2017/18 Wheat & Barley Harvest Grain Sample Analysis

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FGP - 2017/18 Wheat& Barley Harvest Grain Sample Analysis

1. Key Observations

- 120 wheat and 38 barley samples from the 2017/18 harvest were collected and analysed using AusScan NIR calibrations.
- Samples had segregation, test weight and screenings data provided from the relevant grain source.
- Data is collated and compared to the previous year's data collection.
- Protein levels increased relative to the previous year's record yielding crop.
- Wheat and barley variation in available energy content reconfirms the advantage in having AusScan analysis completed on grain samples.

2. Overview of Sample Collection and Testing

The Feed Grain Partnership has for the 5th harvest year completed grain testing using the AusScan NIR technology to assess grain quality. This report provides results from 120 wheat and 38 barley samples collected from Queensland, New South Wales, Victoria, South Australia, Western Australia and Tasmania. Samples were from grain harvested from the 2017 growing season.

Sample collection was targeted to ASW and FED wheat and F1 and F2 barley samples. Some milling wheat samples were included within the samples collected.

NSW Department of Primary Industries at Wagga Wagga completed NIR scans on the samples collected. AusScan calibrations, via Aunir's on line AusScan service, were used to predict grain quality. Test weight and screenings data was collected from grain receival site service providers.

Acknowledgment is provided to representatives from Grainflow, CHS Broadbent, National Variety Trial Collaborators, TAP Agrico, NSW Department of Primary Industries and Stirlings to Coast Farmers Inc for their support in providing access to their 2017/18 harvest grain samples.

3. Results and Discussion

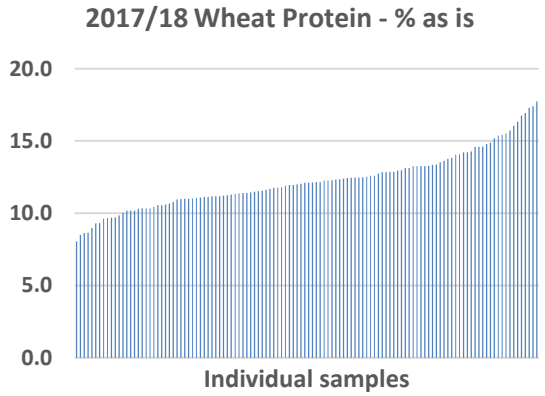
The following tables and figures provide data for the main AusScan results as well as test weight and screenings.

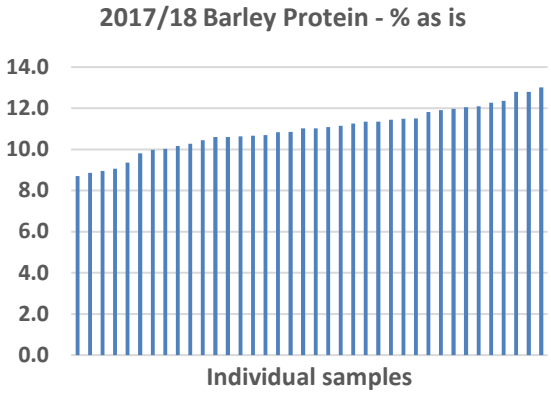
Protein, Screenings & Test Weight

The 2017/18 harvest was seen as "more normal" than the previous year's record grain crop and yield. For comparison, based on ABARES Crop Report the following comparison applied for the past four years. Based on total tonnes and yield, the 2017/18 harvest was much more like the 2014/15 and 2015/16 harvests, although yield is seen as marginally lower.

	2014/15	2015/16	2016/17	2017/18
Wheat – tonnes	23,742,000	22,272,000	34,369,000	22,378,000
Wheat Yield – t/ha	1.9	2.0	2.7	1.7
Barley – tonnes	8,646,000	8,991,000	13,414,000	8,926,000
Barley Yield – t/ha	2.1	2.2	3.3	1.8

Grain protein levels for 2017/18 are shown below. The large level of variation is seen and emphasises the need for end users to be testing grain for protein content. The table comparing the last four years shows protein levels have increased from the prior year's lower levels and are closer to the averages achieved in 2014/15 and 2015/16.





Wheat test weight for 2017/18 is similar to 2014/15 and 2016/17 and below that seen in the prior harvest. Barley test weight does not differ between the last two years. Screenings levels for samples tested were lower than prior years.

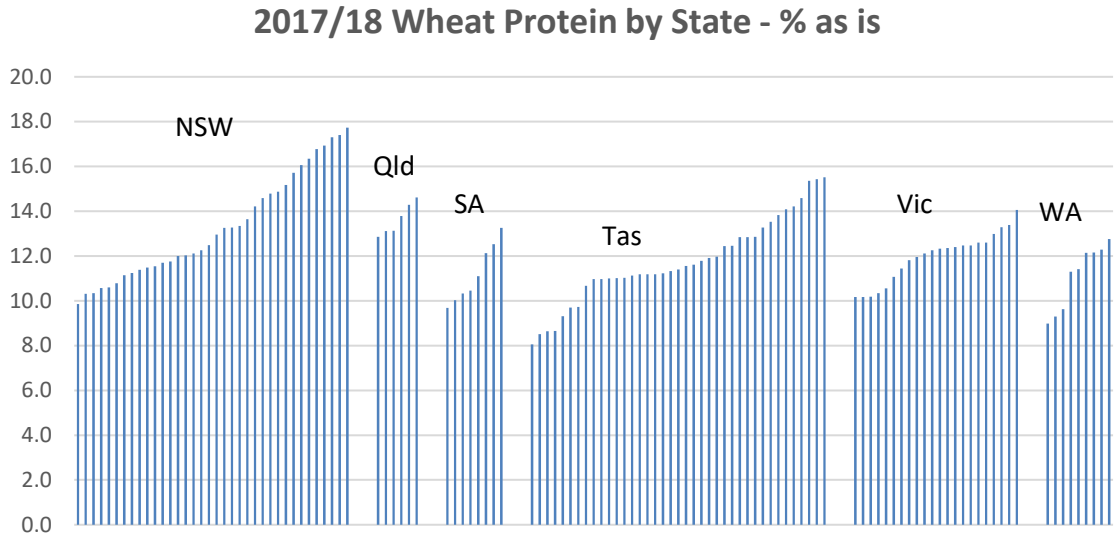
WHEAT	2017/18	2016/17	2015/16	2014/15
Protein % as is basis				
Min	8.1	7.4	8.4	6.9
Mean	**12.3**	**10.0**	**13.5**	**10.6**
Max	17.7	14.8	16.7	16.2
Std Dev	1.99	*1.33*	*2.13*	*2.40*
Test Weight kg/hl				
Min	61.0	68.2	71.1	66.6
Mean	**78.4**	**80.4**	**79.2**	**78.2**
Max	86.0	88.6	84.9	86.0
Screenings %				
Min	0.4	0.5	0.1	1.3
Mean	**2.7**	**5.2**	**3.8**	**7.0**
Max	12.5	26.9	17.9	41.2

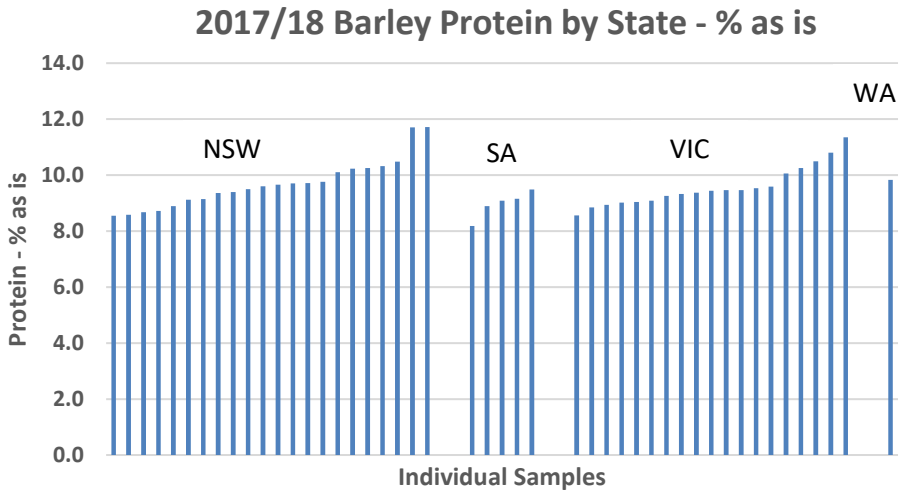
BARLEY	2017/18	2016/17	2015/16	2014/15
Protein % as is basis				
Min	8.7	8.2	8.6	8.4
Mean	**11.0**	**9.6**	**11.1**	**10.4**
Max	13.0	11.7	14.8	12.4
Std Dev	1.11	*0.79*	*1.26*	*1.70*
Test Weight kg/hl				
Min	54.5	58.2	58.5	65.4
Mean	**68.3**	**68.4**	**64.1**	**69.6**
Max	76.8	74.2	69.5	72.4

Screenings %				
Min	0.4	3.2	0.4	3.0
Mean	**4.0**	**16.8**	**13.7**	**21.5**
Max	11.0	37.4	58.7	35.7

State Differences

The figure below demonstrates that differences in protein between samples in any one state is greater than the average difference between states. NSW provided a larger number of high protein wheat and barley samples.





AusScan Nutritional Predictions 2017/18

AusScan predicted average data from wheat and barley samples are provided below. Protein levels are seen to be higher for wheat in Queensland. Fat, ash and crude fibre average content provides minimal differences between states.

WHEAT	Moisture (%)	Fat (as is) (%)	Protein (as is) (%)	Crude Fibre (as is) (%)	Ash (as is) (%)	Starch (as is) (%)
QLD	10.6	1.7	13.6	2.2	1.0	63.3
NSW	10.8	1.7	13.3	2.2	1.1	62.3
VIC	10.1	1.8	12.0	2.5	1.1	62.6
SA	11.0	1.8	11.2	2.2	0.9	64.1
WA	11.3	1.8	11.1	2.3	1.0	63.2
TAS	11.1	1.7	11.8	2.3	1.2	63.1
All Samples	**10.8**	**1.7**	**12.3**	**2.3**	**1.1**	**62.9**
Std Dev	0.86	0.12	1.99	0.37	0.23	2.09

There were no barley samples from Queensland and only one sample from Western Australia. The table below only includes NSW, Vic and SA results. NSW protein levels were higher for barley and lowest in South Australia.

BARLEY	Moisture (%)	Fat (as is) (%)	Protein (as is) (%)	Crude Fibre (as is) (%)	Ash (as is) (%)	Starch (as is) (%)
NSW	10.0	2.3	11.7	7.2	2.1	49.8
SA	10.4	2.4	9.5	7.4	2.1	49.5
VIC	10.2	2.5	10.7	7.6	2.2	48.9
All Samples	**10.2**	**2.4**	**11.0**	**7.3**	**2.1**	**49.5**
Std Dev	0.63	0.19	1.11	0.77	0.09	1.80

The AusScan available energy predications show little difference when comparing the average results for each state. These are avedrage results and there is greater variation in energy content when looking at individual sample results.

WHEAT	Broiler AME (as is) (MJ/kg)	Pig Faecal DE (as is) (MJ/kg)	Pig Ileal DE (as is) (MJ/kg)	Cattle Estimated ME (DM) (MJ/kg)
QLD	13.3	14.1	12.7	12.7
NSW	13.2	14.1	12.4	12.9
VIC	13.1	14.0	12.4	12.9
SA	13.3	14.0	12.6	12.9
WA	13.2	13.9	12.2	12.8
TAS	13.1	13.9	12.0	12.8
All Samples	**13.2**	**14.0**	**12.3**	**12.8**
Std Dev	0.28	0.16	0.37	0.11

BARLEY	Broiler AME (as is) (MJ/kg)	Pig Faecal DE (as is) (MJ/kg)	Pig Ileal DE (as is) (MJ/kg)	Cattle Estimated ME (DM) (MJ/kg)
NSW	12.2	13.0	10.7	12.3

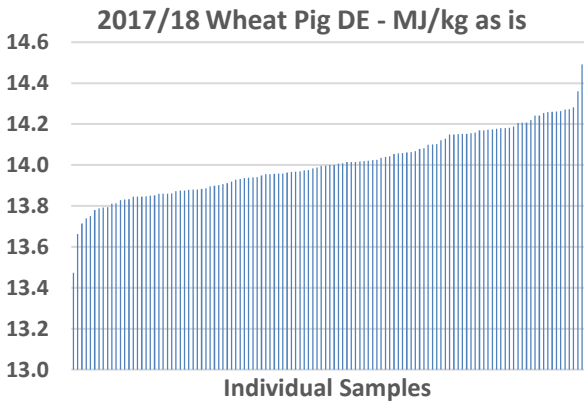
SA	12.2	12.7	10.4	12.2
VIC	12.2	12.7	10.5	12.0
All Samples	**12.2**	**12.8**	**10.6**	**12.1**
Std Dev	0.28	0.28	0.22	0.25

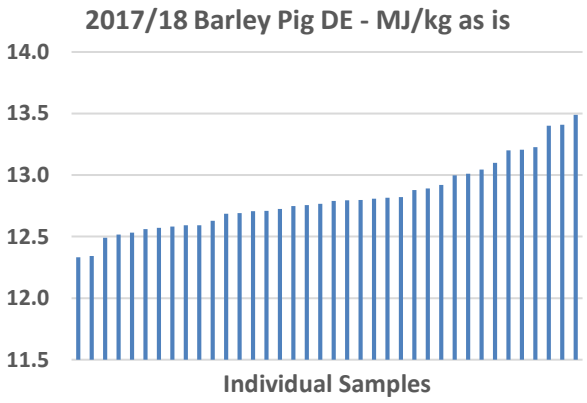
Pig Faecal DE

The AusScan Pig DE prediction average for the last five harvest years shows a variation of 0.5MJ/kg for both wheat and barley, with the 2017/18 harvest year on average increasing by 0.3MJ compared to the previous year's lower Pig DE results.

Across the five years the Pig DE range is 1.3 MJ/kg for both wheat and barley.

	2017/18	2016/17	2015/16	2014/15	2013/14
Pig DE MJ/kg as fed					
WHEAT					
Min	13.5	13.5	13.7	13.5	13.2
Mean	**14.0**	**13.8**	**14.1**	**14.0**	**14.0**
Max	14.5	14.4	14.4	14.4	14.4
BARLEY					
Min	12.3	12.2	12.6	12.6	12.7
Mean	**12.8**	**12.5**	**12.9**	**13.0**	**12.9**
Max	13.5	13.0	13.2	13.3	13.1

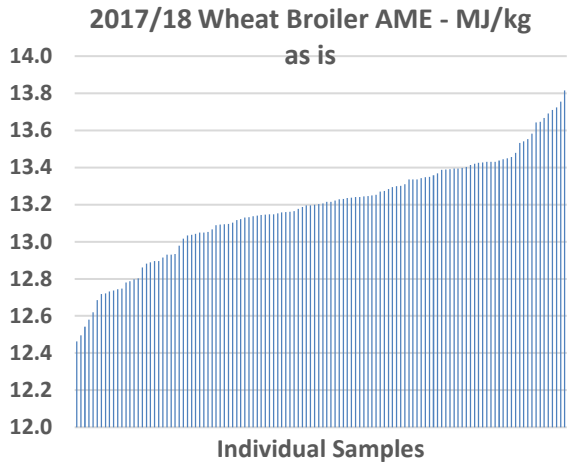


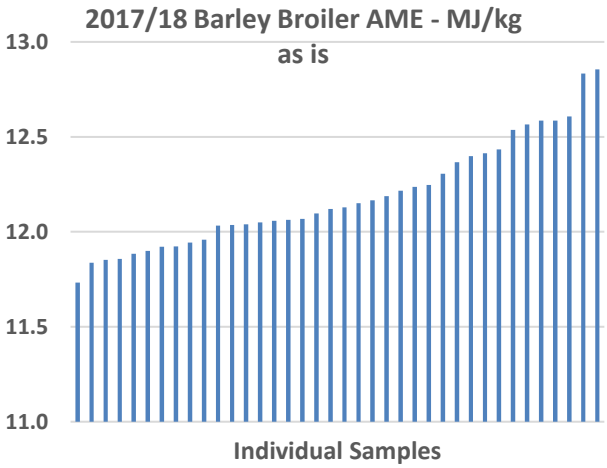


Broiler AME

Broiler AME average at 13.2MJ/kg for 2017/18 is the highest recorded across the five year period and 0.3MJ/kg higher than the previous year. Similarly barley is higher in Broiler AME and a full 1.0MJ/kg higher than the 2014/15 test results. Across the five years Broiler AME ranges by 1.9MJ/kg and barley by 2.4MJ/kg.

	2017/18	2016/17	2015/16	2014/15	2013/14
Broiler AME MJ/kg as fed					
WHEAT					
Min	12.5	12.2	11.9	12.4	11.9
Mean	**13.2**	**13.0**	**12.4**	**12.9**	**13.1**
Max	13.8	13.6	13.1	14.0	13.7
BARLEY					
Min	11.7	11.4	10.5	10.7	11.1
Mean	**12.2**	**12.1**	**11.5**	**11.2**	**11.5**
Max	12.9	13.0	12.1	11.7	12.0

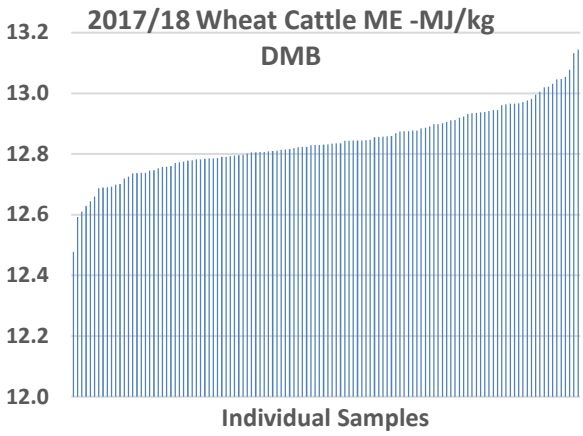


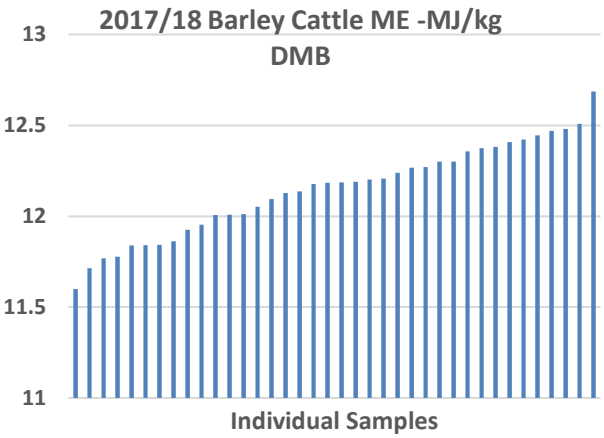


Cattle ME

Cattle ME is known to be less variable in energy content and shows minimal variation for wheat and barley across the five years. The range in Cattle ME is 0.7MJ/kg for wheat and 1.1MJ/kg for barley.

	2017/18	2016/17	2015/16	2014/15	2013/14
Cattle ME MJ/kg DM basis					
WHEAT					
Min	12.5	12.6	12.5	12.7	12.4
Mean	**12.8**	**12.9**	**12.6**	**12.8**	**12.9**
Max	13.1	13.1	12.7	13.1	13.1
BARLEY					
Min	11.6	11.6	12.0	11.9	12.0
Mean	**12.1**	**12.1**	**12.2**	**12.3**	**12.2**
Max	12.7	12.4	12.4	12.7	12.5

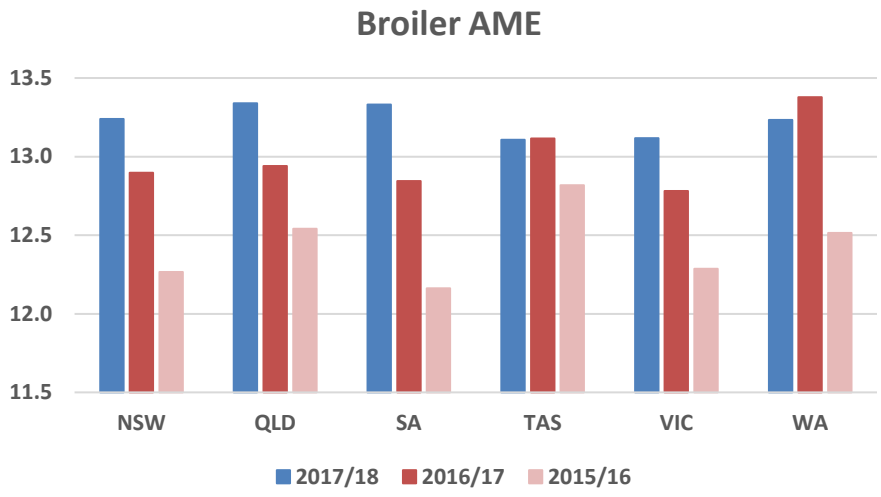


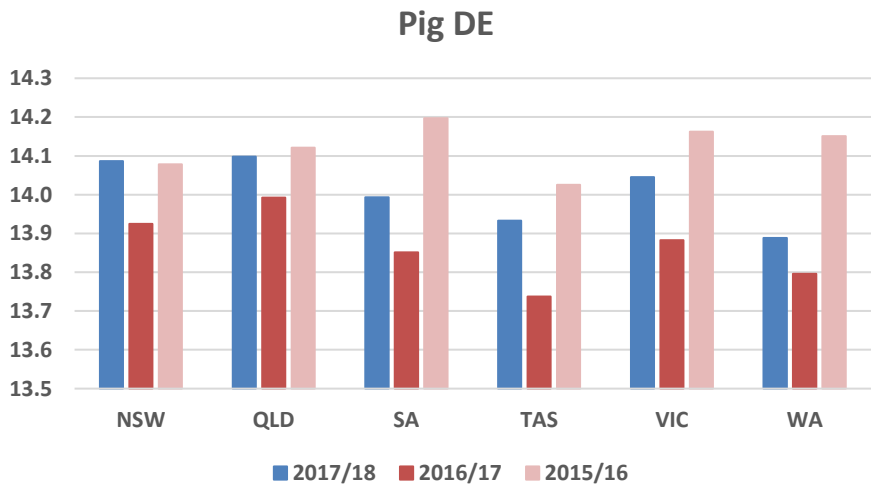


Available Energy by Year and State

The following table and figures identifies the average available energy for Broiler AME, Pig DE and Cattle ME across the six states and previous three years. It is seen that available energy varies between states and between years without any consistency and reflects seasonal crop growing conditions. These differences go down to region and farm level as agronomic factors have a significant impact on cereal grain quality for animal feeding.

	Broiler AME			Pig DE			Cattle ME		
	2017/18	2016/17	2015/16	2017/18	2016/17	2015/16	2017/18	2016/17	2015/16
NSW	13.2	12.9	12.3	14.1	13.9	14.1	12.9	12.8	12.6
QLD	13.3	12.9	12.5	14.1	14.0	14.1	12.7	12.8	12.6
SA	13.3	12.8	12.2	14.0	13.9	14.2	12.9	12.9	12.6
TAS	13.1	13.1	12.8	13.9	13.7	14.0	12.8	12.9	12.6
VIC	13.1	12.8	12.3	14.0	13.9	14.2	12.9	13.0	12.6
WA	13.2	13.4	12.5	13.9	13.8	14.2	12.8	12.9	12.6


Broiler AME
13.5
13.0
12.5
12.0
11.5
NSW
QLD
SA
TAS
VIC
WA
2017/18
2016/17
2015/16


Pig DE
14.3
14.2
14.1
14.0
13.9
13.8
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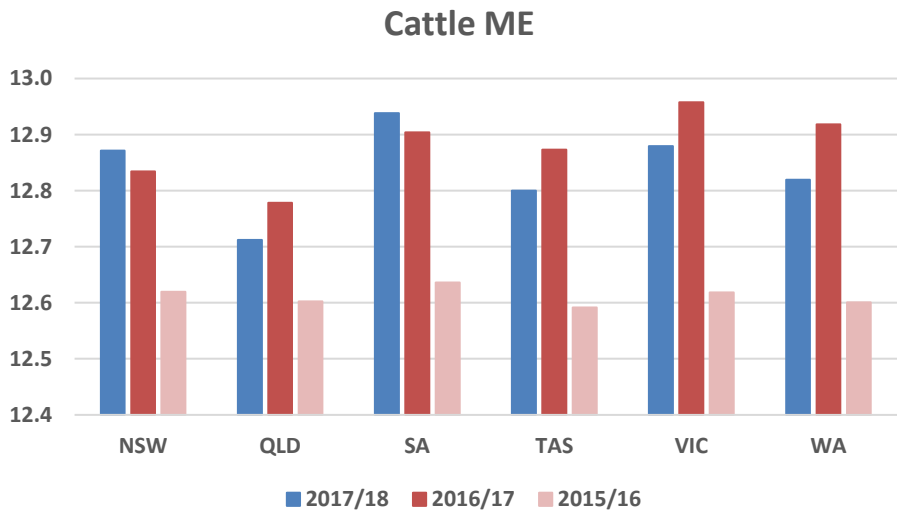
13.6
13.5
NSW
QLD
SA
TAS
VIC
WA
2017/18
2016/17
2015/16


Cattle ME
13.0
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12.5
12.4
NSW
QLD
SA
TAS
VIC
WA
2017/18
2016/17
2015/16

Notes of Caution:

1. Results provided are based on sourcing samples and the reader needs to take care in comparing results for year to year and between states. FGP does not present this report as being representative of the entire crop harvested and advises feed grain users to conduct their own testing work.

2. The AusScan calibrations are based on *in vivo* feeding research, where grains were milled under research controlled conditions. This included hammer milling for pigs and poultry and dry rolling for cattle. Under commercial conditions, the efficiency of milling will affect actual energy availability.