is by far the largest feed grain user in Australia using 2MMT annually. Southern Queensland has seen growth in the beef feedlot sector as much of the Australian feedlot expansion has been occurring in the region. Grain use for feeding beef cattle in southern Qld has reached 1.4MMT per annum. The chicken meat industry has also been expanding in the region with grain demand exceeding 550,000 tonnes. Pig feeding has seen some contraction with closure of smaller less efficient operations. The layer industry is stable and dairy farmers have been under viability pressure in recent years.

Additional volumes of wheat and barley are used in Brisbane and Toowoomba for flour milling and malt production. Sorghum is being used for ethanol production in a plant built at Dalby.

Supply & Demand Balance

There is a small grain surplus of 273,000 tonnes in an average grain production year. The
increase in grain production in the region has just kept ahead of rising grain demand. Surplus grain moves through Brisbane for export markets. The region draws grain from central Qld as well as northern NSW. In lower production years, such as the present year, grain is brought from southern Australia either via road transport or shipping from SA and WA. During the 2002/03 drought year grain was imported from overseas to meet demand.

6.3.3. North Eastern NSW

Grain Production

Crop production includes the growing areas of Moree, Inverell, Narrabri, Tamworth and Quirindi. Cereal grain production is almost 3MMT and supplies a large volume of wheat and sorghum that can either be used in the region or move into southern Qld or the Newcastle and Sydney demand regions. The region is a major supplier of barley to the malting and feed industries.

Grain Demand

Beef feedlots provide the largest demand for grains with many larger well established operations located in the region. Chicken meat production has been growing with expansion of new operations taking place around Tamworth. Dairy feed demand declined with falling numbers of coastal dairy farms. Pig production has been in significant decline with the closure of many small to medium sized piggeries. There remains a concentration of layer farms in the Tamworth area.

Flour milling operations are located in Tamworth and Gunnedah. Malt production takes place in Tamworth. Wheat and barley use in flour milling and malt production have been stable with no significant milling capacity increase.

Supply & Demand Balance

The region has a significant 1.65MMT grain surplus that supports grain use in other regions as well as moving into export markets. Growers in the region have flexibility in supplying to various end use markets depending on demand requirements. The region supplies...
significant volumes of higher protein milling wheat, malting barley and sorghum for the feed market. The surplus grain from this region can be transported in various directions and the region is seen to be critical in allowing the east coast market to function efficiently.

Grain production in the region has been increasing, with an average grain production year providing an additional 500,000 tonnes of surplus grain above use within the region.

### 6.3.4. Western NSW

#### Grain Production

The region includes Nyngan, Coonabarabran, Coonamble, Dubbo, Gilgandra, Narramine, Walgett and Warren. These areas have capacity to plant larger cropping areas when seasonal conditions are favourable. During dry years the reverse occurs, with the regions grain production declining significantly. Wheat is the major grain grown and average production has increased by almost 200,000 tonnes to supply 1.6MMT in an average year.

#### Grain Demand

There is a small demand for milling wheat in the region and no malting capacity. The region does not have any significant intensive livestock feeding enterprises. Dubbo provides feed milling capacity to supply the region. There is demand for supplementary feeds for beef cattle and sheep feeding. This demand is influenced by seasonal conditions affecting pasture growth and prices of beef and lamb.

#### Supply & Demand Balance

The region in average years has a large grain surplus of 1.8MMT. During drought years the region still has a grain surplus. This grain is available for export, or for domestic use in Sydney/Newcastle, NE NSW and Southern Qld.
6.3.5. Sydney Newcastle NSW

Grain Production

The region has no grain production.

Grain Demand

Sydney has high demand for flour production using over 500,000 tonnes of wheat and additional maize. A new mill at Picton has replaced older city based milling capacity. There is also growing malt barley demand with a new plant being built in Sydney.

Feed manufacture is focused on the demand for chicken meat production with the two major processors and a number of independent companies operating in the region. The volume of broiler feeds being supplied has not changed greatly in recent years as the industry has been expanding in regions outside Sydney and Newcastle.

There is a concentration of horse feed manufacturers in the region. The demand for layer and pig feeds has been falling with the closure of farms due to urbanisation and land values.

Feed manufactured in the region moves into South Coast dairy farms. There has however been some decline in the volume of dairy feeds being supplied from the Sydney feed mills.

Supply & Demand Balance

The region has the second largest grain deficit in Australia and provides a large 1MMT demand base for grain to move from other regions. Feed mills take advantage of the availability of both summer and winter crops, drawing grain from the Liverpool Plains and more distant areas. Large volumes of grain move through the region via the Newcastle and Port Kembla grain export terminals.
6.3.6. Central NSW

Grain Production

The region produces the largest volumes of wheat 2.6MMT and barley 0.56MMT in NSW and includes the production areas of the Central West and Riverina. Between 1999/05 and 2007/12 wheat production has fallen by 365,000 tonnes (-12%), oats 77,000 tonnes (-33%) and triticale 121,000 tonnes (-68%). Barley production has remained stable and the area planted to canola has been increasing. The Riverina provides production of irrigated maize. Lupin production in the region is highly variable with low years supplying only 10,000 tonnes through to 142,000 tonnes grown in 2010/11.

Grain Demand

Flour milling in Manildra and Narrandra provides a large demand for milling wheat.

Feed use is spread across various sectors with the beef feedlots being the largest grain users. Feed mills servicing the broiler, layer, pig and dairy markets are located around Young, Griffith and Leeton. The region is seeing major new broiler farm investment that requires increased feed milling capacity and resulting grain demand.

Dairy feeds are supplied into the NSW South Coast as well as meeting shipping container demand for Tasmania and New Zealand.

Supply & Demand Balance

The size of the grain surplus in Central NSW has declined from 2.3MMT in 2008 to 1.68MMT in 2014. This is due to a combination of reduced grain production and increased domestic use within the region. The reduced surplus limits grain available for export through Port Kembla or available for use in Sydney and Victoria.
6.3.7. Murray & Northern Vic

Grain Production

The region is a large producer of wheat 3.6MMT and barley 1.8MMT. The major grain areas are the Victorian Mallee and Wimmera as well as southern NSW including Finley, Deniliquin and Corowa. Production between the 1999/05 and 2007/12 time periods has increased 320,000 and 441,000 tonnes for barley and wheat respectively. Crops that have declined are oats 102,000 tonnes (-29%) and triticale 223,000 tonnes (-68%). Average production of lupins is around 45,000 tonnes; this however varies from year to year from 20,000 to 80,000 tonnes. The majority of these lupins are used in dairy and pig feeds.

Grain Demand

Feed production is the major domestic use industry utilising over 1.1MMT. The dairy industry is the largest grain user, followed by pig and broiler production.

Flour milling is located in Ballarat and Bendigo.

Supply & Demand Balance

The region is a significant supplier of grain to other regions with a 4.3MMT grain surplus. Grain normally moves into the Melbourne feed, flour and malting markets. In addition grain can also be transported to the Western Districts or north to Sydney and northern NSW. The current year, due to supply shortages in Qld and a large price differential, there has been greater volumes of grain moving to northern grain users.
6.3.8. Melbourne & Gippsland Vic

Grain Production

Even though the Gippsland provides a large feed demand, there remains only a small volume of grain grown in the region. In the period 1999/05 there was an average of only 28,000 tonnes grown in the region. Since that time considerable effort has gone into promoting grain production, particularly through use of high rainfall cereal grain varieties. It is of note that during 2007/12, average grain production has remained at 28,000 tonnes. Even though there is local demand and locally grown grain can have a freight price advantage, other factors have prevented any increase in grain production in the region.

Grain Demand

The dairy industry provides the greatest feed grain demand volume, with growth coming from pasture based farms increasing the amount of supplementary dairy feeds in use. The chicken meat industry is also a large grain user and has shown growth with new shed development over recent years. The region also has a significant volume of horse feeds manufactured.

The Melbourne based flour mills and malting plants provide a significant demand for milling wheat and malting barley.

Supply & Demand Balance

The region with a 1.3MMT supply deficit is the largest of any region in Australia. The supply gap is normally filled by grain moving from Victorian cropping areas as well as southern NSW and SA. During higher production sorghum years, this grain can move into Melbourne broiler feed use. During extreme drought years imported feed grains have been used by Melbourne feed mills.
**6.3.9. Western Districts Vic & SE SA**

**Grain Production**

From 1999/05 to 2007/12 grain production in this region has increased by 370,000 tonnes (+66%). This major increase has come from wheat (+99%) and barley (+72%). Like other regions, some of the increase in wheat and barley has come in place of oats (-24%) and triticale (-41%). Part of the increase in grain production is from more favourable growing seasons, with use of growing systems and varieties better suited to high yield potential from higher rainfall years.

Grain production areas are Inverleigh, Winchelsea, Camperdown, Mortlake and Hamilton in Vic and Bordertown, Keith and Millicent in SA.

**Grain Demand**

The dairy industry is the dominant grain use industry in the region. There has been some growth in grain use with higher grain feeding rates and larger herd sizes.

**Supply & Demand Balance**

In 2008 the supply and use of grain was closely balanced. Under current demand and average grain production there is now a 352,000 tonne surplus of grain. This grain is available for export through Geelong or Portland, as well as moving into the Melbourne feed, flour and malt markets. The region has potential to further increase grain production and surplus.
**6.3.10. Adelaide, Mid North & Murraylands SA**

**Grain Production**

Grain supply comes from the Adelaide Plains, Roseworthy and lower mid north areas, Strathalbyn and the Murray Mallee. There has been an increase in production volume, this largely being additional wheat 424,000 tonnes (+31%). Barley has increased by a lower amount 143,000 tonnes (+14%). There has been a decline in oats (-19%) and a major decline in triticale (-61%) production.

**Grain Demand**

Intensive feeding of meat chickens and pigs is the dominant grain use in the region. Feed demand for meat chickens has almost doubled since 2008. There has also been a lesser increase in the demand for pig feeds. In contrast there has been a contraction in demand for dairy and layer feeds as farmers struggle to compete with interstate producers.

Adelaide and surrounding areas provide demand for milling wheat in flour milling and barley for malt production.

**Supply & Demand Balance**

The region is well placed with grain supply being considerably greater than demand. Due to the increase in grain production from more consistent growing years, in an average year the region’s grain surplus has increased. The region would seem well placed for further expansion of the intensive feeding sector.
6.3.11. Eyre Peninsula & Northern SA

Grain Production

The Yorke and Eyre Peninsulas provide larger volumes of grain, predominantly wheat and barley.

Grain Demand

The region lacks any major livestock feeding activity.

Supply & Demand Balance

There is a large grain surplus 2.4MMT that is exported through export terminals on both peninsulas. While grain is normally supplied to export markets, there is potential to ship grain to Tasmania and eastern state users.

6.3.12. South West WA

Grain Production

South West WA is the largest grain producing region in Australia with 7.7MMT grown in an average year. Wheat and barley are the dominant grains, although the region is also the largest oat producer in the country. The region has seen a major decline in lupin production; in contrast canola production has increased significantly.
Grain Demand

Of all the regions, SW WA provides the most even spread of feed use across livestock industries. This is seen to be due to the need to cater for WA food demand and limited ability to ship meat, milk and eggs from the eastern states. It is of note that there remains demand for live sheep export feeds, although this demand has fallen significantly due to reduced export numbers. The pig industry is seeing some expansion due to export meat opportunities.

Perth and Northam provide flour milling demand for wheat. There is a significant capacity for Perth barley malt production with this including some flexibility to chase export market volumes.

Supply & Demand Balance

Due to the size of the grain crop, SW WA has the largest grain surplus of all the regions and never has any issues with available grain supply.

The major grain production areas are in the Avon, Central Midlands, Wheatbelt South and Great Southern. Surplus grain moves to Fremantle and Albany for export.

6.3.13. Central & Eastern WA

Grain Production

The region includes grain production in Eastern around Esperance and Central areas.

Wheat and barley are the main gains grown. The region has also been historically the largest lupin producer. Like other regions the volume of lupins being grown has been declining.
Grain Demand

The region has no significant livestock production requiring consistent feed demand. Similarly there is no major flour or malt production in the region.

Supply & Demand Balance

There is a major surplus of grain that is exported through Esperance and Geraldton ports.

6.3.14. Tasmania

Grain Production

Tasmania, like the Gippsland in Victoria, offers a region with high demand for dairy feeding as well as high and reliable rainfall for higher yielding cereal crops. Just like the Gippsland, there has been a failure to generate any significant increase in grain production to service the growing demand. In 1999/05 Tasmania produced an average 68,000 tonnes of grain per year. During the 2007/12 period, the average was 69,000 tonnes per year. Barley production has remained stable at 28,000 tonnes, while wheat volume has increased at the expense of oats and triticale. Tasmanian grain growers achieve the highest yield in Australia, wheat 4t/ha and barley 4.2t/ha.

Grain Demand

Dairy farmers provide the greatest demand for feed and grain use. The market is however limited in the number of feed manufacturers operating in the state with the majority of dairy feeds being shipped from Victorian and NSW feed mills. There has been growth in feed use by dairy farmers. Grain or concentrate feeding has reached 1,300kg/cow/lactation,
an increase from around 500kg in the late 1990’s.

Additional grain is used in flour and malting, this demand is met from mainland grain importation in addition to local supply.

The Tasmanian freight equalisation scheme assists in reducing the cost to freight grain and feed to Tasmania and works against local grain supply.

The larger volume of other feeds includes aquaculture feeds, mainly salmon, manufactured in Tasmania.

**Supply & Demand Balance**

It is seen that Tasmania has a large 249,000 tonne grain deficit that is supplied from mainland states either as grain or manufactured feeds. In 2008 the deficit was seen as being 142,000 tonnes, this has increased by over 100,000 tonnes due to rising dairy feed demand.
7. REFERENCES


Australian Bureau of Statistics 2014, **7121.0 Agricultural Commodities Data 1861 to 2013**.

Australian Bureau of Statistics 2014 **7215.0 Livestock Products Australia**, March 2014


Australian Grain Exporters Association 2013, *Export grain demand situation and implications for industry*, presentation to the Stock Feed Manufacturers’ Association of Victoria, June 2013.


Australasian Railway Association 2011, submission to the Senate Standing Committee on Rural Affairs and Transport: *Operational Issues in Export Grain Networks*


Dairy Australia, *Australian Dairy Industry In Focus 2013*.


RIRDC 2001, *The Horse Industry Contributing to the Australian economy*, RIRDC Publication No 01/083