



Australian Government
Department of Agriculture
ABARES

Australian grains

Financial performance of grain producing farms, 2012–13 to 2014–15

Therese Thompson

Research by the Australian Bureau of Agricultural
and Resource Economics and Sciences

Research report 15.3
June 2015



© Commonwealth of Australia 2015

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

Creative Commons licence

All material in this publication is licensed under a Creative Commons Attribution 3.0 Australia Licence, save for content supplied by third parties, logos and the Commonwealth Coat of Arms.



Creative Commons Attribution 3.0 Australia Licence is a standard form licence agreement that allows you to copy, distribute, transmit and adapt this publication provided you attribute the work. A summary of the licence terms is available from creativecommons.org/licenses/by/3.0/au/deed.en. The full licence terms are available from creativecommons.org/licenses/by/3.0/au/legalcode.

Cataloguing data

Thompson, T 2015, *Australian grains: financial performance of grain producing farms, 2012–13 to 2014–15*, ABARES research report to client prepared for the Grains Research and Development Corporation, Canberra, June. CC BY 3.0.

ISSN 1447-8358
ISBN 978-1-74323-242-2
ABARES project 43010

Internet

Australian grains: financial performance of grain producing farms, 2012–13 to 2014–15 is available at agriculture.gov.au/abares/publications.

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

Postal address GPO Box 858 Canberra ACT 2601
Switchboard +61 2 6272 3933
Email info.abares@agriculture.gov.au
Web agriculture.gov.au/abares

Inquiries about the licence and any use of this document should be sent to copyright@agriculture.gov.au.

The Australian Government acting through the Department of Agriculture, represented by the Australian Bureau of Agricultural and Resource Economics and Sciences, has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture, ABARES, its employees and advisers disclaim all liability, including for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on information or data in this publication to the maximum extent permitted by law.

Acknowledgements

ABARES relies on the voluntary cooperation of farmers participating in the annual Australian Agricultural and Grazing Industries Survey to provide data used in the preparation of this report. Without their help, the survey would not be possible. ABARES farm survey staff collected most of the information presented in this report through on-farm interviews with farmers. AAGIS is funded by the Department of Agriculture, the Grains Research and Development Corporation (GRDC) and Meat & Livestock Australia (MLA). The author acknowledges contributions from Peter Martin, Haydn Valle, Tom Jackson and Astrid Dhal of ABARES.

Contents

Key points	vii
1 Introduction	1
GRDC grain growing regions	3
Northern region	3
Southern region	5
Western region	7
2 Grain producing farms	9
Specialist grain producers	11
3 Grain production	12
Grain production 2013–14	12
Grain production 2014–15	14
On-farm grain stocks	16
4 Financial performance	18
Financial performance of Australian grain producing farms	18
Financial performance—Northern region	21
Financial performance—Southern region	27
Financial performance—Western region	33
5 Farm investment	39
6 Farm debt	43
7 Productivity	56
Survey methods and definitions	60
Glossary	65
References	69
Further information on grain producers	71

Tables

Table 1 Distribution of grain producing farms, by area planted to grains, oilseeds and pulses, by region	9
Table 2 Financial performance, grain producing farms, Australia	19
Table 3 Financial performance, Northern region grain producing farms	22
Table 4 Selected estimates, Northern region grain producing farms, by scale of operation	25
Table 5 Financial performance, Southern region grain producing farms	29

Table 6 Selected estimates, Southern region grain producing farms, by scale of operation	31
Table 7 Financial performance, Western region grain producing farms	34
Table 8 Selected estimates, Western region grain producing farms, by scale of operation	37
Table 9 Distribution of Northern region grain producing farms, by farm business debt and equity ratio, at 30 June 2014ap	50
Table 10 Distribution of Southern region grain producing farms, by farm business debt and equity ratio, at 30 June 2014ap	51
Table 11 Distribution of Western region grain producing farms, by farm business debt and equity ratio, at 30 June 2014ap	52
Table 12 Average annual broadacre productivity growth, by industry, 1977–78 to 2012–13	57
Table 13 Average annual cropping total factor productivity growth, by region, 1977–78 to 2012–13	59

Figures

Figure 1 Average area sown and yield, grain producing farms, Northern region, 1995–96 to 2013–14p	4
Figure 2 Average production per farm and price received per tonne sold for grains, oilseeds and pulses, Northern region, 1995–96 to 2013–14p	4
Figure 3 Average area sown and yield, grain producing farms, Southern region, 1995–96 to 2013–14p	6
Figure 4 Average production per farm and price received per tonne sold for grains, oilseeds and pulses, Southern region, 1995–96 to 2013–14p	6
Figure 5 Average area sown and yield, grain producing farms, Western region, 1995–96 to 2013–14p	7
Figure 6 Average production per farm and price received per tonne sold for grains, oilseeds and pulses, Western region, 1995–96 to 2013–14p	7
Figure 7 Number of grain producing farms, by area planted, Australia, 1995–96 to 2014–15y	10
Figure 8 On-farm grain stocks at 30 June, grain producing farms, Australia, 1996 to 2014p	16
Figure 9 Farm cash income, grain producing farms, Australia, 1995–96 to 2014–15y	18
Figure 10 Cash receipts, Northern region grain producing farms, 1995–96 to 2014–15y	21
Figure 11 Composition of farm costs, grain producing farms, by region, 2012–13 to 2014–15y	23

Figure 12 Farm cash income, Northern region grain producing farms, 1995–96 to 2014–15y	24
Figure 13 Cash receipts, Southern region grain producing farms, 1995–96 to 2014–15y	28
Figure 14 Farm cash income, Southern region grain producing farms, 1995–96 to 2014–15y	28
Figure 15 Cash receipts, Western region grain producing farms, 1995–96 to 2014–15y	33
Figure 16 Farm cash income, Western region grain producing farms, 1995–96 to 2014–15y	35
Figure 17 Land investment, grain producing farms, Australia, 1995–96 to 2013–14p	39
Figure 18 Land prices, grain producing farms, by region, 1995–96 to 2013–14p	40
Figure 19 Net investment in machinery, vehicles, and farm improvements, grain producing farms, by region, 1995–96 to 2013–14p	42
Figure 20 Composition of farm business debt, grain producing farms, Australia, 1995–96 to 2013–14p	43
Figure 21 Farm business debt, grain producing farms, by region, 1995–96 to 2014–15y	44
Figure 22 Debt-to-receipts ratio, grain producing farms, by region, 1995–96 to 2014–15y	45
Figure 23 Reason for change in farm business debt, grain producing farms, Australia, 2013–14p	46
Figure 24 Reason for change in farm business debt, grain producing farms affected by drought, Australia, 2013–14p	47
Figure 25 Change in farm business debt and equity, grain producing farms, Australia, 1995–96 to 2013–14p	48
Figure 26 Ratio of interest payments to total cash receipts, grain producing farms with debt, by region, 1995–96 to 2014–15y	53
Figure 27 Debt servicing and borrowing capacity, Northern region, 1988–89 to 2014–15y	54
Figure 28 Debt servicing and borrowing capacity, Southern region, 1988–89 to 2014–15y	55
Figure 29 Debt servicing and borrowing capacity, Western region, 1988–89 to 2014–15y	55
Figure 30 Trends in cropping specialists' total factor productivity, total inputs and total outputs, 1977–78 to 2012–13	57
Figure 31 Broadacre total factor productivity growth, by period	58

Maps

Map 1 Grains Research and Development Corporation regions	3
Map 2 Average wheat yields, 2004–05 to 2013–14p	5
Map 3 Rainfall percentiles for 2013–14 winter crop areas	13
Map 4 Rainfall percentiles for 2013–14 summer crop areas	14
Map 5 Rainfall percentiles for 2014–15 winter crop areas	15
Map 6 Rainfall percentiles for 2014–15 summer crop areas	16
Map 7 ABARES Australian broadacre zones and regions	64

Boxes

Box 1 Major financial performance indicators	19
Box 2 Productivity statistics produced by ABARES	56

Key points

Farm cash income

- Farm cash income in all three Grains Research and Development Corporation (GRDC) regions is estimated to have declined in 2014–15 as a result of a reduction in winter grain yields and lower prices for wheat, oilseeds and pulses.
- Incomes of Australian grain producing farms have been relatively high in recent years, compared with incomes recorded historically.
- For Southern region grain producing farms, farm cash income is estimated to have decreased in 2014–15 to average \$184 000 a farm; 43 per cent above the 10-year average to 2013–14 of \$129 000 a farm in real terms.
- Similarly for Western region grain producing farms, farm cash income is estimated to have decreased in 2014–15 to average \$262 000 a farm; 24 per cent above the 10-year average to 2013–14 of \$211 000 in real terms.
- Dry seasonal conditions in the Northern region have resulted in estimated farm cash income of grain producing farms falling to average \$79 000 a farm in 2014–15, around 24 per cent below the 10-year average to 2013–14 of \$105 000 a farm in real terms. If realised, this would be the lowest farm cash income for Northern region grain growing farms since 2006–07.
- Nationally, farm cash income of grain producing farms increased from \$189 590 in 2012–13 to \$213 100 in 2013–14. In 2014–15 farm cash income is estimated to have declined to average \$171 000 a farm, around 24 per cent above the 10-year average to 2013–14 of \$137 000 in real terms.
- Average farm cash income of specialist grain growers, those farms most reliant on grain production, has consistently exceeded the average for mixed enterprise grain producing farms over the past 20 years.
- Farm cash income of Australian specialist grain producers increased from an average of \$269 010 a farm in 2012–13 to \$303 300 in 2013–14 and is estimated to have decreased to an average of \$217 000 in 2014–15; 10 per cent above the 10-year average to 2013–14 of \$197 000.

Rate of return

- Among the agricultural industries surveyed by ABARES in 2014–15, the highest average return to total capital used, excluding capital appreciation, is for Australian specialist grain producers, averaging 3.5 per cent, compared with –0.3 per cent for the beef industry, 1.3 per cent for the sheep industry and 1.5 per cent for the dairy industry. Rate of return to total capital used is a measure of business efficiency in generating profits from all resources used.
- Average rate of return to total capital used is estimated to have been highest for Western region grain producing farms at 6.3 per cent in 2013–14, compared with 3.5 per cent in the Southern region and 0.4 per cent in the Northern region.
- Average rates of return to total capital used increase with the size of grain enterprises in all three GRDC regions for the five years ending 2013–14.
- For farms planting more than 2 400 hectares, rate of return to total capital used averaged 6.2 per cent for Southern region farms over this period, 4.3 per cent for Western region farms and 4.0 per cent for Northern region farms.

- This compares with grain producing farms planting less than 600 hectares, where the rate of return to total capital used averaged 1.2 per cent for Southern region farms, 0.2 per cent for Western region farms and –0.3 per cent for Northern region farms.

Debt

- Debt is an important source of the funding needed for farm investment and ongoing working capital. The largest contribution to increases in farm debt in recent years has been borrowing to fund new investment, particularly purchase of land, tractors, cultivators, sowing and harvesting machinery and vehicles.
- Nationally, farm debt increased by less than 1 per cent during 2013–14 for grain producing farms.
- Around 47 per cent of Australian grain producing farms reduced overall farm debt in 2013–14.
- In the Western region 53 per cent of farms reduced overall farm debt in 2013–14, 46 per cent of farms in the Northern region and 45 per cent of farms in the Southern region.
- Net investment in machinery, vehicles and farm improvements increased in the Western and Southern regions in 2013–14, largely reflecting higher farm cash incomes. However, net investment decreased in the Northern region, where farm cash incomes were reduced as a result of poor seasonal conditions.
- Around 19 per cent of farms in the Northern and Southern GRDC regions and 48 per cent of farms in the Western region carried in excess of \$1 million in debt at 30 June 2014. The high proportion of such farms in the Western region largely reflects the high proportion of farms with large grain enterprises in this region.

1 Introduction

The Australian grains industry plays an important role in the Australian economy, through its contribution to domestic food supply, income generated from exports and through environmental stewardship. Together, grains, oilseeds and pulses represent Australia's largest food export, accounting for more than 34 per cent of the value of food exports (Department of Agriculture 2014).

Total Australian production of grains, oilseeds and pulses is estimated to have averaged 43.8 million tonnes in the three years from 2012–13 to 2014–15, an increase of 17 per cent from the 10-year average production recorded to 2011–12 of 37.5 million tonnes. The number of grain producing farms declined by 26 per cent during this period.

Several factors have contributed to increased production of grains, oilseeds and pulses over the 20 years to 2014–15. These included substantial structural adjustment within the broadacre sector of Australian agriculture away from wool production to grain production, and increasing farm size. Also important has been growth in farm productivity resulting from the continuous adoption and refinement of innovations in crop science, cropping equipment and farm management. Productivity growth is a key mechanism by which agricultural industries remain competitive and farmers maintain profitability to ensure long-term viability.

Grains industry output is increasingly dominated by larger farms. Between 2011–12 and 2013–14 around 2 260 farms, or just 9 per cent of grain producing farms, planted more than 2 400 hectares. These farms account for 41 per cent of production, while the 62 per cent of farms planting less than 600 hectares account for only 17 per cent of total production. Between 1995–96 and 2013–14 the number of farms planting more than 2 400 hectares to grains, oilseeds and pulses increased almost three-fold, while the number of farms planting less than 600 hectares declined by more than one-third.

The increase in the average size of grain enterprises, and improved seasonal conditions in eastern Australia between 2008–09 and 2011–12 following drought during the early and mid 2000s, resulted in an increase in average yields and a rise in total Australian grain, oilseed and pulse production to a record 51.2 million tonnes in 2011–12. Nationally, the financial performance of grain producing farms has trended upward since 2007–08. However, the financial performance of grain producing farms across the three Grains Research and Development Corporation (GRDC) regions has varied.

This report presents the detailed financial performance of grain producing farms from 2012–13 to 2014–15 and discusses recent farm financial performance and productivity in a historical context.

The report draws on data from the ABARES annual Australian Agricultural and Grazing Industries Survey (AAGIS) to provide an overview of production, financial performance and productivity growth of the Australian grains, oilseed and pulse industry. The GRDC funded the preparation of this report and partly funded AAGIS.

Information presented in this report expands on farm survey results published in Australian farm survey results 2012–13 to 2014–15 (ABARES 2015c) and in Agricultural commodities: March quarter 2015 (ABARES 2015a). ABARES uses the latest data to produce estimates from this survey, ensuring that estimates are revised as new information becomes available.

Around 25 350 Australian broadacre farms each plant more than 40 hectares to grains, oilseeds and pulses each year. This report classifies these farms as grain producing farms. More than half these farms derive most of their farm receipts from sales of grains, oilseeds and pulses; these farms are termed specialist grain producers in this report. The other half are mixed enterprises, deriving a large proportion of their receipts from beef cattle, sheep, lambs, wool and other crops and from the sale of grains, oilseeds and pulses.

Farm businesses with less than 40 hectares planted to grains, oilseeds or pulses represent less than 1.0 per cent of the total grain, oilseed or pulse crop area and value of sales and are excluded from this analysis.

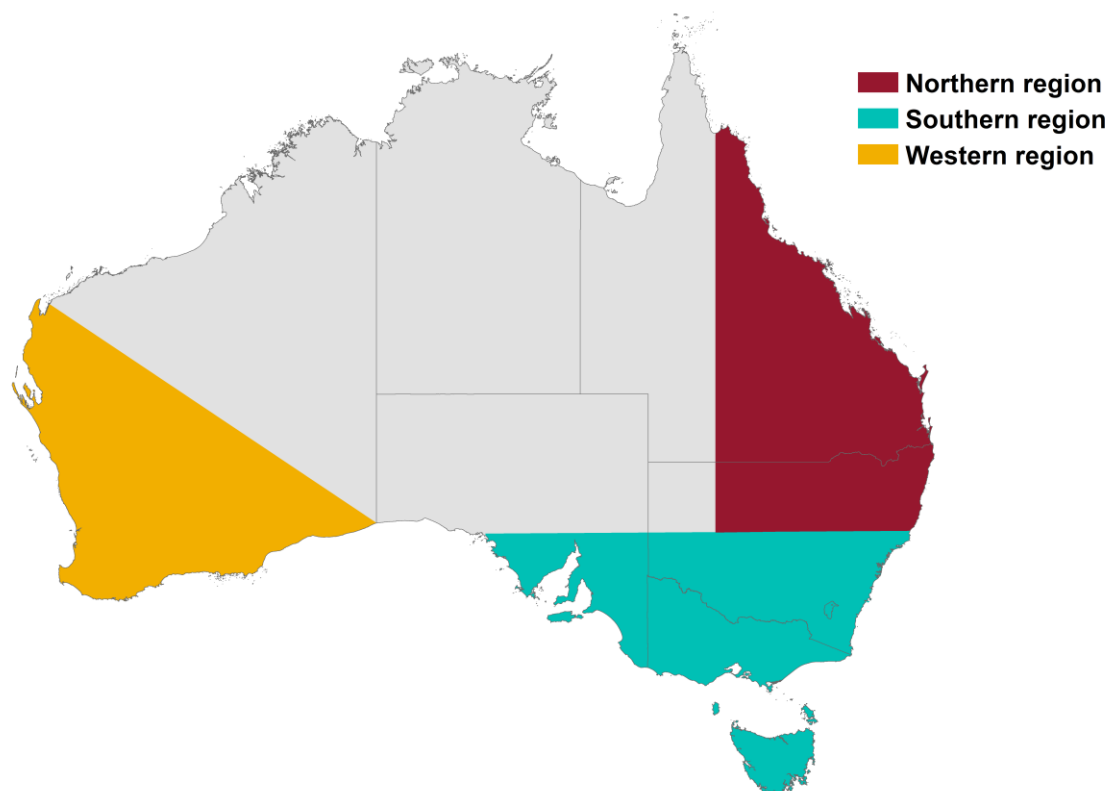
GRDC grain growing regions

The Australian grain sector is characterised by production of predominantly winter cereals, produced across a wide geographic area with differing climate and soil characteristics and diverse management requirements. Pulses and oilseed crops are also important, both in their own right and as break crops in the dominant cereal rotation that assist weed, pest and disease control and provide other benefits such as nitrogen fixation.

In recognition of variations in growing conditions, the GRDC distinguishes three broad agroecological grain growing regions (Map 1).

Descriptions of the three GRDC regions in this chapter are adapted from the GRDC publication 'Our grains industry' (GRDC 2015) and supplemented with information from AAGIS.

Map 1 Grains Research and Development Corporation regions



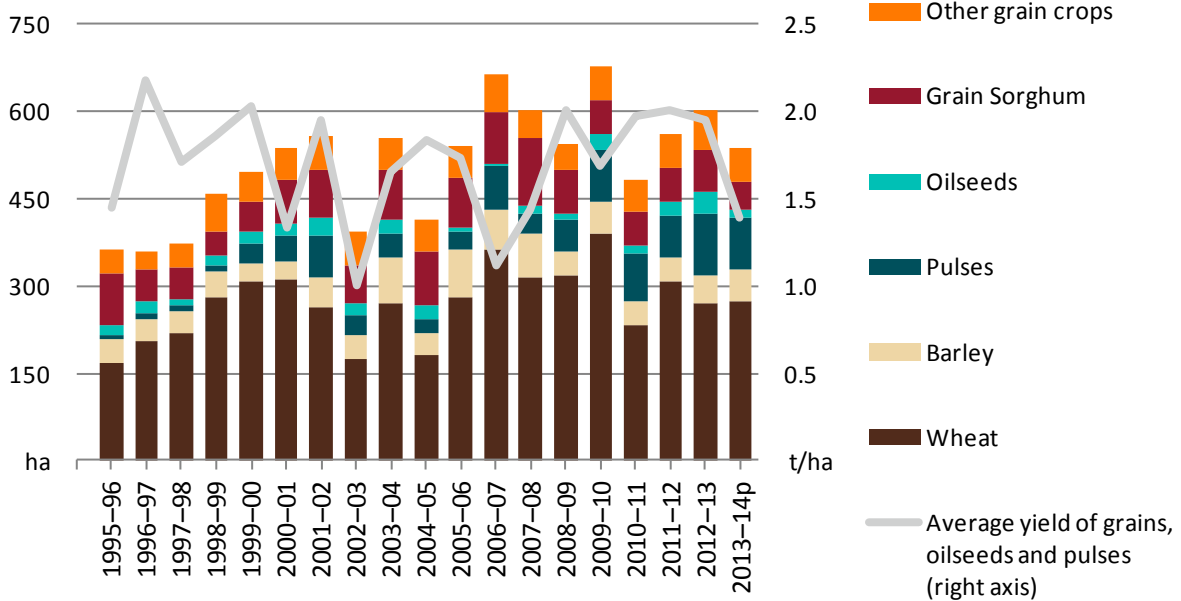
Source: Grains Research and Development Corporation

Northern region

The Northern region, encompassing Queensland and northern New South Wales, has generally high inherent soil fertility. It has relatively high variability in seasonal rainfall, production (resulting from change in area planted to various crops) and yields (Figure 1, Figure 2 and Map 2). Conservation of soil moisture from summer-dominant rainfall is an important factor in determining yield.

Figure 1 Average area sown and yield, grain producing farms, Northern region, 1995–96 to 2013–14p

average per farm

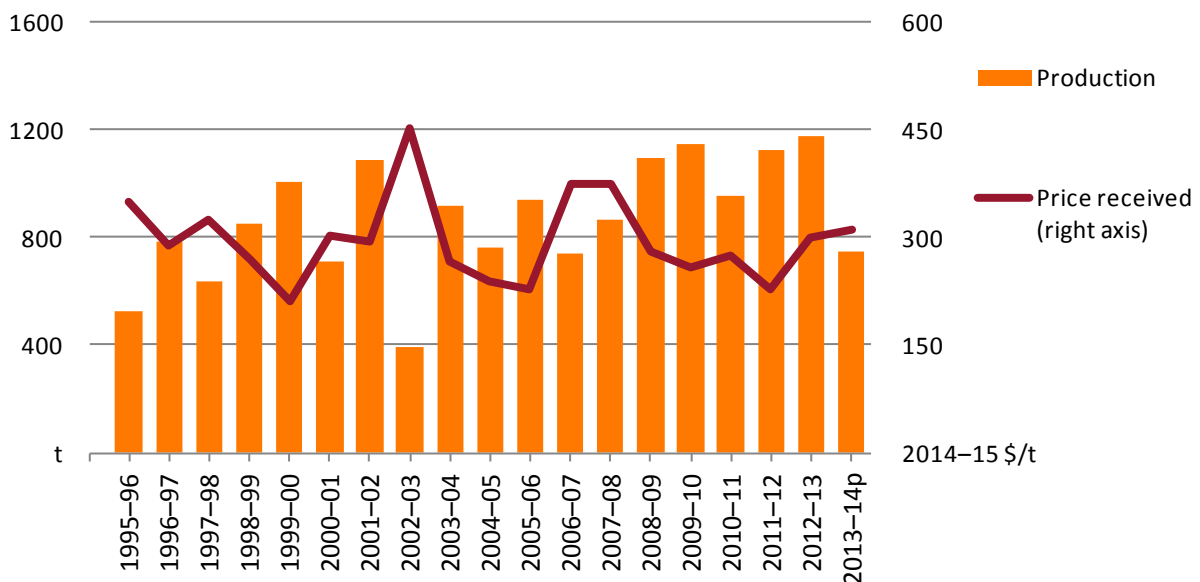


p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Figure 2 Average production per farm and price received per tonne sold for grains, oilseeds and pulses, Northern region, 1995–96 to 2013–14p

average per farm



p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

The Northern region has the highest diversity of crop production, including summer-growing grain sorghum, maize and tropical pulses and winter-growing wheat, barley, pulses and oilseeds (Figure 1). Both winter and summer crops are important for farm profitability.

Production systems include many mixed farming enterprises, particularly large beef cattle enterprises. On average, grain enterprises are smaller than in the Western region but larger than the Southern region.

The Northern region is the largest source of Australia’s premium hard high-protein wheat for export and domestic use. Demand for feed grains from the region’s important livestock industries is a key driver of grain production.

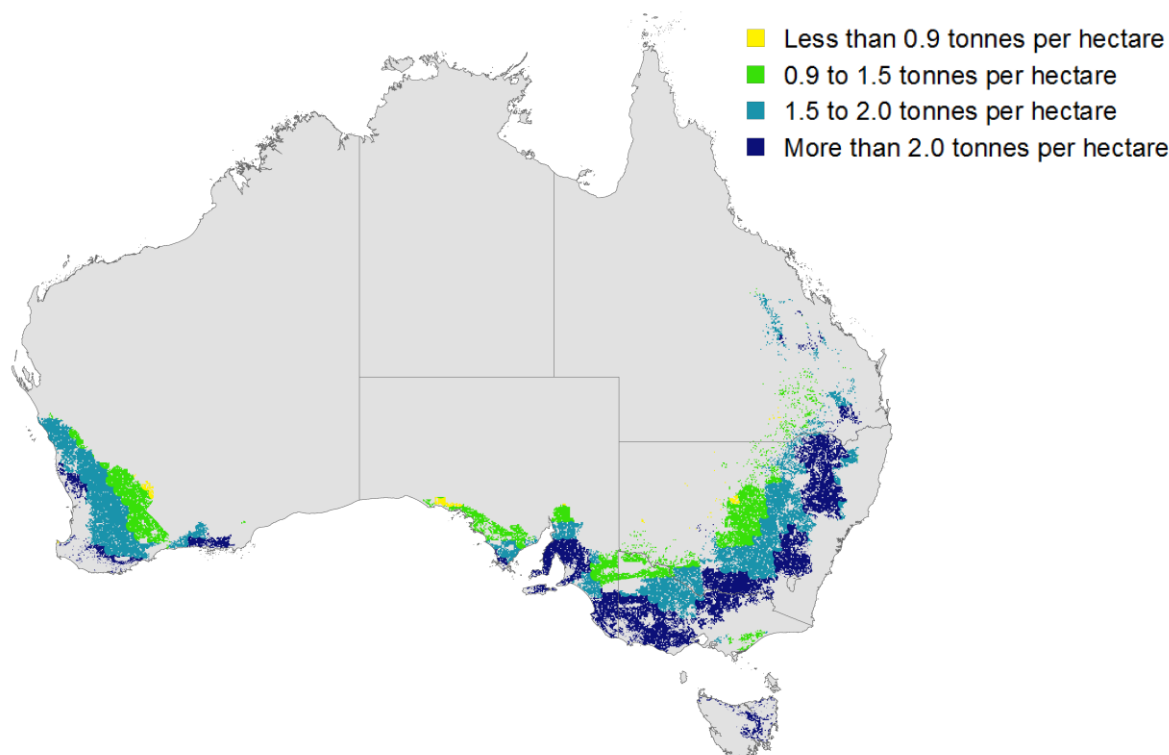
Southern region

The Southern region encompasses south-eastern Australia, including central and southern New South Wales, Victoria, Tasmania and South Australia.

Some areas have very productive soils but most are of lower fertility, with subsoil constraints such as salinity, sodicity and toxic levels of some elements.

Yield potential depends on rainfall through the growing season, with less dependence on stored soil moisture than in the Northern region. Reliability of rainfall within the region varies from relatively high in areas such as the Yorke Peninsula in South Australia to low in inland regions such as the Victorian Mallee and western New South Wales. Rainfall variability was reflected in high variability in grain yields in many areas in the 10 years ending 2013–14 (Map 2).

Map 2 Average wheat yields, 2004–05 to 2013–14p



p Preliminary estimate.

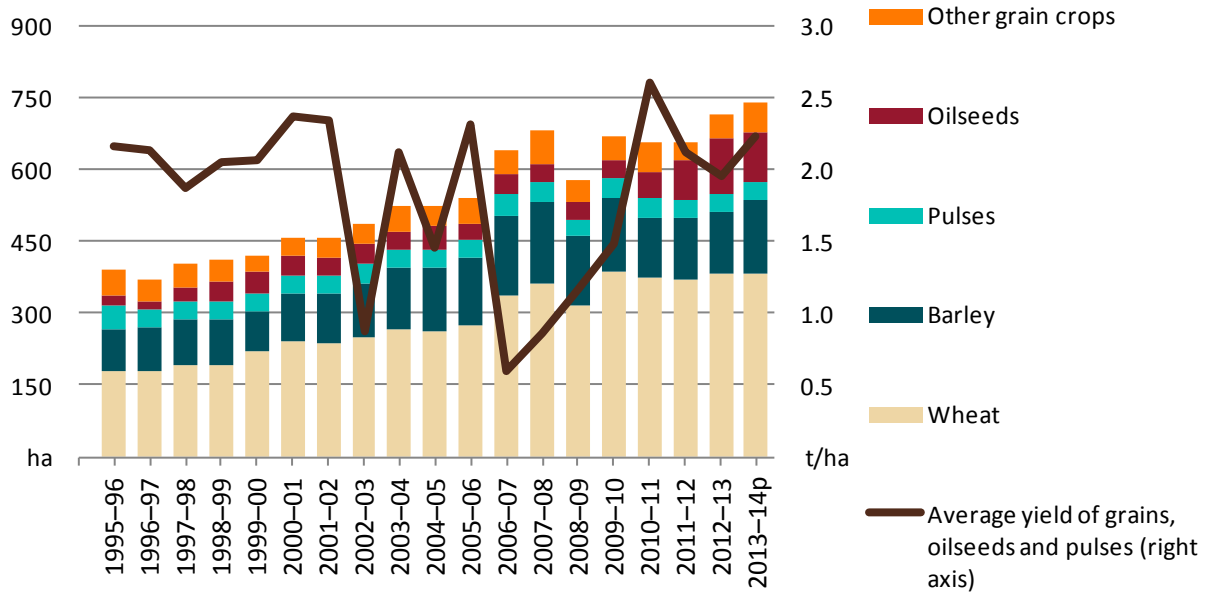
Source: ABARES Australian Agricultural and Grazing Industries Survey

Crop production systems, although dominated by winter crops, are varied and include many mixed farming systems that combine sheep or beef cattle and grain growing. The average area planted to grains, oilseeds and pulses per farm is much smaller than in the Western region. The

average area planted to these crops is similar to the Northern region, but with much less year-to-year variability (Figure 1, Figure 3, Figure 4 and Figure 5).

Figure 3 Average area sown and yield, grain producing farms, Southern region, 1995–96 to 2013–14p

average per farm

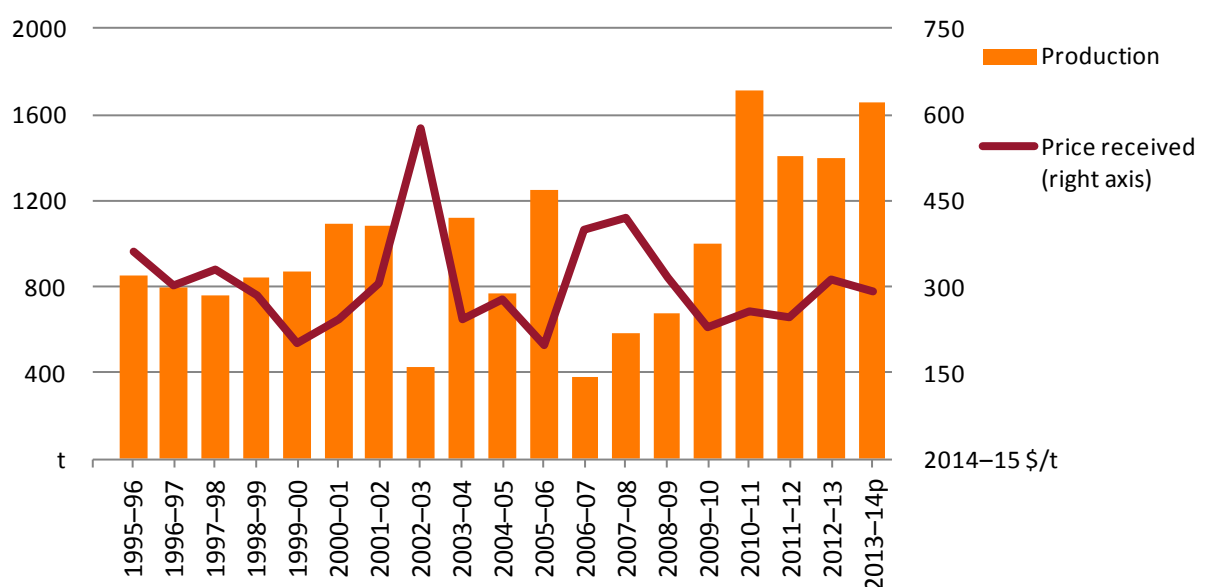


p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Figure 4 Average production per farm and price received per tonne sold for grains, oilseeds and pulses, Southern region, 1995–96 to 2013–14p

average per farm



p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

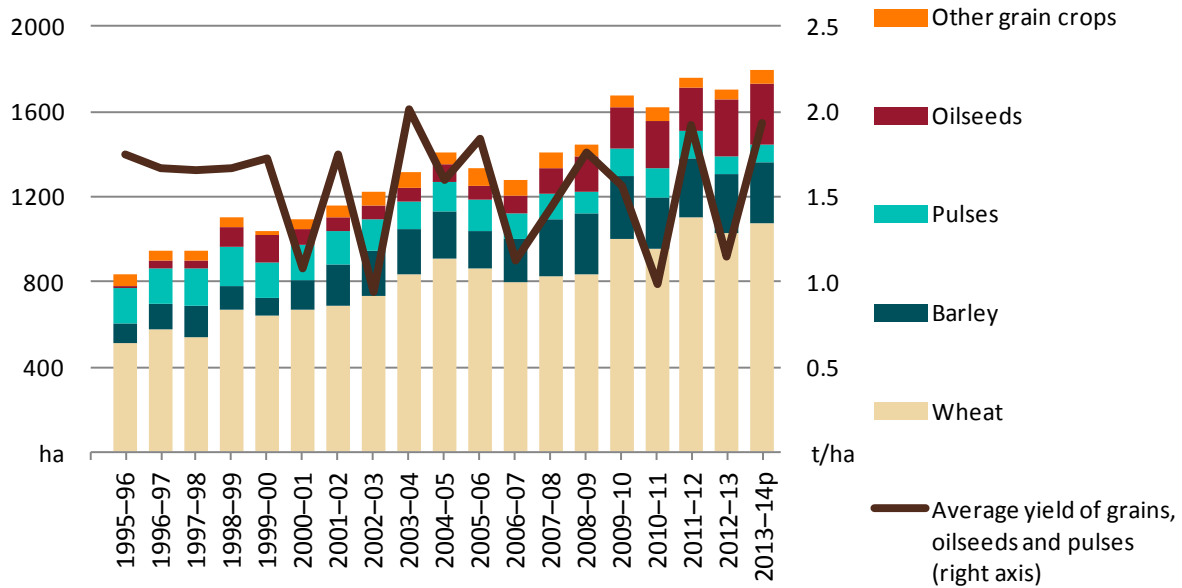
Western region

The Western region comprises the cropping areas of Western Australia, where soil fertility is generally low to very low and yields depend on rainfall through the winter crop growing season.

In many areas, yields are low by world standards (Map 2) with the impact of low yields on farm incomes compensated for by the large area planted to crop per farm (Figure 5 and Figure 6).

Figure 5 Average area sown and yield, grain producing farms, Western region, 1995–96 to 2013–14p

average per farm

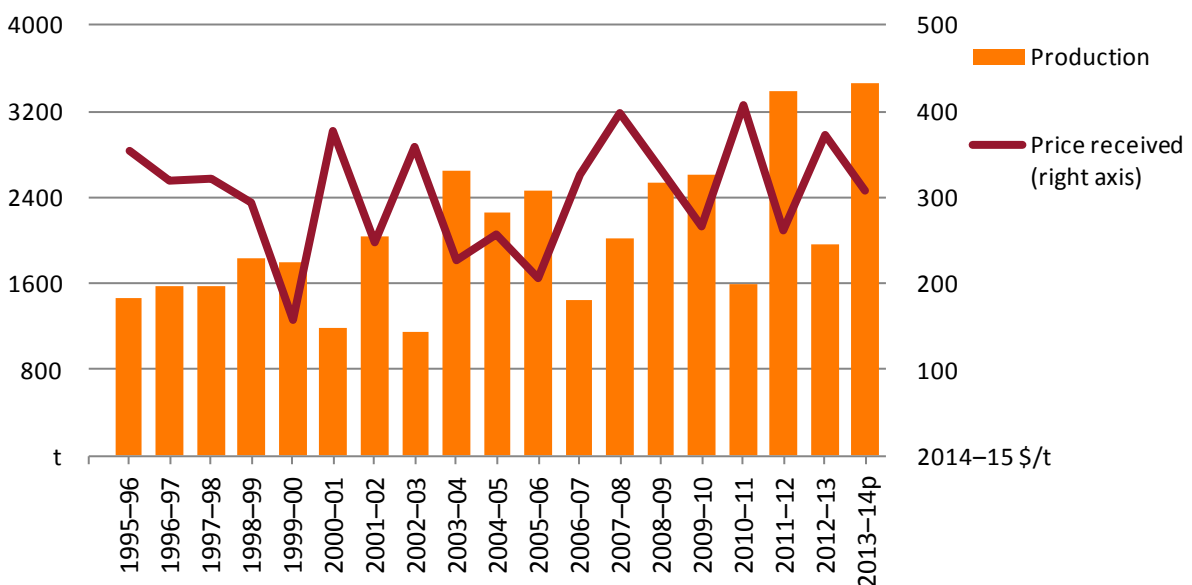


p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Figure 6 Average production per farm and price received per tonne sold for grains, oilseeds and pulses, Western region, 1995–96 to 2013–14p

average per farm



p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Long-term variability in seasonal rainfall and production has generally been lower in southern and central parts of the Western region.

Wheat, barley, canola and lupins are the dominant crops, with sheep enterprises in mixed farming systems usually of less importance. The Western region has a relatively small population and small feed grain using industries. The region consequently exports more than 85 per cent of its grain production.

2 Grain producing farms

Around 25 350 Australian broadacre farms each plant more than 40 hectares of grains, oilseeds or pulses each year. These farms are classified as grain producing farms in this report. Many of these farms are mixed enterprises, deriving a large proportion of their receipts from beef cattle, sheep, slaughter lambs and wool.

In the three years to 2013–14 more than 24 per cent of grain producing farms (6 110 farms) were in the Northern region, 58 per cent (14 720) were in the Southern region and 18 per cent (4 520 farms) in the Western region (Table 1).

Table 1 Distribution of grain producing farms, by area planted to grains, oilseeds and pulses, by region

average between 2011–12 and 2013–14p

Area planted to grains, oilseeds or pulses	Number of farms (no.)	Share of farms (%)	Share of grain, oilseed and pulse production (%)
Northern region			
Less than 600 hectares	4 750	78	19
600 to 1 200 hectares	720	12	19
1 200 to 2 400 hectares	320	5	15
More than 2 400 hectares	320	5	47
Total	6 110	100	100
Southern region			
Less than 600 hectares	9 410	64	23
600 to 1 200 hectares	2 540	17	22
1 200 to 2 400 hectares	2 000	14	30
More than 2 400 hectares	770	5	25
Total	14 720	100	100
Western region			
Less than 600 hectares	1 650	37	6
600 to 1 200 hectares	950	21	11
1 200 to 2 400 hectares	750	17	18
More than 2 400 hectares	1 170	26	65
Total	4 520	100	100
Australia			
Less than 600 hectares	15 810	62	17
600 to 1 200 hectares	4 210	17	18
1200 to 2 400 hectares	3 070	12	24
More than 2 400 hectares	2 260	9	41
Total	25 350	100	100

p Preliminary estimate.

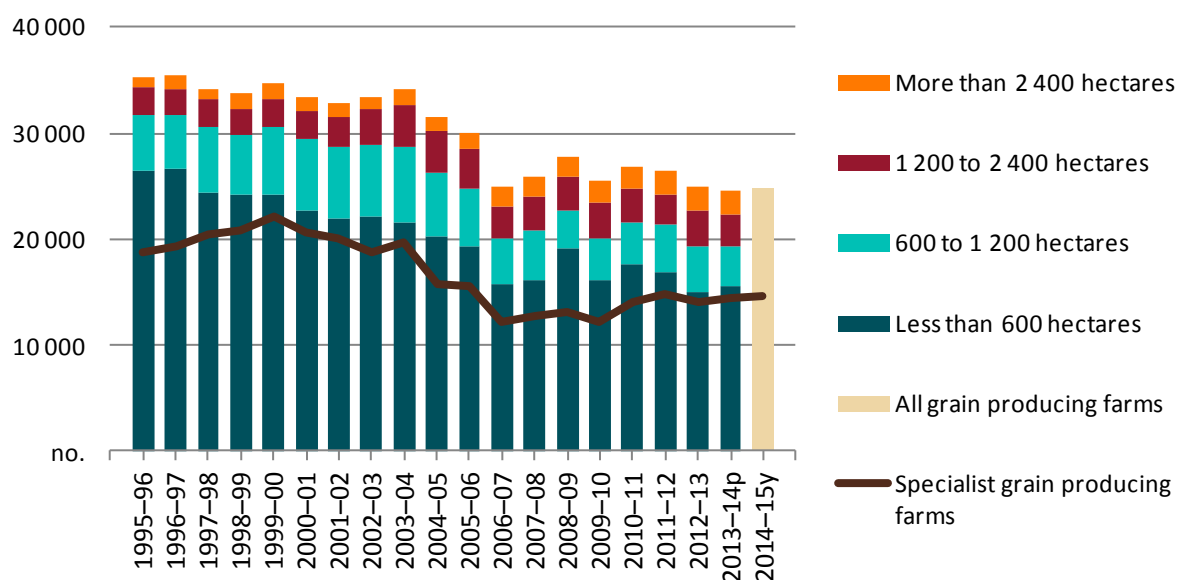
Note: Includes all broadacre farms with more than 40 hectares planted to grains, oilseeds or pulses.

Source: ABARES Australian Agricultural and Grazing Industries Survey

The average area planted per farm to grains, oilseeds and pulses doubled in the Western region and almost doubled in the Southern region from 1995–96 to 2013–14, increasing steadily throughout this period (Figure 3 and Figure 5). In the Northern region, the increase in area planted to these crops was more variable. The average area planted almost doubled between 1995–96 and 2009–10 (Figure 1) but declined with the onset of drier seasonal conditions to be around 50 per cent higher in 2013–14 than in 1995–96.

In all three regions, increases in average area planted to grains, oilseeds and pulses have been because of increases in both the proportion of farm area planted to grain and the average area operated per farm business as a result of farm amalgamation. Farm amalgamations have resulted in a decline in the number of grain producing farms. This is a result of smaller farms being incorporated into larger farm businesses (Figure 7).

Figure 7 Number of grain producing farms, by area planted, Australia, 1995–96 to 2014–15y



p Preliminary estimate. y Provisional estimate.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Between 1995–96 and 2013–14 the number of farms planting more than 2 400 hectares to grains, oilseeds and pulses increased by more than 270 per cent, while the number of farms planting 1 200 to 2 400 hectares increased by more than 110 per cent. From 1995–96 to 2003–04 the number of farms planting between 600 and 1 200 hectares increased before declining to be fewer in 2013–14 than in 1995–96. In contrast, the number of farms planting less than 600 hectares declined by 41 per cent over this period (Figure 7).

In the past 20 years, farms with the largest grain enterprises have markedly increased their share of production. In the three years to 1995–96 farms planting more than 2 400 hectares to grains, oilseeds and pulses accounted for 27 per cent of total production and farms planting less than 600 hectares accounted for 25 per cent of total production. In contrast, in the three years to 2013–14, the 9 per cent of farms (2 260 farms) planting more than 2 400 hectares to grains, oilseeds and pulses produced 41 per cent of total production.

This compares with farms planting less than 600 hectares to grains, oilseeds and pulses. These enterprises accounted for 62 per cent of grain producing farms in the three years to 2013–14 but for only 17 per cent of total production.

Specialist grain producers

Around 14 460 grain producing farms each earn more than 50 per cent of their total farm receipts from the sale of grains, oilseeds or pulses. These businesses are classified as specialist grain producers in this report.

These businesses generally have much larger grain producing enterprises. For 2011–12 to 2013–14 the average area planted to grains, oilseeds and pulses for specialist grain producers was 1 286 hectares, 50 per cent larger than the average of 857 hectares for all grain producing farms. In aggregate, specialist grain producers account for around 90 per cent of the total value of grain, oilseed and pulse sales by Australian broadacre farms. Over time, changes in the number of specialist grain producers have broadly followed changes in the number of all grain producing farms, declining through the early and mid 2000s but increasing slightly between 2006–07 and 2013–14 (Figure 7).

More than 70 per cent of grain producing farms in the Western region and around 60 per cent of grain producing farms in the Southern region are classified as specialist grain producers. The proportion of Northern grain producing farms classified as specialist producers is much lower, averaging 39 per cent in the three years to 2013–14.

3 Grain production

Improved seasonal conditions in eastern Australia from 2008–09, following several drought years during the early and mid 2000s, resulted in an increase in average yields and a steady rise in total Australian grain, oilseed and pulse production to a record 51.2 million tonnes in 2011–12. From 2008–09 the total area planted to grains, oilseeds and pulses consistently exceeded 23.2 million hectares, reaching 24.3 million hectares in 2011–12 (ABARES 2015b).

Winter and summer grain, oilseed and pulse crops achieved Australian production records in 2011–12. Total production of winter grain, oilseed and pulse crops (wheat, barley, canola, chickpeas, faba beans, field peas, lentils, linseed, lupins, oats, safflower and triticale) was 45.7 million tonnes. Total production of summer grain, oilseed and pulse crops (grain sorghum, maize, mung beans, rice, peanuts, soybeans, sunflower, navy beans and cottonseed) was 5.5 million tonnes.

Overall in 2012–13 total area sown to grain, oilseed and pulse crops declined by 2 per cent. Total winter crop production declined to around 37.9 million tonnes in 2012–13, a reduction of 17 per cent on the record winter crop production in 2011–12. This decline was the result of below average rainfall through winter and spring, which reduced winter crop yields in all states. Total summer grain, oilseed and pulse production declined by 1 per cent mainly because of reduced cottonseed production. Overall production of grain sorghum, the main summer crop on grain producing farms, declined only slightly, compared with 2011–12. The exception was northern New Wales where a midsummer heatwave resulted in a decline of 10 per cent.

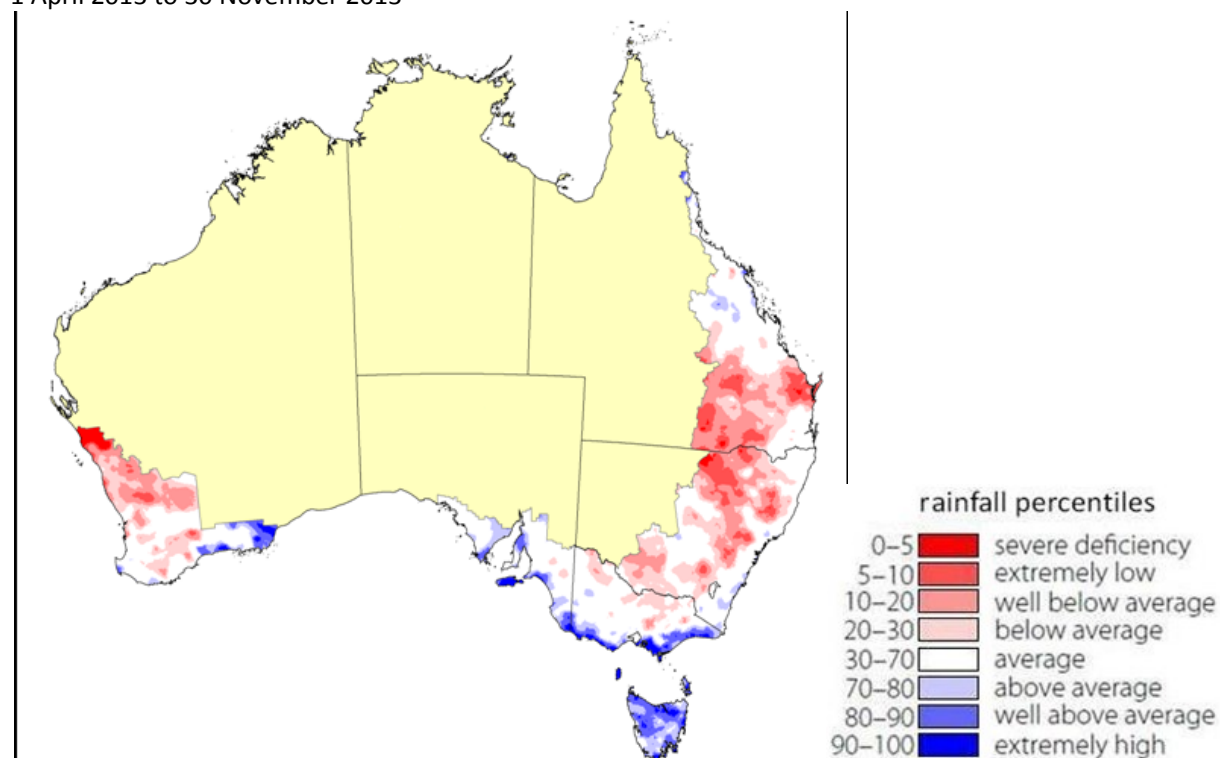
Grain production 2013–14

The total area sown to winter grain, oilseed and pulse crops declined by 4 per cent in 2013–14, compared with the area planted in 2012–13. The area planted to winter crops increased in Western Australia. However, drier seasonal conditions (Map 3) in Victoria, Queensland and New South Wales resulted in a reduction in area planted in those regions.

Total winter crop production is estimated to have increased by 10 per cent in 2013–14 to 41.9 million tonnes, the second largest winter crop on record after 2011–12, as a result of increased yields in Western Australia and South Australia. However, there were marked regional variations in winter crop production. In Western Australia, production increased by 47 per cent in 2013–14 to a near record 16.5 million tonnes, reflecting favourable spring growing conditions in the central and southern parts of the state. South Australian production also increased by 12 per cent, to around 7.2 million tonnes. In contrast, unfavourable seasonal conditions during winter, followed by dry seasonal conditions (Map 3) in spring, resulted in winter crop production declining in Queensland and New South Wales.

Map 3 Rainfall percentiles for 2013–14 winter crop areas

1 April 2013 to 30 November 2013



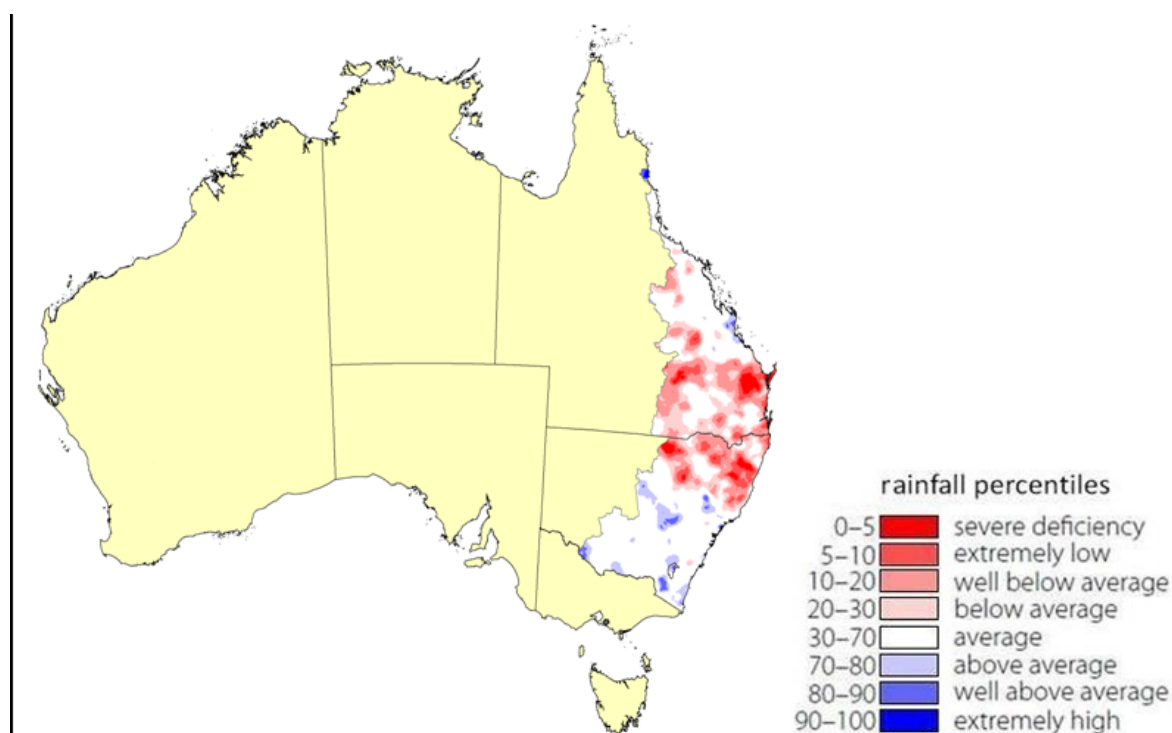
Note: Percentiles for the pastoral zone are not included.

Source: Bureau of Meteorology

Generally unfavourable seasonal conditions during the 2013–14 summer crop planting window in most summer cropping regions in northern New South Wales and Queensland resulted in a decline in summer crop production. Overall in 2013–14 total summer grain, oilseed and pulse plantings were reduced by around 18 per cent. Total summer grain, oilseed and pulse production declined by 30 per cent to 3.9 million tonnes. Production of all summer crops was reduced, but particularly grain sorghum, which declined by 42 per cent in 2013–14 to 1.3 million tonnes, the smallest harvest since 2006–07. This reflected an 18 per cent reduction in planted area and a 30 per cent reduction in the average yield. Grain quality was also adversely affected by unfavourable conditions throughout the growing season (Map 4).

Map 4 Rainfall percentiles for 2013–14 summer crop areas

1 November 2013 to 30 April 2014



Note: Percentiles for the pastoral zone and regions with no summer crops are not included.

Source: Bureau of Meteorology

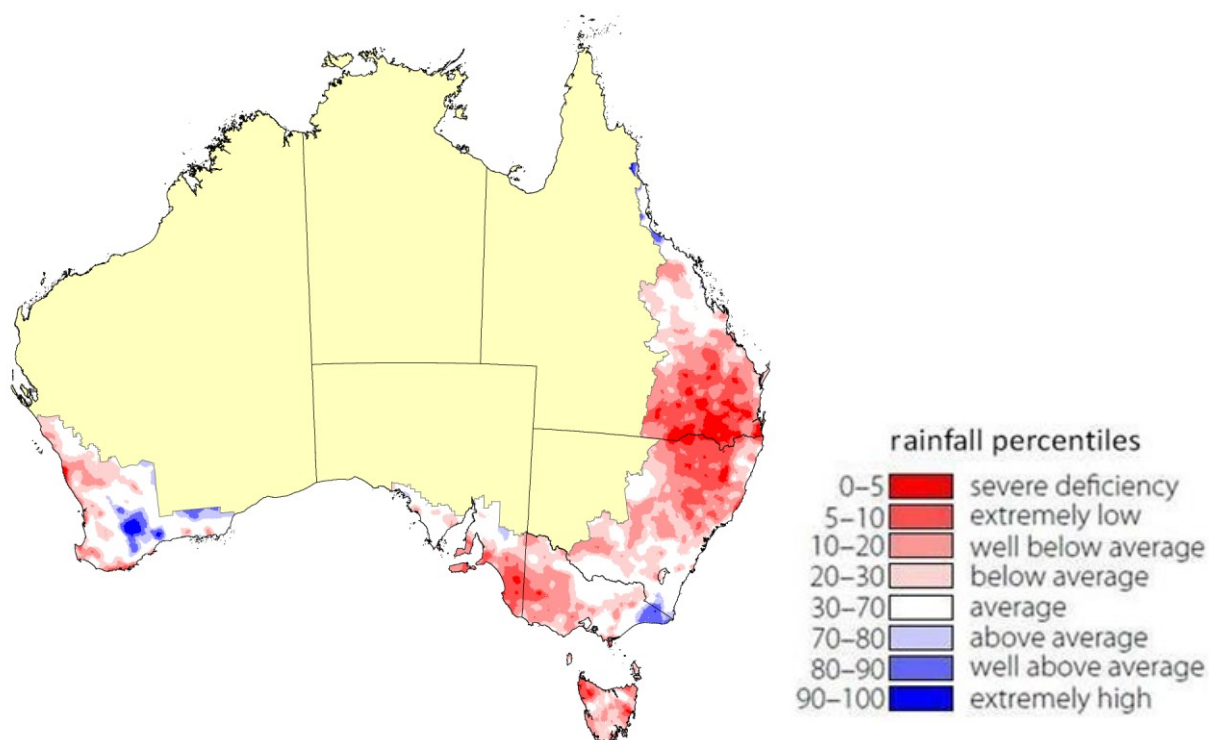
Grain production 2014–15

The total area sown to winter grain, oilseed and pulse crops increased by 6 per cent in 2014–15, compared with 2013–14, with a small increase in most states.

Total winter crop production is estimated to have declined by 8 per cent in 2014–15 to 38.4 million tonnes as a result of drier seasonal conditions (Map 5). In Victoria, drier seasonal conditions contributed to a decline in winter crop production of 19 per cent to 5.5 million tonnes, the lowest since 2009–10. Production is also estimated to have decreased by 12 per cent in Western Australia, relative to the large 2013–14 crop. Continued dry seasonal conditions in Queensland and northern New South Wales also resulted in a further decrease in production of 7 per cent and 6 per cent, respectively.

Map 5 Rainfall percentiles for 2014–15 winter crop areas

1 April 2014 to 30 November 2014



Note: Percentiles for the pastoral zone are not included.

Source: Bureau of Meteorology

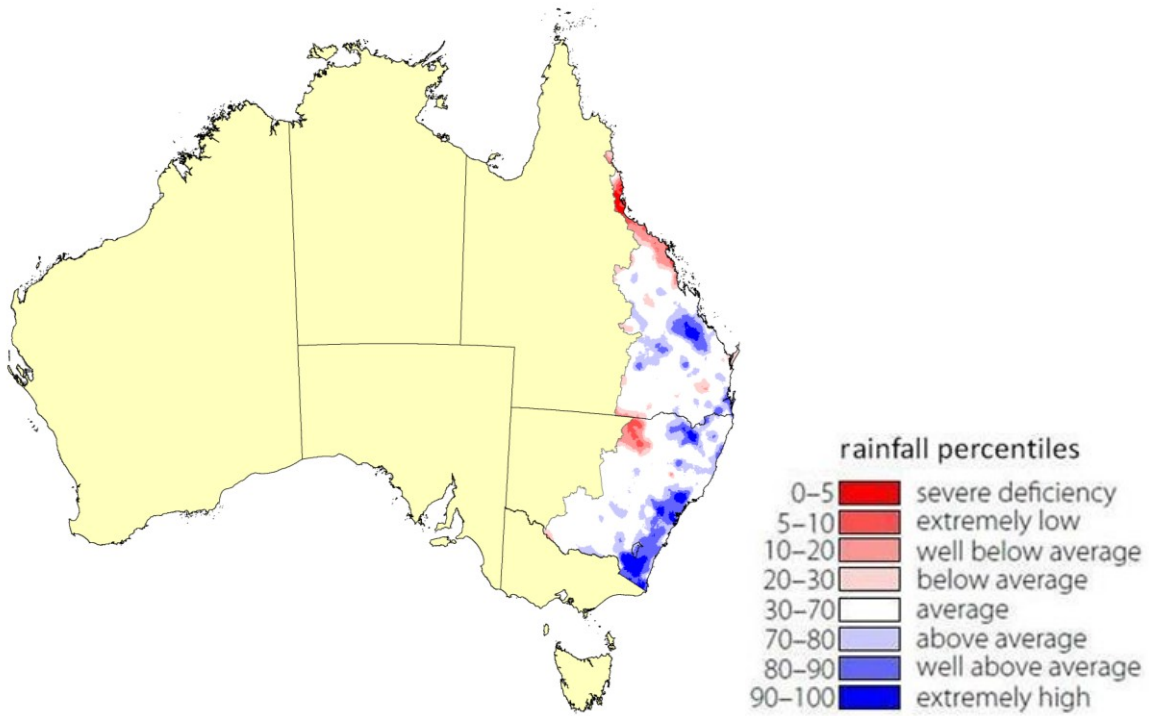
Continuation of dry seasonal conditions through spring resulted in the area planted to summer grain, oilseed and pulse crops declining by around 9 per cent, compared with 2013–14. However, seasonal conditions improved in summer cropping regions in New South Wales and Queensland in December 2014 and January 2015 (Map 6). As a result, yields increased compared with 2013–14 and total summer grain, oilseed and pulse production is estimated to have declined by only 4 per cent to around 3.8 million tonnes in 2014–15.

Grain sorghum production is estimated to have increased by 39 per cent in 2014–15 to 1.8 million tonnes as a result of an increase in area planted in Queensland and an increase in average yield.

Rice production is estimated to fall by 12 percent in 2014–15. This reflects a decline in the area planted as a result of reduced availability of irrigation water in New South Wales.

Map 6 Rainfall percentiles for 2014–15 summer crop areas

1 November 2014 to 30 April 2015

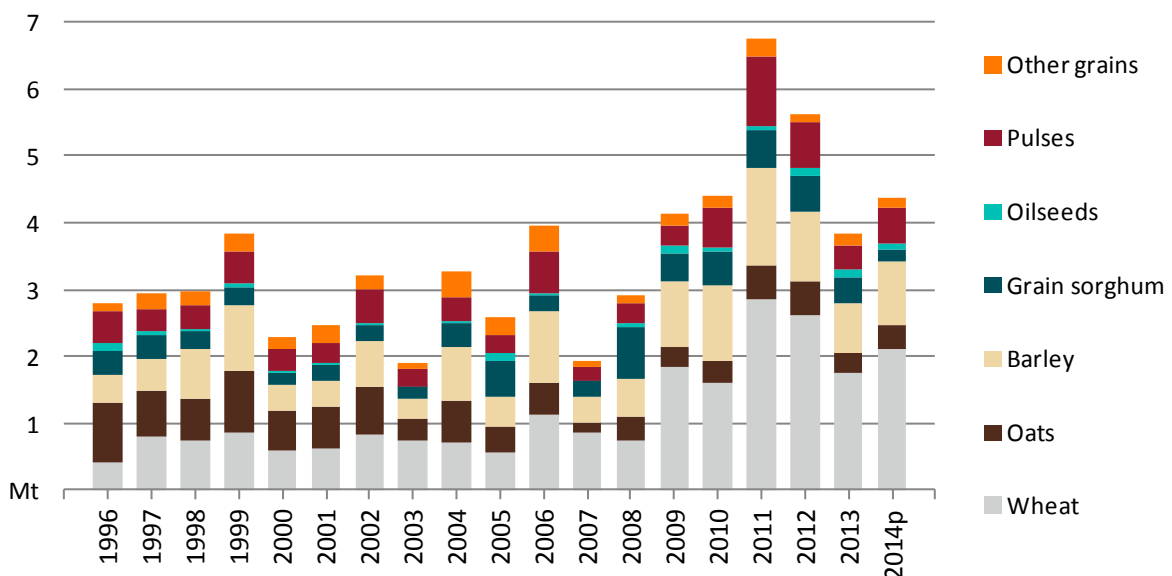


Note: Percentiles for the pastoral zone and regions with no summer crops are not included.
Source: Bureau of Meteorology

On-farm grain stocks

Changes in grain marketing options and the larger size of grain crops in recent years have resulted in Australian grain producing farms increasing the use of on-farm grain storage to store and market their crops. The aggregate tonnage of grains retained on Australian grain producing farms at 30 June has increased over time, particularly in the past six years to 2014 (Figure 8).

Figure 8 On-farm grain stocks at 30 June, grain producing farms, Australia, 1996 to 2014p



p Preliminary estimate.
Source: ABARES Australian Agricultural and Grazing Industries Survey

AAGIS records stocks of unsold grain held by farms at 30 June each year. These estimates do not represent farms' total on-farm grain storage capacity. Grain stocks at 30 June are normally well below the peak that occurs immediately after the winter crop has been harvested in October to January. By 30 June, most of the previous winter crop has been sold and most of the seed for the next winter crop planted. However, a large proportion of harvested summer crops remain on farm because they are typically harvested just before 30 June. This is particularly the case for grain sorghum in the Northern region. While most stocks are held on farm, some are held in storage rented from bulk grain handlers.

In recent years, AAGIS has recorded several large increases in grain stocks held by grain producing businesses at 30 June. The first occurred in 2011 and was mainly confined to the Southern region. The large 2010–11 winter crop was widely affected by wet conditions around harvest, which resulted in downgrading in the quality of a large tonnage of grain and pulses. A large quantity of this lower quality grain was held on farm and remained in storage at 30 June 2011 before being sold early in 2011–12 and contributing significantly to farm receipts in that year. Again in 2011–12, a record winter grain crop resulted in increased grain stocks held by grain producing businesses at 30 June 2012 in all regions, but with the largest increase in the Western region. These stocks were then mostly sold during the early part of 2012–13.

Grain stocks are estimated to have increased at 30 June 2014. This is mainly a result of the increased grain stocks on Western region farms after the record 2013–14 winter crop in this region.

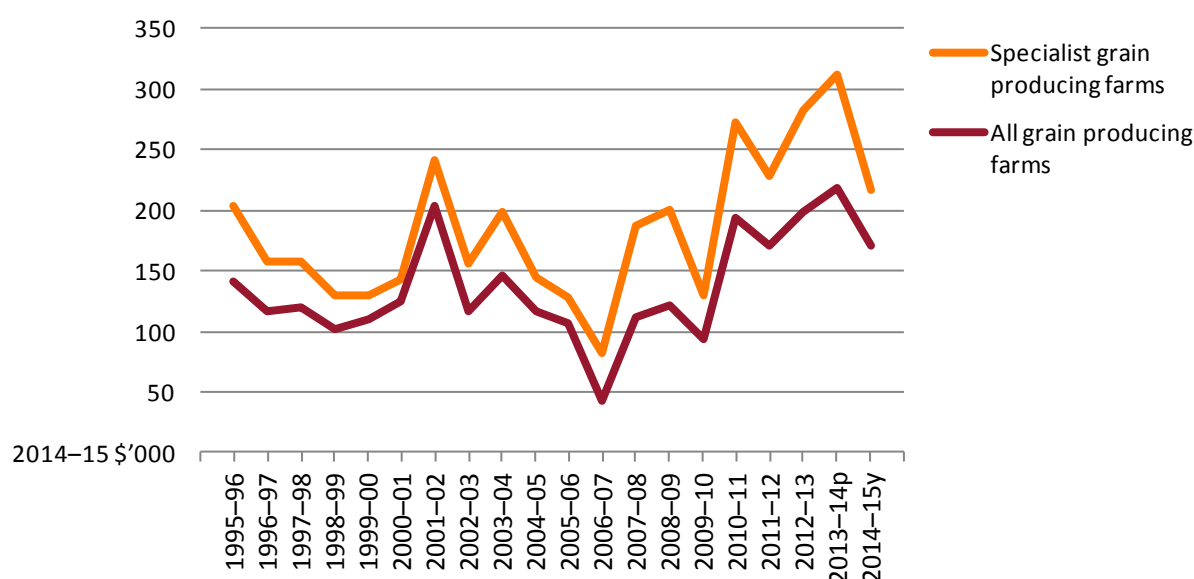
4 Financial performance

Financial performance of Australian grain producing farms

Nationally, the financial performance of grain producing farms has generally trended upward since 2007–08. Favourable yields for a relatively high proportion of grain producing farms increased total grain, oilseed and pulse production and resulted in higher farm receipts and high average farm cash incomes compared with incomes recorded historically (Figure 9).

Figure 9 Farm cash income, grain producing farms, Australia, 1995–96 to 2014–15y

average per farm



p Preliminary estimate. y Provisional estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Farm cash income

Nationally, in 2013–14 average grain, oilseed and pulse receipts increased by 9 per cent, with higher prices for wheat, grain sorghum and pulses and increased grain production, particularly in South Australia and Western Australia. Increased crop receipts were combined with higher livestock receipts as a result of increased sales of sheep and lambs. Overall, total cash receipts increased by 9 per cent in 2013–14, compared with 2012–13. Average total cash costs increased by 8 per cent, with small increases in all major cost categories in 2013–14. With a larger increase in average total cash receipts than in average total cash costs, farm cash income for grain producing farms increased nationally from an average of \$189 590 a farm in 2012–13 to a historically high \$213 100 a farm in 2013–14 (Table 2 and Figure 9). This was around 70 per cent above the average for the 10 years to 2012–13.

Table 2 Financial performance, grain producing farms, Australia

average per farm

Financial performance measure	unit	All grain producing farms			Specialist grain producers				
		2012–13	2013–14p	2014–15y	2012–13	2013–14p	2014–15y		
Total cash receipts	\$	657 660	719 400	(3)	662 000	873 130	953 100	(4)	844 000
Total cash costs	\$	468 070	506 200	(3)	491 000	604 120	649 800	(3)	627 000
Farm cash income	\$	189 590	213 100	(5)	171 000	269 010	303 300	(6)	217 000
Farms with negative farm cash income	%	14	14	(14)	20	12	13	(21)	23
Farm business profit	\$	56 040	86 300	(13)	35 000	112 100	167 000	(10)	59 000
Profit at full equity	\$	122 110	154 900	(8)	101 000	198 880	256 600	(7)	145 000
Rate of return									
– excluding capital appreciation	%	2.6	3.3	(7)	2.7	3.9	4.9	(6)	3.5
– including capital appreciation	%	3.1	3.9	(8)	na	4.5	5.7	(7)	na

p Preliminary estimate. **y** Provisional estimate.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Box 1 Major financial performance indicators

Total cash receipts: total revenues received by the business during the financial year

Total cash costs: payments made by the business for materials and services and for permanent and casual hired labour (excluding owner–manager, partner and family labour)

Farm cash income: *total cash receipts – total cash costs*

Farm business profit: *farm cash income + change in trading stocks – depreciation – imputed labour costs*

Profit at full equity: return produced by all the resources used in the business
farm business profit + rent + interest + finance lease payments – depreciation on leased items

Rate of return to total capital used: efficiency of businesses in generating returns from all resources used
(profit at full equity/total opening capital) x 100

Nationally, in 2014–15 average grain, oilseed and pulse receipts are estimated to have decreased by around 21 per cent. This is mainly a result of lower production in all the major producing states, reflecting a decline from the high yields in 2013–14 combined with reduced prices for wheat, pulses and oilseeds. Overall, with livestock receipts also decreasing, average total cash receipts for grain producing farms are estimated to decrease by around 8 per cent in 2014–15 compared with 2013–14. Average total cash costs are estimated to have decreased slightly (by around 3 per cent), compared with 2013–14, mainly as a result of the lower cost of harvesting and marketing a smaller crop and reduced fuel and interest payment expenditure. Expenditure in most major cost categories is estimated to have decreased, with the exception of crop and pasture chemicals and fertiliser.

In 2014–15 farm cash income for Australian grain producing farms is estimated to have fallen to average \$171 000 a farm (Figure 9), still around 24 per cent above the 10-year average to 2013–14 of \$137 000 in real terms.

Farm business profit and rate of return

Farm cash income is a measure of cash funds generated by the farm business for farm investment and consumption after paying all costs incurred in production; this includes interest payments but excludes capital payments and payments to family workers. It is a measure of short-term farm performance because it does not take into account depreciation or changes in farm inventories. A measure of longer-term profitability is farm business profit because it takes into account capital depreciation and changes in inventories of livestock, fodder, grain and wool.

Increased stocks of grain on farms in 2014 (see [On-farm grain stocks](#)) resulted in a small increase in overall farm inventory values in 2013–14 and 2014–15 despite reductions in beef cattle and sheep numbers in the Northern region. Farm business profit for Australian grain producing farms increased from an average of \$56 040 a farm in 2012–13 to \$86 300 in 2013–14 and then decreased to an estimated average of \$35 000 in 2014–15. This was the result of lower farm cash income and only a small increase in overall farm inventory values.

Profit at full equity, also referred to as earnings before interest and taxes (EBIT), adjusts farm business profit by adding back interest and leasing expenditure so that the performance of all farms can be compared regardless of the financing arrangements in place. For Australian grain producing farms, average profit at full equity increased from \$122 110 a farm in 2012–13 to \$154 900 in 2013–14 but is estimated to have decreased to \$101 000 in 2014–15.

Average rate of return to total capital used (excluding capital appreciation) is a measure of the percentage return generated from all resources used by the farm business. Overall, the average rate of return to total capital used for Australian grain producing farms is estimated to have been 3.3 per cent in 2013–14; it is estimated to decrease to average 2.7 per cent in 2014–15 (Table 2).

Australian specialist grain producers

Average farm cash income for Australian specialist grain growers has consistently exceeded the average for all Australian grain producing farms over the past 20 years (Figure 9). Indeed, the gap between the average farm cash income of specialist grain growers and the average for all grain producing farms has generally widened since 2006–07 as farm cash incomes for grain producing farms have generally increased.

Farm cash income for Australian specialist grain producers increased from an average of \$269 010 a farm in 2012–13 to \$303 300 in 2013–14 and is estimated to have decreased to an

average of \$217 000 in 2014–15; still 10 per cent above the 10-year average to 2013–14 of \$197 000.

Farm business profit for Australian specialist grain producers increased from an average of \$112 100 a farm in 2012–13 to \$167 000 in 2013–14 but is estimated to have decreased to an average of \$59 000 in 2014–15.

Average rate of return to total capital used (excluding capital appreciation) for Australian specialist grain producers is estimated to have been 4.9 per cent in 2013–14; it is expected to decrease to average 3.5 per cent in 2014–15, still well above the 10-year average to 2013–14 of 2.8 per cent.

Among the agricultural industries surveyed by ABARES, the projected average return to total capital used in 2014–15 for Australian specialist grain producers is highest, at 3.5 per cent, compared with -0.3 per cent for the beef industry, 1.3 per cent for the sheep industry and 1.5 per cent for the dairy industry (ABARES 2015c).

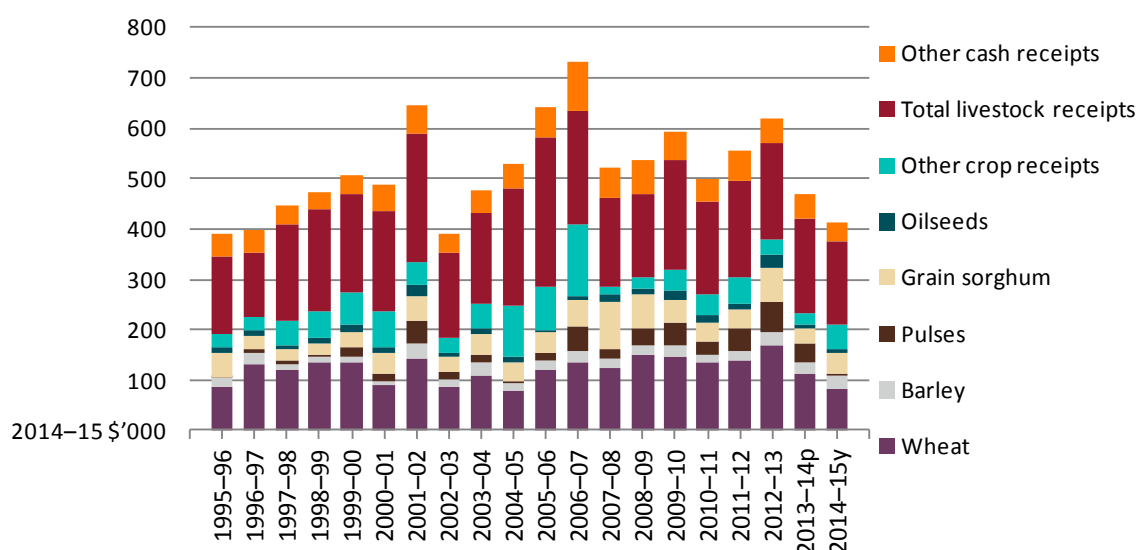
Financial performance—Northern region

Farm cash income

In 2013–14 average farm cash receipts of Northern region grain producing farms decreased (Figure 10 and Table 3). Receipts from winter and summer grains, oilseeds and pulses fell as a result of a 36 per cent decline in production from a historically large crop in 2012–13. Livestock receipts increased slightly, mainly as a result of an increase in the number of cattle, sheep and lambs sold. Total cash receipts decreased by 23 per cent in 2013–14 compared with 2012–13. Average total cash costs declined by 18 per cent, mainly as a result of planting and harvesting a much smaller crop compared with 2012–13, combined with reductions in most major cost categories. With total cash receipts decreasing more than total cash costs, farm cash income decreased in the Northern region from an average of \$148 210 a farm in 2012–13 to \$92 700 a farm in 2013–14 (Table 3). This was around 10 per cent below the 10-year average to 2012–13 of \$106 000 a farm in real terms.

Figure 10 Cash receipts, Northern region grain producing farms, 1995–96 to 2014–15y

average per farm



p Preliminary estimate. y Provisional estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 3 Financial performance, Northern region grain producing farms

average per farm

Financial performance measure	unit	2012–13	2013–14 ^p	2014–15 ^y	
Farm cash receipts					
Wheat	\$	160 770	111 000	(9)	81 000
Barley	\$	25 660	21 100	(25)	29 000
Grain sorghum	\$	63 090	30 000	(20)	40 000
Pulses	\$	57 630	34 600	(16)	4 000
Oilseeds	\$	23 600	7 600	(24)	6 000
Other crops	\$	31 680	21 600	(46)	50 000
Total crops	\$	362 430	225 800	(10)	210 000
Livestock and livestock products	\$	181 010	184 300	(6)	167 000
Other cash receipts	\$	45 510	45 500	(13)	36 000
Total cash receipts	\$	588 940	455 600	(5)	412 000
Farm cash costs					
Fertiliser	\$	36 000	27 700	(11)	26 000
Interest paid	\$	47 720	43 900	(9)	38 000
Crop and pasture chemicals	\$	47 540	34 700	(10)	33 000
Repairs and maintenance	\$	42 970	35 900	(6)	34 000
Fuel, oil and lubricants	\$	38 220	32 900	(6)	28 000
Other services	\$	33 170	29 100	(7)	25 000
Contracts	\$	40 540	21 300	(12)	18 000
Hired labour costs	\$	18 340	18 400	(11)	18 000
Livestock purchases	\$	27 660	23 300	(14)	20 000
Freight, handling and marketing charges	\$	34 780	21 800	(10)	21 000
Total cash costs	\$	440 730	363 000	(6)	333 000
Farm capital and debt					
Farm capital at 30 June	\$	4 933 710	4 629 600	(5)	na
Farm debt at 30 June	\$	681 530	667 000	(10)	634 000
Equity ratio	%	85	85	(1)	na
Farm financial performance					
Farm cash income	\$	148 210	92 700	(13)	79 000
Farm business profit	\$	26 980	-36 100	(35)	-44 000
Profit at full equity	\$	83 920	16 500	(75)	2 000
Rate of return					
– excluding capital appreciation	%	1.7	0.4	(74)	0.1
– including capital appreciation	%	1.4	0.2	(194)	na

^p Preliminary estimate. ^y Provisional estimate. **na** not available.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate.

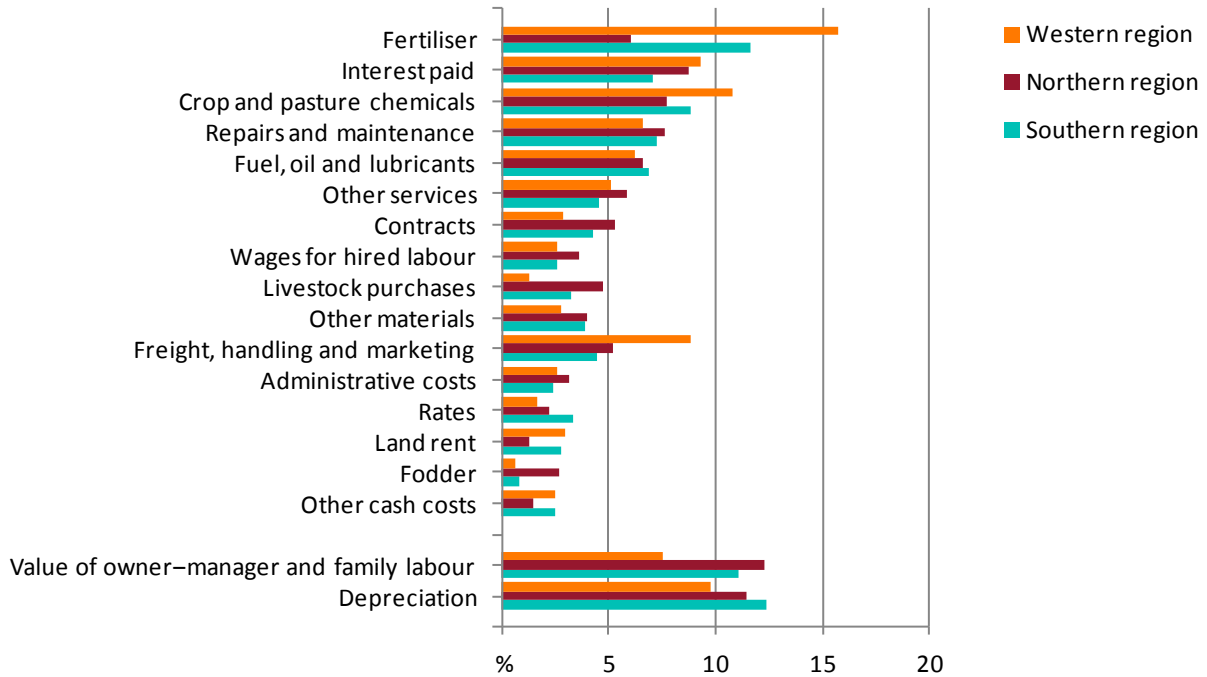
Source: ABARES Australian Agricultural and Grazing Industries Survey

As a consequence of increases in farm debt in the 10 years to 2010–11, interest payments are the largest cash cost for Northern region grain producing farms. On average, livestock purchase

accounts for a much larger proportion of farm costs in the Northern region than in the Southern and Western regions (Figure 11).

Figure 11 Composition of farm costs, grain producing farms, by region, 2012–13 to 2014–15y

average per farm



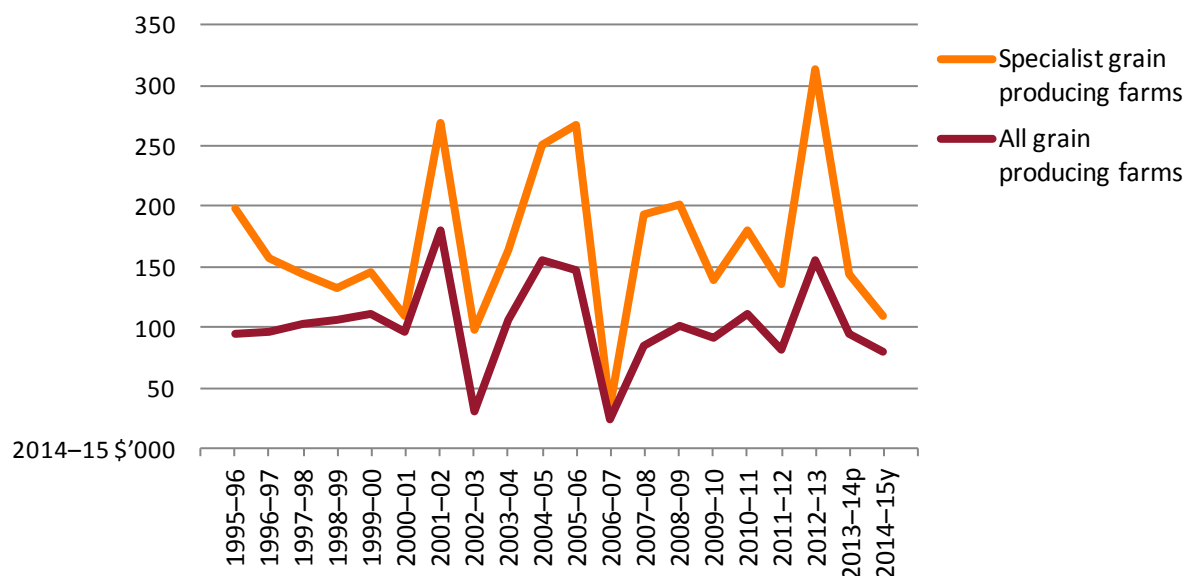
y Provisional estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

In 2014–15 average grain, oilseed and pulse receipts of Northern region grain producing farms are estimated to have declined by a further 22 per cent as a result of reductions in winter crop production. This is despite an expected increase in production of grain sorghum and other summer crops. Crop receipts are estimated to be the lowest in real terms since 2002–03 (Figure 10). On mixed enterprise farms, lower receipts from livestock because of reduced turn-off are also expected to have contributed to lower estimated farm cash receipts. The reduction in receipts is expected to be only partly offset by reduced expenditure on interest payments, fuel and livestock purchase.

In 2014–15 farm cash income of Northern region grain producing farms is estimated to have fallen to average \$79 000 a farm, around 24 per cent below the 10-year average to 2013–14 of \$105 000 a farm in real terms. If realised, this would be the lowest farm cash income for Northern region grain growing farms since 2006–07, when drought severely reduced incomes (Figure 12).

Figure 12 Farm cash income, Northern region grain producing farms, 1995–96 to 2014–15y
average per farm



p Preliminary estimate. y Provisional estimate.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Farm business profit and rate of return

Reduction in beef cattle numbers and on-farm stocks of grain will lower farm inventory values in 2014–15 in the Northern region. As a result, the reduction in average farm business profit in 2014–15 is estimated to have been even larger than the reduction in farm cash income. Farm business profit of Northern region grain producing farms is estimated to have declined further from a loss of \$36 100 a farm in 2013–14 to an estimated average loss of \$44 000 a farm in 2014–15.

For Northern region grain producing farms, average profit at full equity is estimated to have declined from a profit of \$16 500 a farm in 2013–14 to an estimated \$2 000 a farm in 2014–15.

Average rate of return to total capital used (excluding capital appreciation) for Northern region grain producing farms is estimated to have been 0.4 per cent in 2013–14, compared with 3.5 per cent in the Southern region and 6.3 per cent in the Western region. Overall, the rate is expected to have declined to average 0.1 per cent in 2014–15 for Northern region grain producing farms.

Financial performance by size of grain enterprise

Farm financial performance varies between producers with different sized cropping enterprises. Generally, farm cash incomes, farm business profits and rates of return are higher for larger sized grain enterprises (Table 4).

For the five years to 2013–14 rate of return to total capital used (excluding capital appreciation) averaged 4.0 per cent for Northern region grain producing farms planting more than 2 400 hectares, compared with an average of –0.3 per cent for the smallest grain producing farms planting less than 600 hectares (Table 4).

Table 4 Selected estimates, Northern region grain producing farms, by scale of operation

average per farm 2009–10 to 2013–14p

Physical	unit	Area planted to grains, oilseeds and pulses				All grain producing farms	Specialist grain producing farms	Top 25% specialist grain producing farms
		<600 hectares	600 to 1 200 hectares	1 200 to 2 400 hectares	>2 400 hectares			
Total farm area at 30 June	ha	1 400	4 100	5 300	13 000	2 500	2 400	4 300
Wheat – area sown	ha	67	432	951	2 597	292	543	1 033
Wheat yield	t/ha	1.8	1.8	1.9	2.1	1.9	2.2	2.4
Total grains, oilseeds and pulses – area sown	ha	169	851	1 701	4 647	568	1 052	2 032
Total grains, oilseeds and pulses – yield	t/ha	1.5	1.9	1.9	1.9	1.8	2.1	2.3
Total grains, oilseeds and pulses – production	t	247	1 614	3 204	8 840	1 022	2 185	4 582
Average price received for grains, oilseeds and pulses	\$/t	265	241	251	253	253	258	264
Total labour weeks worked	weeks	88	124	162	279	106	114	153
Financial performance								
Total grains, oilseeds and pulses – receipts	\$	61 600	364 100	751 100	2 187 400	246 800	557 500	1 147 300
Total cash receipts	\$	243 000	733 300	1 127 600	3 227 300	505 600	783 700	1 596 500
Total cash costs	\$	196 800	584 400	916 100	2 567 800	406 100	616 100	1 113 000
Farm cash income	\$	46 200	149 000	211 500	659 500	99 400	167 600	483 500
Farm business profit	\$	-35 100	16 300	25 700	388 500	-3 700	49 900	367 900
Profit at full equity	\$	-8 700	108 100	163 700	800 100	56 700	143 400	540 800

continued ...

Table 4 Selected estimates, Northern region grain producing farms, by scale of operation continuedaverage per farm 2009–10 to 2013–14^p

Financial performance	unit	Area planted to grains, oilseeds and pulses				All grain producing farms	Specialist grain producing farms	Top 25% specialist grain producing farms
		<600 hectares	600 to 1 200 hectares	1 200 to 2 400 hectares	>2 400 hectares			
Rate of return								
– excluding capital appreciation	%	-0.3	1.6	1.8	4.0	1.2	2.5	5.9
– including capital appreciation	%	-1.1	1.3	1.1	3.6	0.6	1.9	6.4
Farm capital at 30 June	\$	3 093 700	6 956 000	9 192 800	20 223 700	4 778 200	5 950 000	9 299 900
Farm debt at 30 June	\$	329 000	1 066 300	1 785 600	5 515 500	756 700	1 199 400	2 227 900
Equity ratio	%	89	83	79	70	83	78	75
Debt servicing								
Interest-to-receipts ratio	%	9	11	10	12	10	10	9
Interest and principal to receipts ratio	%	25	23	26	26	25	24	24
Number of farms	no.	4 700	700	400	300	6 000	2 300	600

^p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Specialist grain producers

Average farm cash income of Northern region specialist grain growers exceeded the average of all Northern grain producing farms in all of the past 20 years ending 2013–14.

Farm cash income of Northern region specialist grain producers decreased to an average of \$143 000 a farm in 2013–14. However, it is estimated to have declined to an average of \$110 000 a farm in 2014–15, the lowest farm cash income for Northern region specialist grain producers since 2006–07, when drought severely reduced incomes (Figure 12).

High performing farms

Farm businesses can be classified into performance categories, based on the rate of return (excluding capital appreciation) to all capital used in the business. Rate of return to total farm capital is a complete measure of farm financial performance that values all farm inputs and is not as strongly correlated with farm size as many other financial performance measures. To reduce the effect of changes in commodity prices, seasonal conditions and other year-specific effects on farm performance, three-year moving average rates of return have been calculated for each specialist grain growing farm in the AAGIS database. Results for Northern region specialist grain growing farms classified to the top performing 25 per cent of farms by rate of return for 2009–10 to 2013–14 are included in Table 4.

Over the five years ending 2013–14 the top performing 25 per cent of farms recorded average rates of return to capital of 5.9 per cent a year, well above the average annual rate of return of 2.5 per cent a year for all specialist grain growers in the Northern region.

High performing farms operate mainly larger cropping enterprises, but are found in all enterprise size categories. Over the five years ending 2013–14 the top performing 25 per cent of farms also recorded slightly higher average grain, oilseed and pulse yields and generally received a slightly higher average price for grains, oilseeds and pulses sold.

Financial performance—Southern region

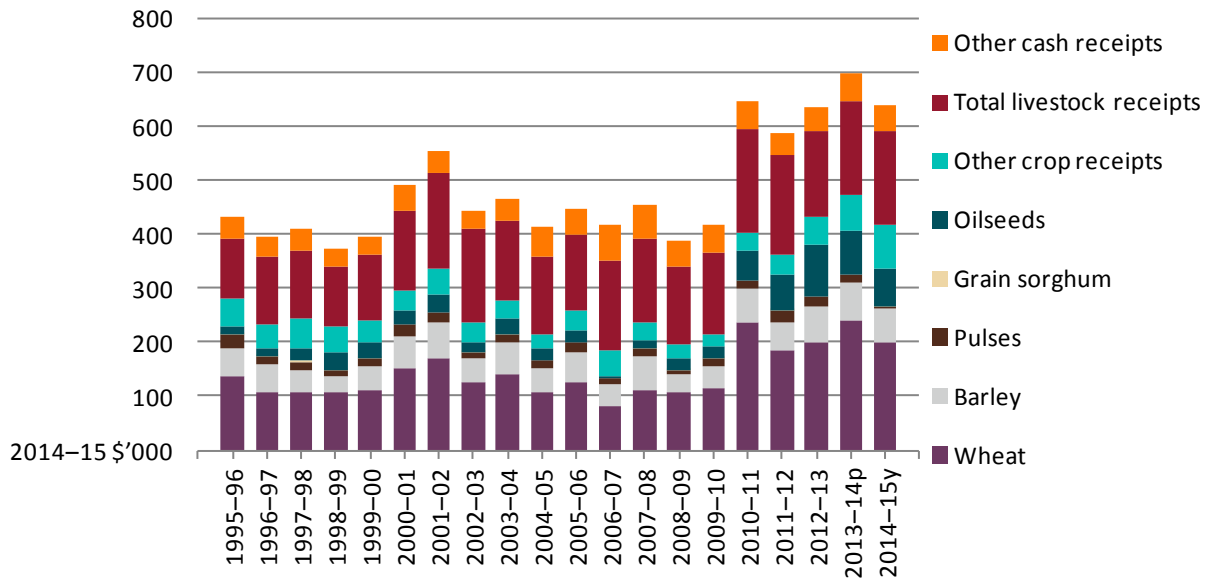
Farm cash income

In 2013–14 despite slightly lower grain yields, receipts from winter grains, oilseeds and pulses increased as a result of higher grain prices. Increased crop receipts were combined with higher livestock receipts on mixed enterprise farms (Figure 13). This was a result of higher average prices for lambs, sheep and beef cattle, as well as increased numbers sold in response to drier seasonal conditions. Average total cash costs are estimated to have increased compared with 2012–13. This was a result of farmers planting and harvesting larger crop areas in 2013–14. With higher average total cash receipts and a smaller increase in total cash costs, farm cash income increased in the Southern region from an average of \$199 300 a farm in 2012–13 to \$220 600 a farm in 2013–14 (Table 5).

In 2014–15 grain, oilseed and pulse receipts are estimated to have decreased by around 15 per cent as a result of decreased winter crop production, reflecting a decline from the high yields in 2013–14. Overall, livestock receipts are estimated to have increased slightly as a result of higher average prices received for lambs, sheep and beef. Average total cash costs are projected to decrease slightly compared with 2013–14. This is a result of decreased expenditure on fuel, livestock purchases and interest.

Figure 13 Cash receipts, Southern region grain producing farms, 1995–96 to 2014–15y

average per farm



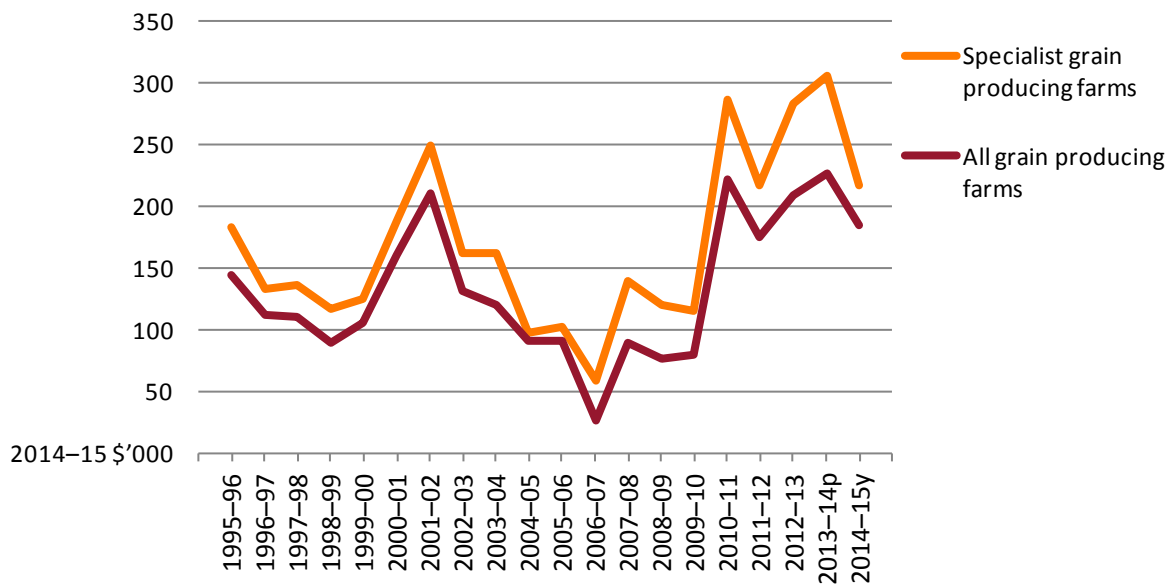
p Preliminary estimate. **y** Provisional estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

In 2014–15 farm cash income of Southern region grain producing farms is estimated to decrease to average \$184 000 a farm (Figure 14), 43 per cent above the 10-year average to 2013–14 of \$129 000 a farm in real terms.

Figure 14 Farm cash income, Southern region grain producing farms, 1995–96 to 2014–15y

average per farm



p Preliminary estimate. **y** Provisional estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 5 Financial performance, Southern region grain producing farms

average per farm

Financial performance measure	unit	2012–13	2013–14^p	2014–15^y	
Farm cash receipts					
Wheat	\$	191 570	233 200	(5)	200 000
Barley	\$	63 680	67 900	(7)	61 000
Grain sorghum	\$	–	–	–	1 000
Pulses	\$	15 430	16 300	(10)	4 000
Oilseeds	\$	91 430	78 400	(8)	70 000
Other crops	\$	51 740	65 700	15	83 000
Total crops	\$	413 840	461 600	(4)	419 000
Livestock and livestock products	\$	151 000	168 200	(6)	172 000
Other cash receipts	\$	40 530	50 300	(13)	49 000
Total cash receipts	\$	605 370	680 100	(4)	639 000
Farm cash costs					
Fertiliser	\$	62 350	68 900	(4)	70 000
Interest paid	\$	39 180	41 400	(7)	41 000
Crop and pasture chemicals	\$	43 660	53 200	(5)	55 000
Repairs and maintenance	\$	39 830	42 300	(4)	43 000
Fuel, oil and lubricants	\$	38 710	41 500	(5)	39 000
Other services	\$	24 450	28 200	(5)	26 000
Contracts	\$	21 710	25 700	(7)	26 000
Hired labour costs	\$	12 730	16 100	(10)	16 000
Livestock purchases	\$	14 760	21 800	(11)	20 000
Freight, handling and marketing charges	\$	22 960	27 500	(7)	27 000
Total cash costs	\$	406 070	459 500	(4)	456 000
Farm capital and debt					
Farm capital at 30 June	\$	4 265 110	4 406 300	(3)	na
Farm debt at 30 June	\$	619 710	671 000	(6)	667 000
Equity ratio	%	84	83	(1)	na
Farm financial performance					
Farm cash income	\$	199 300	220 600	(5)	184 000
Farm business profit	\$	72 110	93 600	(12)	53 000
Profit at full equity	\$	126 920	152 100	(8)	112 000
Rate of return					
– excluding capital appreciation	%	3.1	3.5	(7)	3.3
– including capital appreciation	%	4.1	4.3	(8)	na

^p Preliminary estimate. ^y Provisional estimate. **na** not available.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Farm business profit and rate of return

Farm business profit of Southern region grain producing farms is estimated to have decreased from \$93 600 a farm in 2013–14 to an estimated average of \$53 000 a farm in 2014–15. Profit at full equity is estimated to have decreased from an average of \$152 100 a farm in 2013–14 to an estimated \$112 000 a farm in 2014–15.

Rate of return to total capital used of Southern region grain producing farms is estimated to average 3.5 per cent in 2013–14 and is expected to have decreased to average 3.3 per cent in 2014–15.

Financial performance by size of grain enterprise

For the five years ending 2013–14 rate of return to total capital used, excluding capital appreciation, averaged 6.2 per cent for Southern region grain producing farms planting more than 2 400 hectares and 5.1 per cent for farms planting between 1 200 and 2 400 hectares, compared with an average of just 1.2 per cent for the smallest grain producing farms (farms planting less than 600 hectares) (Table 6).

Table 6 Selected estimates, Southern region grain producing farms, by scale of operation

average per farm 2009–10 to 2013–14p

Physical	unit	Area planted to grains, oilseeds and pulses				All grain producing farms	Specialist grain producing farms	Top 25% specialist grain producing farms
		<600 hectares	600 to 1 200 hectares	1 200 to 2 400 hectares	>2 400 hectares			
Farm area at 30 June	ha	1 000	1 900	4 400	7 000	1 900	2 000	2 500
Wheat – area sown	ha	101	431	998	2 226	379	545	829
Wheat yield	t/ha	2.5	2.4	2.1	2	2.2	2.3	2.5
Total grains, oilseeds and pulses – area sown	ha	218	847	1 691	3 660	687	981	1 496
Total grains, oilseeds and pulses – yield	t/ha	2.3	2.2	2	1.9	2.1	2.2	2.3
Total grains, oilseeds and pulses – production	t	507	1 854	3 328	7 107	1 430	2 152	3 499
Average price received for grains, oilseeds and pulses	\$/t	251	257	250	249	252	254	269
Total labour weeks worked	weeks	84	116	147	216	104	108	127
Financial performance								
Total grains, oilseeds and pulses – receipts	\$	112 900	442 300	782 700	1 666 500	333 000	520 000	894 500
Total cash receipts	\$	293 300	677 700	1 084 000	2 200 300	555 900	690 700	1 146 400
Total cash costs	\$	212 600	469 300	716 900	1 512 900	386 100	458 100	657 800
Farm cash income	\$	80 700	208 500	367 000	687 400	169 800	232 700	488 700
Farm business profit	\$	7 800	91 900	204 700	454 800	69 900	117 400	374 900
Profit at full equity	\$	33 600	164 300	310 300	677 300	123 700	181 300	470 200

continued ...

Table 6 Selected estimates, Southern region grain producing farms, by scale of operation continued

average per farm 2009–10 to 2013–14p

Financial performance	unit	Area planted to grains, oilseeds and pulses				All grain producing farms	Specialist grain producing farms	Top 25% specialist grain producing farms
		<600 hectares	600 to 1 200 hectares	1 200 to 2 400 hectares	>2 400 hectares			
Rate of return								
– excluding capital appreciation	%	1.2	3.6	5.1	6.2	3.1	4.3	8.8
– including capital appreciation	%	1.2	3.6	5.8	7.2	3.4	4.8	10
Farm capital at 30 June	\$	2 931 800	4 645 100	6 422 000	11 298 900	4 091 700	4 380 000	5 616 200
Farm debt at 30 June	\$	311 300	776 700	1 085 500	2 665 100	607 900	702 100	941 600
Equity ratio	%	88	81	80	74	83	82	81
Debt servicing								
Interest-to-receipts ratio	%	8	8	7	8	7	7	6
Interest and principal to receipts ratio	%	21	25	22	21	22	20	19
Number of farms	no.	9 800	2 600	2 000	700	15 100	8 400	2 100

p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Specialist grain producers

Average farm cash income of specialist grain growers has exceeded the average for all grain producing farms in the Southern region in each of the past 20 years (Figure 14).

In 2013–14 farm cash income of Southern region specialist grain producers increased to average \$306 000 a farm. This was the highest farm cash income for Southern region specialist grain producers in more than 20 years. Farm cash income is estimated to have decreased to \$217 000 a farm in 2014–15 (Figure 14), still around 26 per cent above the 10-year average to 2013–14.

High performing farms

Over the five years ending 2013–14 the top performing 25 per cent of specialist grain producing farms in the Southern region recorded average rates of return to capital of 8.8 per cent a year. Farm cash income and farm business profit were more than double the average for all specialist grain growers in the Southern region.

High performing farms operate much larger cropping enterprises on average compared with all specialist grain growers. High performing farms recorded slightly higher average grain, oilseed and pulse yields and received a slightly higher average price for grains, oilseeds and pulses sold.

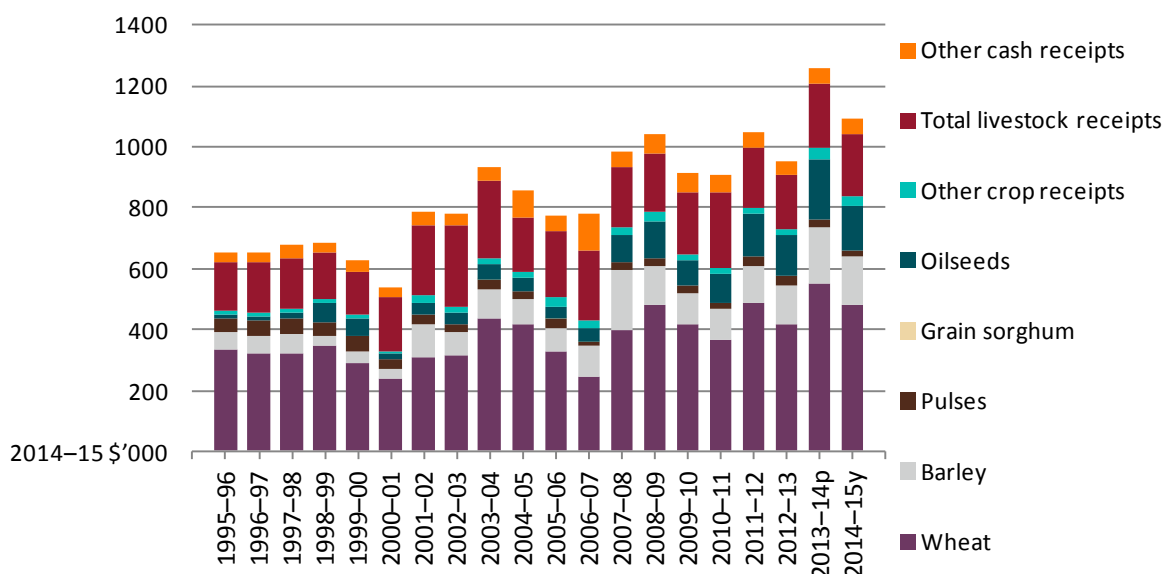
In aggregate, these high performing farms account for 38 per cent of the value of sales of grains, oilseeds and pulses from Southern grain producing farms. This is a relatively smaller share than that recorded for the Western region (39 per cent) and the Northern region (46 per cent).

Financial performance—Western region

Farm cash income

In 2012–13 average farm cash receipts of Western region grain producing farms fell (Figure 15 and Table 7) as the area planted to grains, oilseeds and pulses decreased. Yields also decreased to below the average recorded in 2011–12 (Figure 5).

Figure 15 Cash receipts, Western region grain producing farms, 1995–96 to 2014–15y average per farm



p Preliminary estimate. y Provisional estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 7 Financial performance, Western region grain producing farms

average per farm

Financial performance measure	unit	2012–13	2013–14^p	2014–15^y	
Farm cash receipts					
Wheat	\$	394 580	533 400	(10)	481 000
Barley	\$	122 350	182 900	(15)	157 000
Pulses	\$	32 000	24 400	(31)	23 000
Oilseeds	\$	124 730	195 900	(12)	146 000
Other crops	\$	20 140	35 700	(40)	32 000
Total crops	\$	693 790	972 300	(9)	839 000
Livestock and livestock products	\$	170 760	200 400	(12)	205 000
Other cash receipts	\$	45 590	52 200	(13)	52 000
Total cash receipts	\$	910 130	1 224 900	(8)	1 096 000
Farm cash costs					
Fertiliser	\$	131 530	160 000	(8)	164 000
Interest paid	\$	88 160	92 400	(9)	89 000
Crop and pasture chemicals	\$	95 240	108 000	(9)	108 000
Repairs and maintenance	\$	51 730	71 200	(8)	69 000
Fuel, oil and lubricants	\$	57 190	67 100	(7)	56 000
Other services	\$	35 070	43 600	(9)	71 000
Contracts	\$	17 800	31 900	(20)	34 000
Hired labour costs	\$	22 280	27 200	(12)	27 000
Livestock purchases	\$	10 680	19 000	(29)	9 000
Freight, handling and marketing charges	\$	70 880	105 800	(8)	79 000
Total cash costs	\$	698 680	859 700	(7)	834 000
Farm capital and debt					
Farm capital at 30 June	\$	5 899 830	6 015 200	(7)	na
Farm debt at 30 June	\$	1 331 940	1 437 700	(9)	1 423 000
Equity ratio	%	74	72	(3)	na
Farm financial performance					
Farm cash income	\$	211 450	365 300	(13)	262 000
Farm business profit	\$	42 180	241 600	(21)	90 000
Profit at full equity	\$	155 430	365 300	(15)	208 000
Rate of return					
– excluding capital appreciation	%	2.7	6.3	(13)	4.4
– including capital appreciation	%	2.5	7.3	(15)	na

^p Preliminary estimate. ^y Provisional estimate. **na** not available.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

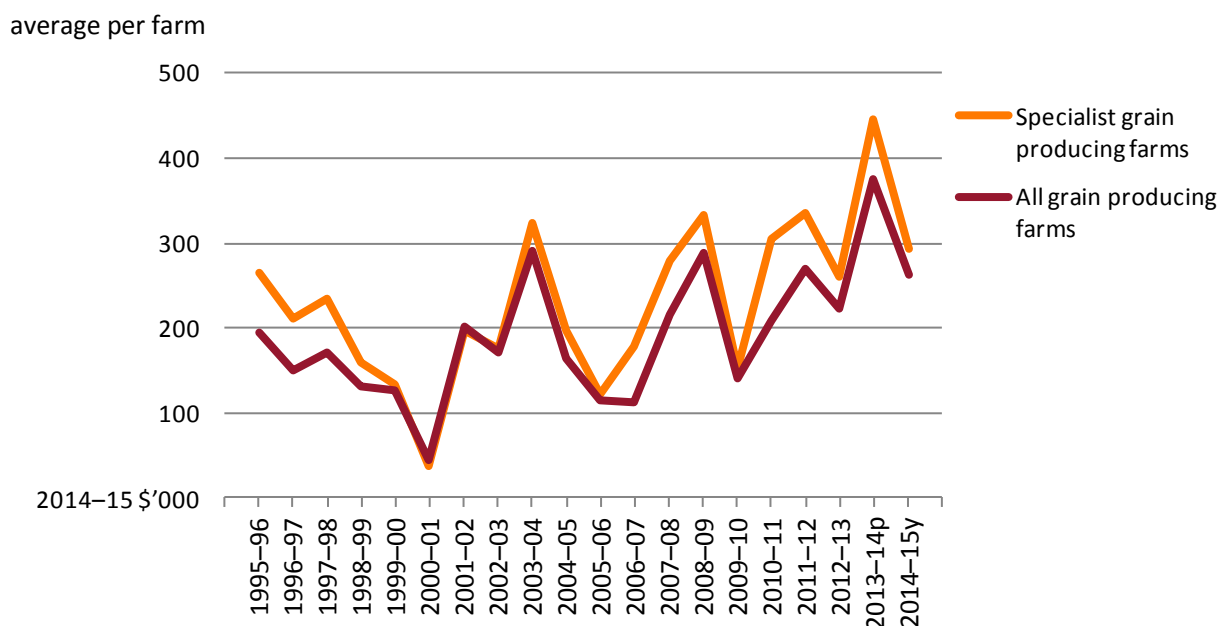
On average, receipts per farm notably increased for grain producing farms in 2013–14. Grain, oilseed and pulse receipts increased by around 39 per cent for grain producing farms as a result of record winter crop production (Figure 15). In addition, livestock receipts increased on mixed

enterprise farms as a result of higher average prices received and an increase in the number of sales. Overall, total cash receipts increased by 35 per cent compared with 2012–13. Average total cash costs increased by around 23 per cent as a result of farmers planting and harvesting a much larger crop area in 2013–14 and increasing their expenditure on repairs and maintenance to take advantage of much higher farm cash receipts (Table 7). Farm cash income of Western region grain producing farms is estimated to have increased to average \$365 300 a farm—85 per cent above the 10-year average to 2012–13 of \$202 000 in real terms. This is estimated to have been the largest farm cash income recorded for Western region grain growing farms in more than 20 years (Figure 16).

In 2014–15 winter crop production is estimated to have declined from the record 2013–14 harvest. The impact of lower crop production on farm receipts is expected to be partly offset by pool payments for grain delivered in 2013–14 and by increased receipts from sheep and lambs, on mixed enterprise farms. Overall, average total cash receipts are estimated to have decreased by around 11 per cent compared with 2013–14 (Figure 15). Average total cash costs are also estimated to have decreased in 2014–15 as a result of reduced costs associated with harvesting a smaller crop, lower expenditure on livestock purchases, interest payments and repairs and maintenance.

In 2014–15 farm cash income of Western region grain producing farms is estimated to decrease to average \$262 000 a farm (Figure 16), 24 per cent above the 10-year average to 2013–14 of \$211 000 in real terms.

Figure 16 Farm cash income, Western region grain producing farms, 1995–96 to 2014–15y average per farm



p Preliminary estimate. y Provisional estimate.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Farm business profit and rates of return

Farm business profit for Western region grain producing farms is estimated to have decreased from an average of \$241 600 in 2013–14 to an estimated \$90 000 a farm in 2014–15.

Rate of return to total capital used for Western region grain producing farms is estimated to have decreased from an average of 6.3 per cent in 2013–14 to 4.4 per cent in 2014–15.

Financial performance by size of grain enterprise

For the five years ending 2013–14, rate of return to total capital used, excluding capital appreciation, averaged 4.3 per cent for Western region grain producing farms planting more than 2 400 hectares and 3.5 per cent for farms planting between 1 200 and 2 400 hectares, compared with an average of just 0.2 per cent for the smallest producers (farms planting less than 600 hectares). In the Western region, farms planting more than 1 200 hectares (41 per cent of farms in the region) account for 81 per cent of total grain, oilseed and pulse production.

Specialist grain producers

Average farm cash income of specialist grain growers has exceeded the average for all grain producing farms in the Western region in 18 of the past 20 years (Figure 16).

In 2013–14 farm cash income of Western region specialist grain producers is estimated to have increased to \$445 000 a farm; the highest farm cash income for Western region specialist grain producers in more than 20 years. This high farm cash income is partly a result of the increase in average scale of grain growing enterprises over this period. In 2014–15 farm cash income of Western region specialist grain producers is estimated to have decreased to \$294 000 a farm (Figure 16), still around 13 per cent above the 10-year average to 2013–14 of \$261 000 in real terms.

High performing farms

Over the five years ending 2013–14, the top performing 25 per cent of specialist grain producing farms in the Western region recorded average rates of return to capital of 8.4 per cent a year. Farm cash income and farm business profit were more than double the average for all specialist grain growers in the Western region (Table 8).

Table 8 Selected estimates, Western region grain producing farms, by scale of operation

average per farm 2009–10 to 2013–14p

Physical	unit	Area planted to grains, oilseeds and pulses				All grain producing farms	Specialist grain producing farms	Top 25% specialist grain producing farms
		<600 hectares	600 to 1 200 hectares	1 200 to 2 400 hectares	>2 400 hectares			
Farm area at 30 June	ha	1 600	3 300	5 700	8 100	4 200	4 200	5 000
Wheat – area sown	ha	115	440	1 030	2 918	1 032	1 427	1 857
Wheat yield	t/ha	1.4	1.6	1.7	1.5	1.6	1.6	1.9
Total grains, oilseeds and pulses – area sown	ha	236	831	1 733	4 661	1 708	2 297	3 000
Total grains, oilseeds and pulses yield	t/ha	1.6	1.7	1.6	1.5	1.5	1.5	1.8
Total grains, oilseeds and pulses – production	t	373	1 418	2 836	6 801	2 594	3 483	5 416
Average price received for grains, oilseeds and pulses	\$/t	282	297	304	286	290	290	303
Total labour weeks worked	weeks	89	102	136	199	127	136	159
Financial performance								
Total grains, oilseeds and pulses – receipts	\$	81 000	381 600	772 800	1 825 300	690 900	940 700	1 482 600
Total cash receipts	\$	281 100	663 100	1 037 300	2 135 200	944 600	1 158 100	1 749 300
Total cash costs	\$	222 400	513 400	792 200	1 601 600	718 400	877 500	1 193 400
Farm cash income	\$	58 700	149 800	245 100	533 600	226 100	280 600	555 900
Farm business profit	\$	-20 800	32 200	103 800	249 800	77 900	115 800	431 600
Profit at full equity	\$	6 300	116 400	220 600	493 200	185 000	248 400	615 600

continued ...

Table 8 Selected estimates, Western region grain producing farms, by scale of operation continued

average per farm 2009–10 to 2013–14p

Financial performance	unit	Area planted to grains, oilseeds and pulses				All grain producing farms	Specialist grain producing farms	Top 25% specialist grain producing farms
		<600 hectares	600 to 1 200 hectares	1 200 to 2 400 hectares	>2 400 hectares			
Rate of return								
- excluding capital appreciation	%	0.2	2.5	3.5	4.3	3	3.7	8.4
- including capital appreciation	%	0.7	2.2	0.6	3.9	2.4	2.6	8.7
Farm capital at 30 June	\$	3 413 700	4 643 600	6 216 700	11 731 200	6 200 700	6 716 500	7 700 000
Farm debt at 30 June	\$	308 100	953 700	1 446 800	2 893 100	1 260 900	1 583 200	1 969 300
Equity ratio	%	90	77	75	71	77	73	69
Debt servicing								
Interest-to-receipts ratio	%	8	10	9	9	9	9	7
Interest and principal to receipts ratio	%	19	21	22	23	22	22	21
Number of farms	no.	1 800	900	800	1 200	4 600	3 200	800

p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

5 Farm investment

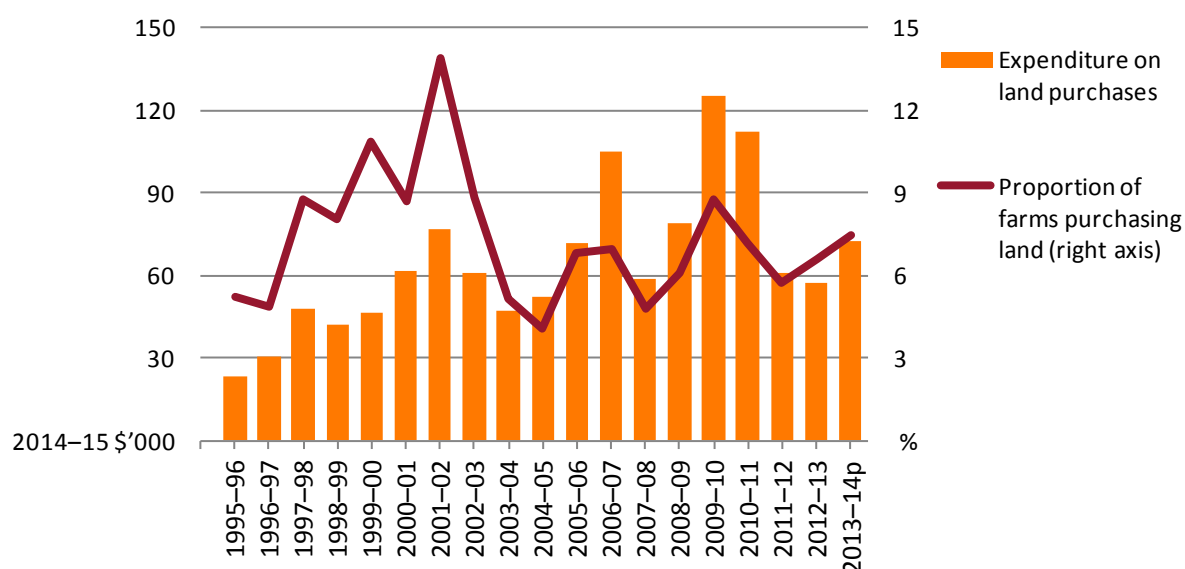
Producers’ capacity to generate farm income is influenced by their past investments, both in additional land to expand the scale of their farming activities and in new infrastructure, plant and machinery to boost productivity in the longer term.

Over the 10 years ending 2013–14 grain producing farms have undertaken considerable new investments in land, plant and machinery.

The proportion of grain producing farms purchasing land was high in all regions during the late 1990s (Figure 17). This declined during the 2000s, but the average area purchased and average value of additions has been higher, with most purchases being undertaken by farms with larger grain enterprises. This has contributed to the increase in numbers of large enterprise size (more than 2 400 hectares) grain farms.

Figure 17 Land investment, grain producing farms, Australia, 1995–96 to 2013–14p

average per farm



p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Despite the decline during the 2000s, the share of grain producing farms purchasing land remained relatively high throughout the 20 years ending 2013–14 compared with other broadacre industries. During this period the proportion of broadacre farms purchasing land has rarely exceeded 6 per cent (ABARES 2015c). For grain producing farms, the proportion has exceeded 6 per cent in 14 of the past 20 years (Figure 17).

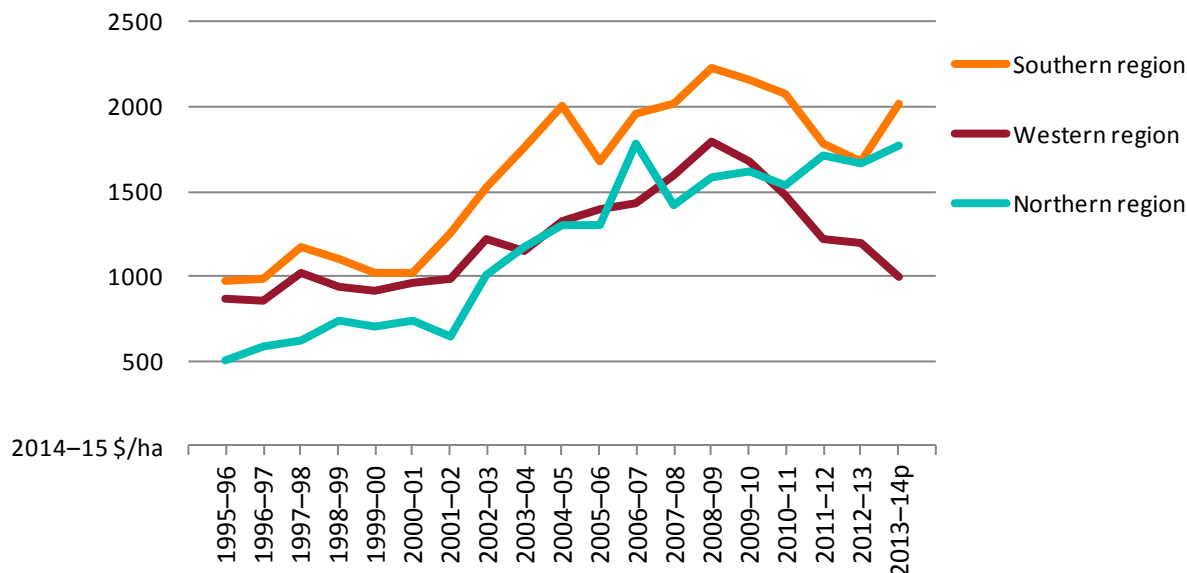
Higher profitability of grain growing enterprises resulted in broadacre farmers shifting from wool production to grain production during the 1990s and farm size increased to take advantages of economies of size in grain production. Higher rates of return for larger, specialist grain producers indicate that high rates of land purchase among this group of farms are likely to continue.

Land values reported for grain producing farms declined after 2008–09, with land values reported in 2013–14 as much as 44 per cent below those reported in 2008–09 in the Western region, in real terms (Figure 18).

Average land prices of grain producing farms increased sharply between 2001–02 and 2008–09, particularly compared with cash receipts generated per hectare, which increased only modestly over this period.

Figure 18 Land prices, grain producing farms, by region, 1995–96 to 2013–14p

average per farm



p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Nationally, the ratio of average land price per hectare to total cash receipts per hectare on grain producing farms doubled from around 4:1 before 2001–02 to around 8:1 in 2008–09. The ratio increased from 4:1 to 8:1 in the Northern region, from 3:1 to 9:1 in the Southern region and from 3:1 to 6:1 in the Western region. With higher farm receipts since 2008–09 and reductions in land values, in 2013–14 these ratios declined to 5:1 in the Southern region and 4:1 in the Western region. In the Northern region the ratio increased to 9:1 in 2013–14 as a result of reduced receipts per hectare and increased land prices.

Only a relatively small proportion of grain producing farms buy land in any one year, but most producers make some investment in plant, machinery, vehicles and/or infrastructure each year. However, because of the much larger average value of land transactions, the value of land purchases usually dominates total investment.

Net investment, excluding land purchase, is the difference between the total value of plant, vehicles, machinery and farm infrastructure purchased and the total value of those items sold or disposed of. Net investment in plant, vehicles, machinery and farm infrastructure for grain producing farms increased from 1995–96 to 2006–07 and has remained relatively high in all three GRDC regions since 2006–07 (Figure 19). In part, this increase in investment has been because of the increase in scale of grain enterprises.

In addition to acquiring new capital items and replacing old items, farms need ongoing maintenance and repair of existing plant, machinery, vehicles and farm infrastructure. This expenditure is recorded in ABARES surveys as the cash cost of repairs and maintenance. A proportion of reported annual expenditure on repairs and maintenance is the capital cost of replacing and upgrading some items of farm capital, such as fencing and watering facilities. Annual expenditure on repairs and maintenance is strongly correlated with farm income.

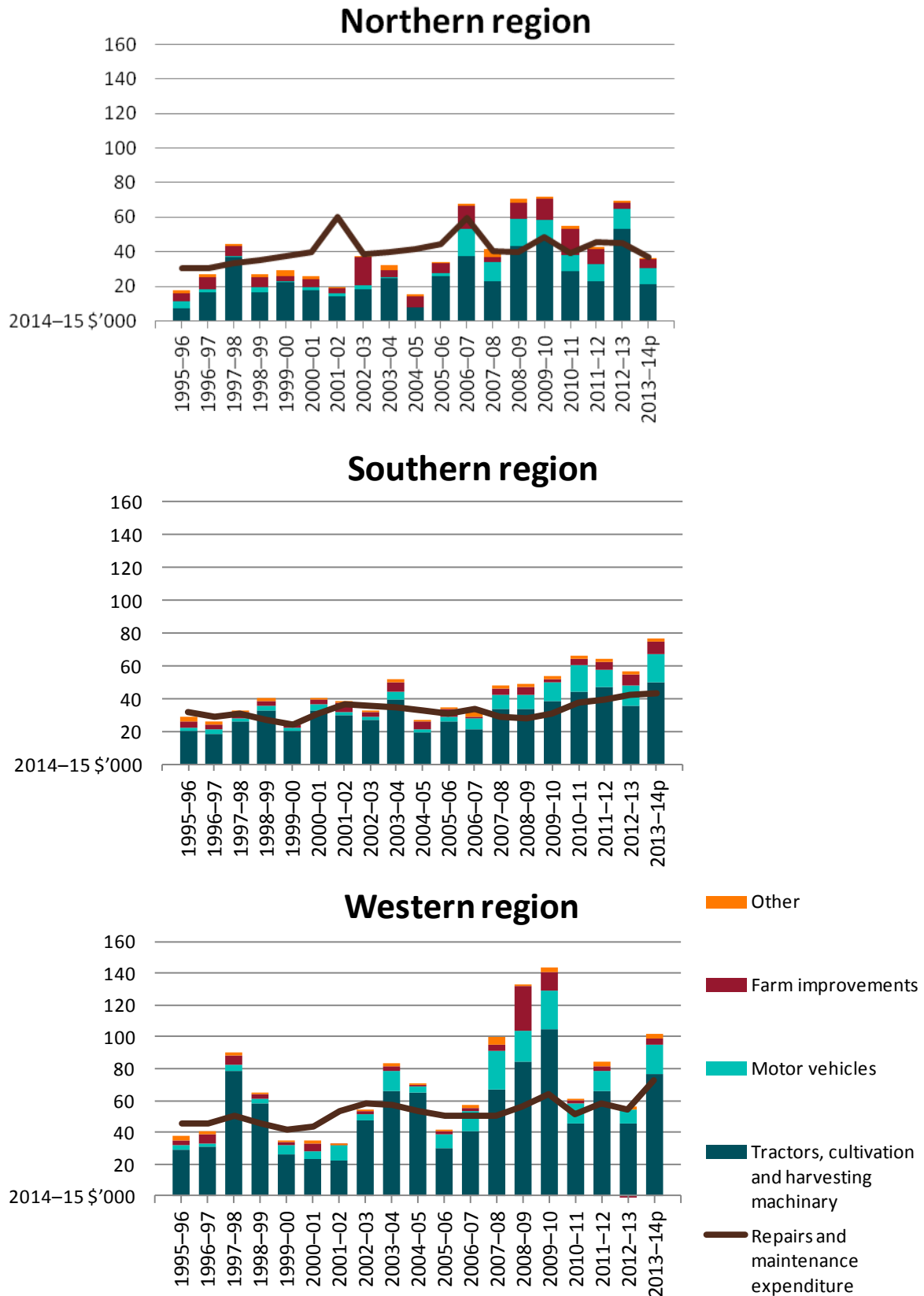
Expenditure on repairs and maintenance rises in years of high farm cash incomes and decreases in years of lower farm cash incomes.

Before 2006–07 average expenditure on repairs and maintenance generally exceeded net capital additions (Figure 19). Since 2006–07 expenditure on repairs and maintenance has generally been less than net capital additions and has remained relatively flat despite higher farm receipts. Expenditure on net capital additions has been relatively high in all three GRDC regions (Figure 19).

In the five years ending 2013–14 tractors, sowing, cultivation and harvesting machinery accounted for 61 per cent of net capital additions in the Northern GRDC region, 69 per cent in the Southern region and 77 per cent in the Western region. Motor vehicles accounted for a further 20 per cent in the Northern region, 21 per cent in the Southern region and 17 per cent in the Western region. Additions to farm improvements (buildings, structures and irrigation facilities) accounted for an additional 17 per cent in the Northern region, but only around 8 per cent in the Southern region and 4 per cent in the Western region, largely reflecting the greater role of beef cattle enterprises in the Northern GRDC region.

Figure 19 Net investment in machinery, vehicles, and farm improvements, grain producing farms, by region, 1995–96 to 2013–14p

average per farm



p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

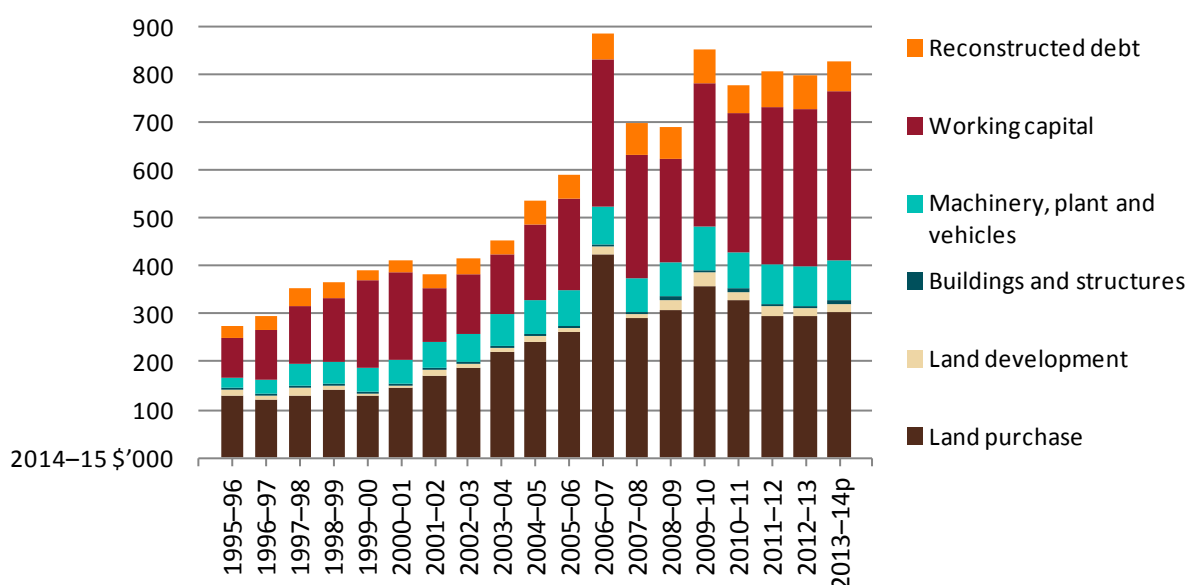
6 Farm debt

Debt is an important source of funds for farm investment and ongoing working capital. Around 95 per cent of grain producing farms are family-owned and operated. For family farms, funding for farm expansion and improvement is generally limited to the funds available to the family, the profits the farm business can generate and the funds it can borrow.

Average debt of Australian grain producing farms doubled in real terms between 2000–01 and 2009–10. Nationally, average debt per farm increased from \$414 000 a farm in 2000–01 to \$854 000 a farm in 2009–10 (Figure 20).

Figure 20 Composition of farm business debt, grain producing farms, Australia, 1995–96 to 2013–14p

average per farm



p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Several factors contributed to the growth in average farm debt of grain producing farms over this period, including:

- lower interest rates
- large increases in land values that raised borrowing capacity
- increases in farm size
- changes in the mix of commodities produced (resulting in the purchase of additional farm inputs, machinery and vehicles as part of the move from wool production to cropping)
- expansion of grain enterprises (increase in seasonal finance to fund crop inputs)
- reduced farm cash incomes during some years in the 2000s because of widespread and extended drought conditions, which led to increased borrowing to fund working capital.

Throughout much of the 2000s, interest rates were historically low, reducing the cost of servicing debt and encouraging borrowing for farm investment. Interest rate subsidies provided to many farms as part of drought assistance programmes also supported borrowing.

The largest contribution to increases in farm debt of grain producing farms in the past two decades has been borrowing to fund new investment, particularly the purchase of land, tractors, cultivation, sowing and harvesting machinery and vehicles. Debt to fund land purchase and the purchase of plant, machinery and vehicles represents the largest share of debt on grain producing farms, accounting for an estimated 53 per cent of average debt on grain producing farms.

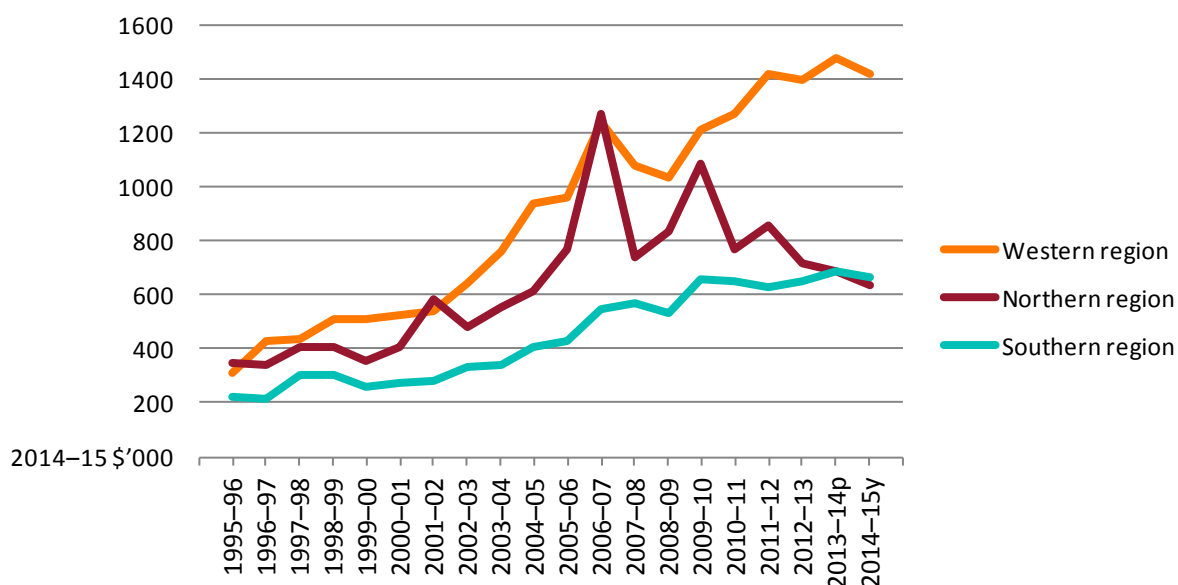
Increased size of grain enterprises and greater use of purchased inputs such as fertiliser and chemicals has also resulted in higher borrowing for ongoing working capital. Additionally, borrowing by grain producers to meet working capital requirements increased during the 2000s to finance crop planting and cash shortfalls when drought depressed farm cash incomes in many regions. For grain producing farms nationally, working capital debt accounted for 43 per cent of average debt at 30 June 2014.

In the Western region, debt to fund working capital accounts for an even higher proportion of average grains farm business debt—around 59 per cent of average debt at 30 June 2014. In part, this is a result of debt being recorded at the time of crop planting when borrowing increases to fund the relatively high fertiliser inputs required for the winter crop in the Western region.

The largest increase in average farm business debt over the period since 2000–01 was in the Western region. In the Western region, average debt increased by 280 per cent in real terms between 2000–01 and 2013–14 (Figure 21). In contrast, in the Northern region average debt per farm has declined in recent years.

Figure 21 Farm business debt, grain producing farms, by region, 1995–96 to 2014–15y

average per farm



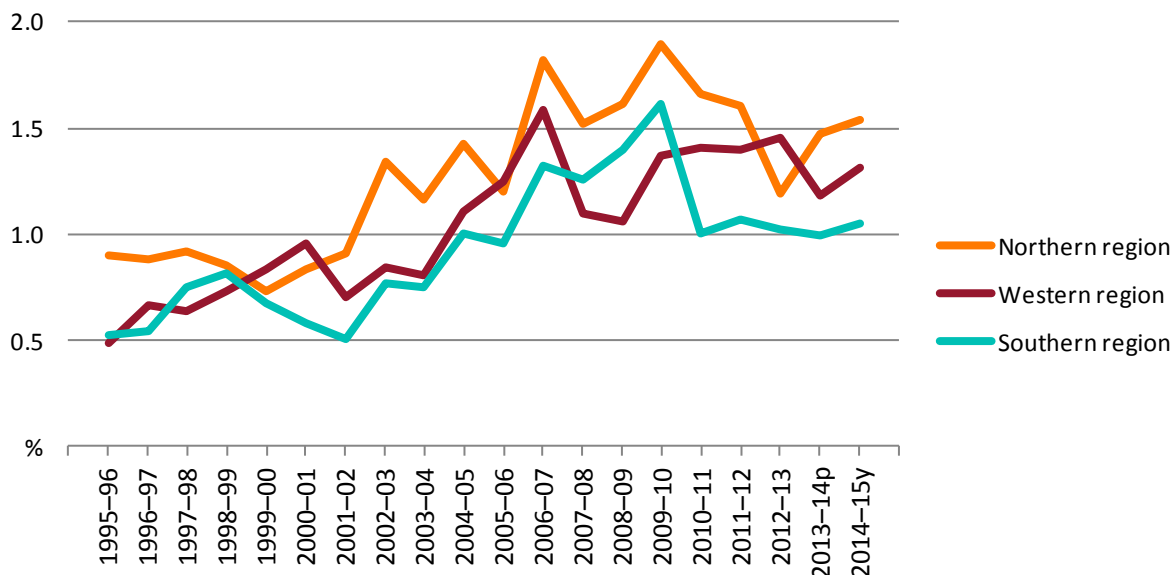
p Preliminary estimate. y Provisional estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

After adjusting for increase in the size of farms, the increase in debt in the Western region is more modest. Farm receipts are used as the measure of farm size for this comparison, with average debt expressed as a ratio to average farm cash receipts. Farm cash receipts are volatile because of variation in seasonal conditions and prices but capture all the ways in which farmers increase the size of their businesses, including increasing the farm area, increasing intensification and switching to production of higher-valued outputs. Notwithstanding

variability in the receipts measure, the ratio of debt to receipts since 2001–02 has increased to a similar extent in the Southern and Western regions, with a slightly larger increase in the Northern region (Figure 22).

Figure 22 Debt-to-receipts ratio, grain producing farms, by region, 1995–96 to 2014–15y
average per farm



p Preliminary estimate. y Provisional estimate.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Increase in average debt per business has slowed for grain producing farms in recent years, particularly in the Southern and Northern regions because of a diminished appetite for further increases in debt by farm businesses, a reduction in land values and more restricted access to credit from lending institutions.

Change in farm debt 2013-14

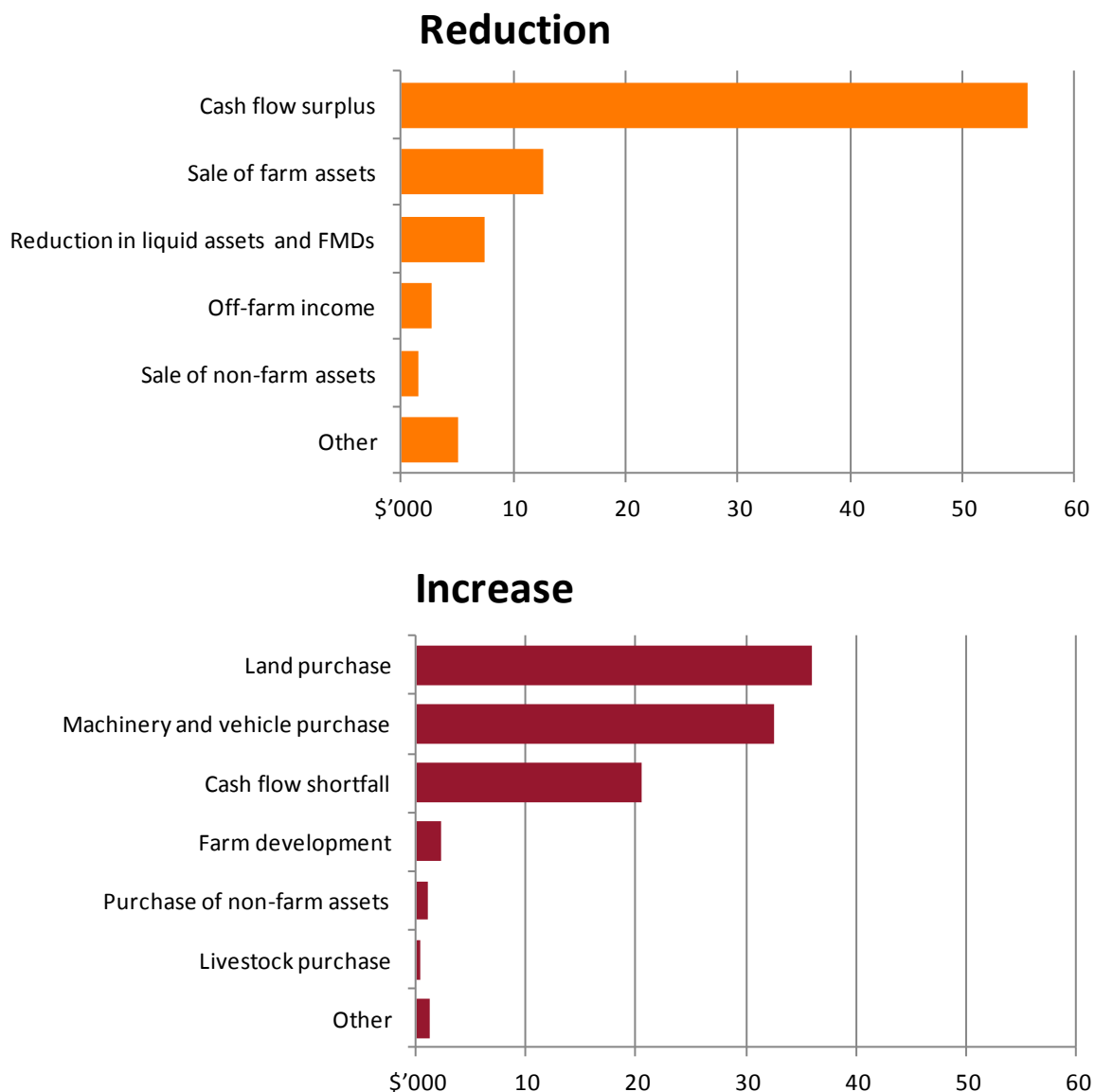
At the national level, farm debt on grain producing farms increased by less than 1 per cent during 2013–14. Around 47 per cent of Australian grain producing farms reduced overall farm debt in 2013–14, with the largest reduction in the Western region as a result of high farm cash incomes. In contrast, debt increased on 32 per cent of grain producing farms in 2013–14, particularly on farms undertaking additional investment.

Cash flow surplus (profit) was the main source of funds used to reduce farm debt in 2013–14, accounting for 66 per cent of the reduction in principal owed by grain producing farms. A further 15 per cent was repaid from the sale of farm assets; 9 per cent from liquid assets such as bank deposits and farm management deposits; 3 per cent from off-farm income; 2 per cent from sale of non-farm assets, such as investment property and shares; and 6 per cent from other sources (Figure 23).

Land purchase accounted for 38 per cent of the increase in principal owed by grain producing farms in 2013–14. A further 35 per cent went to the purchase of farm machinery and vehicles; 22 per cent to fund shortfalls in cash flow (business losses); 2 per cent to farm development; and 1 per cent each to the purchase of non-farm assets, livestock purchase and other purposes. Most of the ‘other’ category funded change in business ownership or partnership arrangements (Figure 23).

Figure 23 Reason for change in farm business debt, grain producing farms, Australia, 2013–14p

average per farm



FMD Farm management deposits. **p** Preliminary estimate.
 Source: ABARES Australian Agricultural and Grazing Industries Survey

Change in debt of farms affected by drought

Nationally 13 per cent of grain producing farms indicated that they were affected by drought in 2013–14, mainly in Queensland and northern New South Wales. Debt increased for 33 per cent of these farms in 2013–14. Debt of farm businesses affected by drought increased by an average of 6 per cent, compared with an average increase of less than 1 per cent in debt of all other grain producing farms in 2013–14. This increase is relatively small when compared with increases in farm debt recorded by drought-affected farms during the 2000s, when increases averaged in excess of 10 per cent in six of the ten years.

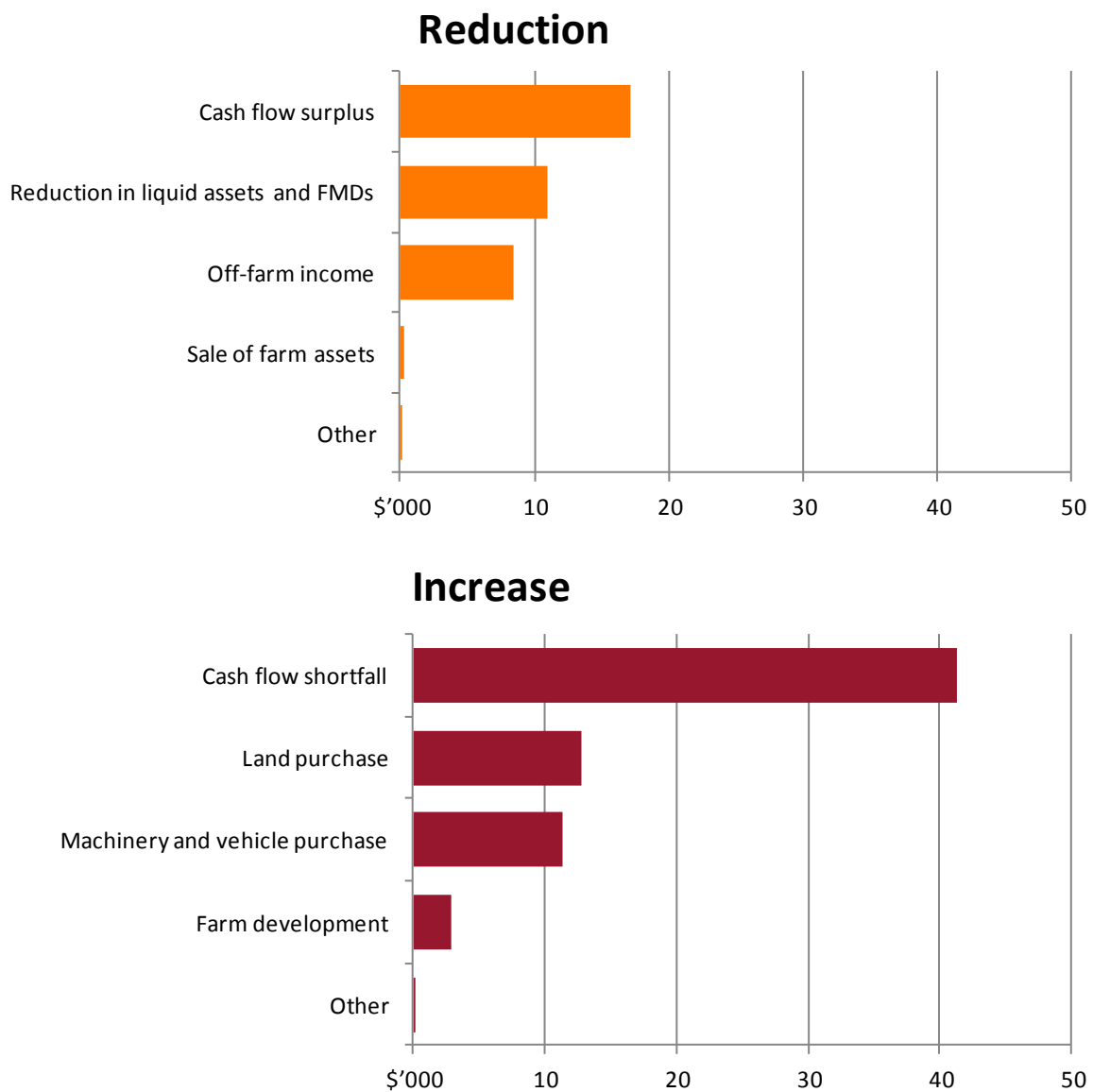
Cash flow shortfall (business losses) accounted for 60 per cent of the increase in principal owed by drought-affected grain producing farms in 2013–14. A further 19 per cent went to the purchase of land; 17 per cent to the purchase of farm machinery and vehicles; 4 per cent to farm

development, including provision of watering facilities for mixed enterprise farms; and less than 1 per cent to other purposes (Figure 24).

Debt remained largely unchanged for 22 per cent of farms affected by drought and was reduced for around 45 per cent of farms. The main contributor to reductions in farm debt on drought-affected farms was higher cash flow, mainly from sale of livestock on mixed enterprise farms. This accounted for 47 per cent of the reduction in principal owed. Farm businesses reduced a further 30 per cent using liquid assets, including bank deposits and farm management deposits; 23 per cent using off-farm income; 1 per cent using sale of farm assets; and less than 1 per cent using other sources (Figure 24).

Figure 24 Reason for change in farm business debt, grain producing farms affected by drought, Australia, 2013–14^p

average per farm



FMD Farm management deposits. **p** Preliminary estimate.
 Source: ABARES Australian Agricultural and Grazing Industries Survey

In addition to debt, drought affects farm businesses in many ways. Stocks of grain and fodder, livestock numbers and, typically, available liquid assets are reduced to fund cash outlays. The combined effect in 2013–14 was that farm business equity declined for 51 per cent of grain producing farms affected by drought. On average, farm business equity declined by \$41 000 a farm.

For farms planting more than 2 400 hectares of grains and affected by drought, farm business debt increased by an average of 16 per cent and farm business equity declined by an average of \$129 000 a farm in 2013–14. The average farm equity ratio declined from 85 per cent to 83 per cent.

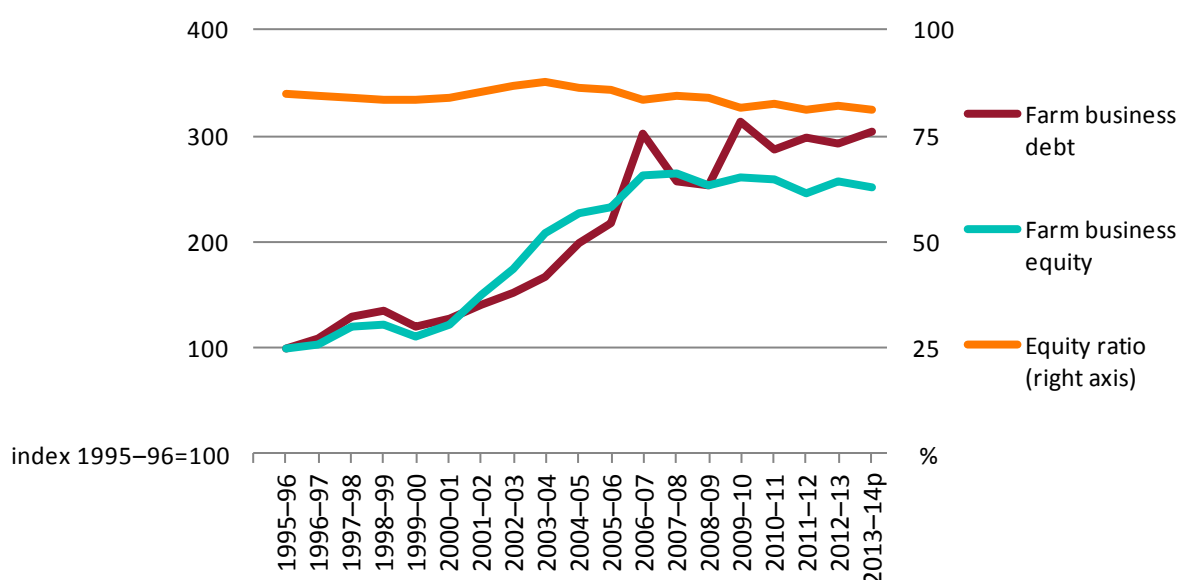
Farm equity

The decline in land values since 2008–09 has reduced farm equity in some regions and prompted financial institutions to tighten lending, restricting access of some farm businesses to further finance.

Nevertheless, on average, farm business equity of grain producing farms remains strong, declining only slightly after the large increase during the 2000s. The average equity ratio of grain producing farms at 30 June 2014 was an estimated 81 per cent, a slight decrease from 82 per cent at 30 June 2013 (Figure 25). Around 70 per cent of farms had equity ratios exceeding 80 per cent at 30 June 2014. In some regions farm equity is estimated to have fallen significantly over the three years to June 2014, mainly as a consequence of reported reductions in land values.

Figure 25 Change in farm business debt and equity, grain producing farms, Australia, 1995–96 to 2013–14p

average per farm



p Preliminary estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Change in farm equity ratios over time should be considered against the background of the increase in average farm size. Equity ratios are typically lower for larger farms because these farms are generally able to service larger debts.

Distribution of farms by debt and equity

The proportion of grain producing farms with relatively high debt varies across the regions and grain enterprise sizes (Table 9, Table 10 and Table 11). Around 19 per cent of farms in the Northern and Southern GRDC regions and 48 per cent of farms in the Western region carried more than \$1 million in debt at 30 June 2014. The high proportion of such farms in the Western region largely reflects the high proportion of farms with large grain enterprises in this region.

In contrast, around 40 per cent of grain producing farms in the Northern region and 36 per cent in the Southern region recorded less than \$100 000 in debt at 30 June 2014. A high proportion of these businesses plant less than 600 hectares to grains, oilseeds or pulses.

The general increase in land values to 2009 boosted the equity most farmers have in their businesses. For some farms, reductions in farm debt and increases in capital investment have resulted in further improvement in farm equity. However, in several areas, farm equity is estimated to have fallen significantly over the three years to June 2014 as a consequence of reductions in reported land values.

The average equity ratio of grain producing farms at 30 June 2014 was estimated to have been 85 per cent in the Northern region and 83 per cent in the Southern region. However, it was much lower at 72 per cent for Western region farms.

Equity ratios are typically lower for farms with larger grain enterprises because they are able to service larger debts and they tend to carry higher working capital debt at 30 June as a result of seasonal crop financing arrangements. Nine per cent of grain producing farms in the Northern region were estimated to have equity ratios below 70 per cent in 2013–14, 13 per cent in the Southern region and 31 per cent in the Western region.

Equity ratios have historically been lower in the Western region. In addition to the larger scale of grain enterprises, relatively reliable grain yields in central and southern parts of this region over the longer term are likely to have encouraged greater borrowing.

Table 9 Distribution of Northern region grain producing farms, by farm business debt and equity ratio, at 30 June 2014ap

percentage of farms													
Farm business debt	unit	Area planted to grains, oilseeds and pulses								All grain producing farms	Specialist grain producing farms		
		<600 hectares		600 to 1 200 hectares		1 200 to 2 400 hectares		>2 400 hectares					
<\$100 000	%	48	(16)	16	(45)	3	(83)	6	(67)	40	(15)	39	(19)
\$100 000 and <\$250 000	%	18	(33)	23	(44)	3	(67)	-	-	17	(29)	13	(37)
\$250 000 and <\$500 000	%	19	(28)	12	(66)	6	(104)	15	(78)	17	(25)	13	(44)
\$500 000 and <\$1m	%	6	(36)	10	(20)	16	(53)	13	(82)	7	(25)	8	(34)
\$1m and <\$2m	%	7	(30)	31	(24)	29	(32)	5	(83)	11	(21)	16	(25)
≥\$2m	%	2	(30)	8	(71)	42	(25)	61	(16)	8	(16)	12	(25)
Total	%	100	-	100	-	100	-	100	-	100	-	100	-
Average farm debt at 30 June	\$'000	346	(15)	872	(22)	1 981	(17)	4 356	(21)	667	(10)	954	(14)
Farm business equity ratio b													
≥90 per cent	%	69	(8)	54	(17)	20	(45)	36	(27)	63	(7)	61	(10)
80 and <90 per cent	%	16	(28)	16	(58)	29	(37)	23	(40)	17	(21)	12	(27)
70 and <80 per cent	%	7	(39)	15	(43)	33	(40)	14	(38)	10	(26)	13	(44)
60 and <70 per cent	%	3	(48)	13	(60)	10	(70)	16	(45)	5	(32)	7	(39)
<60 per cent	%	4	(40)	2	(148)	8	(60)	11	(53)	4	(33)	7	(34)
Total	%	100	-	100	-	100	-	100	-	100	-	100	-
Average farm business equity ratio at 30 June	%	88	(2)	85	(3)	80	(4)	76	(5)	85	(1)	82	(2)
Population of farms	no.	5 000	-	700	-	400	-	200	-	6 300	-	2 400	-

a Excludes debt for large corporate farms. **b** Equity ratio defined as total owned capital at 30 June less debt as a percentage of total owned business capital. **p** Preliminary estimate.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 10 Distribution of Southern region grain producing farms, by farm business debt and equity ratio, at 30 June 2014ap

percentage of farms

Farm business debt	unit	Area planted to grains, oilseeds and pulses								All grain producing farms	Specialist grain producing farms		
		<600 hectares		600 to 1 200 hectares		1 200 to 2 400 hectares		>2 400 hectares					
<\$100 000	%	46	(11)	20	(31)	17	(27)	6	(61)	36	(10)	33	(13)
\$100 000 and <\$250 000	%	13	(25)	11	(36)	na		na		10	(21)	7	(33)
\$250 000 and <\$500 000	%	18	(19)	17	(29)	16	(42)	9	(53)	17	(14)	16	(20)
\$500 000 and <\$1m	%	13	(22)	28	(21)	31	(22)	16	(28)	18	(12)	21	(14)
\$1m and <\$2m	%	8	(25)	17	(24)	19	(26)	13	(50)	11	(14)	12	(16)
≥\$2m	%	3	(25)	8	(37)	17	(23)	56	(13)	8	(12)	11	(15)
Total	%	100	-	100	-	100	-	100	-	100	-	100	-
Average farm debt at 30 June	\$'000	365	(9)	750	(12)	1 142	(11)	2 727	(10)	671	(6)	781	(8)
Farm business equity ratio b													
≥90 per cent	%	58	(8)	46	(15)	37	(21)	24	(20)	51	(6)	49	(8)
80 and <90 per cent	%	20	(19)	19	(28)	25	(22)	22	(37)	21	(13)	19	(16)
70 and <80 per cent	%	13	(20)	18	(28)	20	(22)	22	(29)	15	(13)	18	(16)
60 and <70 per cent	%	6	(30)	11	(33)	5	(47)	19	(37)	7	(19)	8	(23)
<60 per cent	%	3	(47)	6	(44)	14	(34)	13	(52)	6	(22)	6	(29)
Total	%	100	-	100	-	100	-	100	-	100	-	100	-
Average farm business equity ratio at 30 June	%	87	(1)	83	(2)	79	(2)	76	(3)	83	(1)	82	(1)
Population of farms	no.	8 700	-	2 300	-	1 700	-	800	-	13 600	-	8 300	-

a Excludes debt for large corporate farms. **b** Equity ratio defined as total owned capital at 30 June less debt as a percentage of total owned business capital. **p** Preliminary estimate.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 11 Distribution of Western region grain producing farms, by farm business debt and equity ratio, at 30 June 2014ap

percentage of farms

Farm business debt	unit	Area planted to grains, oilseeds and pulses								All grain producing farms	Specialist grain producing farms		
		<600 hectares		600 to 1 200 hectares		1 200 to 2 400 hectares		>2 400 hectares					
<\$100 000	%	71	(11)	na		4	(88)	1	(111)	26	(25)	17	(39)
\$100 000 and <\$250 000	%	0	(34)	11	(87)	0	(1156)	3	(77)	3	(84)	4	(69)
\$250 000 and <\$500 000	%	10	(55)	na		3	(92)	3	(97)	5	(35)	4	(55)
\$500 000 and <\$1m	%	4	(50)	41	(22)	37	(37)	4	(103)	17	(30)	19	(32)
\$1m and <\$2m	%	11	(52)	42	(29)	33	(41)	35	(22)	27	(19)	32	(19)
≥ \$2m	%	4	(42)	7	(47)	24	(45)	55	(17)	21	(13)	25	(14)
Total	%	100	–	100	–	100	–	100	–	100	–	100	–
Average farm debt at 30 June	\$'000	333	(27)	1 234	(24)	1 522	(20)	3 075	(11)	1 438	(9)	1 684	(9)
Farm business equity ratio b													
≥90 per cent	%	79	(9)	21	(54)	5	(130)	7	(54)	35	(18)	25	(26)
80 and <90 per cent	%	7	(54)	30	(34)	22	(43)	16	(44)	17	(28)	18	(34)
70 and <80 per cent	%	2	(80)	10	(74)	40	(28)	27	(32)	17	(24)	21	(20)
60 and <70 per cent	%	8	(67)	16	(56)	14	(82)	27	(30)	15	(24)	18	(25)
<60 per cent	%	4	(58)	23	(39)	19	(45)	23	(30)	16	(20)	18	(22)
Total	%	100	–	100	–	100	–	100	–	100	–	100	–
Average farm business equity ratio at 30 June	%	89	(3)	72	(8)	73	(5)	64	(6)	72	(3)	69	(4)
Population of farms	no.	1 600	–	900	–	800	–	1 100	–	4 400	–	3 400	–

a Excludes debt for large corporate farms. **b** Equity ratio defined as total owned capital at 30 June less debt as a percentage of total owned business capital. **p** Preliminary estimate.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

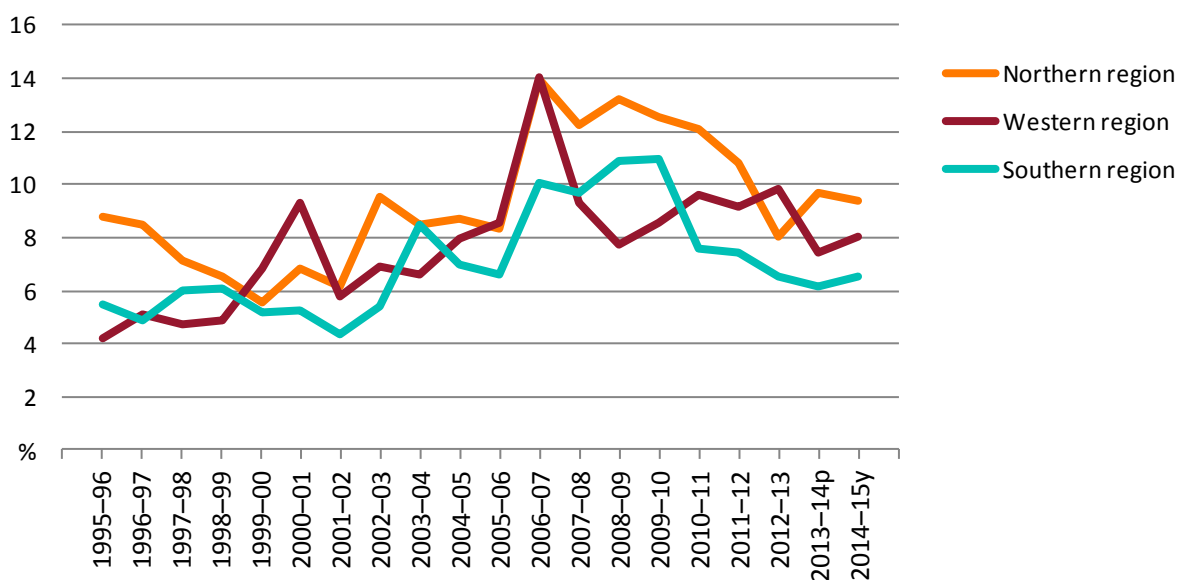
Debt servicing

The proportion of farm receipts needed to fund interest payments rose in the 10 years ending 2009–10. This was because of a combination of large increases in farm debt and reduced farm receipts as a result of extended drought conditions. Interest rate subsidies paid to farm businesses as drought assistance partially offset the increase in interest paid between 2001–02 and 2007–08.

Higher farm receipts of 2010–11 and lower interest rates from 2011–12 resulted in a decline in the proportion of farm receipts needed to fund interest payments (Figure 26). In 2014–15 the ratio of interest payments to farm receipts is estimated to have reduced to around 9 per cent in the Northern GRDC region. This was a result of a decrease in interest payments despite a reduction in farm cash receipts. The ratio is estimated to have increased to 7 per cent in the Southern GRDC region and 8 per cent in the Western GRDC region because cash receipts declined more than interest payments.

Figure 26 Ratio of interest payments to total cash receipts, grain producing farms with debt, by region, 1995–96 to 2014–15y

average per farm



p Preliminary estimate. y Provisional estimate.

Source: Australian Agricultural and Grazing Industries Survey

The proportion of Northern region grain producing farms recording negative farm cash incomes, and therefore potentially needing to borrow additional working capital, is estimated to have increased from 14 per cent in 2012–13 to 28 per cent in 2014–15.

Farm cash incomes for grain producing farms have been highly variable over the past two decades. Mechanisms farm businesses use to manage income variability include holding liquid financial assets (such as farm management deposits) and maintaining high farm equity to provide a reserve of credit to manage income downturns. Credit reserves are unused borrowing capacity, such as an overdraft or line of credit. Maintaining a credit reserve avoids costs of liquidating farm assets to meet cash demands and having to reacquire those assets once the adversity has passed.

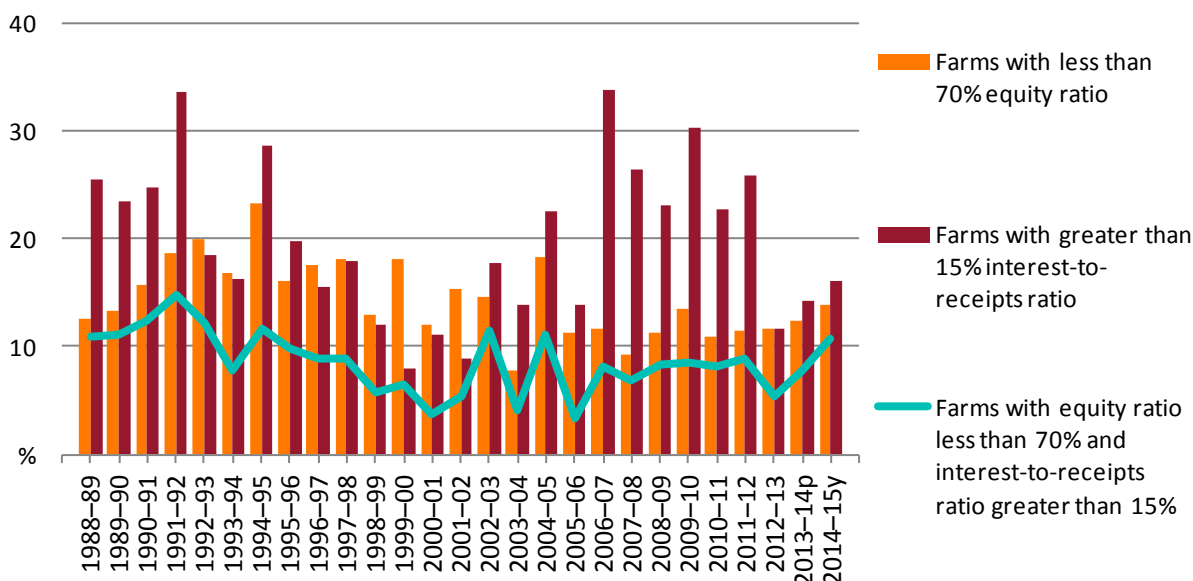
Critical to maintaining credit reserves is a lender’s willingness to provide loans. Financial institutions lend to farm businesses on the basis of the equity farmers have in their businesses

and the capacity of the business to service increased debt long term. Most businesses that operate with an equity ratio of less than 70 per cent are large operations that mostly generate high farm cash incomes or have access to substantial off-farm assets or income.

The proportion of grain producing farm businesses in the Northern GRDC region with relatively low additional borrowing capacity (equity ratio of less than 70 per cent) and relatively high debt servicing commitments (interest-to-receipts ratios exceeding 15 per cent) is estimated to have increased from 5 per cent in 2012–13 to 8 per cent in 2013–14, and is estimated to increase further to 11 per cent in 2014–15. The estimate for 2013–14 is close to the proportion recorded during widespread drought in the Northern region in 1994–95, 2002–03 and 2004–05 (Figure 27).

Figure 27 Debt servicing and borrowing capacity, Northern region, 1988–89 to 2014–15y

percentage of farms



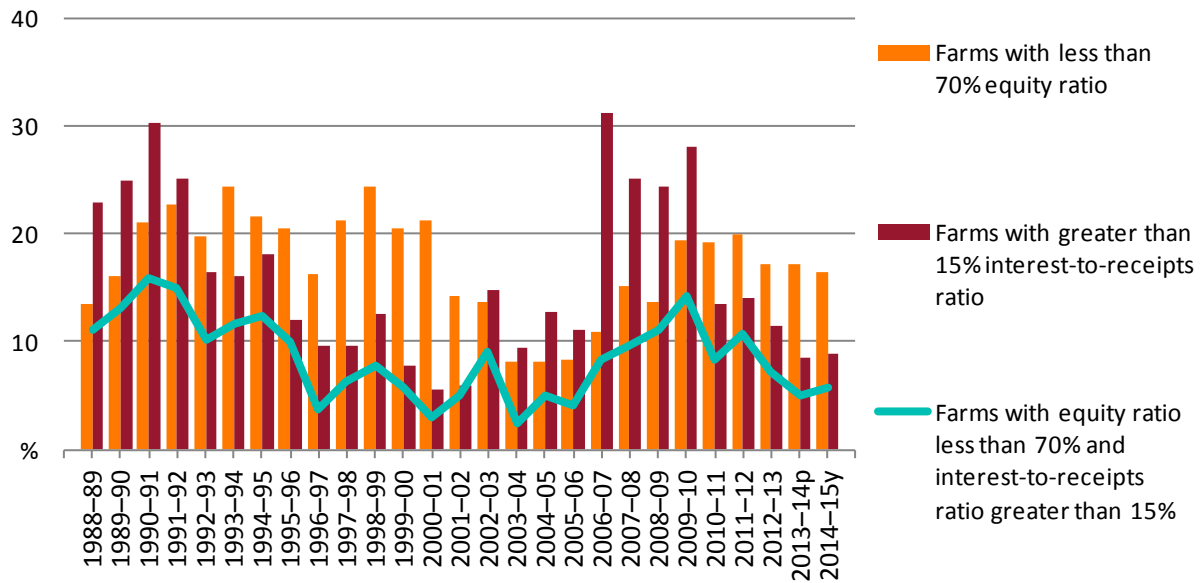
p Preliminary estimate. y Provisional estimate.

Source: ABARES Australian Agricultural and Grazing Industries Survey

Grain producing farms in the Southern GRDC region with relatively low borrowing capacity and relatively high debt servicing commitments increased slightly from 5 per cent in 2013–14 to 6 per cent in 2014–15, which is still relatively low compared with levels through the 1990s (Figure 28).

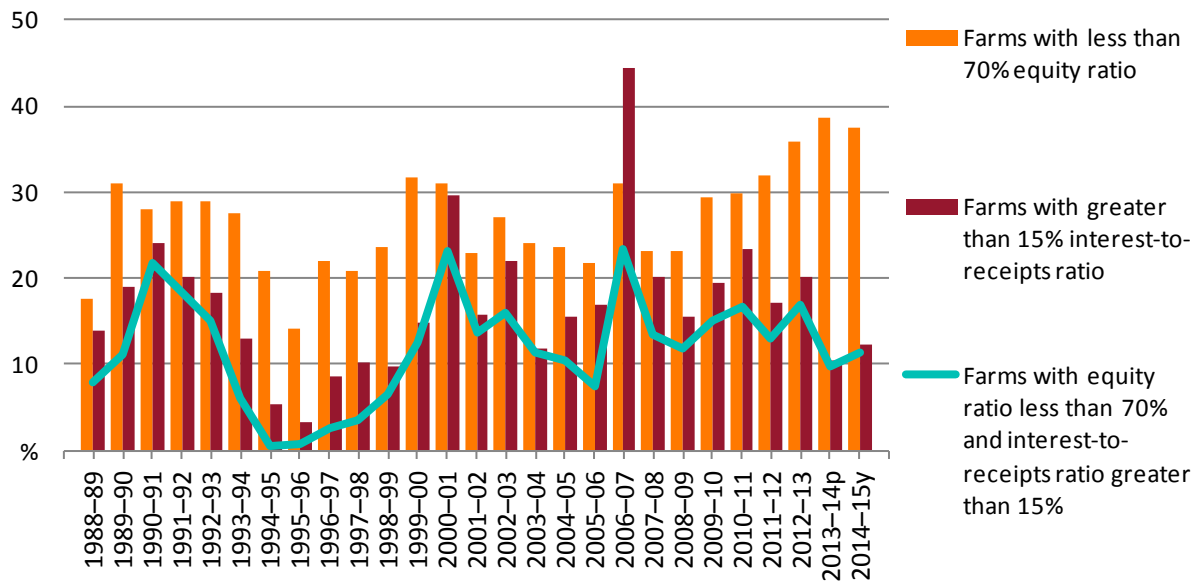
The proportion of Western GRDC region grain producing farms with relatively low borrowing capacity and relatively high debt servicing commitments decreased from 17 per cent in 2012–13 to 10 per cent in 2013–14 as a result of very high farm receipts, and is expected to increase slightly to 11 per cent in 2014–15. This is still well above the percentages recorded through the mid 1990s (Figure 29). This is partly a result of an increase in the average scale of Western region grain enterprises over time.

Figure 28 Debt servicing and borrowing capacity, Southern region, 1988–89 to 2014–15y
percentage of farms



p Preliminary estimate. **y** Provisional estimate.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Figure 29 Debt servicing and borrowing capacity, Western region, 1988–89 to 2014–15y
percentage of farms



p Preliminary estimate. **y** Provisional estimate.
Source: ABARES Australian Agricultural and Grazing Industries Survey

7 Productivity

ABARES produces a number of productivity estimates relating to the Australian broadacre and dairy industries (Box 2). The principal measure is total factor productivity (TFP), defined as the ratio of total market outputs to total market inputs. TFP growth is a useful indicator of trends in the efficiency of agricultural production as it captures the overall effect of changes in multiple inputs and outputs. In contrast, partial factor productivity (PFP)—also measured by ABARES—captures changes in total output relative to single inputs, such as output per hectare of land.

Box 2 Productivity statistics produced by ABARES

The ABARES preferred estimate of productivity is total factor productivity (TFP), which is the ratio of a quantity index of market outputs relative to a quantity index of market inputs. To achieve annual industry-level TFP estimates, it aggregates multiple outputs and inputs across farms using the Fisher index. Average annual TFP growth rates are estimated by fitting an exponential trend line. A detailed description of ABARES TFP methodology is in Zhao, Sheng & Gray (2012).

Data used to estimate the productivity of Australia's broadacre (non-irrigated cropping and grazing) and dairy industries are collected annually through the ABARES national farm survey programme. A consistent methodology has been applied to broadacre farms since 1977–78 and to dairy farms since 1978–79.

The broadacre and dairy industries are defined by the Australian and New Zealand Standard Industrial Classification (ANZSIC), described in the [Surveys methods and definitions](#) section of this report.

Together, the broadacre and dairy industries accounted for 73 per cent of commercial-scale Australian farm businesses and for an estimated 60 per cent of the total gross value of Australian agricultural production in 2013–14. In addition, these farms managed more than 90 per cent of the total area of agricultural land in Australia and accounted for most of Australia's family-owned and operated farms (ABARES 2014).

Productivity growth is generally measured over the long term because it is usually treated as an indicator of technological progress, which can involve significant time lags in both on-farm implementation and realised benefits. Short-term variability in productivity can be dominated by seasonal conditions rather than reflecting shifts in technical efficiency.

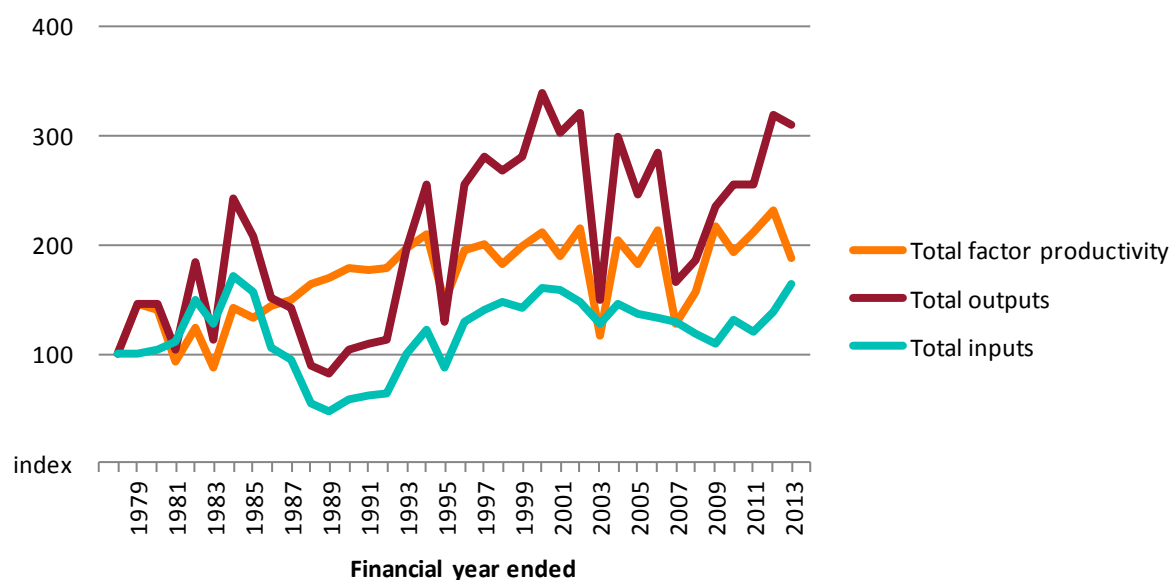
In the cropping industry, productivity growth averaged 1.5 per cent a year from 1977–78 to 2012–13, underpinning strong output growth of 2.6 per cent a year (Table 12). Productivity grew strongly until the early 1990s (Figure 30), averaging 3.6 per cent a year from 1977–78 to 1988–89 (Figure 31). Growth over the two decades to 2012–13 was lower, averaging 1.1 per cent a year from 1988–89 to 2000–01 and 1.4 per cent a year from 2000–01 to 2012–13.

Table 12 Average annual broadacre productivity growth, by industry, 1977–78 to 2012–13

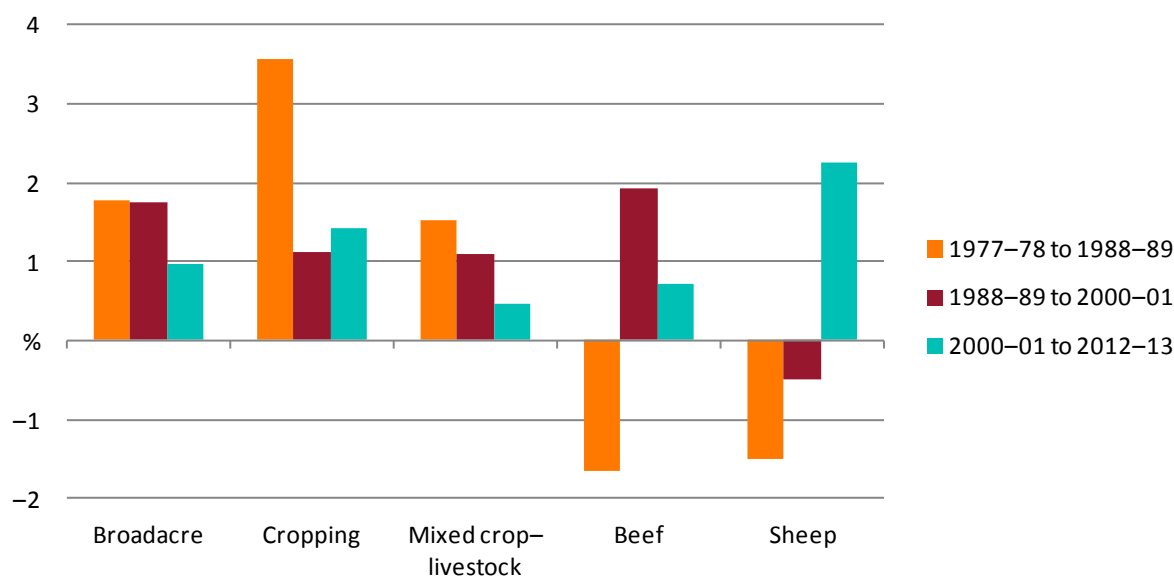
Category	All broadacre	Cropping	Mixed crop–livestock	Beef	Sheep
Total factor productivity					
Productivity	1.1	1.5	0.9	1.3	0.2
Outputs	0.1	2.6	-0.8	1.1	-2.6
Inputs	-1.0	1.1	-1.7	-0.2	-2.8
Partial factor productivity					
Land	1.1	1.2	0.5	1.3	0.0
Labour	2.3	3.4	2.0	1.9	0.8
Capital	1.7	2.8	2.0	0.8	1.3
Materials	-1.7	-1.5	-1.5	-1.0	-2.0
Services	1.0	1.8	0.9	1.0	0.2
Input use					
Land	-0.9	1.4	-1.3	-0.2	-2.6
Labour	-2.2	-0.7	-2.8	-0.8	-3.4
Capital	-1.5	-0.2	-2.9	0.3	-3.9
Materials	1.8	4.1	0.7	2.1	-0.6
Services	-0.9	0.9	-1.7	0.1	-2.7

Source: ABARES

Figure 30 Trends in cropping specialists’ total factor productivity, total inputs and total outputs, 1977–78 to 2012–13



Source: ABARES

Figure 31 Broadacre total factor productivity growth, by period

Source: ABARES

Cropping industry output is strongly influenced in the short term by seasonal factors, resulting in large fluctuations from year to year. At the same time, the effects of input adjustments tend to be more moderate and lagged. For example, poor seasonal conditions throughout much of the 2000s constrained cropping productivity growth, reducing output by 13 per cent compared with the period from 1977–78 to 1999–2000 (Hughes et al. 2011).

The cropping industry has made significant productivity gains over the past 36 years despite periods of adverse seasonal conditions. Advances in technology and changes in industry structure have played a part in supporting industry-level productivity growth. The development of more efficient farming systems, particularly those involving new crop varieties, conservation farming and GPS guidance systems, has increased yields and reduced labour use. An important driver of this change has been improved crop chemicals and application technologies (Dunlop, Turner & Howden 2004; Gray, Leith & Davidson 2014; Hughes et al. 2011).

Advances in key cropping technologies have been accompanied by industry consolidation and growth in average farm size, which more than doubled over the past two decades, as the number of farms declined by a third (Dahl, Leith & Gray 2013). Larger farms tend to be more productive because of their greater capacity to adopt new technologies (Sheng, Mullen & Zhao 2011), including equipment only suitable for farms above a minimum size. In particular, a shift to larger and more efficient planting and harvesting machinery in the 1980s and 1990s, facilitated by larger average farm size, was a key contributor to productivity growth during this period (Nossal et al. 2009).

Average growth in cropping productivity has been consistent across the GRDC agroecological regions despite significant differences in regional characteristics. From 1977–78 to 2012–13 productivity growth averaged 1.4 per cent a year in the Western region and 1.7 per cent a year in the Southern region, driven by strong input growth and even stronger growth in outputs. Although similar productivity growth occurred in the Northern region (1.6 per cent), this resulted from reduced input use and more moderate output growth (Table 13).

Table 13 Average annual cropping total factor productivity growth, by region, 1977–78 to 2012–13

Category	Productivity growth	Output growth	Input growth
All cropping specialists	1.5	2.6	1.1
Northern region	1.6	0.9	-0.7
Southern region	1.7	3.2	1.5
Western region	1.4	3.5	2.1

Note: All cropping specialists also includes cropping specialists from outside the Grains Research and Development Corporation agroecological regions.

Survey methods and definitions

ABARES has conducted surveys of selected Australian agricultural industries since the 1940s. These surveys provide a broad range of information on the economic performance of farm business units in the rural sector. This comprehensive dataset is used for research and analysis that forms the basis of many publications, briefing material and industry reports. Since 1977–78 ABARES has conducted the annual Australian Agricultural and Grazing Industries Survey (AAGIS) to provide a set of data that are collected nationally using a consistent methodology.

Definitions of industries

Industry definitions are based on the 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC06). This classification is in line with an international standard applied comprehensively across Australian industry, permitting comparisons between industries, both within Australia and internationally. Farms assigned to a particular ANZSIC have a high proportion of their total output characterised by that class. Further information on ANZSIC and on farming activities included in each of these industries is provided in Australian and New Zealand Standard Industrial Classification (ABS 2006).

The five broadacre industries covered by AAGIS are:

- Wheat and other crops industry (ANZSIC06 Class 0146 and 0149)
 - farms engaged mainly in growing rice, other cereal grains, coarse grains, oilseeds and/or pulses
- Mixed livestock–crops industry (ANZSIC06 Class 0145)
 - farms engaged mainly in running sheep and/or beef cattle and growing cereal grains, coarse grains, oilseeds and/or pulses
- Sheep industry (ANZSIC06 Class 0141)
 - farms engaged mainly in running sheep
- Beef industry (ANZSIC06 Class 0142)
 - farms engaged mainly in running beef cattle
- Sheep–beef industry (ANZSIC06 Class 0144)
 - farms engaged mainly in running both sheep and beef cattle.

Target populations

AAGIS is designed from a population list drawn from the Australian Business Register (ABR) and maintained by the Australian Bureau of Statistics (ABS). The ABR comprises businesses registered with the Australian Taxation Office. The ABR-based population list provided to ABARES consists of agricultural establishments with their corresponding geography code (currently Australian Statistical Geography Standard), ANZSIC, and a size of operation variable.

ABARES surveys target farming establishments that make a significant contribution to the total value of agricultural output (commercial farms). Farms excluded from ABARES surveys will be the smallest units and in aggregate will contribute less than 2 per cent to the total value of agricultural production for the industries covered by the surveys.

The size of operation variable used in ABARES survey designs is usually ‘estimated value of agricultural operations’ (EVAO). However, in some surveys in recent years other measures of

agricultural production have also been used. EVAO is a standardised dollar measure of the level of agricultural output. A definition of EVAO is given in *Agricultural industries: financial statistics* (ABS 2001). Since 2004–05 the ABARES survey has included establishments classified as having an EVAO of \$40 000 or more. Between 1991–92 and 2003–04 the survey included establishments with an EVAO of \$22 500 or more. Between 1987–88 and 1990–91 the survey included establishments with an EVAO of \$20 000 or more. Before 1987–88 the survey included establishments with an EVAO of \$10 000 or more.

Survey design

The target population is grouped into strata defined by ABARES region, ANZSIC and size of operation. The sample allocation is a compromise between allocating a higher proportion of the sample to strata with high variability in the size variable and an allocation proportional to the population of the stratum.

A large proportion of sample farms is retained from the previous year's survey. The sample chosen each year maintains a high proportion of the sample between years to accurately measure change while meeting the requirement to introduce new sample farms. New farms are introduced to account for changes in the target population, as well as to reduce the burden on survey respondents.

The sample size for AAGIS is usually around 1 600 farms.

The main method of collecting data is face-to-face interviews with the owner–manager of the farm business. Detailed physical and financial information is collected on the operations of the farm business during the preceding financial year. Respondents to AAGIS are also contacted by telephone in October each year to obtain estimates of projected production and expected receipts and costs for the current financial year. ABARES surveys also allow supplementary questionnaires to be attached to the main or to the telephone surveys. These additional questions help address specific industry issues—such as grain cost of production, livestock management practices and adoption of new technologies on dairy farms.

Sample weighting

ABARES survey estimates are calculated by appropriately weighting the data collected from each sample farm and then using the weighted data to calculate population estimates. Sample weights are calculated so that population estimates from the sample for numbers of farms, areas of crops and numbers of livestock correspond as closely as possible to the most recently available Australian Bureau of Statistics (ABS) estimates from its Agricultural Census and surveys.

The weighting methodology for AAGIS uses a model-based approach, with a linear regression model linking the survey variables and the estimation benchmark variables. The details of this method are described in Bardsley and Chambers (1984).

For AAGIS, the benchmark variables provided by the ABS include:

- total number of farms in scope
- area planted to wheat, rice, other cereals, grain legumes (pulses) and oilseeds
- closing numbers of beef and sheep.

Generally, larger farms have smaller weights and smaller farms have larger weights. This reflects both the strategy of sampling a higher fraction of the larger farms than smaller farms and the

relatively lower numbers of large farms. Large farms have a wider range of variability of key characteristics and account for a much larger proportion of total output.

Reliability of estimates

The reliability of the estimates of population characteristics published by ABARES depends on the design of the sample and the accuracy of the measurement of characteristics for the individual sample farms.

Preliminary estimates and projections

Estimates for 2012–13 and all earlier years are final. All data from farmers, including accounting information, have been reconciled; final production and population information from the ABS has been included and no further change is expected in these estimates.

The 2013–14 estimates are preliminary, based on full production and accounting information from farmers. However, editing and addition of sample farms may be undertaken and ABS production and population benchmarks may also change.

The 2014–15 estimates are projections developed from the data collected through on-farm and telephone interviews from October to December, as well as from the preliminary estimates. Projection estimates include crop and livestock production, receipts and expenditure up to the date of interview together with expected production, and receipts and expenditure for the remainder of the projection year. Modifications are made to expected receipts and expenditure where significant production and price change has occurred post interview. Projection estimates are necessarily subject to greater uncertainty than preliminary and final estimates.

Preliminary and projection estimates of farm financial performance are produced within a few weeks of the completion of survey collections. However, these may be updated several times at later dates. These subsequent versions will be more accurate, as they will be based on upgraded information and slightly more accurate input datasets.

Sampling errors

Only a subset of farms out of the total number of farms in a particular industry is surveyed. The data collected from each sample farm are weighted to calculate population estimates. Estimates derived from these farms are likely to be different from those that would have been obtained if information had been collected from a census of all farms. Any such differences are called ‘sampling errors’.

The size of the sampling error is influenced by the survey design and the estimation procedures, as well as the sample size and the variability of farms in the population. The larger the sample size, the lower the sampling error is likely to be. Hence, national estimates are likely to have lower sampling errors than industry and state estimates.

To give a guide to the reliability of the survey estimates, standard errors are calculated for all estimates published by ABARES. These estimated errors are expressed as percentages of the survey estimates and termed ‘relative standard errors’.

Calculating confidence intervals using relative standard errors

Relative standard errors can be used to calculate ‘confidence intervals’ that give an indication of how close the actual population value is likely to be to the survey estimate.

To obtain the standard error, multiply the relative standard error by the survey estimate and divide by 100. For example, if average total cash receipts are estimated to be \$100 000 with a relative standard error of 6 per cent, the standard error for this estimate is \$6 000. This is one standard error. Two standard errors equal \$12 000.

There is roughly a two-in-three chance that the 'census value' (the value that would have been obtained if all farms in the target population had been surveyed) is within one standard error of the survey estimate. This range of one standard error is described as the 66 per cent confidence interval. In this example, there is an approximately two-in-three chance that the census value is between \$94 000 and \$106 000 (\$100 000 plus or minus \$6 000).

There is roughly a 19-in-20 chance that the census value is within two standard errors of the survey estimate (the 95 per cent confidence interval). In this example, there is an approximately 19-in-20 chance that the census value lies between \$88 000 and \$112 000 (\$100 000 plus or minus \$12 000).

Comparing estimates

When comparing estimates between two groups, it is important to recognise that the differences are also subject to sampling error. As a rule of thumb, a conservative estimate of the standard error of the difference can be constructed by adding the squares of the estimated standard errors of the component estimates and taking the square root of the result.

For example, suppose the estimates of total cash receipts were \$100 000 in the beef industry and \$125 000 in the sheep industry—a difference of \$25 000—and the relative standard error is given as 6 per cent for each estimate. The standard error of the difference can be estimated as:

$$\sqrt{((6 \times \$100\,000 / 100)^2 + (6 \times \$125\,000 / 100)^2)} = \$9605$$

A 95 per cent confidence interval for the difference is:

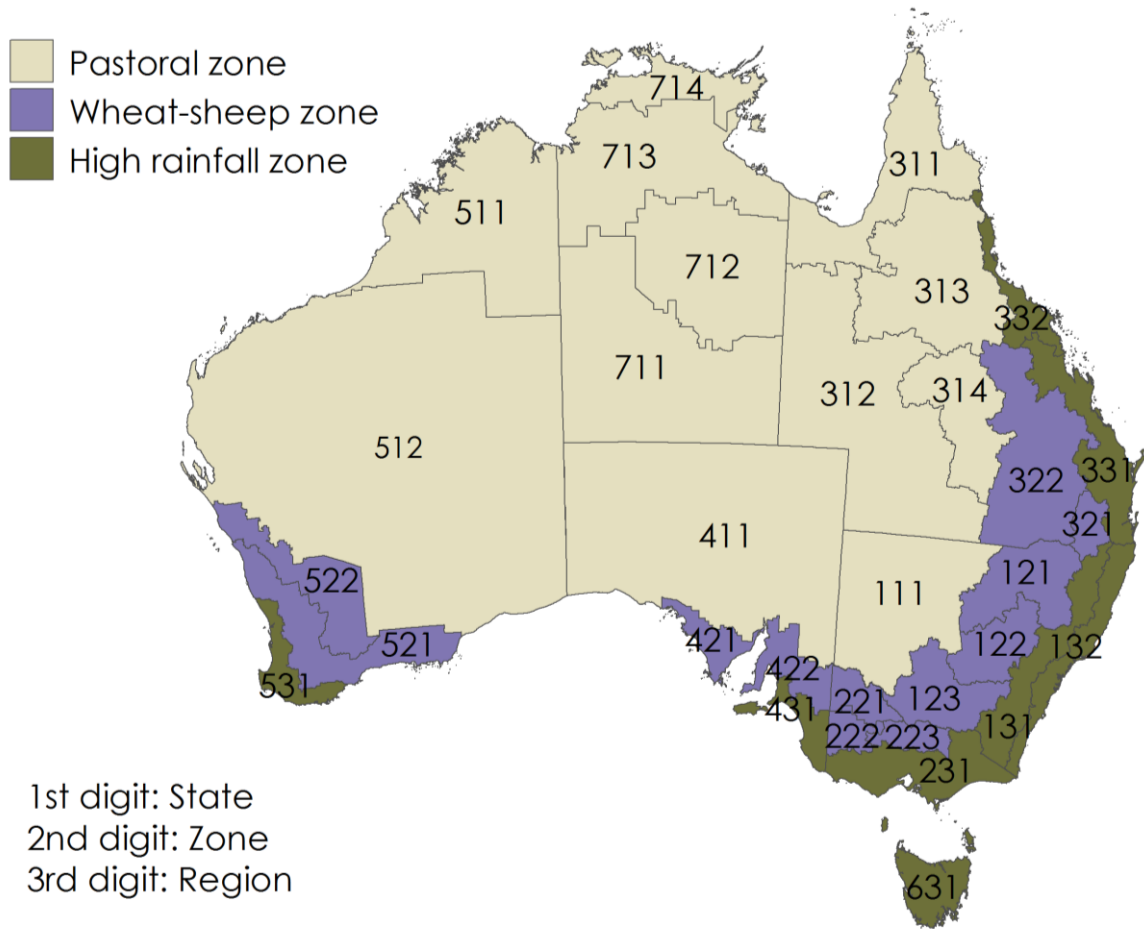
$$\$25\,000 \pm 1.96 \times \$9\,605 = (\$6\,174, \$43\,826)$$

Hence, if a large number (towards infinity) of different samples are taken, in approximately 95 per cent of them, the difference between these two estimates will lie between \$6 174 and \$43 826. Also, since zero is not in this confidence interval, it is possible to say that the difference between the estimates is statistically significantly different from zero at the 95 per cent confidence level.

Regions

Broadacre statistics are also available by region (Map 7). These regions represent the finest level of geographical aggregation for which the survey is designed to produce reliable estimates.

Map 7 ABARES Australian broadacre zones and regions



Note: Each region is identified by a unique code of three digits. The first digit identifies the state or territory, the second digit identifies the zone and the third digit identifies the region.

Source: ABARES

Glossary

Owner–manager The primary decision-maker for the farm business. This person is usually responsible for day-to-day operation of the farm and may own or have a share in the farm business.

Physical items

beef cattle Cattle kept primarily for the production of meat, irrespective of breed.

dairy cattle Cattle kept or intended mainly for the production of milk or cream.

hired labour Excludes the farm business manager, partners and family labour and work by contractors. Expenditure on contract services appears as a cash cost.

labour Measured in work weeks, as estimated by the owner–manager or manager. It includes all work on the farm by the owner–manager, partners, family, hired permanent and casual workers and sharefarmers but excludes work by contractors.

total area operated Includes all land operated by the farm business, whether owned or rented by the business, but excludes land sharefarmed on another farm.

Financial items

capital The value of farm capital is the value of all the assets used on a farm, including the value of leased items but excluding machinery and equipment either hired or used by contractors. The value of ‘owned’ capital is the value of farm capital excluding the value of leased machinery and equipment.

ABARES uses the owner–manager’s valuation of the farm property. The valuation includes the value of land and fixed improvements used by each farm business in the survey, excluding land sharefarmed off the sample farm. Residences on the farm are included in the valuations.

Livestock are valued at estimated market prices for the land use zones within each state. These values are based on recorded sales and purchases by sample farms.

Before 2001–02 ABARES maintained an inventory of plant and machinery for each sample farm. Individual items were valued at replacement cost, depreciated for age. Each year the replacement cost was indexed to allow for changes in that cost.

Since 2001–02 total value of plant and machinery has been based on market valuations provided by the owner–manager for broad categories of capital, such as tractors, vehicles and irrigation plant.

The total value of items purchased or sold during the survey year was added to or subtracted from farm capital at 31 December of the

	relevant financial year, irrespective of the actual date of purchase or sale.
change in debt	Estimated as the difference between debt at 1 July and the following 30 June within the survey year, rather than between debt at 30 June in consecutive years. It is an estimate of the change in indebtedness of a given population of farms during the financial year and is thus unaffected by changes in sample or population between years.
farm business debt	Estimated as all debts attributable to the farm business but excluding personal debt, lease financed debt and underwritten loans, including harvest loans. Information is collected at the interview, supplemented by information contained in the farm accounts.
farm liquid assets	Assets owned by the farm business that can be readily converted to cash. They include savings bank deposits, interest bearing deposits, debentures and shares. Excluded are items such as real estate, life assurance policies and other farms or businesses.
receipts and costs	<p>Receipts for livestock and livestock products sold are determined at the point of sale. Selling charges and charges for transport to the point of sale are included in the costs of sample farms.</p> <p>Receipts for crops sold during the survey year are gross of deductions made by marketing authorities for freight and selling charges. These deductions are included in farm costs. Receipts for other farm products are determined on a farmgate basis. All cash receipt items are the revenue received in the financial year.</p> <p>Farm receipts and costs relate to the whole area operated, including areas operated by on-farm sharefarmers. Thus, cash receipts include receipts from the sale of products produced by sharefarmers. If possible, on-farm sharefarmers' costs are amalgamated with those of the sample farm. Otherwise, the total sum paid to sharefarmers is treated as a cash cost.</p> <p>Some sample farm businesses engage in off-farm contracting or sharefarming, employing labour and capital equipment also used in normal on-farm activities. Since it is not possible to accurately allocate costs between off-farm and on-farm operations, the income and expenditure attributable to such off-farm operations are included in the receipts and costs of the sample farm business.</p>
total cash costs	<p>Payments made by the farm business for materials and services and for permanent and casual hired labour (excluding owner–manager, partner and other family labour). It includes the value of livestock transfers onto the property as well as any lease payments on capital, produce purchased for resale, rent, interest, livestock purchases and payments to sharefarmers. Capital and household expenditures are excluded from total cash costs.</p> <p>Handling and marketing expenses include commission, yard dues and</p>

levies for farm produce sold.

Administration costs include accountancy fees, banking and legal expenses, postage, stationery, subscriptions and telephone.

Contracts paid refers to expenditure on contracts such as harvesting. Capital and land development contracts are not included.

Other cash costs include stores and rations, seed purchased, electricity, artificial insemination and herd testing fees, advisory services, motor vehicle expenses, travelling expenses and insurance. While other cash costs may comprise a relatively large proportion of total cash costs, individually the components are relatively small overall and, as such, have not been listed.

total cash receipts Total of revenues received by the farm business during the financial year, including revenues from the sale of livestock, livestock products and crops, plus the value of livestock transfers off a property. It includes revenue received from agistment, royalties, rebates, refunds, plant hire, contracts, sharefarming, insurance claims and compensation, and government assistance payments to the farm business.

Financial performance measures

build-up in trading stocks The closing value of all changes in the inventories of trading stocks during the financial year. It includes the value of any change in herd or flock size or in stocks of wool, fruit and grains held on the farm. It is negative if inventories are run down.

depreciation of farm improvements, plant and equipment Estimated by the diminishing value method, based on the replacement cost and age of each item. The rates applied are the standard rates allowed by the Commissioner of Taxation. For items purchased or sold during the financial year, depreciation is assessed as if the transaction had taken place at the midpoint of the year. Calculation of farm business profit does not account for depreciation on items subject to a finance lease because cash costs already include finance lease payments.

farm business equity The value of owned capital, less farm business debt, at 30 June. The estimate is based on those sample farms for which complete data on farm debt are available.

farm business profit Farm cash income plus build-up in trading stocks, less depreciation and the imputed value of the owner–manager, partner(s) and family labour.

farm cash income The difference between total cash receipts and total cash costs.

farm equity ratio Calculated as farm business equity as a percentage of owned capital at 30 June.

imputed labour Payments for owner–manager and family labour may bear little relationship to the actual work input. An estimate of the labour input of

cost	the owner–manager, partners and their families is calculated in work weeks and a value is imputed at the relevant Federal Pastoral Industry Award rates.
off-farm income	Collected for the owner–manager and spouse only, including income from wages, other businesses, investment, government assistance to the farm household and social welfare payments.
profit at full equity	Farm business profit, plus rent, interest and finance lease payments, less depreciation on leased items. It is the return produced by all the resources used in the farm business.
rates of return	Calculated by expressing profit at full equity as a percentage of total opening capital. Rate of return represents the ability of the business to generate a return to all capital used by the business, including that which is borrowed or leased. The following rates of return are estimated: rate of return excluding capital appreciation; and rate of return including capital appreciation.

References

- ABARES 2015a, *Agricultural commodities: March quarter 2015*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, available at agriculture.gov.au/abares/publications.
- ABARES 2015b, *Australian crop report*, Australian Bureau of Agricultural Resource Economics and Sciences, Canberra, June, available at agriculture.gov.au/abares/publications.
- ABARES 2015c, *Australian farm survey results 2012–13 to 2014–15*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, available at agriculture.gov.au/abares/publications.
- ABARES 2014, *Australian farm survey results 2011–12 to 2013–14*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, available at agriculture.gov.au/abares/publications.
- ABS 2006, *Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 (Revision 2.0)*, cat. no. 1292.0, Australian Bureau of Statistics, Canberra, available at abs.gov.au/ANZSIC.
- ABS 2001, *Agricultural industries, financial statistics, Australia, Preliminary, 1999–2000*, cat. no. 7506.0, Australian Bureau of Statistics, Canberra, available at abs.gov.au/ausstats/abs@.nsf/cat/7506.0.
- Bardsley, P & Chambers, RL 1984, 'Multipurpose estimation from unbalanced samples', *Journal of the Royal Statistical Society, Series C (Applied Statistics)*, vol. 33, pp. 290–9.
- Dahl, A, Leith, R & Gray, EM 2013, 'Productivity in the broadacre and dairy industries', in *Agricultural commodities: March quarter 2013*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.
- Department of Agriculture 2014, *Australian food statistics 2012–13*, Department of Agriculture, Fisheries and Forestry, Canberra, available at agriculture.gov.au/ag-farm-food/food/publications/afs/food-stats-2012-13.
- Dunlop, M, Turner, GM & Howden, SM 2004, *Future sustainability of the Australian grains industry*, report to the Grains Council of Australia and Grains Research and Development Corporation, CSIRO Sustainable Ecosystems, Canberra.
- Gray, EM, Leith, R & Davidson, A 2014, 'Productivity in the broadacre and dairy industries', in *Agricultural commodities: March quarter 2014*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.
- GRDC 2015, 'Our grains industry', Grains Research and Development Corporation, available at grdc.com.au/About-Us/Our-Grains-Industry.
- Hughes, N, Lawson, K, Davidson, A, Jackson, T & Sheng, Y 2011, *Productivity pathways: climate adjusted production frontiers for the Australian broadacre cropping industry*, ABARES research report 11.5, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, available at agriculture.gov.au/abares/publications.

Nossal, K, Zhao, S, Sheng, Y & Gunasekera, D 2009, 'Productivity movements in Australian agriculture', in *Australian commodities: March quarter 2009*, Australian Bureau of Agricultural and Resource Economics, Canberra agriculture.gov.au/abares/publications

Sheng, Y, Mullen, JD & Zhao, S 2011, *A turning point in agricultural productivity: consideration of the causes*, ABARES research report 11.4 for the Grains Research and Research and Development Corporation, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, available at agriculture.gov.au/abares/publications.

Zhao, S, Sheng, Y & Gray, EM 2012, 'Measuring productivity of the Australian broadacre and dairy industries: concepts, methodology and data', in KO Fuglie, SL Wang & VE Ball (eds), *Productivity growth in agriculture: an international perspective*, CABI, Wallingford, pp. 73–107.

Further information on grain producers

ABARES farm survey data for the grains and other broadacre industries

agriculture.gov.au/agsurf

Australian Bureau of Agricultural and Resource Economics and Sciences

Postal address: GPO Box 858, Canberra ACT 2601

Location: 18 Marcus Clarke Street, Canberra ACT 2601

Switchboard: +61 2 6272 3933

agriculture.gov.au/abares

Grains Research and Development Corporation

1st Floor, 40 Blackall Street, Barton, ACT 2600

Postal address: PO Box 5367, Kingston, ACT 2604

Phone: 02 6166 4500

Fax: 02 6166 4599

Email: grdc@grdc.com.au