2 Agriculture and adjustment

Key points

- The agricultural sector is continually adjusting to the many forces of change.
  – Agricultural output is increasing, but the sector's share of GDP has declined.
  – Approximately 60 per cent of agricultural output is exported.
  – Agriculture remains important to much of rural and regional Australia.
  – Farmers' terms of trade have been declining, but agriculture continues to exhibit strong long-term productivity growth.
  – The contribution to output of wool activity has declined, while other activities, such as beef, sheep meat and horticulture, have expanded.
- Farm numbers and land used in agricultural production have fallen, but there has been an increase in average farm size.
  – In 2005-06, the largest 30 per cent of farms generated 82 per cent of the total value of agricultural operations, while the smallest 50 per cent of farms generated 7 per cent.
  – As a group, the bottom 25 per cent of broadacre farms have not made a profit in any year from 1988-89 to 2007-08.
- The most vulnerable farmers are not necessarily those facing the greatest climate variability.
  – Factors such as small farm scale, land degradation, low liquidity, and lack of diversified income sources are more likely to increase the vulnerability of farms to adverse shocks.
- Many larger inland centres ('sponge cities') are growing at the expense of smaller outlying towns. This process has been underway since at least the early 1900s.
  – Governments can, at the margin, influence the demographic, economic and social patterns of activity and settlement across Australia. This, however, is not best achieved by way of temporary payments to farmers for drought relief.

2.1 Introduction

To evaluate drought support measures, it is necessary to appreciate the changes that have occurred in the agricultural sector and its links to rural communities. The extent of change — on farms, in regional communities and at the sectoral level — from long and short term influences has been marked.

Farm adjustments can manifest as simply changing the mix of crops in response to shifts in commodity prices, taking up outside employment to supplement farm income or enlarging a farm by buying out a neighbour. Musgrave (1990, p. 249) noted 'structural change is the aggregate response, at the regional, industry and national levels, to the myriad of adjustment decisions made at the firm and individual level.'

This mainly descriptive chapter canvasses:

- agriculture's place within the Australian economy — its share of output, its export orientation and prominence in state, territory and regional economies
- how the sector has adjusted over time — for example, changes in the area of land used, numbers of farms, and composition of output
- the non-policy impediments to farmers' self-reliance and preparedness
- the importance of agriculture to rural and regional communities.

The chapter addresses how the changing profiles of agriculture and rural and regional Australia might bear on farmers' capacity to build up their capital base and thereby achieve greater self-reliance and preparedness (box 2.1). The chapter concludes with commentary on whether drought policy should (or can) play a role in maintaining the fabric of rural and regional communities.

Box 2.1 Forms of capital and their implications for self-reliance

A taxonomy of the capital bases that condition how farm businesses adapt to shocks — such as drought or sudden shifts in farmers' terms of trade — can be drawn from Ellis (2000). The forms of capital are:

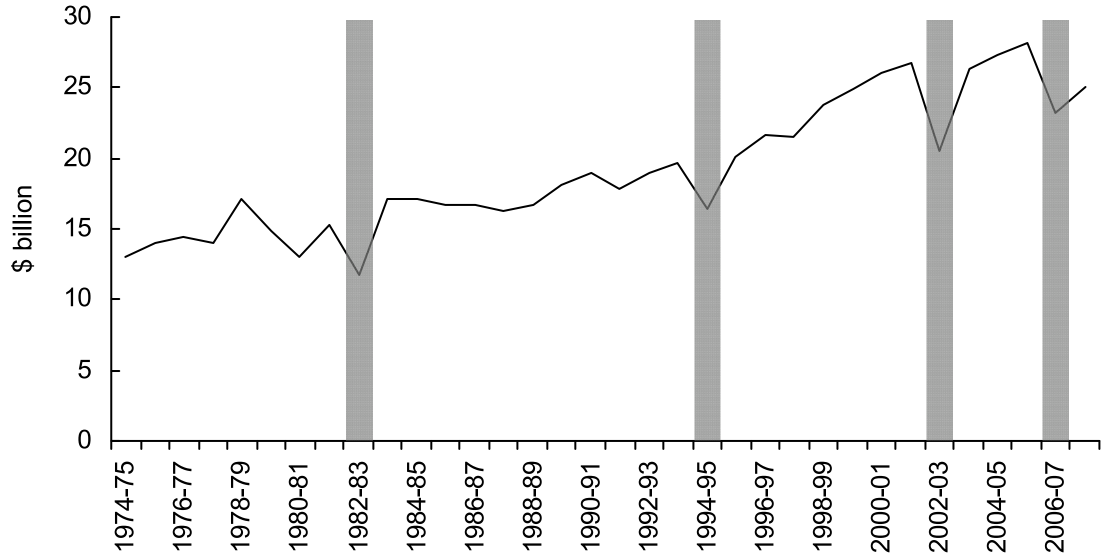
- natural: the natural resource base on which farm production depends
- physical: the infrastructure on farms that is used in production
- financial: farm profitability, cash reserves, investments and non-farm income
- human: levels of education, skills and experience of individuals
- social: the ties between households within a community that affect support and information sharing — a focus of the Expert Social Panel (Kenny et al. 2008).

Governments can play a role in addressing policy-relevant impediments to the accumulation of capital. This is discussed in chapter 7.

2.2 Profile of agriculture in the Australian economy

The output of the agricultural sector has increased over time. By 2007-08, (real) output was almost double its 1974-75 level (figure 2.1). Several major droughts, indicated by shaded years, have caused only temporary downturns, indicating a high level of resilience at the broad sectoral level.

Figure 2.1 **Agricultural output, 1974-75 to 2007-08[a]**
Valued-added (2006-07 prices)



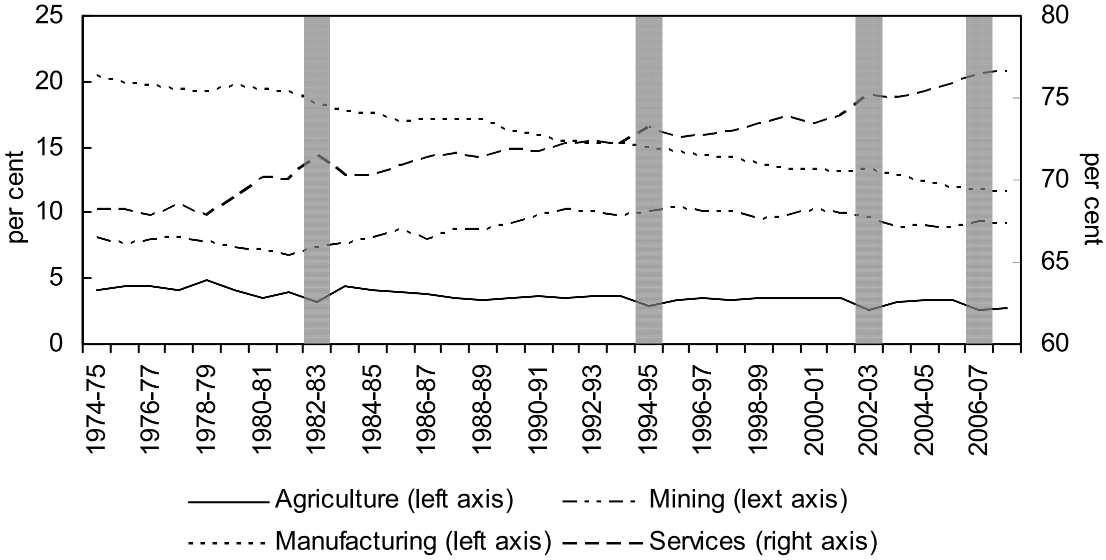
[a] Throughout this publication, shaded years on graphs indicate major droughts.

Data source: ABS (*Australian National Accounts: National Income, Expenditure and Product*, Cat. no. 5206.0).

Despite this growth in output, agriculture's importance to the national economy has waned. In the mid 1970s, its share of industry gross value added was approximately 4 per cent, falling to less than 3 per cent today (figure 2.2). Such trends are evident in all developed nations and reflect the relative growth of the services sector.

Agriculture's significance to exports of goods and services has also declined. In 1974-75, agriculture accounted for around 24 per cent of all exports, but by 2007-08, this had fallen to around 13 per cent (figure 2.3). Manufacturing and other merchandise goods, resources and services increased their share of exports over the period. Nevertheless, agriculture is a highly export-oriented industry, with around 61 per cent of all agricultural output exported. Wool production in particular, is highly export-oriented, as are, albeit to a lesser extent, wheat, beef, wine grapes and dairy products (table 2.1).

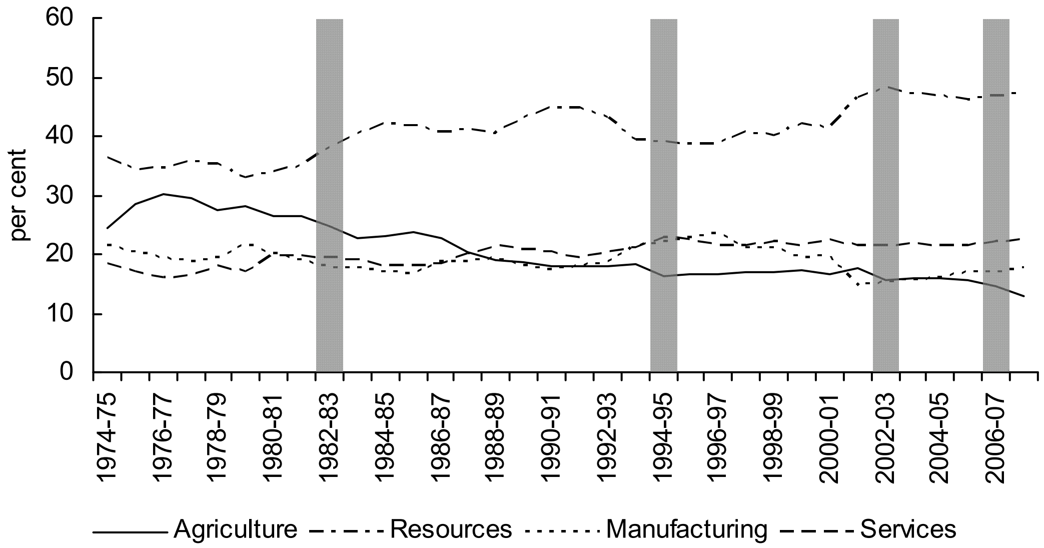
Figure 2.2 **Share of industry production, 1974-75 to 2007-08**
Proportion of gross value added (chain volume)[ab]



[a] Gross value added is defined as gross domestic product minus statistical discrepancy and minus taxes less subsidies on production. [b] Excluding dwellings owned by persons.

Data source: ABS (*Australian National Accounts: National Income, Expenditure and Product*, Cat. no. 5206.0).

Figure 2.3 **Composition of exports, 1974-75 to 2007-08**
Industry share of total exports[a] (chain volume)



[a] Manufacturing includes other (assorted) merchandise goods.

Data source: ABARE (2008a).

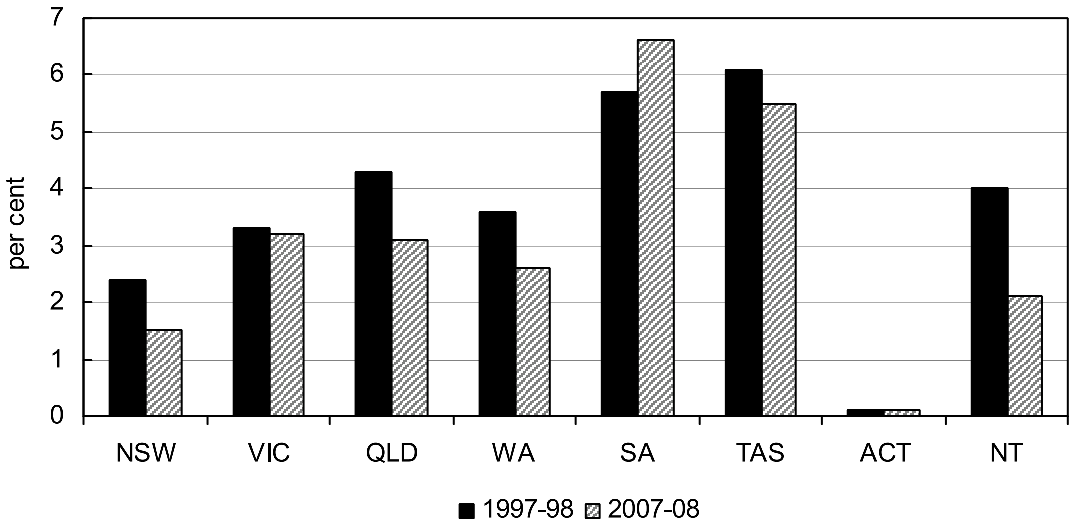
Table 2.1 **Share of agricultural production exported[a]**
Per cent, average over 2004-05 to 2006-07

Commodity group	*Production share exported*
Wool	95
Wheat	73
Beef	64
Wine grapes	60
Dairy products	51
Fruit	9
Vegetables	7
Total agriculture	61

[a] Proportion of gross value of production, 2007-08 dollars.
Source: ABARE (2008b).

Agriculture's contribution to state and territory output has followed the national trend. In each state and territory, with the exception of South Australia and Tasmania, the sector accounts for less than 4 per cent of total industry gross value added. Between 1997-98 and 2007-08, agriculture's share of output increased only in South Australia (figure 2.4).

Figure 2.4 **Share of agriculture by state and territory, 1997-98 and 2007-08[a]**
Proportion of industry gross value added (chain volume)



[a] Excluding dwellings owned by persons.
Data source: ABS (*Australian National Accounts, State Accounts*, Cat. no. 5220.0).

The number of people directly employed in the agriculture sector has also declined from about 430 000 in 1966-67 to about 360 000 in 2007-08 (figure 2.5). This represented around 9 per cent of total employment in the economy in 1966-67 and approximately 3 per cent in 2007-08. Agricultural employment is highly variable in response to short-term factors (for example, drought conditions), while longer-term factors (for example, a rising real price of labour and the associated capital substitution for on-farm labour) are responsible for the downward trend. There was a significant decline in employment following the 2002-03 drought, in contrast to the droughts in 1982-83 and 1994-95, and this has become entrenched in response to the prolonged nature of the current drought event, and the competition for labour elsewhere in the economy.

Figure 2.5 **Employment in agriculture, 1966-67 to 2007-08[a]**
Thousands of persons

Data source: ABS (*Labour Force, Australia, Quarterly*; Cat. no. 6291.0.55.003); RBA from Econdata.

Being somewhat location-specific, agriculture's importance to rural and regional areas remains high (box 2.2). Drought conditions have coexisted with labour shortages in many regional areas, often reflecting the strong performance of the resources sector. Farming families in Western Australia and Queensland in particular have been able to avail themselves of 'fly in fly out' employment opportunities in mining areas. In some cases, mining companies have worked with rural communities to obtain labour outside peak periods in the farming calendar. The resulting diversification of farmers' income has enhanced their self-reliance and capacity to withstand drought.

Box 2.2 **Agricultural employment and rural Australia**

Agriculture's importance to rural and regional areas is borne out by employment data showing sectoral employment by varying degrees of remoteness.

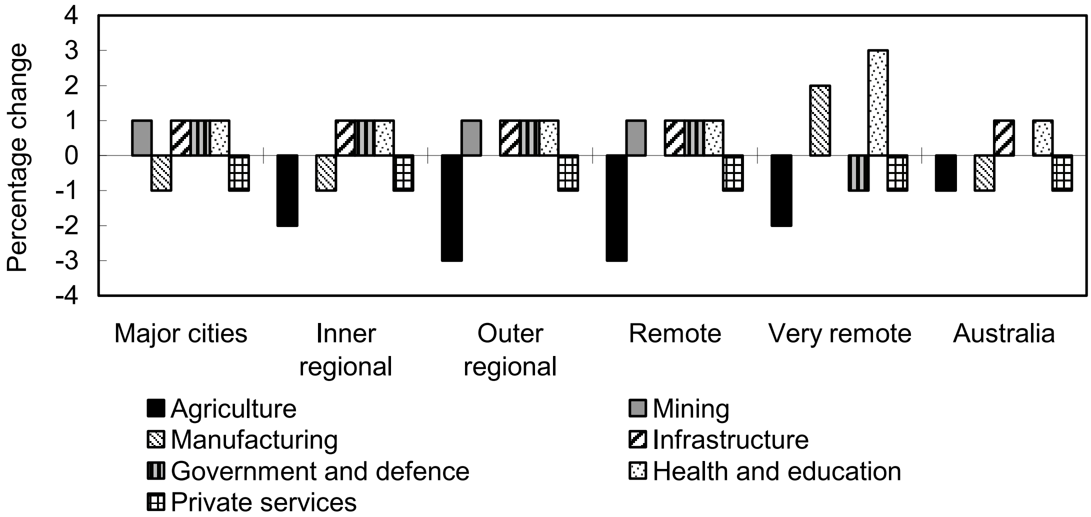
Employment by industry and remoteness class (per cent of total employment, 2006)

	Major cities	*Inner regional*	*Outer regional*	*Remote*	*Very remote*	*Australia*
Agriculture	1	6	14	18	14	3
Mining	1	1	3	9	10	1
Manufacturing	12	11	9	5	5	11
Other[a]	87	81	74	68	73	84

[a] Other includes: infrastructure, government and defence, health and education, and private services.

Between 2001 and 2006, agricultural jobs were lost in all rural and regional areas, particularly in the outer regional and remote areas. In very remote areas, the relative importance of manufacturing (mainly mineral processing) and health and education increased.

Change in the share of employment by industry and remoteness class, 2001–2006



Source: BITRE (2008).

There has been a long-term trend of input prices for farmers rising more rapidly than output prices. This is reflected in the 'farmers' terms of trade' (figure 2.6), defined as the ratio of the index of prices received by farmers, to the index of prices paid by farmers. While the terms of trade can have large short-term movements (for example, a year of high commodity prices, or of rapidly escalating fertiliser prices) the long-term trend is evident and is expected to continue.

Figure 2.6 **Australian farmers' terms of trade, 1966-67 to 2007-08[a]**

a Index base 1997–98 = 100.

Data Source: ABARE (2008a).

The farm sector as a whole has managed declining terms of trade through a combination of increases in farm size (including through farm amalgamations), improvements in productivity and by redirecting resources to take advantage of changing relative prices within agriculture.

Average multifactor productivity growth[1] for the agricultural sector (figure 2.7) grew at 2.1 per cent a year from 1974-75 to 2007-08. By comparison, the average multifactor productivity growth rate for the market sector[2] over the same period was around half of that for agriculture, at just 1.1 per cent a year.

These data suggest that, despite the challenges facing agriculture, the sector has been able to respond and adapt to changing conditions. The correlation between dips in productivity growth and drought is apparent, as is the relatively rapid recovery following drought (with the exception of 2007-08).

1 Multifactor productivity is a measure of the efficiency with which inputs are used to produce output. An increase in multifactor productivity allows more output to be produced with a given quantity of inputs, and vice-versa.

2 Includes: agriculture, fisheries and forestry, mining, manufacturing, electricity, gas and water supply, construction, wholesale trade, retail trade, accommodation, cafes and restaurants, transport and storage, communication services, finance and insurance and cultural and recreational services. The estimate of average multifactor productivity for the market sector has been modified by removing the agriculture, fisheries and forestry category.

Figure 2.7 **Productivity in agriculture, 1974-75 to 2007-08**[a]

a Index base: 2006-07 = 100.

Data Source: Productivity Commission estimates.

2.3 Adjustment in agriculture

The composition of output is changing

Traditionally, Australian agriculture was dominated by extensive pastoral and cropping activities, including wheat, beef cattle and sheep (for wool and meat products). However, over time, the contribution of wool to agricultural output has decreased, while that of wheat has remained roughly unchanged (table 2.2). There has been a marked increase in the significance of the production of other crops (such as fruit and nuts and vegetables) to agricultural output, with their contribution rising from approximately 25 per cent in 1960-61 to 44 per cent by 2007-08. The relative significance of beef and sheep production has also increased over time. Intensive livestock (pigs and poultry) contributed around 3 per cent to the value of agricultural output in 1960-61, rising to nearly 6 per cent by 2007-08 (ABS 2009).

Although cotton and rice production have increased since the 1960s, production of these crops in recent years has been relatively low compared to levels achieved in the late 1990s and early 2000s, reflecting the scarcity of irrigation water. Accordingly, their share in the value of agricultural production in recent years

(0.7 per cent and close to 0.02 per cent respectively in 2007-08[3] (ABS 2009)) has been lower than the levels achieved in the mid and late 1990s.

Table 2.2 **Contribution of agricultural activities to the value of agricultural output[a]**
Per cent

Commodity group	*1960-61*	*2007-08*
Wool	25	5
Wheat	14	12
Beef and sheep	16	22
Dairy	12	10
Other crops	25	44
Other	8	7

[a] 2007-08 data are preliminary and may be subject to change.

Source: ABS (*Value of Primary Production, 1971-72*, Ref. no. 10.27); (*Value of Agricultural Commodities Produced, Australia*, *Preliminary 2007-08*, Cat. no. 7501.0).

Farm numbers are declining, but farms are getting bigger

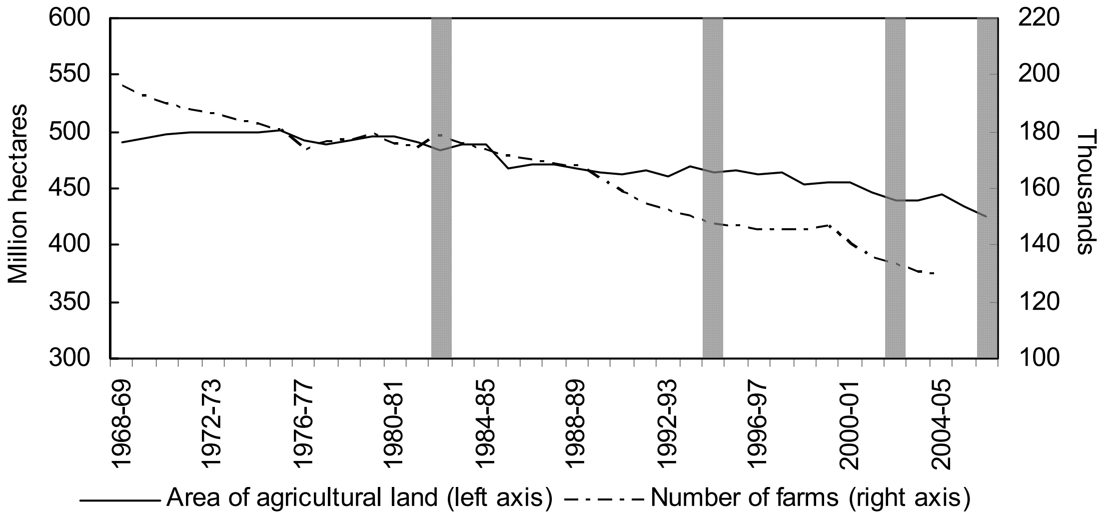
There has been a long-term decline in the number of farm businesses, falling from about 196 000 in 1968-69 to about 130 000 in 2004-05 (figure 2.8). Since 2004-05, ABS data on farm numbers have been based on a register of agricultural businesses sourced from the ATO’s Australian Business Register. This created a discontinuity in the series, and led to a large increase in the number of farm businesses recorded in 2005-06 and 2006-07 (approximately 154 000 and 150 000 respectively; not shown in figure 2.8).

The area of land used for agricultural production has also declined in recent decades, and is now at around 1950s levels. Over the 1968-69 to 2006-07 period, the total area of land devoted to agricultural uses peaked at around 500 million hectares in 1975-76, but subsequently fell to around 425 million hectares in 2006-07.

Farm numbers have fallen at a faster rate than the reductions in the area of agricultural land, as average farm size has increased. In 1968-69, the average farm size was around 2500 hectares and this increased to about 3400 hectares in 2004-05. These national averages however, do not reveal the large differences in farm size between farming industries and regions (for example, horticultural farms typically operate on much smaller plots than broadacre farms).

3 These estimates have a relatively high standard error and should be used with caution.

Figure 2.8 **Farm numbers and area of agricultural land 1968-69 to 2006-07[ab]**



[a] Farm numbers refer to business establishments in productive agricultural activities, typically at one physical location. [b] Until 1985-86, farm numbers included agricultural establishments with an estimated value of agricultural operations (EVAO) of $2500 or more. In 1986-87, the EVAO threshold was raised to $20 000, and was raised again in 1991-92 to $22 500, before being reduced to $5000 from 1993-94 onwards. Therefore, estimates of the number of farm establishments are not strictly comparable between periods with differing EVAO thresholds.

Data Source: ABARE (2008a).

Output concentration

Farm output in Australia is highly concentrated, with the largest farms (in terms of the estimated value of operations, or EVAO) accounting for large shares of agricultural output. Analysis of the distribution of farms by EVAO over time reveals a general trend towards a greater degree of output concentration by farms with a high EVAO. For example, the Productivity Commission (PC 2005b) found that, while only 3 per cent of farms had an EVAO greater than $500 000 in 1982-83[4], by 2002-03, this proportion had risen to 11 per cent. Similarly, 13 per cent of farms had an EVAO of $200 000 to $500 000 in 1982-83, but by 2002-03, this had risen to 22 per cent.

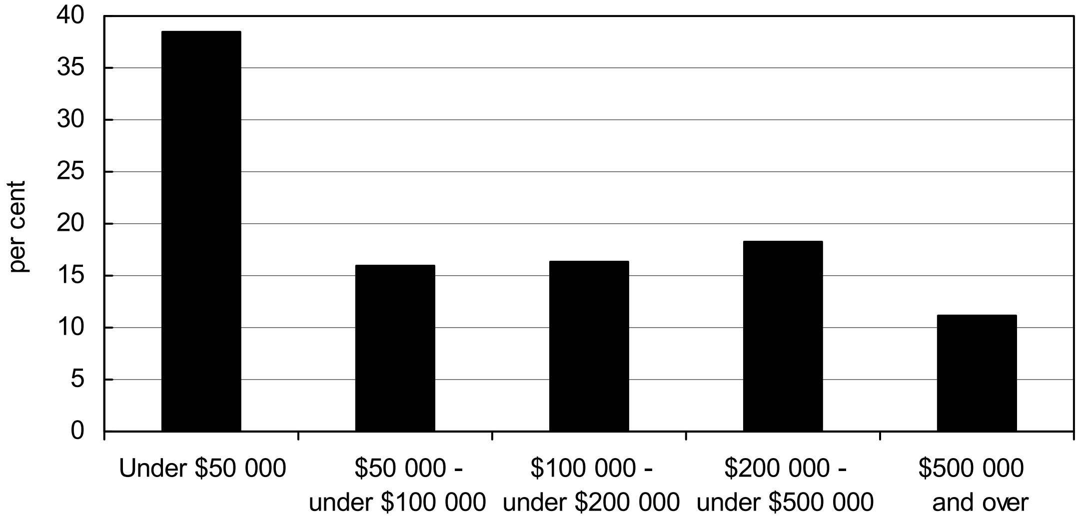
More recent data also show that a small, but significant, proportion of farms have a relatively high EVAO. In 2005-06, approximately 11 per cent of farms had an EVAO over $500 000[5], representing approximately 17 000 farms, while 18 per cent (approximately 28 000 farms) had an EVAO between $200 000 and $500 000.

4 In constant 2004 prices.

5 In 2005-06 prices.

Conversely, approximately 38 per cent of farms (around 59 000 farms) had an EVAO below $50 000 in 2005-06 (figure 2.9).

Figure 2.9 **Distribution of farms by EVAO, 2005-06**



Data source: ABS (*Agricultural Commodities, Australia, 2005-06*, Cat. no. 7121.0).

The degree of output concentration differs among agricultural industries. Those industries that had a relatively high proportion of farms with an EVAO over $1 000 000 in 2005-06 included: cotton growing (53 per cent of farms), mushroom growing (37 per cent of farms), and poultry farming for meat (29 per cent of farms) (ABS 2008a).

At the other end of the spectrum, those industries with a relatively high proportion of farms with an EVAO of under $50 000 were: grape growing (51 per cent of farms), beef cattle farming (42 per cent), and sheep farming (38 per cent) (ABS 2008a). Farms with an EVAO of this magnitude are likely to include many whose owners live and work in town but farm on weekends or who live on a farm and have some occasional work in town but are not engaged in full-time farming activity. By choice or necessity, many owners of farms of this scale earn off-farm income.

As further evidence of the extent of output concentration across agriculture, it is estimated that the largest farms (in terms of EVAO) generate the bulk of agricultural output, while those with smaller EVAO levels generate only a small share of total output (table 2.3).

Table 2.3 **Output concentration in agriculture**[a]

Per cent, share of total value of agricultural operations

	1996-97	*2005-06*
Largest 30 per cent	76.5	82.0
Smallest 50 per cent	9.8	7.2

[a] Farms with an EVAO greater than $5000 (in 2007-08 dollars).

Source: ABARE (2008 unpublished).

This picture is replicated for specific types of agricultural activities. For instance, the Australian Bureau of Statistics and Productivity Commission (ABS and PC 2006) examined the gross value of irrigated production (GVIP) in 2003-04, finding:

- for irrigated horticulture — 73 per cent of GVIP was attributable to the largest 20 per cent of farms, with the smallest 20 per cent contributing 1 per cent
- for irrigated broadacre crops — 69 per cent of GVIP was generated by the largest 20 per cent of farms, while the smallest 20 per cent of farms generated 2 per cent
- for irrigated pastures — 57 per cent of GVIP was attributable to the largest 20 per cent of farms, and the smallest 20 per cent produced about 2 per cent.

Other agricultural activities also display a concentration of output amongst larger farms (table 2.4). For example, in the beef industry in 2003–04, the top 30 per cent of farms (in terms of the value of output) produced more than 80 per cent of industry output, while in the dairy industry, the top 30 per cent produced about 60 per cent of industry output. The consistent trend over the 20 years for all of the sectors is one of increasing concentration of output.

Table 2.4 **Share of industry output by the largest 30 per cent of producers**[ab]

Per cent

	1983-84	*2003-04*
Beef specialists	77	81
Sheep specialists	67	70
Grain businesses	59	62
Dairy specialists	54	59

[a] Ranked by value of output. [b] Sheep specialists includes both sheep meat and wool specialists.

Source: DAFF (2005).

In addition to changes in the distribution of the value of agricultural output, there have been gradual changes in farm ownership. Large agribusinesses with corporate structures have emerged that are integrated across supply chains — including farming, seed supply, agrichemicals, farm machinery, wholesale and distribution, processing, marketing and retail sales.

Some of the recent growth in corporate investment has been encouraged by managed investment schemes (MIS). According to the Australian Agribusiness Group, non-forestry MIS contributions almost tripled between 2004 and 2007 (Department of the Treasury 2008, p. 1). Traditionally, olives and wine grapes were the preferred crops of MIS but, as noted by the Department of the Treasury (2008), almonds and livestock have also become popular in recent years. The growth in non-forestry MIS contributions may, in part, have been driven by the ability of investors to claim upfront deductions for amounts contributed to such schemes.

At the other end of the spectrum, there has been growth in 'hobby farming', typically on small lots. The typical characteristics of 'hobby farmers' were described earlier in this section.

Despite changes in the composition of farm ownership, farming families[6], continue to play a prominent role in the agricultural sector. In 1986, there were approximately 145 000 farming families in Australia, although there was a significant decline by 1991, when the number of farming families fell to around 120 000 (a decline of approximately 17 per cent) (ABS 2003). Throughout the 1990s, the decline in the number of farming families was less marked, with numbers falling to 115 000 by 1996 and approximately 113 000 in 2001. There was however, a larger decline between 2001 and 2006, when the number of farming families fell by around 10 000, to 102 616 in 2006 (ABS 2008c). The exit of some families from agriculture has provided those remaining with greater opportunities to expand their operations and increase their viability.

Farm entries and exits

Understanding farm entries and exits is important for developing policies to build capacity for self-reliance and preparedness, and to assist less viable farmers to either improve viability or leave the industry. For example, exit assistance may not necessarily achieve its desired outcomes if new entrants purchase sub-economic farms. Information on entries and exits for 2003-04 to 2006-07 — a period corresponding with drought conditions in most rural and regional areas — is provided in table 2.5.

6 Defined as a family where the reference person and/or spouse/partner reported that their main occupation was a farmer/farm manager.

Table 2.5 **Business entries and exits**

	Agriculture entries	*Agriculture exits*	*Agriculture entry rate*	*Agriculture exit rate*	*Industry average entry rate*[a]	*Industry average exit rate*[a]
	No.	No.	%	%	%	%
2003-04	23 024	22 364	10.9	10.6	19.4	16.8
2004-05	23 552	22 985	11.1	10.8	18.6	17.0
2005-06	30 029	28 400	14.1	13.3	17.8	16.2
2006-07	24 532	24 616	11.4	11.5	18.0	15.7

[a] Computed as the average yearly entry/exit rate for the following industries: mining, manufacturing, electricity, gas and water supply, construction, wholesale trade, retail trade, accommodation, cafes and restaurants, transport and storage, communication services, finance and insurance, property and business services, education, health and community services, cultural and recreational services, and personal and other services.

Source: ABS (*Counts of Australian Businesses, Including Entries and Exits, June 2003 to June 2007*, Cat. no. 8165.0).

Entry and exit rates from 2003-04 to 2006-07 were generally constant, with the exception of 2005-06, when there was a surge in new entries. A view expressed to this inquiry is that many seeking to leave farming intend to wait until the condition of properties improves after rains arrive or after a year of high production. For example, the Rural Financial Counselling Service New South Wales-Central West submitted:

> Many farmers live in hope – like gamblers – for the 'big year' and believe that if only one good year, we might be able to make enough to be able to get out with more. (sub. 73, p. 10)

If, as the above view suggests, farmers wait until better conditions occur to leave farming, exit rates may not necessarily increase sharply during drought periods. Notably, exit and entry rates in agriculture in each year from 2003-04 to 2006-07 were lower than the corresponding exit and entry rates across other industries in the same years (table 2.5). Regardless of seasonal conditions, exit and entry rates in agriculture seem to be lower than in many other industries.

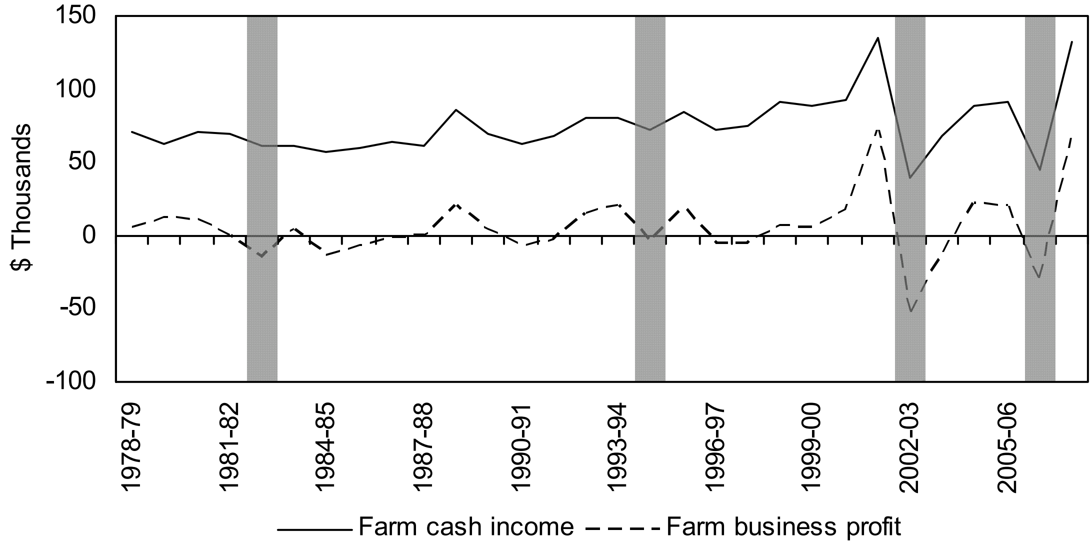
Managing farm income and returns in a variable climate

Farm income and profit have always been volatile in Australia. As illustrative examples, data on farm cash income and farm business profit[7] are provided for dairy farms (figure 2.10) and for broadacre farms[8] (figures 2.11 and 2.12).

Fluctuations in broadacre and dairy farm income and profits share some common elements. Both peaked in 2001-02, to very high levels, followed by declines during the 2002-03 and 2006-07 droughts. Recovery after those droughts occurred relatively quickly, implying strong sectoral level resilience.

Figure 2.10 **Dairy farm performance, 1978-79 to 2007-08**

2007-08 dollars



Data source: ABARE (2008e).

The top 25 per cent of broadacre farms demonstrate a consistently robust financial performance (figures 2.11 and 2.12), generating positive farm cash incomes and farm business profits in all years since 1988-89.[9] During the 2006-07 drought, the farm cash incomes of this group were flat, but strongly rebounded in 2007-08, to be around $9000 higher in real terms than the previous peak in 2001-02. However, the

7 Farm cash income is defined as total revenues received by the farm during the financial year, less payments made by the farm business for materials and services and for permanent and casual hired labour (excluding owner, manager, partner, and family labour). Farm business profit is defined as farm cash income plus changes in trading stock, less depreciation and imputed labour costs. Capital gains on land are excluded.

8 Classified on the basis of rate of return (excluding capital appreciation) to total capital.

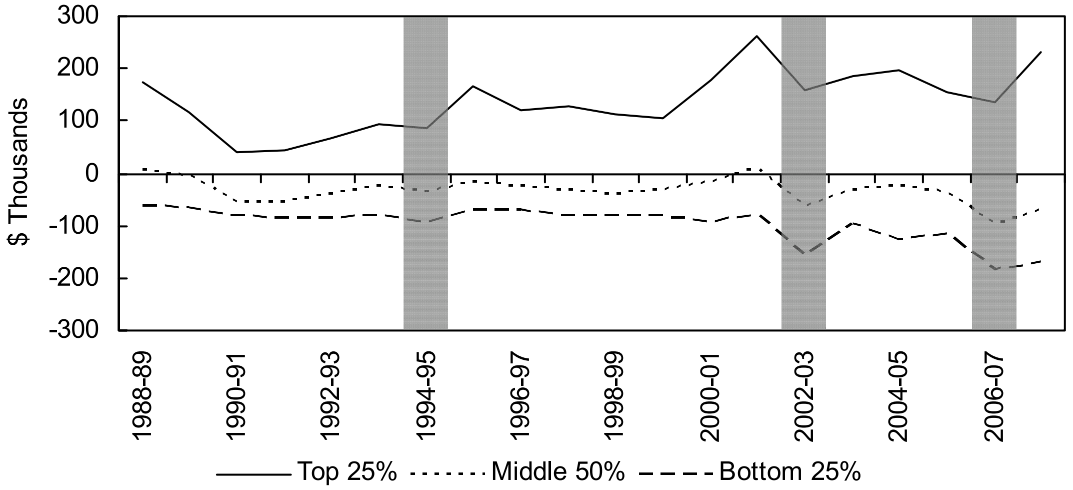
9 The identity of farms in each performance class can change from year to year.

bottom 25 per cent of farms have not recorded a positive farm cash income since 1994-95 and have not achieved a positive profit in any year in the period 1988-89 to 2007-08.

Figure 2.11 **Broadacre farm cash income, 1988-89 to 2007-08**
2007-08 dollars

Data source: ABARE (2009 unpublished).

Figure 2.12 **Broadacre farm business profit, 1988-89 to 2007-08**
2007-08 dollars

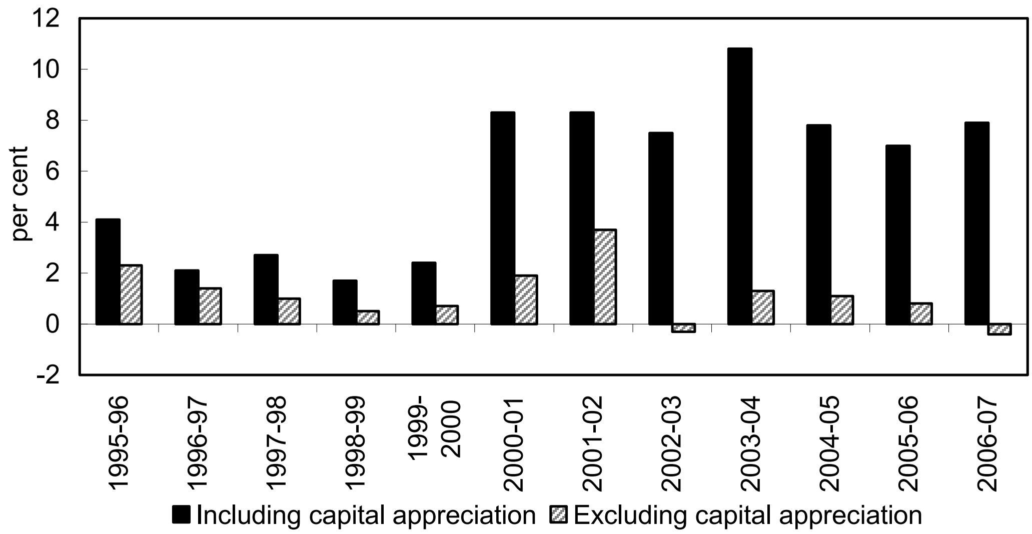


Data source: ABARE (2009 unpublished).

Despite prolonged drought, the rates of return[10] to total farm capital (including capital appreciation) have been high since 2000-01 (figure 2.13). Strong demand for rural land has resulted in a sharp increase in land values in many regions (discussed further in chapter 3), underpinning these high rates of return.

If capital appreciation is excluded however, farm rates of return are much lower, reflecting, in part, several years of poor profitability from below average seasonal conditions, including negative average levels of profitability during the droughts of 2002-03 and 2006-07.

Figure 2.13 **Farm rate of return, 1995-96 to 2006-07**
Average per farm, broadacre industries



Source: ABARE (2008e).

It should be noted that the taxation treatment of agriculture is also a relevant consideration to aspects of this inquiry (box 2.3). More detail on agricultural taxation, including the tax-linked financial tool, Farm Management Deposits (FMDs), can be found in chapter 4, chapter 8 and appendix D.

10 Measures the return to all capital used, computed by expressing farm business profit at full equity as a percentage of the total opening capital (at the beginning of the financial year) of the business.

Box 2.3 **Agricultural activities and taxation**

Agricultural interests in Australia tend to pay relatively low levels of tax. Almost 54 000 individuals in the agriculture, forestry and fishing sector declared business losses on their tax return in 2005-06 — the highest number for any industry. This represented about 12 per cent of the total number of individuals that declared losses. Individuals in agriculture, forestry and fishing comprised around 1 per cent of all individual taxpayers in 2005-06 (ATO 2008b).

In addition, there were about 11 000 non-taxed companies in the sector in 2005-06 (that is, those with net tax less than or equal to $0). This represented about 64 per cent of companies in the sector that filed a tax return for that year (ATO 2008b).

Furthermore, the Department of the Treasury (2006) estimated that, in 2005-06, about $475 million in tax expenditures (defined as concessions, benefits, and incentives delivered to taxpayers via the taxation system) was afforded to agriculture, forestry and fishing.

Off-farm income diversification

Off-farm incomes — including off-farm wages and salaries, investment dividends, rents and other business income, and government social support payments — assist farmers to manage the numerous risks they may face.

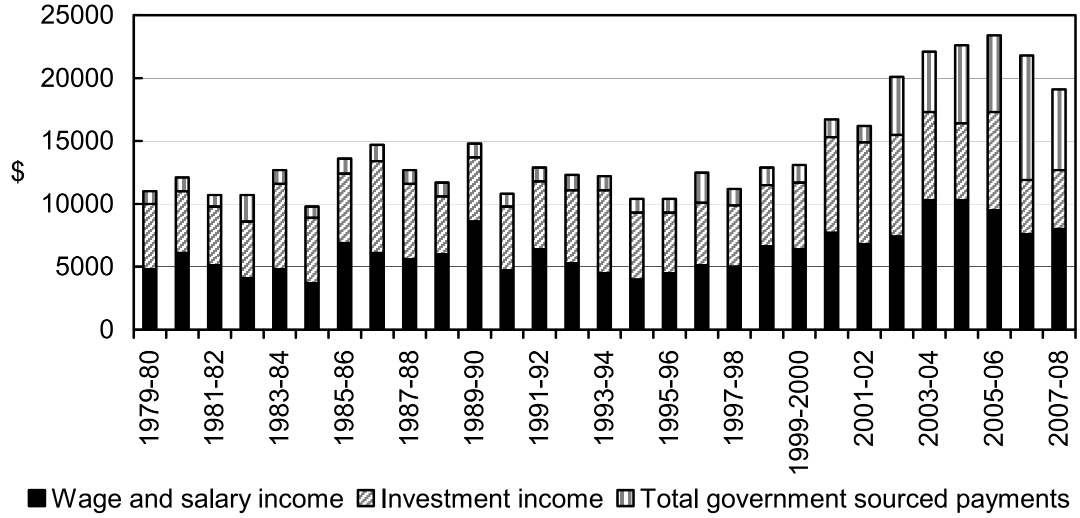
Off-farm income[11], primarily in the form of off-farm wage and salary income and investment income, but also including government sourced payments, has increased in real terms (in 2007-08 dollars) since the late 1970s for both dairy and broadacre farmers (figures 2.14 and 2.15). Although the trend is less pronounced for dairy farmers than broadacre farmers, the increase in off-farm income suggests that a movement towards a greater degree of income diversification has occurred.

While the level of off-farm income received by dairy farmers has risen since 1979-80 (figure 2.14), most of this increase has taken place since 2000-01. The peak amount of wage and salary income received by dairy farmers (in terms of the average amount per farm operator-manager's household) was $5300 in the three years to 1981-82, $10 300 in 2003-04 and 2004-05, and approximately $8400 in the three years to 2007-08. Hence, there has been a movement towards higher receipt of wage and salary income by dairy farmers over time. There has not however, been a movement of a similar magnitude in the receipt of investment income, with an average of $5600 received in the three years to 2007-08, compared with $4900 in

[11] Collected from ABARE surveys and referring to the farm operator-manager's household. That is, the off-farm income of the principal operator and their spouse.

the three years to 1981-82. The level of government sourced payments received by dairy farmers has increased markedly over time. Dairy farm households have been significant recipients of the Exceptional Circumstances Relief Payment in the past few years — the average dairy farm operator-manager's household received $7100 in 2006-07 and $5000 in 2007-08.

Figure 2.14 **Off-farm income sources of dairy farmers, 1979-80 to 2007-08[a]**
2007-08 dollars



[a] Government sourced payments includes payments to families, allowances and pensions, and taxable payments considered to be part of farm business income, but excludes fuel rebates and dairy structural adjustment payments.

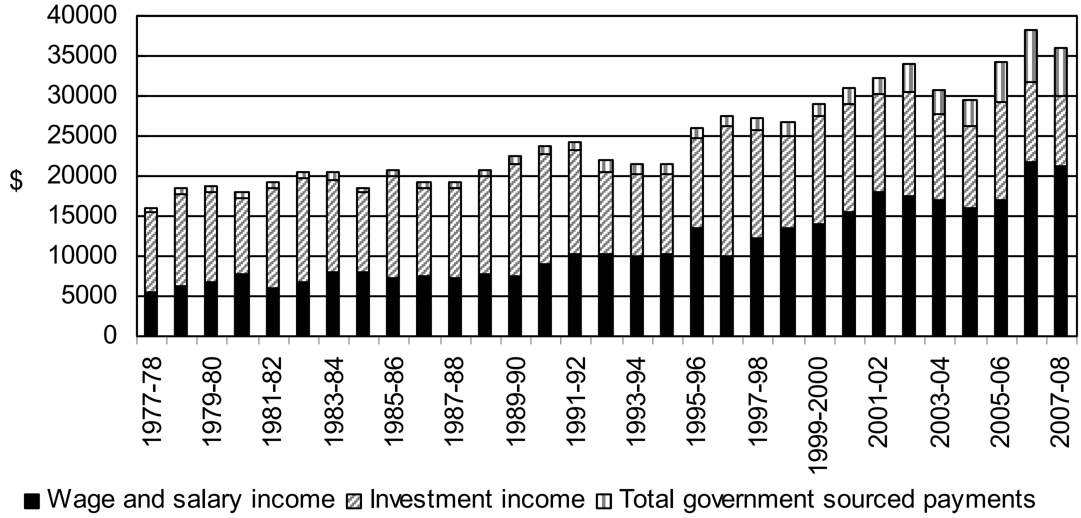
Data source: ABARE (2009 unpublished).

The amount of wage and salary income received by broadacre farmers has increased over time (figure 2.15). For instance, the average amount (per farm operator-manager's household) of wage and salary income in the three years to 2007-08 was $20 000, compared with around $6200 in the three years to 1979-80. Although investment income is a significant source of off-farm income for broadacre farmers, the amount received has changed very little over time, with an average of approximately $12 000 received per annum over the period 1977-78 to 2007-08. Government sourced payments however, have increased steadily since the early 2000s, reaching relatively high levels in 2006-07 and 2007-08.

The data generally indicate that a trend in broadacre farming, and to a lesser extent, dairy farming, has emerged, whereby fewer farmers are wholly reliant on the farm business to generate all of their income. This is demonstrated by the fact that the percentage of broadacre farmers with off-farm wages increased from 25 per cent in 1977-78 to 45 per cent in 2007-08) (see figure 9.3). For dairy farmers, wage and salary income has become more important since the late 1990s, and the percentage of dairy farmers receiving off-farm wages has also increased moderately, from 26 per cent in 1977-78 to 35 per cent in 2007-08. While some view the receipt of off-farm income as an indictment of Australian agriculture, it is in fact a rational response by many to the risks of farming, including Australia's highly variable climate — it is thus a sound risk management strategy, where it can be readily undertaken.

Figure 2.15 **Off-farm income sources of broadacre farmers 1977-78 to 2007-08**[a]

2007-08 dollars



[a] Government sourced payments includes payments to families, allowances and pensions, and taxable payments considered to be part of farm business income, but excludes fuel rebates.

Data source: ABARE (2009 unpublished).

Capital accumulation

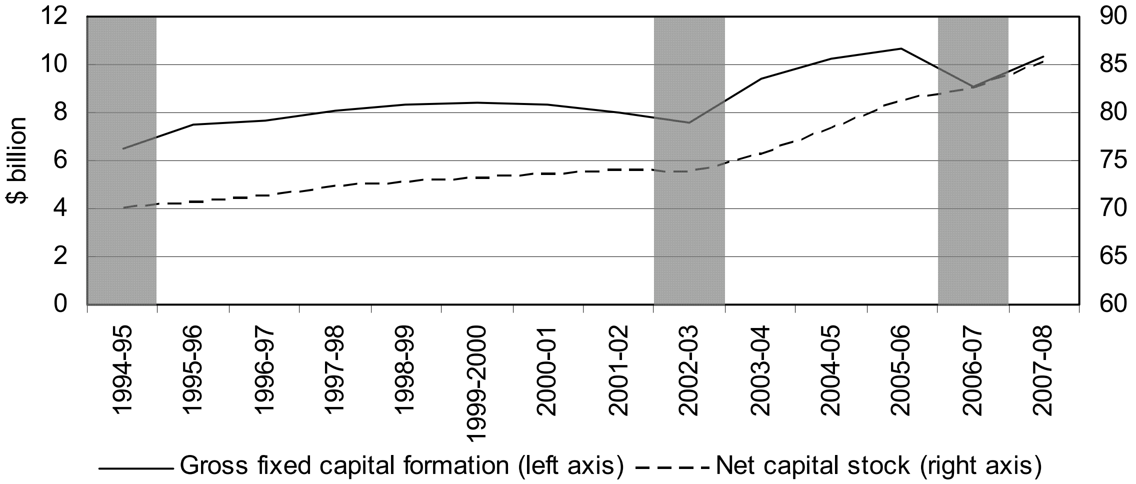
The quantity of capital utilised by the agricultural sector as an input into production has continually increased over time. The net capital stock[12] (in real terms) in agriculture rose from around $70 billion in 1994-95 to $85 billion in 2007-08, representing an increase of approximately 21 per cent over that period for an average annual growth rate of 1.4 per cent per annum (figure 2.16).

Despite the upward trend of agriculture's capital stock, gross fixed capital formation (the value of acquisitions less disposals of fixed assets) displays a degree of variability during the droughts of 2002–03 and 2006–07 (discussed further in chapter 3).

[12] The net capital stock represents the net present value of the future capital services provided by assets.

Figure 2.16 **Net capital stock and gross fixed capital formation, 1994-95 to 2007-08**

Chain volume (2006-07 prices)



Data source: ABS (*Australian System of National Accounts*, Cat. no. 5204.0).

Water availability

In 2004-05, about 65 per cent — or approximately 12 200 gigalitres (GL) — of Australian water consumption was used for agriculture.[13] However, agricultural water use has fallen in recent years, to 11 689 GL in 2005-06 and to 8 521 GL in 2006-07. Approximately 90 per cent of this water was used for the irrigation of pastures and crops, with the remainder used for purposes such as stock watering and cleaning livestock facilities[14] (ABS 2008f).

Most agricultural businesses that irrigated in 2006-07, used water on pastures for grazing. This group also irrigated the largest area in addition to having the greatest water use (table 2.6). Sugar cane, cotton, cereal crops and pasture for hay also used significant amounts of water in 2006-07. Although cotton and rice used significant quantities of water in 2005-06, their use declined markedly in 2006-07.

[13] It is estimated that about 11 per cent of water consumption in 2004-05 was used by households and about 12 per cent by industrial users, with the remainder being used by water supply services, for example, for the purposes of sewerage and drainage services (ABS 2006b).

[14] These data pertain to water sources on or under the ground. This includes water sourced from government and irrigation schemes and surface water, mainly sourced from rainfall and run-off, or from bores tapping groundwater.

Table 2.6 **Pastures and crops irrigated, 2005-06 and 2006-07**

	Businesses irrigating (no.)		*Area irrigated ('000 hectares)*		*Volume applied (GL)*	
	2005-06	*2006-07*	*2005-06*	*2006-07*	*2005-06*	*2006-07*
Pasture for grazing	14 229	12 818	814	567	2 888	2 008
Sugar cane	2 145	1 991	210	202	1 057	978
Cotton	715	555	270	134	1 735	868
Cereal crops	4 488	3 887	375	311	894	825
Pasture harvested for hay	7 116	5 791	256	200	939	795
Fruit and nut trees, plantation or berry fruits	7 823	8 080	139	141	630	648
Grapevines	8 277	7 736	183	178	633	639
Vegetables	6 439	6 355	114	105	431	414
Rice	1 056	311	102	20	1 253	239
Other broadacre crops	901	588	55	37	167	109
Nurseries, cutflowers, cultivated turf	3 645	3 198	15	15	82	72

Source: ABS (*Water use on Australian farms*, Cat. no. 4618.0).

The largest amount of agricultural water use in 2006-07 occurred in New South Wales, which accounted for approximately 32 per cent of total national usage. Victoria and Queensland were also significant users, accounting for around 25 per cent and 20 per cent of total usage respectively. Irrigated agriculture in the Murray-Darling Basin (MDB) in 2006-07, accounted for around 58 per cent (4458 GL) of all water used for irrigation nationally. Nevertheless, between 2005-06 and 2006-07, the area of land irrigated in the MDB fell by 553 000 hectares (a decline of around 33 per cent) and was associated with a decline in irrigation water volumes of nearly 40 per cent (ABS 2008f).

Policies relating to water access entitlements and water allocations have significant effects on agricultural water use (box 2.4). The National Water Initiative, signed by all governments, aims to facilitate the operation of water markets and the trading of water between and within jurisdictions. The ability to trade annual allocations and permanent entitlements has led to premiums for water which are above utility charges. As a consequence of trading, prices vary in response to supply and demand, so that water is typically more expensive during dry conditions.

Box 2.4 **Water reforms**

Water access entitlements give users exclusive access to a share of water from a specified consumptive pool. Water allocations reflect the specific volume of water allocated to entitlements in a given season. Historically, while water rights differed between states, they generally provided a right to take and use water, rather than a property right over water per se. These arrangements led to many overallocated systems with potential extractions by entitlement holders exceeding sustainable levels. This prompted reforms including a cap on diversions from the MDB in 1995, the separation of the water right from land title and the ability to trade annual water allocations and the underlying long-term entitlement.

In 2004-05, the total allocated volumes of water in New South Wales and Victoria were substantially less than the nominal entitlement (see table), and have continued to be less than 100 per cent in many areas of these states in more recent years. For example, Goulburn-Murray Water in Victoria had all of its systems on less than full seasonal allocations in 2006-07 and 2007-08 (see chapter 3).

Water access entitlements and allocations, 2004-05

	Entitlements	*Entitlement volume*	*Allocated volume*
	No.	GL	GL
NSW	118 110	13 302	9 799
VIC	25 514	6 680	4 734
QLD	48 591	4 397	na
WA	17 513	2 547	2 547
SA	10 399	1 661	1 661
TAS	3 110	1 038	1 038
ACT	153	66	66
NT	166	140	140

na Not available.

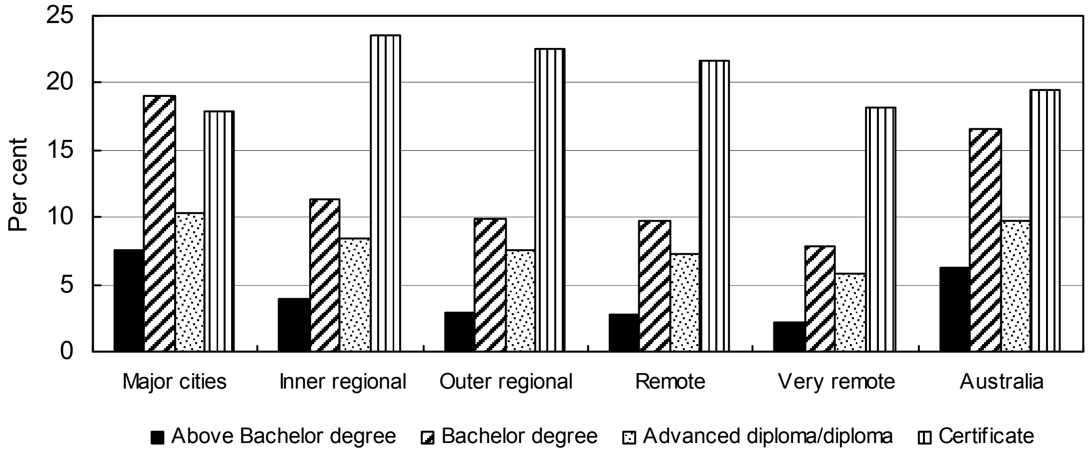
Sources: ABS (2006b); Roberts et al. (2006) and NWC (2008a).

The ability of irrigators to trade allocations has important ramifications across agriculture. For instance, in a dry year, farmers involved in cropping who hold water entitlements may sell their water allocation, rather than use it for cropping, if they believe the net benefit of doing so exceeds the net benefit of producing a crop. The ability to sell entitlements provides more adjustment options, including opportunities for farm exit.

Education and training

Education and training build human capital which enables people to adjust to changing circumstances and take advantage of new opportunities. In terms of post-secondary education, rural and regional areas generally had higher proportions of people with vocational education certificates compared with major cities (figure 2.17). Conversely, about 27 per cent of working age people in major cities had a bachelor degree or higher qualification, compared to 15 per cent in inner regional areas and even lower rates in more remote rural areas.

Figure 2.17 **Level of highest non-school qualification among people aged 25-64 years, by remoteness class 2006[ab]**



[a] Above bachelor degree category includes people with postgraduate degrees or graduate diplomas/certificates. [b] Includes those in migratory Australia and those who had no usual address. Migratory Australia comprises Collection Districts, which contain people who are enumerated on an overnight journey by train or bus.

Source: ABS (*Australian Social Trends, 2008*, Cat. no. 4102.0).

In all age categories, certificates are the most prevalent form of non-school qualifications possessed by farmers. However, the relative significance of advanced diplomas and diplomas versus bachelor degrees and above varies slightly by age class (table 2.7). Among younger farmers (those aged 20-29 and 30-39), bachelor degrees and above are more prevalent than advanced diplomas and diplomas as forms of non-school education. However, among the middle-aged groups and older groups (those aged 40-49, 50-59 and 60-69), advanced diplomas and diplomas are marginally more prevalent than bachelor degrees and above.

Table 2.7 **Highest level of non-school qualification of farmers in farming families by age group, 2006[a]**

Per cent

Qualification level	*15-19*	*20-29*	*30-39*	*40-49*	*50-59*	*60-69*	*70-79*	*80 and over*
Certificate	100	63	55	56	47	42	40	40
Advanced diploma/diploma	0	16	20	21	25	27	25	26
Bachelor degree or above	0	19	23	19	24	26	29	26

a Persons who inadequately described their non-school education were included in the calculation of percentages, which may not sum to 100.

Source: ABS (*Agriculture in Focus: Farming Families, Australia, 2006*, Cat. no. 7104.0.55.001).

While experience is important, the age structure of the farming population also has implications for the future of farm adjustments (box 2.5). (Chapter 9 examines the inordinately large number of farmers of pension age who are still working.)

Box 2.5 **The age of farmers**

Ageing of the farm population has been evident over the past two decades (Barr 2004) and has implications for the number of exits and retirements from farming that occur, in addition to succession and entry into farming by younger persons. In 1981, the median age of farmers was 44, rising to 51 by 2001, and increasing marginally in 2006 to 52 (ABS 2008c). This reflects, in part, a decline in the rate of entry of young people into farming. Barr et al. observed:

> The declining entry of young persons into agriculture is both a response to pressures for agricultural restructuring that encourage some young persons not to begin a career in farming, and the attraction of competing opportunities available for the young elsewhere in society and the economy. (Barr et al. 2005, p. 1)

Associated with this trend is a deferral of retirement, possibly because farmers are continuing on in the absence of a family successor (Barr 2004). The ageing of the farm population tends to be more evident in regions where small farms dominate, such as the high rainfall grazing districts along the Great Dividing Range and along the coastal fringe. Their location in high amenity regions and high land prices can limit options for increasing scale and for younger people to enter agriculture (Barr 2004).

2.4 Building a secure capital base

The vulnerability of farm businesses to shocks, such as drought is in part dependent on the size and composition of the capital base that has been built (outlined in box 2.1).

The stock of natural capital built up on a farm is an important contribution to preparedness for droughts. Further, the earlier that measures are taken to maintain the natural resource base during a drought (such as early destocking), the lower the damage to the environment and the better the position a farm is in for the recovery phase.

Self-reliance can be enhanced by building and maintaining financial reserves and by diversifying income sources (for example, by obtaining off-farm income). Vulnerability to shocks may also be reduced by improving the stock of physical capital; by diversifying farm enterprises and by adopting new technologies. The Rangelands Drought Taskforce observed:

> Those businesses that prior to the drought were able to implement diversification strategies as part of their business plans appear to be in a much better position to survive the drought … Diversification of businesses is the key to pastoral businesses surviving drought. (sub. 60, pp. 2–5)

The data presented in the previous section suggests there is scope for the level of human capital in rural and regional areas to be developed further. By enhancing their skills and knowledge, farmers have the potential to increase the efficiency with which they operate their farms, expand their range of employment opportunities and increase their lifetime earning potential.

Social capital, as a measure of the quality of relationships within a community, can be built up via means such as strengthened family, school, and club relationships, and by organisations, such as businesses, church-based groups and other voluntary bodies. Social capital ensures that a degree of social support is available to individuals affected by adverse circumstances, thus strengthening community self-reliance.

There is no uniform optimal combination of the various types of capital that should be developed and held by all farmers and farm businesses. The relative importance of each varies — for example, a limited amount of physical farm capital may be offset by a greater store of financial capital.

Nelson et al. (2005) constructed a composite index combining the five types of capital in order to assess the vulnerability of farm households to external events. Selected indicators were used to represent each of the five types of capital, and weighted evenly to determine a composite index.

These index results were mapped to illustrate areas where farmers were most vulnerable to stress events such as drought (figure 2.18a). Results indicate that farmers in areas such as western New South Wales, central Queensland, and parts of the east coast were more likely to be vulnerable than farmers in other areas. The key variables leading to greater vulnerability varied by regions. However, land degradation, a small area scale of operations, low average incomes and lack of off-farm income were important indicators of vulnerability (Nelson et al. 2005).

Figure 2.18 **Vulnerability to risks [ab]**

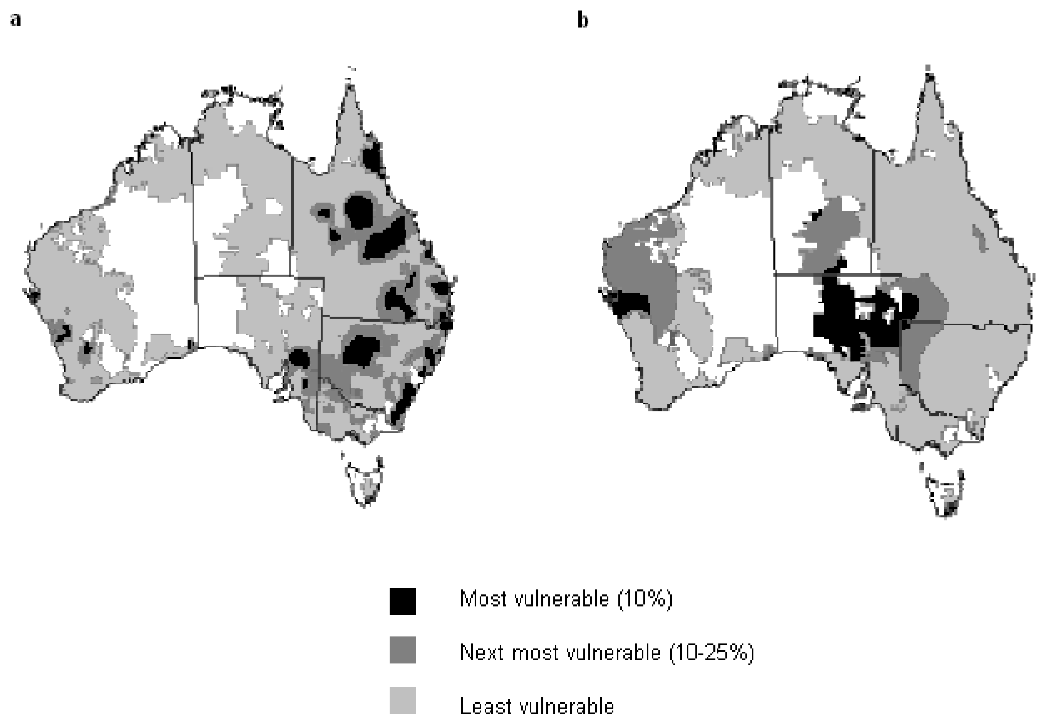


Figure a: Vulnerability of Australian broadacre farms using combined index
Figure b: Exposure of Australian broadacre farms to climate risk

[a] Climate risk represented in terms of extreme pasture growth. [b] Variables used in the index include: average income, income risk and off-farm income (financial capital), diversity of income sources and area operated (physical capital), degradation and Pasture Growth Index extreme (natural capital), operator education and spouse education (human capital), partnerships, internet use, and landcare membership (social capital).

Data source: Nelson et al. (2005).

Climate risk, as modelled by an extreme pasture growth index, was not a substantial driver of overall vulnerability (figure 2.18b). Although some areas, such as central Australia, are exposed to climate risk, overall farm vulnerability does not necessarily coincide with the areas of greatest climate variability. Nelson et al. (2005) concluded that the risks of operating in areas of low and variable rainfall could be offset by other factors, such as scale, and that biophysical indicators of vulnerability (such as rainfall and soil type) are poor indicators of the vulnerability of farm households.

2.5 Rural-urban drift, sponge cities and small towns

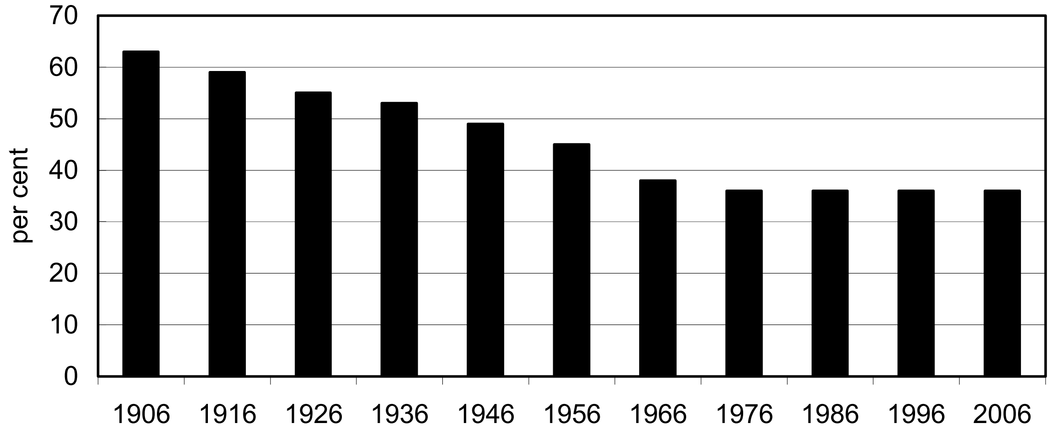
Many participants to this inquiry consider that drought assistance has a role to play in retaining resources in inland Australia. For example, a local Wimmera grain company owner stated:

> The government does need to acknowledge the need to keep regional Australia well populated. We cannot have a country where 90 per cent of our population is along the coastal strip. (Grimble 2008, p. 5)

In assessing the role of drought policy in this context, it is important to first understand that forces, often beyond the influence of governments, have shaped and will continue to drive the settlement patterns of rural Australia.

Australia has steadily become more urbanised over time. In 1906, around 63 per cent of the population lived outside the capital cities, falling to about 36 per cent in the 1970s. Contrary to common perception, this feature of rural-urban drift has since stabilised at that level (figure 2.19), but there is still change within this overall metro-rural split. Between 2001 and 2006, for example, capital cities, some coastal regions, provincial centres and mining towns experienced population growth, whereas the population in many remote areas declined (figure 2.20).

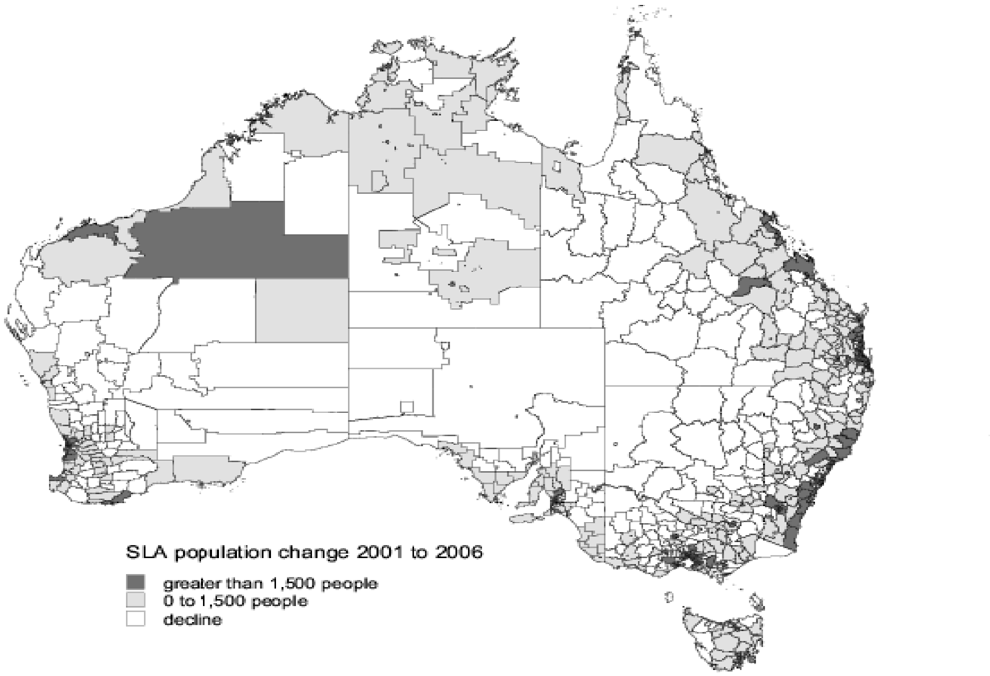
Figure 2.19 **Proportion of population living outside capital cities, 1906-2006[a]**



[a] Excludes the Northern Territory and ACT in 1906 and 1916, and the Northern Territory from 1926 to 1946.

Source: ABS (*Australian Historical Population Statistics*, Cat. no. 3105.0.65.001).

Figure 2.20 **Population change, 2001 to 2006**



Note: SLAs refer to Statistical Local Areas.

Source: ABS (*Regional Population Growth, Australia, 1996 to 2006*, Cat. no. 3218.0).

The ABS (2006a) noted that, in 2004-05, the largest population growth outside capital cities occurred in coastal areas, most of which resulted from internal migration, as people from inland areas and cities moved towards the coast — a reflection of the so-called 'sea-change' phenomenon. Some of the coastal areas with high rates of population growth during the period 2000-05 included Hervey Bay, the Sunshine Coast, and the Gold Coast-Tweed region (ABS 2006a, p. 80). Some inland regional areas, including major provincial centres and towns around the periphery of capital cities have also experienced significant population growth, as have 'tree change' areas. For example, between 2001 and 2006, inland regional areas such as Maitland in New South Wales, Greater Bendigo in Victoria, and Mount Barker in South Australia, all experienced strong population growth (ABS 2007). These population movements are likely to reflect factors such as the relocation of retirees, individuals seeking a change of lifestyle, high city house prices, and the development of technologies that enable people to 'telecommute'.

A number of regional towns have had strong population growth because of the growing demand for labour by the mining industry. The population in high growth mining towns expanded by between 2.2 per cent per annum (Roxby Downs) and 8 per cent per annum (Dysart) between 2001 and 2006 (ABS 2008e).

Some small towns have benefited from the inflows of people to selected coastal and inland areas, while others have declined due, in part, to the greater availability of commercial and other services in the larger towns and to the long-term decline of some rural industries. Prolonged drought may have exacerbated these trends. Over the 1996–2006 period, although remote and very remote areas experienced negative population growth rates, the population growth rate for inner regional areas (as well as major cities) was positive (table 2.8).

Table 2.8 **Population change by area**

Per cent, average annual growth rate

	1996–2001	*2001–2006*	*1996–2006*
Major cities	1.8	1.4	1.6
Inner regional	0.3	1.4	0.8
Outer regional	-0.7	0.8	0.0
Remote	-0.7	0.0	-0.4
Very remote	-0.5	-0.2	-0.3
Australia	1.2	1.3	1.2

Source: ABS (*Australian Social Trends, 2008,* Cat. no. 4102.0).

A notable feature of these data is that the population growth rate for remote areas was negative in the 1996–2001 period (a non-drought period), but was zero in the 2001–2006 period (which included the 2002-03 drought). Additionally, the rate of population decline for very remote areas was faster over 1996–2001 than that over 2001–2006. Overall, the data suggest that major cities and inner regional areas have grown at the expense of remote and very remote areas, but that this phenomenon is a broad trend, and that drought is only one of the many factors at play. Indeed, the New South Wales Farmers Association observed:

> … Tamworth and Orange and Wagga, those centres are doing particularly well. They are sort of the sponge centres, they're dragging and sucking the lifeblood out of a lot of smaller towns, we know that. But the second-tier towns are all towns that have very, very strong, vibrant communities; probably won't expand much but they are strong, vibrant communities. What the drought has done to those communities is it is dragging them down to the level where whether they can be sustained or not is a problem … those towns that have been struggling even in the good times are probably going to continue and the government needs to make a decision about how they're going to address those issues. (trans., pp. 592-3)

The agglomeration benefits of urbanisation are attractive to people and businesses alike (Bradley and Gans 1998). Larger centres have greater product variety, higher order health services, a greater range of leisure activities and economies of scale. They offer better access to a skilled workforce, transport cost savings and inter-firm knowledge spillovers. Improved roads and cars make it is easier for farmers and other local residents to travel to these centres. This, in turn, adds to the adjustment pressures felt by many small towns, as noted by Budge:

> Agricultural production levels, which were once an indicator of the performance of an area, are now not necessarily an indicator of growth. Financially successful farmers may reside in areas with population loss, declining labour markets and loss of services in the towns and rural areas in which they operate. The reality is that the functions of many country towns that once performed the role of rural service centres may no longer have much economic and social relationship with those people and properties comprising the agricultural base of the area … (Budge 2005, p. 6)

The changing distribution of non-metropolitan populations can have consequences regarding the impact of drought on regional areas, which is explored further in chapter 3.

Regional policy and drought support

The Expert Social Panel (Kenny et al. 2008) observed that drought can hit rural communities particularly hard. Inquiry participants made similar observations to the Commission. For example, Centroc (Central New South Wales Councils) pointed to the impact of drought on less resilient regional economies:

> The decimating of communities will only lead to less and less services within rural communities including medical services having a multiplying downward spiralling impact for rural and regional Australia. (sub. 105, p. 1)

Similarly, the Victorian Farmers Federation argued:

> … it is a lot easier for urban communities to weather business shocks that can cause impacts similar to the impact of drought on regional economies. (sub. 74, p. 5)

The view that drought assistance is needed to underpin rural economies is typically supported by two arguments:

- the circulation of support payments through farmers to businesses is said to keep local agriculture-dependent communities ‘ticking over’, thereby offsetting the incentive for town residents to seek (often permanently) alternative employment elsewhere
- drought policy — and any other injection of funds or differential treatment that favours regional areas — is necessary to retain a critical mass of population and preserve the social fabric of local communities.

The first argument reflects an incidental outcome from providing cash to farmers who, by nature of occupation, generally reside, and make some of their purchases, in non-metropolitan locations. The second implicitly promotes drought assistance as a tool of regional development policy. The efficacy of using temporary drought relief as a regional development tool is highly questionable given that it would, at best, be an intermittent and partial palliative for the broader long-term forces identified in this chapter.

Specific regional development policies have been implemented by governments over time. One example is soldier settlement schemes (box 2.6).

Box 2.6 **Soldier settlement farms**

Following both world wars, governments introduced soldier settlement schemes which encouraged returned servicemen to take up plots of agricultural land as a form of repatriation and compensation.

After World War I, more than 37 000 returned servicemen settled on small blocks of land provided by the states, with low interest loans sponsored by the Australian Government. The small blocks, many of them irrigation farms, were often situated on land not well suited to agriculture (Shaw 1982), which, when coupled with the lack of agricultural experience of many returned servicemen, made successful farming difficult. Consequently, many settlers left their blocks during the 1920s and 1930s.

Another, smaller, soldier settlement scheme (the War Service Land Settlement Scheme) was introduced at the end of World War II. Unlike its predecessor scheme, application criteria were more stringent, requiring, for example, that returned servicemen demonstrate their eligibility, suitability and qualifications for settlement and detail their prior agricultural experience. The size of holdings offered to returned servicemen were also larger than in the previous scheme, and adequate guidance and technical advice were made available via extension services. Based on its objectives, this scheme was more successful than its predecessor. However, part of this may be attributable to the improvement in commodity prices that occurred during its early years of operation (Campbell 1982). Australia's soldier settlement initiatives are still seen as a source of structural adjustment problems (Stephens and McGuckian 1995, Watson 2008).

The experience of soldier settlement farming suggests there are lessons that can be drawn from some earlier policies that aimed to influence the regional distribution of population. The merits or otherwise of broader, longer term approaches to regional development — whether through decentralisation, infrastructure investment, greater provision of services, horizontal fiscal equalisation, taxation zone rebates or payroll tax concessions — however, is outside the scope of this inquiry. As discussed in chapter 11, there are a number of state and territory policies that mix the objective of regional development with drought assistance — such overlaps need to be considered and addressed when devising future policies.