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**FRONT COVER:**

Chris Reichstein is an Esperance, Western Australia grain grower and current Nuffield scholar. His WA South Coast region delivered an excellent winter crop in 2013 and it's also having a very promising start to the 2014 season (see District Reports page 43). Chris has just returned home from the first part of his Nuffield experience – a group tour of the powerhouses of world agriculture – to put his winter crop in before heading off again on his individual studies. Applications for the 2015 Nuffield Australia scholarship program close on June 30, 2014. There are 25 scholarships on offer – see [www.nuffield.com.au](http://www.nuffield.com.au) or call 03 5480 0755 for more information. (Photo: Corrina Ridgway)

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# Section

# 1

## Overview

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## Australia area ('000 ha) and production ('000 tonnes) of major winter and summer crops planted for grain during 2013

	NSW		VIC		QLD		WA		SA		TAS		AUSTRALIA TOTAL	
2013-14	Area	Prodn	Area	Prodn	Area	Prodn	Area	Prodn	Area	Prodn	Area	Prodn	AREA	PROD'N
Wheat	3800	6612	1610	3541	800	1200	5015	10500	2279	5128	8	32	13512	27013
Barley	670	1179	915	2178	90	138	1350	3800	925	2225	7	25	3957	9545
Oats (for grain)	250	250	150	315	15	8	240	520	86	160	3	6	744	1259
Triticale	90	180	60	96	1	2	19	28	59	91	1	3	230	400
Sorghum#	140	364	1	2	350	910	1	2					492	1278
Maize#	20	166	2	12	35	151	1	7					58	335
Rice#	100	900	0.5	2	1	4							101	907
Canola	550	688	434	618	1	0.5	1297	1800	285	442			2567	3548
Sunflowerseed#	18	23	1	1	8	8							27	32
Soybean#	20	42	1	2	10	19							31	63
Peanuts#	0.2	0.6			8	18							8	19
Cottonseed#	256	878			136	452							392	1330
Lupins	57	57	28	29			246	461	56	78			387	625
Field peas	50	53	51	68			112	184	32	37			245	342
Chickpeas	220	251	48	50	216	296	19	27	5	6			507	629
Faba beans	29	71	59	127			61	121	4	9			152	328
Mung beans#	10	9			25	22							35	31
Navy bean#					5	6							5	6
Lentils	1	1	79	112			89	141					168	253
<b>TOTAL</b>	<b>6281</b>	<b>11725</b>	<b>3440</b>	<b>7153</b>	<b>1701</b>	<b>3235</b>	<b>8450</b>	<b>17591</b>	<b>3731</b>	<b>8176</b>	<b>19</b>	<b>66</b>	<b>23618</b>	<b>47943</b>

# Estimate for summer crop harvested in 2014. Principal source: ABARES.

## Farmers' terms of trade from Australian grain production (base year is 1997-98 = 100)

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15 (forecast)
<b>PRICES RECEIVED</b>							
Wheat	142.1	110.4	130.1	114.6	158.1	164.8	163.6
Barley	145.3	108.3	135.8	131.7	168.0	153.2	157.6
Canola	142.2	114.2	141.1	133.1	142.3	127.4	131.5
Lupins	142.9	127.2	136.9	118.7	173.5	164.8	116.7
Oats	158.3	116.9	143.2	147.7	172.3	142.6	144.1
Sorghum	121.3	115.9	125.8	111.6	141.6	143.0	130.9
<b>Total grains</b>	<b>137.5</b>	<b>108.8</b>	<b>122.3</b>	<b>117.6</b>	<b>131.3</b>	<b>129.5</b>	<b>129.6</b>
<b>PRICES PAID</b>							
Fuel & lubricants	211.0	191.7	211.3	228.2	210.0	217.3	206.5
Fertiliser	239.6	156.0	157.3	165.5	157.9	150.0	144.5
Chemicals	136.7	116.2	110.4	112.6	110.3	113.6	109.3
Seed	120.7	109.4	120.0	116.4	128.0	128.8	130.1
Labour	142.6	147.3	151.9	155.7	159.3	163.3	167.1
Marketing	137.2	134.0	144.8	154.1	151.1	157.7	157.3
Interest paid	116.8	111.2	122.3	114.9	96.4	85.3	85.3
Rates & taxes	141.6	144.9	149.4	153.0	156.4	160.4	164.1
Insurance	155.6	167.0	173.7	185.8	190.4	194.9	199.4
Capital items	141.2	144.8	149.3	153.2	157.0	161.3	165.4
<b>Total prices paid*</b>	<b>148.9</b>	<b>140.8</b>	<b>144.8</b>	<b>147.2</b>	<b>144.6</b>	<b>144.9</b>	<b>146.3</b>
<b>TERMS OF TRADE</b>	<b>92.3</b>	<b>77.3</b>	<b>84.5</b>	<b>79.9</b>	<b>90.8</b>	<b>89.4</b>	<b>88.6</b>

Note: Terms of trade is the ratio of the index of prices received and the index of prices paid by farmers. \* Excludes livestock costs, fodder, breeding stock etc. Sources: ABARES, ABS



# Domestic and global grains outlook

## AT A GLANCE...

- Wheat and oilseeds indicator prices are forecast to fall in 2014–15, while coarse grains prices are forecast to remain largely unchanged.
- Coarse grains and oilseeds indicator prices are projected to rise in 2015–16 and 2016–17, before easing toward 2018–19 (in real terms). The wheat indicator price is projected to remain largely unchanged in real terms over the outlook period.
- Consumption of grains and oilseeds is projected to grow strongly over the medium term. Rising demand for feed grains and protein meals is a key driver.
- Growth in grains and oilseeds production is projected to occur primarily among relatively low cost producers, such as the Black Sea region and Latin America.

## Short-term outlook

### Prices to ease in 2014–15

The world wheat indicator price (US No. 2 hard red winter, fob Gulf) is forecast to average US\$285 a tonne in 2014–15. While the forecast average price for 2014–15 is 7 per cent lower than the forecast for 2013–14, the difference largely reflects relatively high prices during the first half of 2013–14.

The world coarse grains indicator price (US No. 2 yellow corn, fob Gulf) is forecast to remain largely unchanged in 2014–15 at US\$214 a tonne. Large carry-over stocks are forecast to keep world supplies high despite an expected fall in world production.

The world barley indicator price (France feed barley, fob Rouen) is forecast to decline by 4 per cent to US\$230 a tonne.

The world oilseeds indicator price (US soybeans, fob Gulf) is forecast to decline by 5 per cent in 2014–15 to US\$500 a tonne, driven by record soybean production and rising world stocks. A decline in soybean

prices is expected to place downward pressure on other oilseed prices. The world canola indicator price (Europe rapeseed, fob Hamburg) is forecast to fall by 2 per cent to US\$490 a tonne.

### World production

World wheat production is forecast to rise marginally in 2014–15 to 711 mt. The area planted to wheat is forecast to increase by around 2 per cent, largely offset by a decline in the average yield. Forecast higher production in India, the European Union and Argentina is expected to more than offset declines in other major producers.

World production of coarse grains is forecast to fall by 2 per cent in 2014–15 to 1.2 billion tonnes. This reflects an expected decline in planted area as producers respond to forecast falls in coarse grains prices, especially corn. Additionally, yields are assumed to fall from the above average yields achieved in many countries in 2013–14.

World corn production is forecast to fall by 1 per cent to 957 million tonnes, reflecting lower production in the US and Ukraine. World barley production is forecast to fall by 6 per cent to 135 mt.

World oilseeds production is forecast to remain largely unchanged in 2014–15 at around 502 mt. World production of soybeans is forecast to rise by 2 per cent to a record 291 mt with production forecast to rise in the three major producing countries, the US, Brazil and Argentina. In contrast, world canola production is forecast to fall by 3 per cent to 67 mt, reflecting forecast falls in production in Canada, China and Australia. World sunflower seed production is forecast to fall by 8 per cent to 39 mt, with yields expected to fall from the above average yields achieved in major producing countries in 2013–14.

### United States

Wheat production in the US is forecast to increase slightly in 2014–15 to 58 mt. The harvested area is expected to rise and offset an assumed fall in the average yield. The harvested area is expected to increase, despite a fall in the planted area, because of an expected fall in the abandonment rate.

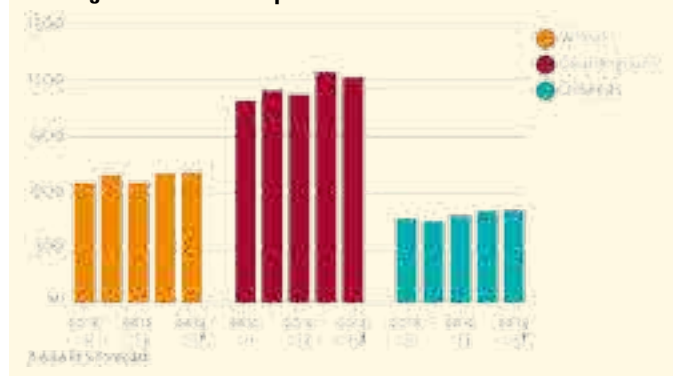
In the US, producers are expected to expand the area planted to soybeans by around 2 per cent in 2014–15 – this is in response to higher expected returns from producing soybeans compared with corn. The US is expected to remain the world's largest producer of soybeans, with production forecast to increase by 3 per cent to 92 mt. A forecast 4 per cent fall in the area planted to corn is expected to result in a 4 per cent fall in production, to 340 mt.

### Black Sea region

In the Black Sea region (the Russian Federation, Ukraine and Kazakhstan), wheat production is forecast to be largely unchanged in 2014–15 at 90 mt.

Wheat production in the Russian Federation is forecast to increase by 1 per cent to 53 mt. Production in Kazakhstan is forecast to be largely

World grain and oilseeds production



■ This report has been reproduced from an article written by Beth Deards, David Mobsby and Christopher Price published in the March 2014 edition of the ABARES publication, *Agricultural Commodities*.

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unchanged, while production in Ukraine is forecast to decline by 3 per cent. In Ukraine, unfavourable seasonal conditions during the planting window led to a decline in area planted to winter wheat.

In 2014–15 barley production is forecast to rise by 11 per cent in the Russian Federation to around 17 mt and by 3 per cent in Ukraine to 7.9 mt. In both countries, the majority of barley is planted in spring and a reduced area planted to winter crops is forecast to result in a larger area planted to barley.

Production of the major summer crops grown in the Black Sea region is forecast to fall in 2014–15. In Ukraine, corn and sunflower seed production are forecast to fall by 22 per cent and 15 per cent, respectively, to 24 mt and 9.4 mt.

This primarily reflects an assumed return to average yields from the above average yields achieved in 2013–14. Similarly, sunflower seed production in the Russian Federation is forecast to fall by 16 per cent to 8.4 mt.

## Latin America

Forecast high production of soybeans in the US in 2014–15 is expected to place downward pressure on soybean prices ahead of the summer crop planting window in Latin America (beginning in October 2014). In response, producers in Latin America are expected to increase the area planted to corn in 2014–15.

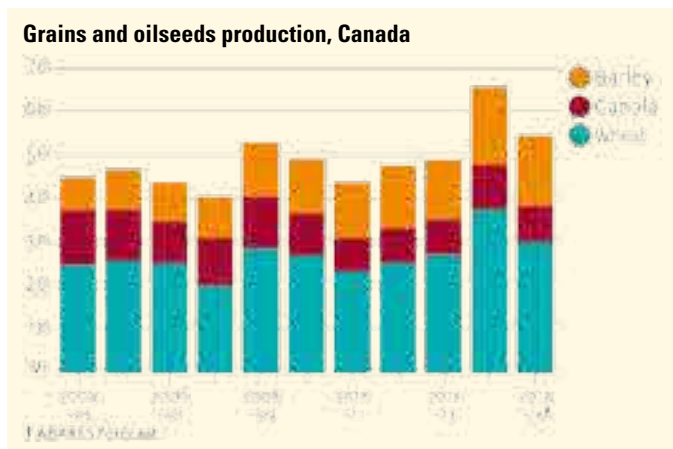
Assuming average yields, corn production is forecast to rise by 10 per cent in Brazil to 76 mt and by 14 per cent in Argentina to 27 mt. Despite an expected decline in area, soybean production is forecast to rise by 2 per cent in Brazil to 89 mt and by 2 per cent in Argentina to 56 mt, driven by an assumed increase in yields.

Wheat production in Argentina is forecast to increase by 19 per cent in 2014–15 to 12 mt. Low carry-over stocks and relatively high prices are expected to result in an increase in the area planted to wheat. Additionally, the average yield is forecast to rise following two years of adverse seasonal conditions. Barley production is forecast to remain largely unchanged at 4.6 mt.

In Argentina, sunflower seed production is forecast to rise by 23 per cent in 2014–15 to 3.4 mt. The area planted to sunflowers is forecast to rise by 22 per cent, following a sharp decline last season when dry conditions reduced the planted area.

## Canada

In Canada, production of wheat, barley and canola is forecast to fall in 2014–15, largely reflecting an assumed return to average yields from the record yields achieved in the previous season. Production of wheat is forecast to fall by 20 per cent to 30 mt; barley by 21 per cent to 8 mt;



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and canola by 8 per cent to just over 16 mt. After a sharp decline in the area planted to canola last year, producers are expected to increase it by around 4 per cent in 2014–15, primarily at the expense of wheat and barley.

## European Union

In the European Union, wheat production is forecast to increase by 1 per cent in 2014–15 to 144 mt. In contrast, barley production is forecast to fall by 9 per cent to 54 mt and canola production is forecast to decline by 3 per cent to 20 mt. More favourable gross margins for wheat during the planting window are expected to have resulted in an increase in the area planted to wheat at the expense of canola and barley. Yields for all three crops are assumed to return to average from the above average yields of last season.

Sunflower seed production in the European Union is forecast to fall by 6 per cent in 2014–15 to around 8 mt, reflecting falls in planted area and yields.

The area planted to sunflowers is forecast to decline by 3 per cent in response to an expected fall in returns to sunflower seeds.

## China

In China, wheat production is forecast to be largely unchanged in 2014–15 at 121 mt and canola production is forecast to fall by 3 per cent to 14 mt. Yields are assumed to fall for both commodities from the record yields achieved last season. But for wheat, the effect on production is expected to be offset by an increase in planted area.

Production of corn and soybeans in China is forecast to fall in 2014–15 by 1 per cent and 2 per cent, respectively, to 215 mt and 12 mt. These forecast falls in production are largely the result of an assumed return to average yields from the above average yields achieved in 2013–14.

## India

Wheat production in India is forecast to increase by 7 per cent in 2014–15 to 99 mt. If realised, this will be a new record for Indian wheat production.

The area planted to wheat has increased significantly from last season, supported by favourable conditions during the planting window.

## Consumption and trade

### Wheat

World consumption of wheat is forecast to increase marginally in 2014–15 to 700 mt. The use of wheat for human consumption, which accounts for around 70 per cent of total consumption, is forecast to increase by 1 per cent.

Despite an expected increase in world feed consumption, the use of wheat for feed is forecast to be largely unchanged, reflecting forecast lower world prices for corn.

### Coarse grains

World coarse grains consumption is forecast to rise by 1 per cent in 2014–15 to 1.2 billion tonnes, largely the result of a forecast 2 per cent



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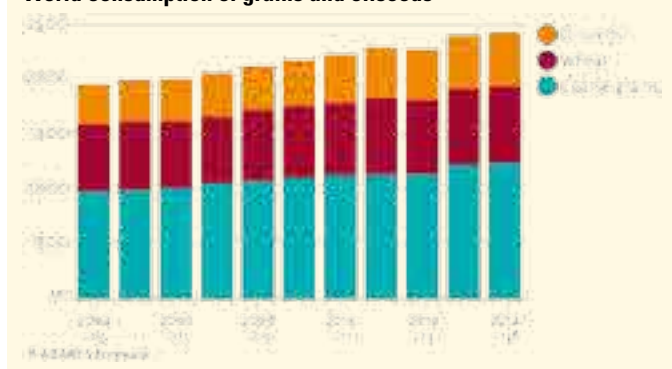
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increase in the use of coarse grains for feed to 743 mt. The increase in use of coarse grains for feed is expected to be driven by lower prices and higher demand. The use of corn for feed is forecast to rise by 3 per cent to 591 mt. The use of coarse grains for food, seed and industrial purposes is forecast to remain largely unchanged at 494 mt.

### World consumption of grains and oilseeds



### Oilseeds

World consumption of oilseeds is forecast to increase by 3 per cent in 2014–15 to a record 500 mt, driven by rising demand for vegetable oils and protein meals.

World consumption of vegetable oils is forecast to increase by 4 per cent in 2014–15 to 173 mt, led by increasing food consumption in developing economies.

World industrial use of vegetable oils (primarily to produce biodiesel) is forecast to increase by 2 per cent to 38 mt. Higher admixture mandates in Indonesia and Argentina in 2014 are forecast to increase the domestic use of biodiesel in those countries. This will partly offset the expected fall in import demand from the European Union as a result of biodiesel import duties introduced in late 2013.

In addition, industrial use of vegetable oils in the US is likely to fall.

World consumption of protein meals is forecast to increase by 4 per cent in 2014–15 to 287 mt. This largely reflects an expected increase in the consumption of soybean meal, primarily in China. Demand for meal is expected to increase in China as demand for pork and poultry recovers from the food safety incidents that reduced consumption last year.

### Trade to rise in coarse grains and oilseeds

World trade in wheat is forecast to decrease by 5 per cent in 2014–15 to 140 mt. The decline largely reflects lower Chinese wheat import demand after quality issues with the domestic crop in 2013–14. While shipments from most major exporters are forecast to decline, these falls are expected to be partly offset by higher exports from the Black Sea region and Argentina.

World trade in coarse grains is forecast to rise by 6 per cent in 2014–15 to 147 mt, led by a forecast 8 per cent rise in world corn trade to 115 mt. Despite forecast falls in corn production in several major exporting countries, large carry-over stocks will allow these exporters to meet an expected increase in world demand. World barley trade is forecast to

### Wheat trade, China



fall by 9 per cent to 20 mt but remain above the five-year average to 2012–13 of 18.5 mt.

World trade in oilseeds is forecast to rise by 1 per cent in 2014–15 to 129 mt, led by an expected 2 per cent increase in soybean trade. Brazil is expected to remain the largest exporter of soybeans, despite the US remaining the largest producer. World trade in canola is forecast to decline by 1 per cent to 13 mt and trade in sunflower seed is forecast to fall by 4 per cent to 1.8 mt.

### Stocks to rise for wheat

World closing stocks of wheat are forecast to increase by 6 per cent in 2014–15 to around 200 mt, increasing the world stocks-to-use ratio to 29 per cent.

The forecast increase in stocks is expected to occur largely outside the major exporting countries. Stocks in the major exporters are forecast to be below the five-year average to 2012–13.

### Wheat trade, China



World consumption of coarse grains is forecast to exceed production by around 8 mt in 2014–15, resulting in a 4 per cent fall in stocks to 189 mt. The world coarse grains stocks-to-use ratio is forecast to fall by one percentage point to 15 per cent. Corn stocks are forecast to fall by 5 per cent to 155 mt, with stocks in several major exporting countries to decline.

Closing stocks of barley are forecast to fall by 9 per cent to around 23 mt.

World closing stocks of oilseeds are forecast to rise by 2 per cent in 2014–15 to around 86 mt, driven by a forecast 3 per cent rise in soybean stocks.

In contrast, canola and sunflower seed stocks are forecast to fall by

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# These should be essential elements of your grain business...



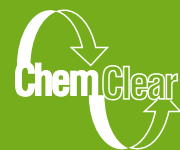
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1 per cent and 4 per cent, respectively, largely reflecting lower world production and continued strong demand. These forecast falls follow a significant rise in canola and sunflower stocks in 2013–14.

## Australian short-term outlook

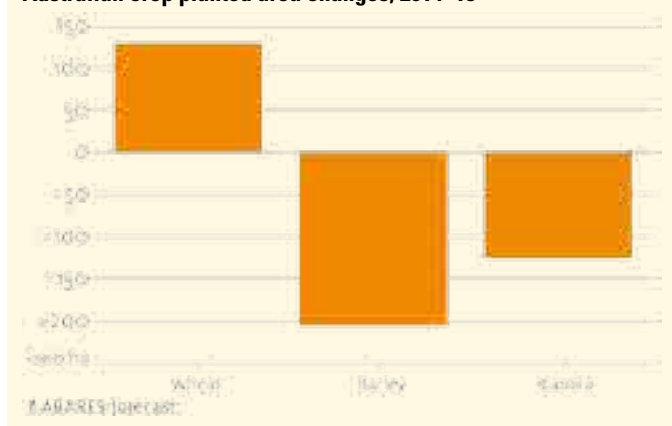
Australian wheat production is forecast to decline by 8 per cent in 2014–15 to around 25 mt, driven by an assumed fall in the average yield. A small increase in the area planted to wheat is expected to partially offset a fall in the average yield from the above average yield achieved in 2013–14, assuming average seasonal conditions.

The volume of Australian wheat exports (July to June) is forecast to rise by 3 per cent, which largely reflects a drawdown in stocks carried over from 2013–14. The value of exports is forecast to increase by 2 per cent to around \$6.4 billion.

Australian barley production is forecast to fall by 20 per cent in 2014–15 to 7.7 mt, largely reflecting an assumed return to average yields from the above average yields of 2013–14. Additionally, the area planted to barley is forecast to decline by 5 per cent to 3.8 million hectares. Because of this expected fall in barley production, the volume of barley exports is forecast to decline by 26 per cent to 4.7 mt; with forecast lower export prices, the value of barley exports is forecast to fall by 29 per cent to \$1.4 billion.

Australian canola production is forecast to fall by 17 per cent in 2014–15 to just below 3 mt, assuming average yields. The area planted to canola is forecast to decline by 5 per cent to 2.4 million hectares, largely the result of forecast falls in the areas planted to canola in New South Wales and Victoria. In these regions, expected low levels of soil moisture will make growing canola less attractive to producers than production alternatives. Largely as a result of the forecast fall in production, the volume of exports is forecast to decline by 32 per cent to 2 mt and the value of exports is forecast to fall by 35 per cent to \$1.1 billion.

**Australian crop planted area changes, 2014–15**



## Global medium-term outlook

### Prices largely unchanged

The world wheat indicator price (US No. 2 hard red winter, fob Gulf) is projected to remain largely unchanged in real terms over the medium term, reflecting similar growth rates in production and consumption.

World indicator prices for coarse grains and oilseeds (US No. 2 yellow corn, fob Gulf; US soybeans, fob Gulf) are projected to rise in real terms in 2015–16 and 2016–17.

An assumed strengthening of economic growth over this period is the

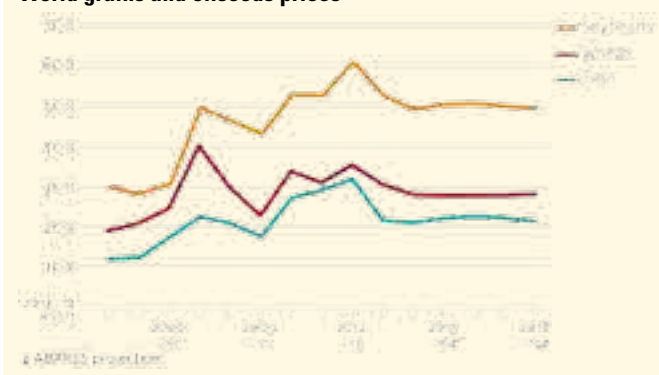
## SECTION 1 OVERVIEW

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primary driver of these forecast increases. Rising incomes, especially in developing countries, such as non-OECD Asia, are expected to result in consumption changes toward a diet higher in animal proteins, increasing demand for feed grains and protein meals. After 2016–17 prices are projected to fall modestly in real terms, reflecting projected increases in production in major producing countries.

**World grains and oilseeds prices**



## Consumption

World wheat consumption is projected to rise by an average of slightly more than 1 per cent a year over the medium term to 738 mt in 2018–19. Human consumption and the use of wheat for feed are both projected to rise, while industrial use is expected to remain a relatively small proportion of total wheat consumption.

Use of wheat for human consumption is projected to increase broadly in line with population growth over the medium term to reach 497 mt in 2018–19.

World coarse grains consumption is projected to grow by an average of 1.3 per cent a year over the medium term to 1.3 billion tonnes in 2018–19, led by an expected increase in feed use.

The use of coarse grains for feed is projected to rise by an average of 1.8 per cent a year to 797 mt in 2018–19. The use of corn for feed is projected to grow over the medium term. The most rapid growth is expected in 2015–16 and 2016–17 when economic growth is assumed to strengthen and increase the demand for animal feed.

Over the medium term, the use of coarse grains for food, seed and industrial purposes is projected to grow by an average of just under 1 per cent a year to 508 mt, compared with 4 per cent a year over the previous decade when US ethanol production grew rapidly. The projected increase over the medium term reflects the increased use of coarse grains for food and some industrial uses (such as malt and starch) more than offsetting a projected slight decline in US ethanol production.

World consumption of oilseeds is projected to rise by an average of 2 per cent a year over the medium term to 537 mt in 2018–19. This reflects an increase in demand for vegetable oils and protein meals, particularly in 2015–16 and 2016–17, when economic growth is assumed to strengthen. Consumption of vegetable oils is projected to grow faster than consumption of protein meals over the medium term,

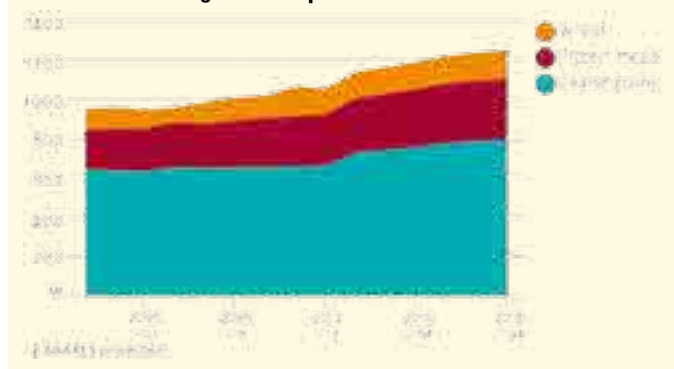


with the consumption of vegetable oils projected to increase by an average of 3 per cent a year to 193 mt in 2018–19.

This growth will occur mainly in developing economies as incomes increase. The use of protein meals is projected to rise by an average of 2 per cent a year to 309 mt in 2018–19.

The industrial use of vegetable oils (primarily for producing biodiesel) is projected to grow moderately over the medium term, supported by government biofuel mandates. But risks to this projected growth are potential changes to biofuel mandates, particularly in the European Union and the US. For example, in the European Union there is a proposal to reduce the amount of food-based biofuels that can count toward the renewable fuel target to 2020 from 10 per cent to 6 per cent of transport fuel. The future of this proposal is still uncertain.

**World feed use of grains and protein meals**



## Rising demand in China and India

Wheat consumption in China and India is projected to grow over the medium term. India is expected to have a higher rate of growth than China in wheat consumption, reflecting per person consumption and population growth. In China, the rate of growth in wheat consumption is expected to be much smaller than that of coarse grains and oilseeds as consumer preferences shift from staples such as wheat to meat and vegetable oils. As significant producers of wheat, China and India are typically small net importers. But toward the end of the outlook period, Indian wheat imports are projected to rise as consumption begins to outpace domestic production.

Corn is the coarse grain consumed most in China and India. Chinese consumption of corn is projected to grow by an average of around 3 per cent a year over the medium term, reflecting higher demand for animal feed. The projected increase in consumption is expected to outpace growth in domestic production. Imports are projected to grow to around 22 mt in 2018–19, which would make China the world's largest importer of corn. In contrast, India is projected to remain a net exporter of corn because domestic consumption of corn is projected to grow only moderately.

In China and India, consumption of oilseeds and oilseed products is projected to rise over the medium term. This reflects increasing demand for vegetable oils, primarily for use in cooking, and protein meals, mainly for livestock feed. Chinese consumption of soybeans – which is the main oilseed consumed in China – is projected to grow by an average of 4 per cent a year over the medium term. This is slower than during the previous decade, when consumption grew by an average of around 9 per cent a year. Higher imports of soybeans will be required to satisfy this projected increase in demand.

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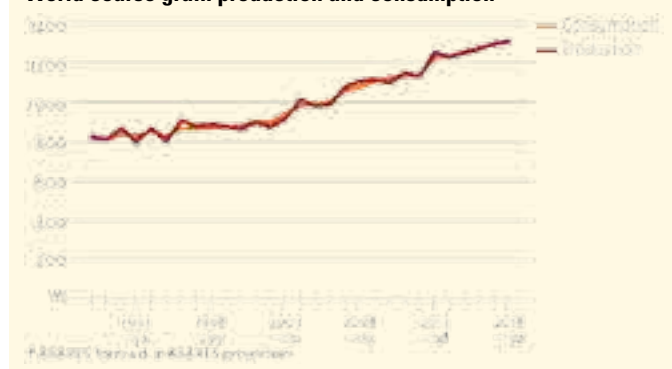
China is expected to continue favouring importing oilseeds for crushing, rather than importing meal and oil. As a result, soybean imports are projected to reach almost 85 mt in 2018–19. India is projected to remain a significant consumer and importer of vegetable oils over the outlook period.

## Production

World wheat production is projected to increase by 1 per cent a year over the medium term to 738 mt in 2018–19, with only modest annual increases projected for planted area and average yield. Growth in planted area is expected to be constrained by competition from other crops.

Coarse grains production is projected to rise by an average of 2 per cent a year over the medium term to 1.3 billion tonnes in 2018–19, driven by an average annual increase in corn production of around 2 per cent. The largest increase in corn production is expected in 2017–18 in response to projected increases in prices in real terms over the previous two years. Barley production is projected to increase by 1 per cent a year to reach 142 mt in 2018–19, after falling by 6 per cent in 2014–15. Large increases in coarse grains production are projected for China, Brazil, Argentina, Ukraine and the Russian Federation.

### World coarse grain production and consumption



World oilseeds production is projected to rise by an average of 2 per cent a year over the medium term to 539 mt in 2018–19, reflecting projected rises in planted area and yields. The projected average annual rate of growth is below the 3 per cent a year achieved over the previous decade because of a slower projected growth rate of the area planted to oilseeds. Over the medium term, the total area planted to oilseeds is projected to rise by around 1 per cent a year. The largest increase in area is expected in 2016–17 in response to an expected increase in prices in real terms in the previous year. Increases in the area planted to soybeans, primarily in Latin America, are projected to contribute most to the projected rise in the area planted to oilseeds.

## Production to expand in the Black Sea region and Latin America

The Black Sea region and Latin America have relatively low production costs and considerable potential for increasing the area planted to crops and achieving productivity gains. But further infrastructure investment is required to fully realise this potential.

In the Black Sea region, production of major grains and oilseeds is projected to increase by an average of 3 per cent a year over the medium term. This projected rise reflects expected increases in the area planted and yields. Yield improvements are expected because of an assumed increase in the adoption of higher yielding varieties and improved farming practices.

Grains and oilseeds production, Black Sea region			
	2014–15 <sup>f</sup> (mt)	2018–19 <sup>z</sup> (mt)	Average annual growth rate (per cent)
Wheat	90	97	2.0
Coarse grains (corn and barley)	60	70	3.7
Oilseeds	26	29	3.5

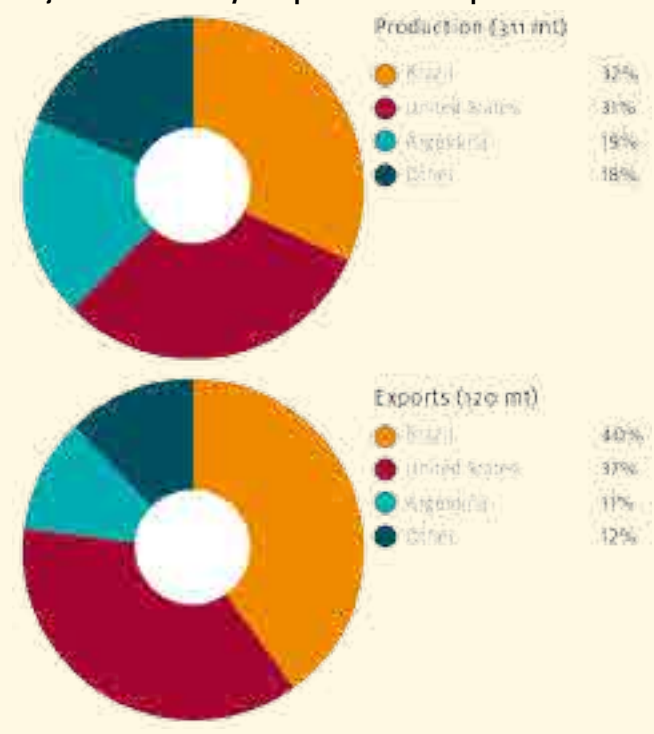
<sup>f</sup> ABARES forecast. <sup>z</sup> ABARES projection.

In recent years, substantial investment in export infrastructure has occurred in the Black Sea region. Capacity and efficiency improvements have been observed, but further investment is required to meet the region's export potential. For example, the Russian Federation has the potential to export around 35 mt of grains and oilseeds a year, given its current port infrastructure. But logistical constraints in transporting grain to port restrict annual exports to around 28 mt.

Grains and oilseeds exports, Black Sea region			
	2014–15 <sup>f</sup> (mt)	2018–19 <sup>z</sup> (mt)	Average annual growth rate (per cent)
Wheat	36	40	3.0
Coarse grains (corn and barley)	24	31	6.2
Oilseeds	4	5	5.8

<sup>f</sup> ABARES forecast. <sup>z</sup> ABARES projection.

### Projected shares of soybean production and exports in 2018–19



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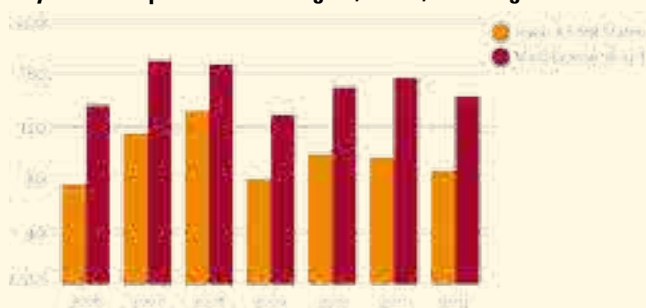




In Latin America, production of soybeans and corn is projected to increase at average annual rates of 2 per cent and 3.6 per cent, respectively, to almost 160 mt and 118 mt in 2018–19. Production growth is expected primarily in Brazil, as a result of productivity gains and increases in the area planted to crops. Brazil has considerable potential to increase the area planted to crops, especially in the Brazilian savanna, and is expected to become the world's largest producer of soybeans over the medium term. Exports of soybeans from Brazil are projected to rise by an average of around 2 per cent a year over the medium term to 48 mt in 2018–19. Corn exports from Brazil are projected to grow by an average of around 6 per cent a year to 48 mt in 2018–19.

Brazilian grains and oilseeds producers face transport and storage problems that have worsened with the increase in production in recent years. For example, transport of soybeans for export from the major producing state of Mato Grosso, in the central west of Brazil, is around 1.5 times more expensive than transporting soybeans from the Midwest

**Soybean transport cost to Shanghai, China, from origin**



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of the US. Both regions are around 1500 kilometres from their main ports. Additionally, current storage capacity in Mato Grosso is estimated to be 34 per cent below recent volumes of production.

Recent infrastructure investment in Brazil is likely to increase supply chain efficiency over the outlook period. The BR-163 highway, connecting Mato Grosso to Brazil's northern ports, Barcarena and Itaquai, is expected to be complete by 2015. Additionally, investment in these ports is anticipated to increase export capacity.

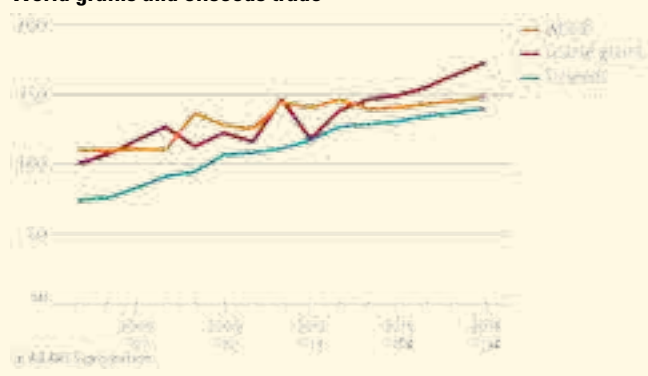
## Trade

World trade in wheat is projected to increase by around 1 per cent a year over the medium term to reach 148 mt in 2018–19.

World trade in coarse grains is expected to rise rapidly over the medium term, by an average of 4 per cent a year to 173 mt in 2018–19. This reflects world demand growth being concentrated in net importing countries. Export growth is expected to rise fastest in the later part of the medium term. This is because an increase in supplies available for export from major exporting countries is expected to place downward pressure on world coarse grains prices and increase consumption. World trade in corn is projected to rise by an average of 4 per cent a year to 136 mt in 2018–19.

World trade in oilseeds is projected to increase by an average of 2 per cent a year over the medium term to 140 mt in 2018–19. This is considerably slower than past growth in exports, which grew by an average of 6 per cent a year over the previous decade.

**World grains and oilseeds trade**



## Australia medium term outlook

In Australia, the area planted to grains and oilseeds is projected to rise marginally over the medium term to 23.7 million hectares in 2018–19. Despite projections of grains and oilseeds prices to remain below peaks of recent years, Australian prices are expected to be supported by an assumed fall in the value of the Australian dollar.

Relatively favourable returns to canola are projected to result in a rise in the area planted to canola, while the area planted to coarse grains is projected to fall slightly over the outlook period. Australian production of grains and oilseeds is projected to rise by an average of 1 per cent a year over the medium term to 45.5 mt in 2018–19.

Australian production of wheat is projected to rise by an average of

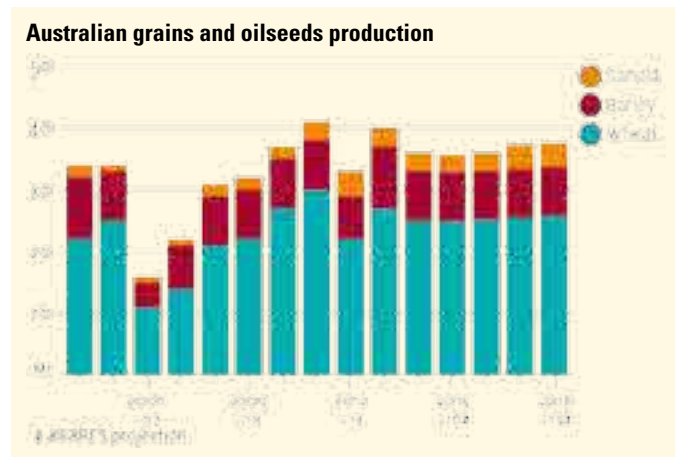
1 per cent a year over the medium term to around 26 mt in 2018–19, largely as a result of an assumed increase in the average yield. The area planted to wheat is projected to rise only marginally to around 13.7 million hectares. The volume of exports is projected to rise slowly over the outlook period, after a 3 per cent decline in 2015–16.

The volume of exports is projected to be just over 19 mt in 2018–19, with a value of \$6.3 billion (in 2013–14 dollars). With increasing competition from the Black Sea region, it is anticipated that Australian exports will continue to shift from North Africa and the Middle East toward Asia.

Coarse grains production in Australia is projected to rise marginally each year over the medium term to reach 12 mt in 2018–19. Barley

production is projected to rise modestly over the medium term to 7.9 mt, reflecting assumed increases in the average yield. But the area planted to barley is projected to decline. Grain sorghum production is projected to rise marginally, reaching 2.3 mt in 2018–19. The volume of barley exports is projected to remain largely unchanged at around 5 mt a year over the medium term.

Australian canola production is projected to rise by an average of 6 per cent a year over the medium term to reach 3.7 mt in 2018–19, reflecting rises in area and improved yields. Australian producers are expected to respond to favourable world oilseeds prices by increasing the area planted to canola by an average of 3 per cent a year to over 2.7 million hectares in 2018–19. Additionally, increased use of genetically modified varieties is expected to lead to an improvement in the average canola yield. The volume of canola exports is projected to increase by an average of 8 per cent a year over the medium term to 2.8 mt in 2018–19, with an export value of around \$1.6 billion (in 2013–14 dollars).



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# Crop yield and world food security

By Tony Fischer

*"Few things matter to human happiness more than the yields of staple crops."*

– *The Economist* (February 26, 2011)

**M**ore than 200 years have passed since Thomas Malthus, author of *An Essay on the Principle of Population* (1798), argued that world population expansion would outstrip growth in food supply, resulting in starvation. In the intervening period these gloomy predictions have reappeared from time to time, only to be banished again by arable land expansion in the New World, massive growth in global food trade, and (more recently) crop yield increase.



Tony Fischer pondered future crop yields and food security on a recent visit to CYMMIT, Ciudad Obregón, Mexico. (Credit: Mark Peoples)



Genetically engineered herbicide-tolerant varieties occupy 81 per cent of the world soybean area, but are presently only grown in North and South America. (Credit: Carl Davies)

It was a take-off in crop yield growth in the mid-1960s that averted the predictions of widespread famine of the time: the so-called 'Green Revolution' championed by Dr Norman Borlaug and his contemporaries. This yield growth, until the turn of the millennium, led to steadily reduced real prices of food and a dramatically slower expansion of arable area. If this desirable situation (with respect to price and arable area) is not to deteriorate under the pressure of relentless growth in demand, further substantial increases in crop yield are essential.

Real prices cannot be allowed to rise greatly, because (as seen recently) this translates into increased malnutrition and misery in the world's two billion poor, and to civil unrest. Meanwhile, in most cases, crop area expansion is a difficult and undesirable option for environmental reasons.

Food security has attracted huge media interest, particularly in relation to its causes (lagging research, land degradation, biofuel cropping, climate change) and ways to reduce demand (change your diet, reduce food wastage). Again and again, these debates come back to the same simple fact: The only way to advance food security is through progress in crop yields across the globe. Yield increase saves land, reduces prices and encourages trade, upon which a growing proportion of the world depends, while for those rural poor disconnected from trade, yield increase directly alleviates hunger and poverty.



FAO's first forecast points to a decline in world cereal production in 2014, but output is nevertheless expected to be the second largest ever. (Credit: Carl Davies)



## SECTION 1 OVERVIEW

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In our recent book, *Crop yields and global food security*, I and my colleagues Derek Byerlee and Greg Edmeades delved into the influences upon, and fundamental limits of, potential yields of 24 of the world's most important crops, including wheat, rice, maize and soybean. We also investigated climate change, resource use efficiency, cropping sustainability and the environmental effects of intensified cropping, as well as key influences on farmer innovation, namely rural socioeconomic, institutions, infrastructure and policy.

### Clear outcomes

For the world's mostly urban population, and for Australia's farmers, there are clear outcomes from our investigations.

Firstly, contrary to dire reports, progress in potential yield (yield obtained when the best management practices and varieties are used) continues, with the average for staples around 0.7 per cent per annum. Increases in potential yield are now largely dependent on plant breeding. Hybrid varieties are well established for maize, and are increasingly common in rice, canola, millet and sorghum, which will add to their current rate of progress.

Yield gaps between potential and actual farm yields vary greatly across crops and regions. Low yield gaps (less than 50 per cent of farm yield) were generally found in wheat, maize and soybeans in the developed world and wheat in the developing world. This is due to good



**An Ethiopian farmer with a farmer-selected early maturing variety of maize that yielded about 3.0 tonnes per hectare**  
(Credit: John Dixon)

Dr Tony Fischer is widely recognised as a pre-eminent Australian crop physiologist who has made an outstanding contribution to agricultural research in Australia and overseas as a research scientist at CSIRO Plant Industry, as director of the Wheat Program at the International Center for the Improvement of Maize and Wheat (CIMMYT) in Mexico and as an influential research manager at the Australian Centre for International Agricultural Research (ACIAR).

Tony grew up on a wheat and sheep farm near Boree Creek in southern NSW. Besides working on the farm, Tony completed degrees in Agricultural Science at the University of Melbourne, before heading overseas to the University of California Davis, where he completed a PhD in plant physiology.

In Australia, Tony worked as a crop agronomist and physiologist at CSIRO and the NSW State Department of Agriculture. He worked in a similar capacity at CIMMYT in Mexico, from 1970 to 1975. He later returned to CIMMYT as the Wheat Program director (1988–95), following which he was a program manager in crop and soils at ACIAR in Canberra, Australia.

These days you'll find Tony in Canberra where he is an Honorary Research Fellow at CSIRO Plant Industry.

"It's fun being back at CSIRO as an honorary fellow," Tony said. "There is always lively discussion about crop issues with colleagues, younger scientists, students and visitors. They were a great resource as I put together the book."

Tony has served on the boards of trustees of several international research centres, as well as the board of GRDC, and has travelled widely in the grain cropping regions of the world, especially those of Asia and Latin America. He has received many awards for contributions to agricultural science, including the Colin Donald and William Farrer medals, and is a fellow of the Australian Institute of Agriculture, the Australian Academy of Technological Sciences and Engineering, and the American Crop Science and Agronomy societies. In 2007 he was elected a Member of the Order of Australia.



**The Tony Fischer Laboratory at CYMMIT was named after Tony in honour of the 'support and friendship of Australia's farmers and wheat scientific community'.**  
(Credit: Mark Peoples)

farming practices, which mean any further yield increases will rely on improvements in the plant, specifically potential yield. Except for Brazil and Argentina, crops in the developing world show larger yield gaps (rice averages 70 per cent, maize often more than 100 per cent) and may have more promise for increasing yield through improved farm management and closing yield gaps.

Closing the large yield gaps would seem the quickest and most feasible intervention for lifting progress. These gaps reflect a multitude of farm-level constraints, including the slow turnover of varieties, disease and pest damage, weeds, low soil fertility, and poor soil management. Solutions are available for all of these, although research can always deliver better solutions, especially in the area of pest and disease control where genetically engineered (GE) resistances have already proved effective in maize and cotton and need to be more widely deployed.

But a major difficulty in developing countries, is that farmers often lack knowledge and resources, and are constrained by poor rural infrastructure and institutions. In the meantime, agricultural extension systems need revamping through new models, ones which inevitably include a much stronger role for the farmers themselves, and involve agribusiness and NGOs.

Where yield gaps are small, raising rates of potential yield is the only way forward. This is becoming more difficult and expensive, despite a steady stream of advances in 'digital agriculture' and biotechnology.

Many breakthroughs in potential yield and stress tolerance are claimed by GE proponents but so far none have delivered direct increases in yield. The biological challenges are immense, and the time lags likely to be counted in decades.

Fortunately, the gradual privatisation of breeding, encouraged by plant breeders' rights and trait patenting, has boosted investment, especially in molecular plant breeding. There are drawbacks with this privatized system, but in the absence of enthusiasm for more public research funding (except perhaps in China, India and Brazil), increased private investment in breeding is the only way forward. Even then, the outcome from increased investment is uncertain, though experience suggests returns are always positive, if not always in the way anticipated.

Increase in crop yield has fed the burgeoning world population with more and cheaper food over the past 50 years and at the same time saved vast areas of land from the plough. To maintain this path in the future, and to insure against events like widespread drought, crop disease epidemics, worse climate change than expected, or land loss through contamination (think of Fukushima), we must strive to boost yield progress of the most important food and feed crops. This will require greater investments in agricultural R&D globally and in rural development in developing countries.

Read more in our book *Crop yields and global food security: will yield increases continue to feed the world?* <http://aci-ar.gov.au/publication/mn158>



**A Cambodian rice farmer who has been taking advantage of available moisture and growing an extra crop of rice each year. (Credit: Sally Ingleton)**



**A farmer from Bangladesh who achieved one of the highest wheat yields in her district, harvesting 3.7 tonnes per hectare. (Credit: Neal Dalglish, CSIRO)**



**Rice farmer from South Sulawesi, Indonesia testing different rice varieties. (Source: IRRI)**

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# Agricultural risk management in Australia – the ‘chips’ are getting bigger

■ By Professor Julie Cotter<sup>1</sup>, Roderick Glass<sup>2</sup> and John Rochecouste<sup>3</sup>

**M**anaging agricultural risk like drought, flood, frost and hail is a major concern to farmers, industry and governments in Australia. This concern is aggravated by the fact that Australia is a commodity-based economy and highly susceptible to both price and yield shocks with consequent implications for farm profitability. Not only have prices of inputs increased faster than commodity returns, but they are doing so in a highly volatile market, requiring large investments in risky conditions.

## How are farmers different to any other business?

Well for one thing they have limited access to insurance which is surprising given the amount of yearly investment involved.

## Could farmers insure their crop?

They can but at present, only against fire and hail although it seems that might be changing. Other countries have it in the form of Multi-Peril Crop Insurance but because of the risk involved the premiums to fully cover the crop are unaffordable without government subsidy.

This can be mitigated by capping the payout so that the risk is shared by the farmer and the insurers. Comparable countries like Canada

support crop insurance but it's not mandatory and farmers bear most of the cost assisted by government. The payout is based on the expected farm gate market price for the coming crop year as determined by the Market Analysis Group of Agriculture and Agri-Food Canada.

In Canada farmers also have the option of selecting the Low Price Option for each crop, which is set at 85 per cent of the nominated base price for the crop, or they can opt for the Contract Price Option.

In fact most nations have some means of backing agricultural production in the event of a crisis. This is not always the same as backing each individual farmer, but it should be recognised that farming – like any skill set – is a national asset. This is particularly so in Australia where farming is increasingly becoming a highly skilled professional activity.

## More farmer self-reliance

With the recent shift in Australian government policy towards farmer self-reliance, there has never been a greater need for comprehensive and affordable crop insurance for Australian farmers. Insurance is one of the key tools needed to effectively manage financial risk and maintain farm profitability for the long term.

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It's part of what's needed to shift from government reactivity to farmer preparedness.

## So why don't we have such a scheme and what is needed to get one in place?

The greatest stumbling block seems to be the lack of a market framework to enable insurance companies to access the data they need and to allow sufficient market competition to drive affordable prices for insurance products. Without a national framework to support the establishment of a liquid market, it's likely that any new insurance products will be unaffordable for the majority of farmers struggling to find their way in the context of increasing risks and greater self-reliance.

Risk is always present in agricultural production systems and higher input costs per crop means that farm business risk is increasing. How many crop failures can a farm business take before the farm business is unable to meet its commitments and the potential for receivership looms? If you are borrowing the money the lender will very quickly limit your finance capacity as debt escalates, so how then do you maximise your crop potential if you cannot finance the fertiliser and other inputs required.

Reserves are difficult to maintain if you have debt where, depending on the interest rates, you may be better off retiring the debt.

Like the casino, the risks are much the same but the value of the chips is getting bigger, so you have more to lose in any single bet.

Apart from climate risk, farmers are also subject to a lot of other risks common to many businesses. The following chart depicts some of these risks.



In the past farmers adopted on-farm techniques, like diversification, to manage their risks and the government had structures in place to compensate farmers for yield shocks especially those resulting from



**There has been a shift in thinking from drought as a disaster to drought as a risk.**

droughts. But because of the unique nature of drought in Australia, characterised by its slow onset and time-frame, the Australian Drought Policy (ADP) has been carved out of the Natural Disaster Relief and Recovery Arrangement (NDRRA). Various government initiatives such as interest rate subsidies emerged to assist risk management in the agricultural sector. But the spotlight is on the capacity of the NDRRA and the ADP to meet the needs that arise from weather risks and other natural disasters.

Recently, given the high susceptibility of Australia to drought and the inefficiencies and inequities associated with the ADP, there has been a shift in thinking from drought as a disaster to drought as a risk that requires more self-reliance on the part of farmers.

This shift in thinking is underlined by the anticipated increased frequency and intensity of extreme weather events – now the casino you're betting in is changing the rules.

The Intergovernmental Agreement on National Drought Program Reform in 2013 agreed to the following:

*"Encourage farm families and primary producers to adopt self-reliant approaches to manage their business risks and ensure that farm families in hardship have access to a household support payment that recognises the special circumstances of farmers."*

In other words, they will put food on the table but won't help finance the next crop. Without the next crop which might not be financed, farmers cannot pay the existing debt. Hence the reason farmers like Rodney Hamilton in Queensland are saying:

*"Part of the problem is transferring production into profit. At the moment there are high costs involved when increasing production, farmers then expose themselves to greater risk and that is the stumbling point. The other side to that is farmers are now using fewer inputs to lessen the risk – but that generally lowers production and subsequent profits. Are fewer inputs sustainable?"*

**Rodney Hamilton – farmer, Condamine Queensland**

Farmers are rightly asking how they manage this for the next generation. At present a significant portion of the next generation are assessing the risk and opting to exit farming.

For those staying in agriculture they would do well to become very savvy in managing business risk.

<sup>1</sup>Professor of Finance, Director of the Australian Centre for Sustainable Business Development at the University of Southern Queensland, Toowoomba.

<sup>2</sup>Vice Chancellor Research Fellow, at the Australian Centre for Sustainable Business Development at the University of Southern Queensland, Toowoomba.

<sup>3</sup>Executive Officer, Conservation Agriculture Australia Inc. (CAA Inc.) Toowoomba. ■

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# Section

# 2

## The grain industry in figures

- All figures and tables presented in this Yearbook have been derived from a combination of ABARES, ABS, International Grains Council, AWB and USDA sources.
- For Australian and other southern hemisphere winter crops the year listed is generally the calendar year the crop is planted and harvested.
- Australian summer crop figures are for the harvest in the following calendar year.
- For northern hemisphere crops, a figure for 2013 for example, is an estimate for the crop harvested in the 2013–14 financial year.
- (Mt = 1,000,000 tonnes) (Kt = 1000 tonnes)

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# Australian grain industry Code of Practice for the management of grain

## AT A GLANCE...

- Was developed as a result of a call from GTA members, the broader grains industry and government;
- Is a detailed description of the activities across the Australian grain supply chain which ensures the Australian grain industry delivers a quality product;
- Enables end users – domestic and export – to buy with confidence understanding the quality systems behind the Australian industry; and,
- Will encourage all industry participants to continually improve their processes.

A quality product is one that has the ability to perform in service and is suitable for its intended purpose, that it is predictable and will perform as intended

Delivery of a quality product to an end user – domestic or export – will ensure that Australian grain is recognised as a premium product able to compete on world markets based on its intrinsic properties. Also, Australia enjoys a natural freight advantage into Asian markets.

A combination of a quality product plus a freight advantage is a formidable combination.

But it would be pure folly to expect this situation to continue unchallenged.

To Australia's historical competitors, such as Canada and the US, can now be added grain from Black Sea ports. Australia has a natural freight advantage over Black Sea grain into Asian markets but this 'advantage' can be eroded should freight rates fall and the quality of product emanating from the Black Sea will only do one thing, improve. And as for Canada and the US – quality improvement is embedded in their processes.

Therefore, it follows, that quality improvement must drive the behaviour of everyone involved in the Australian grain industry. For instance:

- What processes can the producer implement to ensure they deliver a 'quality' product?
- Could a prior load in a trailer compromise delivery of a 'quality' product.
- The rigour around the sampling and testing at point of receipt determine the grade of a load and ensure segregations are appropriate to ensure out turn of a 'quality' product.
- Trading standards attached to the grain contract detail the customer requirements, detail a quality product.

The above are examples of the actions that are required across the Australian supply chain to ensure the ultimate end user receives product that suits their needs.

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Grain Trade Australia recognised the cross supply chain challenges to ensure delivery to customers of a quality product and determined the need to develop the Australian Grain Industry Code of Practice.

The purpose of the Code is to describe practices that the grain industry use to ensure Australian grain and grain products meet domestic or export customer requirements. Customer requirements include those stipulated in contracts and regulatory requirements at the Australian State, Territory and Federal levels and international and overseas country level. There are also a range of industry standards that are covered under the Code.

The Code focuses on those common standards, operating procedures and documented processes. The Code assumes that all participants in the grain supply chain have in place established practices that ensure compliance.

By following the Code, all sectors related to the grain industry, governments, researchers and consumers will gain confidence that processes exist in Australia to successfully produce, store and supply grain that meets the expectations of the entire grain supply chain.

The grain industry is committed to self-regulation. This Code assists that purpose by providing a process that is transparent and which outlines minimum requirements of all involved in the Australian grain supply chain.

The Code of Practice has been developed to provide further guidance to industry and confidence to customers that the grain industry is committed to meeting its obligations of providing grain according to industry-recommended criteria as well as those mandatory regulatory requirements.

## Scope of this Code

This Code is intended to cover all participants of the Australian grain industry. It has been developed to be applicable to all grain and grain products and applies to all stages along the supply chain. The Code has been designed to promote the use of best management practice by industry participants. This means:

- Mandatory compliance with all regulations as required by law; and,
- Recommended compliance with accepted industry practices as documented in the Code.

## Quality assurance systems

Industry recognises the value of formal Quality Assurance systems. While these have been implemented by some sectors of the industry, their widespread adoption has not occurred. Implementation of this Code may assist adoption of Quality Assurance systems at all stages of the supply chain.

## Technical Guideline Documents

As this Code is further developed and reviewed over time, GTA will develop:

- Technical Guideline Documents providing detailed information to industry on specific activities. These documents will assist implementation of activities as outlined in this Code; and,
- Generic forms outlining data to be collected for various activities to support those Technical Guideline Documents. Industry is encouraged to provide input into topics for inclusion and development of Technical Guideline Documents.

It is the intention of the GTA Board, that membership of GTA from July 1, 2014 will require members to adhere to the Code. ■



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# First bulk shipment of faba beans for more than a decade

In March 2014 GrainCorp loaded 21,000 tonnes of faba bean on the *MV Sainty Vitality* at Portland, Victoria, bound for markets in Egypt. This is the largest shipment of faba beans to leave Australia in over a decade and is seen as a positive sign for the faba bean industry, particularly in southern Australia.

The grain had been sourced from the Victorian Wimmera and the south-east corner of South Australia. About 75 per cent of the grain was secured in up-country receival sites with the remainder delivered direct from growers to the port to meet the *MV Sainty Vitality*.

According to Nick Poutney, GrainCorp's head trader for pulses, this shipment demonstrates the company's commitment to the pulse industry. "We want to build on the back of this shipment to service growers and our international buyers," he said. "We hope that growers will see the opportunity this represents and support our investment and the manpower involved in developing this type of trade."

Faba beans are an essential ingredient in Egyptian cuisine, including the country's most popular breakfast food, ful medames. Egypt imports about half a million tonnes of human consumption grade faba beans each year – roughly one-third of which is sourced from Australia.

"Compared to barley and wheat, faba beans performed particularly well in 2013 and we expect to see a 10 to 20 per cent increase in faba bean plantings across the southern regions of Australia this year," said Nick. "Last season generated exceptional yields, which can't be expected very often, but even at average yields of one to two tonnes per hectare, faba beans continue to be a profitable option for growers."

Pulse Australia is very supportive of the shipment, particularly given the record yields achieved in many districts last season. Industry development manager for the southern region, Mary Raynes, said the

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strong and reliable market for faba beans was very positive for growers and supported an expansion in production area.

"There is a very positive outlook for faba bean growers into the foreseeable future," Mary said. "Australia competes with the United Kingdom and France to supply faba beans to Egypt, a market which Pulse Australia helped develop through the negotiation of product specifications with the Egyptian government over a decade ago."

"Our production estimates for faba beans show a five-year average planting area of over 160,000 hectares and an average yield of 1.7 tonnes per hectare. Fiesta VF remains the preferred variety for export to Egypt – a market that takes about 70 per cent of Australia's faba bean product." ■

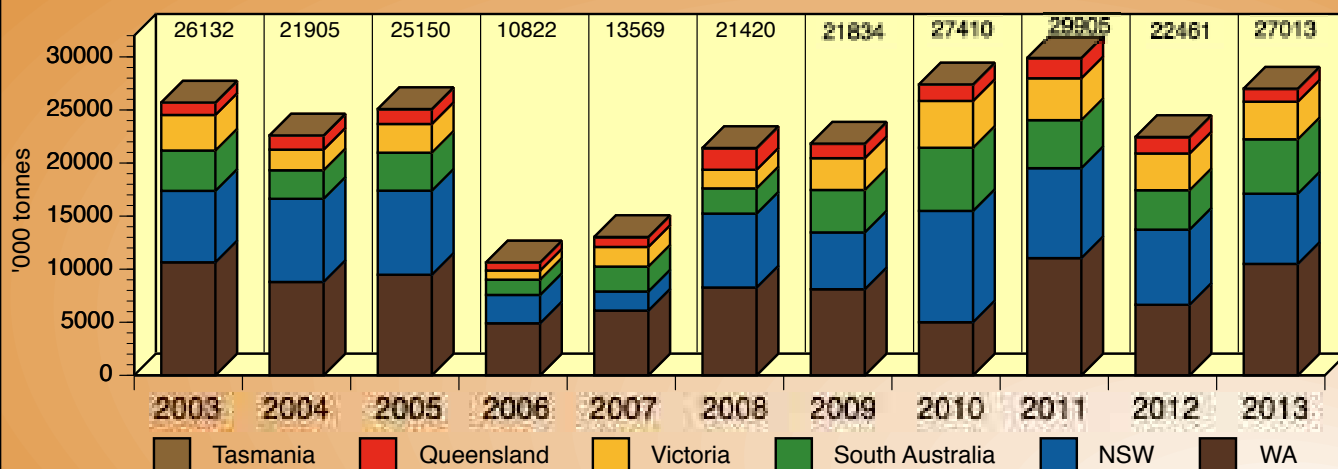


GrainCorp's head trader for pulses, Nick Poutney, has orchestrated this bulk shipment of faba beans on the *MV Sainty Vitality* bound for Egyptian dining tables.  
(Photo: J Sawa)

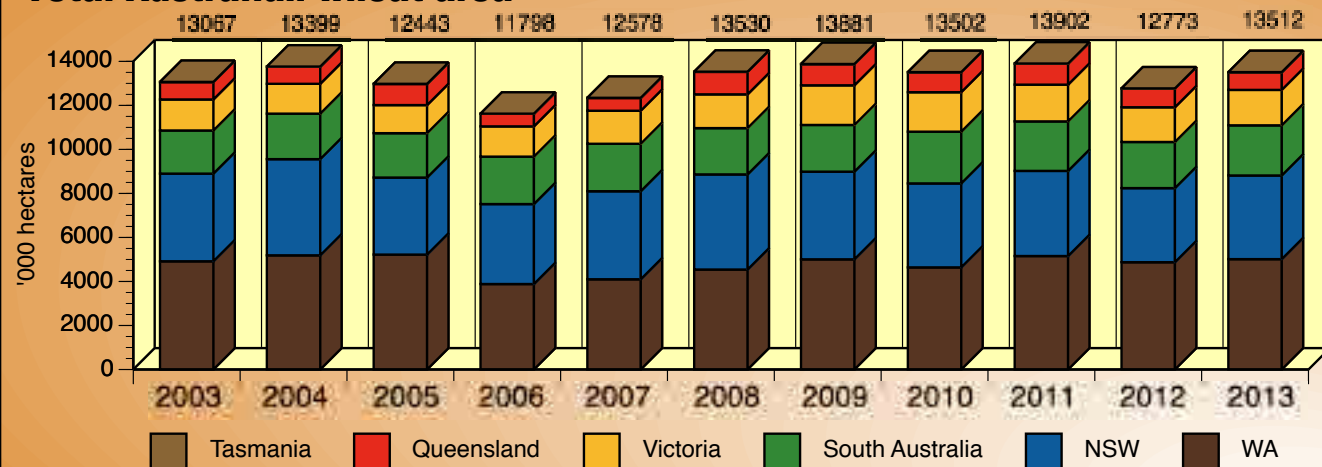


Mary Raynes, Pulse Australia, is positive about the future for faba beans especially given their excellent fit in cropping rotations across NSW, Victoria and South Australia.

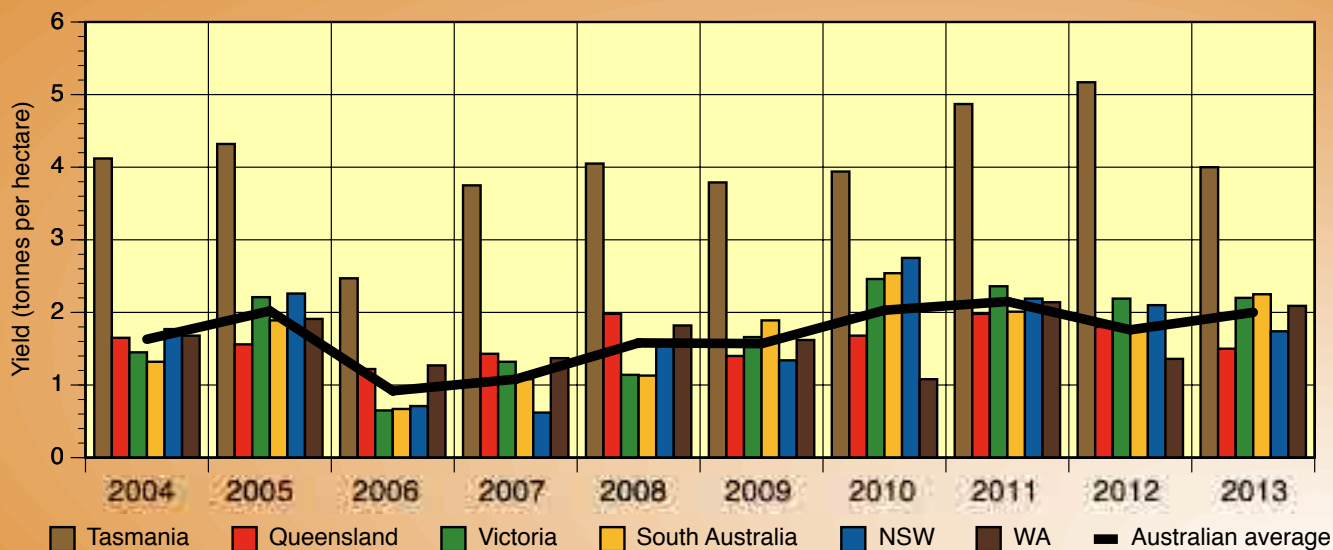
## Australian wheat production



## Total Australian wheat area



## Average Australian wheat yields by state

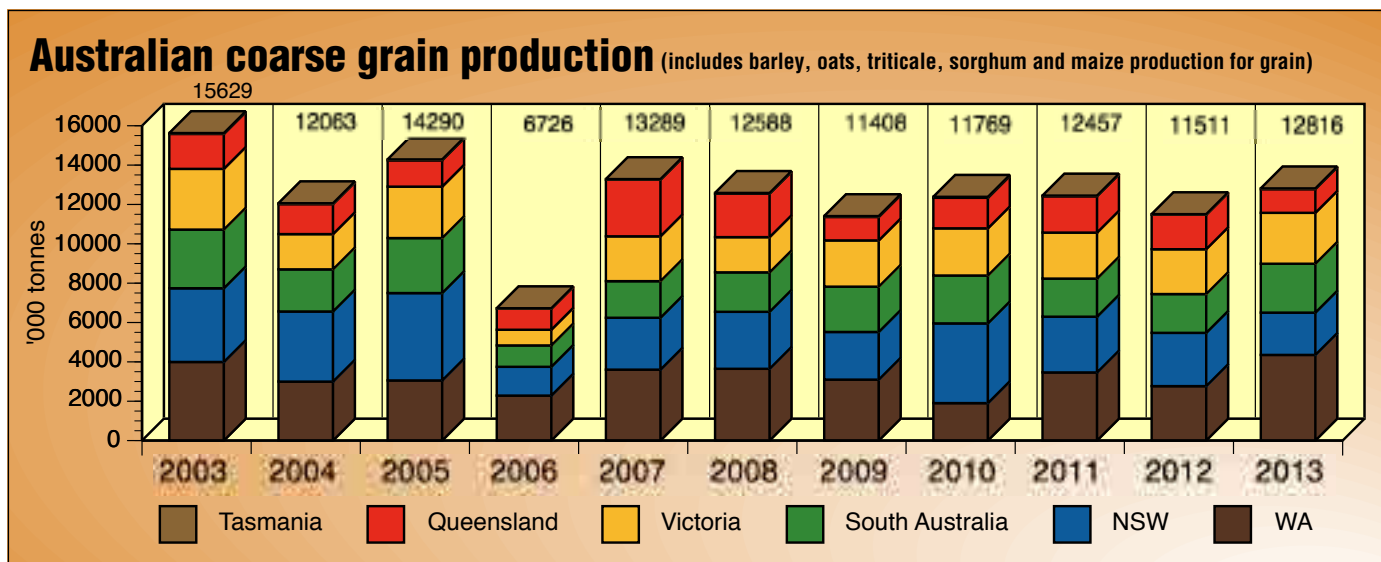




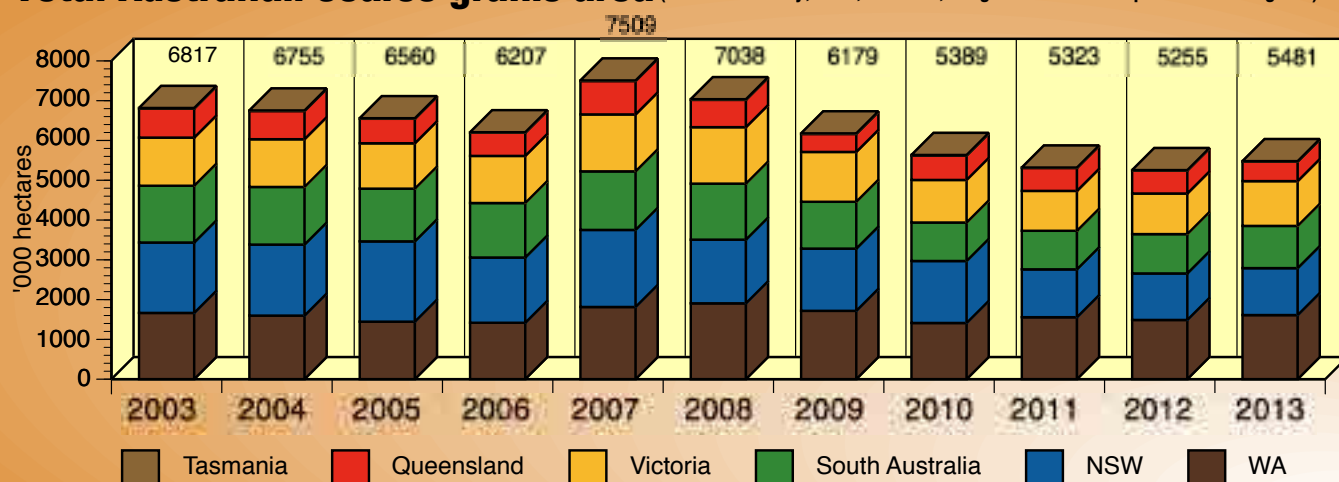
Australian wheat production, domestic disposal and exports (kt)					
	2009	2010	2011	2012	2013
Opening stocks	3738	5782	8945	9490	4351
Production	21834	27410	29905	22461	27013
Availability	25572	33192	38850	31951	31364
Total domestic use	4999	5663	6334	6335	6950
Food/Industrial/Seed	3173	3208	3134	2935	3350
Feed	1826	2455	3200	3400	3600
<b>EXPORTS</b>					
Wheat (incl. grain & flour)	14791	18584	23026	21265	18491
<b>MAJOR DESTINATIONS</b>					
China	745	530	1872	1235	na
Japan	1110	1175	1293	1178	na
Korea, Rep. of	826	1197	2343	1496	na
Malaysia	756	928	894	855	na
Thailand	442	661	1442	475	na
Indonesia	2854	3892	4066	4424	na
Egypt	501	730	618	514	na
Iran	61	0	208	1292	na
Iraq	635	906	522	1771	na
United Arab Emirates	207	353	180	182	na
Yemen	648	779	843	722	na
Kuwait	338	372	320	320	na
Pakistan	69	66	349	409	na
Oceania (NZ, Fiji, PNG)	598	688	864	785	na
<b>CLOSING STOCKS</b>	<b>5782</b>	<b>8945</b>	<b>9490</b>	<b>4351</b>	<b>5923</b>

Wheat production & area by state					
	2009	2010	2011	2012	2013
<b>NSW: Prod. (Kt)</b>	5350	10488	8473	7081	6612
<b>Area ('000 ha)</b>	3983	3815	3868	3367	3800
<b>Vic: Prod. (Kt)</b>	2995	4412	3943	3460	3541
<b>Area ('000 ha)</b>	1801	1793	1669	1577	1610
<b>Qld: Prod. (Kt)</b>	1346	1524	1886	1528	1200
<b>Area ('000 ha)</b>	962	905	953	851	800
<b>WA: Prod. (Kt)</b>	8114	5005	11045	6645	10500
<b>Area ('000 ha)</b>	5006	4640	5156	4875	5015
<b>SA: Prod. (Kt)</b>	4001	5949	4525	3715	5128
<b>Area ('000 ha)</b>	2122	2341	2249	2096	2279
<b>Tas: Prod. (Kt)</b>	27	32	32	31	32
<b>Area ('000 ha)</b>	7	8	7	6	8

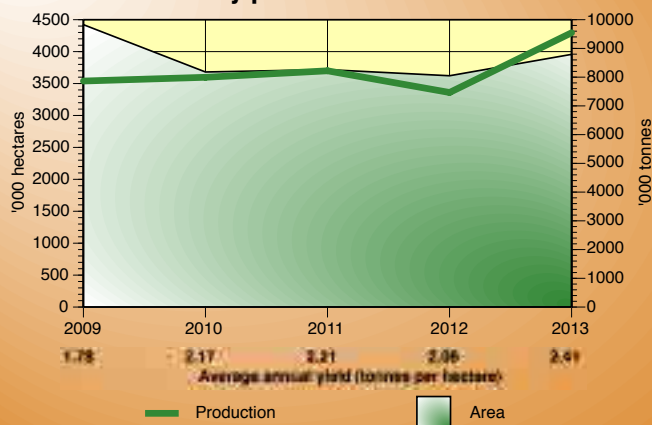
Barley production & area by state					
	2009	2010	2011	2012	2013
<b>NSW: Prod. (Kt)</b>	1236	2194	1425	1331	1179
<b>Area ('000 ha)</b>	951	878	673	616	670
<b>Vic: Prod. (Kt)</b>	1865	1945	2005	1951	2178
<b>Area ('000 ha)</b>	976	802	831	844	915
<b>Qld: Prod. (Kt)</b>	113	146	191	162	138
<b>Area ('000 ha)</b>	69	94	80	88	90
<b>WA: Prod. (Kt)</b>	2554	1549	2761	2214	3800
<b>Area ('000 ha)</b>	1420	1101	1246	1210	1350
<b>SA: Prod. (Kt)</b>	2068	2122	1816	1791	2225
<b>Area ('000 ha)</b>	997	795	881	860	925
<b>Tas: Prod. (Kt)</b>	29	39	23	16	25
<b>Area ('000 ha)</b>	9	11	6	5	7



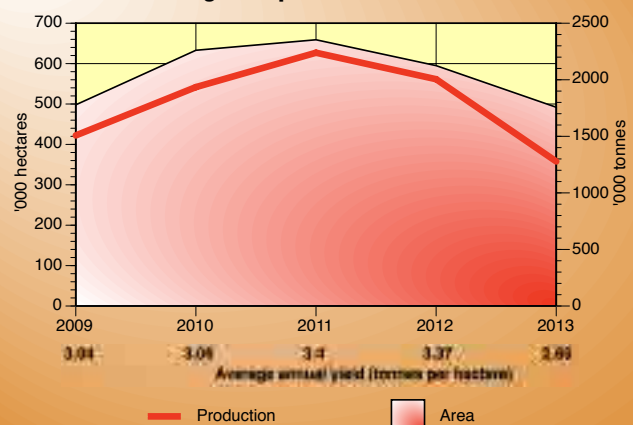
## Total Australian coarse grains area (includes barley, oats, triticale, sorghum and maize production for grain)



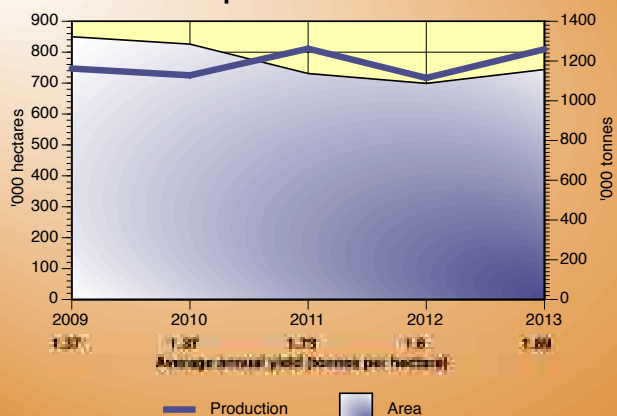
### Australian barley production



### Australian sorghum production



### Australian oats production



### Supply and disposal of Australian coarse grains (kt)

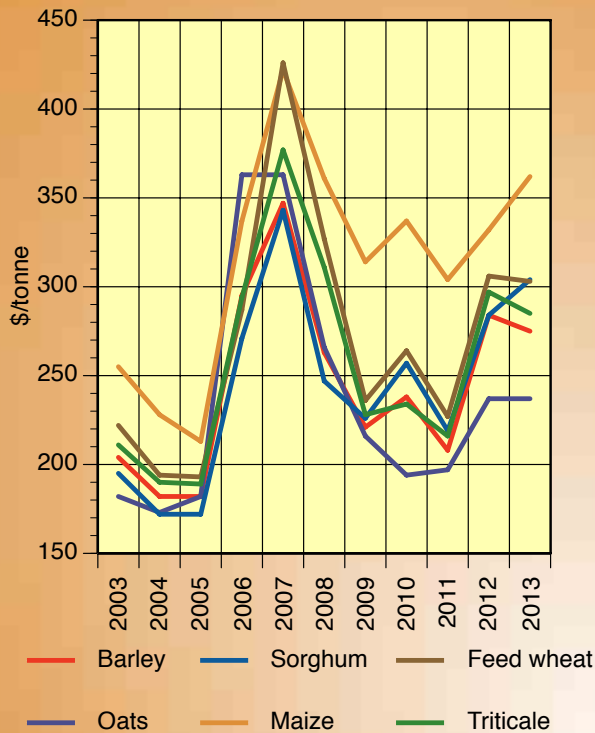
	2009	2010	2011	2012	2013
<b>BARLEY</b>					
Production	7865	7995	8221	7466	9545
Domestic use	3230	2631	2075	2177	3045
Exports	4635	5364	6146	5289	6500
<b>OATS</b>					
Production	1162	1128	1262	1115	1259
Domestic use	954	1009	1059	999	1145
Exports	208	118	203	116	114
<b>SORGHUM</b>					
Production	1508	1935	2239	2005	1278
Domestic use	1167	984	1060	861	569
Exports	998	341	950	1179	709
<b>MAIZE</b>					
Production	328	357	451	496	335
Domestic use	321	312	346	391	271
Exports	13	9	46	106	64
<b>TRITICALE</b>					
Production	545	355	285	429	400
Domestic use	545	355	285	429	400
<b>TOTAL (production)</b>	<b>11407</b>	<b>11769</b>	<b>12457</b>	<b>11511</b>	<b>12816</b>

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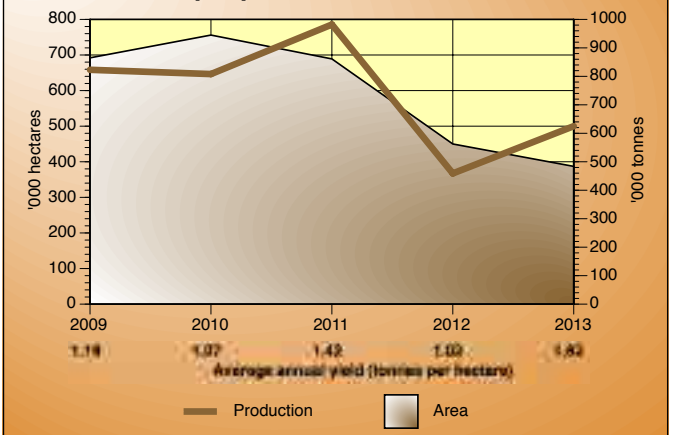
### Australian coarse grains domestic feed prices (\$/tonne delivered capital city)



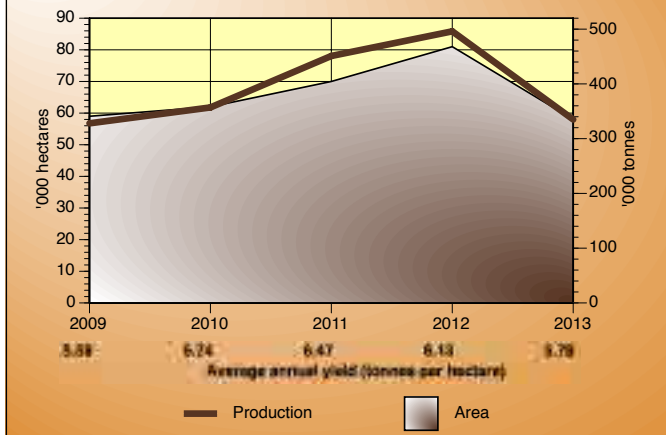
### Supply and disposal of Australian pulses (Kt)

	2009	2010	2011	2012	2013
<b>LUPINS</b>					
Production	823	808	982	459	625
Domestic use	470	621	416	304	474
Exports	353	186	565	155	151
<b>FIELD PEAS</b>					
Production	356	395	342	320	342
Domestic use	196	95	130	145	155
Exports	162	302	215	177	187
<b>CHICKPEAS</b>					
Production	487	513	673	813	629
Domestic use	1	39	93	1	121
Exports	492	461	598	816	508

### Australian lupin production



### Australian maize production



### Australian field pea production



### Australian triticale production



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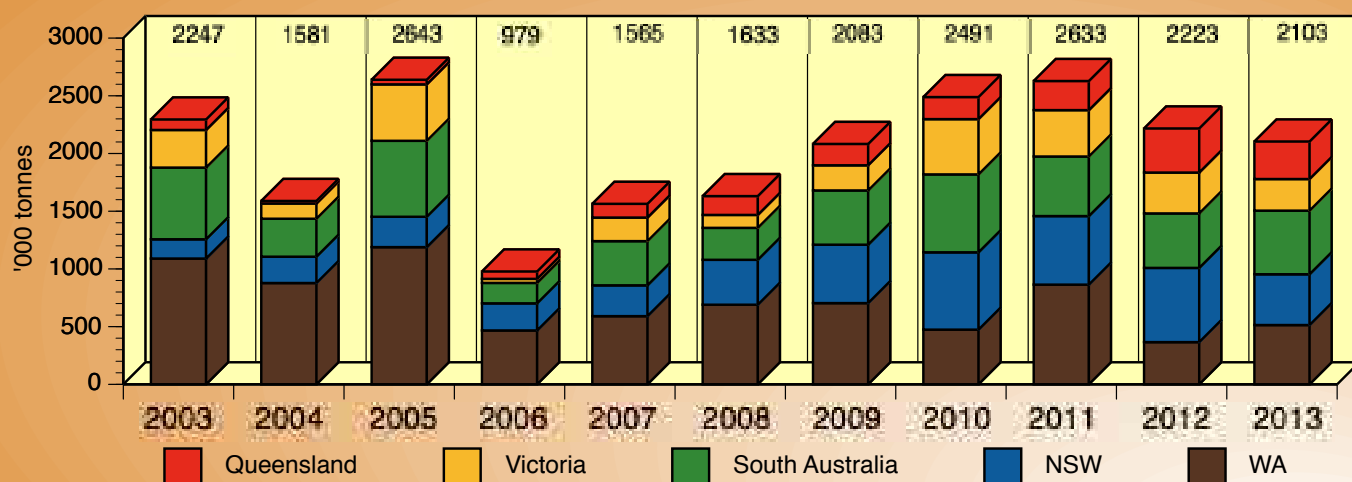
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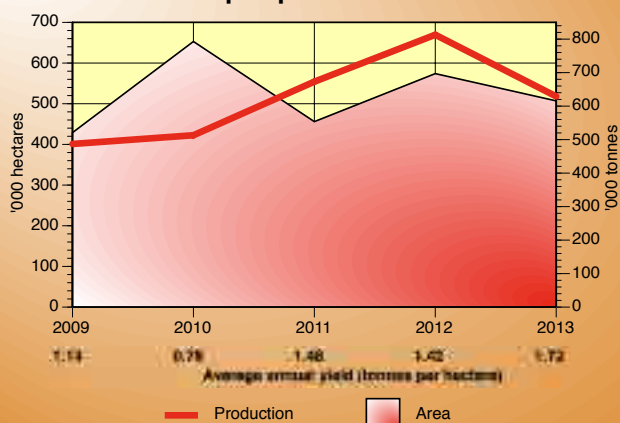
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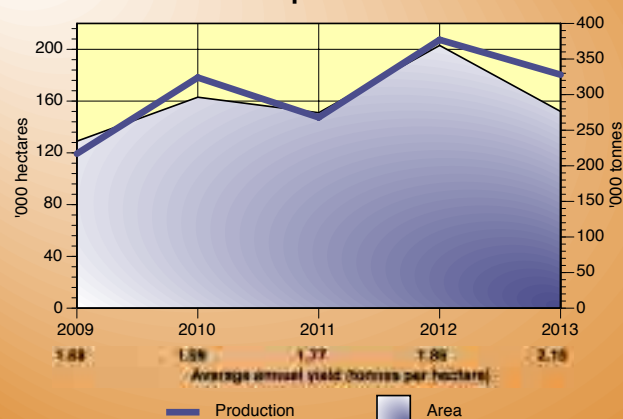
## Australian pulse production



## Australian chickpea production



## Australian faba bean production



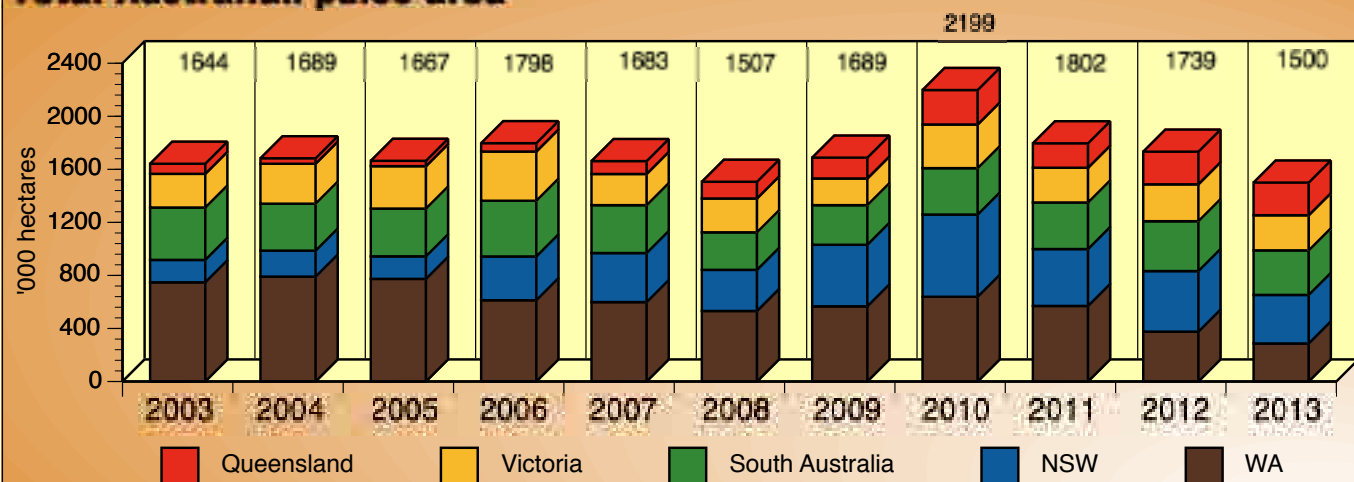
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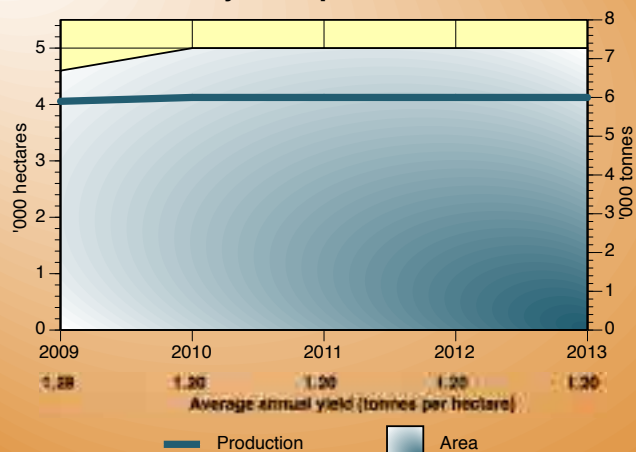


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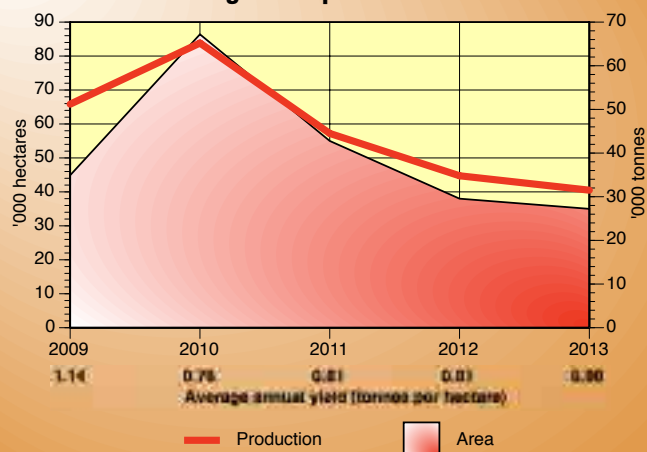
## Total Australian pulse area



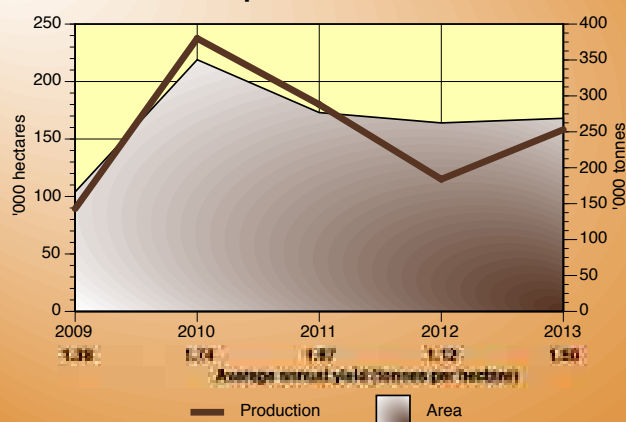
### Australian navy bean production



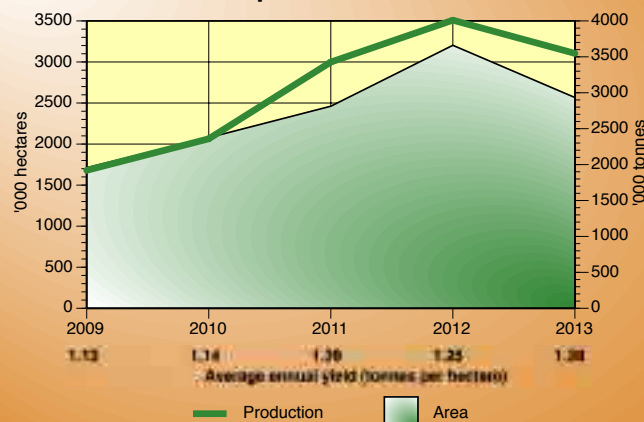
### Australian mung bean production



### Australian lentil production

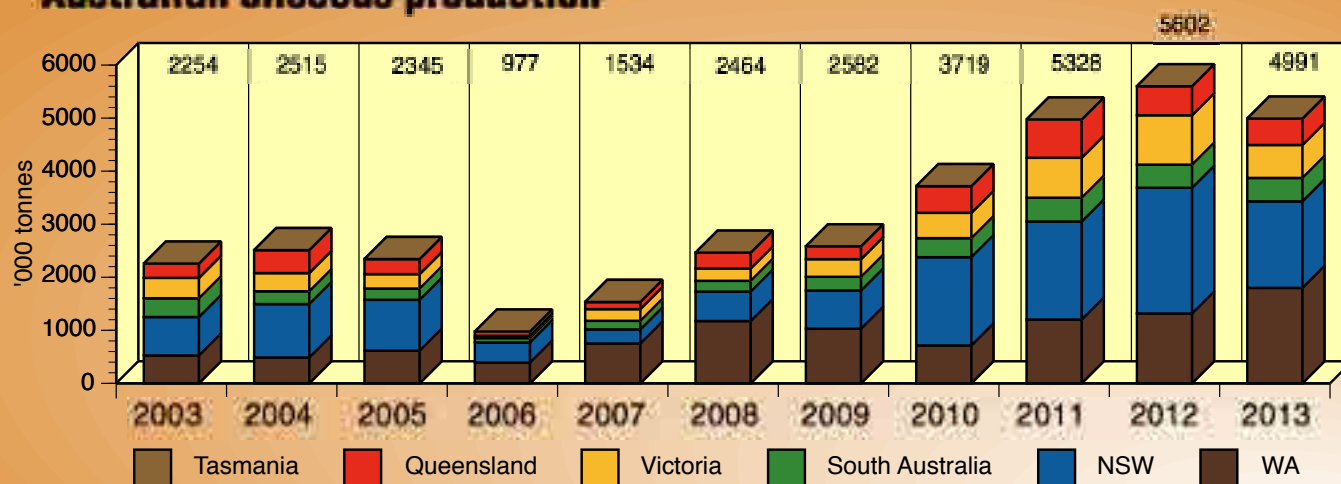


### Australian canola production

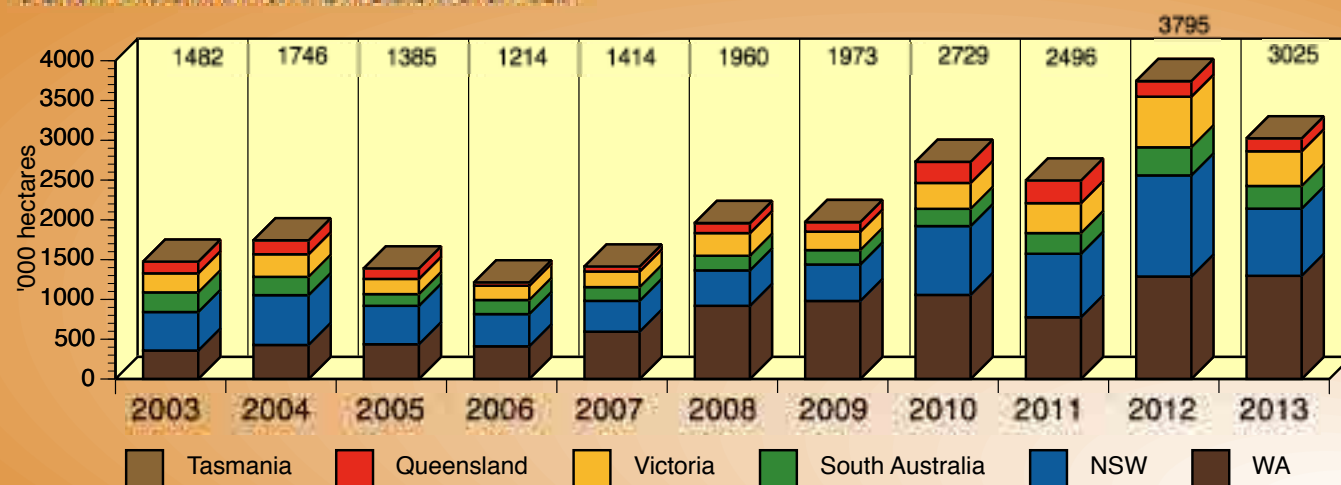




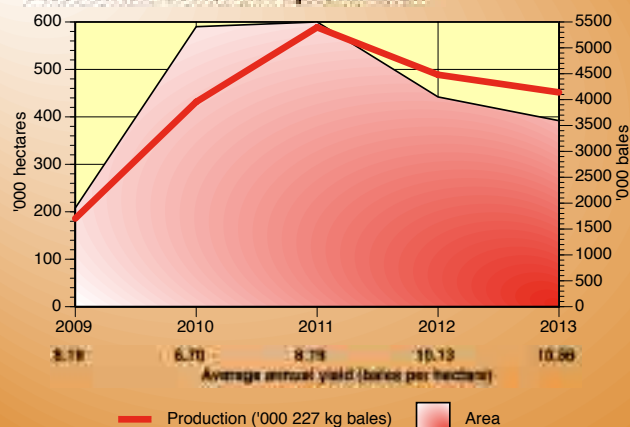
## Australian oilseeds production



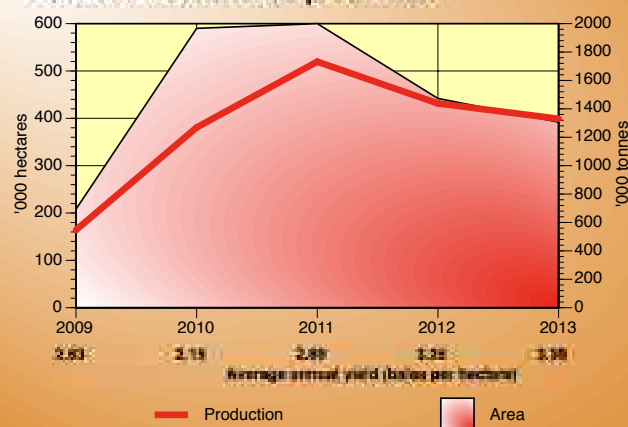
## Total Australian oilseeds area

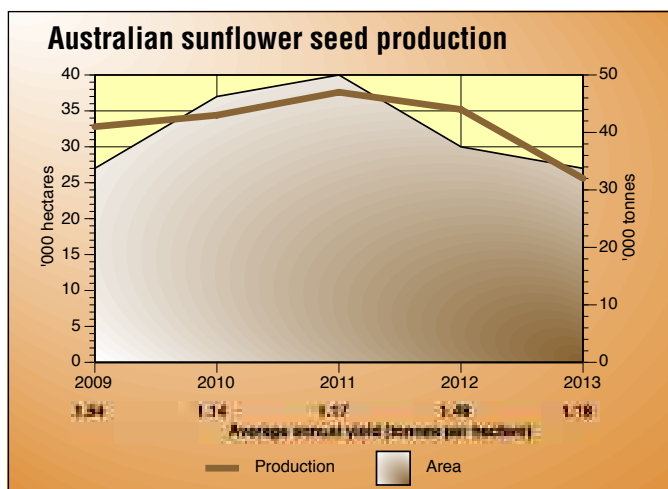
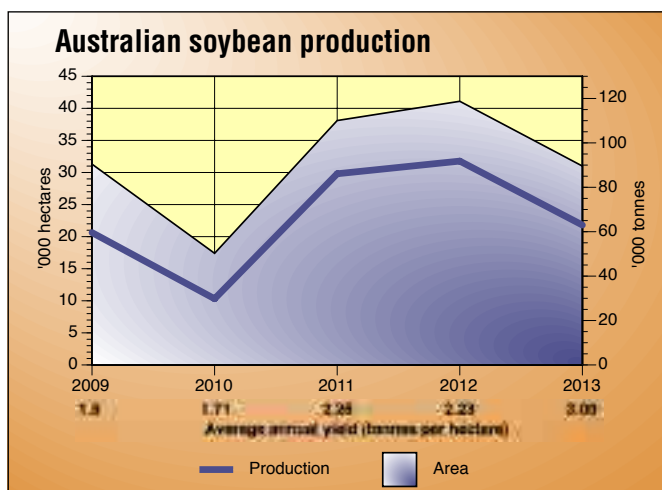
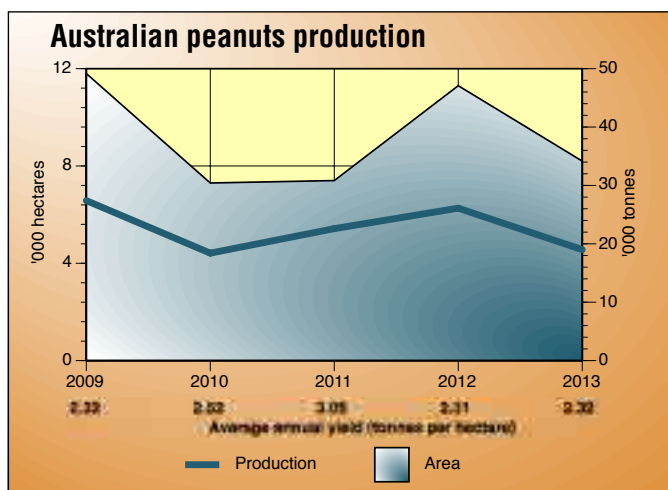


## Australian cotton lint production



## Australian cottonseed production





### Australian canola production, domestic use, seed and oil exports (kt)

	2009	2010	2011	2012	2013
<b>Seed production</b>	1907	2359	3427	4010	3548
<b>DOMESTIC USE</b>	721	810	871	499	567
<i>Crushers</i>	613	803	558	596	557
<i>Seed</i>	8	7	9	11	10
<b>EXPORTS</b>					
<b>Seed</b>	1238	1471	2323	3488	2981
<b>Oil</b>	87	104	117	116	na

### Australian exports of oilseeds, vegetable oils and meals, by type (kt)

	2008	2009	2010	2011	2012	2013
<b>OILSEEDS</b>						
Canola	973.0	1238.0	1471.0	2323.0	3488.0	2981.0
Cottonseed	37.1	105.5	267.9	653.6	754.2	445.3
Linseed	0.0	0.2	0.0	0.0	0.1	na
Peanuts	5.4	4.9	3.5	2.9	2.8	na
Safflowerseed	0.1	0.0	0.1	1.2	3.1	na
Soybeans	1.9	6.8	2.1	1.1	3.1	na
Sunflowerseed	2.5	1.6	0.9	0.6	0.9	0.6
<b>Total</b>	<b>1019.9</b>	<b>1357.3</b>	<b>1745.3</b>	<b>2982.3</b>	<b>4251.4</b>	<b>na</b>
<b>OILS</b>						
Canola	76.3	87.1	104.2	117.3	116.1	na
Cottonseed	10.0	5.4	18.2	2.1	3.7	na
Peanut	0.1	0.9	0.1	0.1	0.1	na
Safflower & Sunflowerseed	1.9	0.0	0.2	0.4	1.5	na
Soybeans	2.2	3.3	1.0	0.2	1.4	na
Olive	4.9	6.9	6.1	5.2	3.0	na
<b>Total</b>	<b>112.0</b>	<b>117.7</b>	<b>146.7</b>	<b>140.4</b>	<b>146.0</b>	<b>na</b>
<b>OILSEED MEALS</b>						
Cottonseed	10.7	11.5	31.7	42.1	42.6	na
Soybeans	1.4	2.2	3.5	6.4	2.9	na
Canola	1.3	19.0	31.5	21.6	41.2	na
Sunflowerseed	0.0	1.2	1.8	2.0	1.7	na
Other	6.2	27.2	35.4	21.7	43.1	na
<b>Total</b>	<b>19.6</b>	<b>61.1</b>	<b>103.9</b>	<b>93.8</b>	<b>131.5</b>	<b>na</b>

**Australian gross grain prices [\$A/tonne delivered to principal market/port, averaged across all grades]**

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14 f
Wheat (APW 10 net pool return)	246	446	341	256	368	275	333	329
Barley (feed)	284	325	232	190	181	206	250	275
Oats	369	281	216	160	196	202	235	237
Triticale	297	252	257	220	184	176	244	235
Maize	339	258	283	268	259	251	304	362
Sorghum	272	258	205	196	213	206	250	304
Rice (Rice Marketing Board)	337	414	566	457	240	270	299	306
Lupins	266	335	280	269	268	232	340	323
Field peas	283	407	345	241	266	295	406	365
Chickpeas	598	622	450	432	404	554	580	470
Sunflowerseed (at crusher)	706	814	696	696	567	551	570	525
Soybeans	353	554	551	551	501	472	434	574
Canola	397	543	548	440	544	513	549	544

**Gross value of Australian grain production [\$A million]**

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Wheat	2619	5292	6021	4765	7052	6775	7021	8805
Barley	1039	2244	1850	1356	1729	1723	1998	2327
Oats	241	423	251	186	221	255	263	245
Triticale	44	113	93	120	65	50	105	88
Maize	60	100	106	88	92	113	151	100
Sorghum	274	977	553	296	412	423	481	309
Rice	55	7	34	90	174	248	349	277
Lupins	125	222	198	222	216	228	156	202
Field peas	40	109	82	86	105	101	130	125
Chickpeas	151	195	199	216	207	308	320	223
Canola	227	659	1011	840	1283	1759	2201	1743
Sunflowerseed	15	59	38	29	24	26	25	19
Soybeans	12	19	44	33	15	41	40	29
Peanuts, linseed, safflower seed	21	35	28	37	30	33	37	30
<b>TOTAL</b>	<b>5122</b>	<b>10803</b>	<b>10778</b>	<b>8663</b>	<b>12138</b>	<b>12485</b>	<b>13723</b>	<b>14969</b>

**Value of major Australian grain exports [\$A million, fob]**

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Wheat (incl. flour)	2765	2990	5028	3692	5516	6378	6776	6275
Barley (incl. malt)	833	1496	1321	1093	1295	1875	1626	1958
Oats	38	37	64	53	37	47	59	30
Sorghum	13	76	405	116	146	299	364	251
Rice	347	110	143	43	165	427	458	416
Lupins	38	31	61	115	89	86	143	71
Field peas + Cow peas	80	61	62	60	85	93	89	85
Chickpeas	168	139	275	255	213	384	533	269
Cottonseed	31	8	19	46	85	195	219	151
Canola	108	303	595	583	866	1344	2094	1679
Other oilseeds	22	27	27	24	14	10	13	18
<b>TOTAL</b>	<b>4426</b>	<b>5278</b>	<b>8015</b>	<b>6087</b>	<b>8516</b>	<b>11162</b>	<b>12426</b>	<b>11226</b>





# What's on the *Greenmount* *Travel* radar for 2014?

For more than 20 years Greenmount Travellers have criss-crossed the globe visiting amazing agricultural, geographical and cultural destinations in China, Russia, South & North Americas, Canada, India, Tibet, Africa, Eastern & Western Europe, Scandinavia, United Kingdom, SE Asia, Japan, The Kimberleys and Nuigini.

We know where to go – and have established excellent farming and agribusiness contacts. We also have valuable experience in dealing with the unique challenges 'out of the square' travel presents. This ensures our tours are well organised and are expertly guided by local, trusted operators and our own experienced Greenmount Travel tour leaders.

Express your interest by giving Lloyd or David a call on 07 4659 3555 or email [travel@greenmountpress.com.au](mailto:travel@greenmountpress.com.au) or visit [www.greenmounttravel.com.au](http://www.greenmounttravel.com.au)

***After a number of highly successful overseas farm study tours in 2013, everyone is asking:  
"Where are you going next year?"***

***Here are our destinations for 2014***

## **Scandinavia**

One of the most beautiful and hospitable parts of the world, we have had two very successful tours through northern Germany, Denmark, Sweden and Norway – with an optional pre-tour small-ship Arctic Circle cruise.

## **North America**

A perennial favourite *Greenmount Travel* tour, although we seem to go to different places every time we visit the US and Canada. Well, it's a big area, but there are some things that cannot be missed, such as a visit to New York or a trip through the Canadian Rockies and the Calgary Stampede.

## **Spain/Morocco**

We last ventured to Spain and Morocco in 2006 and there is a groundswell of interest in returning in 2014. From the deserts of the Sahara to Casablanca, Seville, Madrid, Barcelona – and the wonderful landscapes, food and farming in between.

## **China/Mongolia/ Siberia**

After a number of trips to China and surrounds in recent years, we have come to the conclusion that it is usually better to try for the road less travelled in this part of the world. This tour includes remote regions such as Urumqi and Turpan in Xinjian Province of far western China, the steppes of Mongolia, and Lake Baikal in Siberia.



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# Global wheat stocks in the balance

■ By Profarmer Australia analysts

## AT A GLANCE...

- Little room for error in global wheat.
- Another record production year for US corn predicted.
- US soybean stocks expected to replenish significantly.
- Northern North America planting pace slow.
- Black Sea conflict continues but stocks remain comfortable.

The USDA's World Agricultural Supply and Demand Estimates report released on Friday May 9 was the first to give estimates of the 2014–15 season global grain supply and demand situation. It is important to note the final results of these estimates can be very different to the initial forecasts as highlighted below where, in the past, the final numbers have been well above and below initial estimates.

### Change in USDA global wheat forecasts



As good or bad weather events occur – and political or logistical surprises arise – these can all affect the supply, stocks, demand and price of different commodities to provide volatility and opportunities for all market participants. So while the forecast has set the initial trend, it's a long time until the grain is in the bin and guestimates over the amount that ends up in the bin will largely determine prices come our harvest!

## USDA report largely in-line with expectations for wheat

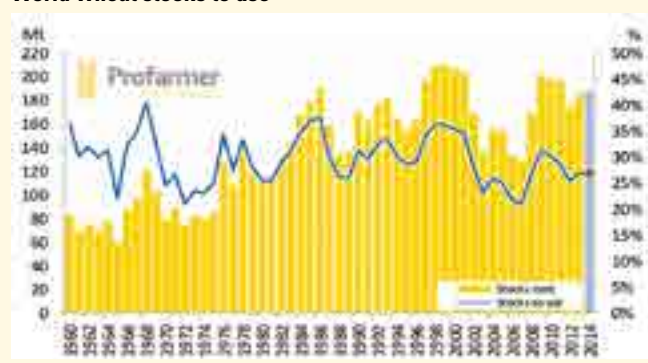
In our view the USDA report was reasonably supportive for wheat as the global production estimate for 2014–15 was lowered 16.9 million tonnes from last year to 697 mt – but global consumption estimates only fell by 6.6 mt to 696.1 mt. This underlines that there is only a 1 mt buffer between global production and global consumption.

There is very little margin for any production errors this coming year. If a production issue was to develop resulting in significant crop losses

and stocks were then drawn down – this should be supportive for new crop global and Australian wheat values.

That said, the USDA put global ending stocks at 187.4 mt giving a global stocks to use ratio of 26.9 per cent compared to the five year average at 28 per cent. Meaning that at the end of 2014–15, the world will have in stock just over one quarter of this year's global demand, which is a reasonably comfortable position (refer chart below).

### World wheat stocks to use



Despite the USDA report being relatively supportive for global wheat prices, it did come largely in-line with what was expected by traders. Due to this we have since seen wheat values push lower. This is because global wheat values have already had a high level of risk premium built in over past months (CBOT wheat futures up roughly A\$50 per tonne since the lows of February).

Hence more new bullish information is required to keep the market rallying from the high levels. The USDA did not provide this in their May report.

US winter wheat production estimates came in smaller than most were anticipating. But this was mainly due to most traders thinking the USDA would use a yield result closer to average for their first estimate, so most were planning on discounting the forecast regardless. But this expectation had already been priced into futures so unfortunately, these numbers didn't provide a bullish kick to the market. Although it does provide another supportive theme to prices as US stocks will tighten in the coming year.

### US wheat stocks to use



Due to the current (mid-May) dryness in the HRW regions of the US, the winter wheat production estimate has fallen 3.5 mt below last year and 3.6 mt below the five year average to 38.1 mt. The spring wheat is

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currently being planted and if it achieves a trend yield of three tonnes per hectare and the planting intentions area is correct, the spring wheat crop should achieve production of around 14.2 mt compared to the five year average of 14.8 mt.

This would put total US wheat production at approximately 52.4 mt, down from 57.9 mt last year and the five year average of 58.8 mt.

## USDA report bearish for corn

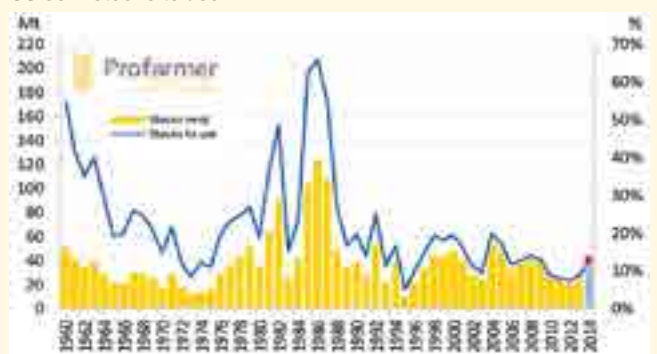
The USDA report was bearish for corn as 2013–14 world ending stocks were forecast higher than trade expectations at 168.4 mt compared to the average trade estimate of 159 mt.

Looking forward to the US new crop, the report forecast another record corn production year in 2014–15 at 353.9 mt – up 255 kt on last year and up on the five year average of 318 mt. This put world corn ending stocks for 2014–15 at 181.7 mt – up 13 mt from the previous year and the five year average of 143 mt which is bearish new crop corn, and potentially feed grain prices in general, such as Aussie feed barley. But there is someway to go here yet.

## Supportive to old crop soybeans, but bearish new crop

For soybeans the report was supportive of old crop and bearish new crop. The 2013–14 US soybean balance sheet is historically very tight and the report added to the tightness by reducing old crop supply and increasing total usage causing the stocks to use ratio to tighten to 3.8 per cent. This was tighter than the trade expected with many thinking the number of Chinese cargo cancellations may see old season US stocks loosen up. Hence nearby futures were supported.

US corn stocks to use



In 2014–15 the US soybean production estimate was put at a record 98.9 mt – up 9.4 mt on the previous year and well above the five year average of 87.6 mt. Should this eventuate it would loosen the new crop

US soybean stocks to use



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US soybean balance sheet and increase the stocks to use ratio from 3.8 per cent to 9.6 per cent year on year relieving some of the higher price pressure in the new crop US soybean market.

In 2014–15 global production of soybeans is forecast at 299.8 mt – that is an increase of 16 mt on the previous year and the five year average is 263 mt. As a result the world stocks to use ratio will increase 4.5 per cent to 29.3 per cent.

With a big world soybean crop forecast and the tight US soybean supply looking to be resolved, this may take some of the premium out of US soybean futures and the oilseed complex which may influence Canadian and European canola and rapeseed markets.

This could subsequently pressure Australian oilseed prices in the coming season. Although again there is a long way to go.

## Black Sea conflict continues but stocks remain comfortable

With all the uncertainty going on around them, Ukrainian grain farmers look to be continuing to plant largely in line with historical expectations.

But concerns still remain of the capacity of Ukraine farmers to fund the in-crop input costs to achieve average yields.

Ukraine is no closer to brokering peace across the country and particularly in the Eastern regions. On May 11 the Donetsk region voted in a referendum for state self rule of the Donetsk People's Republic. The results have not been independently verified although rebels are calling it 80 per cent in favour of leaving the Ukraine and creating a self ruled state.

Ukraine will also have a presidential election on May 25, but it remains uncertain how much this will help ease tensions across the country. So far, Ukraine grain sales and shipments are being executed without any issues but prices are more expensive than they would be without the conflict.

The USDA report reduced the Ukraine wheat area estimate by four per cent to 6.3 million hectares and forecast production for the coming year reduced by 2.2 mt from last year to 20 mt. This compares to the five year average of 23 mt. This would put Ukraine wheat stocks at 35 per cent stocks to use ratio which is a comfortable level and will act as a buffer against any production issues in the 2014–15 season.

After the record 30 mt corn crop last year, the USDA reduced Ukraine corn area estimates by one per cent for 2014–15 to 4.8 million hectares as opposed to the Ukraine Ag Ministry which increased corn area to 5.1 million hectares. The USDA reduced forecast corn yield to 5.42 tonnes per hectare in line with the five year average. This translates to a 4.9 mt fall in corn production from last year to 26 mt which remains well above the five year average of 19 mt.

The 2014–15 corn ending stocks in the Ukraine are forecast to fall 350 kt to 2.8 mt, which at 28 per cent stocks to use ratio, is fairly comfortable.



www.profarmer.com.au May 14, 2014



World total supply and demand for wheat and coarse grains (Mt)							
	Opening stocks	Production	Imports	Total supply	Total use	Exports	Closing stocks
<b>Argentina</b>							
2011	8.1	44.5	0.0	52.6	14.4	35.5	2.7
2012	2.7	45.8	0.0	48.5	17.1	27.9	3.5
2013	3.5	43.8	0.0	47.3	17.8	24.9	4.6
<b>Australia</b>							
2011	10.8	42.4	0.0	53.2	12.0	30.4	9.1
2012	9.1	34.0	0.0	43.2	12.6	28.0	5.3
2013	5.3	39.8	0.0	45.2	12.7	25.9	6.4
<b>Canada</b>							
2011	11.0	48.1	1.1	60.2	28.3	22.6	9.3
2012	9.3	51.6	0.8	61.7	27.7	25.8	8.2
2013	8.2	66.2	0.7	75.1	29.8	26.6	18.7
<b>EU-27</b>							
2011	30.1	284.5	14.3	328.8	274.6	26.6	27.8
2012	27.8	273.5	17.2	318.5	263.2	33.7	21.6
2013	22.1	300.8	16.2	339.1	272.9	41.1	25.1
<b>Kazakhstan</b>							
2011	2.1	26.1	0.0	28.2	10.0	11.8	6.5
2012	6.5	12.1	0.0	18.6	8.7	7.4	2.5
2013	2.6	17.4	0.0	20.0	9.8	7.2	3.0
<b>Russia</b>							
2011	15.9	89.7	0.9	106.5	65.7	27.2	13.6
2012	13.6	67.1	1.8	82.5	60.2	15.5	6.9
2013	6.9	87.7	1.1	95.6	65.1	22.1	8.4
<b>Ukraine</b>							
2011	5.5	56.0	0.1	61.5	30.3	23.0	8.2
2012	8.2	45.6	0.0	53.8	27.1	21.9	4.8
2013	4.8	62.5	0.1	67.4	29.3	32.0	6.2
<b>United States</b>							
2011	55.7	378.3	6.4	440.4	322.2	70.1	48.1
2012	48.1	347.8	10.3	406.2	314.6	48.5	43.0
2013	43.0	427.8	8.0	478.9	345.4	77.9	55.7
<b>Total of world's major exporters of wheat and coarse grains (ie. exporters listed above)</b>							
2011	139.2	969.6	22.8	1131.6	757.5	248.8	125.3
2012	125.3	877.6	30.1	1033.0	731.1	206.1	95.8
2013	96.3	1046.1	26.2	1168.6	782.6	258.0	128.0
<b>China</b>							
2011	112.1	318.5	10.7	441.3	326.6	1.0	113.7
2012	113.7	333.7	8.4	455.8	336.9	0.9	117.9
2013	117.9	347.4	18.4	483.7	348.2	1.0	134.5
<b>India</b>							
2011	18.1	129.1	0.1	147.2	119.1	5.6	22.5
2012	22.5	136.4	0.1	159.0	120.4	12.0	26.6
2013	26.6	135.5	0.1	162.1	128.7	11.0	22.6
<b>World total</b>							
2011	367.8	1850.8	269.2	2218.5	1856.5	269.2	362.0
2012	362.0	1789.8	265.2	2151.8	1817.4	265.2	334.5
2013	334.5	1967.2	290.3	2301.7	1913.9	290.3	387.8

## Summary of world statistics for wheat

	Area million ha	Production (Mt)	Use (Mt)	CLOSING STOCKS		Stocks to use ratio (%)	Trade (imports) Mt	Price US\$ (Hard Red Winter, Gulf)
				World (Mt)	Major exporters (Mt)			
2005	217	621	623	139	66	22	110	176
2006	211	597	609	127	48	21	111	212
2007	215	607	602	132	48	22	110	362
2008	223	685	645	172	69	27	137	271
2009	222	678	652	199	77	30	128	209
2010	218	652	659	194	74	29	133	317
2011	221	697	698	192	68	27	145	299
2012	215	656	674	173	48	26	140	348
2013	224	713	692	190	54	27	150	305

## World wheat production by region (Mt)

	EU 27	Ukraine	Russia	Kazak.	Other FSU 12	Turk.	Canada	US	Argen.	Iran	China	India	Pakis.	North Africa	Aust.	TOTAL WORLD
2006	125.1	13.8	44.9	12.5	14.1	17.5	25.3	49.2	14.5	14.8	108.5	69.4	21.7	17.3	10.8	597
2007	118.0	13.9	49.4	16.5	13.9	15.5	20.1	55.8	16.4	15.0	109.3	75.8	23.3	11.8	13.6	607
2008	150.7	25.9	63.8	12.5	13.3	17.0	28.6	68.0	11.0	10.0	112.5	78.6	20.1	13.0	21.4	685
2009	138.3	20.9	61.8	17.1	14.2	18.5	26.8	60.4	11.0	12.0	115.1	80.7	24.0	17.0	21.8	678
2010	136.8	16.8	41.5	9.6	13.1	17.5	23.2	60.1	15.9	15.0	115.2	80.8	23.9	16.4	27.4	652
2011	138.2	22.3	56.2	22.7	13.8	18.8	25.3	54.4	15.5	13.5	117.4	86.8	25.0	18.3	29.9	697
2012	133.9	15.8	37.7	9.8	14.2	17.5	27.2	61.7	9.3	14.0	121.0	94.9	23.3	17.2	22.4	656
2013	142.9	22.3	52.1	13.9	15.6	17.6	37.5	58.0	10.5	14.5	121.7	93.5	24.0	20.3	27.0	713

## TABLE NOTES...

**European Union 27 (EU 27)** consists of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany (originally West Germany), Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

**Former Soviet Union 12 (FSU 12)** consists of Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

**Near East Asia** refers to Iran, Saudi Arabia, Syria and Turkey.

**Far East Asia** refers to China, Afghanistan, India and Pakistan.

**Southeast Asia** refers to Indonesia, Malaysia, Philippines, Thailand and Vietnam.

## Major world wheat trading regions/countries [Mt]

	2009	2010	2011	2012	2013
<b>IMPORTS</b>					
EU 27	6.0	4.7	7.4	5.2	4.0
FSU 12	5.6	5.7	8.0	7.2	7.4
Northern Africa	19.8	24.3	24.9	22.2	22.9
Middle East	17.3	13.6	16.3	20.4	20.7
Southeast Asia	12.8	15.7	17.4	15.8	15.9
Mexico	3.1	3.4	5.0	3.8	3.7
Brazil	6.5	6.7	7.3	7.4	7.4
Japan	5.5	6.0	5.8	6.3	6.2
<b>EXPORTS</b>					
Argentina	5.1	9.5	12.9	3.6	3.0
Australia	14.8	18.6	23.0	21.3	18.5
Canada	18.2	16.6	17.3	19.0	23.0
EU 27	20.8	22.9	16.7	22.6	29.0
US	23.9	35.1	28.6	27.4	32.0
Russia	18.8	4.0	21.6	11.3	17.5
Ukraine	9.3	4.3	5.4	7.2	10.0
Others	16.8	21.9	19.3	28.1	8.5
<b>Total wheat trade</b>	<b>127.7</b>	<b>132.9</b>	<b>144.8</b>	<b>140.5</b>	<b>150.3</b>

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## World durum wheat production and trade

	2009	2010	2011	2012	2013
<b>PRODUCTION (Mt)</b>					
EU 27	8.7	9.1	8.2	7.9	7.9
Kazakhstan	2.6	1.7	3.0	1.4	2.0
Canada	5.4	3.0	4.2	4.6	6.5
Mexico	2.2	2.2	2.2	2.1	2.3
US	3.0	2.9	1.4	2.2	1.7
Algeria	2.9	2.2	2.5	3.0	2.5
Syria	1.8	1.6	1.7	1.5	1.5
Turkey	3.1	2.9	3.0	3.0	3.0
India	1.0	1.0	1.1	1.2	1.2
Australia	0.5	0.5	0.6	0.5	0.5
Other	9.7	7.8	8.8	7.8	8.9
<b>WORLD TOTAL (Mt)</b>	<b>40.9</b>	<b>34.9</b>	<b>36.7</b>	<b>35.2</b>	<b>38.0</b>
<b>MAJOR IMPORTERS (Kt)</b>					
EU 27	2159	1928	1860	1453	1900
US	534	474	614	670	570
Venezuela	349	403	403	424	400
Japan	234	230	273	197	240
Morocco	548	773	661	765	600
Algeria	1534	1335	1821	1613	1400
Other	1982	2195	1737	2284	2246
<b>MAJOR EXPORTERS (Kt)</b>					
Canada	3675	3117	3859	4289	4400
EU 27	1054	2060	1379	1390	800
US	1045	1051	554	581	640
Mexico	892	770	918	841	1100
Turkey	428	20	2	1	2
Australia	246	233	348	237	250
<b>WORLD TOTAL TRADE (Mt)</b>	<b>7340</b>	<b>7338</b>	<b>7369</b>	<b>7406</b>	<b>7356</b>
<i>Semolina component</i>	<i>263</i>	<i>360</i>	<i>360</i>	<i>350</i>	<i>350</i>

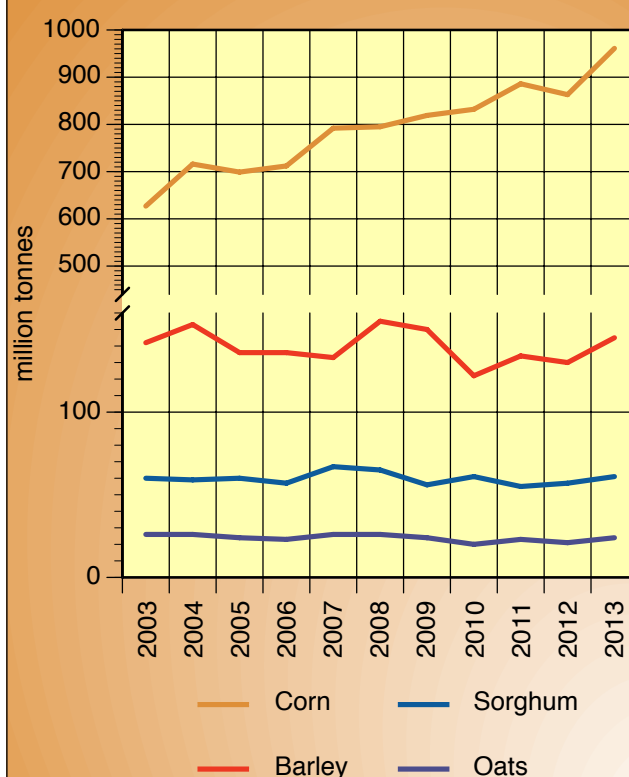
## Summary of world statistics for coarse grains

	2009	2010	2011	2012	2013
Area (million ha)	309	304	312	318	318
Production (Mt)	1114	1097	1155	1125	1125
Total use (Mt)	1107	1126	1159	1146	1146
Closing stocks: World (Mt)	196	173	169	148	148
Closing stocks: US (Mt)	48.1	32.3	22.9	21.9	21.9
S.T.U.R. (%)	18	15	15	13	13
Trade (Mt)	123	117	125	119	119

## World coarse grains production by region and country (Mt)

	2009	2010	2011	2012	2013
EU 27	155.0	139.5	149.9	145.9	158.8
Russia	31.8	16.4	33.1	28.7	34.7
Ukraine	24.1	21.4	33.5	29.5	39.9
Canada	22.5	22.7	22.9	24.4	28.7
Mexico	27.2	29.4	25.7	28.9	29.6
United States	348.8	330.2	323.7	286.0	369.4
Argentina	28.5	33.2	30.1	37.1	33.8
Brazil	58.4	60.4	75.9	83.8	72.8
Turkey	9.8	9.5	10.6	9.9	11.3
China	169.7	183.4	199.3	212.9	224.2
India	34.2	43.4	42.1	40.0	41.7
Southeast Asia	21.9	23.2	25.1	25.3	26.2
North Africa	10.7	12.2	11y	10.3	11.6
Sub-Saharan Africa	77.1	83.6	80	81	80.5
Australia	11.4	11.8	12.6	11.5	12.8
Other	82.9	76.7	75.5	77.8	85.0
<b>TOTAL</b>	<b>1114</b>	<b>1097</b>	<b>1151</b>	<b>1133</b>	<b>1261</b>

## World coarse grain production [Mt]





Major world barley and sorghum producers (Mt)					
	2009	2010	2011	2012	2013
<b>BARLEY</b>					
EU 27	62.0	53.1	51.8	54.5	59.6
United States	4.9	3.9	3.4	4.8	4.7
Canada	9.5	7.6	7.9	8.0	10.2
Russia	17.9	8.4	16.9	13.9	15.4
Ukraine	11.9	8.5	9.1	6.9	7.6
Argentina	1.4	3.0	4.1	5.2	4.7
China	2.3	2.0	2.5	2.4	2.3
Turkey	6.5	5.9	7.0	5.5	7.3
Australia	7.9	8.0	8.2	7.5	9.5
<b>TOTAL WORLD PROD'N</b>	<b>150</b>	<b>122</b>	<b>134</b>	<b>130</b>	<b>145</b>
<b>SORGHUM</b>					
United States	9.7	8.8	5.4	6.3	9.9
Mexico	6.3	6.3	6.1	5.9	7.3
Argentina	3.6	4.5	4.3	4.0	4.6
India	6.7	7.0	6.1	6.0	5.5
Sub-Saharan Africa	24.5	26.1	23.3	23.4	23.8
Australia	1.5	1.9	2.2	2.0	1.3
<b>TOTAL WORLD PROD'N</b>	<b>59</b>	<b>62</b>	<b>56</b>	<b>56</b>	<b>61</b>

World coarse grains trade by region and country (Mt)					
	2009	2010	2011	2012	2013
<b>IMPORTS</b>					
EU 27	3.0	8.6	7.0	11.8	10.9
United States	2.3	2.5	2.9	6.7	3.0
Mexico	11.0	10.8	12.8	7.6	12.2
Southeast Asia	4.6	7.8	6.7	7.8	8.5
Japan	19.2	18.6	17.7	17.7	18.5
South Korea	8.5	8.2	6.7	8.3	9.6
China	3.8	2.7	7.9	5.6	10.9
Saudi Arabia	9.2	7.4	10.5	10.7	12.0
Nth'n Africa & Middle East	20.1	21.6	25.0	23.3	24.4
Others	41.3	28.8	49.8	22.5	37.0
<b>EXPORTS</b>					
Argentina	18.8	19.7	23.9	23.9	21.5
Brazil	7.5	8.4	24.3	25.0	20.0
Australia	5.9	5.8	7.9	6.8	7.4
Canada	3.1	4.5	3.7	5.0	4.9
EU 27	3.0	6.2	6.5	7.3	8.1
Ukraine	11.0	7.8	17.7	15.0	21.2
Russia	2.4	0.3	5.8	4.3	5.6
United States	54.7	50.7	41.0	20.7	45.6
<b>TOTAL WORLD TRADE</b>	<b>123</b>	<b>117</b>	<b>147</b>	<b>122</b>	<b>147</b>

World barley trade by region (Mt)					
	2009	2010	2011	2012	2013
<b>IMPORTS</b>					
Europe	0.4	0.4	0.9	0.3	0.4
FSU 12	0.1	0.6	0.7	0.3	0.4
Saudi Arabia	7.4	5.4	8.6	8.2	8.5
Other Near East Asia	3.0	2.3	3.4	4.0	3.3
China	2.1	2	2.3	2.1	2.6
Japan	1.4	1.4	1.2	1.4	1.3
United States	0.3	0.2	0.4	0.5	0.4
Brazil	0.4	0.3	0.2	0.3	0.3
Mexico	0.2	0.1	0.1	0.2	0.2
Africa	1.0	1.3	1.8	1.3	2.0
Others	1.6	2.0	2.5	1.9	1.9
<b>EXPORTS (feed and malting)</b>					
Australia	4.6	5.4	6.1	5.3	6.5
Canada	1.3	1.4	1.2	1.5	1.0
EU 27	1.1	4.7	3.1	5.0	5.3
United States	0.1	0.2	0.1	0.2	0.2
Ukraine	6.2	2.8	2.5	2.1	2.3
Russia	2.8	0.3	3.5	2.2	2.4
Argentina	0.6	1.0	2.3	2.5	3.0
<b>TOTAL EXPORTS (Mt)</b>	<b>16.9</b>	<b>14.7</b>	<b>20.3</b>	<b>19.5</b>	<b>20.1</b>
<b>TOTAL PRODUCTION (Mt)</b>	<b>150</b>	<b>122</b>	<b>134</b>	<b>130</b>	<b>145</b>

World sorghum trade by country (Kt)					
	2009	2010	2011	2012	2013
<b>IMPORTS</b>					
EU27	26	715	78	255	125
Mexico	2656	2154	1392	2090	600
Colombia	190	307	453	710	200
Chile	458	701	487	460	400
Japan	1493	1386	1343	1935	1350
Israel	39	123	3	53	100
Sudan	358	233	187	115	150
New Zealand	103	42	72	93	50
Others	975	672	614	1262	3293
<b>MAJOR EXPORTERS</b>					
Australia	998	341	950	1179	709
Argentina	1318	1862	1595	3220	1400
China	43	53	52	35	15
India	103	53	104	237	80
United States	4298	3775	1772	2065	3700
<b>TOTAL EXPORTS (Kt)</b>	<b>6298</b>	<b>6333</b>	<b>4629</b>	<b>6973</b>	<b>6268</b>

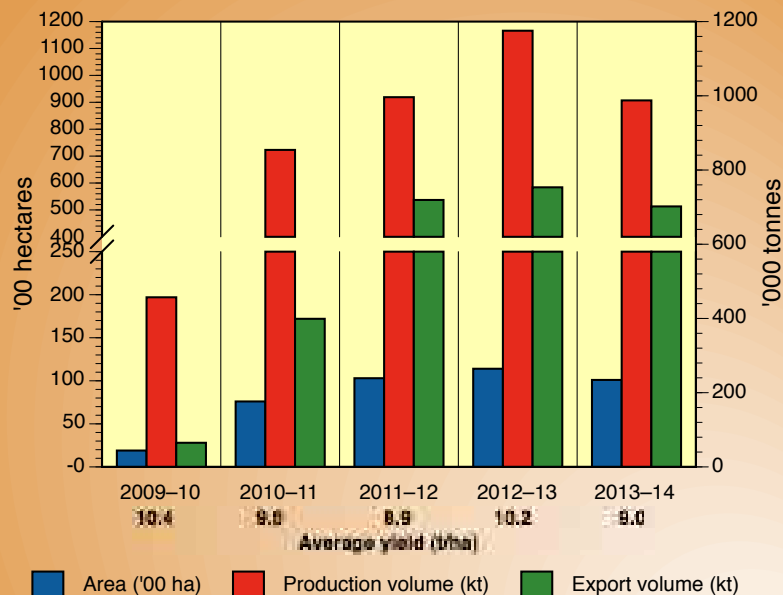
## Major world oilseeds trade and production (Mt)

	2007	2008	2009	2010	2011	2012	2013
<b>IMPORTS: Canola</b>	8.51	11.23	11.11	10.49	13.10	12.90	13.90
<i>Japan</i>	2.30	2.15	2.31	2.32	2.39	2.50	2.30
<b>Soybeans</b>	79.43	76.84	93.10	90.60	93.60	97.00	107.40
<i>China</i>	36.50	41.10	53.90	52.51	57.40	59.50	68.50
<b>EXPORTS: Canola</b>	8.51	11.23	11.11	10.49	13.10	12.90	13.90
<i>Australia</i>	0.47	1.07	1.19	1.55	2.32	3.49	2.98
<i>Canada</i>	5.45	7.32	7.35	7.21	8.69	6.71	8.30
<b>Soybeans</b>	79.43	76.84	93.10	90.60	93.60	97.00	107.40
<i>Brazil</i>	23.49	25.36	28.58	29.95	36.32	41.90	45.00
<i>United States</i>	30.39	31.60	41.70	40.18	37.15	35.91	41.64
<b>Sunflowerseed</b>	1.33	2.28	1.61	1.76	1.98	1.51	1.77
<b>Total world oilseeds trade</b>	<b>93.23</b>	<b>93.91</b>	<b>111.42</b>	<b>106.32</b>	<b>111.35</b>	<b>117.41</b>	<b>127.77</b>
<b>PRODUCTION: Canola</b>	45.09	57.92	60.81	60.10	61.33	63.51	70.82
<i>Australia</i>	1.21	1.84	1.91	2.36	3.43	4.01	3.55
<i>Canada</i>	9.10	12.61	12.94	12.82	14.63	13.93	18.00
<b>Soybean</b>	237.44	221.14	260.85	266.81	241.02	271.14	282.04
<i>Brazil</i>	59.00	61.00	69.12	75.30	66.41	81.53	85.62
<i>United States</i>	87.00	72.86	91.42	90.61	84.20	82.63	89.54
<b>Sunflowerseed</b>	46.00	34.75	32.17	33.57	39.50	35.57	40.19
<b>Total world oilseeds production</b>	<b>403.98</b>	<b>391.69</b>	<b>442.32</b>	<b>456.05</b>	<b>447.10</b>	<b>473.71</b>	<b>504.30</b>

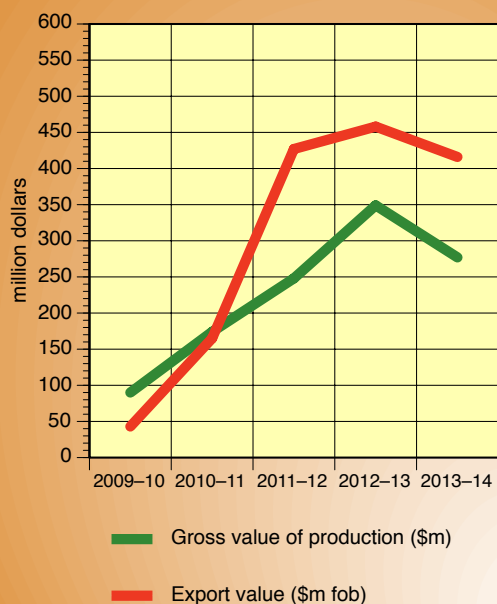
## Major world pulse trade and production (kt)

	2007	2008	2009	2010	2011	2012	2013
<b>IMPORTS: Asia</b>	4092	3591	4840	3761	5000	na	na
<i>India</i>	2952	2594	3750	2304	3222	4604	4095
<b>Africa</b>	831	848	698	1088	927	na	na
<b>Americas</b>	1148	1175	1154	1125	1196	na	na
<b>Europe</b>	1264	1116	1130	1204	1108	na	na
<b>Middle East</b>	223	316	380	314	368	na	na
<b>EXPORTS: Americas</b>	4894	4649	5842	6083	5889	na	na
<i>Canada</i>	3510	3126	4193	4307	4308	4955	5148
<b>Asia</b>	2483	3021	2743	2644	1797	na	na
<b>Europe</b>	941	930	1168	1065	1109	na	na
<b>Turkey</b>	259	165	239	254	267	na	na
<b>Australia</b>	616	961	1302	1430	2141	2228	na
<b>TOTAL WORLD PULSE TRADE</b>	<b>10636</b>	<b>10813</b>	<b>12609</b>	<b>12864</b>	<b>12407</b>	<b>12800</b>	<b>13000</b>
<b>PRODUCTION: Africa</b>	7291	7903	7186	9221	7507	8629	na
<b>Americas</b>	10801	11740	12321	12503	9603	11239	na
<i>Canada</i>	4181	4948	5189	5347	3883	5676	6469
<b>Asia</b>	24757	24314	24266	26470	28335	27479	na
<i>India</i>	15038	14065	14072	17236	17647	18450	19030
<b>Europe</b>	3231	3811	3963	4330	4695	4143	na
<b>Turkey</b>	1385	960	1237	1345	1234	1309	na
<b>Australia</b>	1589	1654	2144	2551	2633	2223	2228
<b>TOTAL WORLD PULSE PRODUCTION</b>	<b>61320</b>	<b>62446</b>	<b>63964</b>	<b>69627</b>	<b>68218</b>	<b>70419</b>	<b>71000</b>

### Summary of Australian rice statistics (paddy) by area and volume



### Australian rice export value and gross value of production



### Summary of world statistics for rice

	Area million ha	Production (Mt, milled)	Use (Mt)	Closing stocks (Mt)	Stocks to use ratio (%)	Trade Mt	Av. price US\$/t (Thai 100%)
2008-09	158	448	435	92	21.1	30	609
2009-10	156	441	438	94	21.5	31	532
2010-11	157	448	445	99	22.2	36	518
2011-12	160	465	458	107	23.3	39	590
2012-13	159	470	468	109	23.2	37	565
2013-14	161	474	474	109	23.0	39	535

### World rice production, by country [Mt, milled equivalent]

	Aust.	B-desh	Brazil	China	EU-27	India	Indon.	Japan	Myan.	Pakis.	Philip.	Thail.	US	Viet.	TOTAL
2008-09	0.04	31.0	8.6	134.3	1.6	99.2	38.3	8.0	10.2	6.9	10.2	19.9	6.5	24.4	448
2009-10	0.14	31.6	7.9	136.6	1.9	89.1	36.4	7.7	10.6	6.8	9.9	20.3	7.1	25.0	441
2010-11	0.51	31.7	9.3	137.0	1.9	96.0	35.5	7.7	10.6	4.8	10.5	20.3	7.6	26.3	448
2011-12	0.64	33.7	7.9	140.7	1.9	105.3	36.4	7.6	10.8	6.6	10.7	20.5	5.9	26.9	465
2012-13	0.82	33.8	8.0	142.9	1.9	105.2	36.8	7.8	10.7	6.0	11.4	20.3	6.4	27.3	470
2013-14	0.64	34.6	8.7	142.3	1.7	105.6	36.8	7.8	11.0	6.3	11.6	20.2	6.1	27.3	474

#### SECTION 2 THE GRAIN INDUSTRY IN FIGURES

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JOHN DEERE

In this section the rice crop is the year of planting.  
(The 2013-14 figure is therefore a forecast of the Australian rice harvest in March-April 2014.)



# Section

# 3

## District Reports

Reviews of the 2013–14  
season and plans  
for 2014–15

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# Western Australia

## GIWA report – 2013 in review

The 2013 season in Western Australia was extraordinary for many reasons, not least for the record delivery of grain. The Grain Industry of Western Australia (GIWA) report shows total grain production at just under 17 million tonnes (Table 1). While very high yields were the primary reason for this total, the continuing shift to cropping from livestock across much of the southern half is increasing the capacity of WA growers to produce more grain each season.

The season was extraordinary for the swings in yield potential from sowing in May, where the best conditions for years were reported, to a devastatingly dry June/July which threatened disaster for grain producers, to a wet August and September which produced tremendous yield potential.

Warm temperatures through spring which prevented any substantive frost damage to crops south of Great Eastern Highway, and perfect harvest weather enabled a dream finish to the harvest. CBH provided an excellent service to enable record deliveries to occur with minimal delays.

The fine harvest weather also resulted in excellent grain quality for all types across the State. Grain size, colour and freedom from weather staining was a feature of deliveries in all regions. On the downside and as forecast as early as September, the very high yields diluted the protein content in wheat and barley. This saw a lower than average percentage of Australian Hard Grade wheat delivered and barley downgrades to Feed from Malt due mostly to low protein.

Not all districts experienced a good season. As reported since June, the north east of the Geraldton Port zone (Ajana to Mullewa) suffered a below average season, as did the districts east of the Great Northern Highway from Wongan Hills and Dalwallinu, and north and east of Merredin. The late winter and spring rain did enable a harvestable crop to be produced in most parts of the eastern wheatbelt, albeit at low yields of around one tonne per hectare.

### Prospects for 2014

After the record breaking 2013 season, and a near perfect break of season in 2014, grower optimism is at an all-time high in almost all WA cropping districts. Comments like 'best start I have ever seen' are not

### SECTION 3 DISTRICT REPORTS

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uncommon. Widespread rains in the two weeks from April 24 to May 8 have set up a perfect opportunity for crop establishment.

Most growers used the opening rains to enable a knockdown spray of weeds. In some cases growers managed two knockdown sprays.

Forecast grain prices remain relatively strong. On the positive side, because summer rain has been limited to small isolated events, growers have been able to prepare for the coming season without the time and expense normally needed to control summer weeds. But the wet start to the season will also mean close attention will need to be given to post emergent weed control of winter weeds.

Soil moisture levels at the start of the season ranged from dry to low across the grainbelt. This situation means that the timing of follow-up rains will be critical to crop establishment on the lighter soils.

Additionally, the quantity of mineralised nitrogen in the soil profile is very low, which in many cases has required additional nitrogen applications at seeding to establish and maintain cereal and canola crops. This contrasts with recent seasons where, after extensive summer rain, there have been very high levels of soil nitrogen available for plants at sowing.

Relatively high prices forecast for wheat is leading to a slight increase of the area predicted to be sown compared to 2013 (Table 2). Canola area is also forecast to increase slightly due to the good opening rains thus reaching the full potential of area being planted. This increased cropping area is mainly taking place in 'flexible' paddocks which would have either been left fallow for weed control and a decrease in the area sown to barley in some districts.

Lupin prices also remains relatively high and this may cause a small increase in the area sown to lupins in suitable areas.

The area sown to milling grade oats is expected to fall after exceptional yields oversupplied the market last year.

■ Compiled from Grain Industry of Western Australia crop reports

**TABLE 1: WA planting area 2013 and 2014 estimates (hectares)**

Port zone	Wheat	Barley	Canola	Oats	Lupins	Field pea	State total
Kwinana	2,400,000	440,000	415,000	110,000	70,000	10,000	
Albany	666,000	365,000	366,000	63,000	13,000	5,000	
Esperance	398,000	243,000	255,000	2,000	9,000	15,000	
Geraldton	957,000	33,000	189,000	4,500	160,000	1,000	
<b>Totals 2014</b>	<b>4,421,000</b>	<b>1,081,000</b>	<b>1,225,000</b>	<b>179,500</b>	<b>252,000</b>	<b>31,000</b>	<b>7,189,500</b>
<b>Totals 2013</b>	<b>4,375,000</b>	<b>1,136,000</b>	<b>1,177,000</b>	<b>187,000</b>	<b>245,000</b>	<b>38,000</b>	<b>7,158,000</b>

**TABLE 2: WA production estimates – 2013 (tonnes)**

Port zone	Wheat	Barley	Canola	Oats	Lupins	Field pea	State total
Kwinana	5,102,000	1,495,000	639,000	294,000	120,000	13,000	7,663,000
Albany	1,873,000	1,411,000	552,000	230,000	18,000	7,000	4,091,000
Esperance	1,367,000	973,000	407,000	4,000	18,000	22,000	2,791,000
Geraldton	1,866,000	66,000	198,000	6,000	302,000	2,000	2,440,000
<b>Totals</b>	<b>10,208,000</b>	<b>3,945,000</b>	<b>1,796,000</b>	<b>534,000</b>	<b>458,000</b>	<b>44,000</b>	<b>16,985,000</b>

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# South Australia

## Crops in 2013

Harvest of the 2013 winter crop was completed in the earlier districts by early December, 2013. Showery weather and several severe fire danger days slowed harvest in the last two weeks of December in many parts of the state while harvest on Kangaroo Island and the south east was not completed until early February, 2014. Total state grain production was well above average at 8.55 million tonnes.

Yields across the state were average to above average despite the dry spring and above average temperatures during spring. Wheat yields were generally above average but significant yield losses occurred in barley crops from the strong winds in mid October.

Grain quality was variable with average protein levels in some areas and below average levels in others, despite higher than normal applications of nitrogen fertilizer.

Wheat screenings (small, pinched, underdeveloped grain) were higher than normal in many areas of the state, particularly on the heavier soil types.

Wheat test weights were lower than normal in some areas, particularly on Western and Lower Eyre Peninsula and the Mid North.

### SOUTH AUSTRALIA 2013–14 WINTER CROP PRODUCTION (tonnes) AND AREA (hectares) AGAINST THE 5 YEAR AVERAGE

		5 year average	2013–14
Wheat	Area	2,158,700	2,295,900
	Prod'n	4,039,900	4,976,000
Durum	Area	68,100	68,300
	Prod'n	178,300	194,930
Barley	Area	1,044,600	854,900
	Prod'n	2,224,600	2,093,500
Oats	Area	77,700	85,000
	Prod'n	123,000	159,700
Rye	Area	9,800	7,100
	Prod'n	8,500	6,350
Triticale	Area	81,300	49,300
	Prod'n	117,000	86,500
Peas	Area	119,200	106,100
	Prod'n	161,900	143,250
Lupins	Area	66,700	69,300
	Prod'n	88,200	105,500
Beans	Area	71,300	69,000
	Prod'n	124,500	139,400
Chickpeas	Area	13,500	20,700
	Prod'n	16,700	29,280
Lentils	Area	78,200	94,800
	Prod'n	116,000	163,350
Vetch	Area	13,600	17,000
	Prod'n	9,300	14,320
Canola	Area	225,900	301,000
	Prod'n	341,200	434,400
<b>Total SA crop</b>	<b>Area</b>	<b>4,028,700</b>	<b>4,038,400</b>
<b>Total SA crop</b>	<b>Prod'n</b>	<b>7,549,000</b>	<b>8,546,500</b>

### SECTION 3 DISTRICT REPORTS

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The frosts in October caused significant yield loss in isolated areas with actual losses higher than predicted prior to harvest.

Snails were generally at lower levels than normal but still caused problems during harvest in pea crops in a number of districts.

### Prospects for the 2014 season

- An intense low pressure weather system on February 14, 2014 brought heavy rain to a large area of the state, causing isolated flooding and some soil erosion, particularly in the areas damaged by widespread fires in mid-January.
- Self-sown cereals emerged rapidly following the rain with thick stands in the stubble of wind-damaged 2013 barley crops and paddocks with high levels of wheat screenings. Self-sown canola and pulse crops emerged more slowly.
- Both summer and winter weeds germinated with the February rain and many growers commenced spraying cropping paddocks in late February to conserve soil moisture for winter crops.
- The extended period of cool moist conditions in mid February will have resulted in significant soil mineralisation, improving nitrogen reserves for this year's crops.
- The hot weather in January and early February 2014 – combined with stubble management practices – significantly reduced snail numbers in areas where populations were high. Snail baiting following the rain has been undertaken on Yorke Peninsula to further reduce numbers. Mouse numbers have built up in paddocks where feed levels were high because of lost grain. Baiting began in these paddocks in mid March when the nutritive value of germinating grain had been exhausted and the mice became hungry.
- Because of above average February rainfall, there is good stored soil moisture in all the major cropping areas of South Australia providing farmers with confidence for the 2014 cropping season.

■ PIRSA Crop and Pasture Report, March 2014

## Victoria

### Western Murray Valley

#### Winter crops – summing up 2013

Dryland wheat in the district averaged 2.0–2.5 tonnes per hectare, highly dependent on rainfall events and nitrogen inputs. Standout varieties were Mace, Ventura, Emu Rock and some Corack. Many growers have bulked up with Suntop for 2014 due to outstanding NVT data the year prior.

Dryland barley averaged 2.2–3.0 tonnes per hectare. Again nitrogen inputs had a major bearing and if you were lucky enough for a big rain – it made all the difference. Growers are becoming more accepting of the requirement for higher nitrogen inputs as our soil status continues to stay down at 30–50 kg N in the 0–60 cm profile band. Hindmarsh barley was exceptional (0.7–1.0 tonnes per hectare better than most other varieties!). Buloke and Scope CL were ok with Baudin suffering with



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the tough spring. Gairdner being nearly gone as a preferred malt variety – generally had high screening of 15–20 per cent+ (yield was similar though to Buloke, Baudin). Most growers are eagerly awaiting the malt approval of Intergrain's LaTrobe barley due to its Hindmarsh background and adaptability to seasonal variation.

Canola yields were lower than anticipated. Dryland canola averaged 700 kg–1.2 tonnes per hectare with oils varying greatly (36–47 per cent). Some frosting accounted for this. Irrigated crops unaffected by frost were generally 2.3–2.5 tonnes per hectare with Crusher TT consistent and the performance of Stingray TT positively surprising us in most situations. The standout variety was Hyola 50 with high yields (2.8 tonnes per hectare) and high oil (46 per cent). But with herbicide resistant ryegrass/wild oats and weed spectrums of wild radish, mustards, turnips and Paterson's Curse it makes conventional canola a difficult choice. Triazine tolerant canola is essential to our longevity in continuous cropping situations.

Legumes – lupins were poor with a late start and quick finish, averaging 0.6 tonnes per hectare. Field peas performed better with a wet winter averaging 1–1.3 tonnes per hectare.

The hay market remains strong with the local dairy market and the northern NSW drought. Many growers received \$140–\$160 per tonne on-farm for good quality cereal hay. Most irrigated crops yielded 8–10 tonnes per hectare and this was an excellent herbicide resistant management tool with 'hay freezing' incorporated to assist with minimising seed set. This will become more common as herbicide resistance increases and our options are reduced.

Major challenges in 2013 were the late start in June and having enough confidence to be aggressive with nitrogen. The soil nitrate reserve remains low (40–50 kg N/ha) since the wet season of 2010 and reasonable cropping years since, which haven't increased the soil reserves. Growers are having to come to terms with applying 120–180 kg urea per hectare for dryland crops each year.

Without starting soil moisture, crop choice was challenging and growing important rotational crops such as canola and field peas was difficult.

## Summer crops in 2013–14

Rice crops on average were better than the previous year with less duck damage and more uniform plant stands. Some wind damage thinned areas out, but plant populations were acceptable for high yields. Cumbungi weed continues to increase in our rice paddocks with reduced tillage pre-seeding and increased rice on rice paddocks reducing rotation duration. With no in-crop options for established Cumbungi, other options will need to be considered such as cultivation and wick wiping.

Warm weather at PI (panicle initiation) created grower confidence and urea was top-dressed (100–150 kg/ha) to push crops from a conservative eight to nine tonnes per hectare to 10–11 tonnes.

It is interesting to note the practice of drill sowing is increasing (10–15 per cent) over traditional flooded aerial sowing (85–90 per cent) with reduced duck, bloodworm and wind damage. Some growers entered into drill sowing to reduce input costs (plane and herbicide inputs). This



Steve Fasham checking for panicle initiation in his Western Murray Valley rice crop.

has proven to be highly variable with drill sowing herbicide requirements often being a higher cost per hectare than aerial applications. Growers are reporting an ease of establishment and saving potentially one ML per hectare.

It is worth noting that barnyard grass pressure increases immensely and is difficult to manage

Corn has become increasingly popular with high commodity prices (\$290–\$305 per tonne on-farm) and opportunities to double crop.

Many growers are assessing the corn option with water values consistently increasing making planning for rice more difficult.

## High water costs

Temporary water on the Murray Irrigation Limited (MIL) scheme is currently trading at \$80–85 per ML (low of \$56 – high \$118). This price is too high to grow profitable rice crops if growers haven't hedged water volumes and pricing earlier. Rice water budgets usually begin at 12–13 ML per hectare versus corn 7–8 ML per hectare. The 2013 summer has seen most rice water usage at 14–16 ML per hectare and corn using 7.5–8.5 ML. Irrigation layouts and soil types are the major factors to crop choice and in time, with growers seeking higher \$ return per ML, there may be a shift for rice growers to put a portion of the area sown into corn to spread risk.

## Prospects for the 2014 season

Glorious rain! Over a three day period in early April 2014, most of the Western Murray Valley (WMV) received 60–80 mm. It was a slow fantastic rain that hardly ran-off and soaked the district. Many growers described it as a: "Once in a lifetime autumn break!"

With the excellent April rain – plus the pre-Christmas rain of 40–50 mm and a 25 mm rain in March we have received to date – a total of 125–150 mm. We now have stored soil moisture, winter weeds germinating and confidence to start sowing into moisture for this season's winter crop. It's amazing to see the district change from dry paddocks to a green tinge in literally five days.

Farmers are eagerly sowing lupins/canola and some long season cereals

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such as Wedgetail wheat, Urambi barley and some oats (yes... people are actually sowing oats). Many grain producers over the past 10 years have switched to short season wheat and barley varieties which can't be sown until early-mid May and finding long season varieties has been challenging. The alternative has been more canola to get started.

With lamb prices increasing to \$5.50–\$6 per kg many mixed farmers have put in grazing options on irrigation such as Italian ryegrass, Shaftal clover and some grazing cereals. There has been some early grazing of brassicas (Titan and Greenland) which was irrigated up early March and ready for grazing in only six weeks due to warm soils!

The early rain will give winter croppers an opportunity to use knockdown herbicides such as Roundup and gramoxone. This is vital for our herbicide resistance management by reducing weed pressure and allowing our pre-emergent herbicides such as trifluralin, Sakura, Boxer Gold and Avadex Xtra to work more effectively.

Rice harvest had begun 10 days prior to the big rain, but only a small amount of paddocks were harvested due to high grain moisture levels (above 22 per cent). The initial harvest reports are very pleasing with yield averaging 10–11 tonnes per hectare.

Corn paddocks sown early in the sowing window of late October have dried down and harvest will begin when paddocks become trafficable after the rain. Early moisture samples show corn yields of approximately 12–14 tonnes per hectare. This is very reassuring after three weeks of 40+ degrees in summer which caused concern for pollen blast and limited fertilisation of kernels.

■ **Laurence Pearce**  
Agronomist, IK Caldwell, Deniliquin NSW

## Victorian Mallee

### Overview

Season 2013 ended on a disappointing note for Mallee farmers with harvest mostly finished by the end of November. Low rainfall is the reason, with Growing Season Rainfall only totalling 175 mm in many areas. Some had less and areas of the southern Mallee had up to 250 mm. The difference being that this year there was no stored moisture as most areas didn't total more than 30 mm over summer. Expectations may have been higher with many farmers commenting that they grew more last year on less rain.

The message here is that stored moisture is money in the bank. It is fair to say that yields were 15–25 per cent below expectation and this was only evident once headers pulled into paddocks and the grain simply wasn't there. Hot winds and above average September temps also lowered yields.

Challenges arising from a dry lead-up

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were plentiful. There were crops affected by last year's herbicide residues caused by lack of microbial breakdown due to the shortfall of moisture. There was a lack of mineralisation to return free nitrogen to paddocks. This meant a lot of pressure was put on early nitrogen management, hence target yields couldn't be met.

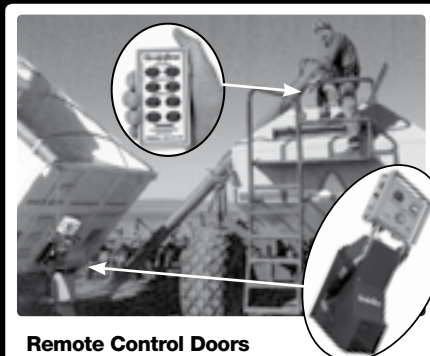


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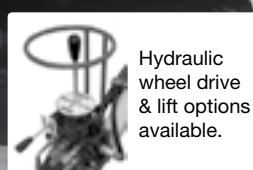
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Typically Mallee grain growers have used nitrogen to make good margins over many years. The decision to apply urea to crops in 2013 – only to have a tight finish – was challenging. Top-dressing is always finished by late August to target yield. The question is: “What if we didn’t top dress urea and the season finished off cool and wet?” It’s then too late to go back and do it so it’s a money up front proposition.

Farming is not a one year decision and we need to be careful not to base our decision making on one year’s experience. It will be different in 2014 – that’s a guarantee. A good example is early sown crops are often viewed as a frost risk. In 2013 the early sown crops were fine, where the late sown legumes suffered the most yield loss. This goes against the traditional philosophy.

The other main challenge was the high pressure of volunteer grains from the 2012 crop causing contamination in the 2013 crop. There were simply no solutions as there was no emergence prior to sowing. This caused some downgrading of the classification to feed quality with barley and wheat cross contaminating each other.

Volunteer canola caused some problems in cereals. It was more expensive to control early, but left late it robbed moisture which we later learned we just couldn’t afford to lose.

Herbicide resistance is to the point where choosing to ignore it could be a career ending choice. Many proactive growers have chosen to drop certain stubbles into windrows to be burnt. The message is not to rely on chemicals. We need cultural methods and some more biological control. Breeding programs such as the introduction of Clearfield tolerant Hurricane lentils will allow for better planning and rotational tools. Roundup Ready canola with triazine tolerance will assist and when we get this in a Clearfield tolerant variety, there will be less residue issues in following crops and more herbicide mode of action diversity.

On a positive note, grain prices held fairly solid which meant a significant difference in terms of overall gross return. Canola reached almost \$500 per tonne, peas \$250, chickpeas \$360 and lupins \$300 with lentils reaching \$500. Wheat was up to \$240 and barley \$180 per tonne.

Everyone would have liked an extra 20 per cent to compensate for the below average yields. Diversity is the key and like all farming challenges, commodity prices change too. There was a phase where farmers grew chickpeas on the back of prices of \$450 to \$600 per tonne. Now they are down to \$360, and we are seeing they are not an effective grass break and following crops lack some nitrogen benefits. Accordingly field peas made a comeback in 2013.

### Individual crop performance

**Canola** struggled to emerge in dry soils. Yields were down to 0.5 to 1.0 tonne per hectare. The average would be around the middle at 0.75 tonnes which is barely above break even price.

**Wheat** yields were variable depending on soil type and paddock selection/rotation. The yield range was too great to summarise, but those who averaged above 1.8 tonnes per hectare were relieved. Many were below this.

**Barley** was slightly higher yielding but again there was a hit on the price.

**Field peas** were mainly consistent averaging around one tonne per hectare. Prices were good and the additional benefits of nitrogen fixation and pre harvest grass control made these a good option in 2013.

**Chickpeas** are a later finishing crop and hence they copped some frost effect late in the season. Prices dropped off so they also copped a bit of criticism given that crops on grown chickpea stubble this year didn’t perform well.

**Lentils** are a moisture conserving crop and yielded like the peas. The price is the big appeal, so there has been some role reversal with chickpeas here.

**Lupins** also yielded well in 2013 at 0.7 to 1 tonne per hectare. The highlight was the \$300 per tonne which many growers received. This is considered high for stockfeed and would be a great proposition every year at this price.

There are some exciting times ahead with new varieties coming through of canola, wheat, barley, lentils, field peas and vetch – all having something new and suited to Mallee growers.

■ Simon Severin

## Wimmera

Harvest was all but complete by Christmas in the Wimmera for the 2013 season following a good run of weather and not too many interruptions. Each year seems to compact the harvest into an ever shorter time period as machines and infrastructure get bigger and more efficient.

Following the driest start to a season in memory for many of us, the weather gods smiled upon the Wimmera in May 2013 with a slightly late start. Opening rains brought most dry sown crops out of the ground, but cloddy soil conditions meant there was a staggered germination in many paddocks. Volunteer canola in cereal crops was the first problem to be addressed as marginal moisture was quickly used up by the volunteers. Wheat plants were too small to be sprayed at first so compromise treatments were made to get crops away. Many of these paddocks required a follow up treatment, but follow up rains saved the day.

It then became obvious that volunteer wheat in newly sown crops was going to be a problem. More of that problem later.

Winter rainfall in the Wimmera in 2013 was generally above average which was good for crop growth but did make spraying activities hard to fit in between rain events. Good managers used the rain to their advantage by applying large amounts of nitrogen in the July/August period to maximise tiller production. Many paddocks received a follow-up application of urea at mid to late tillering.

By September most crops were looking fantastic and only needed a finishing rain in October to realise their potential. As usual that rain did not come, but the crops had enough in reserve to make average or better. As October progressed, a series of small frosts had growers worrying if all their good work and dollars invested might end up as hay.

### An October frost

On Friday October 18, Donald district growers attended the annual Emerald Grain pre-harvest breakfast meeting at the Donald Football Club. All will clearly remember the Donald football oval as white as snow at 7.30 am that morning. The frost knocked flowers from chickpea and lentil crops over a large area and also damaged some canola and cereal crops.

Harvest approached in mid November when the header would decide how much damage was done that October morning. Early indications were that barley quantity was almost unaffected while quality seemed to be a consistent Feed 1. Perhaps this was caused by the early finish to the season rather than the frost. Most barley had escaped serious damage.

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Wheat crops were less fortunate. While quality was generally good and protein a little above average, yields were knocked back by as much as 30 per cent by the frosts in October. Growers reported driving the header into slight hollows in the paddock and seeing grain stop flowing into the tank. That illustrates how close Wimmera farmers were to a complete wipe out due to frost.

Pulse crops were variable in results with faba beans being the standout success. Good yield and good prices made beans the best legume for most growers. Chickpeas and lentils varied depending on maturity and topography. Those in low lying paddocks suffered considerably from frost. Most did flower again but not like the first time.

Canola yielded very well as new varieties proved their value to Wimmera growers. As with pulses, some low lying plains were badly hit by frost, but most fared well.

Growers who followed wheat with barley were concerned all spring by the contamination causing large dockages at harvest. The term 'wharley' was used to describe this grain!

Emerald Grain at Donald opened a segregation for wharley concerned there might be more than 10,000 tonnes in the district. Fortunately, most samples fell into the F1 grade and only about 4000 tonnes was F1W. Astute buyers could see value in this grade and were keen to buy it as growers delivered.

In summary, the 2013–14 season was a good one for most Wimmera farmers. Generally above average yields and reasonable prices were the order of the day and most agreed they would take another 2013 every year.

■ Mike Laidlaw  
Harberger Farm Supplies, Donald, Victoria.

## New South Wales

### Central West

The 2013 season was a mixed bag for the Central West of NSW – from fairly decent yields and happy growers to the south and the east of the region to the still desperate area to the north west taking in Walgett and surrounds.

Summer rain prior to the season was scarce resulting in low starting moisture profiles and little mineralization of nitrogen over the warmer months. In crop, mid-July saw the last of the rain till a late September blessing that saved the bulk of the crops in the region. This fall was in the order of 40–90 mm apart from the NW where Coonamble only received 14 mm with their harvest reflecting this. The winter was also a warm one, in fact the second warmest on record after 2009, with temperatures 1.5°C above the average.

Frosts were savage in parts, causing damage to the NE of the region on cereals and some damage to pulses in the bulk of the Central West.

The crop mix reflected the dry start with little to no canola going into the ground compared to the norm.

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### 2013 RAINFALL vs ANNUAL AVERAGE

Town	Coonamble	Nyngan	Trangie	Dunedoo
2013 rainfall	269	294	337	387
Av rainfall	543	486	520	654



Windrow burning at Collie.




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Chickpeas at 'Summerlea' Nyngan.

## Crop mix

### Cereals

Wheat dominated the crop mix with yields from 0 to 5.0 tonnes per hectare. Protein levels followed the rule of yield and protein being inversely proportional. The low yielding Coonamble district delivered 44 per cent of its wheat over 14 per cent protein. Tottenham had 72 per cent of its wheat delivered silo under 11.5 per cent protein, while Nyngan's level was 50.7 per cent wheat delivered below 11.5 per cent.

These levels reflect two things – very low yields and high protein go hand in hand and the lack of top-dressing opportunities for nitrogen in-crop on the better crops.

Disease wise 2013 was a big year for crown rot – little surprise really with the dry spring and little breakdown of stubble loadings from the previous years. On the flip side, rust levels were understandably low in the dry conditions.

Army worms went on the march in spring in the Trangie–Narromine area, with appropriate action taken to exterminate these critters!

The wheat variety mix was primarily Gregory, some Sunguard and Suntop, and a big push towards the shorter options such as Spitfire and small amounts of Dart where seed could be obtained.

The late planting also resulted in an increase in the area of barley sown, in particular the short season Hindmarsh.

One of the biggest problems emerging in the region was the scary amount of grass weeds that came through grass sprays. Preliminary data from an extensive Grain Orana Alliance (GOA) testing program has shown some resistance levels of serious concern. There has been an increased amount of windrow burning post-harvest to try and run grass weed seed numbers down.



Seedling canola at 'The Lease' Warren.

### Pulses

Pulse crops were dominated by chickpeas again – they are known for their low moisture usage and late sowing abilities but these traits were put to the test in 2013. Large areas of chickpeas failed or were unharvested in the Walgett-Coonamble-Burren Junction region as the spring rains just didn't come in high enough amounts. The crops that got through to stripping were plagued with a cool August that did not favour fruit retention and eight frost events from August 18 to 22. Yields ranged from 0–2.0 tonnes per hectare across the region. The dollar value for this crop still remains low and may affect crop selection decisions in 2014.

The lupin area was low but paid a handsome reward with prices in excess of \$600 per tonne. The late break was responsible for the small sowing and yields were in the 0.4–2.0 tonnes per hectare range. The usual challenges arose with this crop of poor plant stands, frosting and limited weed control options. The area will greatly expand in 2014 due to the buoyant prices and the great autumn break we are experiencing.

Field peas continued to increase in area in 2013 due to some better marketing options into the human consumption market in the Central West. The area is still small compared to the other legumes but there is increased interest in 2014. Yields varied from 0–1.7 tonnes per hectare and prices were very robust versus the like of chickpeas.

Faba beans were challenged by the lack of an autumn break. There was little disease pressure in the crop due to dry conditions and insect numbers were also low.

### Canola

Of the small acreage sown, the TT production system encompassed the bulk of canola hectares sown. With growers in the Central West hitting the brick wall of herbicide resistance, other tools from the toolbox are being utilised – triazine canola being one of these. Yields ranged from 1.0–1.7 tonnes per hectare, with a wide and wonderful variation in oil levels. Small areas of irrigated canola were grown in the Trangie region with 1.8–2.4 tonnes per hectare being achieved.

## Prospects for 2014

The bulk of the region has had the most terrific of starts – the sad exception to this is Walgett and parts of Coonamble, where rainfall has been needed the most, have sadly missed out. Walgett had only received 90 mm up to the end of April versus their average of 180 mm. Major falls will be needed before much winter cropping occurs in this area. Dubbo on the other hand was up to 294 mm by the end of April versus their average of 196 mm.

Canola planting is in full swing in the Nyngan/Tottenham area, with a obvious huge increase in area due to the great starting moisture levels we have. Faba beans are also going in the ground in the Coonamble region. Trying to get growers to not sow too early is the biggest challenge

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Canola at 'Kinross' Gulargambone.

at the moment. Early wheat varieties will be utilised and pushed to the start of their window.

A healthy range of legumes will be thrown in the mix as growers attempt to get some N in the system after a number of years of low wheat protein levels.

■ Penny Heuston  
Delta Agribusiness, Warren

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## Queensland

### Darling Downs

#### Overview

The past 12 months have been exceptionally dry with rainfalls around 35 per cent of the average for March to March. This has meant that the winter 2013 and current summer crops have both had to rely on stored soil moisture for yield and quality. The only saving grace has been the exceptional rainfall at the end of March, with most of the area receiving between 125 and 200 mm of soaking rain, which has filled the moisture profile in many cases. The exception to this is where the ground was worked for weed control, and in places this has led to significant erosion from the heavy rain.

#### Winter 2013

June 2013 rainfall was good and allowed some good establishment of the winter crops. Wheat and barley areas were up 50 per cent and 30 per cent

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respectively on 2012 with strong prices encouraging the plant, and there was more double cropping than usual due to good soil moisture levels.

There was some early disease in cereals and pulses but as the season dried out this disappeared. The first major blow was the frosts in mid-late August which caused significant leaf burn and even killed some plants outright. Chickpeas were particularly hit hard by a  $-7^{\circ}\text{C}$  ground temperature following mild minimums of  $10\text{--}15^{\circ}\text{C}$  and maximums around  $24^{\circ}\text{C}$ . Fortunately, the stored soil moisture allowed crops to grow back but maturity was delayed and the crops all suffered from lack of rain and warmer temperatures due to growing later in the season.

There were some unusual crop effects with pod abortion in chickpeas caused by an October frost after temperatures in the mid  $30^{\circ}\text{C}$ , and this occurred more in the later sown crops delayed after the August frosts.

At the finish, winter crop yields depended very much on the level of stored soil moisture. Wheat ranged from 1.0 to 4.5 tonnes per hectare, although the crop mostly managed low screenings and fair protein. Barley performed better with the top yields around 5.0 tonnes per hectare. Chickpeas averaged a disappointing 1.25 tonnes per hectare. There was some crown rot damage and mouse damage later in the season reducing yields, although at least the cereal prices were strong.

### Summer 2013–14

Crop establishment was difficult, both with irrigated and dryland crops. The irrigators found it difficult to water-up the cotton and corn, and some crops needed replanting. The dryland growers had to contend with the lack of a general planting rain, with isolated storms their planting opportunity, and this led to crops with patchy emergence or some growers not able to plant one hectare of summer crop. Dryland cotton planting opportunities were very limited.

The summer went downhill from there with minimal rainfall and a dose of over  $40^{\circ}\text{C}$  weather with hot winds around New Year which halted pasture growth and affected all crops. The dry weather also put paid to the summer plant option. The sorghum area was only about 70 per cent of the expected planting. Some soybeans were able to be planted but the moisture disappeared before most of the mungbean crops could go in, and there was very little summer corn planted.

The end result was that all the dryland crops suffered significant moisture and heat stress through the season. Some early sorghum was harvested before the end of March with yields between 1.5 and 5.0 tonnes per hectare. The majority of the crop was harvested in mid to late April, a few weeks after a late March rainfall. There was some sprouting damage but fortunately with the grain so short in supply, prices for both sorghum 1 and 2 are holding up well. But mice have been a major problem in sorghum, along with wild pigs in areas. A number of sorghum and corn crops were cut for silage as the outlook tightened, with demand at record highs for silage and hay.

Soybeans have coped well enough with the stress to form harvestable

seed although the crops are very short, whilst the few mungbean crops will be very average as they suffered from split pods and sprouting from the rain.

The hot dry season did suit the irrigated cotton but most growers ran short of water at the finish, and then the late March rain has reduced yield and quality. Overall a very difficult summer.

### Winter outlook for 2014

From a mid-March depressing outlook, the rainfall spread over a full week has filled a lot of soil profiles, and this has revitalised the winter crop outlook. Forage crop seed quickly ran short, especially oats, and barley seed is now tight as early planting is underway.

There will be an increase in the barley area due to its strong price, competitive growth and growers looking to combat disease, and from almost no chickpeas being planned, chickpeas will now have a reasonable area. Wheat will be the mainstay, but growers are praying that there will be a planting rain in May so they can plant in the window.

The experts tell us we are heading towards an El Niño event later in the year, so there is a move to make use of this moisture with winter crop, and this may lead to less ground being fallow for the next summer crop.

■ Hugh Reardon-Smith, Agronomist  
Landmark, Pittsworth

## Central Queensland

### Weather

It was a hot and dry 2013–14 summer in Central Queensland (CQ). November 2013 was the last month most grain growing districts had above average monthly rainfall. During the last week in March 2014, the Dawson (over 120 mm) and Callide (around 100 mm) districts received above average monthly rainfall whereas most of the central highlands received only moderate (about 60 mm) falls and only more in a few patches (over 100 mm).

In mid-April Cyclone Ita drenched the North Queensland coastal strip but inland CQ receive only small but steady falls.

### Winter crop 2013

**Wheat:** The area planted to wheat in 2013 was about average for CQ (200,000 hectares). Interruptions due to rain caused an extended planting period from mid April to early July. Farmers were pleasantly surprised at yields given many crops received no in-crop rain. The yield range of early planted crops was 2.5 to 4.0 tonnes per hectare but soil moisture was a limiting factor in double cropped, late planted or weedy crops and yields were low (0.7 to 1.7 tonnes per hectare.) Low grain protein (8.5–10.5 per cent) was common.

The crop demand for nitrogen has increased as a result of improved farm practice in CQ, leading to better use of rainfall and increased yield with less water. Also, a decline in soil fertility (lower organic carbons means there is less N to mineralise for the next crop) as a result of 50 plus years of cropping and a run of good seasons and high yielding crops, have depleted soil N reserves. Unless CQ farmers increase the amount of nitrogen they apply where needed, they will fail to optimise yield and protein.

**Chickpea:** Planting of chickpea (80,000 hectares) extended from early May to late June 2013. Ascochyta Blight was detected in some early crops and preventative sprays were applied by some growers but many did nothing. Dry weather prevented Ascochyta Blight from becoming a major issue in the 2013 season. Chickpea yields range from 1.4 to 2.0 tonnes per hectare. Frequent fires in headers while harvesting chickpeas were a serious issue especially during extremes of high temperatures and

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low humidity. Some farmers were forced to stop harvesting chickpea crops until weather conditions changed.

### Summer crop 2013–14

**Sorghum:** The area planted to sorghum in CQ this summer was well down (80,000 hectares) from average (250,000 hectares). A small area of sorghum (30,000 hectares) was planted in mid January 2014, in the Callide and Dawson, and parts of the central highlands (Gindie to Clermont). A slightly larger area (50,000 hectares) was planted late (end of January to late February), much of this in the northern highlands (Mt McLaren) following patchy and variable rain.

While some paddocks had good moisture and will achieve above average yields, a significant area was planted on a 'wing and a prayer'. Current prices of \$300 per tonne delivered port (Mackay/Gladstone) were reason enough for many farmers to push the planting window. A few crops had already failed prior to good but patchy rain in late March. Sorghum is a 'very forgiving crop' so some crops will yield better than 4.0 tonnes per hectare although most crops will only achieve moderate yields (about 2.5 tonnes per hectare).

**Mungbeans:** The area planted to mungbeans (20,000 hectares) is down on recent years. Crop yields have generally been low and some crops have failed but high prices have made most crops worth doing.

**Sunflower:** The area planted to sunflower is low (less than 5000 hectares)

### Prospects for the winter crop 2014

**Winter crop:** How much and when rains falls will determine the area planted to winter crop in 2014. A small summer crop planting

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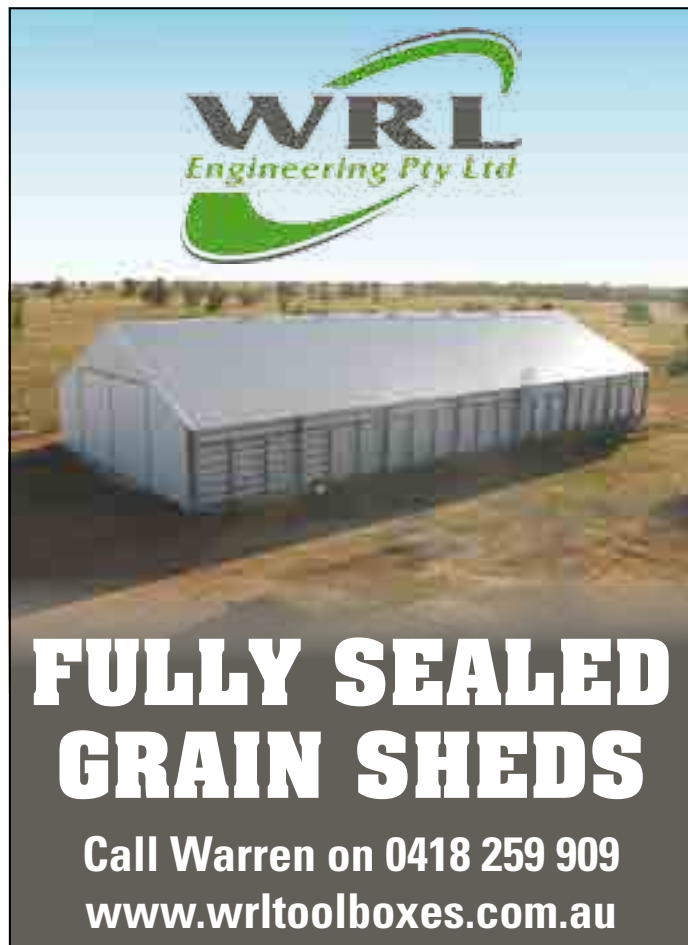
means a potentially large area is available for winter crop. But while many paddocks have sufficient soil moisture to plant, farmers can expect low to moderate yields unless good in-crop rain falls. January-February is generally the wettest months in CQ and is most frequently when the soil profile is filled for winter crop. Farmers then look for rain in April/May to re-wet the soil surface to plant. One good rain event post-plant is enough to make a wheat crop. My early estimate is about 150,000 hectares of wheat and 50,000 hectares of chickpeas but a big rain would see that increase substantially.

**Wheat:** Wheat planting started in mid April in CQ for some farmers with frost free paddocks. The majority of the wheat will be planted during the period, last week of April through to mid May.

**Chickpea:** Chickpea planting will not start until early May for most farmers.

### Livestock and pastures

Pastures from Clermont to south of Rolleston are surprisingly green but short, given low rainfall during summer. While it is too late to grow bulk pasture recent rain has added months of quality feed going into the



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2013 winter. Most cattle are in good to excellent condition as summer pastures have generally been short but of a higher quality.

## Water

Rainfall has been variable and in many cases insufficient to run water. As a result some farms dams are full while neighbours are still carting water – a major issue for people who rely on surface water and dams for stock water. The Fairbairn Dam is currently at 54 per cent capacity or 706,555 megalitres.

## Property values

High farm debt, low commodity prices, high input cost and retaining skilled staff are major issues for many operators in rural Australia including CQ farmers. But there are enough CQ farmers with financial capacity to ensure demand for farming land is strong, especially for the better scrub soils and in the Kilcummin/Mt McLaren and Gindie districts. It is difficult to determine an average value for land as some individual property values are inflated because they were bought with 'mine money' or neighbour buying neighbour. It is also tricky to value assets that go with the sale. Farming land at \$1400 to \$2000 per hectare and \$1000 to \$1500 per hectare for grazing land is a rough guide.

■ **Maurie Conway,**  
Central Queensland Grower Solutions, Sustainable Farming Systems,  
Department of Agriculture, Fisheries and Forestry.  
Emerald.

## South Burnett

### Overview

Last year was described as wet, wet and more wet while this year it has been dry, dry and more dry. It was literally 12 months between decent soaking rains – first week of March 2013 until the third week of March 2014. Although there was a limited planting opportunity in November.

About 70 per cent of the expected summer planting area was planted. Many crops were planted on marginal moisture. Crops that were planted around November suffered severe drought and many never recovered. They got hit with heat and drought all the way through to mid-March. Too late for most crops.

Establishment was patchy in many paddocks. It was a problem over all types of crops. The main reason was lack of soil moisture and the seedbed drying out quicker than expected. Even very experienced farmers were caught out with the speed of soils drying out.

Overall most growers are saying this is their worst year ever. It is particularly bad for growers along the creeks and rivers that had been flooded and lost crops and infrastructure to be faced with a significant drought. The increase in irrigation costs made an already bad situation worse.

Growers spent much of the winter repairing flood damage and waiting until parts of paddocks dried out to get them ready for a summer crop.

## Crop performance

**Peanuts:** The 2013–14 peanut crop plantings are about 75 per cent of anticipated due to lack of planting rains. Rain in November allowed many crops to go in on limited moisture, but then most crops never received significant rains until the third week in March.

Obviously the protracted dry had a very big impact on the growth of most crops. Some crops never got more than 15–20 cm across. Other crops that managed to score a storm grew better, but due to the dry conditions put on a very poor crop. Quite a few of these pods were empty, indicating a dry podding zone and unable to take up calcium.

Some peanut crops have been made into hay and sold for around \$400 per tonne.

As many crops will be late, due to lack of heat units, we do not need frosts around the typical first frost time of Anzac Day.

Peanut yields will be down significantly due to the drought conditions. Of the crops that will be harvested yields will be variable from 0.4 to 1.2 tonnes per hectare.

**Corn:** The area of corn is about 60 per cent that of expected.

The drought hit the corn crops hard. Some never got over a metre tall and have died. Quite a few others have been taken off for silage. Not good quality, but farmers and feedlotters were desperate for feed.

Yield potential for those crops to be harvested will be around 0.8–2.0 tonnes per hectare.

**Sorghum:** Sorghum plantings suffered from patchy establishment. But sorghum handled the dry conditions better than the other crops.

Ironically, when it was time to harvest the November planted crops in the third week of March, it rained. It was fortunate that shot and lost grain levels were not as high as expected. Yields ranged from 0.5–2.0 tonnes per hectare.

**Winter cereals:** Winter crop plantings in 2013 were down as there were few planting opportunities in late May and June. Also many paddocks were still being repaired from the floods and wet weather over summer.

Some winter crops were damaged by frost. Generally damage was partial head sterility of wheat, and some patches in low lying areas. A couple of crops were cut for silage that had bad damage. Overall the dry weather did a lot more damage than the frosts as crops received no significant rain until November.

**Pulses:** Pulses plantings were well down on expected. Planting time is December and January and there was little rain at this time, other than a few isolated storms. Crops really struggled under the dry conditions and quite a few crops have been lost.

**Soybeans:** Hardly any planted. Most of the dryland crops abandoned.

**Mungbeans:** Hardly any planted. Not worth commenting on.

**Navy beans:** Only a couple of crops planted.

**Chickpeas:** Very few chickpeas in 2013.

## Trends in cropping and/or livestock

More cropping country is going under pasture by both cropping farmers and blocks bought by 'life stylers'. This trend will continue following the very bad year for croppers.

## Trends in property values

Prices for bare cropping land can be up to \$5000 to \$6000 per hectare. With the current returns from cropping it is impossible to justify these prices. Despite the increase in number of blocks for sale the price is holding so far.

■ **Ian Crossthwaite**  
BGA AgriServices, Kingaroy

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# Section

# 4

## Managing Resistance

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# Break the glyphosate habit



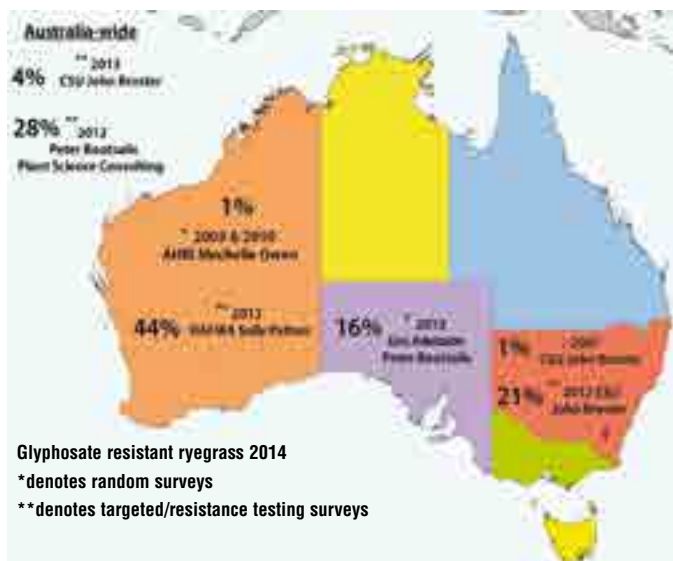
We are creatures of habit. For some reason I always buy Colgate toothpaste, the other brands don't even get a look in. Mrs Marsh was just so trustworthy and I daren't use another brand for fear of my teeth falling out.

Similarly, when it comes to knockdown herbicides, most growers automatically reach for the glyphosate. Such a reliable, brilliant herbicide that rarely lets them down.

But this year may be the first year that glyphosate fails for many Australian grain growers as resistance to this herbicide is going through the roof in some areas.

Random surveys of WA by AHRI researcher Mechelle Owen in 2010 found that seven per cent of paddocks surveyed had glyphosate resistant ryegrass. This was up from one per cent in 2003. Another survey (not random) by Sally Peltzer from DAFWA in the South West of Western Australia in 2013 found that 44 per cent of paddocks surveyed had glyphosate resistant ryegrass. Other surveys by John Broster, CSU, and Peter Boutsalis, Plant Science Consulting, are also turning up plenty of glyphosate resistance.

The short term answer is to use more paraquat based products and don't automatically reach for the glyphosate. But this is not a long term solution as paraquat resistance will result. There can be only one true long term solution and that is to farm with a very low weed seed bank.



## Random or targeted surveys

The Glyphosate Sustainability Working Group led by Dr Chris Preston have documented a huge increase in the discovery of glyphosate resistance in Australia in recent years (Figure 1).

There are two types of resistance surveys – random or targeted.

The random surveys visited randomly selected paddocks and sampled

Random survey	Targeted survey
Paddocks selected at random in a given area	Samples taken where weed numbers are high and/or resistance is suspected
Samples taken by researcher if weeds are found	Agronomist/grower nominates weedy paddock and takes sample
AHRI – 2010 University of Adelaide 2011 and 2012 Charles Sturt University 2007 and 2010	DAFWA – WA – 2013 Charles Sturt University, Griffith NSW 2012 Resistance testing services • Charles Sturt University, • Plant Science Consulting, Adelaide
1090 samples tested for glyphosate resistance	1022 samples tested for glyphosate resistance
23 samples with 20 per cent or greater survivors to glyphosate	207 samples with one per cent or greater survivors to glyphosate
Two per cent of samples confirmed resistant	20 per cent of samples contain glyphosate resistant ryegrass

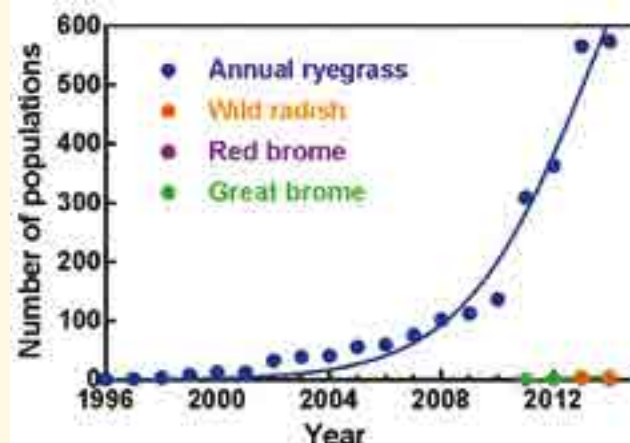
weeds from a range of species which were later tested. The targeted surveys sampled weeds from weedy paddocks that were nominated by growers/agronomists. They were not targeted specifically because glyphosate resistance was suspected – they were targeted because weed numbers were high and resistance to a range of herbicides was suspected.

There were 207 paddocks (20 per cent) with glyphosate resistant ryegrass in the targeted surveys. This should serve as a big wake up call.

## The results

The random surveys found low levels of glyphosate resistance. On average, only 2 per cent of populations tested as glyphosate resistant (20 per cent survival or greater). Two per cent may sound very low and that there is

**FIGURE 1: The number of populations of ryegrass and brome grass with confirmed glyphosate resistance (by testing) in Australia as reported by the Glyphosate Sustainability Working Group. This is the confirmed populations only. The actual number of glyphosate resistant populations is likely to be much higher.**



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**TABLE 1: Summary of random surveys testing for glyphosate resistance. Only populations with greater than 20 per cent survival to glyphosate are reported here.**

Year of sampling	Organisation	Region of survey	Number of samples	Number with glyphosate resistance	% of paddocks with glyphosate resistance
2010	AHRI	WA	362	3**	1
2007	Charles Sturt University	Eastern NSW	127	1	1
2010	Charles Sturt University	Western NSW	121	0	0
2011	University of Adelaide	Northern Victoria	115	0	0
2012	University of Adelaide	North Mallee SA	127	0	0
2012	University of Adelaide	South Mallee SA	116	0	0
2012	University of Adelaide	South east SA	122	19	16
<b>Total</b>			<b>1090</b>	<b>23</b>	<b>2</b>

\*\* Mechelle Owen found 25 populations with survivors to glyphosate in the AHRI survey, however only 3 populations had greater than 20 per cent survival.

**TABLE 2: Summary of targeted surveys testing for glyphosate resistance. Weedy paddocks were targeted (not necessarily where glyphosate resistance was suspected). DAFWA survey is populations with 1 per cent or greater survival. Charles Sturt University data is 10 per cent survival or greater.**

Year of sampling	Organisation	Region of survey	Number of samples	Number with glyphosate resistance	% of paddocks with glyphosate resistance
2013	DAFWA	South West WA	132	58	44
2012	Charles Sturt University	Griffith, NSW	99	21	21
2013	Charles Sturt University resistance testing service	Australia wide	391	15	4
2012	Plant Science resistance testing service	Australia wide	400	113	28
<b>Total</b>			<b>1022</b>	<b>207</b>	<b>20</b>

207 paddocks (20 per cent) with glyphosate resistant ryegrass. This should serve as a big wake up call.

nothing to worry about. But, this is actually a significant result for a random survey. We also need to keep in mind that several of these random surveys are a few years old so resistance levels will have increased since.

The targeted surveys found much higher levels of resistance. Twenty per cent of populations from targeted surveys had glyphosate resistant ryegrass. In some of these surveys we are reporting one per cent survival or greater and in others it is 10 per cent survival or greater so the definition of resistance is different to the random surveys. Keep in mind that the targeted surveys were not specifically targeting glyphosate resistance, they targeted weedy paddocks where resistance to a range of herbicides was suspected.

## Testing for glyphosate resistance



Testing annual ryegrass for herbicide resistance.

Testing for glyphosate resistance is increasing. Growers who send weeds to resistance testing services are now often requesting for glyphosate to be tested. Testing for resistance is a great idea, especially for rare resistance genes such as glyphosate.

## Short term answers

Use more paraquat based products as either a single knock or in the double knock technique. Paraquat based

products are most cost effective at controlling small weeds. We should use more paraquat based products in these situations to give glyphosate a break.

For example, in Western Australia this year there was a perfect opportunity for a paraquat based knockdown. A long, dry summer with

a distinct break at the end of April. Growers were faced with only small weeds. There is no need to use glyphosate in this situation.

The double knock of a full rate of glyphosate followed by a full rate of paraquat based product one to seven days later is the ideal herbicide option to take the pressure off glyphosate. But it simply isn't possible to achieve a double knock on every paddock every year. This practice should be used whenever it is practical and cost effective.

## Long term answers revolve around low weed seed bank

The problem with the short term answers above is paraquat resistance. The first herbicide resistance paper that Professor Stephen Powles published in 1986 was on paraquat resistance. Rotating to paraquat is a good idea but is only a short term solution.

The only real, long term solution to glyphosate resistance in ryegrass (and all resistance problems for that matter) is to farm with a very low weed seed bank. Once growers declare war on weeds, and adopt a take no prisoners approach using a combination of chemical, cultural and mechanical weed control, they have a win. It is difficult, and takes considerable motivation, but it can be done.

Declare war on weeds (guerrilla warfare is best, confuse the enemy), and take no prisoners.

## What to do if you suspect glyphosate resistance this year

**Step 1:** Test. Sample some plants from the field and send them to Peter Boutsalis of Plant Science Consulting in Adelaide for quick testing.

**Step 2:** If resistance is confirmed jump hard on the problem. Don't let them set seed.

**Step 3:** Develop a long term plan to declare war on weeds. Chemical, Cultural, Mechanical.



# Non-herbicide tactics to suppress weeds and help resistance management

■ By Greg Brooke, NSW DPI, Trangie

## AT A GLANCE...

- At Bithramere, northern NSW, east–west crop row orientation in barley yielded the same as north–south sowing but reduced biomass of weeds by 30 per cent compared with a north–south row orientation.
- At Merredin and Beverley in WA, east–west sowing gave a 24 per cent yield increase in cereals and a 37 to 54 per cent suppression in weed biomass.
- At Trangie, north west NSW, increasing the seed density of the barley varieties Hindmarsh and Granger, improved their yield and also increased their competitiveness against weeds.

**T**he rise in herbicide resistance throughout Australian cropping systems has meant that weeds are dictating more and more how farmers can farm. With multiple resistance occurring in some weed species, non-herbicide measures to control or at least help suppress weeds are of increasing necessity. For integrated weed management (IWM) systems to be effective, non-herbicide strategies are imperative.

Prior to the advent of selective in-crop herbicides and the introduction of the semi-dwarf gene, cereal cultivars were taller and by nature had more suppressive effect on weeds such as oats. A crop's competitive effect is most highly correlated with its ability to generate a large leaf area index early in its growth stage.

Several studies have been done amongst current cereal cultivars to determine whether some varieties are inherently better at suppressing weed growth than others.

Can the inherent ability of some varieties to accumulate biomass be put to effect against weeds?

What are the trade-offs in yield vs weed suppression from high vs low harvest index varieties?

Does increasing the crop sowing rate assist with weed competition? And what are the effects of increasing seeding rate on variety performance and on weed suppression?

Does row orientation make any difference to either yield or weed suppression?

It is involved that as a plant type, barley is more competitive than wheat, and for this reason barley is usually chosen for these plant competition trials.

## Row orientation – does it make a difference?

Many paddocks in the northern cropping region of Australia were originally set up for controlled traffic tramlines around 15 years ago. This was based on practicalities such as reducing headland area by choosing row direction according to the longest run of the paddock. This meant that row direction varied from paddock to paddock. In irrigation fields it is with the fall of the paddock. Practicalities aside, what difference does row orientation make to crop yield and suppression of weeds?

Deliberately orienting crop rows at 90 degrees to the sunlight direction east–west (E–W) works on the principle that the crop will intercept more sunlight (photosynthetically available radiation) than will N–S sowing, giving weeds less chance to develop in the crop inter-row.

In winter when the sun is at a lower angle (solar plane) this shading of the inter row can confer advantages particularly in southern latitudes. Western Australian research from 2002 to 2005 at Merredin and Beverley (latitudes South 31° to 32°) has shown both yield advantages as well as weed suppression from east–west row orientation compared with north–south.

Merredin in Western Australia is similar in latitude to Tamworth, northern NSW.

Annual total solar radiation at Merredin is very similar to annual total solar radiation at some eastern state sites, for example: Merredin WA 7036 MJ/m<sup>2</sup>; Trangie NSW 6864 MJ/m<sup>2</sup>; Goondiwindi Qld/NSW border 7172 MJ/m<sup>2</sup>.

Within wheat and barley crops oriented east–west in the WA trials, weed biomass (averaged throughout all trials) was reduced by 51 and 37 per cent, and grain yield increased by 24 and 26 per cent (compared with crops oriented north–south).

Weeds sown into these trials were wild radish at 300 pod segments per m<sup>2</sup> and annual ryegrass at 200 seeds per m<sup>2</sup>.

At Bithramere near Tamworth in 2012, Matt Gardner and others established a trial with two barley varieties – Hindmarsh and Skipper – with a sown population of canola as a substitute weed.

Row orientation as well as row spacing (30 cm vs 50 cm) were evaluated. An E–W row orientation conferred a reduction in weed (canola) biomass of 39 per cent.

Skipper, being more vigorous than Hindmarsh, reduced weed (canola) biomass a further 30 per cent and 42 per cent over Hindmarsh for the N–S and E–W sowing.

Fumitory weed was also prolific in the N–S sowing but was reduced almost to nothing in the E–W row orientation.

Row orientation had no significant impact on grain yield under high weed competition. When no weeds were present, the N–S orientation had a 6 per cent and 7 per cent yield improvement for the 30 and 50 cm row spacing treatments.

Summer crop research with sorghum in 2011 showed row orientation had no advantage in terms of yield. This is most likely because the sun is at a higher angle over summer and also because of the relatively lower plant populations involved and the wider rows (75 cm).

But importantly, E–W sowing of sorghum did not yield any less than did N–S sowing meaning it would be compatible with winter crop programs which deliberately oriented crop rows E–W for weed control.

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## Row spacing – does it make a difference?

The Bithramere 2012 trial with 30 cm vs 50 cm showed no clear effects in reducing weed (canola) biomass, but the wider row spacing did incur a yield penalty of 11 per cent in the nil weed treatment.

At Merredin WA, two row spacings of 23 cm vs 60 cm were used and at Beverley WA two row spacings were studied at 18 cm vs 36 cm. Averaged throughout all trials, weed biomass was lower in crops with narrow row spacings.

## Varieties – are there differences?

Most published work has concentrated on crop type (such as barley vs wheat vs canola vs lupins etc) and not on varieties. Recent work with barley varieties shows there is as much difference between barley varieties as there can be between crop types.

The Bithramere trial with two barley varieties showed the more vigorous barley variety Skipper, reduced weed (canola) biomass by 30 to 40 per cent over Hindmarsh.

Skipper also out-yielded Hindmarsh with both weeds present and not present and at both 30 and 50 cm row spacings.

Figure 1 summarises the results of a barley competition trial conducted at Trangie in 2013 and shows the capacity of different varieties to yield both with and without weeds and the yield loss incurred by weeds (oats).

Fifteen barley varieties were sown at 100 seeds per m<sup>2</sup> and three of these varieties were sown at double rate of 200 seeds per m<sup>2</sup>. Row spacing was 33 cm. The oat variety Yarran was surface sown as a substitute weed at 50 seeds per m<sup>2</sup> and was allowed to grow right

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through until maturity. The yield loss attributed to weeds averaged across all varieties was 0.3 tonnes per hectare.

The popular and high yielding variety Hindmarsh, both with and without weeds present, was the highest yielding barley variety. Increasing the seed rate to 200 seeds per m<sup>2</sup> improved the yield of Hindmarsh both with and without weeds and also gave greater suppression of weeds.

This is consistent with other seeding rate trial work with Hindmarsh in variety specific agronomy package (VSAP) trial work.

The variety Granger at 200 seeds per m<sup>2</sup> improved yield where weeds were present but only maintained yield where there were no weeds present.

Figure 2 shows the effects of weed (oat) suppression by barley variety.

Varieties such as Hindmarsh which are lower biomass types proved less suppressive of weeds than bulkier types such as Granger, Fathom and Commander.

Increasing the seeding rate of Hindmarsh caused greater suppression of oat yield.

Granger at 200 seeds per m<sup>2</sup> gave the greatest reduction in oat yield.

More information: Greg Brooke, NSW DPI, Trangie – Mobile: 0437 140 577  
Email: greg.brooke@dpi.nsw.gov.au

This article was reviewed by Tony Cook NSW DPI Tamworth.

FIGURE 1: Barley competition trial, Trangie 2013

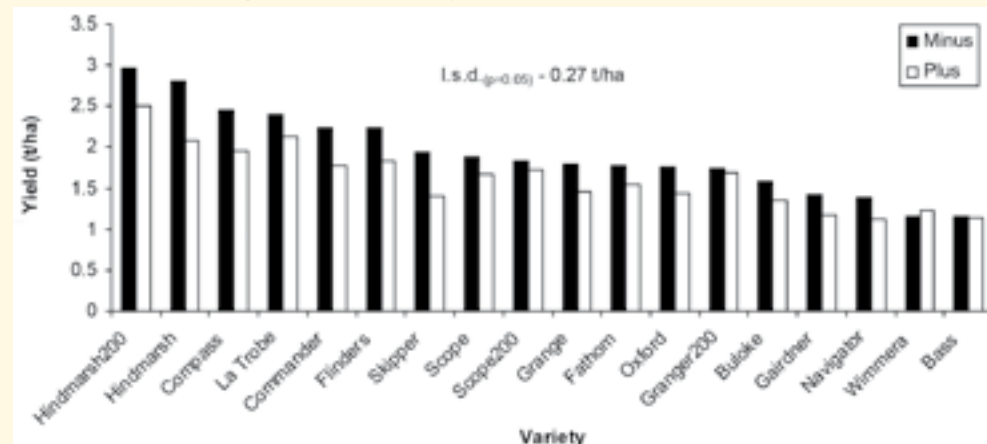
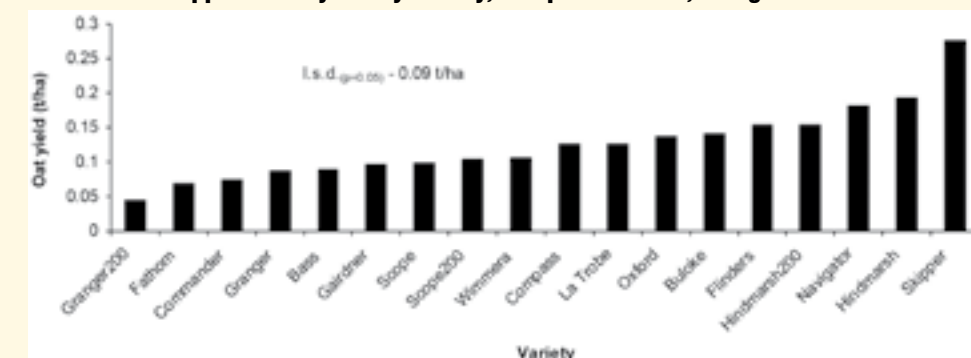


FIGURE 2: Oat suppression by barley variety, competition trial, Trangie 2013



# Section

# 5

## Precision Agriculture



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# Precision agriculture adoption trends: What, where and for how long?

Rick Llewellyn<sup>1</sup>, Jackie Ouzman<sup>1</sup>, Frank D'Emden<sup>2</sup>

There are many aspects to the adoption of precision agriculture by Australian farmers. For some simpler components such as GPS guidance, adoption has been relatively rapid and widespread, while adoption of precision agriculture technology for site-specific management has been considered to be relatively slow but on a rising trajectory. Compared to the more uniform benefits of GPS guidance and autosteer, adoption of variable rate management and reasons for its relative advantage are expected to be far more 'site-specific'.

As part of a broader GRDC-supported study of practice change by grain growers, the path to PA adoption across a range of southern Australian regions has been investigated. The study placed particular emphasis on the role of advisers and the perceived benefits of future adoption. The study collected data on various PA component practices and technologies ranging from yield mapping, variable rate fertiliser through to soil and crop mapping technologies.

A key aim is to help identify where potential lies to most effectively facilitate future profitable use of PA practices, and more complex farming practice change generally.

The focus of this summary is on the rate of adoption of different practices over time.

## How the survey was done

In September-October 2012 a survey of 573 growers across Australia's southern grain growing region was conducted by telephone with

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respondents chosen at random from a database of growers with greater than 500 hectares of grain crops.

Regions covered included South Australia (Central, Mallee, Upper and Lower Eyre Peninsula); Victoria (Loddon, Wimmera, Mallee); NSW (Riverine Plains; Central West) and Western Australia (Southern; Northern Central; Southern Central).

Among a large number of questions eliciting farm, farmer and perception information, farmers were asked to report on what year they first started using a particular practice or technology.

## What we found

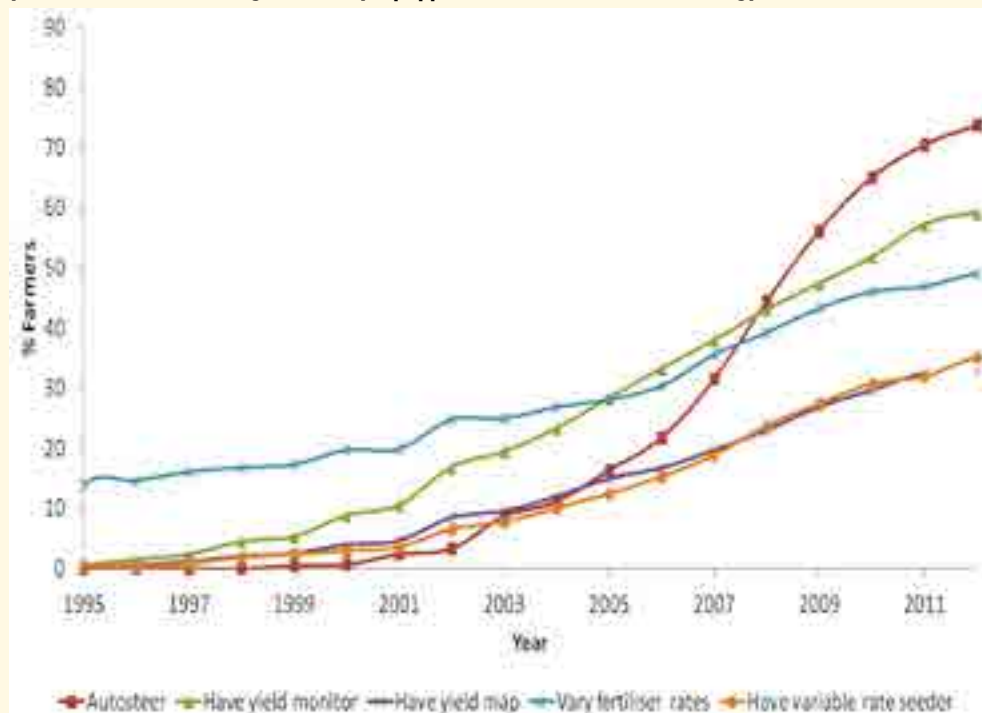
Respondents were asked what year they had first used autosteer, varying fertiliser rates within a paddock, collected yield map data, acquired yield monitoring technology and acquired seeding machinery with variable rate technology (VRT). The results clearly show the surge

in autosteer adoption over the past five years and the much lower but steady uptake of variable rate technology (Figure 1).

The use of varying fertiliser rates within paddocks on identified zones is consistently higher than the use of VRT seeding equipment. The results show that a substantial number of growers have been varying fertiliser rates on identified paddock zones in a 'low-tech' way without the use of variable rate seeding technology (Figure 1). Use of varying fertiliser rates is now increasing at about the same rate as uptake of seeders equipped with variable rate technology.

A high proportion of growers have yield monitoring equipment but only about half have collected yield map data (Figure 1). This difference does not appear to have narrowed over the past decade. The adoption of yield mapping is very closely associated with adoption of variable rate seeding technology (Figure 1) and varies greatly across regions (Figure 2).

**FIGURE 1: Cumulative adoption of autosteer, yield mapping and variable fertiliser application (i.e. application of different fertiliser rates within a paddock), also showing proportion of farmers with yield monitor and seeding machinery equipped with variable rate technology**



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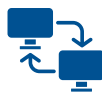


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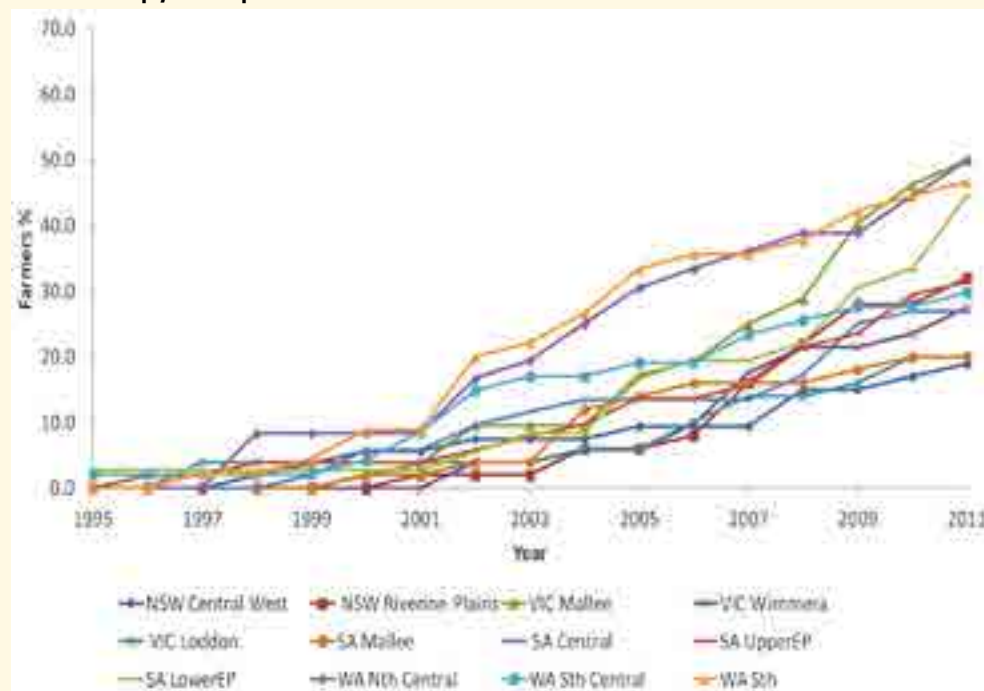
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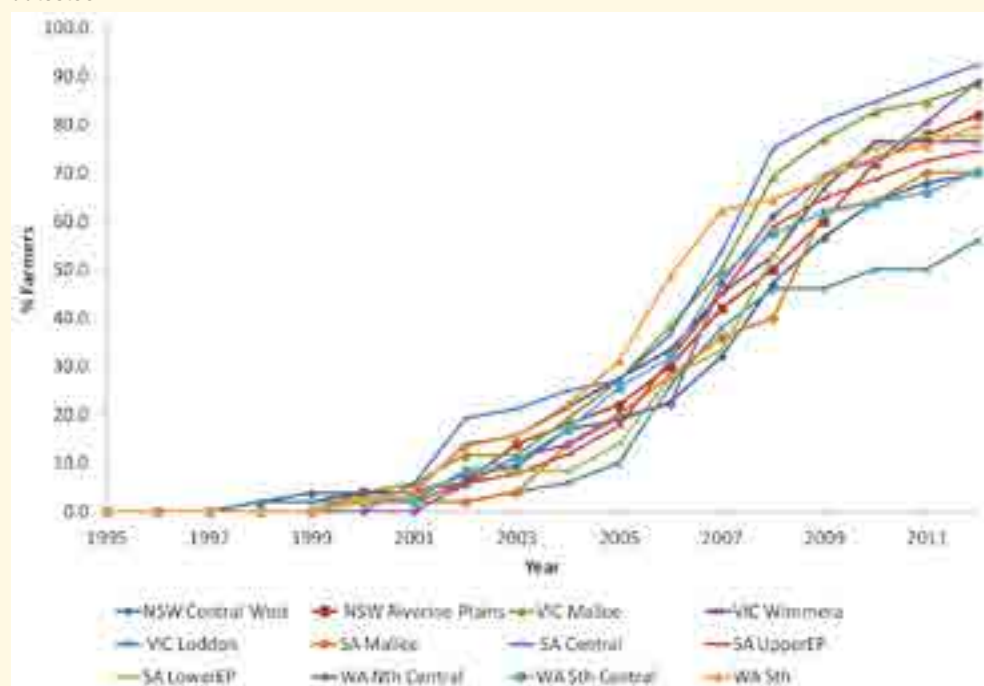
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**FIGURE 2: Cumulative adoption of yield mapping by region based on proportion of farmers who have collected crop yield map data**



**FIGURE 3: Cumulative adoption of autosteering by region based on proportion of farmers who have used autosteering**



Autosteering adoption shows higher and more consistent uptake across regions with the rate of increase in adoption slowing in some regions as adoption rates approach 70–90 per cent (Figure 3).

## To sum up

The rate of increase in autosteering adoption appears to be slowing as peak adoption levels are approached. Steady increases in the adoption and use of VRT components have occurred and are expected to continue over the next five years but there are major differences between regions in both current uptake and future expectations. Yield mapping is also increasing steadily but the proportion of farmers with yield monitoring capacity but not collecting yield monitoring data does not appear to be reducing. The adoption and expectations for a range of other PA-related innovations such as soil and crop mapping technologies are also being analysed, together with major drivers and opportunities for more targeted strategies for supporting profitable use of PA-related technology.

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This article was presented as a paper at the 16th Symposium on Precision Agriculture in Australasia, 2013. The Symposium was arranged by SPAA and Precision Agriculture Laboratory.





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# A global view of PA research and opportunities for Australia

Emma Leonard, AgriKnowHow

## AT A GLANCE...

- Precision agriculture is relevant to large and small scale farmers and is about improving efficiency and profitability with and without technology.
- Drivers for the development of precision management systems vary across the globe.
- New tools are in development, many are looking for a problem to solve, others need proving in Australian conditions.
- Take the opportunity to attend overseas conferences.

With about 80 per cent of grain growers in developed countries already using some form of satellite driven machine guidance, many may consider that spatial technology in farming has come of age. The reality is that guidance and autosteer are technologies at the vanguard of a new approach to farming.

Spatial tools and systems for agriculture are still in their infancy and it will take several decades before this latest agricultural revolution reaches



At the 5th Asian Conference on Precision Agriculture, Dr Kodaira, Tokyo University of Agriculture and Technology, presented information on a real-time soil sensor able to collect data on 19 soil parameters including macro and micronutrients. (Photo: Emma Leonard, AgriKnowHow)



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maturity. This was my recurring point of view at the conclusion of the three international precision agriculture conferences I attended in June/July, 2013.

Two events were targeted at the scientific community – 5th Asian Conference on Precision Agriculture (ACPA) and 9th European Conference on Precision Agriculture (ECPA) – while the third – InfoAg in the US – was designed for farmers and agronomists.

I attended these events with the support of an Industry Development Award (IDA) from the GRDC. The objective of my IDA was to gain a global perspective on the development and application of spatial technologies and information and communication technologies (ICT) and to share these with Australian farmers, agronomists and researchers.

## Relevance of precision management

The development of spatially based, precision management systems for agriculture is relevant to large and small scale farmers in the developed and developing worlds. In his key note address at the ACPA, held in South Korea, Dr Raj Kholsa of the Colorado State University illustrated that patterns of variation on large and small scale farms are

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very similar. Thus precision farming can be relevant irrespective of scale; but the management system used may differ in its level of sophistication.

For example, precision management in a broadacre agriculture system in the US might include nitrogen prescriptions based on soil and crop data collected using sensors and satellite, with applications controlled via computers. In a developing country precision could be a dose of fertiliser measured using a bottle cap and placed at the base of each maize plant, rather than being broadcast haphazardly by hand.

This example illustrates that precision does not necessarily require expensive and complex technology but is about improving efficiency and productivity, which in turn should support increased profitability and sustainability.

### A global perspective

The speed at which precision management systems are adopted will be driven by their ability to deliver on-farm benefits. But the development and adoption is also influenced by regional priorities and presentations at the three conferences showed these to differ across the regions.

**China** – Labour saving techniques and tools are a key focus for agricultural development in China. Improving yield per unit of inputs supported by cheap sensors and input controllers suited to smaller scale producers is also important.

Dr Chunjiang Zhao, director of the National Engineering Research Centre for Information Technology in Agriculture reported that the annual investment in China in precision agriculture research is about US\$66 million.

**South Korea** – Extremely high levels of land productivity are already achieved in South Korea. The 2006 figures presented at the ACPA reported production of US\$17,327 per hectare compared to US\$984 for

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the US. This is partly because production is focused on intensive, small scale production of relatively high value vegetable and fruit crops.

In his address Dr Sun-Ok Chung, Professor at Chungnam National



**Emma Leonard, recently returned from a precision agriculture fact-finding study. (Photo: Clarisa Collis)**

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University, proposed that precision technologies offer South Korea with the opportunity to combine food with medicine and focus on what he termed 'human specific' crop production. Such food products could be tailored to meet physical and mental health requirements. Such crops could be produced in plant factories. These warehouse based multistorey farms have water, light and nutrient inputs controlled by sensors. A fully automated, robotic plant factory produces ginseng is already established in Korea.

**Japan** – While food security is important in Japan, it is food safety that is paramount.

Technology to provide traceability through the food chain as well as non-destructive sensors to measure product quality before going to market are areas of interest presented by Dr Sakae Shibusawa, Professor at Tokyo University of Agriculture and Technology. It is interesting to note that at Hokkaido University the Laboratory of Vehicle Robotics is already running a fully robotic farming operation.

**Europe** – High value crops and reducing environmental impacts are priority areas for precision management research in Europe. For example, orchard crops offer significant opportunities for the improved application of pesticides. Approximately 4.4 per cent of the cropped area in the European Union is under orchards, yet 14 per cent of all pesticides used are applied in orchards.

At the field tour, organised as part of the ECPA, Dr Alexandre Escola and colleagues from the University Lleida, Spain, demonstrated the use of a light emitting laser (lidar) to measure canopy density in grape vines. This information was then used to moderate pesticide rates.

This research team has also produced a simple web-based system ([www.dosafrut.es](http://www.dosafrut.es)) to determine the pesticide requirement for different sized fruit trees. Its use has resulted in up to a 50 per cent reduction in pesticide application.

Another important focus in Europe is improved integration between equipment. Dr Robbin Gebbers, Leibniz Institute for Agricultural Engineering Postdam-Bornim, Germany, reported on two initiatives aimed at improving equipment compatibility and integration of multiple platforms.

Agricultural Industry Electronics Foundation (AEF) is an international partnership between implement manufacturers and tractor manufacturers within the agricultural industry. With a worldwide membership of over 100 companies the objective of the AEF is to promote the electronic standardisation and assure that ISOBUS-implements and tractors from different brands.

A near market system 'iGreen' provides connectivity between multiple machines, irrespective of brand, to achieve two-way data flow.

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**United States** – Unmanned aerial vehicles (UAVs) were of interest in Asia and Europe but in the US they were the platform of the moment. At InfoAg, at least six providers of fixed wing and rotary UAVs or UAV based services were exhibited. No doubt this flurry of excitement has been triggered by the announcement that the US laws on the commercial use of UAVs will change in 2015 but the details have yet to be presented.

The use of precision technology is seen to be relevant across all industry sectors in the US, but there seems to be tailoring to industry sectors. For example, initial robotic investments are being focused on horticulture and industries where smaller vehicles are appropriate. John Deere presented details of a fully automated orchard sprayer and mowing systems being tested in a commercial citrus orchard.

In the US, broadacre application of spatial management is similar to Australia but new commercial platforms are being developed.

For example, FieldScripts is a variable rate seeding package for corn, delivered by Monsanto through agronomists. To be fully launched next year this system uses up to 20 layers of data to provide a farmer with variable rate seeding maps for different Monsanto corn cultivars. Monsanto also owns the company that supplies the variable rate seeding equipment.

Apparently, Cargill is working on a similar product that may include other parameters but these are currently top secret!

## To sum up

Over 300 papers and posters were presented at these three events. Many of these can be found in the programs on the conference websites. I encourage you to take a look at these resources to gain a taste of the diversity of precision management tools and applications that are in the pipeline.

In addition to myself, only seven delegates from Australia attended one of these three events. I encourage everyone interested in PA to take the opportunity to attend these and similar international events.

Source: GRDC's *Ground Cover Newspaper*, Issue 107, NovDec-2013  
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Email: nff@nff.org.au

**President:** Brent Finlay

**Chief Executive Officer:** Matt Linnegar

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Email: michael.schaefer@grainproducers.com.au

**Independent:** Peter Bridgman

Email: peter.bridgman@grainproducers.com.au

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### AgForce Queensland

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Email: agforce@agforceqld.org.au – Web: www.agforceqld.org.au

**State President:** Ian Burnett

**Chief Executive Officer:** Charles Burke

**Grains President:** Wayne Newton

**Grains Policy Director:** Nina Murray

## Western Australia

### Council of Grain Grower Organisations (COGGO)

26 Winthrop Drive, WINTHROP WA 6150

Ph: 08 9310 2636

Email: hugh.lennerts@coggo.net.au

**Independent Chairman:** Chris Wilkins

**Company Secretary:** Hugh Lennerts

## Grain Industry Association of Western Australia (GIWA)

PO Box 1081, BENTLEY DC, WA, 6983

Ph: 08 6262 2128

Email: info@giwa.org.au

**Executive Officer:** Johanna Gastevich

## Pastoralists' & Graziers' Association of WA (PGA)

Ground Floor, 28–42 Ventnor Ave, WEST PERTH WA 6005

Ph: 08 9212 6900 – Fax: 08 9485 0299

Email: pga@pgaofwa.org.au – Web: www.pgaofwa.org.au

**Policy Director:** Ian Randles

**PGA Western Graingrowers Chairman:** John Snooke

## Western Australian Farmers Federation (WAFarmers)

PO Box 6291, EAST PERTH WA 6892

Ph: 08 9486 2100 – Fax: 08 9361 3544

Email: reception@wafarmers.org.au

**Chief Executive Officer:** Peter Nolin

Email: peternolin@wafarmers.org.au

## WA Grains Group (WAGG)

C/- PO, LAKE GRACE WA 6353

Ph: 0428 654032

Email: wagrainsgroup1@bigpond.com – Web: wagrainsgroup.com

**Chairman:** Doug Clarke

## South Australia

### Grain Producers SA

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Ph: 1300 734 884 – Fax: 08 8391 4901

Email: info@grainproducerssa.com.au

Web: www.grainproducerssa.com.au

**Chief Executive Officer:** Darren Arney

**Chairman:** Garry Hansen

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### Victorian Farmers Federation (VFF)

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Email: vff@vff.org.au – Web: www.vff.org.au

**President:** Peter Tuohy

**Chief Executive Officer:** Graeme Ford

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Email: emailus@nswfarmers.org.au – Web: www.nswfarmers.org.au

**Chief Executive Officer:** Matt Brand

**Grains Committee:** Daniel Cooper

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PO Box 6022 House of Representatives

Parliament House, CANBERRA ACT 2600

Ph: 02 6277 7520 – Fax: 02 6273 4120

Email: minister@maff.gov.au – Web: www.aph.gov.au/B\_Joyce\_MP

### Minister for the Environment – The Hon. Greg Hunt MP

PO Box 6022 House of Representatives

Parliament House, CANBERRA ACT 2600

Ph: 02 6277 7920 – Fax: 02 6273 7330

Email: Greg.Hunt.MP@aph.gov.au

Web: www.aph.gov.au/G\_Hunt\_MP

### Shadow Minister for Agriculture – The Hon. Joel Fitzgibbon MP

Parliament House, CANBERRA ACT 2600

Ph: 02 6277 4550 – Fax: 02 6277 8422

Email: joel.fitzgibbon.mp@aph.gov.au – Web: www.joelfitzgibbon.com

### Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)

Department of Agriculture, Fisheries and Forestry

18 Marcus Clarke Street, Canberra City

GPO Box 1563, CANBERRA ACT 2601

Ph: 02 6272 2000 – Fax: 02 6272 2001

Email: info.abares@daff.gov.au – Web: www.daff.gov.au/abares

**Executive Director:** Karen Schneider

## AusIndustry

Industry House, 10 Binara Street, Canberra

GPO Box 9839, CANBERRA ACT 2601

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### Australian Pesticides and Veterinary Medicines Authority (APVMA)

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### Department of Foreign Affairs and Trade

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Web: www.dfat.gov.au

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**Deputy Secretary, Office of Trade Negotiations:** Jan Adams

### DAFF Levies

Department of Agriculture – Levies

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**Assistant Secretary:** Lisa Hind

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### National Residue Survey

Australian Government Department of Agriculture

18 Marcus Clarke Street, Canberra City

GPO Box 858, CANBERRA ACT 2601

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**Director National Residue Survey:** Ian Reichstein

Email: ian.reichstein@daff.gov.au – Web: www.daff.gov.au/nrs

### Office of the Gene Technology Regulator

(MDP 54)

GPO Box 9848, CANBERRA ACT 2601

Ph: 1800 181 030 – Fax: 02 6271 4202

Email: ogtr@health.gov.au – Web: www.ogtr.gov.au

**Gene Technology Regulator:** Dr Joe Smith

### Office of Rural Financial Counselling

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#### Department of Agriculture and Food, WA

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### Grains Research & Development Corporation

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#### Address after July 14, 2014:

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**Managing Director:** John Harvey

Email: [grdc@grdc.com.au](mailto:grdc@grdc.com.au) – Web: [www.grdc.com.au](http://www.grdc.com.au)

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**Managing Director:** Craig Burns

### Cotton Research & Development Corporation

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PO Box 282, NARRABRI NSW 2390  
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Email: [crdc@crdc.com.au](mailto:crdc@crdc.com.au) – Web: [www.crdc.com.au](http://www.crdc.com.au)

**Chair:** Mary Corbett

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**Farm Productivity & Delivery:** Chris Murphy

## Meat & Livestock Australia (MLA)

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Ph: 07 3331 3333 – Fax: 07 3871 0383  
Email: [sra@sugarresearch.com.au](mailto:sra@sugarresearch.com.au)

## Australian Wool Innovation Limited

Level 30, HSBC Centre, 580 George St, Sydney NSW 2000  
GPO Box 4177, SYDNEY NSW 2001  
Ph: 02 8295 3100 – Fax: 02 8295 4100  
Email: [info@wool.com](mailto:info@wool.com) – Web: [www.wool.com](http://www.wool.com)  
**Chief Executive Officer:** Stuart McCullough

## CSIRO Enquiries

Bag 10, CLAYTON SOUTH, VIC 3169  
Phone: 1300 363 400 Mon-Fri 9:00am–4:00pm EST  
Email: [enquiries@csiro.au](mailto:enquiries@csiro.au) – Web: [www.csiro.au](http://www.csiro.au)

## Grain-related CSIRO Flagships

**Food Futures, Director (acting)** – Nigel Preston Ph: 07 3833 5957  
**Sustainable Agriculture, Director** – Brian Keating Ph: 07 3833 5635  
**Water for a Healthy Country, Director** – Carol Couch Ph: 02 6246 5745  
**Climate Adaptation, Research Scientist** – Andrew Ash Ph: 07 3833 5638

## Related Cooperative Research Centres

### Future Farm Industries CRC

University of Western Australia  
MO81, 35 Stirling Highway, CRAWLEY WA 6009  
Ph: 08 6488 1952 – Fax: 08 6488 2856  
Email: [peter.zurzolo@futurefarmcrc.com.au](mailto:peter.zurzolo@futurefarmcrc.com.au)  
Web: [www.futurefarmonline.com.au](http://www.futurefarmonline.com.au)  
**Chair:** Andrew Inglis **Chief Executive Officer:** Peter Zurzolo

### Plant Biosecurity CRC

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Email: [m.knobel@pbrc.com.au](mailto:m.knobel@pbrc.com.au)

### CRC for High Integrity Australian Pork

PO Box 466, WILLASTON, SA 5118

Ph: 08 8313 7683 – Fax: 08 8313 7686

Email: [roger.campbell@porkcrc.com.au](mailto:roger.campbell@porkcrc.com.au) – Web: [www.porkcrc.com.au](http://www.porkcrc.com.au)

**Chief Executive Officer:** Dr Roger Campbell

## International agencies

### Australian Centre for International Agricultural Research (ACIAR)

GPO Box 1571, CANBERRA ACT 2601

Ph: 02 6217 0500 – Fax: 02 6217 0501

Email: [aciara@aciara.gov.au](mailto:aciara@aciara.gov.au) – Web: [aciara.gov.au](http://aciara.gov.au)

**Chief Executive Officer:** Dr Nick Austin

### International Center for Agricultural Research in the Dry Areas (ICARDA)

PO Box 114/5055, BEIRUT, LEBANON

Ph: +961 1 813301 / 3 – Fax: +961 1 804071

E-mail: [icarda@cgiar.org](mailto:icarda@cgiar.org) Web: [www.icarda.org](http://www.icarda.org)

**Director General:** Mahmoud Solh

### International Maize and Wheat Improvement Center (CIMMYT)

Apdo. Postal 6-641, 06600 Mexico, D.F., MEXICO

Ph: +52 55 5804 2004 – Fax: +52 55 5804 7558

Web: [www.cimmyt.org](http://www.cimmyt.org)

**Director General:** Thomas Lumpkin

## Associated Industry

### Agrifood Awareness Australia Limited

PO Box E10, KINGSTON ACT 2604

Ph: 02 6269 5620 – Fax: 02 6273 3968

### AgriFood Technology

260 Princes Highway, Werribee

PO Box 728, WERRIBEE VIC 3030

Ph: 1800 801 312 – Fax: 03 9742 4228

Email: [lab.vic@agrifood.com.au](mailto:lab.vic@agrifood.com.au) – Web: [www.agrifood.com.au](http://www.agrifood.com.au)

### Australian Herbicide Resistance Initiative

School of Plant Biology

The University of Western Australia

35 Stirling Highway, CRAWLEY WA 6009

Ph: 08 6488 7870 – Fax: 08 6488 7834

**Director:** Professor Stephen Powles

Ph: 08 6488 7833 – Fax: 08 6488 7834

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Web: [www.feedlots.com.au](http://www.feedlots.com.au)

**President:** Don Mackay

**Chief Executive Officer:** Dougal Gordon

### Australian Oilseeds Federation

PO Box H236, AUSTRALIA SQUARE NSW 1215

Ph: 02 8007 7553 – Fax: 02 8007 7549

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**Treasurer:** Charles Aldersey

Web: [www.australianoilseeds.com](http://www.australianoilseeds.com)

### Australian Research Council

Level 2, 11 Lancaster Place, Majura Park ACT 2609

GPO Box 2702, CANBERRA ACT 2601

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Email: [info@arc.gov.au](mailto:info@arc.gov.au) – Web: [www.arc.gov.au](http://www.arc.gov.au)

**Chief Executive Officer:** Professor Aidan Byrne

### Australian Seed Federation Limited

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PO Box 3572, MANUKA ACT 2603

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**Executive Chairman:** Andrew Gee

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## Bean Growers' Australia Limited

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 PO Box 328, KINGAROY QLD 4610  
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**Managing Director:** Lloyd Neilsen  
 Email: lneilsen@beangrowers.com.au  
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 Email: info@beangrowers.com.au  
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## Centre for Legumes in Mediterranean Agriculture (CLIMA)

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 PO Box 256, MOREE NSW 2400  
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 Email: info@farmsafe.org.au – Web: www.farmsafe.org.au  
**Executive Officer:** John Temperley  
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SA	Ph: 02 6752 8210	
QLD	Ph: 1300 737 470	
WA	Ph: 08 9359 4118	Fax: 08 9359 3468
VIC	Ph: 03 9207 5511	
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**Chairman:** James Whiteside

## Grains & Legumes Nutrition Council

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 Ph: 02 8877 7877 – Fax: 02 9888 5421  
 Email: contactus@glnc.org.au – Web: www.glnc.org.au  
**Managing Director:** Georgie Aley

## Grains Research Foundation Ltd (GRFL)

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 Mob: 0447 763 852 – Fax: 07 4632 2689  
 Email: admin@grf.org.au  
 Email: secretary@grf.org.au – Web: www.grf.org.au  
**Chairman:** Damien Scanlan

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 Email: gordon@pulseaus.com.au  
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 Mob: 0427 384 760  
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 Ph: 02 6953 0411 – Fax: 02 8916 8350  
 Email: mdelgigante@sunrice.com.au – Web: www.sunrice.com.au  
**Chairman:** Gerry Lawson  
**Chief Executive Officer:** Rob Gordon

### Sustainable Resource Management

18 Marcus Clarke Street, Canberra City  
 GPO Box 858 CANBERRA ACT 2601  
 Ph: 02 6272 3933  
**First Assistant Secretary:** Ian Thompson

### Tractor and Machinery Association of Australia

Suite 617, 434 St Kilda Road, MELBOURNE VIC 3004  
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## GrainCorp Operations Ltd (Sydney)

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Ph: 02 9325 9100 – Fax: 02 9325 9180  
Email: inquiries@graincorp.com.au – Web: www.graincorp.com.au  
**Executive Chairman and Acting CEO:** Don Taylor

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Ph: 08 8304 5000 – Fax: 08 8231 1249 – FreeCall: 1800 018 205  
Email: viterra.aus@viterra.com – Web: www.viterra.com.au

## Australian Grain Exporters Association (AGEA)

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Email: agea@agea.com.au  
**President:** Chris Aucote

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Email: grainfutures@asx.com.au – Web: www.asx.com.au/grainfutures  
**Enquiries:** Dougal Hunter, Business Development

## Namoi Cotton Commodities Pty Ltd

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Ph: 07 4631 6100 – Fax: 07 4631 6184  
**Grain Marketing and Logistics:** John Haigh  
Ph: 07 4631 6118 – Mob: 0428 146 318 – Fax: 07 4631 6184  
Email: jhaigh@namoicotton.com.au  
Web: www.namoicotton.com.au

## Grain standards/rules/contracts

### Grain Trade Australia Ltd

PO Box R1829, Royal Exchange, NSW 1225  
Suite 1, Level 10, 66 Hunter Street, SYDNEY NSW 2000  
Ph: 02 9235 2155 – Fax: 02 9235 0194  
Email: admin@graintrade.org.au – Web: www.graintrade.org.au  
**Chief Executive Officer:** Geoff Honey

## Grower Groups

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48 Station Street, QUIRINDI NSW 2343  
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Email: office@agvance.com.au – Web: www.agvance.com.au  
**Contact:** Natalie Eade

### BCG (Birchip Cropping Group)

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Email: info@bcg.org.au – Web: www.bcg.org.au  
**Chief Executive Officer:** Chris Sounness

### Conservation Agriculture & No-till Farming Association (CANFA)

PO Box 276, WELLINGTON NSW 2820  
**Executive Officer:** Neville Gould  
PH: 02 6845 1044 – Fax: 02 6845 1099 – Mob: 0427 452 488  
Email: canfa@bigpond.com – Web: www.canfa.com.au

### Conservation Agriculture Australia (CAA) Formerly CAAANZ

**Executive Officer:** John Rochecouste  
Ph: 07 4635 0824 – Mob: 0419 790 747  
Email: rochecouste@iinet.net.au

### Corrigin Farm Improvement Group Inc. (CFIG)

Box 2, CORRIGIN WA 6375  
Email: cfg@cfg.asn.au – Web: www.cfg.asn.au

### Central West Farming Systems

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Ph: (02) 6895 1007 – Mobile: 0408 655 205 – Fax: (02) 6895 2688  
Email: diana.parsons@industry.nsw.gov.au

### Conservation Farmers Inc (CFI)

PO Box 1666, TOOWOOMBA QLD 4350  
Ph: 07 4638 5356 – Fax: 07 4632 2689  
Email: office@cfi.org – Web: www.cfi.org.au  
**Executive Director:** Bernard O'Brien

### Eyre Peninsula Agricultural Research Foundation (EPARF)

SARDI, Minnipa Agricultural Centre  
Box 31, MINNIPA SA 5654  
**Project Manager:** Naomi Scholz  
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**Executive Officer:** Felicity Taylor

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Ph: 0467 244 631

**Chief Executive Officer:** Cindy Cassidy

Email: [farmlink@farmlink.com.au](mailto:farmlink@farmlink.com.au) – Web: [www.farmlink.com.au](http://www.farmlink.com.au)

## Grain Growers Limited

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Ph: 02 9888 9600 – Fax: 02 9888 5821

Freecall 1800 620 519

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**Executive Director:** Mark Allison

**General Manager, Grower Interests:** Michael Southan

## Grain Orana Alliance Inc (GOA)

PO Box 2880, DUBBO NSW 2830

Ph: 0400 066201 Email: [admin@grainorana.com.au](mailto:admin@grainorana.com.au)

**Chief Executive Officer:** Maurie Street

## Grower Group Alliance

Faculty of National and Agricultural Science UWA – (MO82)

PO Box 1081, BENTLEY DC, WA, 6983

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Email: [rwallis@gga.org.au](mailto:rwallis@gga.org.au) – Web: [www.gga.org.au](http://www.gga.org.au)

## Hart Field Site Group Inc.

Hart Field Site Group Inc.

PO Box 939, CLARE SA 5453

Ph: 0427 423 154

Email: [admin@hartfieldsite.org.au](mailto:admin@hartfieldsite.org.au) – Web: [www.hartfieldsite.org.au](http://www.hartfieldsite.org.au)

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PO Box 6, MINGENEW WA 6522  
Ph: 08 9928 1645 – Fax: 08 9928 1540  
**Executive Officer:** Sheila Charlesworth  
Mob: 0427 281 007 – Email: [sheila@mig.org.au](mailto:sheila@mig.org.au)  
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### **Northern Grower Alliance**

**Chief Executive Officer:** Richard Daniel  
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### **Partners in Grains**

**National Coordinator:** Kim Blenkiron  
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Email: [sa@partnersingrain.org.au](mailto:sa@partnersingrain.org.au) – Web: [www.partnersingrain.org.au](http://www.partnersingrain.org.au)  
**National Chair:** Gemma Walker  
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### **Riverine Plains Inc**

**Executive Officer:** Fiona Hart  
PO Box 214, MULWALA NSW 2647  
Ph: 03 5744 1713  
Email: [info@riverineplains.com.au](mailto:info@riverineplains.com.au) – Web: [www.riverineplains.com.au](http://www.riverineplains.com.au)

### **SANTFA (South Australian No-Till Farmers Association Inc)**

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**Chairperson:** Brad Moyle  
Mob: 0408 774033 – Email: [admin@santfa.com.au](mailto:admin@santfa.com.au)  
PO Box 923, CLARE SA 5453  
Ph: 08 8842 4278 – Fax: 08 8842 1875

### **South East Premium Wheat Growers Association (SEPWA)**

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**Executive Officer:** Niki Curtis  
Ph: 08 9083 1125 – Fax: 08 9083 1100 – Mob: 0447 908 311  
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### **Southern Farming Systems Ltd**

23 High Street, INVERLEIGH, VIC 3321  
Ph: 03 5265 1666 – Fax: 03 5265 1678

Email: [office@sfs.org.au](mailto:office@sfs.org.au) – Web: [www.sfs.org.au](http://www.sfs.org.au)  
**Chief Executive Officer:** Jon Midwood  
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### **SPAA Precision Agriculture Australia**

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**Executive Officer:** Nicole Dimos  
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### **Victorian No-Till Farmers Association (VNTFA)**

PO Box 1397, HORSHAM VIC 3402  
Ph: 03 5382 0422 – Mob: 0429 820 429  
Email: [info@vicnotill.com.au](mailto:info@vicnotill.com.au) – Web: [www.vicnotill.com.au](http://www.vicnotill.com.au)

### **Walgett Special One Grain (WSOG)**

PO Box 496, WALGETT NSW 2832  
Ph: 1300 28 12 28 – Fax: 02 6828 1249  
Email: [admin@specialonegrain.com.au](mailto:admin@specialonegrain.com.au) – Web: [www.wsoc.com.au](http://www.wsoc.com.au)  
**Chief Executive Officer:** Peter Burke  
Email: [PeterB@specialonegrain.com.au](mailto:PeterB@specialonegrain.com.au)  
Mob: 0428 226 992

### **WANTFA**

PO Box 5, WEMBLEY WA 6014  
Ph: 0409 056 350  
Web: [www.wantfa.com.au](http://www.wantfa.com.au)  
**Executive Director:** David Minkey – Mob: 0417 999 304  
Email: [david.minkey@wantfa.com.au](mailto:david.minkey@wantfa.com.au)

### **Yorke Peninsula Alkaline Soils Group**

61–63 Main Street, MINLATON SA 5575  
Ph: 08 8853 2241 – Fax: 08 8853 2269  
**Project and Funding Coordinator:** Kristin McEvoy  
Mob: 0400 283 015  
Email: [projects@alkalinesoils.com.au](mailto:projects@alkalinesoils.com.au) – Web: [www.alkalinesoils.com.au](http://www.alkalinesoils.com.au)

## **Government Grants**

**For special circumstances assistance administered by DAFF go to:**

Web: [www.daff.gov.au/agriculture-food/drought](http://www.daff.gov.au/agriculture-food/drought)

**GrantsLINK (for assistance with federal grants for community projects) see:**

Web: [www.grantslink.gov.au](http://www.grantslink.gov.au)  
Ph: 1800 026 222  
Web: [www.business.gov.au](http://www.business.gov.au)





# Section

# 7

## Suppliers' Directory

### AGRICULTURAL CHEMICALS

**Achieve – Crop Care:** [www.croptcare.com.au](http://www.croptcare.com.au)  
**Axial – Syngenta:** [www.syngenta.com](http://www.syngenta.com)  
**Barrack 720 Fungicide – Crop Care:** [www.croptcare.com.au](http://www.croptcare.com.au)  
**Barrack Betterstick – Crop Care:** [www.croptcare.com.au](http://www.croptcare.com.au)  
**Boxer – Syngenta:** [www.syngenta.com](http://www.syngenta.com)  
**Cognito – Syngenta:** [www.syngenta.com](http://www.syngenta.com)  
**Deluge – Victorian Chemicals:** [www.vicchem.com](http://www.vicchem.com)  
**Envoy – Victorian Chemicals:** [www.vicchem.com](http://www.vicchem.com)  
**Hammer – Crop Care:** [www.croptcare.com.au](http://www.croptcare.com.au)  
**Hasten – Victorian Chemicals:** [www.vicchem.com](http://www.vicchem.com)  
**Hot-Up – Victorian Chemicals:** [www.vicchem.com](http://www.vicchem.com)  
**Ken-Up Dry – Kenso:** [www.kenso.com.au](http://www.kenso.com.au)  
**Pentagon – Farmoz:** [www.farmoz.com.au](http://www.farmoz.com.au)  
**Precept – Bayer CropScience:** [www.bayercropscience.com.au](http://www.bayercropscience.com.au)  
**Rancona – Chemtura:** [www.chemturaagrosolutions.com.au](http://www.chemturaagrosolutions.com.au)  
**Roundup PowerMax – Nufarm:** [www.nufarm.com.au](http://www.nufarm.com.au)

**Sakura – Bayer:** [www.sakuraerbicide.com.au](http://www.sakuraerbicide.com.au)  
**Spray Seed – Syngenta:** [www.syngenta.com](http://www.syngenta.com)  
**Speedy 250 – Kenso:** [www.kenso.com.au](http://www.kenso.com.au)  
**Steward EC – DuPont:** [www.dupont.com](http://www.dupont.com)  
**Valor – Sumitomo:** [www.sumitomo-chem.com.au](http://www.sumitomo-chem.com.au)  
**Velocity – Bayer CropScience:** [www.bayercropscience.com.au](http://www.bayercropscience.com.au)

### AG MACHINERY PARTS

**Alloy & Stainless Products:** [www.asproducts.com.au](http://www.asproducts.com.au)  
**ITC National:** [www.itcnational.com.au](http://www.itcnational.com.au)  
**Neil's Parts:** [www.neils.com.au](http://www.neils.com.au)

### CONTAINER RECYCLING

**drumMuster:** [www.drummuster.com.au](http://www.drummuster.com.au)

### EDUCATION

**C-Qual:** [www.c-qual.com](http://www.c-qual.com)  
**CSIRO:** [www.csiro.au](http://www.csiro.au)  
**Rockhampton Grammar School:** [www.rgs.qld.edu.au](http://www.rgs.qld.edu.au)  
**Toowoomba Grammar School:** [www.twgs.qld.edu.au](http://www.twgs.qld.edu.au)

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**Graintec Scientific:** [www.graintec.com.au](http://www.graintec.com.au)  
**Infratec Sofia:** [www.foss.com.au/sofia](http://www.foss.com.au/sofia)  
**John Deere:** [www.johndeere.com.au](http://www.johndeere.com.au)  
**Omnistar:** [www.omnistar.com.au](http://www.omnistar.com.au)  
**Outback Guidance:** [www.outbackguidance.com](http://www.outbackguidance.com)  
**Sparex:** [www.sparex.com](http://www.sparex.com)  
**TACS Australia:** [www.tacs.com.au](http://www.tacs.com.au)  
**Trimble:** [www.trimble.com/agriculture](http://www.trimble.com/agriculture)

## EMPLOYMENT

**The Gate:** [www.the-gate.com.au](http://www.the-gate.com.au) 0408 717 459

## ENERGY

**Ergon:** 1300 736 349  
**Mobile Energy:** [www.mobileenergyaustralia.com.au](http://www.mobileenergyaustralia.com.au)

## FERTILISERS & SOIL HEALTH SERVICES

**Amorsil – Nutrifert:** [www.nutrifert.com.au](http://www.nutrifert.com.au)  
**BASF:** [www.basf.com.au](http://www.basf.com.au)  
**Bioag:** [www.bioag.com.au](http://www.bioag.com.au)  
**Big N – Incitec Pivot:** [www.incitecpivot.com.au](http://www.incitecpivot.com.au)  
**Charlie Carp:** [www.charliecarp.com](http://www.charliecarp.com)  
**Chemtura:** [www.chemtura.com.au](http://www.chemtura.com.au)  
**EasyATS – Incitec Pivot:** [www.incitecpivot.com.au](http://www.incitecpivot.com.au)  
**Easy N – Incitec Pivot:** [www.incitecpivot.com.au](http://www.incitecpivot.com.au)  
**Granulock – Incitec Pivot:** [www.incitecpivot.com.au](http://www.incitecpivot.com.au)  
**Hibrix:** [www.hibrix.com.au](http://www.hibrix.com.au)  
**Nutrilab:** 07 4671 5155  
**Omnia Nutriology:** [www.omnia.net.nz](http://www.omnia.net.nz)  
**Phosyn Analytical:** [www.yaraphosyn.com](http://www.yaraphosyn.com)  
**Ultimate Agri Products:** [www.ultimateagri.com.au](http://www.ultimateagri.com.au)  
**Victorian Chemicals:** [www.vicchem.com](http://www.vicchem.com)  
**Zinc – Yarra:** [www.yarra.com.au](http://www.yarra.com.au)

## FERTILISER STORAGE

**Bushmans:** [www.bushmantanks.com.au](http://www.bushmantanks.com.au)

## GRAIN STORAGE & HANDLING

**AgriDry:** [www.agridry.com.au](http://www.agridry.com.au)  
**AgriShelter:** [www.agrishelter.com.au/](http://www.agrishelter.com.au/)  
**Allied Grain Systems:** [www.alliedgrainsystems.com.au](http://www.alliedgrainsystems.com.au)  
**AllShelter:** [www.allshelter.com.au](http://www.allshelter.com.au)  
**Assorted Bag Closers:** 03 9399 9171  
**Convey-All:** [www.convey-all.com](http://www.convey-all.com)  
**CSW Chaser Bins:** [www.cswag.com.au](http://www.cswag.com.au)  
**CustomVac:** [www.customvac.com.au](http://www.customvac.com.au)  
**Cyclone Silos (One Steel):** [www.onesteelcyclone.com.au](http://www.onesteelcyclone.com.au)  
**Darling Downs Tarps:** [www.ddt.com.au](http://www.ddt.com.au)  
**Ellis & Son:** Freecall 1800 808 769  
**Geronimo:** [www.geronimo.com.au](http://www.geronimo.com.au)  
**Jaylon:** [www.jaylon.com.au](http://www.jaylon.com.au)  
**Kotzur:** [www.kotzur.com.au](http://www.kotzur.com.au)  
**Maersk Line:** [www.maerskline.com](http://www.maerskline.com)  
**Polytex:** [www.polytex.net.au](http://www.polytex.net.au)  
**Silo Ventilation Systems:** [www.silovent.com](http://www.silovent.com)  
**Tapex:** [www.tapex.com.au](http://www.tapex.com.au)  
**Westfield Augers:** [www.grainaugers.com](http://www.grainaugers.com)

## HARVESTERS & COMBINES

**Case IH Agriculture:** [www.caseih.com](http://www.caseih.com)  
**Chesterfield:** [www.chesterfieldaustralia.com.au](http://www.chesterfieldaustralia.com.au)  
**Claas:** [www.landpower.com.au](http://www.landpower.com.au)  
**John Deere:** [www.johndeere.com.au/combines](http://www.johndeere.com.au/combines)  
**Neil's Parts:** [www.neils.com.au](http://www.neils.com.au)  
**New Holland Agriculture:** [www.newholland.com](http://www.newholland.com)

## INSECT MANAGEMENT

**Bioglobal:** [www.bioglobal.com.au](http://www.bioglobal.com.au)

## IRRIGATION

**Valmont Irrigation:** [www.valley-au.com](http://www.valley-au.com)

## LP GAS

**Kleenheat Gas:** 1300 135 111

## MACHINERY MANUFACTURERS & DISTRIBUTORS

**Case IH Agriculture:** [www.caseih.com](http://www.caseih.com)  
**Claas:** [www.landpower.com.au](http://www.landpower.com.au)

**Flexicoil:** [www.flexicoil.com.au](http://www.flexicoil.com.au)

**John Deere:** [www.johndeere.com.au](http://www.johndeere.com.au)

**Neil's Parts:** [www.neils.com.au](http://www.neils.com.au)

**New Holland Agriculture:** [www.newholland.com](http://www.newholland.com)

## SEED SUPPLIERS & PLANT BREEDERS

**Australian Grain Technologies:** [www.ausgraintech.com](http://www.ausgraintech.com)

**Canola Breeders:** [www.canolabreeders.com.au](http://www.canolabreeders.com.au)

**Nufarm:** [www.nufarm.com.au](http://www.nufarm.com.au)

**Nuseed:** [www.nuseed.com](http://www.nuseed.com)

**Nuseed Roundup Ready Canola – Nufarm:** [www.nufarm.com.au](http://www.nufarm.com.au)

**Pioneer:** [www.pioneer.com](http://www.pioneer.com)

**Roundup Ready Canola – Monsanto:** [www.monsanto.com.au](http://www.monsanto.com.au)

**Seednet:** [www.seednet.com.au](http://www.seednet.com.au)

## SEED TREATMENT

**CRT Seed Treatment:** [www.cropcare.com.au](http://www.cropcare.com.au)

**Dividend – Syngenta:** [www.syngenta.com.au](http://www.syngenta.com.au)

**Emerge – Syngenta:** [www.syngenta.com.au](http://www.syngenta.com.au)

**Nodulaid – Becker Underwood:** [www.beckerunderwood.com.au](http://www.beckerunderwood.com.au)

**Nodulator – Becker Underwood:** [www.beckerunderwood.com.au](http://www.beckerunderwood.com.au)

## SOIL & PLANT ANALYSIS

**Phosyn:** [www.yaravita.com](http://www.yaravita.com)

## SPRAYERS & SPRAYER EQUIPMENT

**Case IH Agriculture:** [www.caseih.com](http://www.caseih.com)

**Croplands:** [www.croplands.com.au](http://www.croplands.com.au)

**Goldacres:** [www.goldacres.com.au](http://www.goldacres.com.au)

**Hardi:** [www.hardi.com.au](http://www.hardi.com.au)

**Integrated Transfer Solutions:** [www.its-aust.net](http://www.its-aust.net)

**John Deere:** [www.johndeere.com.au](http://www.johndeere.com.au)

## TILLAGE MANUFACTURERS & DISTRIBUTORS

**Boss Engineering:** [www.bosseng.com.au](http://www.bosseng.com.au)

**Bourgault:** [www.bourgault.com](http://www.bourgault.com)

**Case IH Agriculture:** [www.caseih.com](http://www.caseih.com)

**Excel Agriculture:** [www.excelagr.com.au](http://www.excelagr.com.au)

**Flexicoil:** [www.flexicoil.com.au](http://www.flexicoil.com.au)

**Gessner Industries:** [www.gessner.com.au](http://www.gessner.com.au)

**John Deere:** [www.johndeere.com.au](http://www.johndeere.com.au)

**K-Line:** [www.k-line.net.au](http://www.k-line.net.au)

**Manutec:** [www.manutec.com.au](http://www.manutec.com.au)

**Serafin:** [www.serafinmachinery.com.au](http://www.serafinmachinery.com.au)

## TANK CLEANERS

**All Clear – Agnova:** [www.agnova.com.au](http://www.agnova.com.au)

## TRAVEL & RECREATION

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**Charlton's Tackle & Bait:** 07 3818 1677

**Greenmount Travel:** 07 4659 3555 [www.greenmounttravel.com.au](http://www.greenmounttravel.com.au)

## WEED MANAGEMENT AT HARVEST

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