

National Land & Water Resources Audit

An Initiative of the Natural Heritage Trust

**SOCIAL AND ECONOMIC PROFILES FOR
SELECTED REGIONS WITHIN
AUSTRALIA'S RANGELANDS 2004**



**Natural
Heritage
Trust**

*Helping Communities
Helping Australia*

An Australian Government Initiative

Disclaimer

The views and opinions expressed in this report reflect those of the author and do not necessarily reflect those of the Australian Government or the National Land & Water Resources Audit.

The material presented in this report is based on sources that are believed to be reliable. Whilst every care has been taken in the preparation of the report, the author gives no warranty that the said sources are correct and accepts no responsibility for any resultant errors contained herein and any damages or loss, howsoever caused or suffered by any individual or corporation.

Social and Economic Indicators for Selected Regions within Australia's Rangelands, 2004

**Rural and Regional Statistics National Centre, Australian Bureau of Statistics
GPO Box 2272
Adelaide
SA 5001**

Information contained in this report may be copied or reproduced for study, research, information or educational purposes, subject to inclusion of an acknowledgement of the source.

This project was managed by Mr. Blair Wood, Executive Director - National Land & Water Resources Audit under funding from the National Heritage Trust. Contact details:

info@nlwra.gov.au

Contents

	<i>Page</i>
List of abbreviations and symbols.....	iv
Introduction.....	1
Methodology.....	4
Data quality.....	8
Summary of Issues.....	11
 CHAPTERS	
1 Comparison between regions.....	14
2 Desert Uplands.....	19
3 Darling Riverine Plains.....	49
4 Gascoyne–Murchison.....	83
5 Ord.....	113
6 Gawler.....	140
7 VRD Pastoral District.....	171
 ADDITIONAL INFORMATION	
Glossary.....	198
Bibliography.....	202

List of abbreviations and symbols

AAGIS	Australian Agricultural and Grazing Industries Survey
ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
CD	Census Collection District
EVAO	Estimated value of agricultural operations
ha	Hectares
IBRA	Interim Biogeographic Regionalisation of Australia
km	Kilometres
na	not available or not applicable
n.e.i.	not elsewhere included
NLWRA	National Land and Water Resources Audit
no.	Number
np	not available for publication (due to confidentiality) but included in totals
RSE	Relative standard error
SLA	Statistical Local Area
t	Tonnes
VACP	Value of agricultural commodities produced
*	data subject to sampling variability between 25% and 50%
**	data subject to sampling variability greater than 50%, estimate is not published
\$'000	thousand dollars
\$m	million dollars
—	nil or rounded to zero (including null cells)

NOTES

The commentary accompanying the statistics in this profile uses rounded figures. While unrounded figures are provided in tables, accuracy to the last digit is not claimed and should not be assumed. In particular, no reliance should be placed on statistics with small values.

Where figures have been suppressed for reasons of confidentiality, they have been included in relevant totals.

Where figures have been rounded, discrepancies may occur between sums of the component items and totals.

Introduction

The following information has been compiled to provide a regional profile for selected regions within Australia's rangelands.

The profile presents a range of indicators that have been identified as being useful for informing rangeland management policy. The indicators provide a broad overview of both the social and economic conditions of the selected regions.

Selected Regions

The six regions are:

- Darling Riverine Plains (NSW/Qld)
- Desert Uplands (Qld)
- Gawler (SA)
- VRD Pastoral District (NT)
- Gascoyne–Murchison (WA)
- Ord (WA)

The National Land and Water Resources Audit (NLWRA) specified the regions as aggregations of Interim Biogeographic Regionalisation (IBRA) of Australia Version 5.1 regions and subregions.

The definition of each region is specified in the chapter containing the data for that region. The locations of the regions are illustrated in the following map.



Content of the profile

The statistics presented in this profile provide important contextual information that can be used to support the decision-making processes that may be undertaken in developing policies or programs within the rangelands.

The first part of the profile provides background information to be used in the interpretation of the data. This part has 4 sections:

Introduction;
Methodology;
Data Quality;
Summary of Issues.

The sections Methodology and Data Quality provide general information about the processes and data sources that were used. The section Summary of Issues provides information about specific issues with the selected data items and regions. These issues should be important considerations if the procedures used for this profile are subsequently used as the basis for producing data for other regions.

The data is presented as seven chapters. Chapter 1 is a comparison of data between the selected regions, and chapters 2 to 7 provide the data for each region. The chapters for each region have a standard format. The following is a description of the structure of the chapters for each region:

Section	Description
Introduction	A brief description of the selected region
Headline Indicators	The five key indicators that were specified for the report. These are discussed below.
Social Profile	This presents data on the overall population of the region. Data is presented for age, industry, occupation, hours worked, income, education and computer and internet usage. The data is obtained from the ABS Census of Population and Housing.
Social Profile of farmers	This presents data for farmers. The data is similar to that provided in the Social Profile but the population is restricted to those that identify themselves as farmers or farm managers. The data is obtained from the ABS Census of Population and Housing.
Agriculture and Natural Resource Management	This presents data for agricultural production and natural resource management from the ABS Agricultural Census.

The relevance of the Headline Indicators is discussed below. The other data items provide a broader summary of the social and economic conditions in the regions.

Headline Indicators

The Headline Indicators were selected for inclusion in this report by the NLWRA. This follows on from work initially described in the report by the Bureau of Rural Sciences *Compilation of a Database of Socioeconomic Indicators for the Rangelands, March 2001*. These five indicators were also published as maps in the report by National Land and Water Resources Audit *Rangelands – Tracking Changes, Australian Collaborative Rangeland Information System, 2001*.

The following is a summary of the rationale for the inclusion of the five indicators in the National Land and Water Resources Audit report.

Indicator	Rationale for inclusion
Median age of farmers	Age statistics can help explain the likely desire of property owners/mangers to remain on the property, their exposure to environmental concepts, their attitude towards stewardship and their adoption of different resource management practices.
Total family farm income	Level of income can explain potential opportunities to experiment with new sustainable management practices.
Farms with property management plans	Property management plans reflect motivation to manage more sustainably, skills in management, and access to and use of different information for management decisions.
Age dependency ratio	Provides a useful economic snapshot of the population structure/ composition.
Net migration of young people	Net migration assists in understanding population changes, particularly in those beginning their careers, and those most able to be mobile and/or completing their education.

Methodology

The regions presented in this report are aggregations of IBRA regions and subregions as specified by NLWRA. This posed a challenge as to how to best present data that are not collected or readily available on these boundaries.

PRESENTATION OF ABS AND ABARE DATA

ABS

The profile draws mainly on data from the Census of Population and Housing 1991, 1996 and 2001 and the Agricultural Census 2000–01.

1 Census of Population and Housing 1991, 1996 and 2001

- The majority of data in this profile was sourced from the Census of Population and Housing. The smallest spatial geographic unit used for data collection and dissemination is the Census Collection District (CD).
- Except for net migration, all the data items from the Population Census were calculated using an area-weighted geographical concordance between the CDs and the region. The boundaries for the specified regions were spatially compared with the CD boundaries to determine which CDs were either wholly or partially within the region.
- For CDs partially within the region, the proportion of the CD's area that was within the region was calculated. These proportions were then applied to the CD level data and aggregated to produce estimates specifically for the region.
- This estimation allows better alignment of the data to the region than the aggregation of selected CDs. However, it also introduces a degree of inaccuracy into the data. Further information about area-weighted concordance is provided on page six.
- Population Census data is available for 'place of enumeration' (i.e. where the person was counted on census night) or 'usual residence'. The best representation of the population for a given area would be data by 'usual residence'. However, data is not available for CDs on 'usual residence' for the 1991 and 1996 Censuses.
- Therefore, to produce data for the 1991, 1996 and 2001 Censuses using the area-weighted CD concordance for the best possible match with the specified regions, Population Census data is presented on a 'place of enumeration' basis.
- The exception is the net migration of young people. Net migration data is only available at the Statistical Local Area (SLA) level, and SLA data for 'usual residence' is available for the 1991, 1996 and 2001 Censuses. Therefore net migration of young people is calculated by 'usual residence'.

ABS *continued*

- Calculation of net migration used a population-weighted concordance for SLA data. The proportions applied to the SLA data were the proportions of the SLA population that were within the specified regions. This was calculated from the population data produced using the area-weighted CD concordance.

2 Agricultural Census 2000–01

- The smallest geographic unit for which data from the Agricultural Census are available is the SLA. SLAs are quite large (areally) and may not align closely with the specified regions.
- An area-weighted concordance could have been applied, but such a concordance assumes that agricultural activity is equally distributed across the SLA. This is patently not the case, so instead of using a concordance, SLAs that were wholly or partly within the desired region were identified. The NLWRA then selected those SLAs to be used for aggregation.
- As a result of this process, the agricultural data presented are for areas which subjectively approximate the desired region, rather than match the actual region itself.

ABARE

The profile draws on farm data from the Australian Agricultural and Grazing Industries Survey (AAGIS) conducted by ABARE.

- The AAGIS is conducted annually by ABARE. The data from each farm in the sample is then appropriately weighted and aggregated to produce the final estimates. These data are geo-coded which allows ABARE to aggregate the data specifically for the IBRA regions, providing that the number of observations in any selected area are large enough to produce a statistically valid estimate.

AREA-WEIGHTED CONCORDANCE

The following example illustrates how an area-weighted concordance is applied.

An IBRA region covers three CDs: all of CD 1 and parts of CDs 2 and 3. Only 25% of CD 2 falls within the boundary of this IBRA region while 66% of CD 3 is within the IBRA region. By applying these factors to the total population for each CD, we can produce an estimate of the total population for the IBRA region. In this case, the estimated total population of the IBRA region is 583 people.

EXAMPLE – AREA WEIGHTED CONCORDANCE

<i>CD</i>	<i>Population</i>	<i>Conversion</i>	<i>Population</i>
	<i>no.</i>	<i>factor used</i>	<i>contributing</i>
		<i>no.</i>	<i>to IBRA region</i>
<i>CD</i>	<i>no.</i>	<i>no.</i>	<i>no.</i>
1	500	1.00	500
2	200	0.25	50
3	50	0.66	33
IBRA estimate			583
Upper limit estimate			750
Lower limit estimate			500

When using concorded data the following limitations of this methodology need to be taken into account:

- An area-weighted concordance assumes that the population is distributed equally across an area. However, in reality the population (and its associated characteristics) may be concentrated in a particular location or locations within the area.
- Where CDs are wholly within the specified region, the spatial distribution of the population of the CD is not an issue. However, where CDs (or SLAs) are partially within the specified region, the concorded data may not truly reflect the distribution of the characteristics of the population.
- This introduces a level of inaccuracy into the data that is not easily quantified. For example, if one person in each of two contributing CDs or SLAs partially within the specified region is incorrectly included or excluded from the estimates, a two-person error is introduced.

In general, the CD concordance usually provides a better fit than the SLA concordance. SLAs are larger than CDs and are more likely to include large population centres. Therefore it is more likely that the population is not as evenly distributed.

AREA-WEIGHTED CONCORDANCE *continued*

In order to provide some context to the amount of possible variation within the estimates, the example provides the upper and lower possibilities of the total population of the region. The upper limit is calculated by including the total population for all CDs wholly or partially in the region (750), while the lower limit is calculated by only counting the total population for CDs which are wholly within the region (500).

For the regions specified for this profile, the closeness of the match between the region and CD boundaries is variable. For some regions the majority of CDs that intersect the region lie fully within the region. However, for other regions, the majority of intersecting CDs lie only partially within the region, and therefore the calculation of data for these regions involves the extensive use of conversion factors as described earlier.

While care was taken in producing and applying the concordance, the ABS will not guarantee the accuracy of concorded data.

Data quality

CENSUS OF POPULATION AND HOUSING

The Census of Population and Housing aims to take a ‘snapshot’ of Australia every 5 years – not only counting the population but collecting information on the social, economic and housing characteristics of Australian society. The census is self-enumerated; this means that each household is asked to fill in the details required on the census form. The information asked for is collected under the *Census and Statistics Act 1905* which requires that the householder complete the form and take responsibility for its contents.

The census includes all people in Australia on census night, with the exception of foreign diplomats and their families. Visitors to Australia are counted regardless of how long they have been in the country or how long they plan to stay. Australian residents out of the country on census night are out of the scope of the census.

Each stage of the census is subject to stringent quality assurance measures. However, in a census there are recognised sources of error which may survive in the data produced. These include undercounting, processing and respondent error. Some of these are overcome or ‘repaired’ during processing.

The effect of those errors that remain is generally slight, although they may be more important for small groups within the total population. The effect of these errors may also be different in each Census so there may be variations when comparing data for regions over time, particularly for small areas or population groups.

For example, there are specific population measurement issues that can affect the counts for the Indigenous population. Special procedures were adopted to encourage Aboriginal and Torres Strait Islander peoples to participate in the census and to enable effective counting of the Indigenous population. However, the census question on Indigenous origin relies on identification of Indigenous status by the person or persons completing the census form for themselves and others where present. Changes in the propensity to identify are an important influence on Indigenous population counts and contribute to some of the growth in the Indigenous population. Further information on the data quality of Indigenous census data can be found in *Population Distribution, Aboriginal and Torres Strait Islander Australians* (cat. no. 4705.0).

For all Population Census data, table cells containing small values are randomly adjusted to avoid releasing information about particular individuals. The effects of these adjustments are statistically insignificant.

AGRICULTURAL CENSUS 2000–01

Estimates of farm production are based on information obtained from the Agricultural Census conducted at 30 June 2001. Value of agricultural commodities produced (VACP) quantity data are collected from the Agricultural Census and other Australian Bureau of Statistics (ABS) collections with some information from external sources. The ABS data is collected under the authority of the *Census and Statistics Act 1905*. Most price information is obtained from non-ABS sources, including marketing authorities and industry sources.

The scope of the 2000–01 Agricultural Census was establishments undertaking agricultural activity with an estimated value of agricultural operations (EVAO) of \$5,000 or more. An establishment is the smallest accounting unit of a business within a state or territory, controlling its productive activities and maintaining a specified range of detailed data enabling value added to be calculated. In general an establishment covers all operations at a physical location, but may consist of a group of locations provided they are within the same state or territory. The majority of establishments operate at one location only.

The estimates are based on information obtained from respondents to the 2000–01 Agricultural Census. Since not all the selected units responded, the estimates may differ from those that would have been produced if all farms had responded. An indication of this sampling variability, or 'error', for the estimates shown in this profile is represented by asterisks. Further information on sampling error is provided in the Glossary.

ABARE

The design of the Australian Agricultural and Grazing Industries Survey (AAGIS) is such that the selected samples ensure adequate sample representation for different industries, farm sizes and mixes of farm enterprises.

Around 1,400 farms are selected across Australia to represent all agricultural establishments with an EVAO above \$22,500 per annum. Participation in the survey is voluntary.

ABARE employs highly experienced survey officers and statisticians to guide the design and operation of the data collection and estimation process. This process involves a set of quality controls, with procedures being tailored to the specific requirements of individual surveys. Problems of data quality arising from low response rates are reduced by the use of procedures to guide the selection of replacement farms, and the use of statistical and other modelling in the estimation process. Data quality is also enhanced by checks against available external data sources and by internal consistency checks.

Only a small number of farms out of the total number of farms are surveyed. Despite the use of sample weights, the estimates derived from these farms are likely to be different from those that would have been obtained if information had been collected from a census of all farms. An indication of this sampling variability or 'error' for the estimates shown in this profile is represented by asterisks. Further information on sampling error is provided in the Glossary.

The small sample size of the AAGIS means that data was only available for two of the requested areas. Data for the remaining regions was either unavailable or had high sampling errors (i.e. RSE in excess of 50%).

Summary of Issues

Area concordance - closeness of match

Most of the data in this report is from the Population Census, and has been produced using an area-weighted concordance between the specified regions and CD boundaries. The closeness of the geographical match between the regions and CD boundaries is variable. This has consequences for the veracity of the estimates produced by the concordance in the context of each profiled region.

For example, in 2001 for Desert Uplands there were 31 CDs with a total population of 6,226 that intersected the Desert Uplands region. Only 3 of these CDs (with a total population of 644) were completely within Desert Uplands. The other 28 CDs have boundaries that intersect the region's boundary. The population estimate for the region was 3,737 with 83% of this estimate being calculated using proportions applied to the CD data. Therefore a significant proportion of this estimate could be affected by the limitations of this methodology.

In general, the match between the specified regions and CDs was better for the larger regions. Larger areas often result in a higher proportion of the intersecting CDs being completely within the region. This has the effect of reducing the proportion of the population estimate for the region being produced through the area-weighted concordance methodology.

Are the IBRA boundaries suitable for social and economic data?

The IBRA boundaries have been developed using attributes of lithology, climate, geology, landforms and vegetation to define interacting similar ecosystems. While population centres will occur within the IBRA regions, the presence or location of these centres has not been used when defining the regions.

For example, the boundary defined for the Gawler IBRA region includes the Whyalla urban centre. In 2001, the population for the Gawler IBRA region was 42,000 with Whyalla contributing 21,000 or half of this total.

Following consultation, the users of this profile considered that the Whyalla urban centre did not form part of the Gawler IBRA region, in that it did not provide support and services to the region. Using their local knowledge, a decision was made to exclude Whyalla from the social and economic data for the Gawler IBRA region.

Reporting anomalies and estimates involving small numbers

Estimates produced from a small number of observations can be heavily influenced by sources of error within the observations. For example, the VRD Pastoral District had 42 people identified as farmers in 2001. The calculation of the median age of farmers for this region for 1991, 1996 and 2001 resulted in an unexpected pattern in the data, which did not appear to represent changes over time in the median age of farmers in the region.

Closer examination of the data indicated that the calculation of median age appeared to be heavily influenced by reporting anomalies with persons identifying themselves as farmers. The impact of these anomalies was different in each census.

In order to overcome the impact of having few observations in the specified region, it is sometimes necessary to expand the area of interest. In this case, the region used for the calculation of median age of farmers was expanded to include 6 adjoining SLAs. The median age was calculated using 177 farmers in 2001 and produced a series for 1991, 1996 and 2001 that appeared to be more consistent when compared to estimates for Northern Territory as a whole.

Highly mobile populations

For the Census of Population and Housing, CD level data on a 'usual residence' basis was available for the 2001 Census, but not for the 1991 and 1996 Censuses. Because of the requirement to present data for the regions over time, most of the data for this profile was prepared on a 'place of enumeration' basis. For most areas the data is similar, but there can be differences in some areas where there are a large number of visitors to the area on census night. In these areas the enumeration count may be large compared with the usual residence count. Examples are snowfields and other tourist areas, and regions with large Indigenous populations.

For the VRD Pastoral District, the initial age dependency ratio prepared for 1991, 1996 and 2001 showed an unexpected pattern. The area concordance produced a good match with the region, with over 80% of the population estimate for VRD Pastoral District being derived from CDs that were fully within the region.

However, for the VRD Pastoral District in each of 1991, 1996 and 2001 Censuses, there was a large proportion of the population that was not usually resident in the same region as their place of enumeration. The age structure of those resident in the area was different to the age structure of those who were not at their place of usual residence on census night. The impact on the age dependency ratio was different for each census.

In this case, to present a series for the age dependency ratio, usual residence data for the SLA of Victoria was used. While this is a larger geographic area than desired, the result is considered to be a better representation of the data for the VRD Pastoral District resident population.

Producing social and economic profiles across the rangelands

In producing this profile, the intention was to develop a methodology that would produce estimates that could be applied consistently across the regions with minimal clerical intervention. This would have also provided a template for the provision of data across the rangelands.

However, the issues discussed above illustrate that the processes that provide good estimates for some regions may not do the same for other regions. A number of these issues arise because of the need to concord data from the geography on which it was released.

Other issues relate to the data itself. In some cases there are very few observations within the target region, and this impacts on the quality of the estimates. This applies to data from both censuses and surveys.

For this report the estimates produced using the standard area-weighted concordance methodology were clerically examined on a case-by-case basis. In order to produce estimates for a larger number of regions across the rangelands in a cost-effective manner, clerical intervention should be minimised. In this context, the decisions made about the data may be different.