



Social Atlas for Sustainable Management

A Social and Economic Database for the
National Land and Water Resources
Audit

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John Cary, Shannon Kelson and Heather Aslin,

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Department of
**AGRICULTURE
FISHERIES &
FORESTRY -
AUSTRALIA**



The Bureau of Rural Sciences (BRS) is the science agency within the Commonwealth Department of Agriculture, Fisheries and Forestry – Australia.

Postal address:

Bureau of Rural Sciences

PO Box E11

Kingston, ACT 2604

Internet: <http://www.affa.gov.au/output/ruralscience.html>

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Introduction

The National Land and Water Resources Audit, funded by the Natural Heritage Trust, aims to provide nation-wide assessments of Australia's land, vegetation and water resources to support improved management and sustainable development of these resources. Theme 6 of the Audit deals with the capacity of people and social institutions to change their current natural resource management practices towards more sustainable practices. This theme has been addressed in part by compiling national data sets about socio-economic factors relevant to capacity to change. It is intended to link these socio-economic data sets with others describing the nature and condition of Australia's natural resources.

Many socio-economic factors have been discussed by different authors as being relevant to landholders' and farm families' ability and willingness to change to more sustainable land management practices. They include factors like age, educational levels, income and awareness of land degradation issues. Information about these factors can be obtained directly from specially commissioned surveys, but is also available from previous surveys done for other purposes (secondary data sources). At the national level, the Census of Population and Housing conducted by the Australian Bureau of Statistics (ABS), and farm surveys conducted by the Australian Bureau of Agricultural and Resource Economics (ABARE), are particularly important sources of information about rural and regional Australia. However, the last Census was conducted in 1996 and so information from it is rather dated. This should be borne in mind in interpreting maps based on Census data. The Census is unique in that it collects data about the whole Australian population and therefore Census data are not subject to sampling errors. In some cases, comparisons have been made in this atlas between 1991 and 1996 Census data to indicate trends.

In this atlas, a set of possible indicators of ability to change identified by Fenton et al. (2000) in an earlier Audit report has been applied. Applying these indicators has involved identifying data sources for as many indicators as possible, and depicting relevant data in map form, accompanied by charts giving further details of the data underlying maps. In particular, the charts give information about the sizes of the Relative Standard Errors (RSEs) for ABARE data, which are derived from survey samples. The size of RSEs for the relevant data sets should be taken into account in interpreting the maps. Large RSEs suggest the need for caution in interpretation.

The maps vary in the geographical basis used for data depiction. Many of the maps use Statistical Divisions (SDs) as the basis for presentation, but some maps use the much smaller Statistical Local Areas (SLAs). Details of SDs, including their names and numbers, are given in Reference map (i). SDs cover the whole of Australia without gaps, and do not cross State boundaries. SDs are intended to be relatively homogeneous areas within which there are identifiable social and economic links among populations. SLAs consist of one or more Census Collection Districts and generally correspond with single Local Government Areas, parts of Local Government Areas and/or unincorporated areas (Haberkorn et al. 2000, ABS 1997).

The maps presented at the Statistical Division level represent ABARE indicator data that are obtained by sample rather than census and therefore subject to sampling error. For each of the indicators at SD level an additional map is presented showing the size of the sampling error for each SD. For some SDs the reported estimates are based on small samples and have high sampling errors and, therefore, should be interpreted with caution.

Much of Australia is characterised by low population density (nearly 70% of Australia). In areas of low population density the SDs are geographically much larger but the populations

are often still small and spread over a large area. This presents difficulties for adequate sampling using normal approaches. Data for these SDs in the maps need to be treated with caution as there are very few data points spread over large geographies. The Northern Territory is represented as one SD. While ABARE sampling rates have been increased for the Northern Territory the number of properties in the sample is still small and thus the sampling estimates are unlikely to adequately represent the diversity of the SD. Other SDs (particularly in northern Australia) are characterised by a low density pastoral zone and, sometimes, a more densely settled coastal fringe which presents difficulties for generalising sample estimates at the SD level. For example, the Central SD of WA (which includes Shark Bay) is a mix of predominantly low population density rangeland and a two coastal SLAs where 1996 farmer/farm manager populations were relatively larger.

Data sets for this atlas have been limited to national ones, given the Audit's national scope. Table 1 shows how the data obtained are related to a modified form of the indicator framework suggested by Fenton et al. (2000). Details of specific data sources are indicated on the maps and under chart titles.

Table 1 Indicator types used, data obtained, and numbers of maps and charts depicting the data

Indicator type	Indicator data obtained	Map no.	Chart no.
Age and experience			
Age of farmer	Median age of farmers and farm managers, 1996	1	1
Demography of the young	Change in median age of farmers and farm managers, 1991-1996	2	
	Change in the population aged 15 to 24 years, 1991-1996	3	
Education and training			
Level of farmer education and training	Farmers aged 14-16 years when their schooling completed, 1996	4	
	Farmers aged 17-18 years when their schooling completed, 1996	5	
	Farmers with basic vocational qualifications, 1996	6	
	Farmers with skilled vocational qualifications, 1996	7	
	Farmers with higher qualifications, 1996	8	
Level of farmer participation in management and relevant training	Participation in any courses or training activity 1996-1997 to 1998-1999	9	2
Farm financial characteristics			
Level of farm income	Median farm family income, 1996	10	
	Annual family income, 1996-97 to 1998-99		
	Annual farm cash income, 1996-97 to 1998-99	11 12	3 4
Level of off-farm income	Off-farm income, 1996-97 to 1998-99	13	5
Level of farm business profit	Farm profit at full equity, 1996-1997 to 1998-1999	14	6
Level of household spending	Total household expenditure	15	7
Level of farm debt	Level of farm debt, 1996-1997 to 1998-1999	16	8
	Farm equity ratio, 1996-1997 to 1998-1999	17	9
	Farms with equity ratio less than 80%, 1996-1997 to 1998-1999	18	10

Indicator type	Indicator data obtained	Map no.	Chart no.
Farm family characteristics			
No. of children (family size)	Farm families with dependent children, 1996	19	
Farm structure			
Farm size	Median farm estimated value of agricultural operations (EVAO), 1996-1997	20	
	Farm area, 1996-1997 to 1998-1999	21	11
Identification of land management problems			
Identification of on-farm land degradation issues	Proportion of farmers reporting weed problems, 1998-1999	22	12
	Proportion of farmers reporting soil acidity problems, 1998-1999	23	13
	Proportion of farmers reporting significant land or water degradation, 1998-1999	24	14
	Proportion of farmers reporting dryland salinity problems in 1998-1999	25	15
	Proportion of farmers reporting irrigation salinity problems in 1998-1999	26	16
	Proportion of farms reporting a documented farm plan or Property Management Plan in 1998-1999	27	17
	Sustainable practice		
	Proportion of farms reporting undertaking Landcare related work, 1998-1999	28	
	Cropping management practices, 1998-1999	29	18
Social and institutional contact as sources of change			
Contact with Landcare and similar groups	Membership of Landcare, 1998-1999	30	19
Time spent in land management group participation	Length of Landcare membership (longest serving member), 1998-1999	31	20
	Median length of Landcare membership, 1998-1999	32	
Influence of Landcare	Involvement with Landcare influenced farm decisions, 1998-1999	33	21
Remoteness			
Settlement density	Farmer population, 1996	Ref. map (iii)	
Farmer remoteness	Degree of accessibility/remoteness (ARIA), 1996	34	
Other community level indicators			
Socio-economic advantage/disadvantage	Socio-economic index of rural advantage (SEIFA), 1996	35	
	Socio-economic index of socio-economic disadvantage (SEIFA), 1996	36	

A report accompanying this atlas (*Human and Social Aspects of Capacity to Change Sustainable Management Practices: Combined Report for the National Land and Water Resources Audit Theme 6*), discusses the findings in more detail and places them in a broader context of what is known about landholders' ability to change to more sustainable land management practices.

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Social atlas

Age and experience

1. Median age of farmers and farm managers, 1996

- comparisons between urban and rural populations show the average age of rural Australians overall (including farmers) is higher than urban Australians, and is increasing faster
- changes in median or average ages are related to population shifts away from inland Australia towards major cities and the coast, shifts particularly pronounced among 15-24 year-olds
- the increasing age of farmers raises concerns that younger Australians are not entering farming at a high enough rate to replace older farmers or farm managers as they reach normal retirement age
- ABARE data indicate that in 1997-98, the average age of broadacre farmers, including pastoralists, was approximately 54 years, and that they are older than other types of farmers on average
- in 1996, overall median age of farmers and farm managers was 48 years; the map indicates median ages are highest in remote north-western Australia (the Kimberley and Pilbara); parts of south-eastern Western Australia; southern and north-eastern Northern Territory and adjoining western Queensland; and scattered coastal or near-coastal areas in the eastern states
- the median age of farmers and farm managers was considerably higher than 48 years in extensive areas of the pastoral uplands of the Great Dividing Range in Victoria, New South Wales and south eastern Queensland
- farmers generally were considerably younger in central cropping and sheep areas of Western Australia, except in the Great Southern and south west coastal areas and were younger in pastoral South Australia and south west Queensland
- while populations are small in some Statistical Local Areas, older median ages in the northern and western parts of the inland are associated mainly with pastoral properties (cattle producers), and suggest pastoralists' children are not taking over properties as their parents reach retirement age

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data relates to members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager'.

Caveats:

- figures reported are a median farmer age for each SLA; data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census

Related Indicators

Change in median age of farmers and farm managers, 1991-1996 – **Map 2.**

2. Change in median age of farmers and farm managers, 1991-1996

ABS census data show the median age of farmers and farm managers increased from 46 to 48 years between 1991 and 1996, whereas over the same period the average age of the metropolitan population increased by only one year

- median age of farmers and farm managers increased in most of rural Australia, with largest increases mainly in arid and semi-arid inland Australia, and particularly pastoral areas - in many of these areas median age increased by four or more years between 1991 and 1996
- this increase reflects relatively few younger people entering farming and many existing farmers or farm managers remaining on the land, possibly because few alternatives are open to them
- median age decreased in some remote areas of Australia, including Far North Queensland, Tennant Creek and Darwin areas, north-eastern Northern Territory, and several Statistical Divisions in inland Western Australia and South Australia
- reasons for decreases are not clear but they generally occur in sparsely-populated Statistical Local Areas (SLAs) with small numbers of farmers and farm managers areas, or SLAs with more Aboriginal people (on average younger than other Australians) identifying themselves as farmers

Data Source:

Australian Bureau of Statistics (ABS) 1991 and 1996 Population and Housing Census. Data represents members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager'.

Caveats:

- figures reported are a median farmer age for each SLA; data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census
- change in years is calculated as the difference between the 1996 median farmer age and the 1991 median farmer age

Related Indicators

Median age of farmers and farm managers, 1996 – **Map 1**.

3. Change in the population aged 15 to 24 years, 1991-96

- this map depicts change in the size of the population of all 15 to 18 year olds in rural areas between 1991 and 1996
- the 15-24 age group is particularly interesting because it covers the younger generation leaving school, some of whom might be expected to take up farming and eventually inherit parents' farms
- if there are substantial changes in this age group over short periods of time, it suggests increasing numbers of rural 15 to 24 year olds, including farm 15 to 24 year olds, are leaving the area for educational or work opportunities elsewhere, particularly in regional centres and capital cities
- changes in the 15-24 year age group also reflect family sizes and family age structures as they include children growing up and entering this age range for the first time
- there are likely to be important influences from Aboriginal populations in parts of rural Australia, as the Aboriginal populations tends to have a younger age structure than the non-Aboriginal, and may have more children entering this age range over a given period
- there were marked differences between the pastoral zone and the rest of Australia, with percentages generally increasing in pastoral areas (with the exception of two areas of inland Queensland which recorded 50% or more decreases)
- largest increases were mainly in inland Western Australia, the Northern Territory, and south-western Queensland - gains in these remote areas reflect substantial Aboriginal populations and possibly young people seeking temporary work in pastoralism, mining and tourism
- a few scattered areas mainly in eastern Queensland, southern New South Wales, the Upper Murray of South Australia, and south-western Western Australia also showed increases of up to 25%
- throughout most of the less remote regions, the percentage of 15-24 year olds decreased, with greatest decreases mainly in the wheat-sheep belt
- losses of 15-24 year olds in wheat-sheep areas may reflect drought, low commodity prices and perceived poor prospects for these farming operations during the 1990s

Data Source:

Australian Bureau of Statistics (ABS) 1991 and 1996 Population and Housing Census. Data represents members of the population who were aged 15 to 24 years in 1991 and 1996.

Caveats:

- note 15 to 24 year olds are reported as a proportion of the 15 to 24 year old population in 1991

Education and training

4. Farmers aged 14-16 years when their schooling completed, 1996

- farmers and property managers in Australia generally have low levels of formal education compared to many other occupational groups
- in 1996 in most SLAs in Australia at least 55% of farmers were 14-16 years old when they completed their formal education
- in ABARE broadacre and dairy farmer surveys between 1996 and 1999, younger farmers were more likely to have post-secondary education than older farmers
- ABARE's surveys covering all members of farm families indicate that, at least among broadacre and dairy farmers, farmers' spouses have higher average levels of formal education than farmers
- In 1996 the highest percentages of farmers who were 14-16 years old when they completed their education were in northern Western Australia (the Kimberley and Pilbara), inland south-eastern Western Australia, north-central Northern Territory, Bathurst and Melville Islands, northern Eyre Peninsula in South Australia, and western Tasmania
- in Western Australia, these areas correspond closely with areas of highest average ages of farmers and farm managers, and mainly represent pastoralists running cattle stations
- there are relatively high percentages of farmers with this educational level in the inland Northern Territory, Queensland's Gulf Country, and many east coast Statistical Local Areas in Queensland and northern New South Wales - these cover pastoralists, wheat-sheep farmers, and some high rainfall area farmers (dairy farming, horticulture, cropping)

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data represents members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager' and who were 14-16 years of age when they completed school.

Caveats:

- data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census
- the number of farmers who noted they were 14 years, 15 years and 16 years when they completed schooling were aggregated to approximate the equivalent age for having completed the Year 10 Certificate; the proportion of farmers who completed school aged 14-16 years was calculated for each SLA as a proportion of the total farmer population for the SLA

5. Farmers aged 17-18 years when their schooling completed, 1996

- this map shows farmers who completed their education at 17-18 years, and thus are likely to have completed secondary school, but have had no further post-school education
- generally in Australia fewer than 45% of farmers were 17-18 years old when they completed their formal education
- by comparison, the ABARE survey of broadacre properties shows that in 1994-95, 50% of farm owner-managers had completed 1-4 years of secondary school and 23% had completed 5-6 years)
- highest percentages of farmers at this educational level are in central western and south-eastern Western Australia, central and south-central Queensland, north-central New South Wales and the Murray Lands of South Australia, with small pockets in south-west Western Australia, Tasmania and Victoria
- land uses in most of these areas are broad-acre and wheat-sheep farming, pointing to relatively low average levels of formal education among these farmers in these areas
- outcomes are likely to be related to average farmer age (older farmers being less likely overall to have post-secondary education than younger ones), and possibly that farmers in these areas tend to live further from educational institutions than those in more densely settled areas

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data relates to members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager' and who were 17-18 years of age when they completed school.

Caveats:

- data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census
- the number of farmers who reported they were 17 years and 18 years when they completed schooling were aggregated to approximate the equivalent age for having completed the Higher School Certificate; the proportion of farmers who completed school aged 17-18 years was calculated for each SLA as a proportion of the total farmer population for the SLA

6. Farmers with basic vocational qualifications, 1996

- this map shows percentages of farmers who, in 1996, had a basic post-secondary vocational qualification, defined as completing a course lasting one semester to one year full-time (or equivalent), which provided practical skills and knowledge in a particular field
- typically, fewer than 10% of farmers had basic vocational educational qualifications at the time of the 1996 Census
- in the majority of SLAs fewer than 5% of farmers had basic vocational educational qualifications; SLAs where 5-10% of farmers had basic vocational educational qualifications tended to be concentrated in the wheat sheep zone – western slopes area of New South Wales
- the few areas of where more than 10% farmers had these qualifications are SLAs where there are very small populations of farmers (less than 124 farmers per SLA)

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data represents members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager' and who stated they had a basic vocational qualification. Basic vocational qualifications involve courses lasting from one semester to one year full-time (or equivalent) providing practical skills and knowledge for those wanting to work at the operative level in various fields.

Caveats:

- data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census
- the proportion of farmers with a basic vocational qualification was calculated for each SLA as a proportion of the total farmer population for the SLA

7. Farmers with skilled vocational qualifications, 1996

- this map depicts percentages of farmers in 1996 with skilled vocational qualifications, defined as having completed a course lasting two to four years and typically involving on-the-job training for working in a specific vocation, trade or craft that requires a high degree of skill
- relatively few farmers overall fell into this educational category
- highest percentages of farmers with these qualifications (15% or more with skilled vocational qualifications) were in Far North Queensland, south-western Western Australia and scattered Statistical Local Areas mainly west of the Divide in New South Wales, and western Victoria and the Murray Lands of South Australia
- distribution of farmers with these qualifications is likely to be related to locations where relevant training courses are offered, for example TAFE colleges - extensive TAFE networks exist in New South Wales and Victoria because of relatively high population density in higher rainfall areas of these States, and hence larger numbers of potential students

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data represents members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager' and who stated they had a skilled vocational qualification. Skilled vocational qualifications are defined as courses lasting two to four years, and typically involving some on-the-job training, for those wanting to work in a specific vocation, recognised trade or craft that requires a high degree of skill in a range of related activities.

Caveats:

- data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census
- the proportion of farmers with a skilled vocational qualification was calculated for each SLA as a proportion of the total farmer population for the SLA

8. Farmers with higher qualifications, 1996

- this map shows the percentage of farmers who at the time of the 1996 Census had obtained a university qualification
- educational levels are important to farm profitability and uptake of new land management practices
- ABARE 1994-95 data on broadacre and dairy farmers show that only 10% of farm owner-managers had tertiary qualifications (there were marked gender differences as only 9% of male owner-managers had these qualifications whereas 42% of females did, but female owner-managers made up only 3% of the sample)
- ABARE found that 16% of owner-managers in the sheep and beef industries had completed tertiary education, but percentages were lower for farmers in other broadacre industries and dairying
- highest percentages of farmers with university qualifications were in the Kimberley and Geraldton areas of Western Australia, northern part of the Northern Territory, south-western Queensland, near Canberra and Albury-Wodonga, in the Whyalla and Murray Lands areas of South Australia, and Hobart and Launceston areas of Tasmania
- while population sizes in some areas were low, this distribution appears to be closely related to farmers' proximity to university campuses in regional centres and capital cities

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data represents members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager' and who stated they had a higher qualification. Higher qualifications were calculated by summing the number of farmers with the following qualifications: higher degree, postgraduate diploma, bachelor degree, undergraduate diploma, associate diploma.

Caveats:

- data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census
- the proportion of farmers with a higher qualification was calculated for each SLA as a proportion of the total farmer population for the SLA

9. Participation in any courses or training activity, 1996-1997 to 1998-1999

- continuing education throughout life is linked to farm profitability, and one study found that farm incomes tend to be higher as farmer participation in training increases
- an analysis of the most recent ABARE Resource Management Survey indicates that recent participation in training activities is frequently associated with higher adoption of sustainable management practices
- highest participation rates (more than 80%) were in Queensland's Northern Statistical Division (near educational facilities in the regional centres of Charters Towers and Townsville), Loddon and Barwon areas of Victoria (near Melbourne, Geelong and Bendigo), and the Southern Division of Tasmania (near Hobart)
- other areas with high participation rates were Mackay in Queensland, the Lower Great Southern and South West in Western Australia, Gippsland, the Murray Lands and the South East in South Australia.
- lowest participation rates were in the Northern Territory; south-western, Far North and south-eastern Queensland; western and northern South Australia; and Upper Great Southern Division of Western Australia
- low participation rates in some areas, but not all, may be explained by remoteness and distance from educational institutions
- participation was low in many pastoral areas, and the older average age of pastoralists and their higher existing levels of formal education may be relevant in explaining reluctance to undertake further training

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey 1996-1997, 1997-1998, 1998-1999 (Resource Management Supplementary Survey). Data relates to the proportion of farms surveyed indicating participation in any course/training in the three years July 1996 to June 1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Farm financial characteristics

10. Median farm family income, 1996

- figures on this map show median annual farm family incomes calculated from responses to the 1996 Census - farm family income includes income from all sources earned by all members of the family living on-farm, including government social service and exceptional circumstances payments
- off-farm income is generally easier for farm families to obtain in areas closer to towns and regional centres where jobs are available in sectors such as retail, education, health, personal services and government – off-farm income can help buffer farm families against changes in on-farm income due to drought or other adverse seasonal conditions
- highest median incomes (more than \$80,000) were earned by farm families in part of the western Pilbara of Western Australia, north-eastern and central-eastern Northern Territory, and central western Tasmania - most of these areas show income from large pastoral properties, but the areas near Port Hedland in Western Australia's Pilbara and Queenstown in Tasmania probably indicate income from mining-related work
- families earned \$60,000-\$80,000 in Western Australia east of Perth, the Shark Bay area, the central inland and the Kimberley; near Townsville in Far North Queensland; and a small area on Melbourne's eastern outskirts
- incomes ranged between \$20,000 and \$60,000 throughout most of the pastoral, wheat-sheep and intensive agriculture zones
- lowest incomes (less than \$20,000) were recorded in Western Australia east of Shark Bay, the inland Pilbara and adjoining area of central western Northern Territory; and parts of inland Queensland
- low incomes in parts of inland Western Australia, the Northern Territory and Queensland may reflect drought conditions that caused de-stocking of some pastoral properties in 1995-96

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data relates to members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager'.

Caveats:

- figures reported are a median income for each SLA; data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census

Related Indicators

Annual family income, 1996-1997 to 1998-1999 – **Map 11.**

11. Annual family income, 1996-1997 to 1998-1999

- total farm family income includes income from all sources (both on-farm and off-farm), not only farming returns, and is given here as a three-year average based on ABARE survey data (ABARE refers to this measure as farm family income)
- values depicted are at the level of Statistical Divisions and some values have high standard errors so need to be interpreted with caution
- there were relatively high total incomes in the Central and Midlands areas of Western Australia; the Northern, Mackay and Fitzroy areas of Queensland; the Far West of New South Wales; and Victoria's Loddon and Barwon areas
- high on-farm farm incomes tend to be related to property sizes, with returns from large pastoral properties higher than from small farming operations - this is confounded by the fact that pastoral properties are in more remote and sparsely settled regions where few opportunities may exist for family members to earn off-farm income
- lowest total incomes for the period 1996-97 to 1998-99 were in the contiguous areas of south-eastern New South Wales and eastern and north eastern Victoria, and in the Wide Bay - Burnett area of Queensland,
- relatively low total incomes in parts of the pastoral and wheat-sheep zones were related to low commodity prices (particularly wool), drought (particularly in central-western and northern Queensland), and lack of off-farm employment opportunities
- due to drought, many farm families received financial assistance from State or Commonwealth Government during this period, raising total incomes significantly

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data relates to the proportion of broadacre and dairy farms surveyed indicating average annual family income over the three years 1996/1997, 1997/1998 and 1998/1999. Family share of farm income plus any wages (that are included as farm costs for taxation assessment) paid to owner manager, spouse and dependent children plus all off-farm income of owner manager and spouse. Family share of farm income is share of net farm business income of owner manager, spouse and dependent children. Net farm business income is farm cash income plus change in trading stocks less depreciation less any wages (that are included as farm costs for taxation assessment) paid to the owner manager's family and other family members.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Median family income, 1996 – **Map 10.**

12. Annual farm cash income, 1996-1997 to 1998-1999

- annual farm cash income is defined as the difference between *total cash receipts* from the farm business and *total cash costs* incurred by the business - it is shown here as a three year average as for Maps 10 and 11;
- the income data reported is for farms run by owner managers and excludes properties in corporate ownership
- many figures underlying this map have high standard errors due to small sample sizes, so interpretations need to be carefully qualified
- the map shows marked regional differences, but also reflects property sizes with areas dominated by large pastoral properties tending to have highest average annual incomes
- there were apparent exceptions to the property size effect in the Northern Territory, Central West and Far North Queensland - the last two are probably due to the effects of drought over this period
- in the Northern Territory, low cash incomes reflect the fact that family-owned pastoral properties tend to be small as compared with pastoral properties elsewhere - any larger cattle stations in the Northern Territory are corporately-owned and not included in these figures
- farms in many coastal and near coastal areas in southern Queensland, New South Wales, western Victoria and the Adelaide region of South Australia earned low farm cash incomes (less than \$30,000)
- in some coastal areas, low farm incomes may relate to the fact that the farming business is often of a smaller scale and a substantial part family income is coming from off-farm sources

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data represents the proportion of broadacre and dairy farms surveyed indicating average annual farm cash income over the three years 1996/1997, 1997/1998 and 1998/1999. Farm cash income is defined as the difference between total cash receipts from the farm business (total revenues received) and total cash costs incurred by the business (payments made by the farm business for materials and services, which includes debt repayments and permanent/casual labour costs).

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Off-farm income, 1996-1997 to 1998-1999 – **Map 13.**

Profit at full equity, 1996-1997 to 1998-1999 – **Map 14.**

13. Off-farm income, 1996-1997 to 1998-1999

- the map shows a three-year average (1996-97, 1997-98, 1998-99) for off-farm income earned by farm families - including income from off-farm wages and salaries, other businesses, investments and government assistance payments
- off-farm income of farm households has generally increased each year in real terms between 1984 and 1994; off-farm wages and salary earnings are of most importance to farm households with relatively small incomes
- off-farm incomes as a proportion of farm family income fluctuate between years depending the level of farm cash income
- in 1994-95 (a year in which many broadacre business were affected by drought) almost two in five broadacre families earned off-farm wages and salaries contributing an estimated 59% of total household income for these families
- off-farm income tends to be higher where female partners or other family members are able to contribute to family income by working in local towns (for example in retail, education, health, and local government sectors)
- off-farm income tends to reflect distances from population centres, with ABARE data indicating that spouses of owner-operators who live near rural and remote townships earn higher average off-farm wages or salaries than those living further away
- highest average off-farm incomes were earned by families in the South West of Western Australia, Northern Territory, Far North Queensland, Central West of New South Wales and Loddon area of central Victoria
- in South West Western Australia and Far North Queensland, high off-farm income may reflect tourism-related activities in these popular areas
- off-farm income may have an important bearing on farm families' ability to spend on improving land management practices and addressing land degradation

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data represents the proportion of broadacre and dairy farms surveyed indicating average annual off-farm income over the three years 1996/1997, 1997/1998 and 1998/1999. Off-farm income is defined as the off-farm income of the owner manager and spouse only, is based on a three-year average, and includes income from wages, other businesses, investment and social welfare payments

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

14. Profit at full equity, 1996-1997 to 1998-1999

- this map shows three-year averages for profit at full equity, defined as farm business profit, *plus* rent, interest and finance lease payments, *less* depreciation on leased items - it measures return on all resources used in the farm business
- farm profit may relate to farm families' ability to address land management problems and improve their farm's ecological sustainability
- highest average farm profits at full equity (\$50,000 or greater) were in Western Australia's Central Division and adjoining Midlands; Northern, Mackay and Fitzroy areas of Queensland; and New South Wales Far West; (except for Victoria, this is a similar grouping as for annual family income)
- over the three year period average farm losses of more than \$8,000 were recorded in Far North Queensland, the Wide Bay - Burnett area, Hunter region, south-eastern New South Wales and adjoining areas of eastern Victoria, Victorian Central Highlands, and Adelaide region of South Australia

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data represents the proportion of broadacre and dairy farms surveyed indicating average annual profit at full equity over the three years 1996/1997, 1997/1998 and 1998/1999. Profit at full equity is defined as farm business profit (farm cash income plus changes in trading stock less depreciation less imputed labour costs for family labour), *plus* rent, interest and finance lease payments, *less* depreciation on leased items. It reflects the return on all resources in the farm business.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Annual farm cash income, 1996-1997 to 1998-1999 – **Map 12.**

15. Total household expenditure, 1998-1999

- total household expenditure is likely to be directly related to annual family income (on- and off-farm) and to reflect farm families' disposable income to some degree, as well as relative costs in different areas of Australia
- household expenditure is likely to be affected by remoteness, with farm families in remote locations needing to spend more on travel (vehicles, fuel, air fares or private aircraft), and likely to be paying higher prices for goods and services than families in more densely settled areas
- farm families in remote areas are also likely to spend substantial amounts on children's education, with many children from pastoral families boarding away from home to attend schools, colleges or universities in regional centres or capital cities
- size and composition of farm households (particularly number of dependent children) is likely to be a factor influencing total household expenditure
- from this map, total expenditure was highest (more than \$50,000) on average in the pastoral and sheep-wheat zones (with the notable exceptions of the Kimberley and South Eastern areas of Western Australia, where expenditure is extremely low)
- other low expenditure regions (less than \$20,000) were the Northern and Mackay areas of Queensland, north-eastern New South Wales, the Illawarra, southern Tasmania and areas in eastern and central Victoria - this may reflect the fact that these are mainly well-serviced areas where costs of goods and services are comparatively lower

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data represents the proportion of broadacre and dairy farms surveyed indicating level of household expenditure in the year 1998/1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

16. Level of farm debt, 1996-1997 to 1998-1999

- farm debt includes all liabilities related to the farm business which appear on balance sheets in financial accounts - this includes the farm mortgage, other term loans, business overdrafts, fully drawn advances, amounts owed to creditors and hire purchases related to the farm enterprise
- farm debt levels are related to property size as large pastoral properties, for example, are usually much more valuable than small properties in more intensive agricultural areas, and so pastoral enterprises are likely to have larger mortgages
- debt levels are influenced by need to borrow to offset farm losses, and to fund property expansion or new equipment purchases
- land values in different regions are a major factor influencing size of mortgages
- highest debt levels occurred in Western Australia's South Eastern region, Northern Territory, across central Queensland and in Victoria's Barwon area
- average debt levels were comparatively high (\$225,000 or more) in most of Western Australia for which data is available, with the exception of the extreme south-west
- debt levels were relatively low (\$75,000-\$150,000) in Far North and south-eastern Queensland; Far West and south-eastern New South Wales; and much of inland Victoria and South Australia

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data relates to the proportion of broadacre and dairy farms surveyed indicating level of farm debt over the three years 1996/1997, 1997/1998 and 1998/1999. Farm debt includes all liabilities related to the farm business which appear on balance sheets in financial accounts - this includes the farm mortgage, other term loans, business overdrafts, fully drawn advances, amounts owed to creditors and hire purchases related to the farm enterprise.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Farm equity ratio, 1996-1997 to 1998-1999 – **Map 17.**

Farms with equity ratio less than 80%, 1996-1997 to 1998-1999 – **Map 18.**

17. Farm equity ratio, 1996-1997 to 1998-1999

- farm business equity is the value of owned (total) capital *less* farm business debt as measured at 30 June each year, and the farm equity ratio is calculated as farm business equity as a percentage of owned (total) capital
- equity ratios may be affected by need to borrow to cover operating losses or for new farm investments, and may also be affected by changes in land values - most recent increases in debt among broadacre farmers have occurred to fund new investments
- overall equity ratios for the broadacre industries are relatively high; there are some exceptions in pastoral areas with extended experience of poor seasonal conditions and low wool prices
- in cropping industries, rising land values in many areas (increasing the value of owned capital) have led to higher farm equity
- the dairy industry is notable in having shown decreases in equity during much of the 1990s due to borrowing for farm expansion and new technology
- high equity ratios (90-100%) were seen in south-west Western Australia, Far North Queensland, the Brisbane area, New South Wales coast and Far Western New South Wales, Ovens-Murray and Central Highlands of Victoria, and throughout South Australia except the Upper and Lower South East and Eyre Peninsula
- equity ratio was lower (below 85%) in much of inland Australia reflecting the higher debts and possibly lower land values in pastoral areas in much of the inland, especially northern Australia - exceptions are South Australia and the New South Wales Far West
- lowest ratios (less than 80%) occurred in Western Australia's South Eastern Division, Central West Queensland, and the Loddon and Barwon areas of Victoria - the last two have relative small numbers of farms in the survey and the estimates are likely to be less reliable

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data represents the proportion of broadacre and dairy farms surveyed indicating average annual farm equity ratio over the three years 1996/1997, 1997/1998 and 1998/1999. Farm equity is defined as the value of owned capital *less* farm business debt. Farm equity ratio is calculated as farm business equity as a percentage of owned (total) capital.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Level of farm debt, 1996-1997 to 1998-1999 – **Map 16.**

Farms with equity ratio less than 80%, 1996-1997 to 1998-1999 – **Map 18.**

18. Farms with an equity ratio of less than 80 per cent, 1996-1997 to 1998-1999

- a farm equity ratio of 80% is often considered a 'trigger point' in measuring farm resilience in the face of changes farm income - farms with 80% or less equity are seen as being vulnerable to downturns in farm income
- farms with 80% or less equity are seen as being likely to have potential difficulty in servicing debt in adverse seasons or when commodity prices are low
- the map depicts a three-year average for percentages of farms with an equity ratio of *less* than 80%, by Statistical Local Areas
- areas where more than 50% of farms had less than 80% equity were concentrated in Queensland's Northern, Central West and Fitzroy Statistical Local Areas; and the Mallee and Barwon areas of Victoria
- fewer than 10% of farms had less than 80% equity in widely scattered areas including the Far North and the Morton areas of Queensland; the Richmond-Tweed and Illawarra regions of New South Wales; and the Ovens-Murray area of north-eastern Victoria
- overall, there was some tendency for lower percentages of farms with less than 80% equity to be in coastal areas of southern and south-eastern Australia, with higher percentages in many parts of the inland, and in Western Australia
- lower equity ratios and higher borrowing levels may be of less concern in parts of Western Australia because of the generally greater reliability of the climate, particularly in south-western Western Australia, hence more reliable farm incomes and less risk of being unable to service debt

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data relates to the proportion of broadacre and dairy farms surveyed indicating an average annual farm equity ratio of less than 80% over the three years 1996/1997, 1997/1998 and 1998/1999. Farm equity is defined as the value of owned capital *less* farm business debt. Farm equity ratio is calculated as farm business equity as a percentage of owned (total) capital.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500
- data are only for those farms with less than 80% equity ratio

Related Indicators

Level of farm debt, 1996-1997 to 1998-1999 – **Map 16.**

Farm equity ratio, 1996-1997 to 1998-1999 – **Map 17.**

Farm family characteristics

19. Farm families with dependent children, 1996

- dependent children are an important factor in influencing farm families' income needs and expenditure patterns
- many farm families in more remote areas spend considerable sums of money on children's education, particularly when children board away from home to attend schools, colleges or universities in capital cities or regional centres – this raises these families' income needs
- dependent children are an indicator of family life cycle stage and relate to parents' age as well as influencing considerations about inter-generational transfer of family farms
- highest proportions of farm families with dependent children (more than 60%) were recorded in one small area on Melbourne's eastern outskirts, in the Midlands area of Western Australia, and in south-western Queensland
- lowest percentages (less than 20%) were recorded in south-eastern Western Australia, a small area south-east of Perth, and parts of the Kimberley and Pilbara; south of Darwin and in the southern part of the Northern Territory; the western section of Queensland's Gulf Country; south-eastern New South Wales south of Canberra; and north-eastern Eyre Peninsula in South Australia
- some areas with low percentages correspond with areas where median ages of farmers and farm families are higher (for example south-eastern Western Australia, the Pilbara and southern Northern Territory), suggesting many children in these areas have reached adulthood and ceased to be dependent

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data represents members of the population who classified themselves as having an occupation of 'Farmer' or 'Farm Manager'. Dependent children are defined as the number of children under 15 years of age plus those aged 15-24 years pursuing full-time education. Farm families are defined as such if at least one family reference person lists their occupation as 'farmer'/'farm manager'.

Caveats:

- figures reported are a median income for each SLA; data are for self described Farmer/Farm Managers and vary from that used to describe Farm under the Agricultural Census

Farm structure

20. Median Estimated Value of Agricultural Operations (EVAO), 1996-1997

- estimated value of agricultural operations (EVAO) is a measure of the value of the annual production of a farm business, estimated from physical livestock and crop information provided in the Agricultural Census and three-year weighted average prices derived from the Farm Financial Survey
- the map shows how the value of agricultural operations is strongly related to property sizes, with pastoral properties generally being much larger than properties in the wheat-sheep, cropping and intensive agriculture zones
- average property sizes have changed over recent decades - ABARE data show a trend towards fewer and larger farming operations, with the percentage of small farms (EVAO less than \$80,000) in 1997 substantially lower than in 1987
- a characteristic of Australian agriculture is the very large disparity in farm size (measured here by EVAO) between different regions
- median EVAOs were highest in pastoral areas, particularly the arid and semi-arid interiors of Western Australia, Northern Territory, South Australia and western Queensland - these areas have extremely large cattle and sheep stations with low stocking rates
- around the fringes of high EVAO areas were pastoral and wheat-sheep operations with slightly smaller capacity with values between \$160,000 and \$320,000
- operations in more intensively settled high rainfall areas of the eastern states and Western Australia's south-west had average EVAO's less than \$160,000
- the distribution of value of agricultural operations greater than \$30,000 is flat or rectangular but is skewed at the upper end, above \$200,000, with smaller numbers of properties with very high EVAOs

Data Source:

Australian Bureau of Statistics (ABS) 1996/1997 Agricultural Census. Data represents median farm Estimated Value of Agricultural Operations (EVAO) in 1996/97.

Caveats:

- figures reported are EVAO for each SLA
- data are only included for farms with an EVAO of more than \$5,000 per annum

Related Indicators

Farm area, 1996-1997 to 1998-1999 – **Map 21**.

21. Farm area, 1996-1997 to 1998-1999

- farm size has a marked effect on income from the farming operation, with larger farm businesses generally being more profitable than smaller ones – however, small farms (which tend to be in less remote areas) on average have much higher off-farm incomes
- this map shows average property sizes are very much larger (greater than 5,000 ha) in the pastoral zone than they are elsewhere in Australia
- of the regions for which data are available (excluding the Kimberley and Pilbara), average farm areas were largest in the Northern Territory, which is dominated by cattle stations
- farm sizes also tended to be large (more than 5,000 ha) throughout most of Queensland, including all coastal areas north of the Wide Bay-Burnett region as well as the inland
- by contrast, more intensive types of farming (of less than 5,000 ha) are not well differentiated on this map; average farm sizes were less than 5,000 ha throughout the better-watered cropping and dairying areas and much of the wheat-sheep zone
- farm sizes uniformly averaged less than 5,000 ha throughout Tasmania

Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey (3 year average). Data relates to the average farm area (hectares) of those broadacre and dairy farms surveyed over the three years 1996/1997, 1997/1998 and 1998/1999.

Caveat:

- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Median farm Estimated Value of Agricultural Operations (EVAO), 1996-1997 – **Map 20.**

Identification of land management problems

22. Proportion of farms reporting weed problems, 1998-1999

- this is a measure of weed problems as perceived by farmers – their perceptions of the severity of weed problems may differ from other scientific assessments, and are likely to be focused on weeds that are significant problems for the farming enterprise, not environmental weeds *per se*
- overall, relatively high percentages of farms reported weed problems and there were few areas where the percentage was below 10%
- weed problems were reported by 15% or more of farms throughout the pastoral zone where data were available
- weed problems on pastoral properties reflect the fact that grazing is mainly on native pastures, and many pastoralists consider encroaching native woody shrubs and shrub regrowth to be a weed problem as it reduces grass available for stock and makes property access more difficult – this is particularly the case in western New South Wales and inland Queensland
- lowest percentages of farmers reporting weed problems were in south-eastern Queensland and adjoining north-eastern New South Wales, central west New South Wales, the Wimmera and Goulburn areas of Victoria, The Eyre Peninsula of South Australia and the south west of Western Australia.

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary Survey). Data relates to the proportion of farms surveyed that reported significant weed problems in 1998-1999.

Caveats:

- while ABARE sample is based on a number of ‘farms’ it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Proportion of farms reporting significant land or water degradation, 1998-1999 – **Map 24.**

23. Proportion of farms reporting soil acidity problems, 1998-1999

- this is a measure of soil acidity problems as perceived by farmers – their perceptions of soil acidity problems may differ from other scientific assessments
- soil acidity is a land management problem in that inhibits vegetation growth and makes soil less suitable for growing pastures and some crops – it is a consequence of imbalances in the soil nitrification process which causes changes in the availability of soil nutrients to plants
- high soil acidity problems, typically in more intensively farmed grazing and cropping areas, were reported in Mid North Coast and Central West of New South Wales, Gippsland and East Gippsland areas of Victoria, and the Central and Midlands areas of Western Australia
- few farms in the Northern Territory, Queensland, Tasmania or South Australia reported acidity problems

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary Survey). Data relates to the proportion of farms surveyed that reported significant soil acidity problems in 1998-1999.

Caveats:

- while ABARE sample is based on a number of ‘farms’ it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Proportion of farms reporting significant land or water degradation, 1998-1999 – **Map 24.**

24. Proportion of farms reporting significant land or water degradation, 1998-1999

- this is a measure of significant land or water degradation problems as perceived by farmers – their perceptions of land or water degradation problems may differ from other scientific assessments
- this map shows a more general interpretation of land and water problems reported on Australian farms, which could include weeds, salinity, soil, wind or water erosion and soil acidity
- 15% or more farms in nearly all areas of Australia reported experience of one or more land degradation problems
- highest percentages (>50%) were reported in Western Australia's Lower Great Southern, Midlands and Central areas; Queensland's Northern and Mackay areas; the Northern, Hunter and South Eastern areas of New South Wales; and the East Gippsland area of Victoria
- low percentages of farms (<15%) reported significant problems in Far North Queensland and Western and Southern Tasmania

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary Survey). Data relates to the proportion of farms surveyed that reported significant land or water degradation problems in 1998-1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

25. Proportion of farms reporting dryland salinity problems, 1998-1999

- this is a measure of dryland salinity problems as perceived by farmers – their perceptions of dryland salinity problems may differ from other scientific assessments
- dryland salinity is the most extensive type of salinity problem experienced on Australia's farms
- highest percentages (>20%) of farms reporting this problem were in Western Australia's wheat-sheep areas in the Midlands (>35% of farms) and Lower Great Southern regions; Central West of New South Wales; and the Mallee and Loddon areas of central and western Victoria
- in areas of Queensland, north-eastern and southern New South Wales where scientific assessments indicate potential salinity hazard, salinity was not recognised as a problem on farms
- areas with higher percentages of farms reporting dryland salinity correspond reasonably closely with cereal cropping areas in southern Australia, with the exception of north-eastern New South Wales and Queensland where high summer rainfall helps prevent this problem occurring
- very few farms (<5%) reported dryland salinity problems in Queensland, southern New South Wales, eastern Victoria or Tasmania
- dryland salinity was not reported as a significant problem in Tasmania due to a lower rate of native vegetation clearing and less-saline groundwater than southern mainland Australia
- areas in Western Australia, Victoria, South Australia and central New South Wales where 10% or more of farmers indicated they had dryland salinity problems have been identified as 'indicative priority regions' in the *National Action Plan for Salinity and Water Quality*, suggesting farmers' perceptions match reasonably well with judgements made in scientific assessments

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary Survey). Data relates to the proportion of farms surveyed that reported significant dryland salinity problems in 1998-1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Proportion of farms reporting significant land or water degradation, 1998-1999 – **Map 24**.

26. Proportion of farms reporting irrigation salinity problems, 1998-1999

- this is a measure of irrigation salinity problems as perceived by farmers – their perceptions of irrigation salinity problems may differ from other scientific assessments
- irrigation salinity presents one of the most serious problems experienced on Australia's irrigation farms
- irrigation salinity results when irrigation water run-off raises natural water tables and brings salty groundwater to the surface, where it can severely inhibit plant growth
- the areas of significant irrigation salinity reported by farms are in the lower Murray Darling Basin of New South Wales and in northern Victoria
- the most serious areas of reported irrigation salinity, reported by more than 20% of farms, are in the Loddon Valley of Victoria, followed – in order of seriousness – by the lower Murray and Goulburn areas of Victoria
- 5% of farms in the Murray Division of New South Wales also reported irrigation salinity problems
- awareness that irrigation salinity problems exist on their properties may indicate that farmers are favourably disposed to undertaking remedial action, provided resources and appropriate methods are available to them

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary Survey). Data relates to the proportion of farms surveyed that reported significant irrigation salinity degradation problems in 1998-1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Proportion of farms reporting significant land or water degradation, 1998-1999 – **Map 24.**

27. Proportion of farms reporting a documented farm plan or property management plan, 1998-1999

- the relatively high standard errors for values in many regions means this map must be interpreted cautiously
- developing a farm plan or property management plan could indicate that farmers or farm families are adopting an informed and professional approach to the farm business, and are considering long-term planning horizons
- existence of a farm plan or property management plan is likely to indicate that the farmer (or other members of the farm family) have received training or professional assistance in land management and farm business planning
- professional training or assistance in farm planning, and development of property management plans, could increase the likelihood that farms will be managed in an ecologically sustainable way
- highest percentages of farms reporting having a property management plan (>50%) were recorded in the North West and Mackay regions of Queensland, and the Barwon area of Victoria
- percentages were low (<20%) in the Northern Territory; Queensland's Far North, Northern and Wide Bay-Burnett areas; the Richmond-Tweed, Mid-North Coast, North Western and Murrumbidgee areas of New South Wales; Victoria's Ovens-Murray, East Gippsland, and Western District areas; and the Outer Adelaide region in South Australia

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey 1998-1999 (Resource Management Supplementary). Data refers to the proportion of broadacre and dairy farms surveyed that reported having a property management plan or documented farm plan in the period 1998-1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Sustainable practice

28. Proportion of farms reporting undertaking Landcare related work, 1998-1999

- percentages of farms carrying out Landcare-related work might be expected to be related to Landcare membership and possibly to reflect farmers' willingness to address land degradation problems percentages (in fact there is a strong correspondence with the spatial distribution of reported significant land or water degradation - Map 24)
- awareness of land degradation issues as a result of Landcare's influence is not the same as acting on these issues – this question aims to identify farms where action has been taken action as a result of Landcare's influence
- map percentages are not necessarily easy to interpret because the *need* for Landcare-related work in each area is a factor that needs to be taken into account as well as farmer participation levels – in areas with few land degradation problems, no work may be needed
- highest percentages (74-92%) of farm undertaking this work were recorded in the Mackay area of Queensland, Northern and Murray areas of New South Wales, and the Yorke and Lower North area of South Australia
- lowest percentages (35% or less) occurred in most of northern and inland Queensland, north-eastern and south-eastern New South Wales, south-eastern Tasmania, and Eyre Peninsula in South Australia

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary). Data relates to the proportion of broadacre and dairy farms surveyed that reported undertaking some form of Landcare related work in the period 1998-1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

29. Cropping management practices, 1998-1999

- this map depicts the range of cultivation practices used by cropping farms in each relevant Statistical Local Area during 1998-99, as reported in ABARE farm surveys - practices are as described by farmers themselves
- data depicted relate only to cropping practices, not to other types of farming, and hence are relevant mainly to farmers in the wheat-sheep zone, not pastoral or intensive agriculture areas
- the circles show relative proportions of farms in each area using the cropping practices described in the legend
- farmers adhering to traditional cultivation practices might be expected to be more resistant to change and less willing to adopt new innovations; whereas farmers adopting newer tillage practices (including minimum tillage and direct drilling) may be more willing to change
- conservation tillage practices requiring less soil cultivation (including minimum tillage and direct drilling) are seen as more sustainable than traditional practices as they lessen likelihood of soil erosion and help retain soil structure
- adoption of new cropping practices may require significant investment in new farm machinery and so may be difficult for farmers in poor financial circumstances to afford
- cropping practices are likely to be influenced by farmers' perceptions of soil and climatic factors, as well as by social norms and traditions prevailing in particular farming communities and farming families
- the map indicates that many Western Australian farms used direct drilling techniques, with these techniques generally being favoured by a higher proportion of farms in Western than eastern Australia
- with the exception of farms in the Murray Lands area, more than 50 % of South Australian farms reported the adoption minimum tillage and direct drilling techniques
- in much of southern Queensland, inland New South Wales, and throughout Victoria, there were relatively high proportions of farms (usually 50% or more in each area) reporting the use of traditional cultivation techniques

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary). Data relates to the proportion of cropping farms surveyed that reported sowing by direct drilling, minimum tillage or traditional cultivation in the period 1998-1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500
- cropping farms may use several sowing/cultivation methods in the same season

Social and institutional contact as sources of change

30. Membership of Landcare, 1998-1999

- the community Landcare movement, which began in Victoria in 1986, has been very successful and it is estimated that 37% of broadacre and dairy farms in Australia had a family member who belonged to a Landcare group in 1998-99
- surveys show that Landcare members tend to come from larger and less-intensively cropped farms, with more livestock, higher levels of farm cash income, and higher rates of return on farm business capital
- recent estimates suggest that there are now more than 4,000 community Landcare groups operating in Australia
- Landcare groups form an important communication network for farmers to exchange information about problems affecting their properties, and potential solutions
- estimates of membership of landcare recorded on this map are based on an ABARE survey; many percentages have high standard errors and are based on small samples, so should be interpreted with caution
- areas where more than 60% of farms had a member belonged to a landcare group occurred in Western Australia's Central, Midlands, and Lower Great Southern areas; the Northern Territory; and the Northern and Mackay areas of central-eastern Queensland – all of these are estimates based on small samples
- membership was low (less than 30%) in Western Australia's extreme south-west; Far North and southern Queensland; much of northern New South Wales; most of South Australia with the exception of Eyre and Yorke Peninsulas and the Adelaide region; and western Tasmania

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary). Data relates to the proportion of broadacre and dairy farms surveyed which reported a property representative was a member of Landcare in the period 1998-1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Length of Landcare membership (longest serving member), 1998-1999 – **Map 31.**

Median length of Landcare membership, 1998-1999 – **Map 32.**

Involvement with Landcare influenced farm decisions, 1998-1999 – **Map 33.**

31. Length of Landcare membership (longest serving member on farm property), 1998-1999

- length of Landcare membership may relate to farmers' and farm families' awareness of and willingness to address land degradation problems if Landcare members have higher awareness and greater commitment to a land stewardship ethic
- taking action on problems requires motivation, financial incentives and appropriate skills and resources as well as favourable attitudes and awareness
- average Landcare membership was longest (8-10 years) in the Northern Territory, Queensland's Far North and the Gippsland area of eastern Victoria
- slightly shorter average lengths (6-8 years) were seen in areas extending from Western Australia's Upper Great Southern, Midlands and Pilbara regions; Queensland's Mackay region; the New South Wales Far West; all of Victoria for which data were available; Tasmania's Northern area; to South Australia's Murray Lands and Northern areas
- membership lengths averaged 4-6 years for the remaining areas for which data were available

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary). Data relates to the length of Landcare membership of the longest serving Landcare member on a farm property.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500
- only includes farms with a property representative who was a Landcare member in 1998-99

Related Indicators

Membership of Landcare 1998-1999 – **Map 30**.

Median length of Landcare membership, 1998-1999 – **Map 32**.

Involvement with Landcare influenced farm decisions, 1998-1999 – **Map 33**.

32. Median length of Landcare membership, 1998-1999

- community Landcare started in 1986 and lengthy membership periods could be an indication of farmers' commitment to the movement and its stewardship ethic
- lengthy membership could be an indicator of awareness of and preparedness to act to remedy land degradation problems and adopt sustainable management practices, but clear links between attitudes and behaviour are often difficult to demonstrate
- highest membership periods (8-10 years) were reported in the Northern Territory; Queensland's Northern and Wide Bay-Burnett areas; the Murray area of southern New South Wales; Victoria's Ovens-Murray, East Gippsland and Barwon areas; and South Australia's Murray Lands
- in all other areas for which data were available, median membership length ranged from 2 to 8 years

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary). Data relates to the proportion of broadacre and dairy farms surveyed reporting a property representative was a member of Landcare in the period 1998-1999 and fell within the median (50 per cent quartile).

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500
- only includes farms with a property representative who was a Landcare member in 1998-99

Related Indicators

Membership of Landcare 1998-1999 – **Map 30.**

Length of Landcare membership (longest serving member), 1998-1999 – **Map 31.**

Involvement with Landcare influenced farm decisions, 1998-1999 – **Map 33.**

33. Involvement with Landcare influenced farm decisions, 1998-1999

- the map shows percentages of farms where farmers reported in ABARE surveys that their on-farm decision-making was influenced by the Landcare movement
- higher percentages could indicate that farmers in these areas are more receptive to Landcare messages and the stewardship ethic promoted by the movement
- one survey found that 59% of broadacre and dairy farmers participated in at least one Landcare training activity in the three years to June 1996, and this training could influence farm decision-making even among farmers who are not Landcare group members
- there are high standard errors for some map percentages and small sample sizes in some Statistical Divisions, indicating need for caution in interpretation
- highest percentages (>than 80%) were recorded in Western Australia's Central and Lower Great Southern regions, the Central West of Queensland, Victoria's Ovens-Murray area, and throughout South Australia except for the Eyre region and the Murray Lands (no data were available for the last region)
- high percentages correspond with pastoral and intensive agriculture areas, but percentages are generally in the mid-ranges (between 50 and 80%) over much of the wheat-sheep zone for which data were available
- lowest percentages (<50%) were recorded in Western Australia's South West and Midlands; the Northern Territory; Queensland's Mackay and South West areas; and Victoria's East Gippsland, Western District and Mallee areas

Data Source:

Australian Bureau of Agricultural and Resource Economics (ABARE) Annual Farm Survey, 1998-1999 (Resource Management Supplementary). Data relates to the proportion of broadacre and dairy farms surveyed where it was reported that involvement with Landcare had influenced farm decisions in the period 1998-1999.

Caveats:

- while ABARE sample is based on a number of 'farms' it was assumed for the purposes of the project that a farm equated to a farmer/farm manager
- ABARE farm survey is based on establishments with a minimum annual estimated value of agricultural operations of \$22,500

Related Indicators

Membership of Landcare 1998-1999 – **Map 30**.

Length of Landcare membership (longest serving member), 1998-1999 – **Map 31**.

Median length of Landcare membership, 1998-1999 – **Map 32**.

Remoteness

34. Degree of accessibility/remoteness (ARIA), 1996

- ARIA is a measure of remoteness from services, and is calculated for each of 11,338 population centres using a weighted index of each centre's road distance to service centres in four categories (a different calculation method is used for off-shore islands to reflect water barriers)
- all the scores obtained are converted into values scaled from 0 (high accessibility) to 12 (high remoteness) – each Statistical Local Area is then assigned to one of five categories based on average scores for populated centres within it
- the map shows the generally high remoteness of inland Australia (score of 9.08 or higher), covering virtually all of the pastoral zone – this is related to large property sizes and low population densities
- wheat-sheep and more intensive cropping areas around coastal and near coastal Australia (including all of Tasmania), were less remote, with scores of 5.9 or less
- islands like Bathurst, Melville, Flinders, King and Kangaroo Island had higher scores (were more remote) than adjoining mainland areas due to water barriers

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Data represents a generic measure of remoteness across Australia, with remoteness interpreted in terms of accessibility to a range of the closest services centres. The *Accessibility/Remoteness Index of Australia* (ARIA) was developed by the Department of Health and Aged Care in collaboration with the National Key Centre for Social Applications of Geographical Information Systems (GISCA).

Caveats:

- remoteness values are derived from the road distance to service centres
- values for populated localities are then interpolated to a 1km grid, averages are calculated for larger areas, and the resulting values are then grouped into 5 different categories, ranging from highly accessible (1) to very remote (5)

Other community level indicators

35. Socioeconomic Index of Rural Advantage (SEIFA), 1996

- the degree of rural advantage (R_SEIFA) is a measure of relative rural socio-economic advantage – it is based on several Census variables, takes all adults into account not only farmers, and covers all areas of rural Australia *except* centres with a population of 1,000 or more
- a higher score on R_SEIFA indicates the area has attributes such as a large proportion of households with relatively high incomes or a trained workforce - conversely a lower score indicates that an area has a smaller proportion of households with high incomes and employees in skilled occupations
- rural advantage was highest (50 or more points above the rural average) near Perth, Geraldton and Kalgoorlie in Western Australia; the Darwin area; near Brisbane; near major regional centres in New South Wales' coastal and near-coastal areas and near Canberra; and near Albury-Wodonga and Melbourne
- higher than average rural advantage strongly reflects proximity to capital cities and major regional centres
- low SEIFA scores (50 to 100 points below average) were recorded in much of inland Australia except for some areas near larger towns and regional centres
- low scores in parts of the inland may reflect substantial representations of Aboriginal Australians, who on average are significantly socio-economically disadvantaged in comparison with other Australians

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Also known as the *SEIFA* index (Socioeconomic Index for Areas), the ABS developed this index of relative advantage based on 1996 population census data. The rural index covers all areas of Australia except for urban centres with a population of 1,000 and over. A higher score on the index of relative socio-economic advantage indicates an area with high proportions of high income earners, professional workers and more highly qualified people, as well as low unemployment rates. Conversely, a lower score on the index indicates an area with a smaller proportion of households with high incomes or a smaller proportion of employees with skilled occupations. The urban/rural split is considered necessary because major structural differences were found in the relationships between socio-economic variables related to advantage for the urban and rural areas.

Caveats:

- the index contains only limited wealth aspects. For example, inherited wealth, savings and property values are not included
- family structure such as the number of income earners and number of dependents is not strongly represented in the index and therefore the index may poorly distinguish between different family types
- access to infrastructure such as schools, community services, shops and transport is not represented

Related Indicators

Socio-economic index of disadvantage (SEIFA), 1996 – **Map 36.**

36. Socioeconomic Index of Disadvantage (SEIFA), 1996

- the index of relative socio-economic disadvantage, D_SEIFA, is based on Census data on population attributes such as income, educational attainment, employment and job skill levels – it covers all of Australia including larger population centres and differs from R_SEIFA in this respect
- as for Map 35, areas with above average SEIFA scores tended to be close to cities and major towns
- highest scores (50 or more points above average) were recorded in parts of the wheat belt east of Perth; near Canberra; near Armidale in north-eastern New South Wales and parts of New South Wales and Victoria near Albury-Wodonga; and near Melbourne and Ballarat in Victoria
- high scores strongly reflected proximity to capital cities and major regional centres
- scores in much of remote inland Australia were low (0-100 points below average)
- in some cases where above average scores were recorded in remote areas, this appears to be related to nearby mining operations that generate relatively high incomes, reduce unemployment, and may require skilled workforces – for example near Port Hedland and Kalgoorlie in Western Australia

Data Source:

Australian Bureau of Statistics (ABS) 1996 Population and Housing Census. Also known as the *SEIFA* index (Socioeconomic Index for Areas), the ABS developed this index of relative disadvantage based on 1996 population census data. The index of relative socio-economic disadvantage covers all areas of Australia and is derived from attributes such as low income, low educational attainment and high unemployment. Therefore, the higher an area's score of relative disadvantage, the fewer the number of families with low income and unskilled occupations.

Caveats:

- the index contains only limited wealth aspects. For example, inherited wealth, savings and property values are not included
- family structure such as the number of income earners, number of dependents, etc. is not strongly represented in the index and therefore the index may poorly distinguish between different family types
- access to infrastructure such as schools, community services, shops and transport is not represented

Related Indicators

Socio-economic index of rural advantage (SEIFA), 1996 – **Map 35**.