

**Monitoring the social and economic impacts of forestry:
A case study of the Green Triangle**

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Executive Summary

This report presents results of a case study in which recommended indicators for monitoring the social and economic impacts of forestry were tested in the 'Green Triangle' region of south-east South Australia and south-west Victoria.

The indicators tested were developed as part of a project undertaken for the Forest Industries Branch of the Department of Agriculture, Fisheries and Forestry, which aims to identify cost effective indicators for monitoring social and economic impacts of Australian forestry. The indicators were developed by reviewing the types of information needed about social and economic impacts of forestry, followed by identifying methods that can be utilised to measure these impacts. The indicators were refined after a workshop in which key stakeholders were consulted, and then tested in two case study regions: the Green Triangle, and north-east Tasmania. The final set of recommended indicators is described in detail in Schirmer (2008a), while results of the Tasmanian case study are presented in Schirmer (2008b).

The Green Triangle was selected as a case study region in which to test the indicators as it is an important forest industry region in Australia, in which the industry is based predominantly on plantation forestry. In 2006, there were more than 170,000 hectares of softwood plantation, and just under 140,000 hectares of hardwood plantation, established in the region. A significant manufacturing industry has developed over several decades to process the softwood resource, while harvesting of hardwood plantations is currently beginning in the region.

The indicators tested aim to identify key information that enables assessment of social and economic impacts of the forest industry in the region. In particular, the indicators aim to assess:

- Key characteristics of the forest industry;
- Impacts of the forest industry on the broader community;
- Impacts of the forest industry on its workforce; and
- Impacts of the forest industry on Indigenous people.

Two types of data were utilised to measure indicators: existing data produced by organisations such as the Australian Bureau of Statistics and Bureau of Rural Sciences; and a survey of forestry workers which gathered information on aspects of impacts of the industry on its workforce for which data were not otherwise available.

Indicators were measured where possible for the Green Triangle, and for three regions within the Green Triangle – the South East region (covering the South Australian part of the region), the Western District (covering the south-west Victorian part) and the Wimmera (extending further north in Victoria). Data were also measured where possible for individual 'statistical local areas' (SLAs) - each local government area in the region is made up of between one and three SLAs. Trends in the Green Triangle were compared to trends seen in Australia, South Australia and Victoria over the same period.

Five key characteristics of the forest industry were examined: direct employment in the industry; estimated value of production; estimated volume of production; efficiency of production; and consumption of wood and paper products.

A total of 3,369 people were employed in the Green Triangle forest industry in 2006. Of these, the large majority – 2,777 – were based in the South East region of the

Green Triangle, 518 in the Western District and 74 in the Wimmera. This includes people employed in forestry and logging and wood and paper product manufacturing; it excludes people employed in transport of logs, and some silvicultural contractors, as these are not included in forestry employment figures by the ABS. The local government areas (LGAs) with the most forestry workers were Mt Gambier, Wattle Range, and Grant, in South Australia. Total employment in the Green Triangle forest industry grew more than the Australian average over 1996 to 2001, and fell less than average over 2001 to 2006, indicating the industry is more stable in the Green Triangle than many other Australian regions. The large majority of employment in the industry – 82% of workers - is located in the manufacturing sector, while only 18% of workers are employed in growing and harvesting trees.

Approximately 82% of workers in the Green Triangle forest industry worked in the softwood plantation sector in 2006, while 12% worked in hardwood plantations, 3% in native forestry, and the sector in which the remaining 3% worked was unknown.

The estimated volume and value of forestry production could only be measured at state scale, providing limited information about the Green Triangle region. Growth in both volume and value of production was slower in South Australia and Victoria than in Australia as a whole over 2000-01 to 2006-07. The efficiency of production was difficult to measure due to a lack of data on the labour required to produce different types of products; more detailed direct survey of the forest industry is needed to produce useful data on the productivity of labour.

Consumption of wood and paper products in Australia is a useful predictor of likely demand for wood and paper products from the Green Triangle and other forestry regions. Per capita consumption of paper and paperboard products grew over most of the period of 1994-95 to 2006-07, as did consumption of wood-based panel products. Consumption of sawnwood showed a more variable pattern, but grew over much of 1998-99 to 2003-04, and subsequently declined.

Impacts of the forest industry on the broader community were examined by measuring the dependence of the labour force on the forest industry; social characteristics of forestry dependent regions; the location of forest industry employment; and the impact of the forest industry on rural population. These indicators, as with all those reported here, represent a subset of the many ways the forest industry may impact on the broader community, and should be accompanied by in-depth studies which examine how people experience and interact with the forest industry, and the impact of changes to the forest industry.

Dependence on the forest industry was measured by calculating the proportion of the employed labour force who worked in the forest industry. Within the Green Triangle, the highest dependence occurs in the South East region. The LGAs of Grant, Mount Gambier, and Wattle Range all have very high dependence, with over 11% of the workforce, and up to 16%, working in the forest industry in 2006. This level of dependence is much higher than the Australian or South Australian average. It only reflects direct dependence on forestry; indirect dependence through industries who supply the forest industry or rely on spending of wages and salaries by forestry workers should also be considered. In the Western District, parts of Glenelg Shire have a higher than average dependence on forestry employment, with the SLAs of Glenelg – Heywood and Glenelg – North having between 4% to 6% of their labour force employed in forestry.

Overall dependence on the forest industry has fallen over time in almost all regions, a result of a broadening labour force and some decline in employment in the forest industry in recent years.

Key social characteristics of local regions with differing levels of dependence on the forest industry, including total population, unemployment rates, education levels, median age, household income, the ratio of working age to child/retirement age population, and economic diversity, were compared. The goal was to identify whether local areas with high dependence on forestry differ to other areas of the Green Triangle. In areas with medium or high dependence on forestry, a slightly higher proportion of the adult population held a bachelor degree or higher qualification, and residents were slightly younger than average, while median household income grew at a slightly slower rate in areas with high forest industry dependence. It is possible these differences are not due to the forest industry but to other factors.

Forestry workers tend to be relatively urbanised, being more likely to be based in large towns/regional centres than in small towns or rural areas within the Green Triangle. Forestry workers are more likely to live in towns with a population of more than 10,000 people and less likely to live in towns with less than 200 residents or in rural areas outside towns compared to the overall labour force of the Green Triangle. Forest industry employment is also much more urbanised than employment in the agricultural industry. This indicates that any shift from traditional agriculture to forest-industry based employment is likely to be accompanied by some urbanisation of employment opportunities in the region.

Areas experiencing plantation expansion were analysed to identify whether the plantation expansion has affected rural population levels. At the SLA scale, there was no evidence that areas experiencing plantation expansion had experienced a greater loss of rural population than those experiencing no or little plantation expansion. This means that any population decline resulting from plantation expansion is too small to be distinguished from other factors causing rural population decline, with many areas in the region experiencing loss of rural population over 1996 to 2006 whether or not plantation expansion occurred.

Perceptions held about forestry by members of communities living in the Green Triangle were not examined in this case study, due to a lack of time and resources. Understanding the social impacts of forestry requires understanding perceptions, as they inform how people understand, experience and respond to forestry in the region.

A range of characteristics of the forestry workforce were examined, to help identify the impacts the industry has in the people who work for it. Key findings were that:

- Forest industry workers in the Green Triangle earn a slightly higher income on average than other members of the labour force;
- The forest industry across Australia has a higher rate of occupational disease and injury requiring compensation than all other industries, and this rate is declining at a slower rate than for other industries, indicating ongoing high injury and disease rates compared to other industries;
- A majority of forestry workers in the Green Triangle indicated they were satisfied with their life in general, the local area they live in, and the health of their family; a smaller majority were satisfied with their own health and their financial situation;

- Forestry workers in the Green Triangle are satisfied many aspects of their work in the industry, including the level of challenge, income, interactions with colleagues, and sense of accomplishment, but a higher proportion feel dissatisfied with the support received from those outside the industry, the rules set by government on how forestry can operate, and the fairness of decisions made about the forest industry;
- Forestry workers are predominantly male, with around 18% of workers female in 2006. However, female participation in the forestry workforce in the Green Triangle is growing at a greater rate than for the labour force overall, indicating the ‘gender gap’ between the forest industry and overall labour force is narrowing, albeit slowly;
- Forestry workers in the Green Triangle are slightly younger on average when compared to the overall labour force, however, the forestry workforce aged more rapidly than the labour force as a whole over 1996 to 2006, indicating that this difference is likely to narrow;
- Green Triangle forestry workers have less attachment to the place they live in compared to forestry workers living elsewhere in Australia, and are less likely to believe they will be living in the same area in five years time, indicating a relatively low ‘attachment to place’;
- Around 30% of forestry workers have more than one member of their household working in the industry, while 22% have a family history of work in the industry extending beyond one generation. Many workers have reasonably strong social networks within the forest industry, although very few indicated that ‘most or all’ of their friends worked in the industry, indicating good social links outside the industry;
- Green Triangle forestry workers are more likely to work full-time hours than those in the general labour force; and
- Forestry workers are more likely to have a post-school qualification than average for the total population aged over 15.

The Green Triangle forest industry has a lower than average proportion of Indigenous workers, when compared to the Australian forest industry average and the average for the labour force in the Green Triangle. However, Indigenous employment has grown at a faster rate than average in the forest industry in recent years, indicating this gap may be closing. Indigenous workers are most likely to work as machinery operator/drivers and labourers, and less likely to work as managers, technicians, trades workers, and in clerical and administrative works, compared to the rest of the forestry workforce.

The indicators reported in this document provide a broad overview of the key social and economic characteristics of forestry and forestry workers, and of the communities that are dependent on forestry, in the Green Triangle. The indicators can be used to identify how these characteristics are changing over time, and hence to examine social and economic change related to the forest industry. These social and economic changes may have many impacts on different people. However, the indicators can provide only a limited understanding of impacts, and should be accompanied by in-depth studies which provide a more complete understanding of the social and economic impacts of forestry. These studies include studies of downstream economic impacts, of the ways people experience the changes identified in the indicators and what these changes mean for their lives, and of perceptions about forestry, amongst others.

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1.0 Introduction

In April 2008, the Forest Industries Branch of the Department of Agriculture, Fisheries and Forestry (DAFF) engaged the Fenner School of Environment and Society to identify a set of indicators to describe and quantify the social and economic impact of forestry in Australia over time.

The indicators developed need to:

- Be cost effective, to enable regular monitoring;
- Be valid – measure what they are intended to measure;
- Be replicable over time – requiring a consistent, replicable and cost effective methodology;
- Be applicable across both native forest and plantation sectors;
- Be applicable at local, regional and national scale where possible; and
- Provide information on the most relevant social and economic impacts.

A key priority was to identify indicators that can be readily and cost effectively measured over time using available sources of data, as well as identify where further information is needed, but not as easily accessible.

Indicators were developed by reviewing the types of information needed about social and economic impacts of forestry, followed by identifying methods that can be utilised to measure these impacts. Information needs were identified by reviewing current forest policies, media reports on forestry, recent research recording public perceptions about forestry, and reports produced by stakeholders with an interest in forestry in Australia. Methods for measuring indicators were identified by reviewing the data currently produced on forestry by different organisations such as the Australian Bureau of Statistics, and reviewing methods used in recent research studies to measure the impacts of forestry.

The initial indicators identified were discussed at a workshop of forestry stakeholders, and an initial set of recommended indicators developed based on these discussions. The following types of indicators were recommended for monitoring the social and economic impacts of forestry in Australia:

- Indicators which measure characteristics of the forest industry:
 - Direct employment in the forest industry;
 - Proportion of land utilised by the forest industry;
 - Estimated value and volume of production;
 - Efficiency of production, measured as labour productivity; and
 - Consumption of wood and paper products.
- Impacts of the forest industry on the broader community:
 - Dependence on the forest industry, measured as the proportion of the employed labour force working in the forest industry;
 - Social characteristics of forestry-dependent communities;
 - Location of forest industry employment;
 - Impact of plantation forestry on rural population; and
 - Values, uses and perceptions of forestry activities.
- Impacts of the forest industry on its workforce:
 - Income earned by forestry workers;
 - Physical and mental health of forestry workers;
 - Self-rated wellbeing of forestry workers;
 - Age and gender of forestry workers;
 - Forestry workers' attachment to place;

- Forestry workers' cultural and family attachment to forestry;
- Hours worked by forestry workers; and
- Education qualifications of forestry workers.
- Impacts of the forest industry on Indigenous people:
 - Quantity of Indigenous employment in the forest industry;
 - Types of Indigenous employment in the forest industry; and
 - Area of forest owned or accessed by Indigenous people.

These recommended indicators were then tested in two case study regions: north-east Tasmania, and the Green Triangle region of south-west Victoria and south-east South Australia. These two regions were chosen as they have a considerable amount of forest industry activity. In the Green Triangle region, this activity is based almost completely on plantation forestry, including both hardwood and softwood plantations, while in Tasmania the industry is based on native forests and plantations.

This document reports the results of testing indicators in the Green Triangle case study region. Results for each of the recommended indicators are presented, and trends in the Green Triangle forest industry compared to trends in Australia overall. Not all of the recommended indicators could be tested in the case study region, due to time and resource constraints. Where an indicator could not be tested, it is not presented in this report; details of methods for measuring these indicators can be found in Schirmer *et al.* (2008a).

The results of the analysis presented in this report were used to refine the indicators recommended by the consultancy; the final recommended indicators are documented in Schirmer *et al.* (2008a). Results of the Tasmanian case study are documented in Schirmer *et al.* (2008b).

2.0 Case study and methods

This section describes the case study region, and provides a brief overview of the methods used to measure the different indicators measured for this report.

2.1 Case study: The Green Triangle

This report presents the results of testing indicators in the Green Triangle region, which covers much of western Victoria and south-east South Australia. This region was chosen to test indicators because it contains a large integrated forest industry.

The Green Triangle region is an important forest industry region in Australia, with the industry predominantly based on plantation forestry. A large area of both hardwood and softwood plantations are located in the region. Softwood plantations have been established in the region since the early 1900s, while hardwood plantations have been established predominantly since the mid-1990s. In 2006, there were more than 170,000 hectares of softwood plantation, and just under 140,000 hectares of hardwood plantation, established in the region¹. A significant manufacturing industry has developed over several decades to process the softwood resource. Harvesting of hardwood plantations is currently beginning in the region.

The local government areas (LGAs) included in the Green Triangle study region are shown in Figure 1.

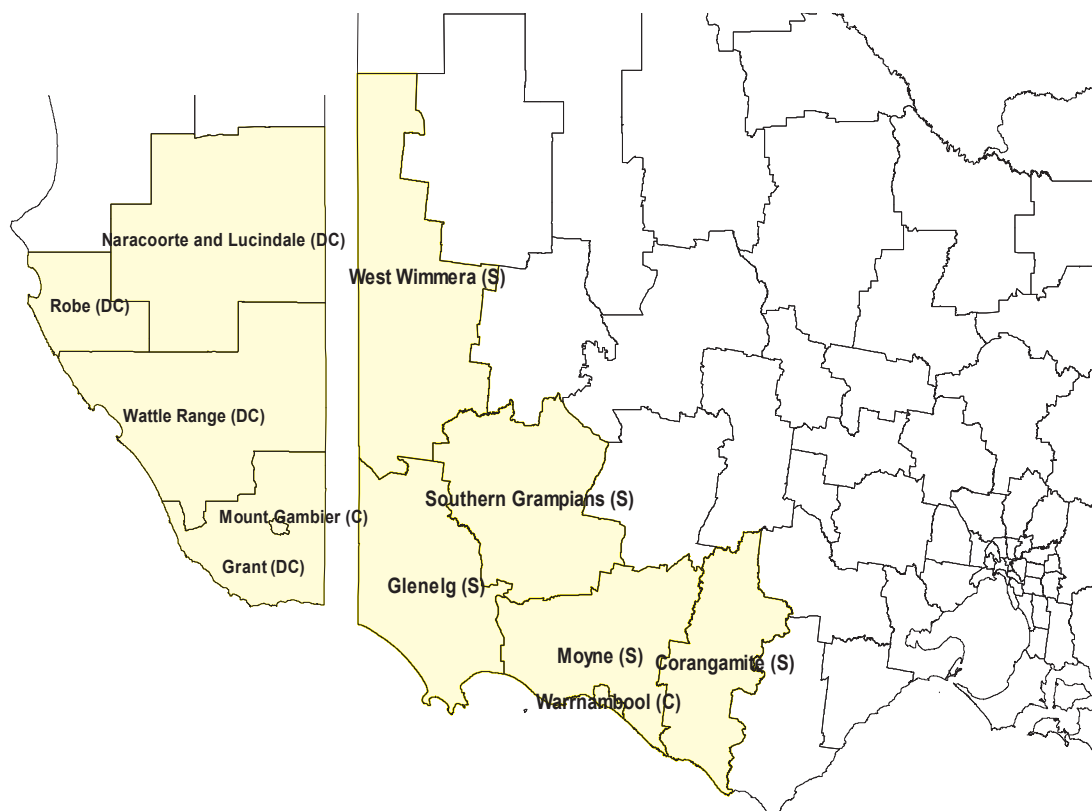


Figure 1: Map of the Green Triangle case study region²

Where possible, indicator data for this case study are presented for different 'Statistical Local Areas' in the study region (described below), for 'Statistical

¹ These data are based on the Bureau of Rural Sciences *National Plantation Inventory* database.

² Local government areas included in the study are shown in yellow. The letters in brackets after each name refer to the type of local government, where 'DC' refers to 'District Council', 'S' refers to 'Shire', and 'C' refers to 'City'.

Divisions' within the region (also described below), and for the states of South Australia and Victoria, and Australia as a whole. This enables comparison of trends in individual LGAs within the region, as well as comparison of the region to state and national averages.

Statistical Local Areas (SLAs) are geographic regions measured by the ABS which are either the same size as, or smaller than, LGAs. Within the study region, each local government area is made up of between one and three SLAs, as shown in Table 1. SLAs are often either equivalent to the boundaries of previous LGAs which were amalgamated, or separate the city and rural areas of an LGA.

Table 1: Statistical Local Areas located in each Local Government Area

LGA	SLA/s in LGA	Description of SLAs
Naracoorte and Lucindale (DC)	Naracoorte and Lucindale (DC)	SLA is the same as LGA
Robe (DC)	Robe (DC)	SLA is the same as LGA
Wattle Range (DC)	Wattle Range (DC) – East Wattle Range (DC) - West	LGA has been split into two SLAs, one covering the east of the SLA (including Penola), the other the West (including Millicent, Tantanoola).
Mount Gambier (C)	Mount Gambier (C)	SLA is the same as LGA
Grant (DC)	Grant (DC)	SLA is the same as LGA
West Wimmera (S)	West Wimmera (S)	SLA is the same as LGA
Southern Grampians (S)	S. Grampians (S) – Hamilton S. Grampians (S) – Wannon S. Grampians (S) - Bal	LGA has been split into three SLAs, in which 'Hamilton' is equivalent to the city of Hamilton, 'Wannon' is in the west of the LGA, and 'Bal' (referring to 'Balance') covers the east of the LGA
Glenelg (S)	Glenelg (S) – Heywood Glenelg (S) – North Glenelg (S) – Portland	LGA has been split into three SLAs, in which 'Portland' is equivalent to the city of Portland, 'Heywood' is in the southern half of the LGA, and 'North' covers the northern part of the LGA
Moyne (S)	Moyne (S) - North-East Moyne (S) - North-West Moyne (S) - South	LGA has been split into three SLAs, each of which covers the geographic part of the LGA as described (north-east, north-west and south).
Warrnambool (C)	Warrnambool (C)	SLA is the same as LGA
Corangamite (S)	Corangamite (S) – North Corangamite (S) – South	LGA has been split into two SLAs, each of which covers the geographic part of the LGA as described (north and south).

Statistical Divisions (SDs) refer to groupings of LGAs which are considered to have some geographic and economic linkages that mean they form a coherent group. In the case study region, there are three SDs:

- South East (SA): The South East SD consists of the LGAs of Grant, Mount Gambier, Wattle Range, Naracoorte and Lucindale, and Robe;
- Western District (Vic): The Western District SD consists of the LGAs of Warrnambool, Corangamite, Moyne, Glenelg, and Southern Grampians; and
- Wimmera (Vic). This SD includes the LGA of West Wimmera. As it includes only a single LGA, it is usually presented together with the Western District SD.

For some indicators, it was not possible to gather data to the LGA scale, with only larger scale data available. This is identified as each indicator is presented and discussed.

2.2 Methods

The data sources and methods used to measure each indicator are explained briefly as each is presented in Section 3.0. A more detailed discussion of the methods used to calculate each indicator can be found in Schirmer *et al.* (2008a).

This section describes the types of data used to measure indicators, with all indicators presented in this report measured using one of two types of data:

- Data from existing sources such as the Australian Bureau of Statistics (ABS); or
- Data from a small survey of Australian forestry workers undertaken for this consultancy.

2.2.1 Data from existing sources

Where data from existing sources have been used to calculate indicators, the data source and methods used are briefly described when the indicator is reported. More detailed information on the methods used to calculate each indicator can be found in the methods used to calculate each indicator can be found in Schirmer *et al.* (2008a).

2.2.2 Data from survey of forestry workers

Some indicators could not be measured using existing data as no data are currently available for them. Where this was the case, data were gathered via an online survey which was sent to forestry companies operating in the case study regions examined for this consultancy³.

The survey included a range of questions on forest workers' health, wellbeing, and attachment to place and to the forestry industry, including:

- Health – the types and severity of health problems experienced;
- Workplace health risks – a rating of the extent to which the work the respondent undertakes is believed to present a health risk (e.g. hours worked, stress, exposure to noise, exposure to physical risk);
- Satisfaction with different aspects of life (family, finance, overall level of satisfaction);
- Satisfaction with different aspects of work in the forest industry (e.g. the amount of challenge their work presents);
- Level of attachment to the local community the respondents lives in; and
- Level of cultural and family attachment to forestry.

Valid survey responses were received from 132 respondents. Of these, 54 were based in Tasmania, 19 in the Green Triangle, and 56 in other regions. This means the responses from the Green Triangle can be compared to responses from workers in the other regions included in the survey⁴.

Responses to the survey are likely to have been biased. Respondents were predominantly involved in managing plantations and native forests, with a smaller proportion involved in silvicultural activities, and very few employed in processing. The responses are therefore biased towards those involved in forest management and

³ Ethics approval was gained from the Australian National University Human Research Ethics Committee ('the Committee') prior to the release of the survey.

⁴ Many forestry businesses operate across multiple regions; while the survey was sent principally to those operating in the Green Triangle and Tasmania – the regions examined for this consultancy – companies were encouraged to send the survey to all their workers so responses from these regions could be compared to the broader sample of forestry workers achieved.

administrative positions, and away from field-based workers and workers in manufacturing jobs (Figure 2).

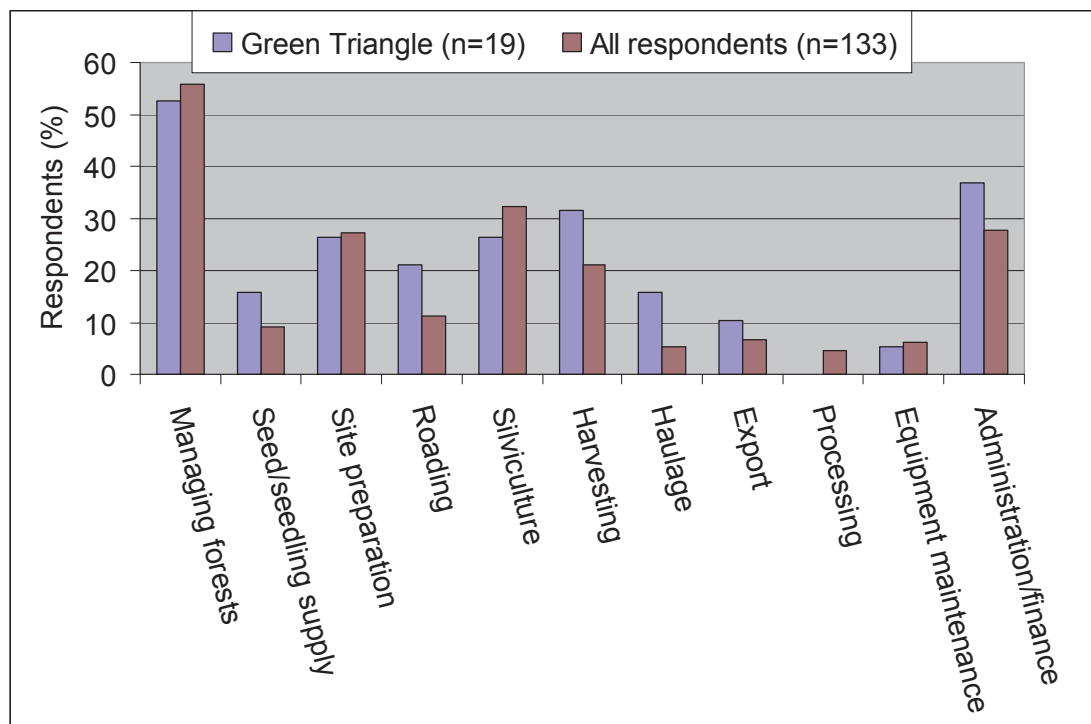


Figure 2: Occupation of forestry workers responding to survey

General characteristics of respondents were as follows:

- Gender: 70% male; 30% female for both Green Triangle and respondents overall;
- Average age: 37 years for Green Triangle respondents and 39 years for all respondents;
- Average length of time working in the industry: 11.4 years for Green Triangle respondents, and 13.3 years for all respondents; and
- Respondents worked in all sectors of the forest industry, although a greater percentage worked in plantation forestry.

While the survey was reasonably small, the responses received enable testing of some key recommended indicators; the results are discussed as individual indicators are reported. They should be considered biased towards people working in particular jobs in the industry, and not representative of all types of forest industry workers.

3.0 Results of the case study

This section presents results for each of the indicators tested in this case study. The key uses and limitations of each indicator are explained, and conclusions are drawn as to its usefulness of the indicator for monitoring of changes in the forest industry.

The indicators are presented in four sections:

- Characteristics of the forest industry;
- Impacts of the forest industry on the broader community;
- Impacts of the forest industry on its workforce; and
- Impacts of the forest industry on Indigenous people.

3.1 Characteristics of the forest industry

The indicators in this section provide information on the following characteristics of the forest industry:

- Direct employment in the forest industry;
- Estimated value of forest industry production;
- Estimated volume of forest industry production;
- Efficiency of production (labour productivity); and
- Consumption of wood and paper products.

These characteristics provide a useful basis for analysing how the forest industry is changing in terms of employment, production and consumption. These characteristics are important to track over time, as changes in characteristics of the industry are likely to be associated with changes in the social and economic impacts of the industry on its workers, and on local and regional communities.

3.1.1 Employment in the forest industry

Direct employment in the forest industry in the Green Triangle was measured in three ways, in which total employment and change in employment over time was measured for:

- The forest industry as a whole;
- The ‘forestry and logging’, and ‘wood and paper product manufacturing sectors’ of the industry; and
- The plantation and native forestry sectors.

Each measure is useful as it provides an understanding of not just how many jobs there are, but where jobs are located within the industry.

The data presented are all based on ABS *Census of Population and Housing* data. These data are likely to exclude some contractors working in the forest industry, particularly silvicultural and transport workers. Based on Schirmer (2008), the total number estimated by the ABS may undercount direct reliance on forest industry employment by approximately 10 to 13%. Data on employment in the native forest and plantation sectors were based on a brief telephone survey of forestry firms in the region. All the data are based on where forestry workers live, rather than where they work as it draws on ‘place of usual residence’ data from the ABS⁵.

Employment in the forest industry as a whole

A total of 3,369 people were employed in the forest industry in the Green Triangle in 2006⁶. Employment in different parts of the region is shown in Figures 3 to 4, and the rate of change over time in Figure 5. The large majority of forest workers – 2,777 – were based in the South East Statistical Division (SD), while 518 were based in the Western District SD and only 74 in the Wimmera SD. Within the South East SD, most forestry workers were based in Mt Gambier, Wattle Range and Grant. Most forestry workers in the Western District were based in Glenelg Shire.

Total employment in the forest industry in South Australia and Victoria followed similar trends to the Australia average over the period 1996-2006, with some growth in employment over 1996-2001, and decline over 2001-2006⁷.

However, employment trends were quite different within the Green Triangle. In the South East region, employment grew more than the average over 1996 to 2001 and fell less than average over 2001 to 2006, indicating the industry has been growing more strongly in this region compared to others over this period. Employment in the Western District and Wimmera regions showed greater variability, growing over 1996 to 2001 and declining over 2001 to 2006. In most local areas within the Green Triangle employment in forestry either grew slightly over 1996 to 2001 and fell over 2001 to 2006, or fell over both periods⁸.

⁵ This differs to some other reports – for example, Schirmer (2008) reports employment by place of work. Place of usual residence is a useful measure as it gives an indicator of where forest industry workers live and hence are likely to interact with others in their community, spend a large proportion of their income, and develop a range of social and economic networks.

⁶ The forest industry is defined as those employed in forestry and logging and wood and paper product manufacturing.

⁷ See Appendix 1 for graphs showing the exact average annual rate of change in employment for each local area within the Green Triangle.

⁸ The only exceptions to this trend were in Corangamite and Moyne Shires, both of which had very small numbers of forestry workers overall, such that it is possible randomisation of data by the ABS has influenced the trends observed. The ABS randomises data to preserve confidentiality of individuals. While this does not impact on trends where there are large numbers of people involved,

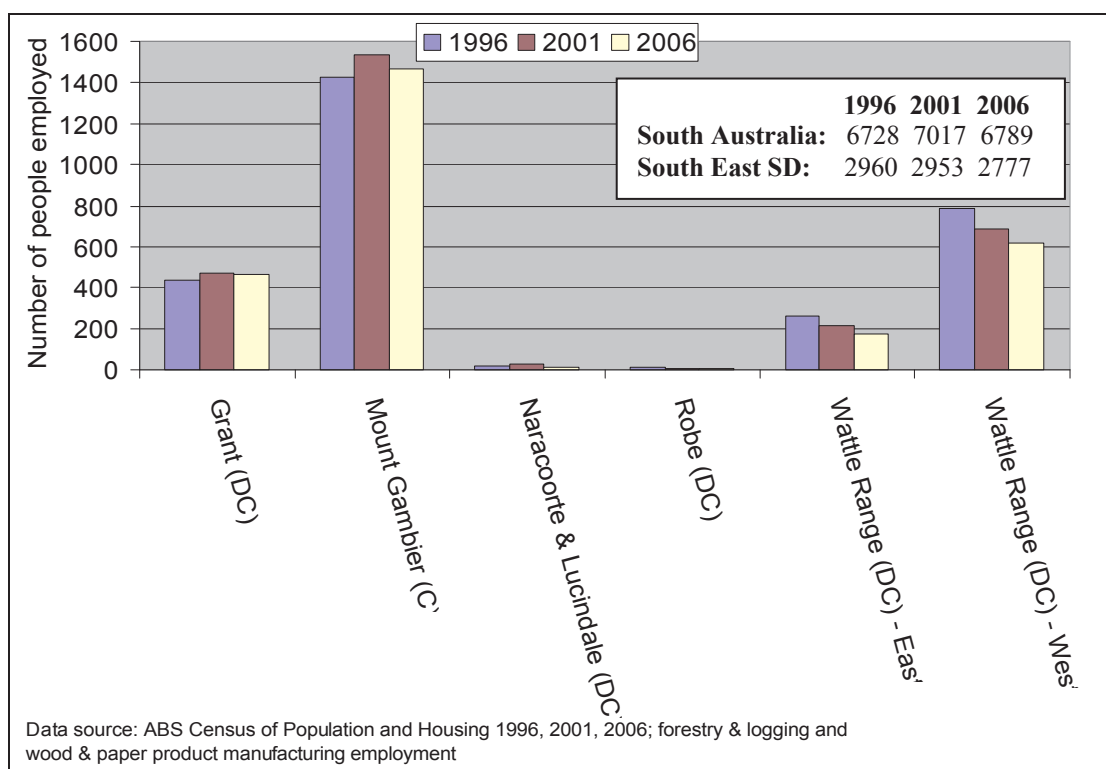


Figure 3: Employment in the south-east South Australian forest industry, total all sectors, 1996, 2001, 2006⁹

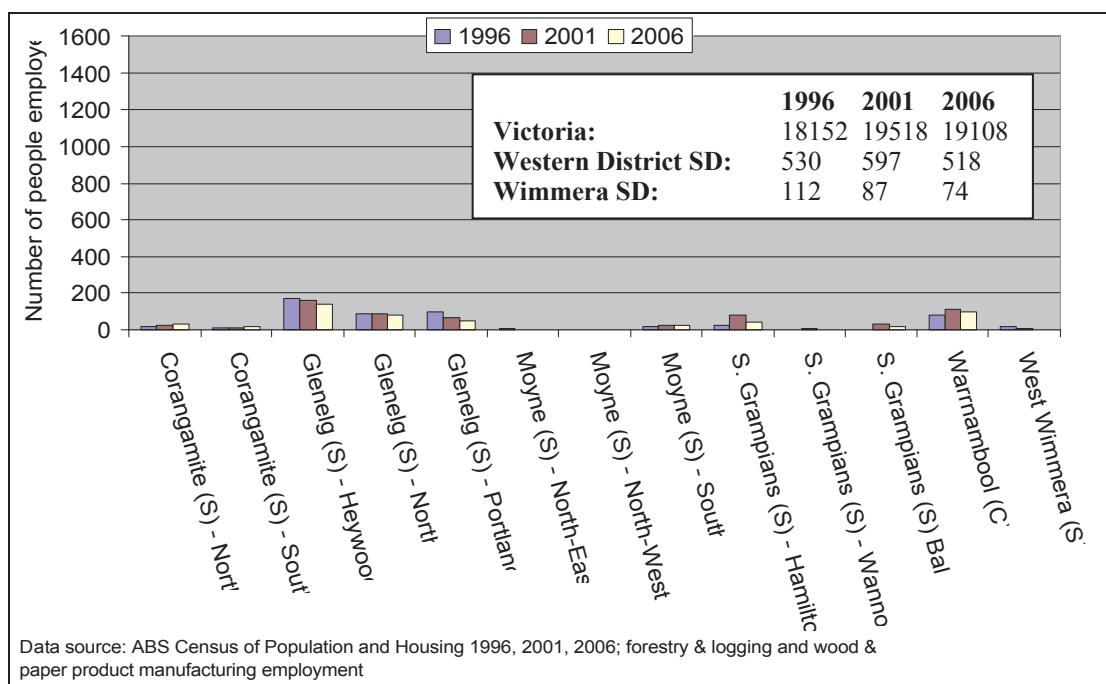


Figure 4: Employment in the Western District and Wimmera, Victorian forest industry, total all sectors, 1996, 2001, 2006

where small numbers are involved (particularly where there are less than 10 people being reported), randomisation may have a strong influence, and trends should be considered subject to influence by the randomisation process.

⁹ Figures 4 and 5 present data on total employment for different parts of the study region. The scale on the y-axis of the graphs is the same to ensure the information in the graphs can be easily compared. This is done through this report – wherever a particular type of data is presented over multiple graphs, the y-axis is standardised to ensure easy comparison of data across the graphs.

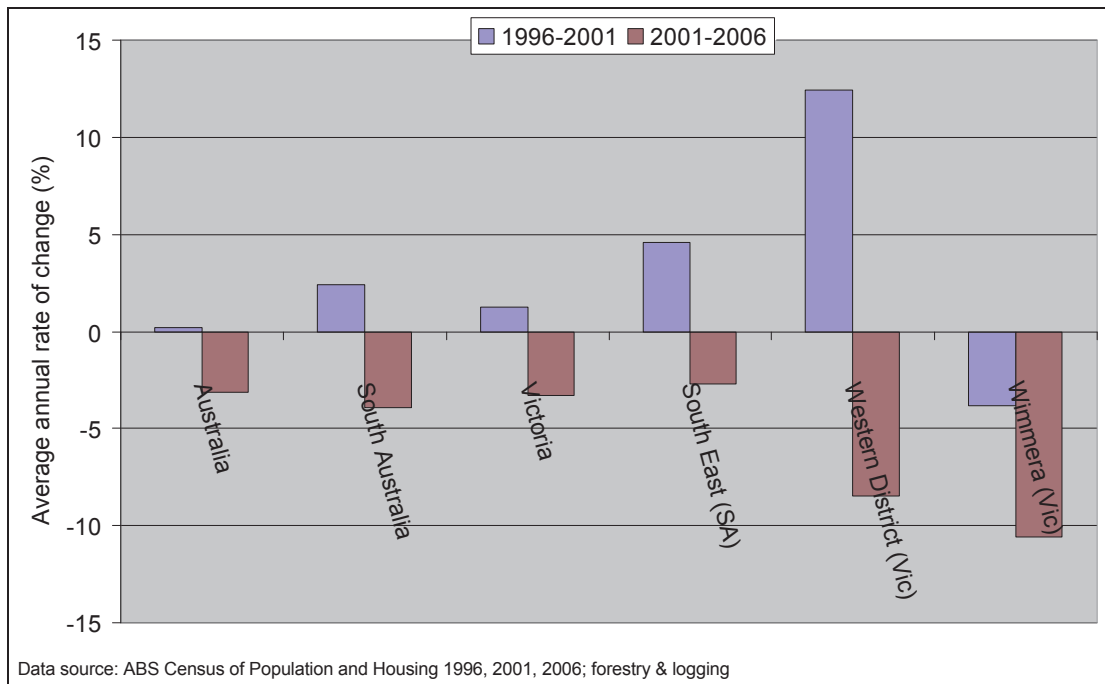


Figure 5: Rate of change in employment in the forest industry, 1996, 2001, 2006

Employment in the forestry and logging, and wood and paper product manufacturing, sectors

Total employment in the ‘forestry and logging’ and ‘wood and paper product manufacturing’ sectors is shown in Figures 6 to 11. Forestry and logging is defined as the activities of growing and managing forests, and harvesting trees. Wood and paper product manufacturing involves processing wood and paper products, and includes people who work in woodchip mills, sawmills, wood-based panel production, and pulp and paper production.

Overall, 82% of people who work in the forest industry work in wood and paper product manufacturing, while only 18% are employed in forestry and logging activities. The latter figure is likely to undercount the true level of activity that occurs prior to processing, with Schirmer (2008) finding that ABS data do not include many silvicultural contractors who work in activities such as ground and soil preparation, tree planting, fertilising and pest and weed control while plantations are growing. However, it is evident that the manufacturing sector supports the majority of employment in the forest industry in the Green Triangle.

In Australia, South Australia, Victoria and most parts of the Green Triangle, forestry and logging employment grew over 1996 to 2001, and subsequently declined, with the exceptions of (a) Portland, where there has been continuing growth in forestry and logging employment, and (b) Warrnambool, West Wimmera, and Wattle Range – West, where there has been consistent decline in forestry and logging employment¹⁰.

In both South Australia and Victoria, employment in wood and paper product manufacturing grew over 1996 to 2001 (similar to growth seen for Australia as a whole), but declined slightly over 2001 to 2006, compared to a slight increase in Australia.

¹⁰ See Appendix 1 for graphs showing the average annual rate of change in employment in forestry and logging and wood and paper product manufacturing for each local area within the Green Triangle.

Overall, the Green Triangle experienced greater decline and/or slower growth in wood and paper product manufacturing than the Australian, South Australian and Victorian averages over 1996 to 2006. Employment in wood and paper product manufacturing declined slightly in most parts of the Green Triangle over 1996 to 2006, with this decline occurring even in the South East region where most of those employed in wood and paper product manufacturing are located. Areas which did not experience decline typically had relatively low numbers of employees, meaning that an increase involved a small number of people.

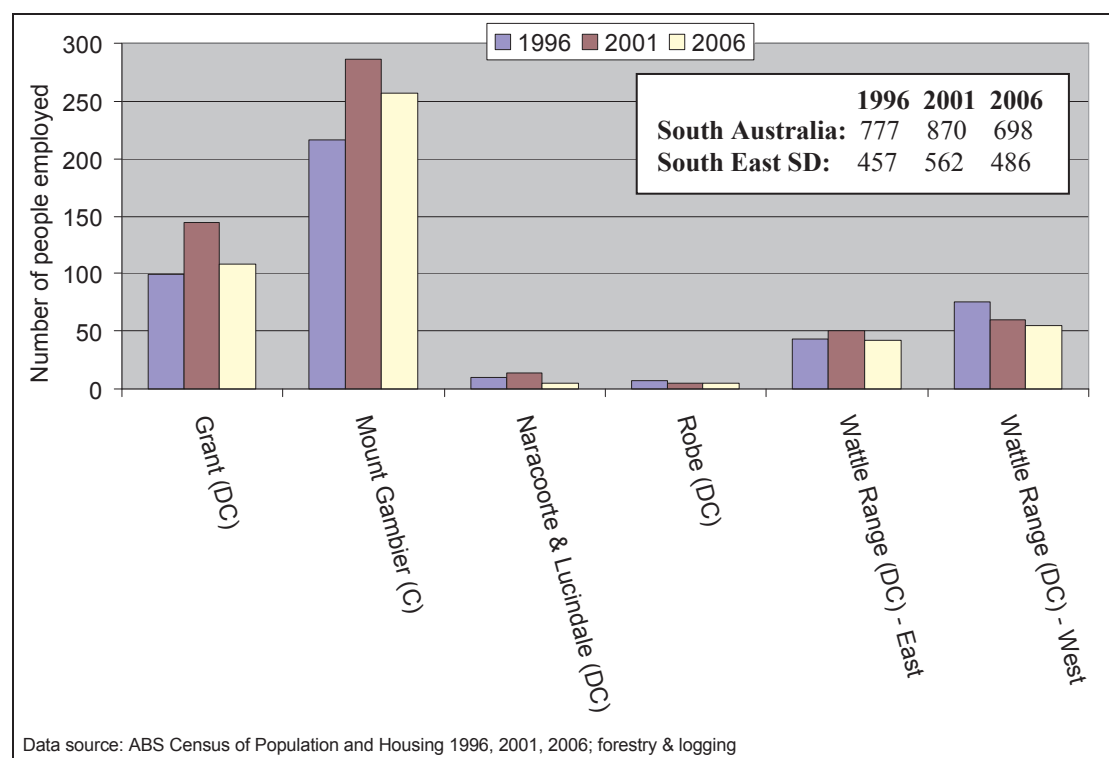


Figure 6: Employment in forestry and logging sector – South Australia, 1996, 2001, 2006

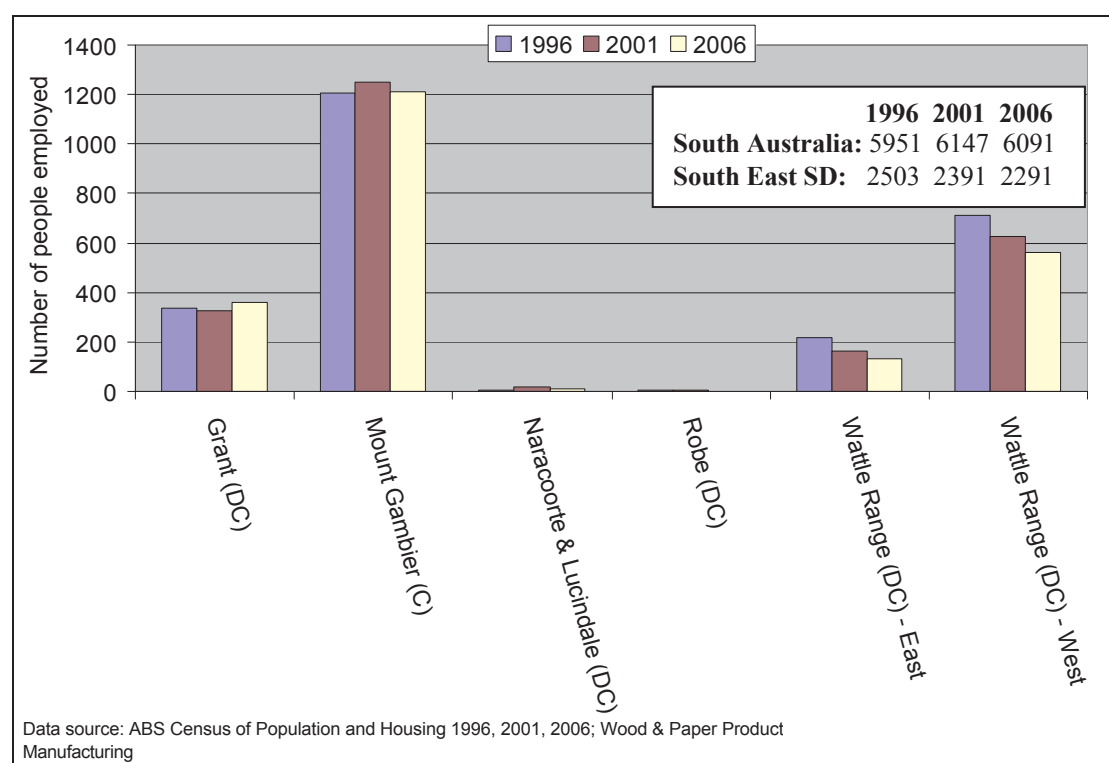


Figure 7: Employment in the South Australian wood and paper product manufacturing sector, 1996, 2001, 2006

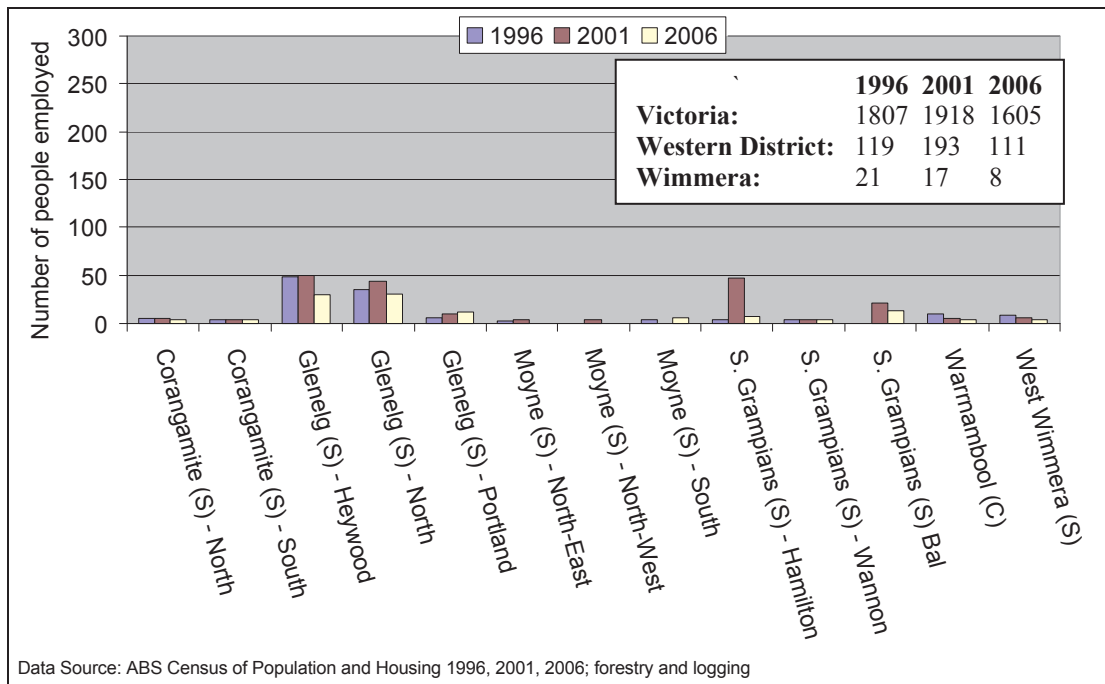


Figure 8: Employment in forestry and logging sector – Victoria, 1996, 2001, 2006

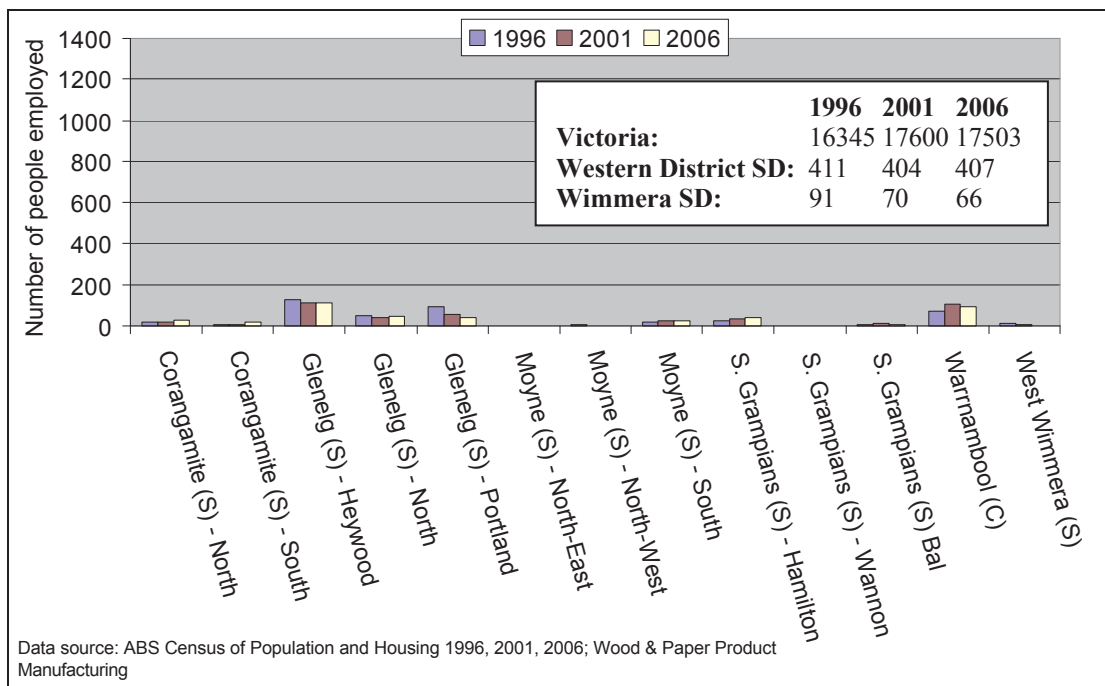


Figure 9: Employment in the Victorian wood and paper product manufacturing sector, 1996, 2001, 2006

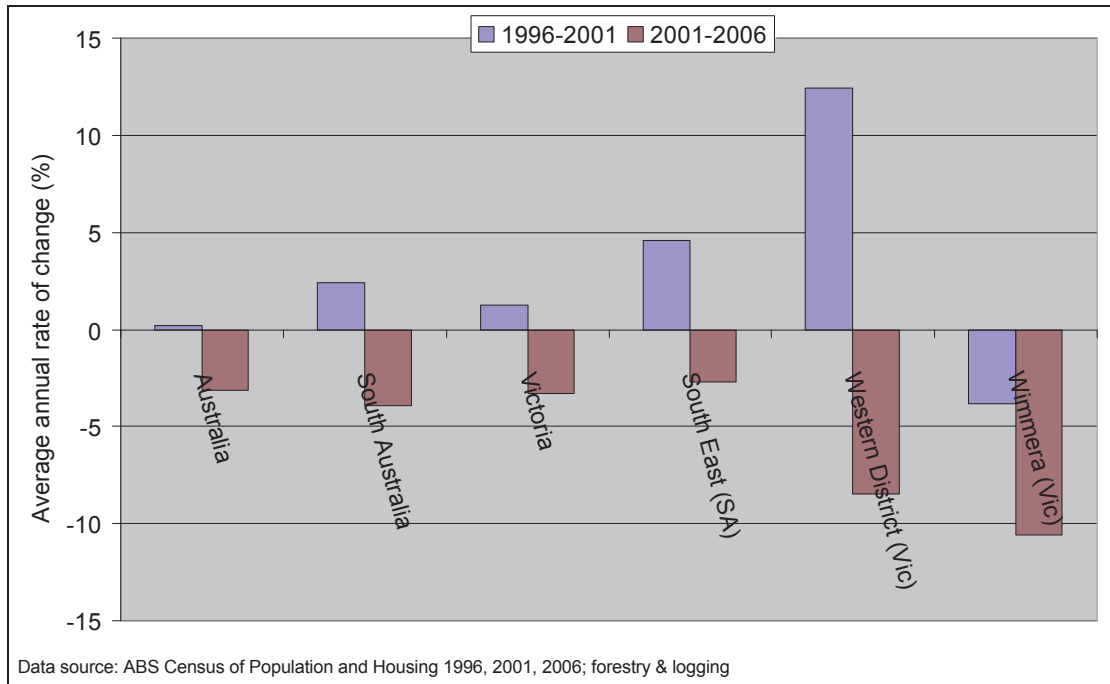


Figure 10: Rate of change in employment in forestry and logging sector, 1996, 2001, 2006

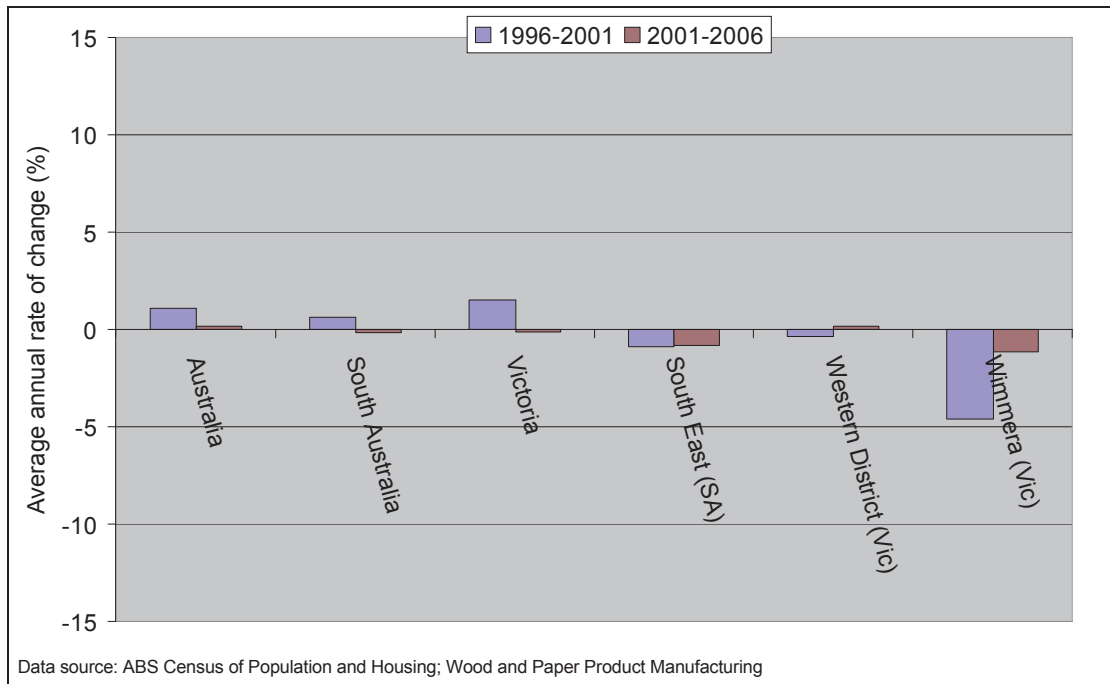


Figure 11: Rate of change in employment in wood and paper product manufacturing sector, 1996, 2001, 2006

Employment in the native forest and plantation sectors

The majority of people working in the forest industry in the Green Triangle work in the plantation sector, as can be seen in Figure 12 and 13¹¹. In total approximately 82% of forest industry workers work in the softwood plantation sector, 12% in hardwood plantations, 3% in native forestry, and the sector in which the remaining 3% of people work is unknown.

These data do not include many silvicultural contractors, and it is likely that once contracting employment is included, employment in hardwood plantations would be higher, as much of the work currently generated in this sector is undertaken by silvicultural contracting firms. The large majority of employment in the softwood plantation sector is in the processing sector; as hardwood plantations in the region are only just beginning to be harvested in 2008, there is as yet little to no work generated by the processing of hardwood plantations. This is expected to change in coming years as harvest volumes grow rapidly.

The proportion of workers in each sector varies by individual LGAs (Figure 13). The small proportion of native forest-based employment in the Green Triangle occurs in the Victorian part of the Green Triangle. Hardwood and softwood plantation employment are spread across the region, with most LGAs having a mix of employment in both sectors, with the exception of Mt Gambier and Grant where forest industry employment is almost totally based on softwood plantations.

¹¹ Data on employment in the plantation and native forest sectors were gathered by asking forestry businesses what proportion of their activities occurred in each sector. Where a business did not provide information, local industry experts were asked their knowledge of (a) which sector a business operated in and (b) the broad size of its overall operations in terms of number of employees. This information was gathered based on the location of the forestry business. ABS data on forest industry employment by place of residence then had to be adjusted to estimate the proportion of employment in each sector. This requires making an estimate based on knowledge of where forest industry workers typically live in relation to the location of their place of employment. Based on Schirmer (2008), it was assumed that a large majority of forestry workers live in the same local government area (LGA) as their place of work, or in a neighbouring LGA, and that relatively few live more than one LGA away from their place of employment. The data in Figures 12 and 13 are also based on the wood source used by a business, whether or not that wood was sourced from within the region. Some processors source timber from some distance away, or import a wood-derived product and process it to a further stage. The data should be taken as a broad indication of location of plantation and native forestry employment, rather than a precise estimate.

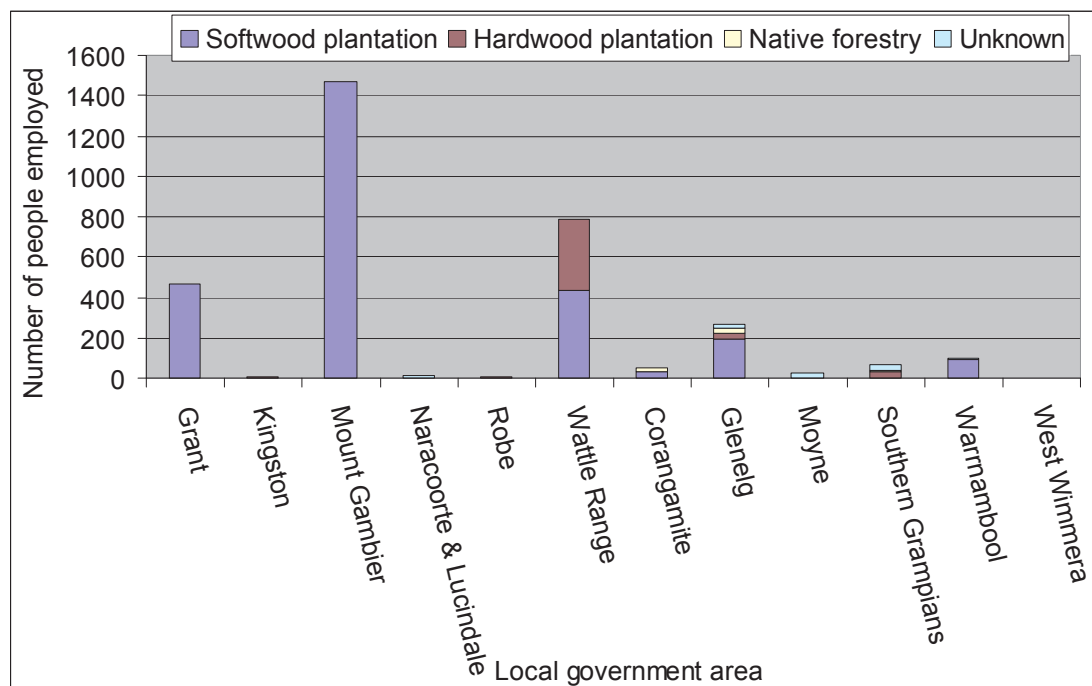


Figure 12: Number of forestry workers in plantation and native forest sectors by LGA, 2006

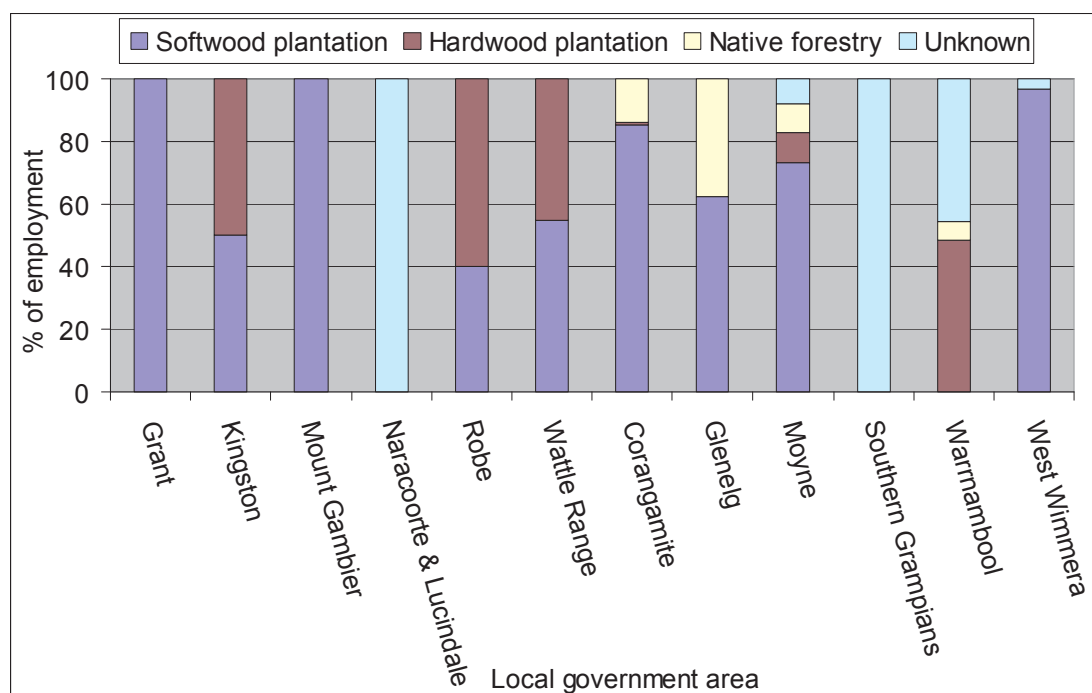


Figure 13: Proportion of employment in plantation and native forest sectors by LGA, 2006

3.1.2 Estimated value of forest industry production

The value of production of an industry provides important information about its economic impact on the region in which it operates, as the value of production is a useful indicator of the economic activity generated by the industry.

The estimated value of production of the forest industry can be measured at several points in the chain of production:

- Gross value of log production (roundwood);
- Gross value of sawnwood;
- Gross value of wood based panels; and
- Gross value of paper and paperboard.

Growth in the value of production was slower in South Australia and Victoria than in Australia as a whole over 2000-01 to 2006-07, and the value of production declined in South Australia over 2003-04 to 2006-07, as can be seen in Figures 14 and 15.

The Green Triangle contains most of South Australia's wood production, and so the figures for South Australia can be considered to reflect trends in the South Australian side of the Green Triangle. In Victoria, however, the forest industry is spread across many regions, and only a small part of production occurs in the Green Triangle. It is therefore not possible to identify if Victorian trends reflect trends in the Green Triangle over this time period.

Information on value of production was only obtained at national and state level, with specific data on the Green Triangle not able to be obtained¹². While forestry processors in the region were asked to provide information on their production, most declined to provide this information for confidentiality reasons, and also because the data can be complex to provide – many wood and paper manufacturers produce a wide variety of products with differing values. In addition, confidentiality concerns mean that it is often not possible to report value of production for local regions, as there are often less than three businesses producing particular products in an SLA or SD, and the business may be individually identifiable if data were presented at these scales.

¹² Data from the Australian Bureau of Agricultural and Resource Economics (ABARE) *Forest and Wood Products Statistics* series were used to estimate value of forestry production over time, comparing trends in Australia, South Australia and Victoria.

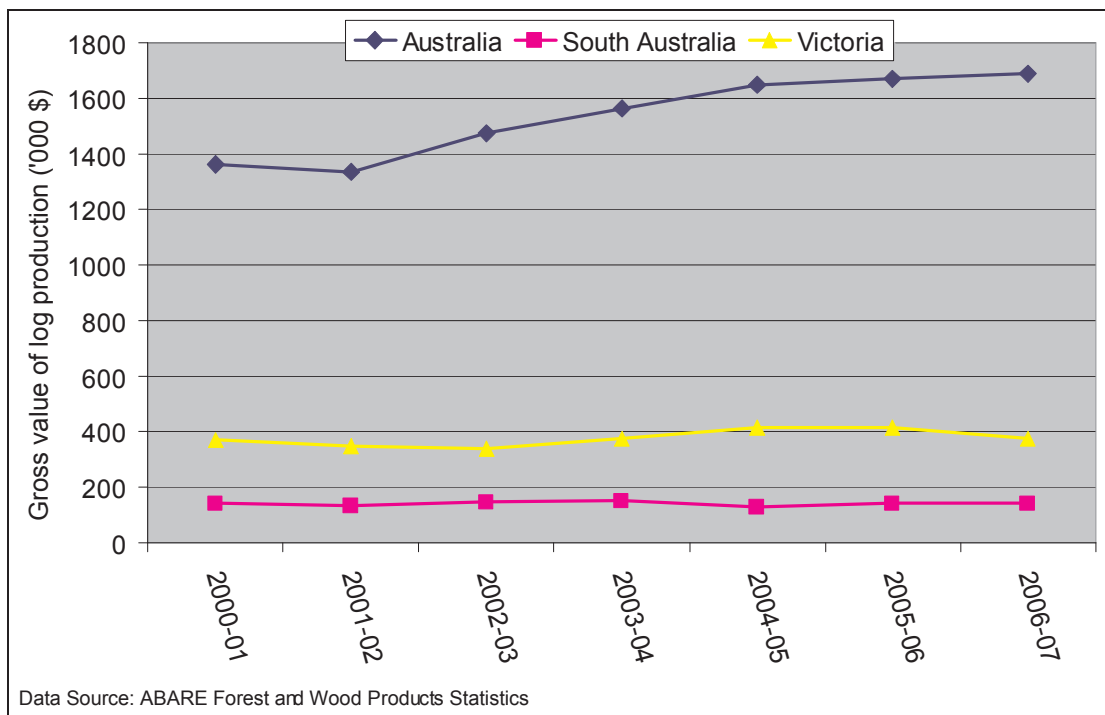


Figure 14: Estimated value of forest industry production – gross roundwood equivalent, 2000-01 to 2006-07

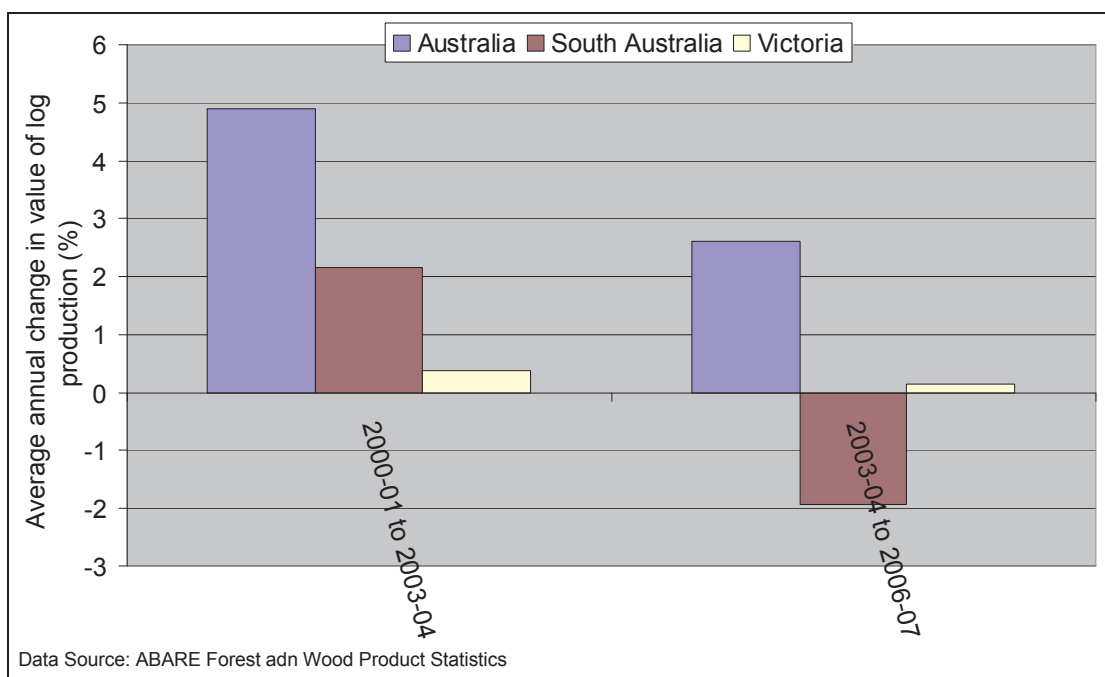


Figure 15: Average annual change in value of forest industry production – gross roundwood equivalent, 2000-01 to 2003-04 and 2003-04 to 2006-07

3.1.3 Estimated volume of forest industry production

The volume of production of an industry provides important information about its economic impact on the region in which it operates, as the volume of production is a useful indicator of the economic activity generated by the industry. When combined with information on value, it can provide useful data on trends in the industry.

The estimated volume of production of the forest industry can be measured at the following points in the chain of production as initial products such as roundwood are value added to produce products such as paper, sawnwood and wood based panels:

- Volume of roundwood;
- Volume of sawnwood;
- Volume of wood based panels; and
- Volume of paper and paperboard.

Similarly to the results for value of production, there was higher growth in the volume of log production in Australia as a whole compared to South Australia and Victoria over 2000-01 to 2006-07, as can be seen in Figures 16 and 17. Over 2003-04 to 2006-07, the volume of log production fell in South Australia, grew in Victoria, and grew in Australia at a higher rate than in Victoria.

Information on volume of production was only obtained at national and state level, with specific data on the Green Triangle not able to be obtained¹³. While forestry processors in the region were asked to provide information on their production, most declined to provide this information for confidentiality reasons, and also because the data can be complex to provide – many wood and paper manufacturers produce a wide variety of products. In addition, confidentiality concerns mean that it is often not possible to report value of production for local regions, as there are often less than three businesses producing particular products in an SLA or SD, and the business may be individually identifiable if data were presented at these scales.

¹³ While data were obtained from some wood and paper product manufacturers within the Green Triangle, almost half did not provide information on volume produced. Because of this, data from the Australian Bureau of Agricultural and Resource Economics (ABARE) *Forest and Wood Products Statistics* series were used to estimate volume of forestry production over time, comparing trends in Australia, South Australia and Victoria.

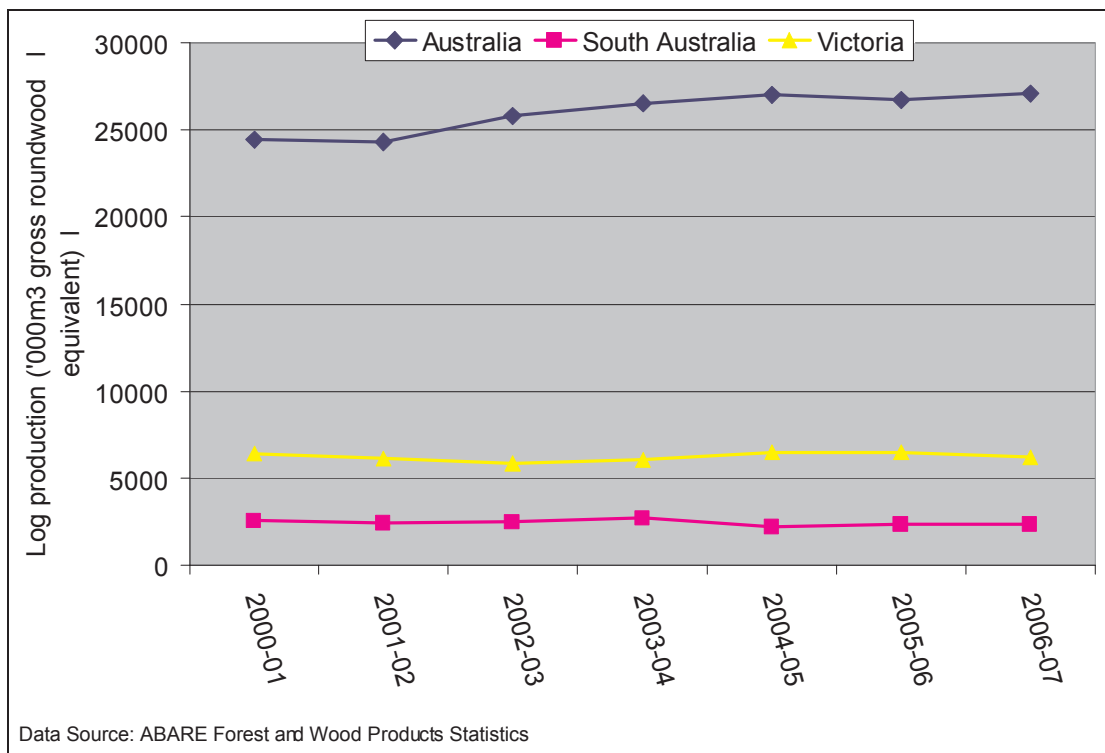


Figure 16: Estimated volume of forest industry production – gross roundwood equivalent, 2000-01 to 2006-07

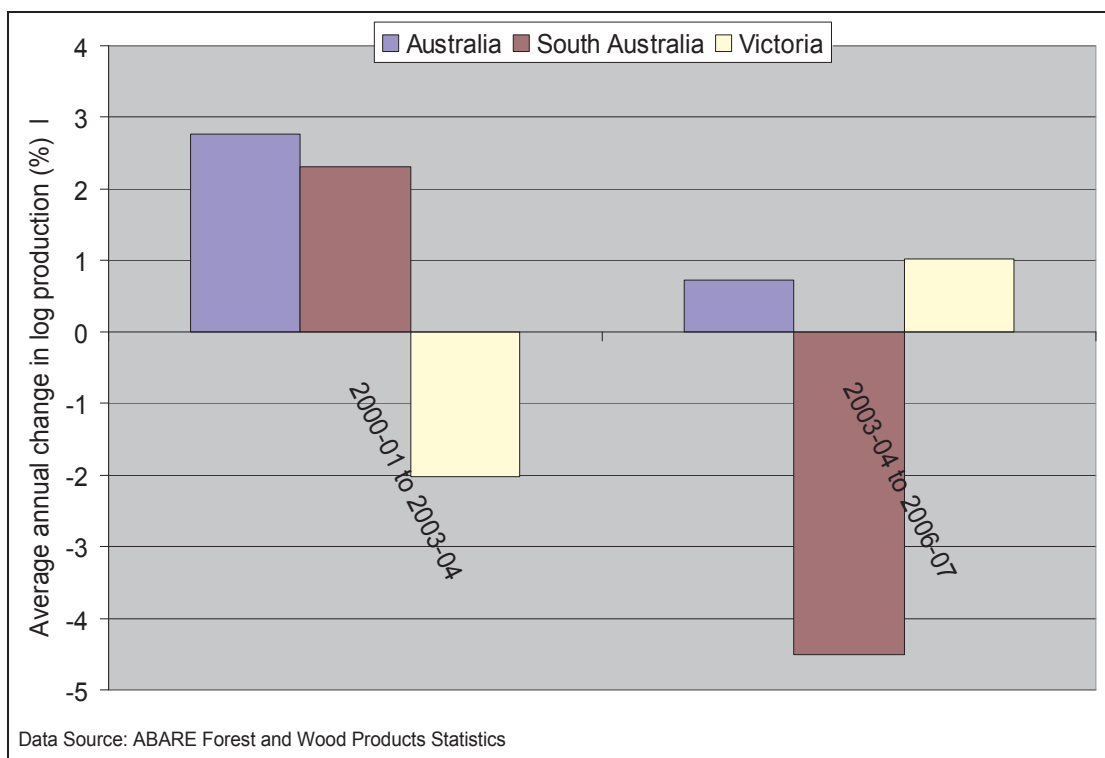


Figure 17: Average annual change in volume of forest industry production – gross roundwood equivalent, 2000-01 to 2003-04 and 2003-04 to 2006-07

3.1.4 Efficiency of production (labour productivity)

The efficiency of production of an industry is a key measure of economic efficiency, with increases in productivity often indicating increased investment in technology and skills that enable higher production per labour unit, and hence improved competitiveness in the marketplace. From a social viewpoint, changes in efficiency of production may have implications for the number of jobs available in an industry, or the skills required of workers.

This indicator is measured by dividing the volume of output produced by the units of labour required to produce it.

An attempt was made to measure this indicator using data from ABARE's *Forest and Wood Product Statistics*, in which the employment required per unit of gross roundwood equivalent produced was calculated. However, the productivity estimates varied widely, most likely because each region produces different types of wood and paper products, and differing amounts of labour are required to produce different products. For example, based on gross roundwood equivalent (GRWE) and total employment in the forest industry, in 2006-07 (ABARE *Forest and Wood Product Statistics*):

- 370 cubic metres of GWRE were produced per forestry worker in Australia;
- 345 cubic metres of GWRE were produced per forestry worker in South Australia;
- 326 cubic metre of GWRE were produced per forestry worker in Victoria; and
- 1170 cubic metres of GWRE were produced per forestry worker in Tasmania.

The productivity measure will be most useful if measured separately for different types of wood and paper products, rather than as a generic measure based on gross roundwood equivalent.

It is therefore recommended that efficiency of production be measured using data from direct survey of forestry businesses, and:

- Be specifically calculated for different types of wood and paper products; and
- Be calculated separately for the native forest and plantation sectors.

This means this indicator may not be feasible to monitor regularly, and may instead need to be measured based on occasional studies.

It also means it was not possible to identify labour productivity for the Green Triangle forest industry based on currently available data.

3.1.5 Consumption of wood and paper products

Consumption of wood and paper products is a key indicator of demand for these products, and hence of likely trends in forest industry production. Changes in consumption may indicate shifts in social impacts of the forest industry.

The rate of consumption of wood and paper products per capita can only be measured at national scale in Australia, as consumption data are not available at smaller scales.

National consumption per capita is shown in Figure 18 for sawnwood, wood based panels, and paper and paperboard, per 1,000 people, for Australia. It can be seen that:

- After growing for most of the period of 1995-2003, sawnwood consumption fell over 2004-2007;
- Consumption of paper and paperboard has grown overall, but not steadily over time, with some decreases in consumption at some points in time; and
- Consumption of wood based panels has grown over time, with some variation in trends in individual years.

The average annual rate of change in consumption for the periods 1994-95 to 1999-00, and 2000-01 to 2006-07, are shown in Figure 19. Growth in consumption of wood based panels and paper and paperboard was relatively similar across these two periods, while growth in the rate of sawnwood consumption fell considerably in the latter period.

National wood and paper consumption data provide useful information relevant to the Green Triangle region. As the wood and paper products produced in the Green Triangle, particularly from softwood plantations, are sold into national (as well as international) markets, forest industry production in the region is likely to be influenced by domestic consumption trends. Decreases in sawnwood consumption in recent years may at least partly explain the slower rates of growth and, in South Australia, decrease in volume and value of wood production in the Green Triangle, with sawnwood a major product produced by Green Triangle forest industry manufacturers.

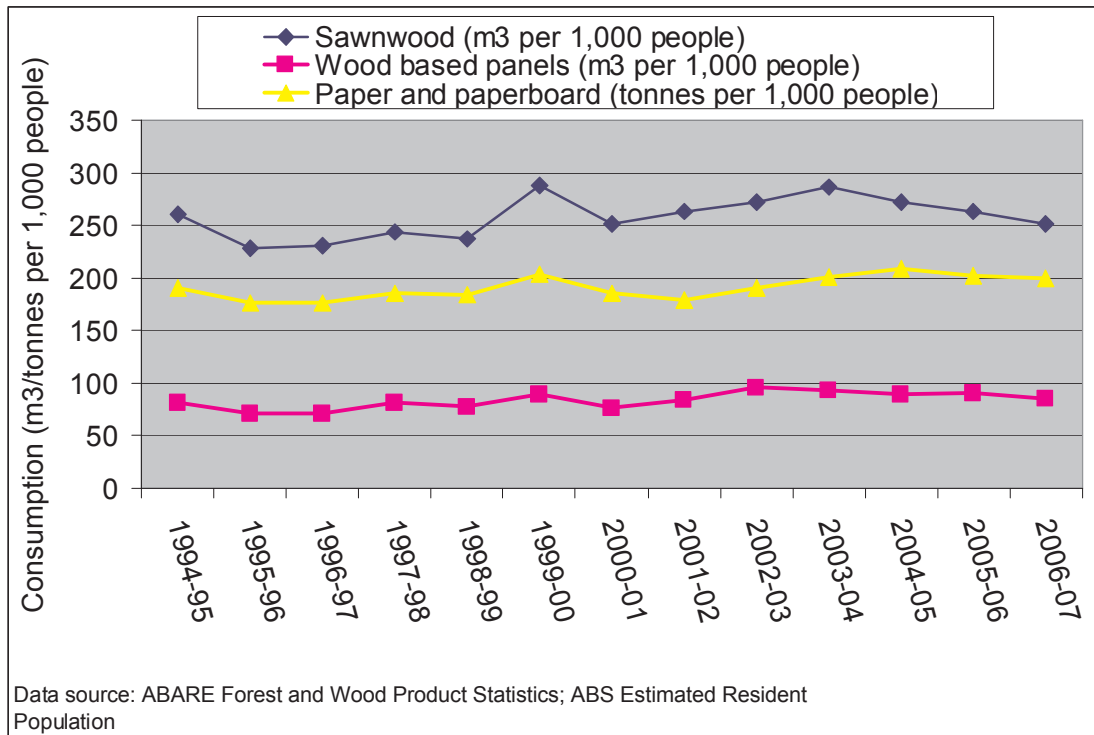


Figure 18: Consumption of wood and paper products per 1,000 people, 1995-95 to 2006-07

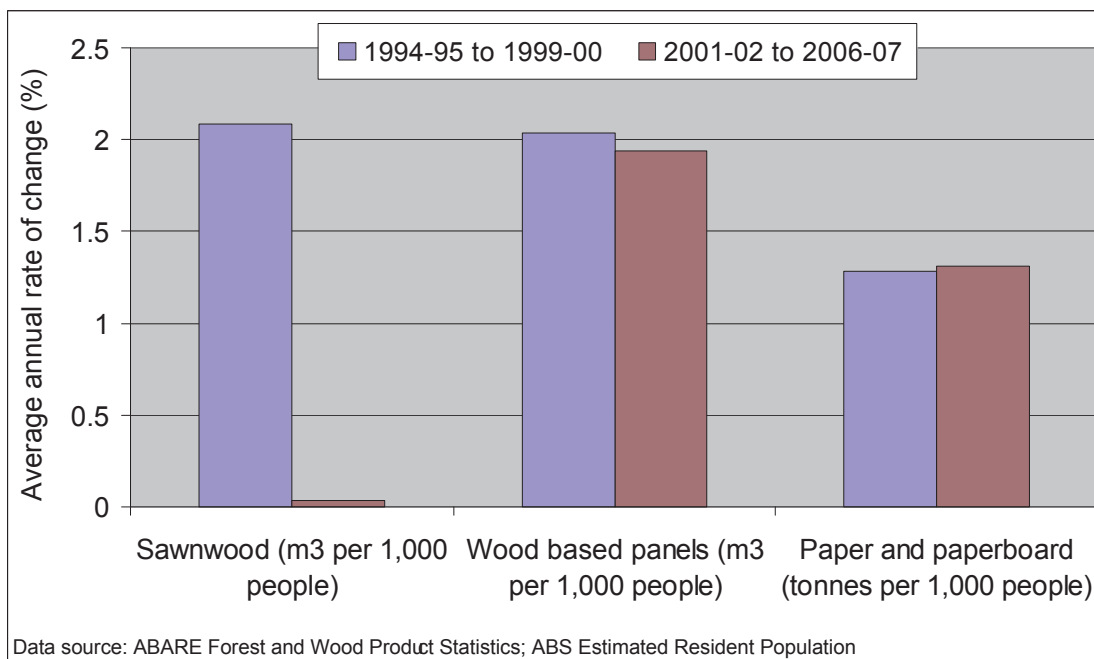


Figure 19: Average annual change in consumption of wood and paper products per 1,000 people, 1995-95 to 2006-07

3.2 Impacts of the forest industry on the broader community

The following indicators provide information that can assist in monitoring the social and economic impacts of the forest industry on the communities in which it is situated:

- Dependence on the forest industry (% employment);
- Social characteristics of forestry dependent regions;
- Location of forest industry employment;
- Impact of forest industry on rural population; and
- Values, uses and perceptions of forestry activities.

These indicators provide a picture of how dependence of different communities on the forest industry is changing over time, and also how forestry-dependent communities are changing in terms of their key socio-demographic and economic characteristics.

Change in social characteristics may be an indicator both of impacts of the forest industry on a community, and provide important understanding of how characteristics of the communities in which the industry operates may influence the industry. For example, if forestry-dependent communities have low levels of unemployment this may partly reflect job creation in the forest industry, but may also be a result of changes to employment in a range of industries. Low levels of unemployment may indicate the forest industry will have difficulty recruiting workers to fill new jobs, constraining its capacity to expand.

The indicators in this category provided a limited but useful understanding of key characteristics of forestry-dependent communities. They should be accompanied by in-depth studies which examine how people experience and interact with the forest industry, and the impacts of changes to the forest industry.

3.2.1 Dependence on the forest industry (% employment)

A first step in understanding the social and economic impacts of the forest industry is to identify the extent to which different regions depend on the forest industry. This indicator measures dependence by identifying the percentage of the workforce in a given area who depend directly on the forest industry for their employment¹⁴.

Within the Green Triangle, the highest dependence on the forest industry occurs in the South East region (see Figures 20 to 23, and Appendix 2 for graphs showing average annual rate of change in dependence over time). The SLAs of Grant, Mount Gambier, Wattle Range – East and Wattle Range – West all have very high dependence on forestry employment, with over 11% of the workforce, and up to 16%, working in the forest industry in 2006¹⁵. This level of dependence is much higher than the Australian or South Australian average.

In the Western District, parts of Glenelg Shire have a higher than average dependence on forestry employment, with Glenelg – Heywood and Glenelg – North having between 4% to 6% of their labour force employed in forestry over time, although this is still lower than for the four South East region SLAs.

Overall dependence on the forest industry has fallen over time in almost all regions, with some experiencing slight growth over 1996-2001 followed by decline over 2001-2006. The only regions with growth in dependence over 2001-2006 were those which had a very small number of forestry employment, such that this reflected very little real change in dependence.

Dependence on the plantation and native forest sectors could only be measured for 2006 (Figure 23). As the majority of employment in the region is based around softwood plantation forestry, the greatest proportion of dependence is also located in this sector, although in Wattle Range there is higher dependence on hardwood plantation derived products than in other areas.

Overall, there is considerable variability in dependence on the forest industry in the Green Triangle, with the highest dependence occurring in the South East part of the region. This may change in coming years as harvesting of hardwood plantations begins, as this process is likely to generate new types of employment based on the forest industry in the region.

The overall decline in dependence reflects both change in the forest industry, with some decline in overall forestry employment in the region in recent years, and also growth in the overall size of the labour force and other industries in parts of the region.

¹⁴ The indicator is measured by calculating the proportion of the working labour force employed in the forest industry. The data used were sourced from the ABS *Census of Population and Housing*, based on place of usual residence data. Note that it would also be possible to measure dependence using 'place of employment' data, as was done by Schirmer (2008). Dependence was measured based on a person's place of usual residence here because this reflects where people live, and hence where they are likely to spend a large proportion of their income.

¹⁵ If all contractors were included in ABS forestry data, the total dependence on forestry would be higher; For example, ABS data indicate that in Tasmania as a whole, 2.53% of the workforce are employed in forestry, whereas Schirmer (2008) estimated the figure to be 3.08% once all contractors were included in estimates. That said, ABS data are likely to accurately reflect changes over time in forestry employment as data have been measured the same way over time.



Figure 20: Proportion of labour force employed in the forest industry, 1996, 2001 and 2006

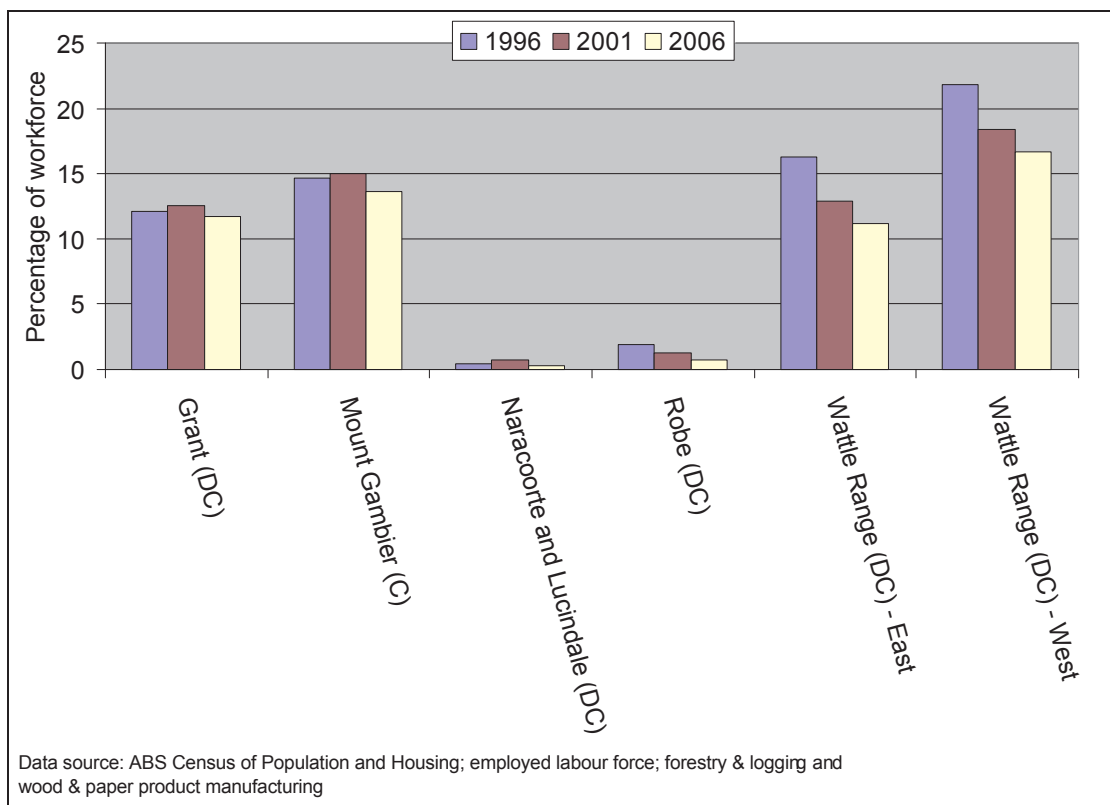


Figure 21: Proportion of labour force employed in forest industry - South Australia, 1996, 2001 and 2006

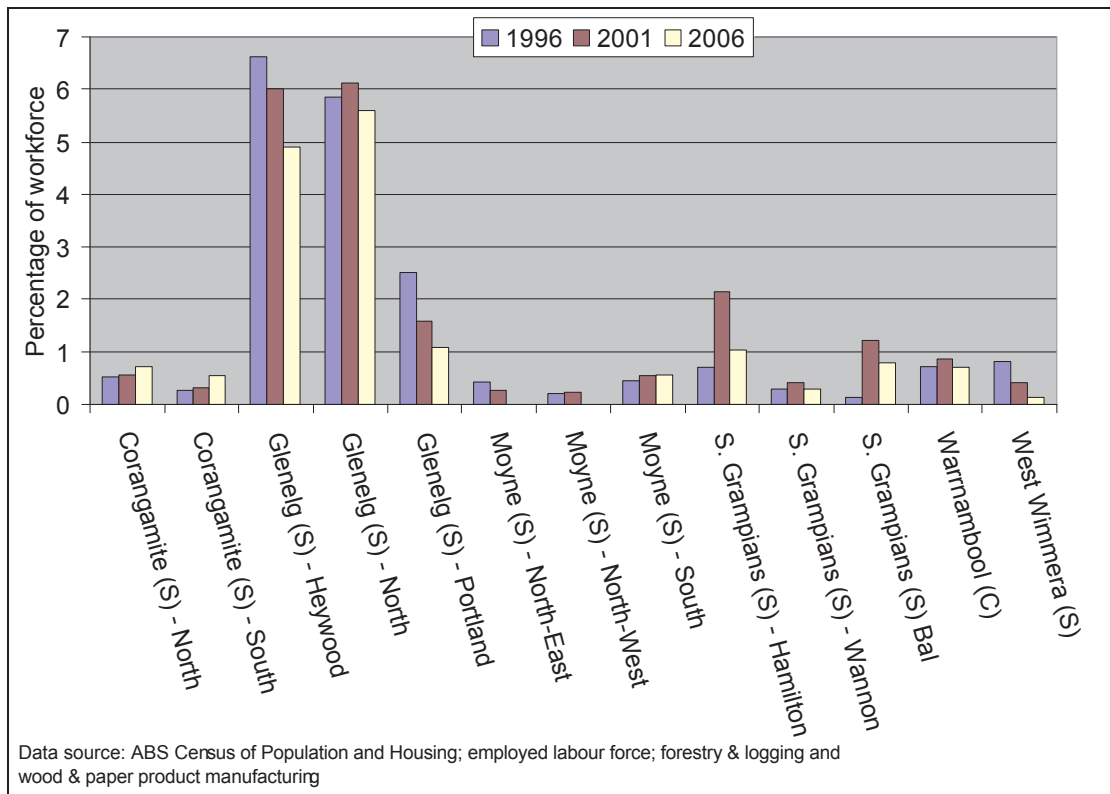


Figure 22: Dependence on the forest industry, measured as proportion of labour force employed in Victoria, 1996, 2001 and 2006

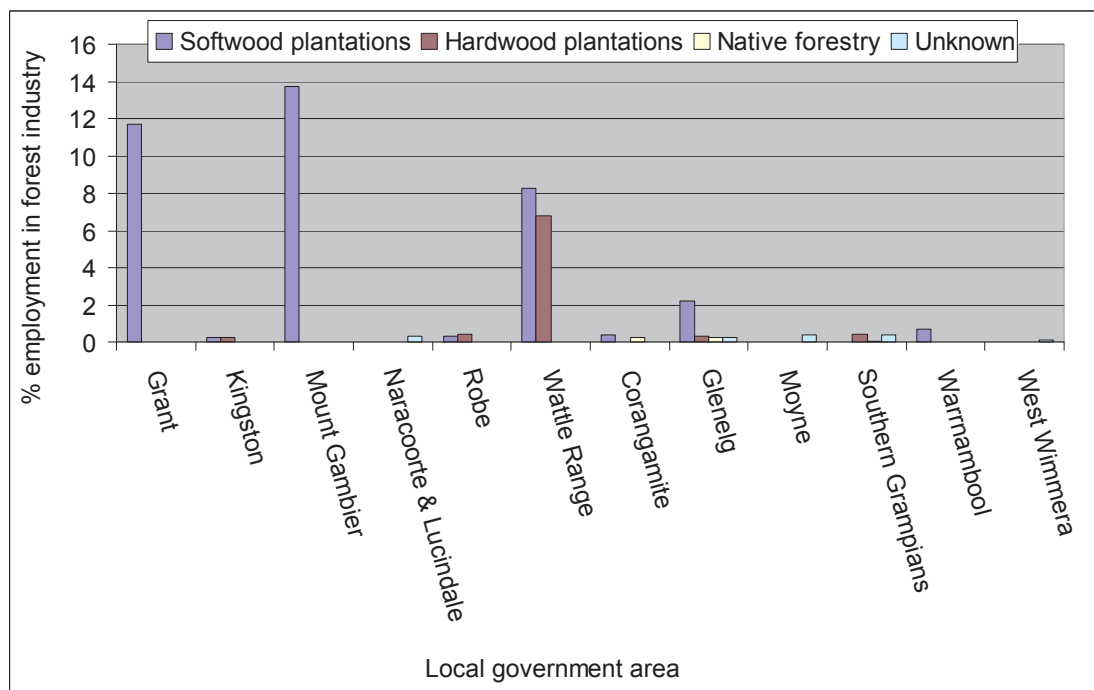


Figure 23: Dependence on the forest industry, measured as proportion of labour force employed in different forest industry sectors by LGA, 1996, 2001 and 2006

3.2.2 Social characteristics of forestry-dependent regions

It is possible that forestry-dependent communities have different social characteristics to other communities. These differences may or may not be a result of forest industry activities; either way, they are important to understand as they may influence the ability of a community to adapt to changes in the forest industry.

To better understand whether this is the case, this indicator measures key characteristics believed to be related to a region's ability to adapt to change, namely whether the total amount, and change, in the following differ for regions with higher and lower dependence on forestry:

- Total population;
- Unemployment rate;
- Educational qualifications (proportion of over 15 population with (a) no post-school qualifications, (b) certificate/diploma, (c) bachelor degree or higher);
- Median age;
- Median household income;
- Dependency ratio, which shows the ratio of population age <15 years and >65 years to the working age population aged 25-64 years; and
- Economic diversity (measured as proportion of total employed labour force working in the top three employing industries).

Areas within the Green Triangle were classified as having low, medium and high dependence on forestry based on the proportion of the labour force employed in forestry, with:

- Low = <2% of labour force employed in forestry;
- Medium = 2% to 5% of labour force employed in forestry;
- High = 5% to 10% of labour force employed in forestry; and
- Very high = >10% of labour force employed in forestry.

Based on this classification, the classification shown in Table 2 was identified.

Table 2: Classification of regions by level of dependence on the forest industry

Level of dependence	Region/s
Low dependence	Large scale: Australia, South Australia, Victoria Regional scale: Western District, Wimmera SLAs: Kingston, Naracoorte & Lucindale, Robe, Tatiara, Warrnambool (C) ¹⁶ , Corangamite (S) – North, Corangamite (S) – South, Moyne (S) - North-East, Moyne (S) - North-West, Moyne (S) – South, S. Grampians (S) – Hamilton, S. Grampians (S) – Wannon, S. Grampians (S) Bal, West Wimmera (S).
Medium dependence	SLA: Glenelg (S) - Portland
High dependence	SLAs: Glenelg (S) – Heywood, Glenelg (S) - North
Very high dependence	Regional scale: South East (SA) SLAs: Grant (DC), Mount Gambier (C), Wattle Range (DC) – East, Wattle Range (DC) – West.

Information on social characteristics of each region are presented in Table 3. For each, two figures are presented: the level in 2006, and rate of change over 1996-2006. This enables identification of whether regions with higher dependence on forestry have different characteristics (e.g. higher/lower unemployment rate) than other regions, and whether they have been changing in the same ways as other regions.

¹⁶ As described previously, (C) refers to 'city', (S) to 'Shire', and (DC) to 'District Council. Vic and SA refer to the states in which particular regions are located.

When characteristics of low, medium and high dependence forestry regions were compared for the Green Triangle, only three differences were observed between areas with differing levels of dependence:

- In areas with medium or high dependence on forestry, a slightly higher proportion of the adult population had a bachelor degree or higher qualification, than in areas with low dependence on forestry;
- Median age was slightly younger on average in regions with high or very high dependence on forestry compared to those with low dependence on forestry. However, some individual SLAs with low dependence on forestry had a median age as low as that in areas with high or very high dependence on forestry; and
- Median household income grew at a slightly slower rate in areas with higher dependence than the average for regions with low dependence on forestry.

In all three cases, it is entirely possible these differences are due to factors unrelated to the forest industry. The size of difference is relatively small, and it is not possible to identify to what extent the forest industry may either contribute to or be affected by these differences.

No other consistent differences were observed between areas with different levels of dependence on the forest industry, indicating that areas with high dependence on the forest industry have few differences in social characteristics compared to those with less dependence located nearby.

While areas with high dependence on forestry were rarely different to others, it is useful to identify whether the Green Triangle as a whole has different characteristics to the Victorian, South Australia, or Australian average. When examining the data in Table 3, it is apparent that:

- Areas within the Green Triangle which had a fairly small population (typically under 5,000) generally experienced a gradual loss of population over 1996 to 2006, while areas with a large population or near regional cities (e.g. Mt Gambier, Grant), and areas experiencing an influx of 'seachangers' such as Robe, experienced population growth;
- The overall unemployment rate in most parts of the Green Triangle was lower than the Australian unemployment rate in 2006, with the exception of Glenelg – Portland, and Mount Gambier, which had higher unemployment rates than the average for Australia, South Australia or Victoria;
- Unemployment rates fell in all regions examined over 1996-2006 with the exception of Naracoorte and Lucindale where there was a very low unemployment rate throughout this period;
- The proportion of the population aged over 15 with no post-school qualifications fell in all regions over 1996 to 2006, while the proportion of the population with a bachelor degree or other postgraduate qualification grew, similar to the average for Australia, South Australia and Victoria;
- Median age grew in all areas over 1996-2006 across all regions;
- Median household income was lower in most parts of the Green Triangle regions, and in South Australia, than the Australian and Victorian average, with the exception of Corangamite (both SLAs) and Grant; and
- While the overall dependency ratio – the proportion of the population aged under 15 and over 65 compared to those aged 25-64 – grew in Australia over 1996-2006, in most Green Triangle regions it either fell, or grew more slowly than the Australian average. Where the dependency ratio is falling, this indicates a growing number of working age people compared to 'dependent' aged population (whether

child or retirement age); slow growth indicates that the proportion of children and elderly are increasing as a proportion of the population.

Table 3: Social characteristics of Green Triangle study region

Forestry dependence	Region	2006 - Total population	Change in population 1996-2006	2006 – Unemployment rate	Change in unemployment rate 1996-2006	2006 - % population with no post-school quals	Change in population with no post-school quals, 1996-2006
Low	Moyne (S) - North-East	2331	-0.61	2.57	-6.25	69.64	-0.88
Low	Moyne (S) - North-West	2707	-0.85	2.90	-4.60	67.19	-1.11
Low	West Wimmera (S)	4356	-1.17	2.67	-5.72	71.89	-0.92
Low	S. Grampians (S) - Wannon	2251	-1.12	4.16	-4.07	68.23	-1.14
Low	Naracoorte and Lucindale (DC)	7901	0.10	3.21	0.02	67.93	-1.13
Low	Wimmera (Vic)	48441	-0.53	4.75	-3.36	69.02	-1.05
Low	Corangamite (S) - South	7467	-0.07	3.04	-3.23	67.86	-1.12
Low	Moyne (S) - South	10221	0.62	3.59	-5.54	65.20	-1.47
Low	Warrnambool (C)	30199	1.06	5.23	-5.18	63.86	-1.33
Low	Corangamite (S) - North	8911	-0.56	4.32	-4.33	70.34	-0.88
Low	Robe (DC)	1716	3.44	3.17	-7.22	72.65	-0.20
Low	S. Grampians (S) Bal	5200	-0.32	2.77	-5.97	61.86	-1.46
Low	Australia	19855288	1.18	5.24	-4.29	60.58	-1.34
Low	Victoria	4932423	1.17	5.41	-4.25	60.20	-1.34
Low	South Australia	1514336	0.54	5.24	-4.93	63.34	-1.16
Low	S. Grampians (S) - Hamilton	9205	-0.05	4.64	-4.78	65.86	-1.28
Low	Glenelg (S) - Portland	10246	0.03	7.78	-3.96	68.30	-0.86
Low	Western District (Vic)	98855	0.07	4.68	-4.70	66.73	-1.18
Medium	Glenelg (S) - Heywood	5891	-0.22	4.43	-3.68	67.63	-1.12
High	Glenelg (S) - North	3227	-1.20	5.23	-3.49	72.27	-1.11
High	South East (SA)	62214	0.24	4.88	-2.94	70.14	-1.02
V. High	Wattle Range (DC) - East	3107	-0.43	3.78	-2.66	70.83	-1.06
V. High	Grant (DC)	7691	0.34	3.50	-5.23	67.73	-1.19
V. High	Mount Gambier (C)	23272	0.56	7.10	-2.00	69.23	-0.99
V. High	Wattle Range (DC) - West	8366	-0.51	5.86	-2.71	72.67	-0.89

Table 3: Social characteristics of Green Triangle study region (cont.)

Forestry depend- ence	Region	2006 - % population with bachelor degree or higher	Change in % population with bachelor degree+ 1996-2006	2006 - Median age	Change in median age 1996-2006
Low	Moyne (S) - North-East	8.60	7.40	42	1.05
Low	Moyne (S) - North-West	8.18	6.29	39	0.54
Low	West Wimmera (S)	6.60	4.29	43	1.32
Low	S. Grampians (S) - Wannon	7.73	5.99	44	1.00
Low	Naracoorte and Lucindale (DC)	7.52	5.07	37	0.57
Low	Wimmera (Vic)	8.21	5.26	42	1.35
Low	Corangamite (S) - South	8.09	5.40	38	1.52
Low	Moyne (S) - South	10.25	5.99	39	1.14
Low	Warrnambool (C)	11.63	4.52	36	1.25
Low	Corangamite (S) - North	7.97	4.71	42	1.35
Low	Robe (DC)	6.18	2.71	42	1.05
Low	S. Grampians (S) Bal	12.13	6.97	41	0.79
Low	Australia	15.59	4.96	37	0.88
Low	Victoria	17.19	4.84	36	0.91
Low	South Australia	12.97	4.90	38	0.86
Low	S. Grampians (S) - Hamilton	9.87	5.19	41	1.71
Low	Glenelg (S) - Portland	8.09	4.25	38	1.88
Low	Western District (Vic)	9.54	5.40	39	1.14
Medium	Glenelg (S) - Heywood	7.89	6.01	40	1.11
High	Glenelg (S) - North	6.81	8.56	45	1.54
High	South East (SA)	6.73	4.97	37	0.88
V. High	Wattle Range (DC) - East	7.88	5.49	37	0.57
V. High	Grant (DC)	7.02	5.60	38	1.18
V. High	Mount Gambier (C)	7.46	4.19	36	1.25
V. High	Wattle Range (DC) - West	5.23	5.53	39	1.47

Table 3: Social characteristics of Green Triangle study region (cont.)

Forestry dependence	Region	2006 - Median household income	Change in median household income 1996-2006	2006 - Dependency ratio	Change in dependency ratio 1996-2006
Low	Moyne (S) - North-East	739	5.79	0.67	0.37
Low	Moyne (S) - North-West	914	8.24	0.55	-0.60
Low	West Wimmera (S)	728	6.43	0.66	0.37
Low	S. Grampians (S) - Wannon	651	5.21	0.67	-0.95
Low	Naracoorte and Lucindale (DC)	925	7.59	0.53	-0.94
Low	Wimmera (Vic)	728	5.26	0.65	-0.07
Low	Corangamite (S) - South	1035	8.22	0.58	-0.19
Low	Moyne (S) - South	935	7.71	0.56	-1.06
Low	Warrnambool (C)	874	7.34	0.55	0.08
Low	Corangamite (S) - North	695	5.11	0.67	0.23
Low	Robe (DC)	796	6.86	0.61	0.59
Low	S. Grampians (S) Bal	986	9.80	0.56	-0.51
Low	Australia	1027	6.59	0.50	2.41
Low	Victoria	1021	6.26	0.49	-0.28
Low	South Australia	885	6.42	0.51	-0.30
Low	S. Grampians (S) - Hamilton	765	6.11	0.60	-0.44
Low	Glenelg (S) - Portland	836	5.71	0.55	-0.51
Low	Western District (Vic)	850	7.14	0.60	-0.22
Medium	Glenelg (S) - Heywood	980	7.13	0.52	-0.98
High	Glenelg (S) - North	643	4.45	0.73	0.38
High	South East (SA)	874	5.95	0.55	-0.25
V. High	Wattle Range (DC) - East	853	5.51	0.52	-0.71
V. High	Grant (DC)	1063	6.53	0.49	0.01
V. High	Mount Gambier (C)	816	4.95	0.53	-0.10
V. High	Wattle Range (DC) - West	810	4.67	0.60	0.23

3.2.3 Location of forest industry employment

The location of jobs can provide important information on their social impact, and on what types of towns will be most impacted by a change in employment in an industry. Recent studies have indicated that many people believe the majority of jobs in the forest industry are located in larger towns and regional centres, and fewer in small towns and villages, and this perception has been recorded in the Green Triangle region (Schirmer *et al.* 2008c). Identifying where forest industry employment is located can help identify whether these perceptions are correct, and also whether the location of forest industry jobs is changing over time.

This indicator compares the proportion of forestry employment located in different sized towns versus the proportion of (a) employment in the agricultural sector, and (b) overall employment. Town size was classified into groups of rural areas towns with:

- Rural land and localities with < 200 population;
- 200-499 population;
- 5,00-999 population;
- 1,000-1,999 population;
- 2,000-2,999 population;
- 3,000-4,999 population;
- 5,000-9,999 population; and
- > 10,000 population.

This range of town sizes was selected as many of the towns in the areas being studied had a population of less than 5,000, and so it was considered useful to ensure several categories of town size were included.

Overall, the distribution of forest industry employment in the Green Triangle in 2006 was somewhat similar to the distribution of the total labour force across differently sized towns (Figures 24 and 25)¹⁷.

The key difference is that a moderately higher proportion of forest industry employment is located in towns with more than 10,000 population and less are located in towns with less than 200 residents and rural land compared to the distribution of the labour force overall. This confirms the perception that forest industry employment is typically centred in larger towns/cities within the Green Triangle region.

Forest industry employment in the Green Triangle is much more urbanised than the location of agricultural employment. This indicates that any shift from traditional agriculture to forest industry-based employment is likely to be accompanied by some shift of employment to regional centres.

¹⁷ It was only possible to measure these data for 2006, as data for earlier years were not able to be accessed from the ABS within the timeframe of the consultancy.

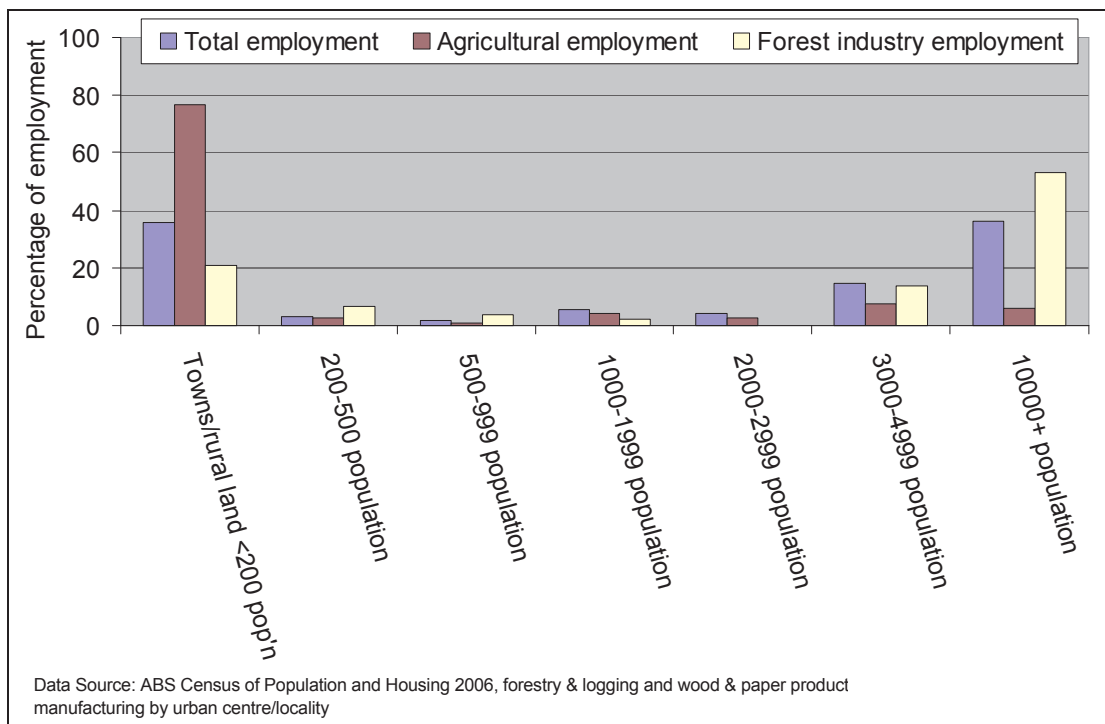


Figure 24: Proportion of forestry, agricultural and total employment in localities of different sizes in the South East region of South Australia, 2006

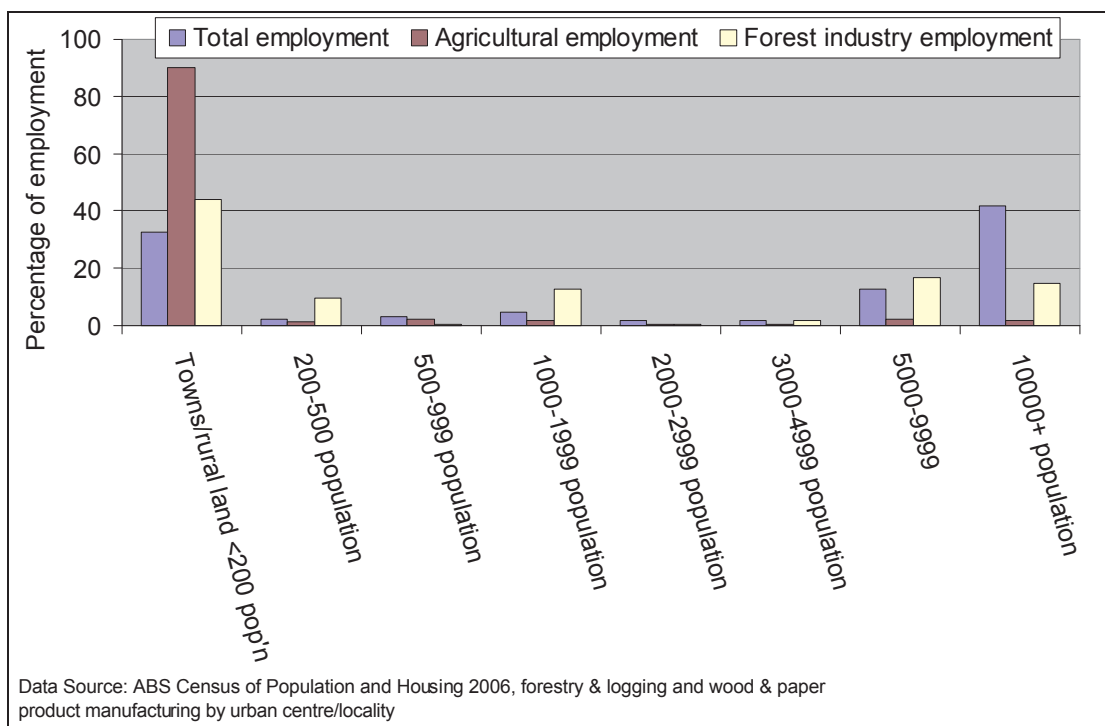


Figure 25: Proportion of forestry, agricultural and total employment in localities of different sizes in the Western District and Wimmera regions of Victoria, 2006

3.2.4 Impact of forest industry on rural population

In recent years, concerns have been expressed that expansion of plantations may lead to change in the population of small rural towns and on rural land. This indicator compares rural population change in areas experiencing different rates of plantation expansion, to identify if there are identifiable differences in rural population change in areas experiencing rapid rates of plantation expansion compared to the average rate of change in rural population. Rural population is defined as the population living on rural properties and in localities (small towns and settlements) with less than 200 residents. This social indicator relates to plantation forestry only, as these concerns have been expressed exclusively about plantation expansion and do not relate to native forestry.

The rate of expansion of plantations¹⁸ and average annual rate of change in rural population over 1996 to 2006 are shown in Figures 26 to 27. When the rate of plantation expansion is compared to change in rural population, no apparent pattern is seen – areas with higher rates of plantation expansion did not experience higher rates of population decline, and vice versa. Rural population declined somewhat in most regions, irrespective of whether they were experiencing plantation expansion, and rates of rural population decline were not higher in areas experiencing the most plantation expansion.

This indicates that, at the SLA scale, the expansion of plantations in recent years in the Green Triangle has not had an impact on overall rural population levels that is able to be distinguished from other factors influencing rural population. While it is still possible that plantation expansion led to loss of population, at the SLA scale this decline was no greater than that caused by other trends in the region, such as amalgamation of farms.

It is possible that at more localised scales, plantation expansion has been associated with loss of rural population, as the SLA scale is still reasonably large – a single SLA may include a large number of rural properties, only a small number of which will have been established to plantation over a given period.

¹⁸ Initially, average annual change in plantation area was calculated. However, this proved to be a poor indicator of rate of change, as some areas which experienced expansion of plantations of only 400 hectares over this period (eg Moyne – South) experienced a much higher rate of change in plantation area (32,000% as the area of plantations at the beginning of the period was less than one hectare) than those which experienced a greater expansion of plantations (for example, plantation area in Glenelg – North grew from 760ha to 21,560ha over the same period, but the average annual rate of change was only 275%). It is therefore more appropriate to use the area of expansion of plantations, rather than the average annual rate of change, as a measure of plantation expansion. This indicator can only be measured meaningfully at local scale, so includes only SLAs and not larger regions.

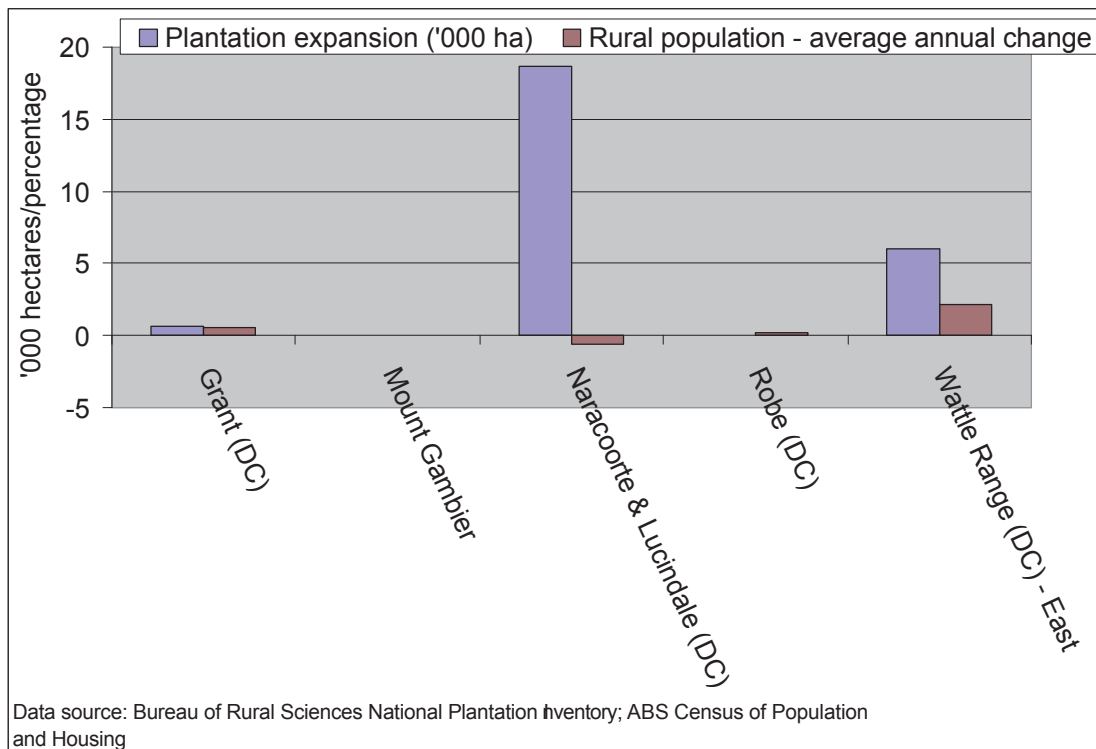


Figure 26: Area of plantation establishment and average annual rate of change in rural population, 1996-2006 – South East region, South Australia

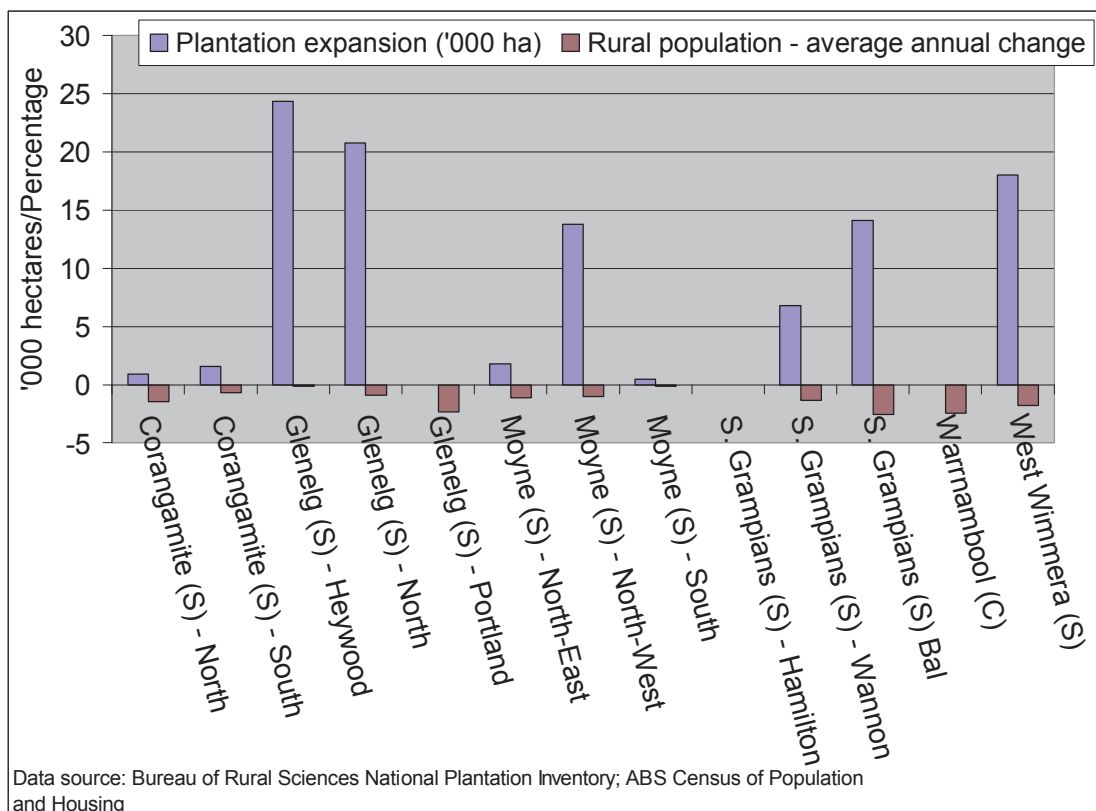


Figure 27: Area of plantation establishment and average annual rate of change in rural population, 1996-2006 – Western District and Wimmera regions, Victoria

3.2.5 Values, uses and perceptions of forestry activities

Perceptions of the Green Triangle population about forestry were not identified for this study, as this would require a survey of the communities within the region, which was not possible to undertake for this consultancy. It is important to understand how the following are changing over time:

- Attitudes and values held about different types of forestry - what overall values and attitudes do people hold regarding forestry in general, and acceptability of different forestry practices? How do these differ between people with different characteristics and living in different regions?;
- Uses of forests – are different people changing the ways they use the forest, for example the types of recreational activities undertaken and access for uses such as firewood collection? Is frequency of use changing? Are the types of people using forests changing over time?; and
- Perceptions of forestry activities – what are the differing perceptions of forest industry activities and how are these changing over time? This may include examining access to information sources and how these influence perceptions.

A recent study by Williams et al. (2008) surveyed residents living in a region which encompassed the Green Triangle. They focused on understanding perceptions of different types of land use change in the region, including land use change to blue gum (hardwood) plantations. Key findings included that land use change to plantations was viewed more negatively than the other types of land use change studied. Compared with other land use changes such as expansion of dairy farming, expansion of cropping and growth in rural residential development, more people thought that expansion of blue gum plantations led to population loss, fewer jobs, lower levels of community involvement, road damage and wildfire risk. These perceptions varied widely, however. Less than 50% of respondents viewed blue gum plantations as a negative land use overall, with others either unsure or viewing them positively.

This indicates that expansion of hardwood plantations in the region remains controversial and its impacts are widely debated. There is no ‘consensus’ view about the impacts of plantations, with different people holding different opinions.

It would be useful to undertake a similar survey in the future once hardwood plantations have matured and a harvesting and processing industry is developed, to identify if this is associated with any change in perceptions of hardwood plantations in the region.

3.3 Impacts of the forest industry on its workforce

The following indicators provide information that can assist in monitoring the social and economic impacts of the forest industry on the people who depend on forestry for their livelihood, by analysing change in the following characteristics of forestry workers over time:

- Income earned;
- Work injury rates;
- Self-rated physical and mental health;
- Self-rated well-being;
- Age;
- Gender;
- Attachment to place;
- Cultural and family attachment to forestry;
- Hours worked; and
- Educational qualifications.

These indicators provide a picture of key characteristics of forestry workers compared to the overall labour force, how their well-being is changing over time, and their relationship to the industry that employs them.

They provide a useful understanding of some key characteristics, but should be accompanied by more in-depth study which identifies what changes in the different characteristics mean – if the forestry workforce is ageing, is this an indicator of potential future skills shortages? How does working long (or short) hours affect people in the industry?

3.3.1 Income earned by forestry workers

The income earned by forestry workers is a key indicator of their wellbeing, although with limitations. Higher income does not always indicate higher wellbeing, although it is argued to have at least some impact on wellbeing by a number of theorists, and many studies have demonstrated some link between the two.

The average income earned by forestry workers in 2006 is shown in Figure 28, while change in income over 2001-2006 is shown in Figure 29. The distribution of forestry workers income is compared to that of the overall labour force in Figure 30¹⁹. It can be seen that in the South East region of South Australia, forest industry workers earned more on average than forestry workers in other regions, while in the Western District and Wimmera regions, they earned less than average for other regions. Western District and Wimmera forestry workers have experienced slower growth in the \$1,000-1,599 income bracket than other regions, while South East forestry workers experienced higher growth in this category, consistent with the finding that income is higher in the South East. The reasons for the difference in income within the Green Triangle cannot be identified based on this data, with more work needed to identify the reasons for differences in income.

When compared to average income across all workers, fewer forestry workers earn less than \$400/week, and more earn between \$400-\$1599 than the average across the total workforce. Slightly more forestry workers earn above \$1600 per week compared to the overall workforce.

Therefore forestry workers on average earn a higher income than the Australian average across most income categories. This is partly because forestry worker income is measured for those employed in forestry, whereas income across the whole labour force includes income earned by those on social security benefits, which tends to reduce income.

This difference is greatly reduced when low income earners are removed; Figure 31 shows distribution of income amongst workers earning more than \$400/week, which would exclude most social security payments. A greater percentage of forestry workers earn \$600-999 than the average for all workers, while fewer earn \$400-599, and somewhat fewer earn above \$1600. Income distribution of forestry workers and the general workforce is similar for the \$1,000-1,499/1,599 category.

¹⁹ Data for this indicator were calculated using ABS statistics. While the survey of forestry workers undertaken for this case study also asked for information on income, the sample achieved does not provide a robust analysis of distribution of income within the forestry labour force and was not high enough to analyse differences between forestry sectors. Key limitations of the ABS data include that:

- The ABS changed their income categories substantially between the 2001 and 2006 Census of Population and Housing. This means there is limited comparability of data across these two periods, although some comparison is possible. As a result, the income categories are unevenly distributed as they have been grouped into categories that are possible to compare across the two periods
- ABS data can only be realistically presented for regions which had >50 forestry workers. This is because in areas where there are few forestry workers, randomisation of data by the ABS to preserve confidentiality may mean the data do not accurately represent average forestry income, and because the small sample involved means it is not possible to identify whether variation in income distribution is a natural function of the variation expected in a small sample, or reflects actual differences in income between regions.

It is recommended that this indicator only be used to Statistical Division level as small numbers of workers in some SLAs reduce usefulness of using the indicator at local scales²⁰.

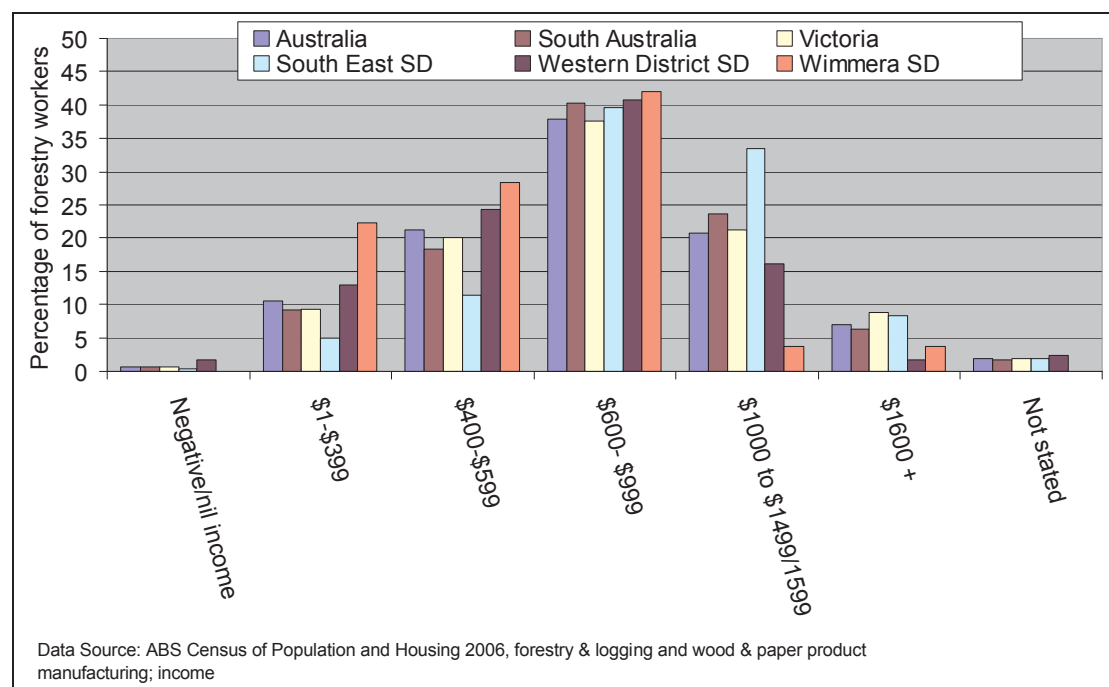


Figure 28: Distribution of forestry worker income, 2006 – Australia, South Australia and Victoria, and South East, Western District and Wimmera Statistical Divisions²¹

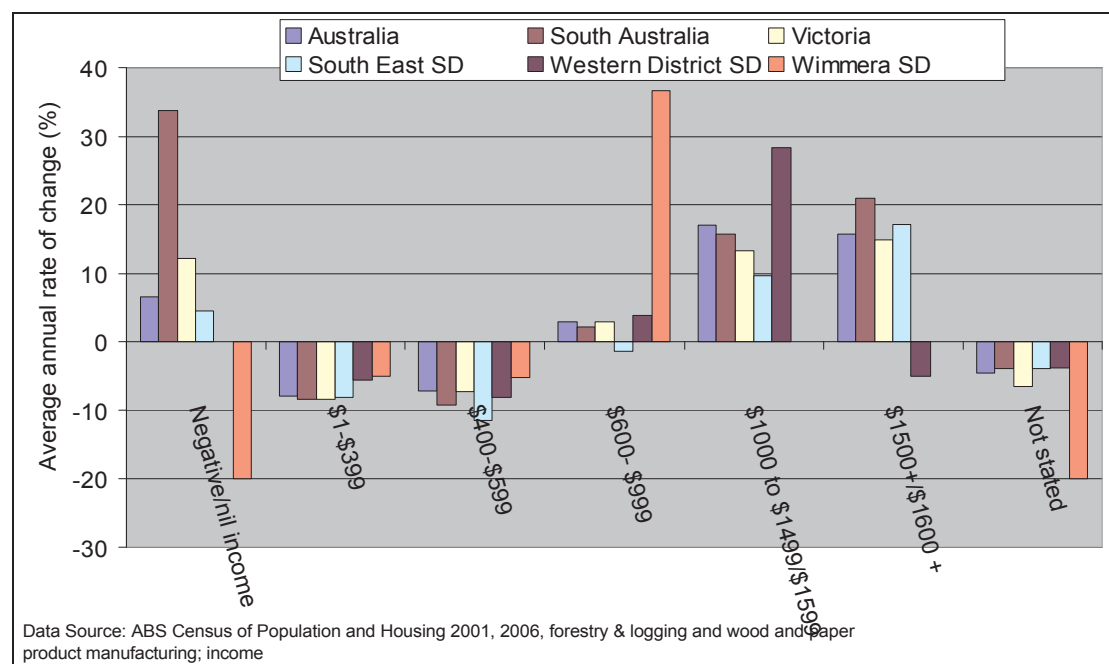


Figure 29: Average annual rate of change in percentage of forestry workers in different income categories, 2001-2006

²⁰ Data by SLA are shown in Appendix 3; it can be seen that there is variation within SLAs, however the small numbers of people employed in many SLAs means it is not possible to evaluate if the distribution of income reflects differences in income paid across regions, or simply reflects (a) randomisation of data by the ABS and (b) variation that would be expected when comparing small samples.

²¹ The '\$1,000 to \$1,499/\$1,599' category has two ranges as the ABS changed the income ranges for which they collect data over time. Before 2006, income was measured up to \$1,499; after 2006, income was measured up to \$1,599.

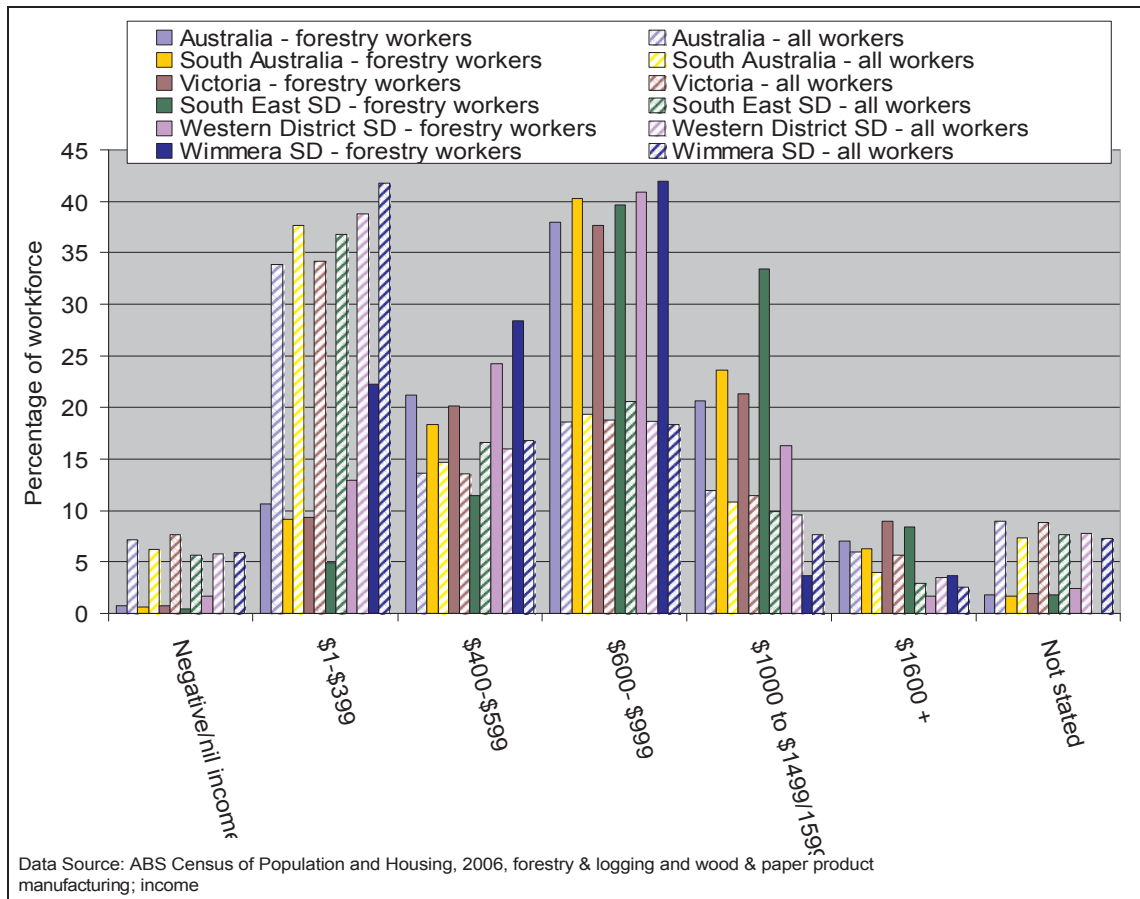


Figure 30: Comparison of forest worker income and average income of total workforce, 2006

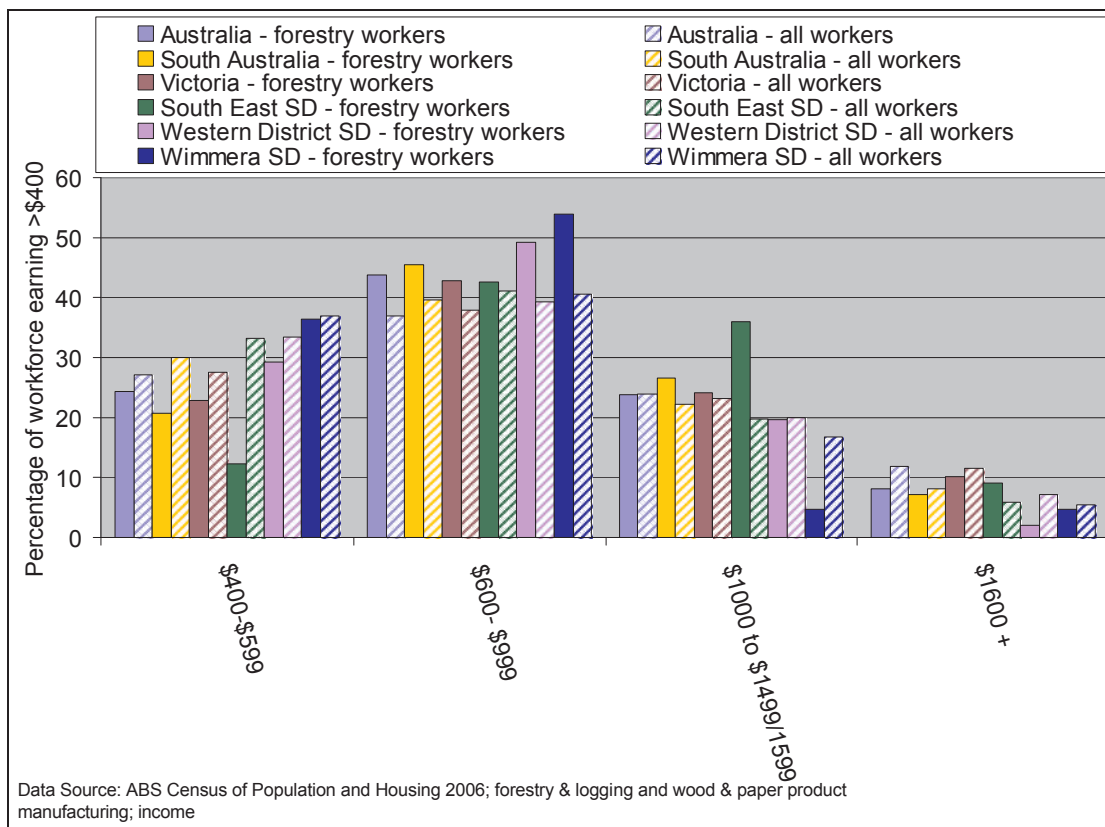


Figure 31: Comparison of forest worker income and average income of total workforce for those earning more than \$400 per week, 2006

3.3.2 Physical health – reported injury rates

The physical health of forestry workers has a significant influence on their wellbeing. The most direct way to measure how working in the industry impacts on wellbeing of workers is to identify the rate of workplace injuries experienced by forestry workers.

This social indicator reports rates of workplace injuries per 1,000 forest industry workers over a financial year. The information in injuries is drawn from the National Data Set for Compensation-based Statistics (NDS). The NDS records all occupational diseases and injuries for which a work-based compensation payment has occurred, including diseases and injuries causing death, permanent incapacity, or temporary incapacity. It does not include incidence of occupation-related diseases or injuries for which no compensation payment has been made, so represents only a subset of the total occupational diseases and injuries. It is a useful dataset because it allows comparison across industries, so that even with only compensated diseases and injuries included it enables identification of whether the forest industry has higher occupational disease and injury rates than other industries.

When examining data over 1997-98 to 2005-06 (Figures 32 and 33²²), it can be seen that:

- There is a higher rate of occupational disease and injury in the forestry and logging sector compared to the average across all industries, and compared to the ‘agriculture, forestry & fishing’ and ‘agriculture’ industries;
- There is a higher rate of occupational disease and injury in the wood and paper product manufacturing sector compared to the manufacturing sector as a whole, and compared to the average across all industries;
- Occupational disease and injury rates are consistently higher in the wood and paper product manufacturing sector compared to the forestry and logging sector;
- Occupational disease and injury rates in the forestry and logging sector have varied widely. While there has been a slight fall in the rate of forestry and logging incidence of injury and disease over time, this fall has been less than that experienced in either of the comparison categories; and
- Occupational disease and injury rates in the wood and paper product manufacturing sector have fallen over time, but not at the same rate as they have fallen in the manufacturing sector as a whole, or across all Australian industries.

Overall, the forest industry experiences a higher rate of occupational disease and injury than other industries, particularly in the manufacturing sector, and rates of occupational disease and injury are falling more slowly than for other industries. The higher risk of disease and injury in the forest industry compared to others is an indicator of reduced wellbeing in the industry.

While these data do not specifically cover the Green Triangle, they indicate that it is likely that the forest industry there has relatively high levels of occupational disease and injury. It would be useful to have data for native forest and plantation sectors separately, as different technologies and practices are used for both and this may be associated with differing rates of injury and disease. Unfortunately, these data are not currently available.

²² The data is presented two ways: in Figure 32, change in reported injury rates over time for each industry can be compared; in Figure 33, the rate of injuries for a defined period of time can be compared across different industries.

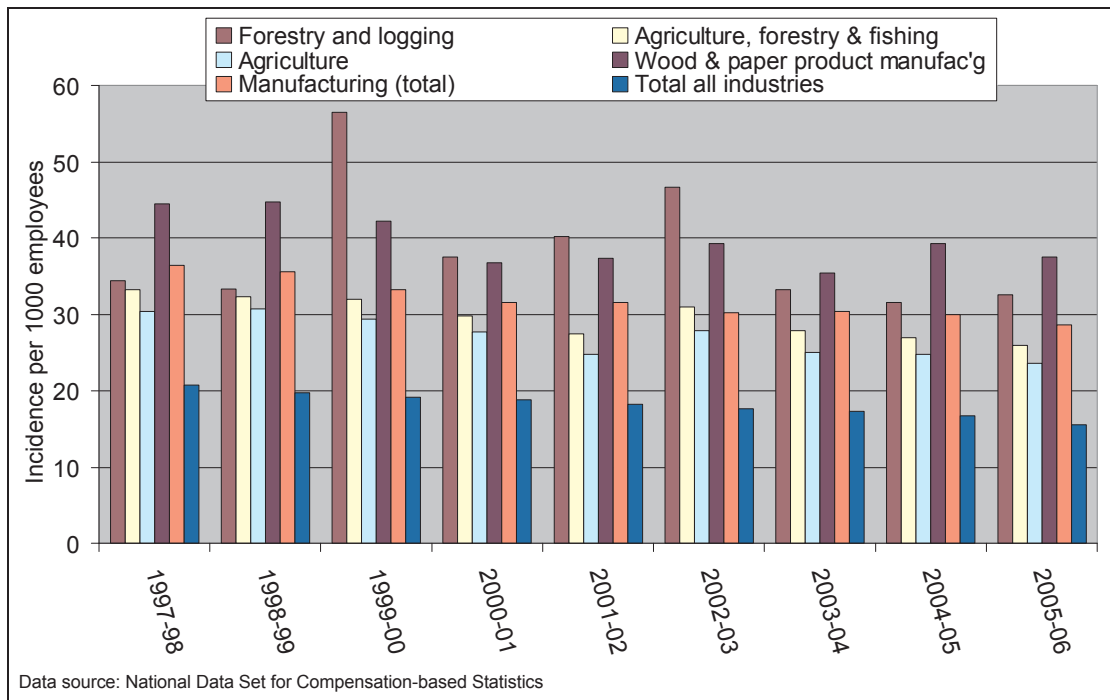


Figure 32: Compensated occupational disease and injury rate per 1,000 workers, compared across industries, 1997-98 to 2005-06

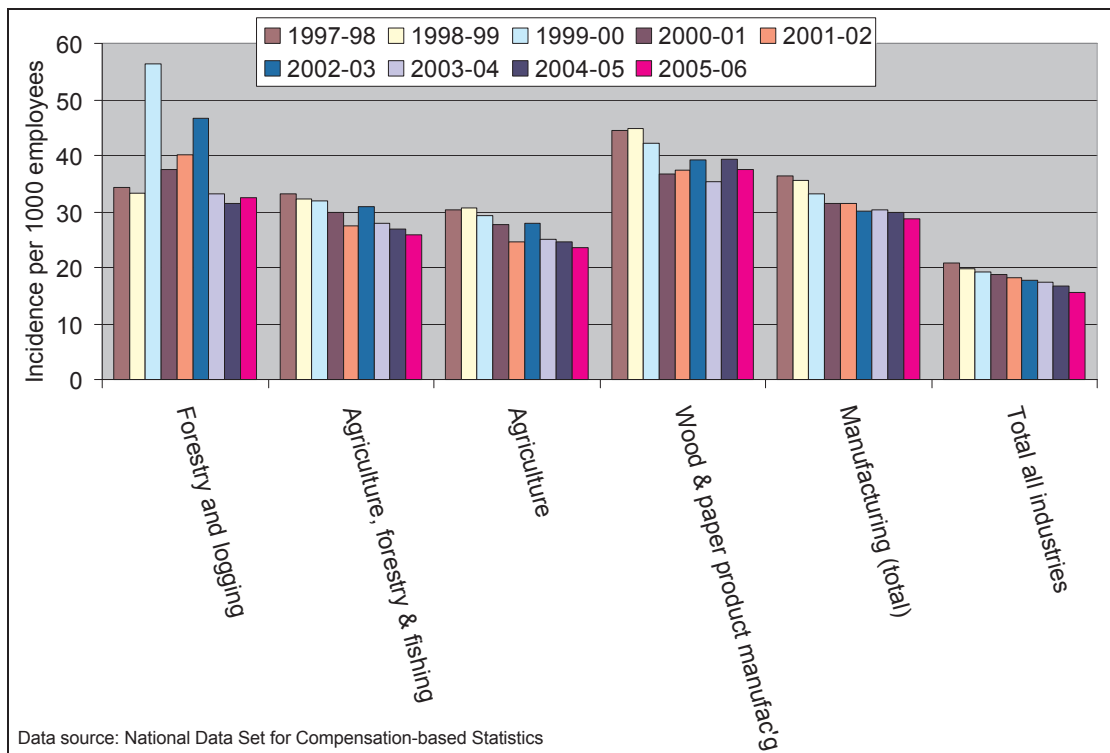


Figure 33: Compensated occupational disease and injury rate per 1,000 workers, compared over time, 1997-98 to 2005-06

3.3.3 Self-rated health (physical and mental)

While data on compensated disease and injury are useful, they provide information on a subset of health issues that may be of relevance. This social indicator reports the physical and mental health of forestry workers, based on their self-reported health.

Data were gathered via a survey of forestry workers in which they were asked to self-identify the extent to which they had experienced symptoms such as difficulty sleeping, depression, stress or anxiety, and physical injury while working, as well as the level of work-related risk they perceived was present in their workplace as a result of the physical conditions, hours worked, equipment, noise, and stress. As described in the 'Methods' section, survey responses may be biased towards office-based industry workers.

The proportion of respondents who had experienced a symptom of ill-health is identified in Figure 34, which compares forestry workers in the Green Triangle to all survey respondents. Survey respondents were also asked whether they had seen a medical professional; between 7% and 15% of respondents had seen a medical professional about the symptoms they experienced.

Green Triangle respondents reported similar health problems to all other forestry workers across all categories.

Across all workers, difficulty sleeping was the most common health problem reported, with 67% of respondents experiencing the symptom and 8% of these seeing a health care professional about it. The least common health problem was physical injury incurred at work, with 12% experiencing the symptom and 6% of these seeing a health care professional about the injury. The low level of physical injury reported is likely to be influenced by the high number of respondents who were employed in forestry jobs that do not involve physical labour.

Forty six per cent of respondents experienced back pain, and 10% of these had seen a health care professional about it. Fifty seven per cent of employees have been affected by stress, anxiety or depression, with 8% of these visiting a health care professional because of these symptoms. Headaches and excessive fatigue also affected just under half of those surveyed.

Further work is needed to identify if these results are unusual for people of working age who are employed, or whether trends for forestry workers are different to other workers. Repeating this survey over time would enable identification of whether forest industry workers are experiencing changes in levels of health problems over time.

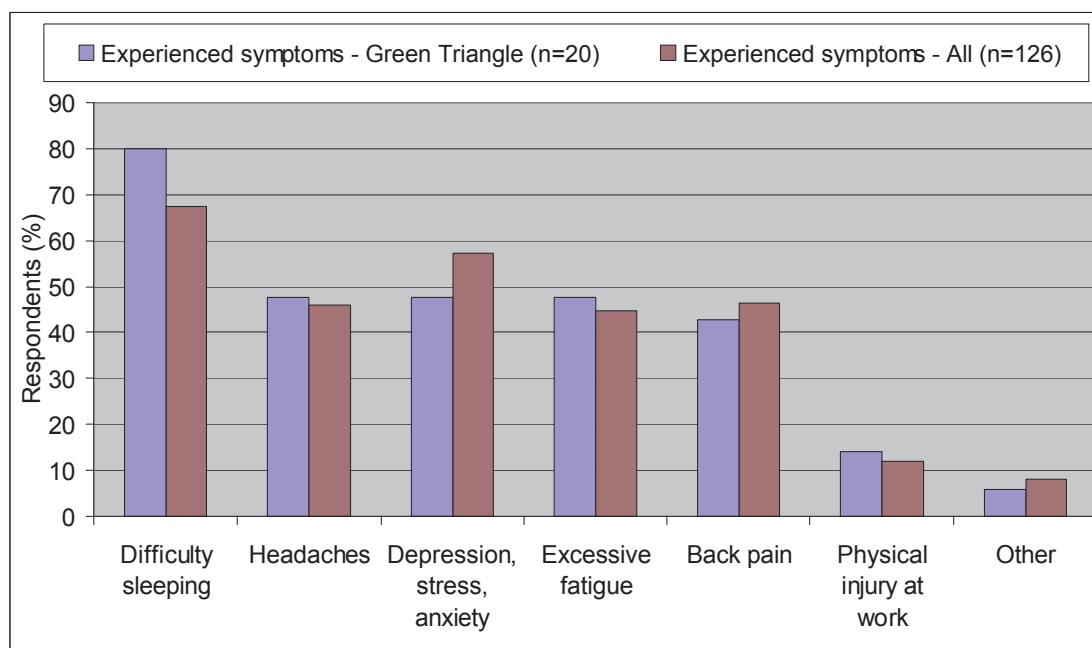


Figure 34: Health problems experienced by forest worker survey respondents

As well as asking about health problems experienced, the survey asked worker's perceptions of the level of risk their work presented to their wellbeing. Responses are shown in Figure 35.

The level of noise experienced at work was perceived to be the smallest risk to forest industry employees. Physical elements of working in the forest industry, and the equipment used were usually considered to present no or little risk. This is likely to reflect the bias in survey responses towards those who are primarily office-based employees.

Aspects of working in the forest industry which led to the largest perceived level of risk were stress and the numbers of hours worked, with 62% and 38% of all respondents respectively rating these as medium to very high risks.

Forestry workers located in the Green Triangle were very similar to all other respondents to the survey, with the same trends reported in terms of work risk. The small differences evident are likely to be the result of the small sample achieved for the Green Triangle, and cannot be confidently identified as indicating differences between workers in the Green Triangle and elsewhere.

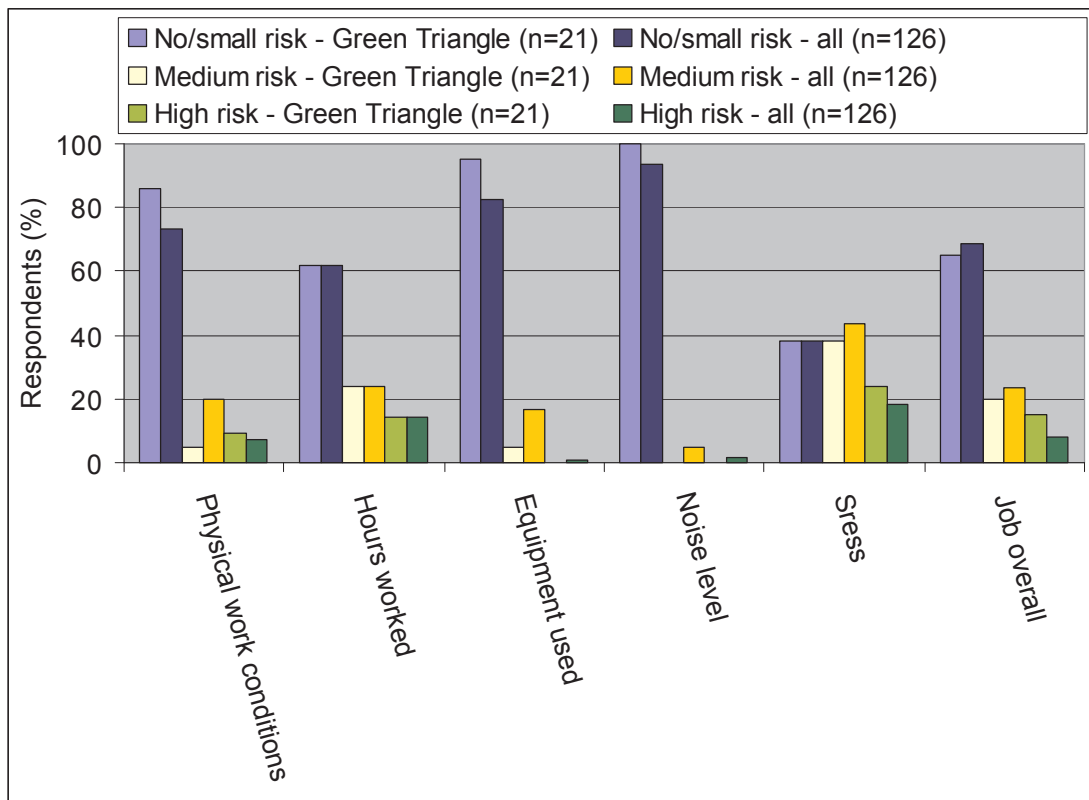


Figure 35: Workplace risks identified by survey respondents

Overall, the responses indicate that the survey approach can provide useful information on worker health. However, it is not possible to identify the extent to which health problems were linked to the workplace for many of the health issues identified; and the small sample means it is not possible to identify how representative these responses are of workers in the forest industry as a whole. While this survey provided useful data for forest industry workers as a whole, it was less useful in identifying any regional differences in forest worker health. Use of a survey to identify these issues should be carefully designed and resourced to enable a large sample of workers to be surveyed, if different regions are to be adequately compared.

3.3.4 Wellbeing of forestry workers

The survey sent to forestry workers asked them to rate their level of satisfaction with a range of issues related to their life, work, family and income (see Figures 36, 37 and 38). The survey responses to questions about satisfaction with their own lives and financial situation (Figure 36) suggest that forest industry workers are generally happy with most aspects of their life, particularly life in general and the area in which they live, although their level of satisfaction of their financial situation and health was slightly lower than for other aspects of their lives. Green Triangle respondents were very similar to other workers in all aspects. As previously, the small differences evident between workers in the Green Triangle and other workers are likely to reflect the small sample size achieved from the Green Triangle rather than actual differences in level of satisfaction.

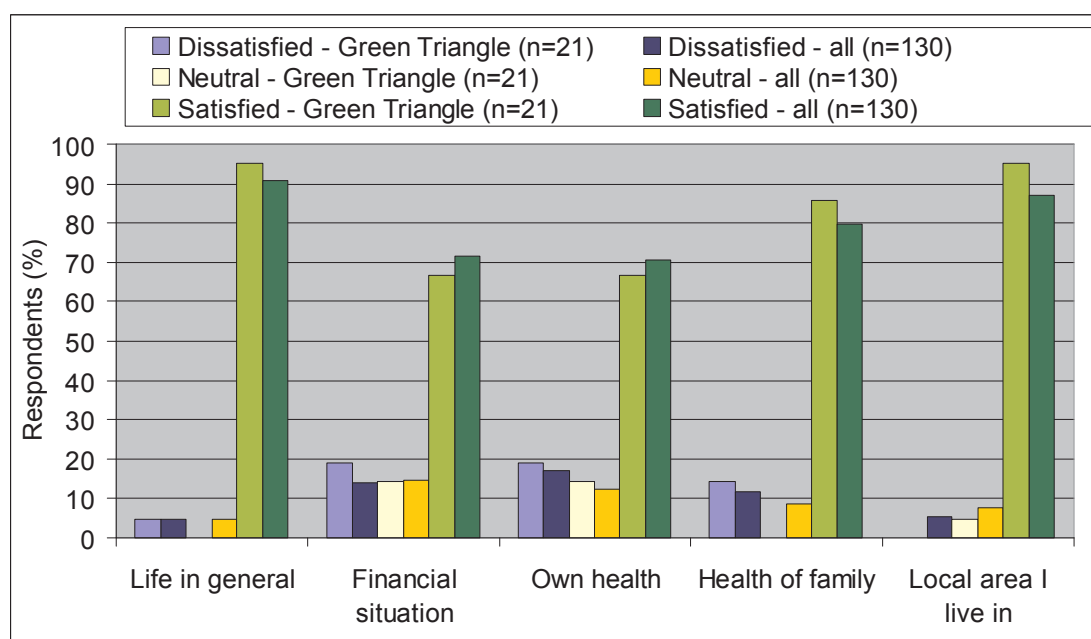


Figure 36: Forest workers' satisfaction with life – survey responses

Forestry workers satisfaction with different aspects of their work varied more widely. Workers who responded to the survey were asked their level of satisfaction with the challenge in their work, control and independence, job security, balance, workmates and other people, and with their job overall (Figures 37 and 38). Responses to this question from Green Triangle respondents were similar to the average for all respondents, indicating that the issues raised by Green Triangle respondents, such as dissatisfaction with support received from organisations outside the industry, are common across the industry nationally rather than being region-specific.

Forestry workers were in general less satisfied with the following compared to other aspects of their work:

- the level of support received from groups outside the forest industry such as local government and other community bodies;
- the rules set by government on how the forest industry can operate; and
- the fairness of decisions about management of the forest industry.

All these issues relate to the views and decisions of people outside the industry about the industry, and indicate these external influences are a key factor influencing wellbeing and work satisfaction. There was also less satisfaction with long-term viability of the industry than other aspects of work for many respondents.

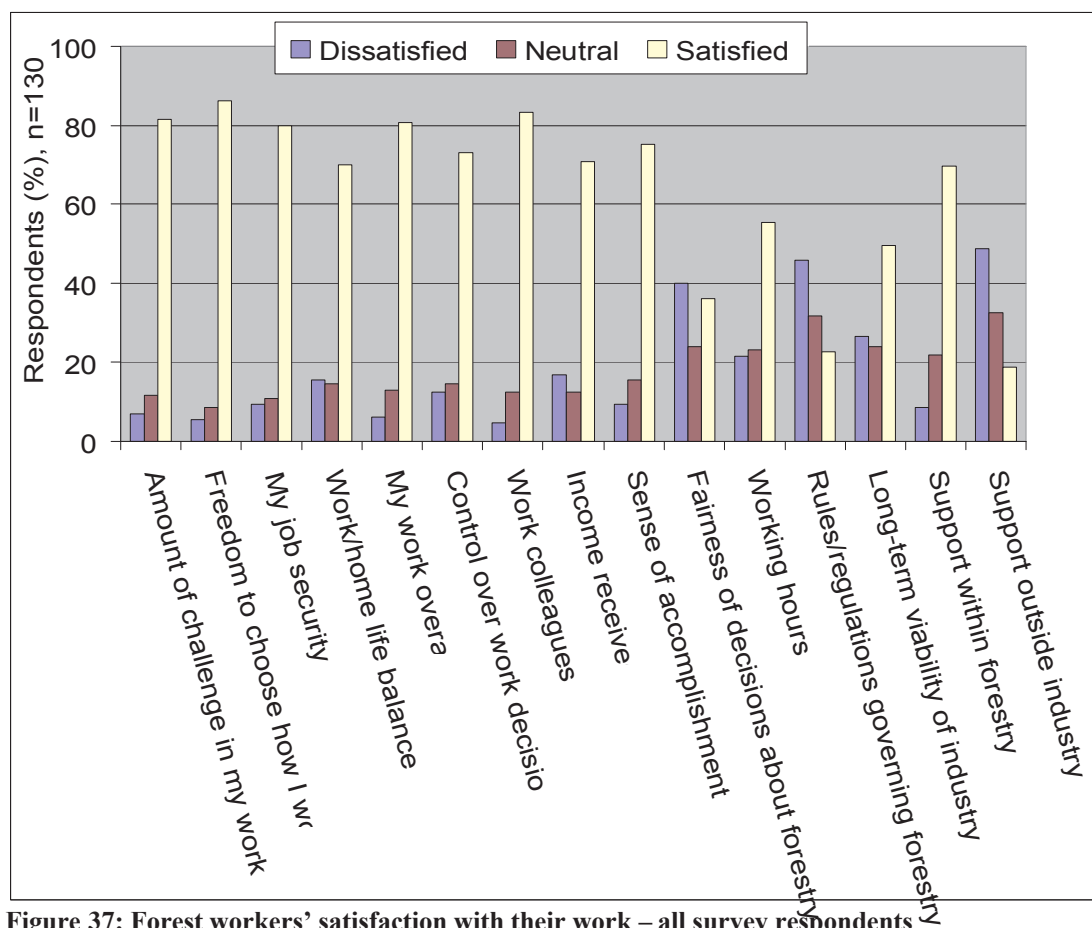


Figure 37: Forest workers' satisfaction with their work – all survey respondents

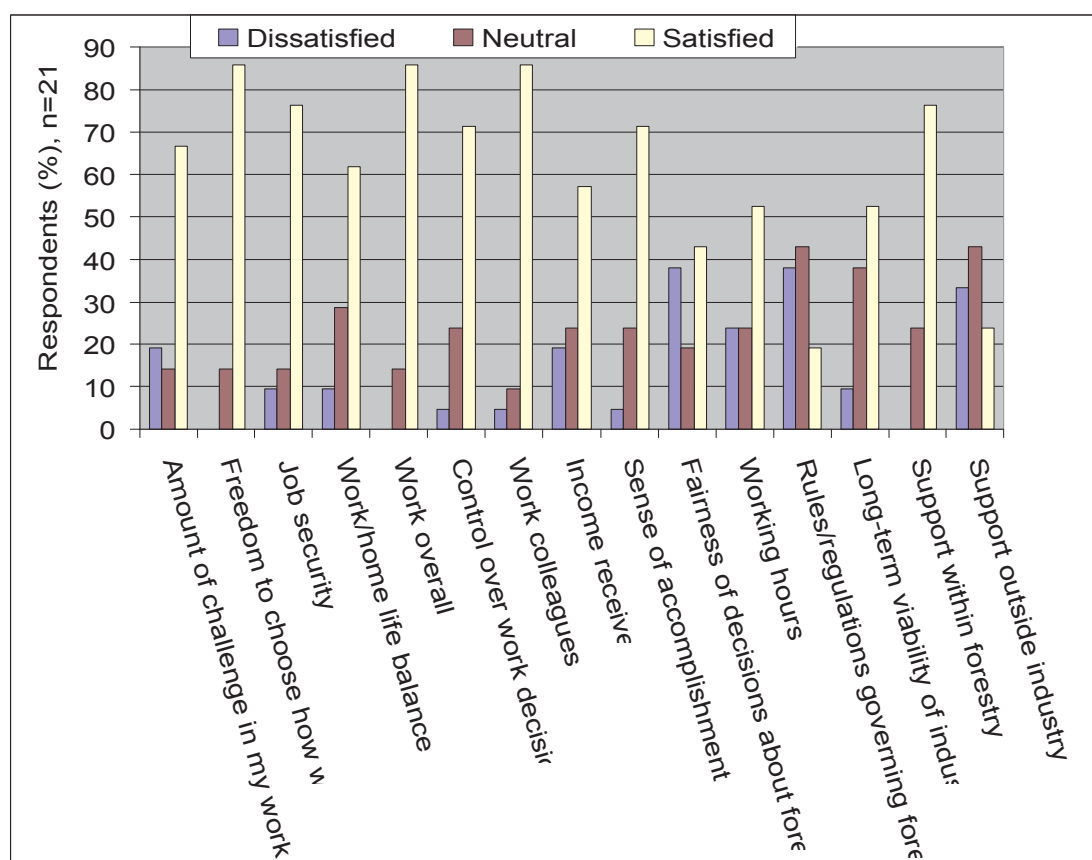


Figure 38: Forest workers' satisfaction with their work – Green Triangle

A third set of questions asked forest industry workers about the level of importance of a range of factors related to their work (Figure 39). Most aspects were considered highly important, with the following rated as highly important by the greatest number of respondents:

- a sense of worthwhile accomplishment;
- having independent control over work done;
- fair and consistent management;
- stimulating and challenging work; and
- a good work-life balance.

Of slightly less importance were aspects such as income and job security. The factor considered by the most number of people to be of lowest importance was interactions with the public forming part of their work.

Responses to these questions may assist in the understanding of levels of satisfaction with life and work as indicated by factors illustrated in Figure 36 to 38.

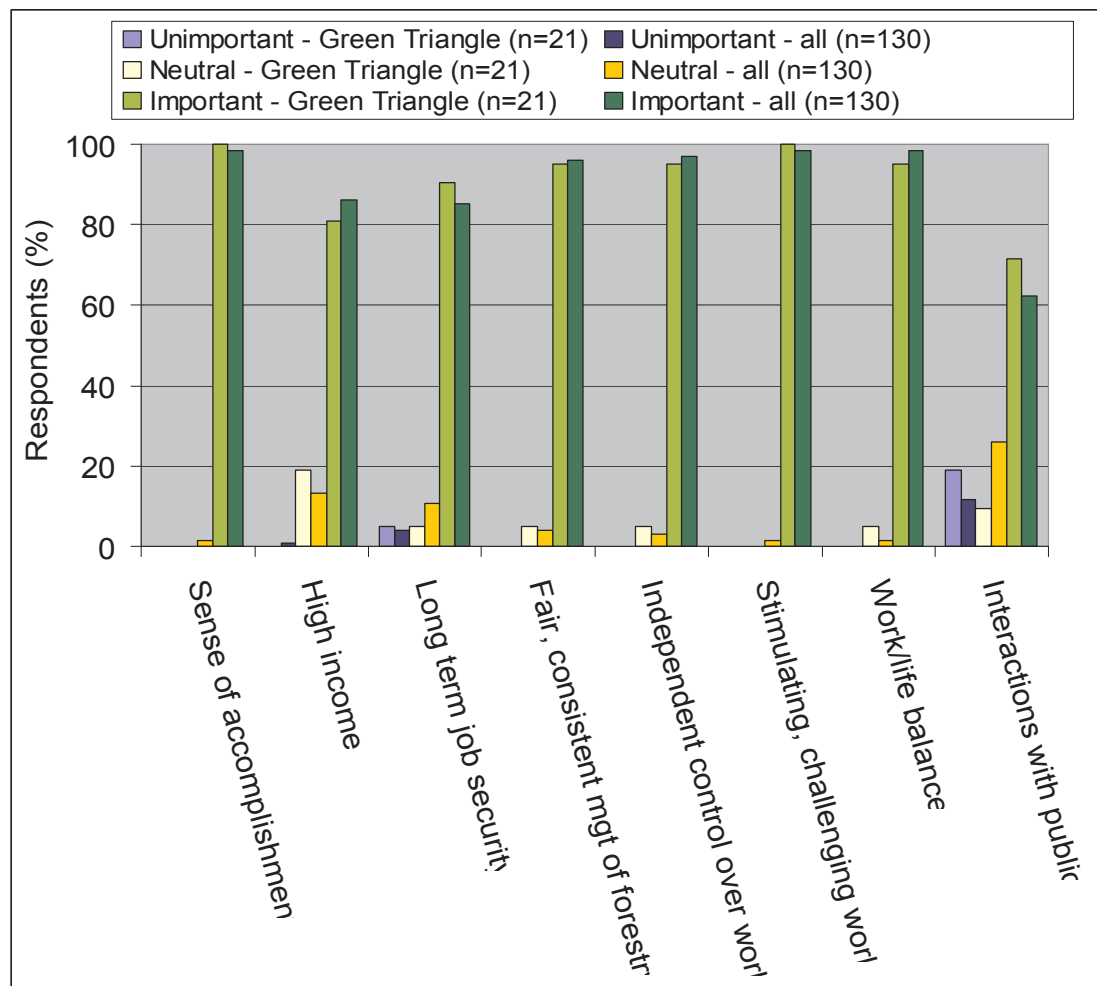


Figure 39: Importance of different aspects of work in the forest industry – survey responses

3.3.5 Demographic characteristics – age

Changes in the age composition of the forestry workforce may have a range of consequences for the industry, and may also reflect impacts forestry has on its workforce. For example, if the investment in terms of skills training or, in the case of some contractors, funds to purchase equipment needed to enter the industry are high, this may prevent many younger people from entering the industry. Higher than average ageing of the labour force can indicate issues such as difficulty recruiting new workers into the workforce, and likely future skills and labour shortages if older workers retire without new workers in a younger age demographic replacing them.

The proportion of forestry workers falling into different age groups are compared to the total labour force in 2006 for major regions within the Green Triangle in Figure 40²³. Appendix 3 provides the same data for each SLA in the case study region²⁴.

In most parts of the Green Triangle, there are fewer forest industry workers aged 15-24, and more aged 25-44, than the average for the total labour force. In the 45-54 age groups, forest industry workers and the labour force are similar, while the 55-64 and 65 and older age groups have a lower proportion of forest industry workers compared to the total labour force.

No major differences are apparent between Australia, South Australia, Victoria, and the South East, Western District and Wimmera regions. While there are some differences in the Wimmera region compared to others, this region also has a small number of forestry workers, and it cannot be assessed whether the differences indicate a difference between regions, or are an artefact of the small sample.

Overall, forestry workers have a slightly younger age profile than the labour force in general, with the exception of 15-24 year olds.

The average annual rate of change in the proportion of forestry workers and the labour force falling into different age groups is shown in Figure 41. It can be seen that:

- The forest industry experienced a greater drop in the proportion of the workforce aged 15-24 and 25-34 over 1996 to 2006 compared to the total labour force;
- The forest industry has experienced a slightly lower drop in the 35-44 year age group than the overall labour force for most regions over 2001 to 2006, and in two cases (South Australia and Wimmera) experienced growth in this category while there was a decline in this category for the overall labour force;
- The forest industry has experienced greater growth in the 45-54 age groups compared to the overall labour force in all regions except the Wimmera
- In the 55-64 age group, there is considerable variability across regions – in some, the forestry workforce experienced greater growth than the overall labour force; while the reverse was true in other regions; and

²³ The data presented are based on ABS statistics; while the survey of forestry workers asked for information on age, the sample received was not high enough to use as an analysis of age distribution within the workforce.

²⁴ Age distribution of the workforce varied considerably by SLA, as can be seen in Appendix 3. As with previous indicators, the small numbers of workers in some SLAs mean that fairly wide variation would be expected to result simply from chance, and so it is not possible to identify if patterns seen in any individual SLA are the result of specific workforce issues – for example, changes in the forest industry leading to an ageing of the workforce, or new and younger workers being attracted into a region by establishment of new forestry activity – or if they simply reflect the wide distribution expected when small numbers are involved.

- The South Australian forestry industry has experienced much lower growth in workers aged 65 and over than the overall labour force and than the Australian forest industry on average, while the Victorian forest industry experienced higher than average growth in workers aged 65. In the South East and Western Districts, there was much greater growth in the proportion of forest industry workers aged over 65 than in the labour force as a whole for the same category.

This indicates that the forestry workforce, while still having an overall slightly younger age profile than that of the total labour force, is ageing more rapidly than the total labour force, particularly in the South East and Western Districts.

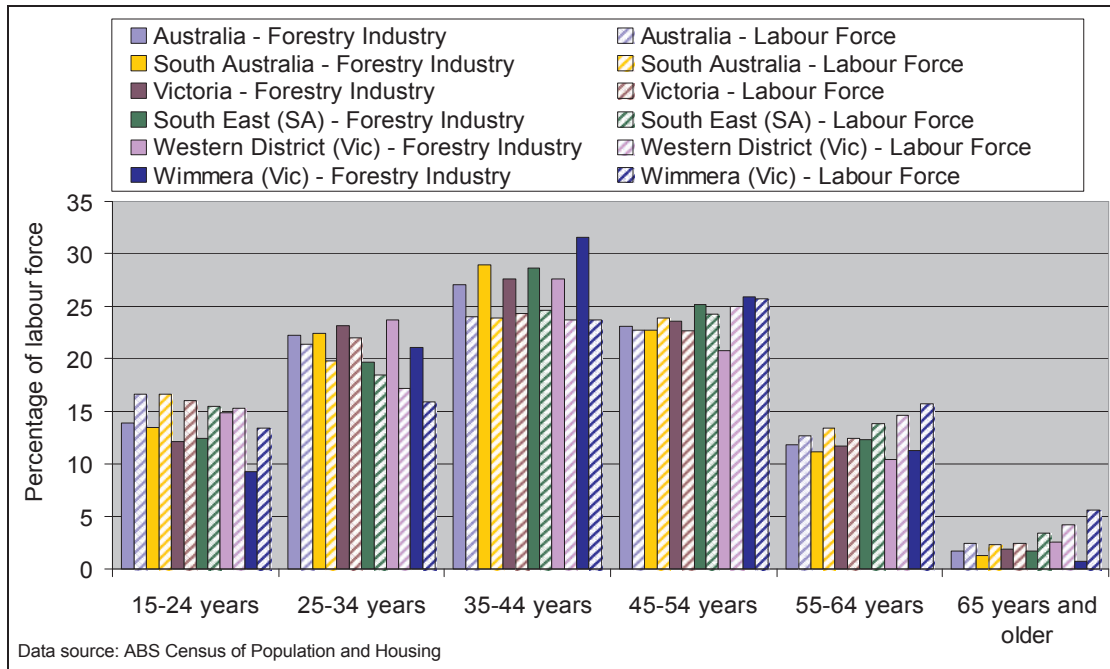


Figure 40: Proportion of labour force in different age groups, 2006

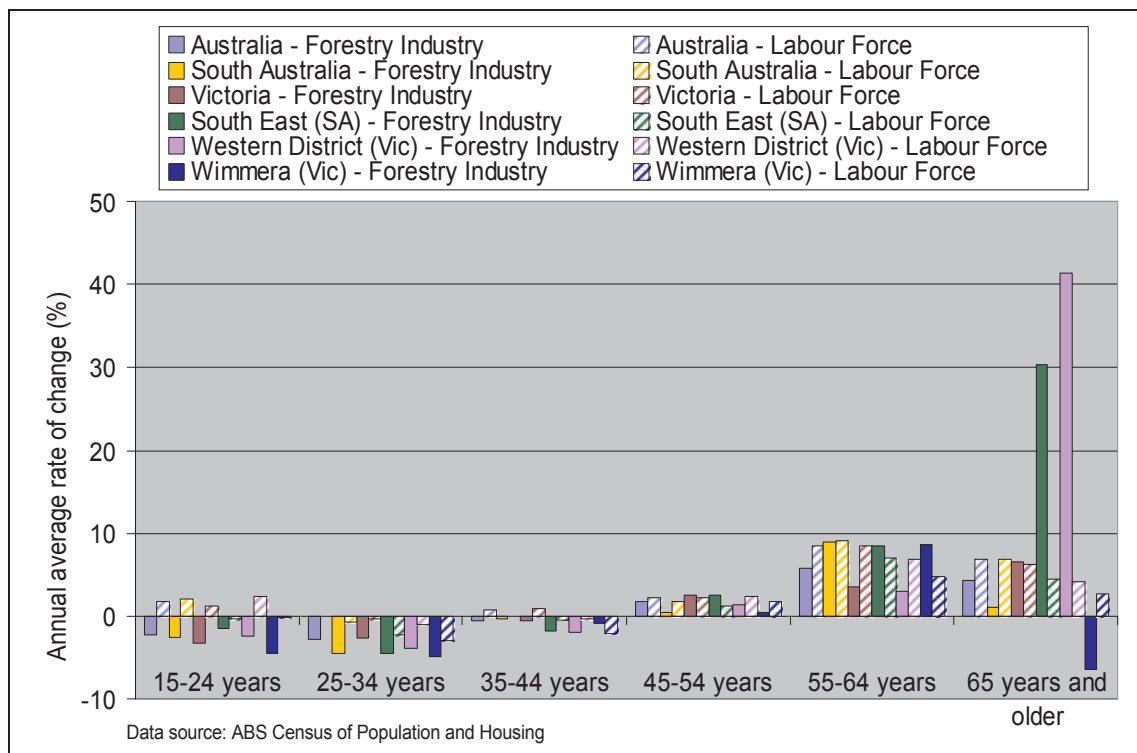


Figure 41: Average annual rate of change of age by percentage of labour force, 2001-2006

3.3.6 Demographic characteristics - gender

The proportion of male and female workers in the forest industry provides useful information on gender issues and access to the industry by men and women. This indicator identifies the proportion of the forestry workforce that is male and female, and compares this to employment in the general labour force.

The gender of workers in the forestry workforce in 2006 is compared to the gender of those working in the labour force as a whole in Figure 42. It can be seen that²⁵:

- The forest industry has a much higher proportion of male workers than the average for the labour force, and a lower proportion of female workers; and
- This pattern holds across all regions, and also at SLA scale (see Appendix 3 for data at SLA scale)²⁶.

The average annual rate of change in the proportion of the workforce who are male and female is shown in Figure 43, comparing the forest industry and overall labour force. In all regions except the Wimmera, growth in female participation in the forestry workforce was higher than the average for the labour force as a whole. This indicates that the different in the gender balance of workers between the forest industry and the workforce as a whole is narrowing, albeit slowly, both in the Green Triangle and in Australia as a whole.

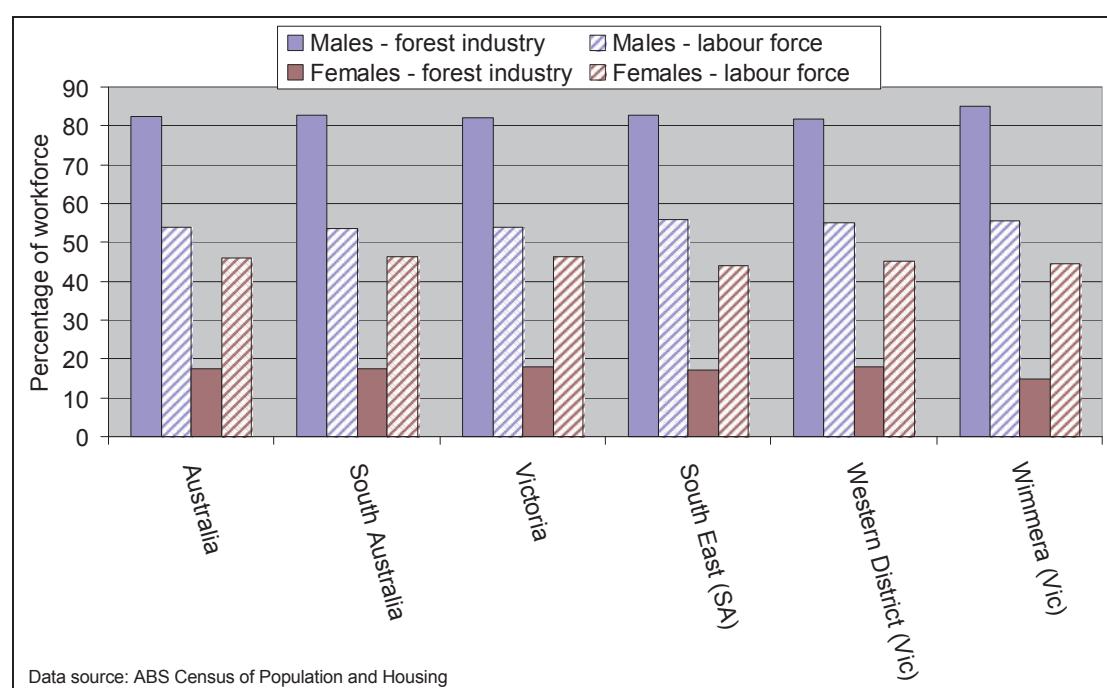


Figure 42: Percentage of male and female workers in forest industry and overall labour force, 2006

²⁵ This indicator is presented based on ABS statistics; while the survey of forestry workers asked for information on gender, the sample received was not high enough to provide a robust analysis of distribution of age within the forestry labour force and was not high enough to analyse differences between forestry sectors.

²⁶ The proportion of male and female workers varies more widely at SLA scale, likely a result of small numbers of workers in some SLAs which is usually associated with wider variability in characteristics when expressed as a percentage than for larger numbers.



Figure 43: Average annual change in proportion of males and females in the workforce, 2001-06

3.3.7 Attachment to place

A forest industry worker's attachment to the place they live and/or work in can be an important indicator of how they are affected by changes in the industry. Having a high level of attachment to place may mean workers rely on the forest industry for employment that allows them to maintain their attachment to place, and will be unwilling to change the location of their employment if a change happens in the industry.

Information on attachment to place was gathered by asking questions in the survey of forestry workers undertaken for this consultancy. Attachment was identified by asking questions about the length of time, they and their family have lived in the local area, and their desire to continue living and working in the area.

Most respondents are somewhat or strongly attached to the local community they live in (Figure 44), although Green Triangle forestry workers were more likely to rate their local community as a 'good' rather than 'excellent' place to live (Figure 45).



Figure 44: Strength of attachment to local community – survey respondents

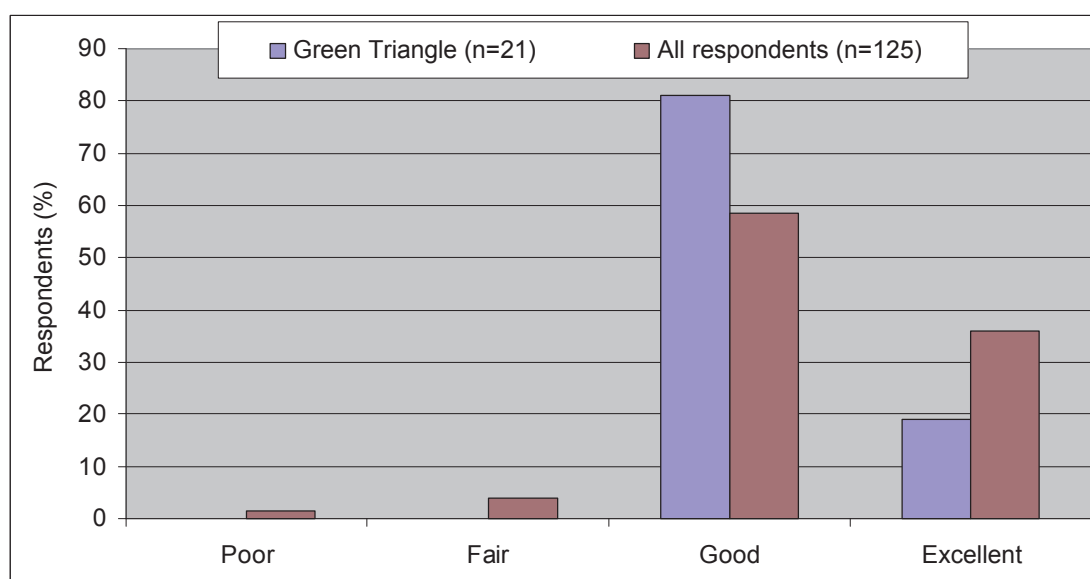


Figure 45: Rating of local community as a place to live – survey respondents

Fewer Green Triangle forestry workers expect to be living in the same place five years from now compared to other respondents, with more expressing uncertainty about whether this would be the case (Figure 46).

The length of time forestry workers had lived in their current locality ranged from less than one year to more than 50 years. The average was similar for Green Triangle forestry workers (15 years) and all respondents (15.2 years). More than 80% of respondents indicated that they were the first generation to live in the area, with similar results for respondents based in the Green Triangle versus other regions.

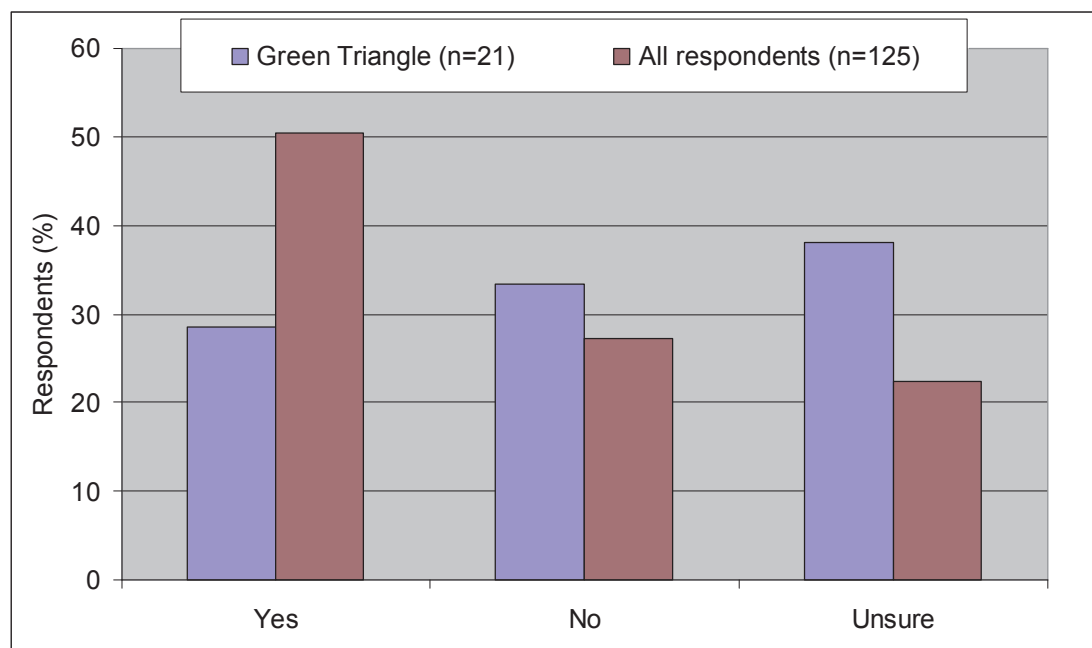


Figure 46: Responses to question ‘Do you expect to be living in the same place five years from now?’

Overall, forestry workers indicate a reasonably strong attachment to place, although most do not have long-standing family attachments to the region they live in, and a large proportion are either not planning to be living in the same region in five years time, or unsure. Green Triangle forestry workers may have somewhat lower attachment to the localities they live in than other respondents to the survey, being less likely to rate their community as an excellent place to live, and less likely to indicate they would still be living in the same location in five years time.

3.3.8 Social and family attachment to forestry

Similarly to being attached to the local area in which they live and work, forestry workers may have a social or family attachment to the forest industry which affects how they cope with changes to the industry. People with a strong social or family attachment to forestry – assessed by identifying the extent to which their family members and friends work in the industry, their involvement in forest industry organisations, and length of time spent working in the industry – may find it more difficult to adjust to some types of changes in the industry.

Data for this indicator were collected via the survey of forestry workers.

Green Triangle forestry workers had worked in the industry for an average of 11.4 years (n=20), compared to 14.9 years for all respondents (n=120). However, when asked what proportion of their working lives had been spent in the forest industry, Green Triangle forestry workers were reasonably similar to other respondents (Figure 47).

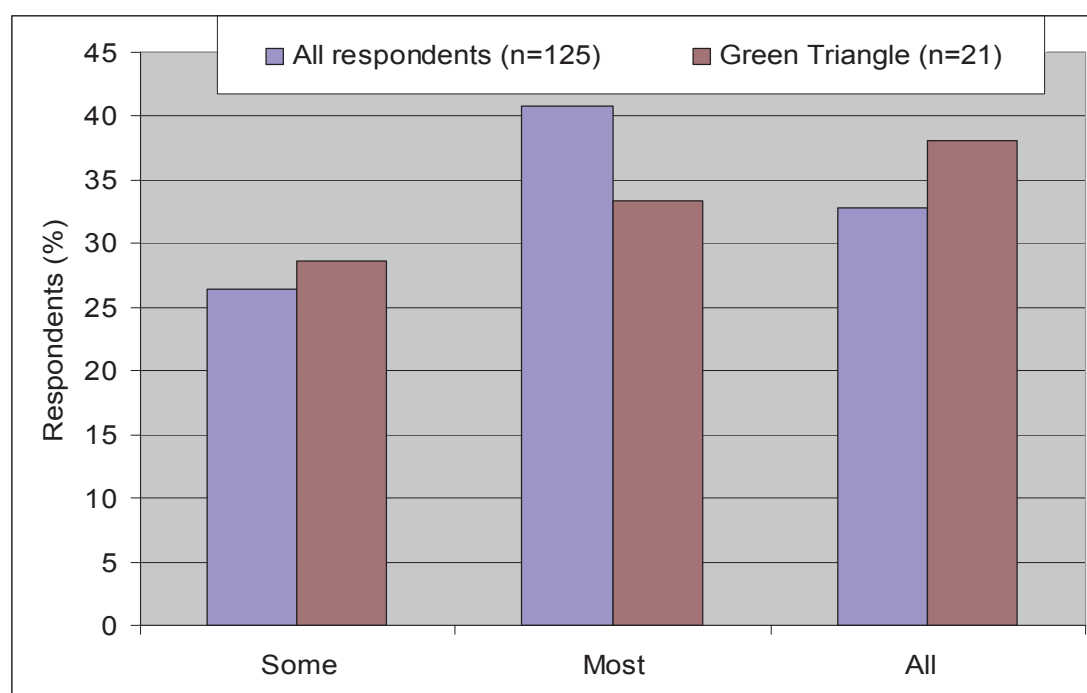


Figure 47: Proportion of working life survey respondents had spent in the forest industry

Just under 30% respondents indicated that other members of their household have jobs within the forest industry (see Figure 48), while the large majority did not have others in their household working in the industry. Less than 15% of respondents had at least one other member of their immediate and extended family working in the forest industry or forest related jobs, while a larger number who had friends who were also forest industry employees (see Figure 49). Twenty two per cent of respondents indicated that more than one generation of their family had worked in the industry. Respondents also tended to speak to other forest workers not living with them more than they spoke to family and friends not living with them; this higher rate is most likely due to daily contact with work colleagues (see Figure 50).

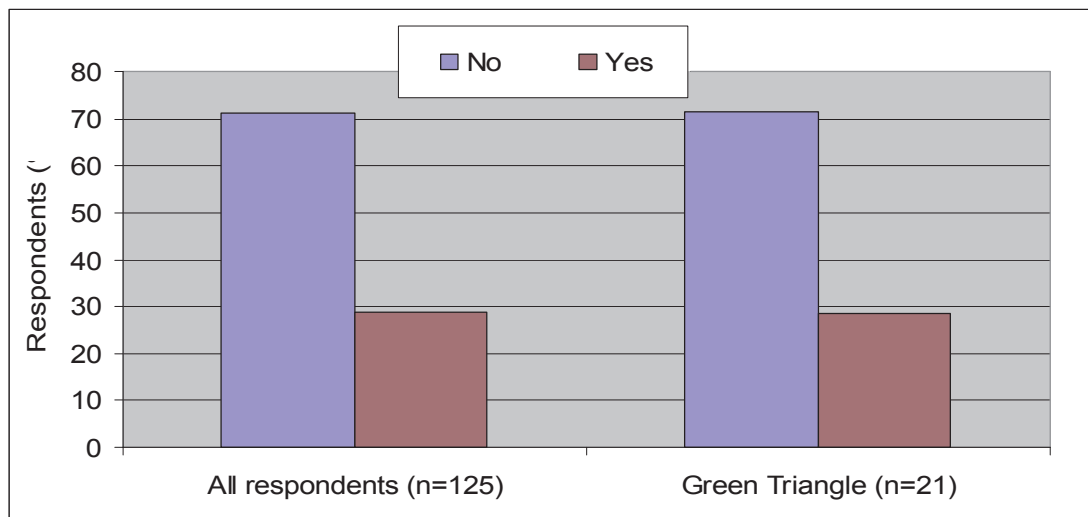


Figure 48: Do other members of your household work in the forest industry? – survey responses

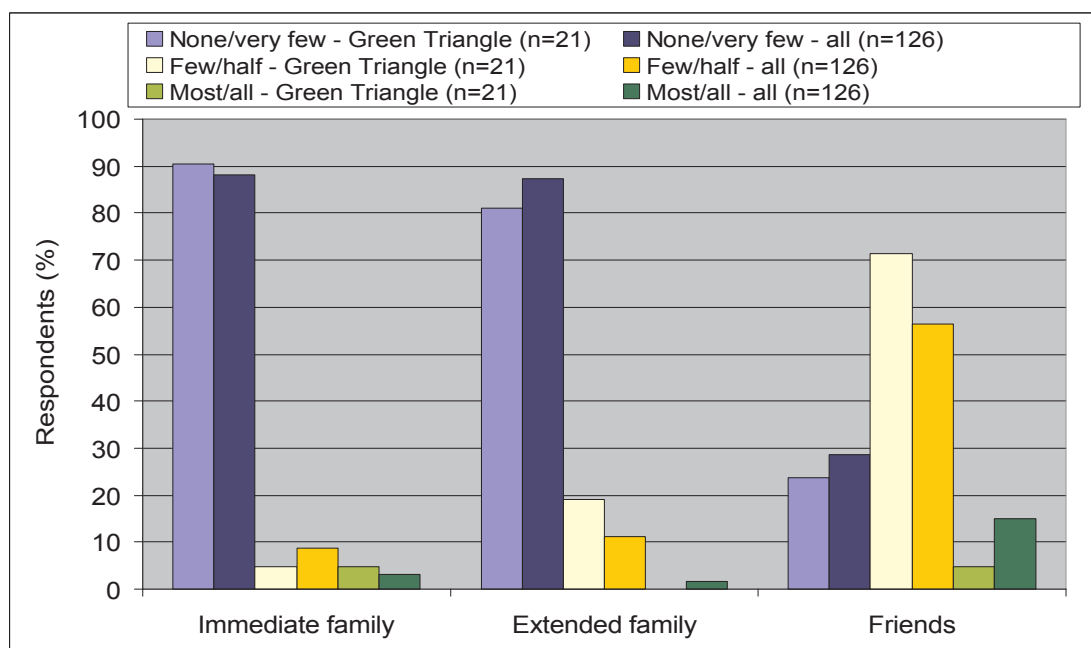


Figure 49: Proportion of family and friends working in forest industry – survey responses

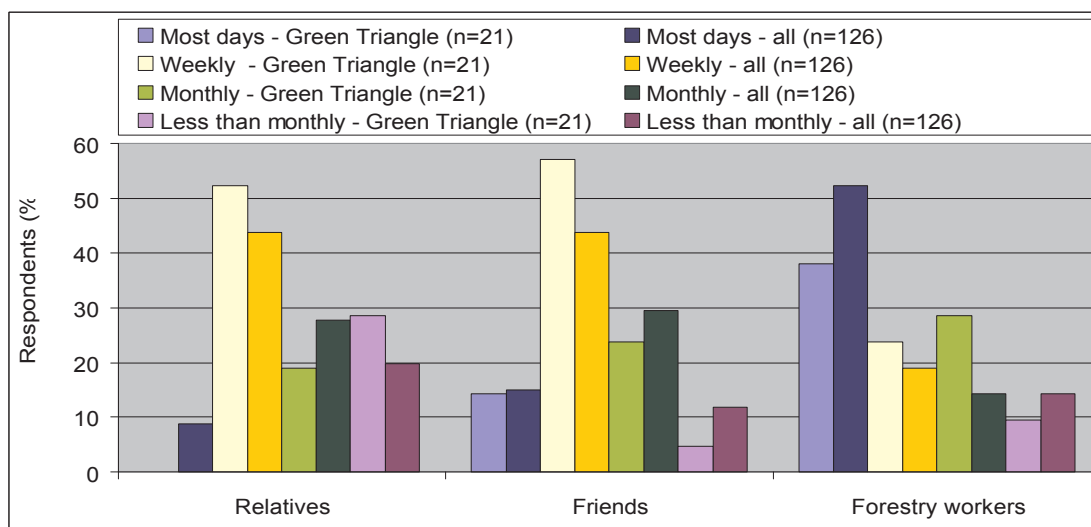


Figure 50: Frequency with which survey respondents spoke or met with relatives, friends, and other forest workers

3.3.9 Hours worked

The number of hours a person works has the potential to influence their wellbeing. Excessively high work hours may contribute to stress and a poor work/life balance; working less hours than desired may also reduce wellbeing. For this reason, monitoring trends in work hours can be a useful way of identifying wellbeing of forestry workers.

Forestry workers are less likely to work under 34 hours, and more likely to work 35 hours or more per week, than the average for the labour force, as can be seen in Table 4 for the regions of Australia, Victoria, South Australia, and the South East, Western District and Wimmera regions.

The average annual rate of change over 2001 to 2006 in number of hours worked, for each category of working hours, is shown in Figures 51 to 56. Over this period, there was greater decline in the proportion of forestry workers in Australia, South Australia and Victoria who worked less than 25 hours compared to the labour force as a whole. The Green Triangle showed different patterns, with the proportion of forestry workers in the South East working 1-14 hours growing at a faster rate than the average, and the proportion of forestry workers working 15-24 hours in the Western District and Wimmera regions growing more rapidly than the average. The forest industry experienced less decline in the proportion of the workforce working 25 hours or more compared to the labour force overall.

This indicates that the forest industry in the Green Triangle is maintaining a higher proportion of full-time work compared to the labour force overall. This is different to the trend for the workforce as a whole; a common trend noted across Australia in recent years has been increasing levels of part-time work. This trend is not as evident in the forest industry (with the exception, to some extent, of the South East region of South Australia), with the forest industry on average maintaining, or in some areas increasing, average hours worked per person.

The proportion of forestry workers who work more than 40 hours per week has been growing across Australia and South Australia. Within the Green Triangle, there is less evidence of this trend, with few regions within the Green Triangle showing an increasing trends in the proportion of workers who work more than 40 hours a week.

Data for individual SLAs is shown in Appendix 3. The high variability and small sample size means that it is more appropriate to present and analyse at the regional, rather than the local, level for this indicator²⁷.

²⁷ At the Statistical Local Area scale, small numbers of workers in some SLAs mean that there is wide variation in the proportion of workers who worked different hours per week. This can be seen in the tables shown in Appendix 3. It is therefore recommended that this indicator be examined at the regional, rather than the local scale, so that high enough numbers of forestry workers are included to ensure trends represented are meaningful trends rather than reflecting random variation resulting from only having a small sample of workers.

Table 4: Hours worked – comparison of labour force and forest industry workers

Percent of workforce working different hours - 2006	Australia	South Australia	Victoria	South East (SA)	Western District (Vic)	Wimmera (Vic)
Labour force - None	3.7%	4.0%	3.6%	5.8%	4.5%	4.1%
Forestry - None	2.9%	3.7%	3.0%	4.9%	3.4%	0.0%
Labour force - 1-15 hours	10.8%	11.5%	11.6%	10.9%	12.6%	11.6%
Forestry - 1-15 hours	3.7%	3.1%	3.5%	2.0%	2.8%	4.1%
Labour force - 16-24 hours	8.9%	9.1%	9.0%	8.5%	9.0%	9.0%
Forestry - 16-24 hours	3.9%	3.2%	3.7%	2.2%	6.0%	8.2%
Labour force - 25-34 hours	9.8%	11.0%	9.4%	9.7%	9.8%	10.2%
Forestry - 25-34 hours	5.0%	5.2%	4.6%	3.9%	6.0%	4.1%
Labour force - 35-39 hours	16.8%	18.9%	16.2%	14.7%	13.5%	13.4%
Forestry - 35-39 hours	24.3%	25.1%	23.7%	21.4%	22.5%	28.8%
Labour force - 40 hours	18.3%	15.8%	19.3%	16.2%	16.5%	18.0%
Forestry - 40 hours	20.8%	20.0%	22.2%	23.5%	25.3%	35.6%
Labour force - 41-48 hours	11.1%	11.2%	11.1%	12.0%	10.0%	9.6%
Forestry - 41-48 hours	16.8%	18.5%	17.1%	20.7%	16.0%	9.6%
Labour force - 49 hours and over	17.7%	15.8%	16.9%	19.4%	21.2%	21.4%
Forestry - 49 hours and over	20.4%	19.5%	20.0%	19.8%	16.4%	9.6%
Labour force - Not stated	2.8%	2.5%	2.8%	2.8%	3.0%	2.8%
Forestry - Not stated	2.2%	1.7%	2.1%	1.6%	1.7%	0.0%
Data source: ABS <i>Census of Population and Housing</i> 2001, 2006.						

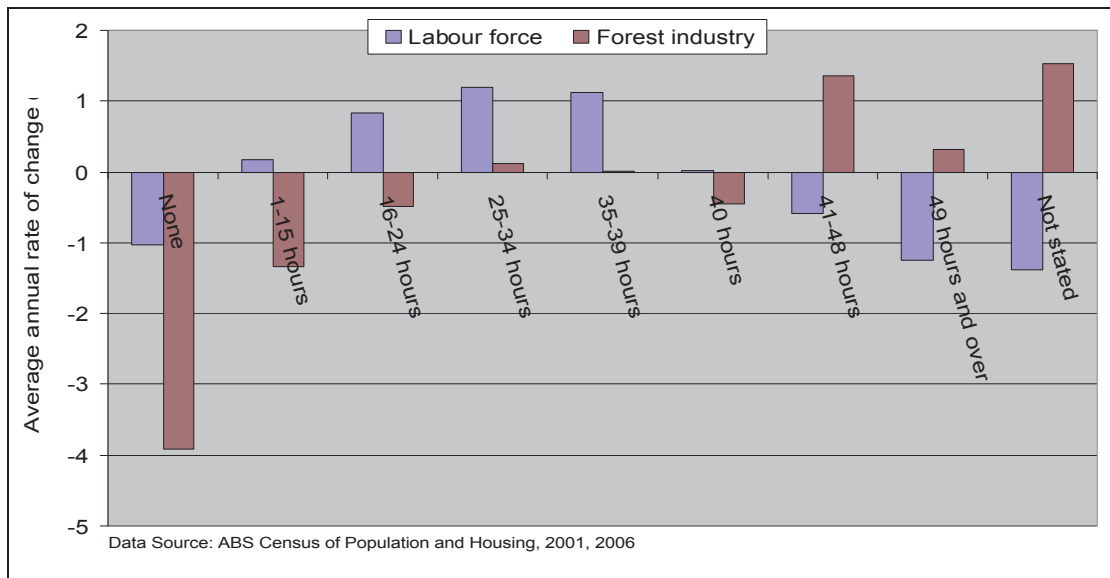


Figure 51: Average annual rate of change in working hours by category, 2001-2006 - Australia

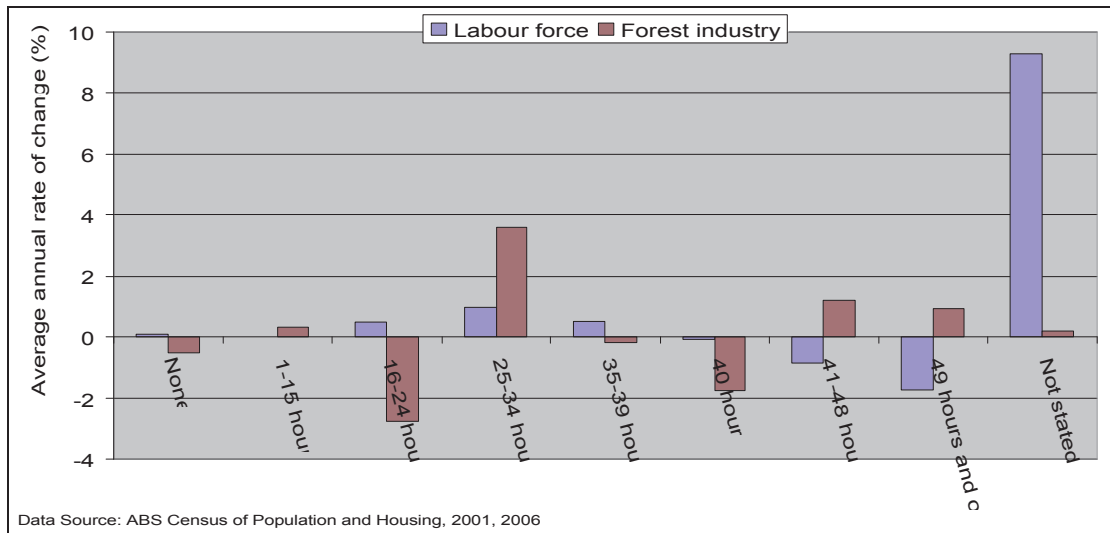


Figure 52: Average annual rate of change in working hours by category, 2001-2006 – South Australia

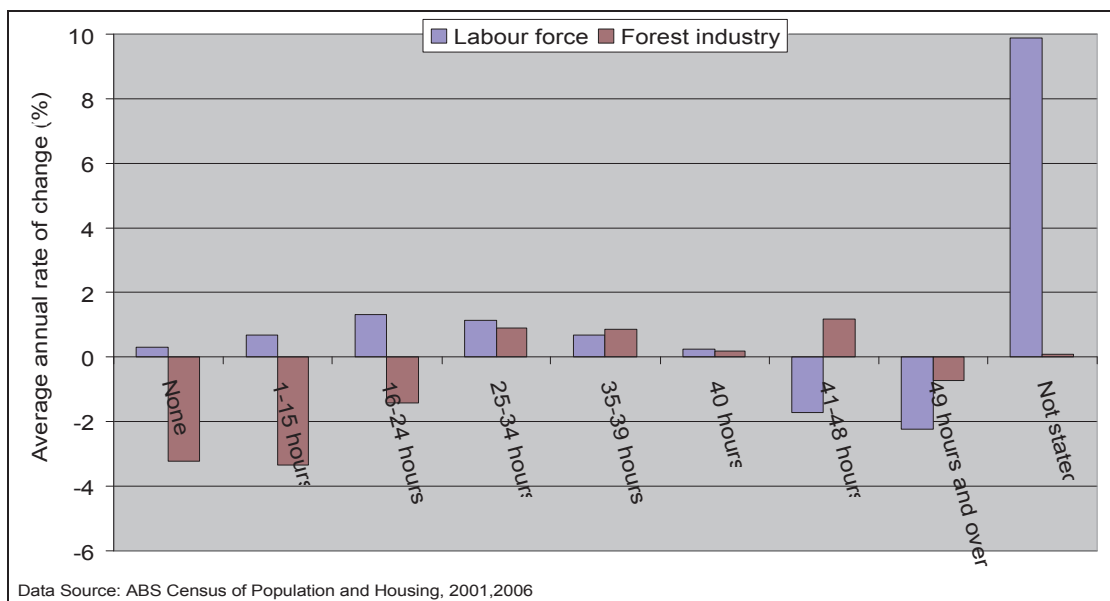


Figure 53: Average annual rate of change in working hours by category, 2001-2006 – Victoria

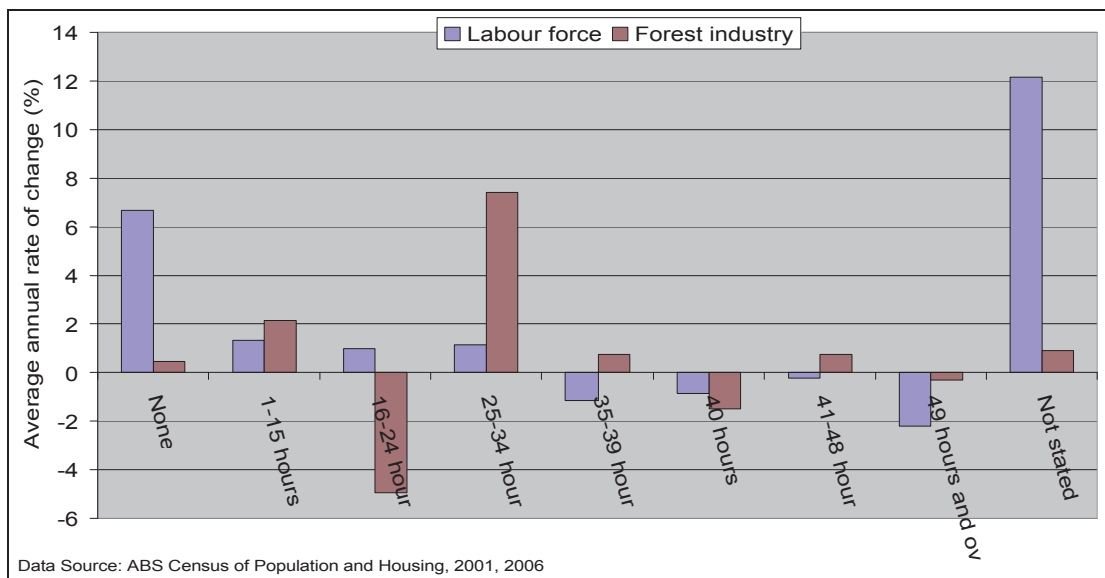


Figure 54: Average annual rate of change in working hours by category, 2001-2006 – South East SD, South Australia

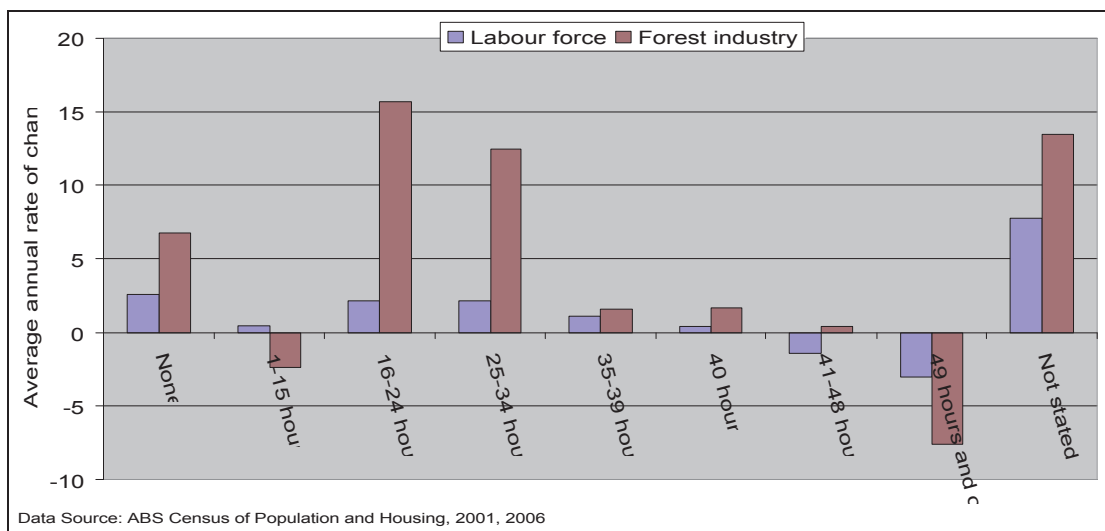


Figure 55: Average annual rate of change in working hours by category, 2001-2006 – Western District SD, Victoria

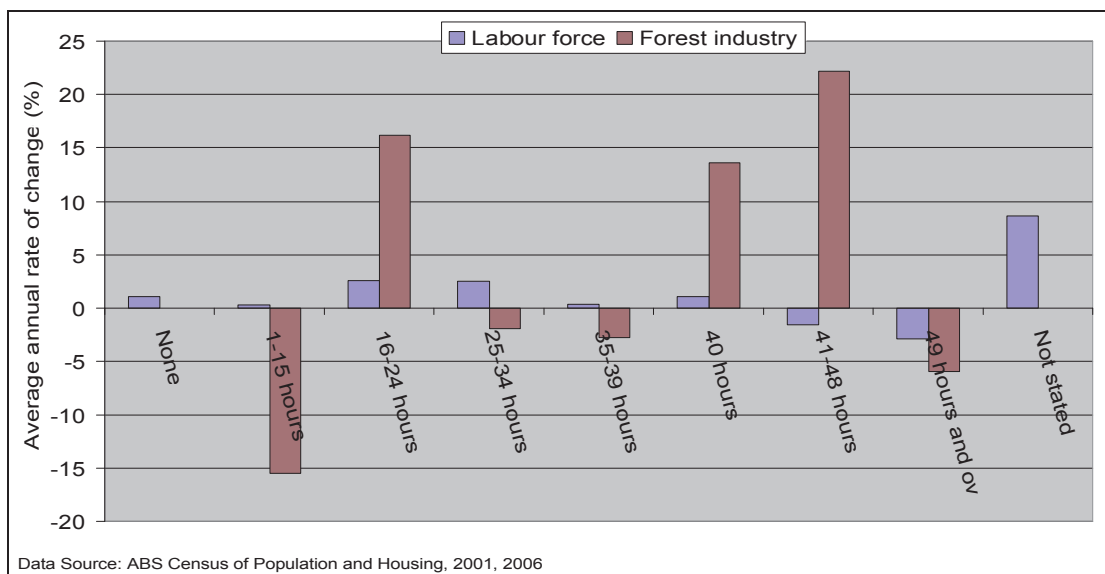


Figure 56: Average annual rate of change in working hours by category, 2001-2006 – Wimmera SD, Victoria

3.3.10 Educational qualifications

The level of formal qualifications a person has achieved is a good predictor of their employment and income earning capacity. Higher levels of education may assist workers in adapting to change in the forest industry, particularly technological change. A high level of education is therefore often viewed as indicative of highly skilled workers who are likely to earn a good income and be adaptable to changing needs within an industry. Low education levels may indicate lower adaptability, although it is important not to over-estimate the influence of education – other factors also influence people's ability to adapt to change.

This indicator identifies the proportion of forest industry workers with different levels of formal educational qualifications, and compares it to the average across the whole labour force.

In general (Figure 57):

- Forest industry workers are more likely to have a post-school qualifications than average for the total population aged over 15²⁸;
- Forest industry workers are more likely to have a certificate or diploma than average for the whole population; and
- Forest industry workers are less likely to have a bachelor degree or postgraduate qualification than average for the whole population.

Green Triangle forestry workers are very similar to those in Australia, South Australia and Victoria; within the Green Triangle the only region showing different trends is the Wimmera, which has a very small number of forestry workers.

Overall the forest industry has experienced a slower rate of decline in the proportion of workers with no post-school qualifications compared to the average for the whole population (Figure 58), and slower growth in the proportion of workers with a certificate/diploma, or a bachelor degree or postgraduate qualification. This has varied slightly in some regions – for example, in Victoria the proportion of forestry workers with a bachelor degree or higher greater slightly faster than the proportion within the labour force as a whole. This means that while forest industry workers are currently more likely than average to have a post-school qualification or hold a certificate or diploma, this gap may lessen over time based on the trends over 2001 to 2006.

These patterns hold for most but not all Statistical Local Areas, as can be seen in Appendix 3²⁹.

²⁸ Formal qualifications are only measured for the population aged over 15 years, to avoid bias in estimating the proportion of the population with qualifications, which would occur if children still attending school were included.

²⁹ A key issue with this indicator is that at the Statistical Local Area scale, small numbers of workers in some SLAs mean that there is wide variation in the educational qualifications. It is not possible to tell if variation in individual SLAs is the result of the random distribution expected when small numbers are involved, or of significant differences in educational qualifications of forest industry workers across different locations. With small numbers of workers, it is not possible to identify where trends are significant, and hence it is recommended that this indicator is best analysed at the regional, rather than the local, level.

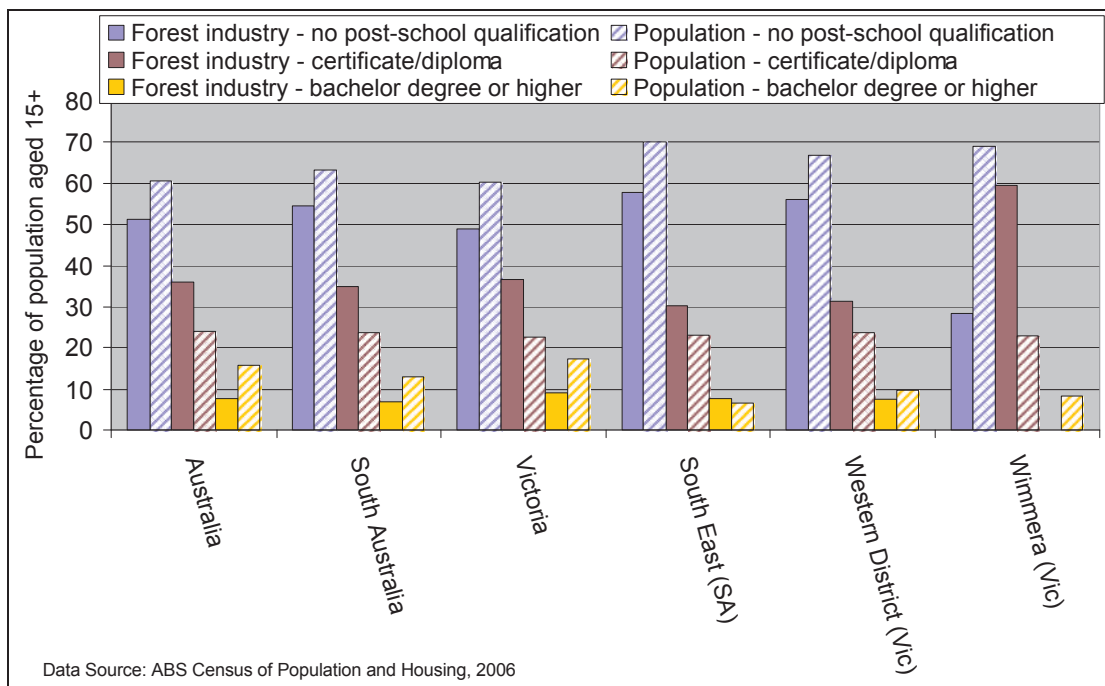


Figure 57: Proportion of population with different types of educational qualification – forest industry and total population aged over 15, 2006

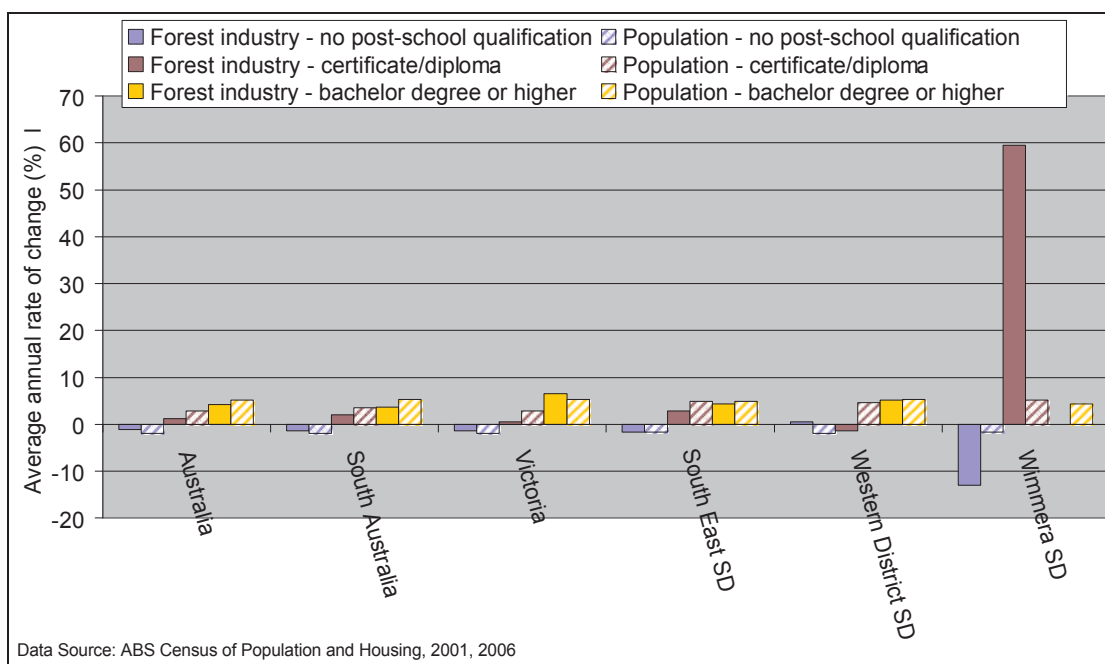


Figure 58: Average annual rate of change of population with different types of educational qualifications, 2001-2006

3.4 Impacts of the forest industry on Indigenous people

The following indicators provide information that can assist in monitoring the social and economic impacts of the forest industry on Aboriginal and Torres Strait Islanders, through monitoring:

- The proportion of forest industry workers who are Indigenous people;
- The type of employment Indigenous people have in the forest industry; and
- The area of forest owned or accessed by Indigenous people.

These indicators provide a picture of some aspects of Indigenous involvement in the forest industry. They represent only a small subset of issues around forestry and Indigenous people, however, and must be accompanied by in-depth studies which examine the values and importance of forests for different Indigenous groups, and capacity building and skills needed by both the forest industry and Indigenous people to improve engagement between the industry and Aboriginal and Torres Strait Islanders.

3.4.1 Indigenous employment in the forest industry – quantity

The proportion of Indigenous workers in the forestry workers, and how this is changing over time, is one measure of Indigenous participation in forestry in Australia. Change over time in the proportion of Indigenous workers may indicate that barriers to Indigenous people working in the industry, such as issues related to skills and resources needed to access work in the industry, are changing.

As very few people employed in the forest industry identify themselves as Indigenous, this indicator can only be reported to the statistical division scale, with data not able to be reported for individual SLAs.

The Green Triangle forest industry has a lower than average proportion of Indigenous workers in its labour force. The proportion of workers in the forest industry and the overall labour force who self-identified as indigenous in 2006 is shown in Figure 59, as is the ‘non-response’ rate, meaning the percentage of people who did not indicate whether they were indigenous or non-indigenous³⁰. The figure shows that South Australia, Victoria, and the South East, Western District and Wimmera regions have a lower proportion of Indigenous workers than the Australian average, in both the forest industry and the total labour force. The difference is largest for the forest industry workforce, which has a very low proportion of Indigenous workers.

While Indigenous employment as a proportion of the workforce is lower in the Green Triangle than the Australian average, it is growing more rapidly, so may shift over time to being similar to the rest of the workforce. The average annual rate of change in the proportion of Indigenous and non-Indigenous workers, shown in Figure 60, indicates that growth in Indigenous workers in the forest industry over 2001-06 was higher in South Australia, Victoria and the South East region, and lower in the Wimmera and Western District than the Australian average. Rates of growth in Indigenous employment in forestry were higher than growth in Indigenous employment in the overall labour force for South Australia, Victoria and the South East region.

³⁰ The proportion of people who were non-indigenous is not shown, as it is over 95% in all cases and reduces the ability to compare indigenous status across the forest industry and the total labour force.

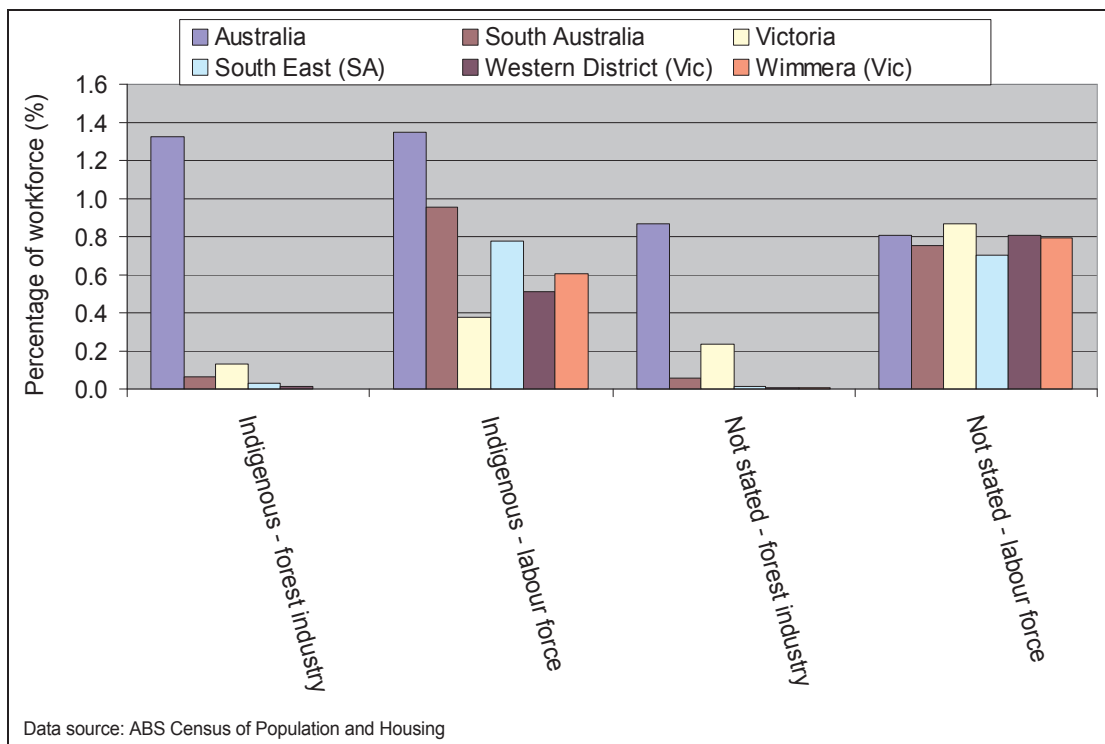


Figure 59: Percentage of Indigenous workers and non-response rate – forest industry and total labour force, 2006

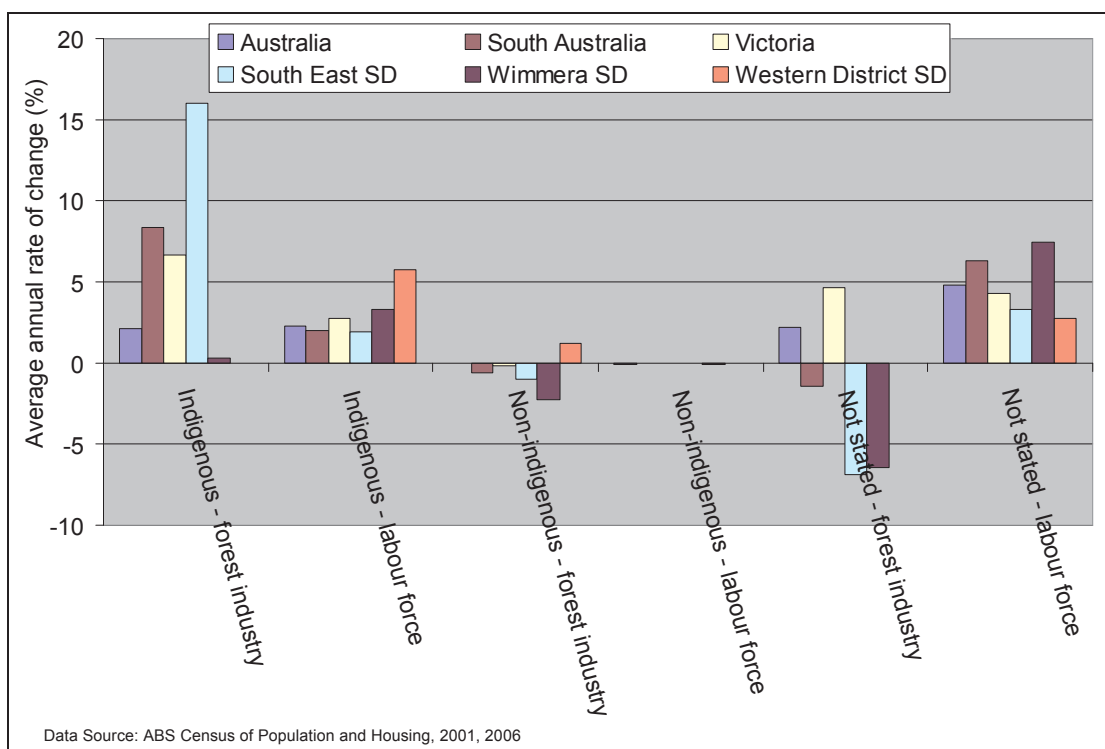


Figure 60: Average annual rate of change, 2001-2006, in Indigenous and non-Indigenous employment

3.4.2 Indigenous employment in the forest industry – type

As well as knowing how many Indigenous people work in the forest industry, it is important to identify what types of jobs they work in. A high rate of employment does not necessarily indicate that Indigenous people are able to access all types of work in the industry including management positions. This social indicator identifies the proportion of indigenous employees who have different types of occupation within the forest industry, such as field worker, manager or administrator.

Similarly to the previous indicator, the low rate of Indigenous employment means this indicator can only be meaningfully reported at large scale – in this case, at national and state scale only.

The proportion of Indigenous forestry workers is compared to the proportion of all forest workers who have different types of occupation in Figure 61. It can be seen that:

- Indigenous forestry workers are less likely to be managers, professionals, technicians and trades workers, clerical and administrative workers, or sales workers, compared to the forestry workforce as a whole; and
- Indigenous forestry workers are more likely to be working as machinery operators and drivers, and labourers, compared to the overall forestry workforce.

The only exception to this trend was in South Australia, where Indigenous workers were as likely as non-Indigenous workers to be working as managers. As most South Australian forestry employment is located in the Green Triangle, these workers are likely to be located in the Green Triangle.

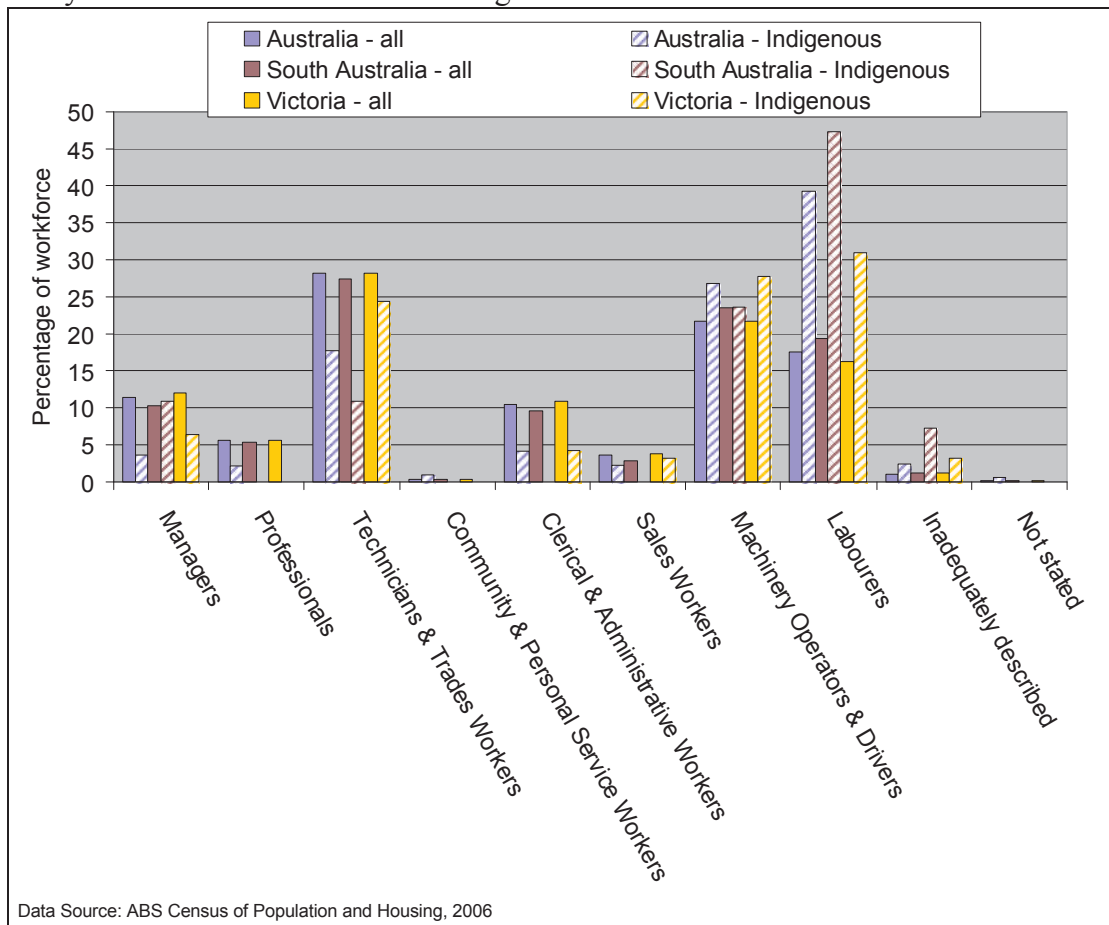


Figure 61: Proportion of workers with different occupations – Indigenous and total forestry workforce, 2006

3.4.3 Area of forest owned or accessed by Indigenous people

The cultural and social importance of forests to Indigenous people goes well beyond being a source of employment. Access to forests can be highly important for many Aboriginal and Torres Strait Islanders, and this social indicator identifies the total area owned or accessed by Indigenous people, using data on the location of Native Title determinations and appeals, and areas containing Indigenous Land Use Agreements.

Table 5 identifies the total area of forest land owned by Indigenous people in different states and territories, and the area of forest on the Register of the National Estate for Indigenous values.

It can be seen that there is a relatively small area of Indigenous-owned forest in Victoria compared to most other States except Tasmania, and South Australia ranks fourth in terms of area of native forest owned by Indigenous people. South Australia and Victoria also have a relatively small area of native forest listed on the Register of the National Estate for Indigenous Values. It is not possible to identify what proportion of the forest area listed in the table is located in the Green Triangle.

The data on which this indicator is based are a fairly limited representation of the extent to which Indigenous people may access and utilise forest resources in Australia, or of the spiritual and cultural significance of forests to different Indigenous people. It may be best to undertake more in-depth work to better understand how to monitor access to forests and how this is changing over time.

Table 5: Forest land owned and accessed by Indigenous people, 2007

	Native forest owned by Indigenous people (hectares)	Plantation owned by Indigenous people (hectares)	Native forest on Register of the National Estate for Indigenous values (hectares)
New South Wales	197,000	0	96,000
Northern Territory	15,342,000	15,000	790,000
Queensland	3,374,000	2,000	458,000
Western Australia	1,645,000	1,000	4,000
South Australia	283,000	0	51,000
Tasmania	4,000	0	2,000
Victoria	4,000	0	173,000
Australia	20,848,000	19,000	1,574,000
Data source: Bureau of Rural Sciences National Forest Inventory as reported in Australia's <i>State of the Forests</i> report			

4.0 Conclusions

The indicators reported in this document provide a broad overview of the key social and economic characteristics of forestry and forestry workers, and of the communities that are dependent on forestry, in the Green Triangle. The indicators can be used to identify how these characteristics are changing over time, and hence to examine social and economic change related to the forest industry. These social and economic changes may have many impacts on different people. It is important to undertake further work to improve the extent to which the social and economic changes shown in the different indicators can be understood in terms of their impacts on different individuals and groups. More in-depth studies are needed to identify downstream economic impacts, of the ways people experience the changes identified in the indicators and what these changes mean for their lives, and of perceptions about forestry, amongst others.

The results of analysing the indicators suggest that the forest industry in Australia and the Green Triangle have some important differences. These differences suggest a range of potential issues if the forest industry experiences change in the future.

In particular, some parts of the Green Triangle are highly dependent on the forest industry, indicating a high vulnerability to experiencing impacts of changes to the industry. The relative urbanisation of forestry employment indicates that any shift from traditional agriculture to forestry will involve a change in the location of employment opportunities and hence impacts on rural areas. Social characteristics of forestry dependent regions are fairly similar to non-forestry dependent regions in the Green Triangle; this is not unexpected given that even in highly forestry dependent regions more than 80% of the labour force work in industries other than forestry.

Occupational disease and injury rates are high in the forest industry, although most forestry workers indicate high levels of satisfaction with their jobs and lives overall. The major source of dissatisfaction with their work comes from external decisions made about the industry, rather than from internal conditions within the industry, for most workers. Workers earn slightly higher than average incomes, and are more likely to have post-school qualifications than is average for the labour force.

Indigenous participation in the Green Triangle forest industry labour force is currently lower than average for Australia, but growing. Further work is needed to identify how best to encourage and facilitate Indigenous participation in the industry.

It would be useful to undertake studies which enable improved interpretation of the meaning of the social and economic characteristics and changes identified here, in order to better utilise the indicators tested in this case study. While this report has attempted to interpret what the data measured in indicators means in terms of social and economic impacts of the industry, further study is needed to be able to make better use of this data. While this report has identified social changes associated with the forest industry, and social and economic characteristics of the industry, it is difficult to identify what these indicators mean in terms of impacts on communities and forestry workers in the regions. These further studies would enable improved utilisation of the recommended indicators.

5.0 References

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- Williams, K., Dunn, C., Ford, R. and Anderson, N. 2008. *Understanding residents' views on land use change*. Report prepared for the *Socio-economic impacts of land use change* study. March 2008. CRC for Forestry Technical Report 187. CRC for Forestry, Hobart.

Appendix 1: Rate of change in employment - SLAs

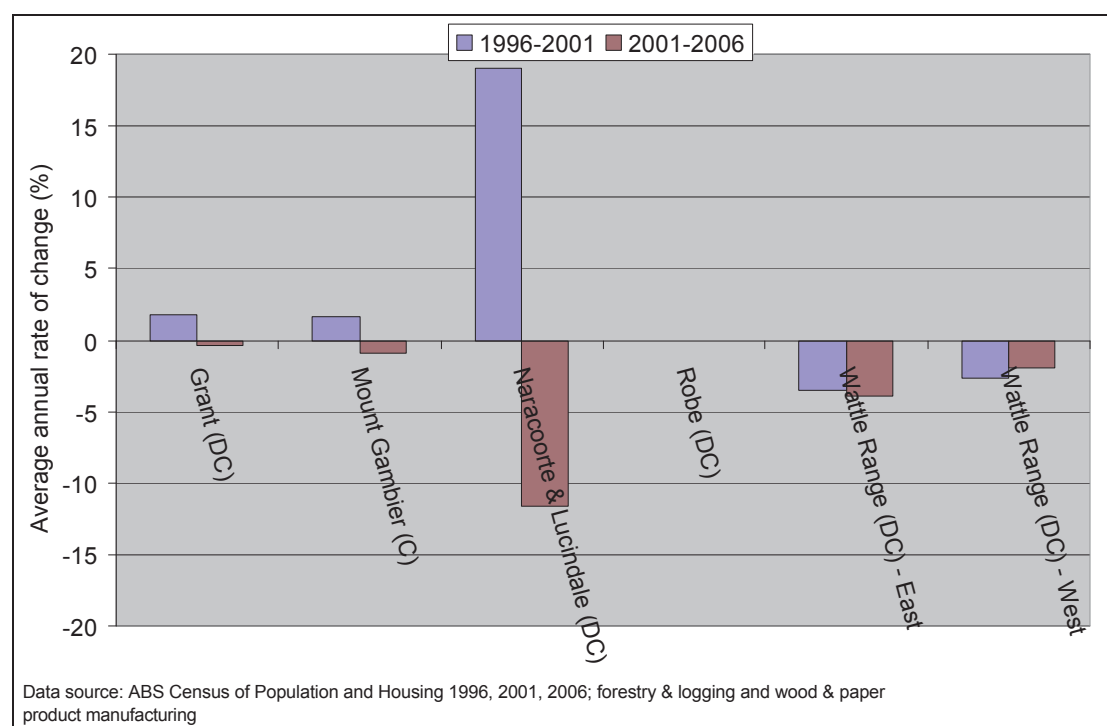


Figure A1.1: Rate of change in employment in South East SD, 1996, 2001, 2006³¹

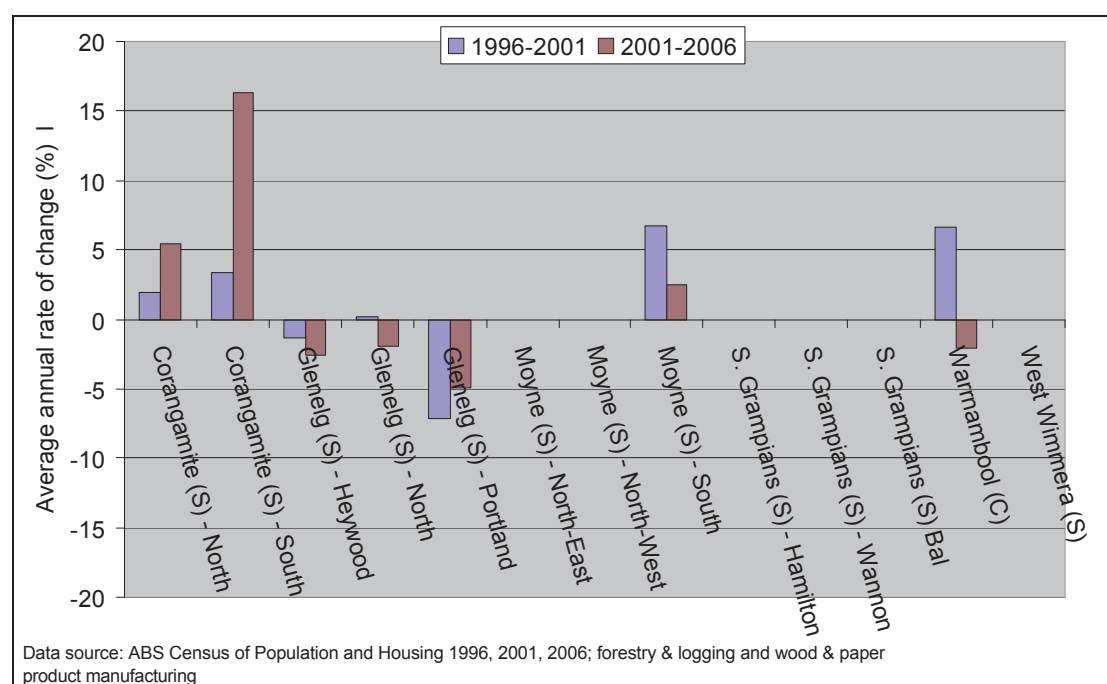


Figure A1.2: Rate of change in employment in Western District and Wimmera SDs, 1996, 2001, 2006

³¹ Note: Where an area had < 20 employees in all time periods rate of change is not shown, as randomisation of data by the ABS together with small numbers of people employed make the rate of change data potentially meaningless for areas with small numbers of forest industry workers.

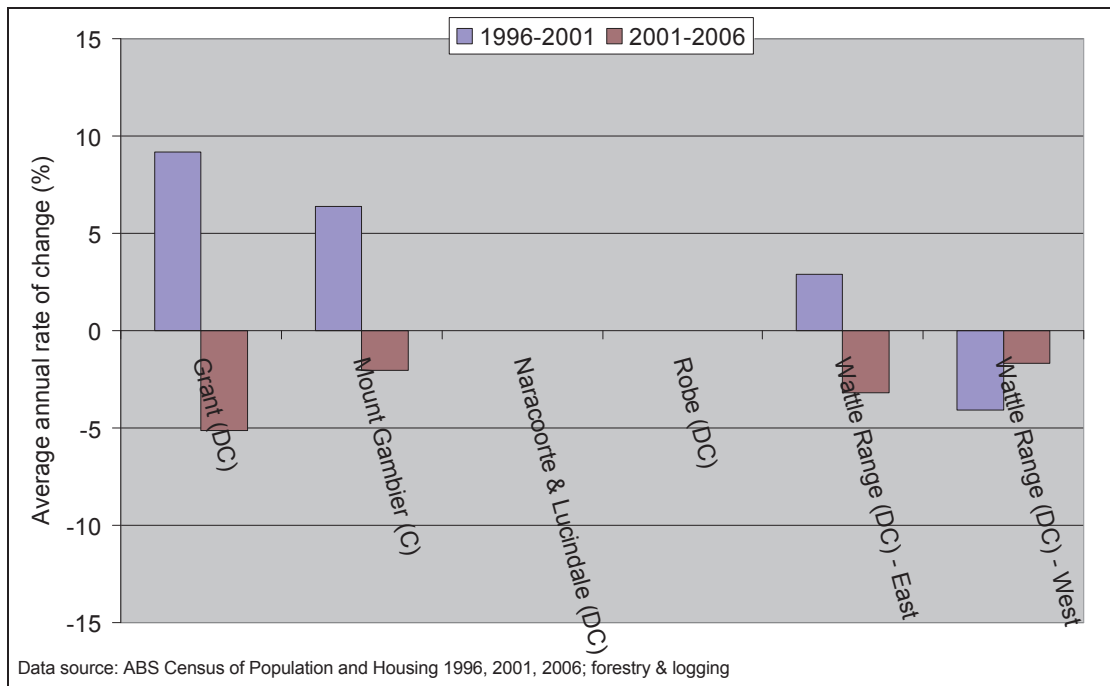


Figure A1.3: Rate of change in employment in forestry and logging sector – South Australia, 1996, 2001, 2006

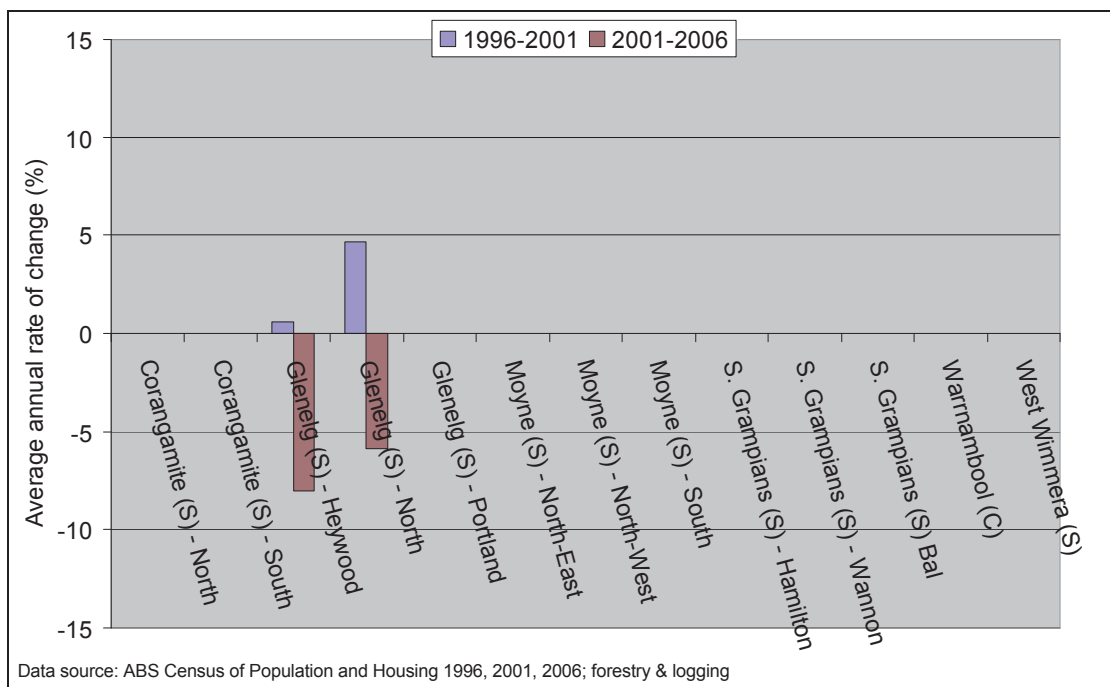


Figure A1.4: Rate of change in employment in forestry and logging sector - Victoria, 1996, 2001, 2006

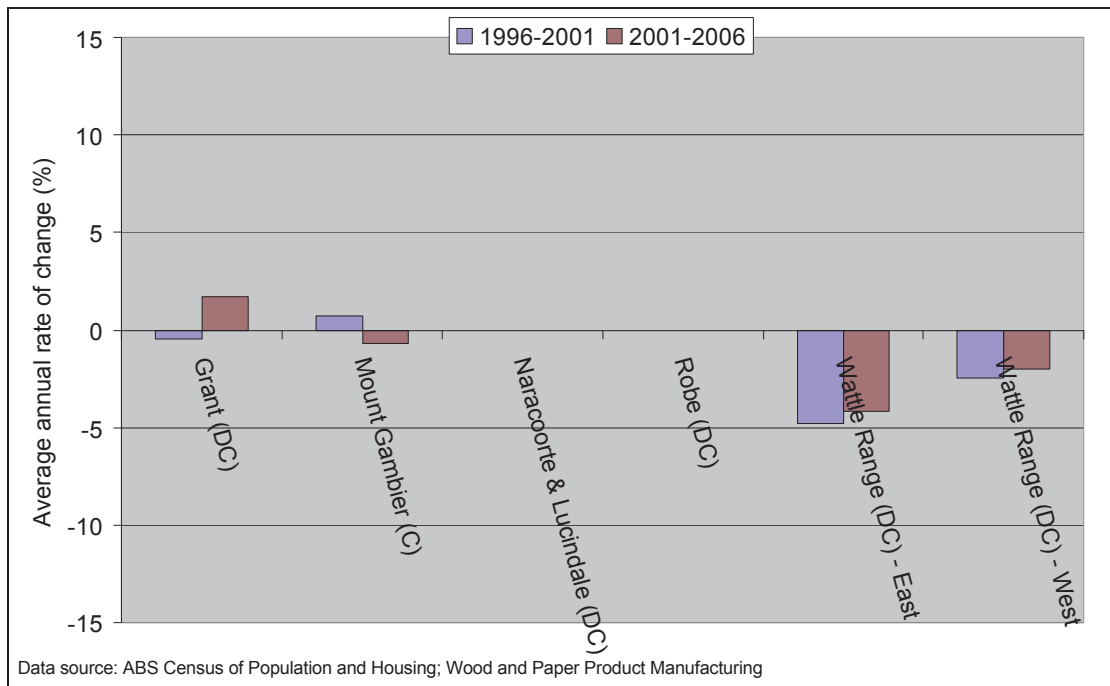


Figure A1.5: Rate of change in employment in the South Australian wood and paper product manufacturing sector, 1996, 2001, 2006

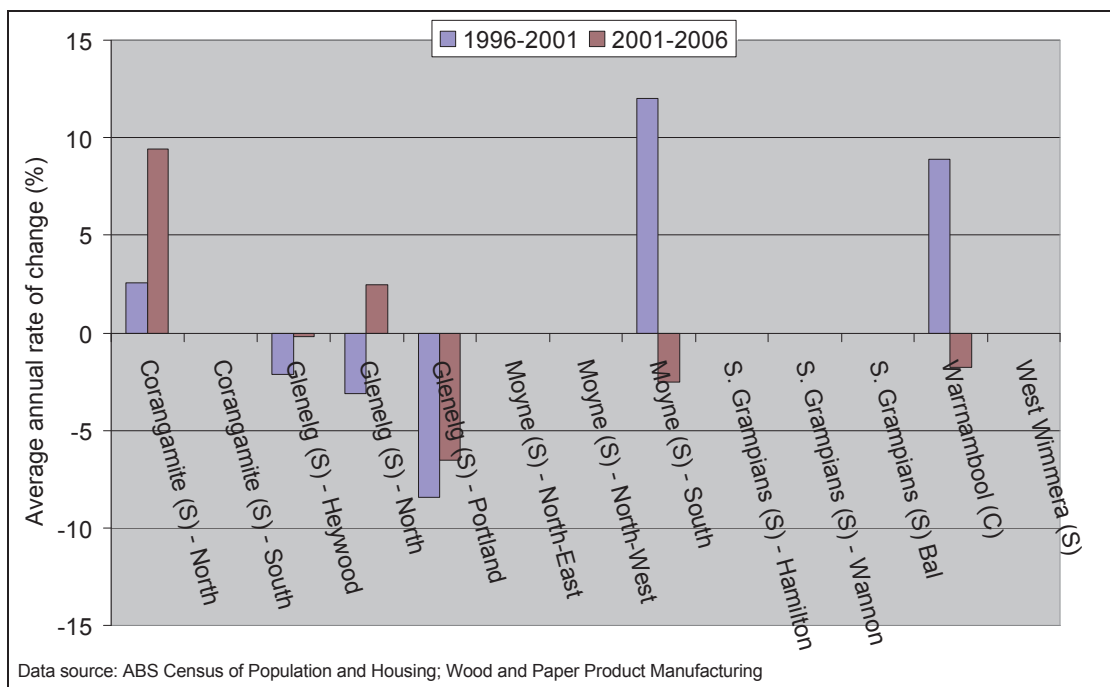


Figure A1.6: Rate of change in employment in the Victorian wood and paper product manufacturing sector, 1996, 2001, 2006

Appendix 2: Average annual change in dependence on the forest industry (% employment)

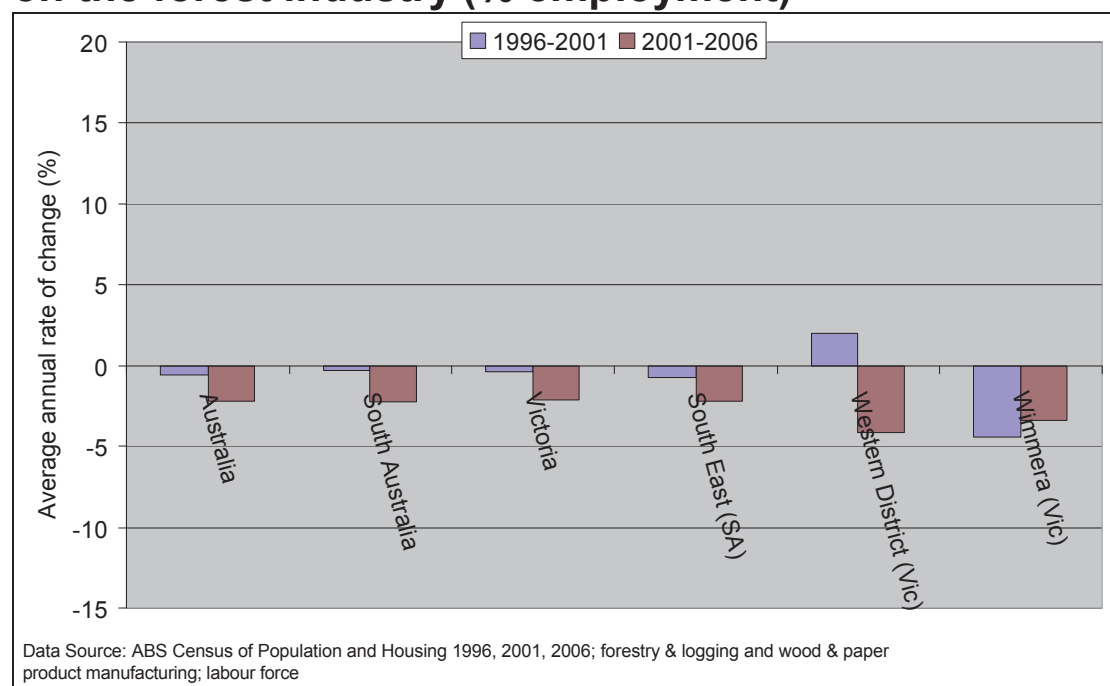


Figure A2.1: Average annual change in dependence on the forest industry, measured as proportion of labour force employed, 1996-2001 and 2001-2006

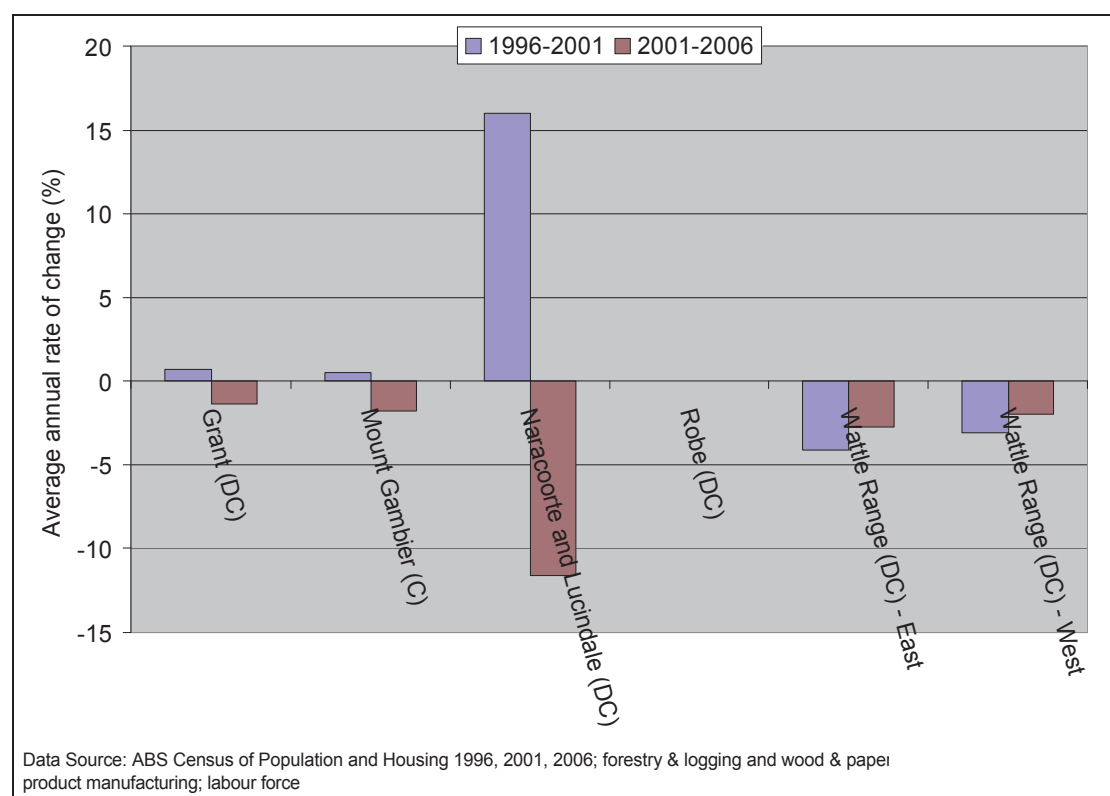


Figure A2.2: Average annual change in dependence on the forest industry, measured as proportion of labour force employed in South Australia, 1996-2001 and 2001-2006

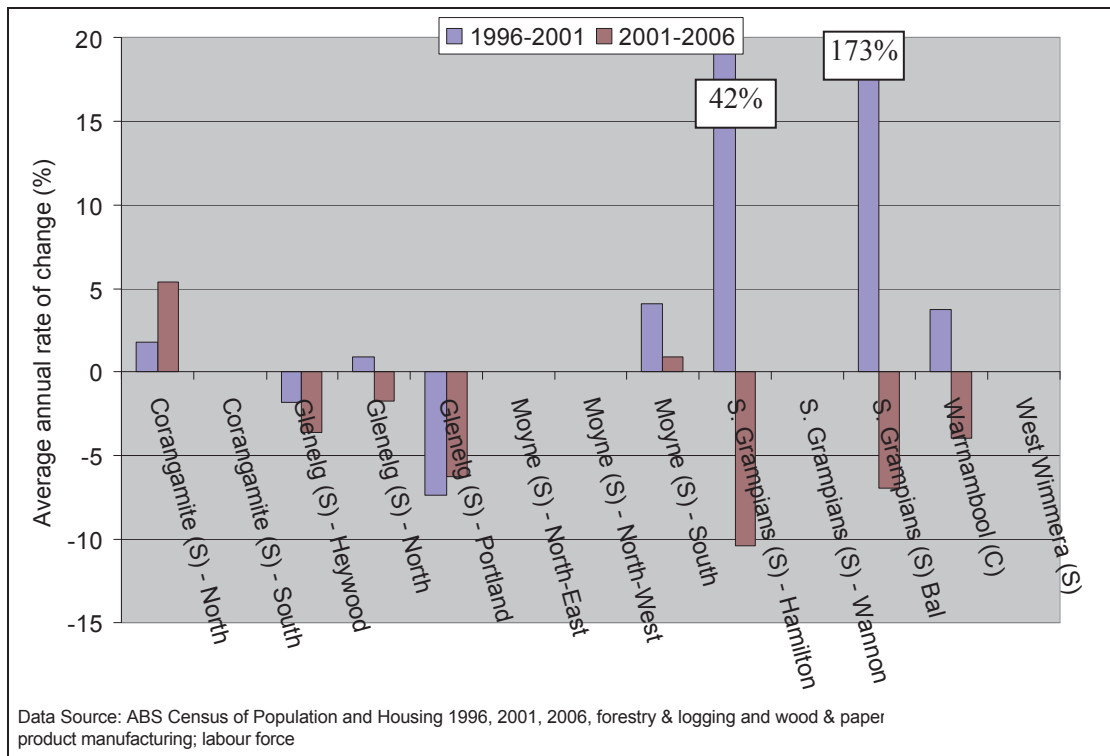


Figure A2.3: Average annual change in dependence on the forest industry, measured as proportion of labour force employed in Victoria, 1996-2001 and 2001-2006

Appendix 3: Forestry worker characteristics by SLA

A3.1 Income

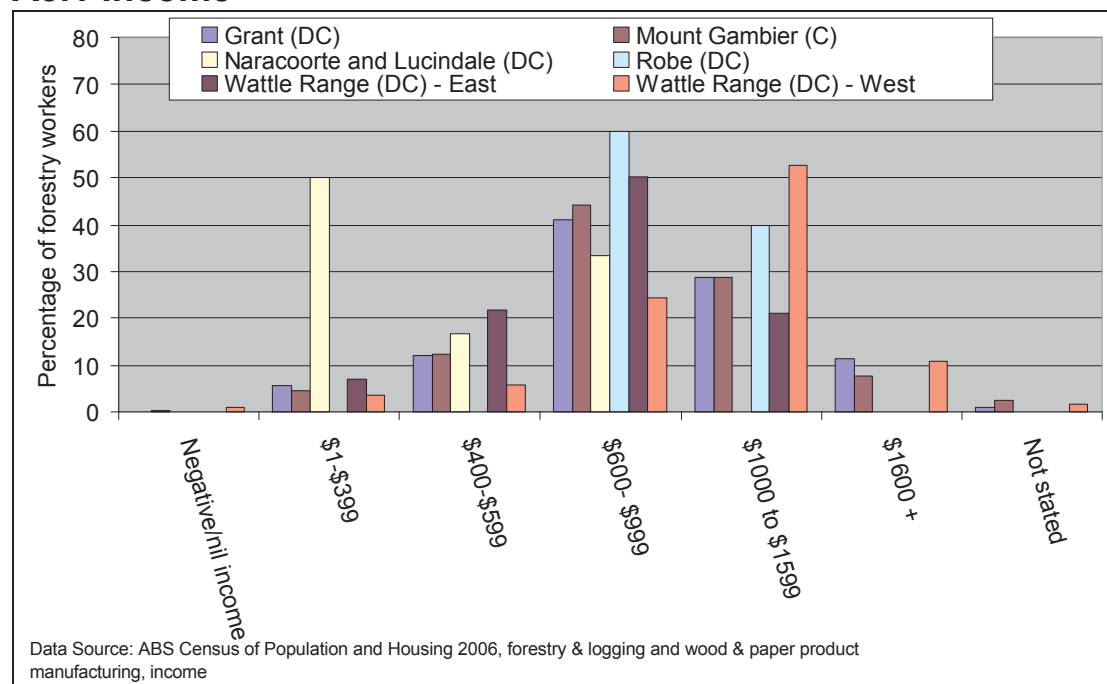


Figure A3.1: Distribution of forestry worker income, 2006 – local areas in South East South Australia

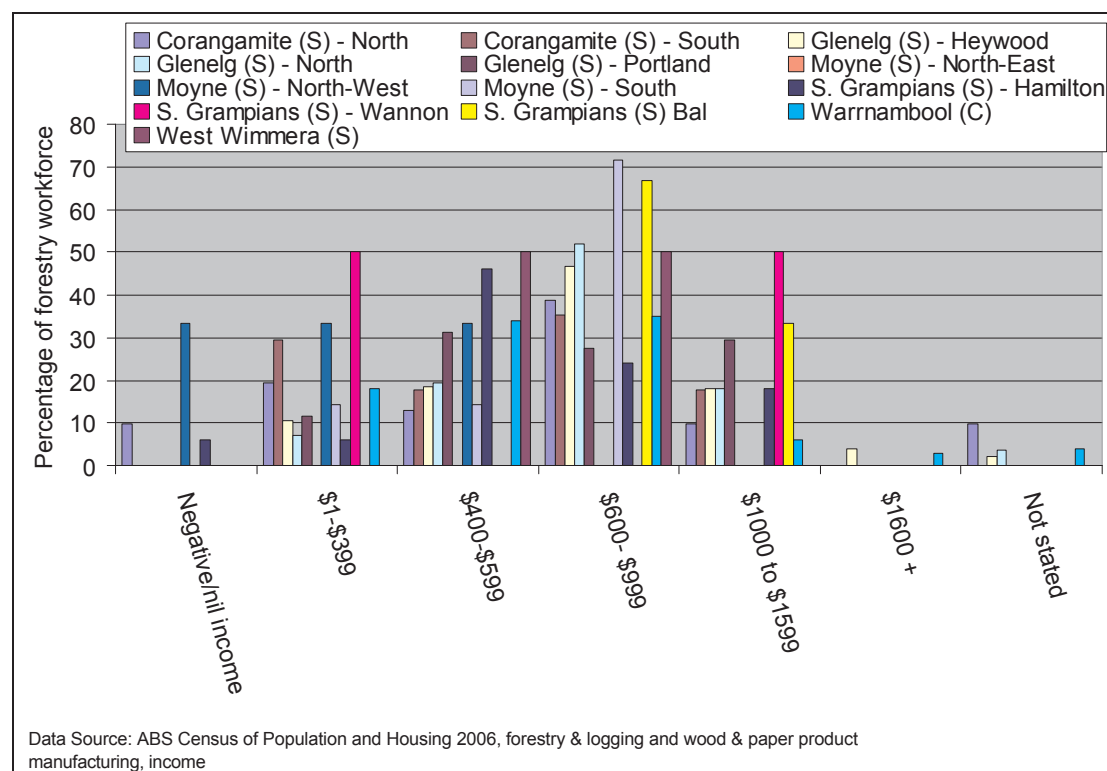


Figure A3.2: Distribution of forestry worker income, 2006 – local areas in the Western District and Wimmera regions of Victoria

A3.2 Age distribution

Table A3.1: Percentage of labour force in different age groups, forest industry and total labour force - 2006

	Forest industry 15-24 years	Total labour force 15- 24 years	Forest industry 25-34 years	Total labour force 25- 34 years	Forest industry 35-44 years	Total labour force 35- 44 years	Forest industry 45-54 years	Total labour force 45- 54 years	Forest industry 55-64 years	Total labour force 55-64 years	Forest industry 65 years and older	Total labour force 65 years and older
Australia	13.9%	16.7%	22.3%	21.4%	27.1%	24.0%	23.1%	22.8%	11.8%	12.7%	1.7%	2.4%
South Australia	13.5%	16.6%	22.4%	19.8%	28.9%	23.9%	22.8%	24.0%	11.1%	13.4%	1.2%	2.3%
Victoria	12.1%	16.0%	23.1%	22.1%	27.6%	24.4%	23.6%	22.7%	11.7%	12.4%	1.9%	2.4%
South East (SA)	12.5%	15.5%	19.7%	18.4%	28.7%	24.7%	25.2%	24.2%	12.4%	13.8%	1.7%	3.4%
Western District (Vic)	14.9%	15.3%	23.7%	17.1%	27.6%	23.7%	20.8%	25.0%	10.5%	14.6%	2.5%	4.2%
Wimmera (Vic)	9.2%	13.3%	21.1%	15.9%	31.7%	23.7%	26.0%	25.8%	11.3%	15.7%	0.8%	5.6%
Grant (DC)	0.0%	13.2%	30.0%	15.0%	35.0%	27.0%	35.0%	25.6%	0.0%	14.9%	0.0%	4.2%
Mount Gambier (C)	8.0%	18.5%	22.0%	20.6%	24.7%	23.7%	24.0%	23.1%	17.3%	12.0%	4.0%	2.1%
Naracoorte and Lucindale (DC)	9.4%	15.9%	15.3%	17.7%	40.0%	23.9%	25.9%	25.3%	9.4%	13.9%	0.0%	3.3%
Robe (DC)	24.5%	12.6%	11.3%	15.7%	26.4%	24.2%	20.8%	21.4%	11.3%	17.8%	5.7%	8.4%
Wattle Range (DC) - East	21.3%	11.8%	21.3%	22.0%	21.3%	26.0%	23.4%	21.3%	12.8%	15.5%	0.0%	3.5%
Wattle Range (DC) - West	50.0%	13.1%	50.0%	16.3%	0.0%	26.4%	0.0%	26.0%	0.0%	14.4%	0.0%	3.8%
Corangamite (S) - North	19.0%	12.1%	20.3%	16.5%	23.6%	24.0%	22.9%	25.3%	12.5%	17.0%	1.7%	5.0%
Corangamite (S) - South	34.7%	12.2%	23.6%	16.2%	13.9%	26.3%	15.3%	25.3%	12.5%	14.9%	0.0%	5.1%
Glenelg (S) - Heywood	16.7%	11.6%	33.3%	14.2%	16.7%	24.7%	0.0%	27.4%	33.3%	16.7%	0.0%	5.4%
Glenelg (S) - North	33.3%	11.3%	33.3%	12.4%	0.0%	24.7%	33.3%	26.1%	0.0%	18.3%	0.0%	7.1%
Glenelg (S) - Portland	5.8%	15.7%	16.3%	19.2%	37.3%	25.3%	26.6%	25.6%	12.8%	12.0%	1.3%	2.3%
Moyne (S) - North-East	11.4%	10.0%	23.9%	15.1%	30.1%	20.9%	25.0%	29.7%	8.8%	15.9%	0.8%	8.5%
Moyne (S) - North-West	8.8%	10.8%	27.1%	13.0%	30.0%	25.0%	24.1%	24.2%	10.0%	18.7%	0.0%	8.3%
%Moyne (S) - South	6.1%	13.5%	15.2%	16.1%	33.1%	23.7%	29.0%	25.8%	16.1%	15.8%	0.5%	5.1%
S. Grampians (S) - Hamilton	38.6%	17.9%	20.8%	18.5%	11.9%	20.9%	18.8%	24.0%	9.9%	15.5%	0.0%	3.1%
S. Grampians (S) - Wannon	20.7%	12.3%	20.7%	11.9%	17.2%	22.4%	31.0%	27.5%	10.3%	17.1%	0.0%	8.7%
S. Grampians (S) Bal	28.6%	9.7%	28.6%	13.7%	14.3%	22.7%	14.3%	27.0%	14.3%	19.4%	0.0%	7.5%
Warrnambool (C)		20.0%		19.7%		23.2%		23.3%		11.7%		2.1%
West Wimmera (S)	33.3%	10.2%	33.3%	12.8%	0.0%	24.7%	0.0%	24.8%	33.3%	18.2%	0.0%	9.3%

Data source: ABS *Census of Population and Housing* 2006.

A3.3 Gender

Table A3.2: Gender of workforce – comparison of forest industry and labour force, 2006 and 2001

	2006				2001			
	Males - forest industry	Males - labour force	Females - forest industry	Females - labour force	Males - forest industry	Males - labour force	Females - forest industry	Females - labour force
Australia	82.5%	53.9%	17.5%	46.1%	83.2%	55.1%	16.8%	44.9%
South Australia	82.6%	53.7%	17.4%	46.3%	83.3%	55.2%	16.7%	44.8%
Victoria	82.1%	53.8%	17.9%	46.2%	83.2%	54.9%	16.8%	45.1%
South East (SA)	82.9%	55.9%	17.1%	44.1%	83.6%	57.4%	16.4%	42.6%
Western District (Vic)	81.9%	54.9%	18.1%	45.1%	84.9%	56.4%	15.1%	43.6%
Wimmera (Vic)	85.1%	55.5%	14.9%	44.5%	79.3%	57.2%	20.7%	42.8%
Grant (DC)	79.3%	56.0%	20.7%	44.0%	80.1%	56.8%	19.9%	43.2%
Mount Gambier (C)	84.5%	54.5%	15.5%	45.5%	84.4%	56.3%	15.6%	43.7%
Naracoorte and Lucindale (DC)	76.9%	56.3%	23.1%	43.7%	80.6%	57.6%	22.6%	42.4%
Robe (DC)	100.0%	53.1%	0.0%	46.9%	62.5%	57.3%	0.0%	42.7%
Wattle Range (DC) - East	69.9%	57.0%	30.1%	43.0%	73.5%	57.6%	26.5%	42.4%
Wattle Range (DC) - West	86.4%	56.6%	13.6%	43.4%	87.4%	58.8%	12.6%	41.2%
Corangamite (S) - South	80.0%	57.1%	20.0%	42.9%	100.0%	57.0%	0.0%	43.0%
Corangamite (S) - North	89.3%	55.3%	10.7%	44.7%	86.4%	56.2%	13.6%	43.8%
Glenelg (S) - Heywood	85.8%	56.5%	14.2%	43.5%	83.3%	57.7%	16.7%	42.3%
Glenelg (S) - North	80.5%	55.5%	19.5%	44.5%	90.6%	57.1%	9.4%	42.9%
Glenelg (S) - Portland	73.5%	55.7%	26.5%	44.3%	81.5%	57.8%	20.0%	42.2%
Moyne (S) - North-East		56.8%		43.2%	0.0%	58.4%	100.0%	41.6%
Moyne (S) - North-West		56.4%		43.6%	100.0%	59.2%	0.0%	40.8%
Moyne (S) - South	77.8%	54.8%	22.2%	45.2%	95.8%	56.6%	16.7%	43.4%
S. Grampians (S) - Hamilton	84.1%	55.1%	15.9%	44.9%	85.2%	56.5%	14.8%	43.5%
S. Grampians (S) - Wannon	0.0%	56.8%	100.0%	43.2%	0.0%	57.9%	75.0%	42.1%
S. Grampians (S) Bal	85.7%	56.3%	14.3%	43.7%	73.3%	56.8%	23.3%	43.2%
Warrnambool (C)	90.7%	52.9%	9.3%	47.1%	88.0%	54.6%	13.0%	45.4%
West Wimmera (S)	100.0%	56.8%	0.0%	43.2%	66.7%	59.3%	0.0%	40.7%

Data source: ABS *Census of Population and Housing* 2001, 2006.

A3.4 Hours worked

Table A3.3 Percentage of workforce working different hours by Statistical Local Area, 2006

	Corangamite (S) - North	Corangamite (S) - South	Glenelg (S) - Heywood	Glenelg (S) - North	Glenelg (S) - Portland	Moyne (S) - North-East	Moyne (S) - North-West	Moyne (S) - South	S. Grampians (S) - Hamilton	S. Grampians (S) - Wannon	S. Grampians (S) - Bal	Warrnambool (C)	West Wimmera (S)
Labour force - None	3.5%	4.3%	5.8%	4.4%	6.8%	2.5%	3.3%	5.2%	4.8%	4.2%	3.3%	4.0%	5.0%
Forestry - None	0.0%	0.0%	3.9%	3.5%	0.0%		50.0%	0.0%	0.0%	50.0%	0.0%	3.0%	0.0%
Labour force - 1-15 hours	12.6%	11.1%	11.6%	11.2%	12.4%	10.5%	11.7%	13.1%	12.9%	11.1%	10.7%	13.9%	9.8%
Forestry - 1-15 hours	10.7%	0.0%	0.0%	0.0%	6.0%		50.0%	0.0%	6.7%	0.0%	0.0%	3.0%	0.0%
Labour force - 16-24 hours	9.1%	7.1%	7.9%	8.9%	9.6%	9.6%	7.0%	8.8%	8.8%	8.8%	10.0%	9.5%	8.2%
Forestry - 16-24 hours	0.0%	16.7%	5.2%	3.5%	0.0%		0.0%	27.3%	13.3%	50.0%	0.0%	3.0%	0.0%
Labour force - 25-34 hours	10.7%	8.4%	9.2%	11.9%	10.0%	7.6%	9.1%	9.4%	10.8%	8.7%	9.0%	10.0%	9.7%
Forestry - 25-34 hours	10.7%	0.0%	1.9%	17.6%	0.0%		0.0%	0.0%	0.0%	0.0%	25.0%	5.1%	0.0%
Labour force - 35-39 hours	10.2%	8.2%	13.0%	10.9%	15.0%	9.8%	8.1%	11.5%	16.7%	7.8%	10.6%	17.3%	7.7%
Forestry - 35-39 hours	10.7%	16.7%	24.7%	21.2%	24.0%		0.0%	13.6%	6.7%	0.0%	0.0%	41.4%	50.0%
Labour force - 40 hours	16.1%	12.3%	15.4%	16.5%	16.9%	15.5%	14.1%	14.8%	18.5%	19.5%	17.2%	17.7%	17.4%
Forestry - 40 hours	25.0%	50.0%	26.0%	11.8%	26.0%		0.0%	18.2%	46.7%	0.0%	25.0%	26.3%	0.0%
Labour force - 41-48 hours	9.1%	9.1%	10.5%	8.4%	13.2%	8.0%	8.5%	8.8%	10.3%	8.7%	8.6%	10.3%	8.7%
Forestry - 41-48 hours	21.4%	16.7%	18.8%	16.5%	18.0%		0.0%	13.6%	13.3%	0.0%	12.5%	13.1%	50.0%
Labour force - 49 hours and over	25.9%	36.1%	22.3%	25.3%	13.3%	32.9%	35.0%	25.1%	13.8%	27.7%	27.6%	14.6%	30.0%
Forestry - 49 hours and over	21.4%	0.0%	15.6%	22.4%	26.0%		0.0%	27.3%	13.3%	0.0%	37.5%	5.1%	0.0%
Labour force - Not stated	2.7%	3.3%	4.3%	2.4%	2.8%	3.6%	3.1%	3.2%	3.5%	3.6%	3.0%	2.6%	3.5%
Forestry - Not stated	0.0%	0.0%	3.9%	3.5%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Data source: ABS *Census of Population and Housing* 2001, 2006.

Table A3.3 Percentage of workforce working different hours by Statistical Local Area, 2006 (cont.)

	Grant (DC)	Mount Gambier (C)	Naracoorte and Lucindale (DC)	Robe (DC)	Wattle Range (DC) - East	Wattle Range (DC) - West
Labour force - None	5.2%	4.3%	7.1%	7.0%	5.0%	6.1%
Forestry - None	4.0%	3.9%	0.0%	0.0%	4.2%	8.3%
Labour force - 1-15 hours	11.0%	11.2%	8.9%	17.0%	8.3%	12.9%
Forestry - 1-15 hours	2.8%	2.0%	16.7%	0.0%	0.0%	1.7%
Labour force - 16-24 hours	9.3%	9.0%	7.5%	8.7%	6.9%	9.3%
Forestry - 16-24 hours	2.3%	1.9%	0.0%	23.1%	3.6%	2.2%
Labour force - 25-34 hours	9.9%	9.7%	9.7%	10.0%	8.4%	10.0%
Forestry - 25-34 hours	5.3%	3.1%	16.7%	0.0%	2.4%	5.0%
Labour force - 35-39 hours	13.3%	17.8%	13.2%	7.8%	12.8%	17.0%
Forestry - 35-39 hours	15.3%	18.5%	16.7%	23.1%	15.5%	34.2%
Labour force - 40 hours	14.6%	15.6%	18.1%	15.4%	21.1%	14.7%
Forestry - 40 hours	23.9%	24.0%	33.3%	23.1%	33.3%	19.1%
Labour force - 41-48 hours	10.7%	13.7%	11.1%	9.3%	12.6%	11.5%
Forestry - 41-48 hours	18.6%	22.0%	0.0%	0.0%	22.0%	19.3%
Labour force - 49 hours and over	23.3%	15.8%	21.4%	21.6%	22.6%	15.9%
Forestry - 49 hours and over	25.2%	23.1%	16.7%	30.8%	17.3%	8.8%
Labour force - Not stated	2.7%	2.9%	3.0%	3.2%	2.4%	2.5%
Forestry - Not stated	2.5%	1.5%	0.0%	0.0%	1.8%	1.4%
Data source: ABS <i>Census of Population and Housing</i> 2001, 2006.						

A3.5 Educational qualifications

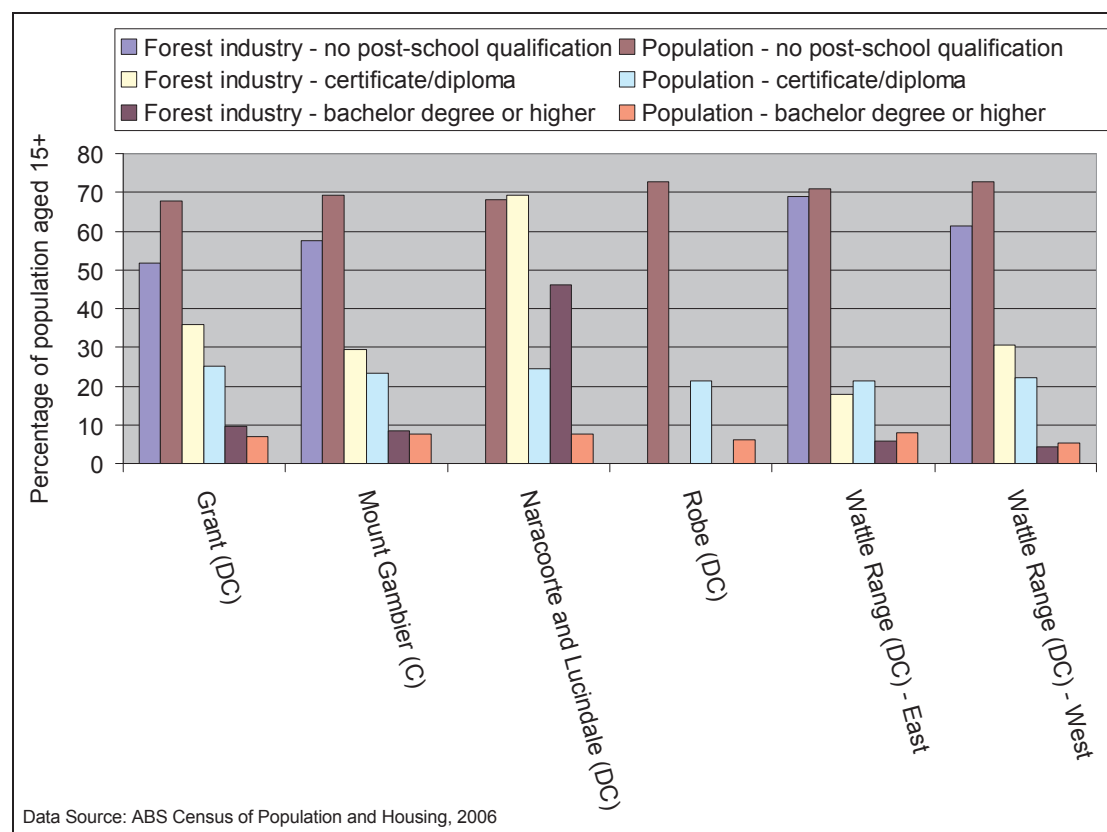


Figure A3.3: Proportion of population with different types of educational qualification – forest industry and total population aged over 15, 2006, South East – South Australia

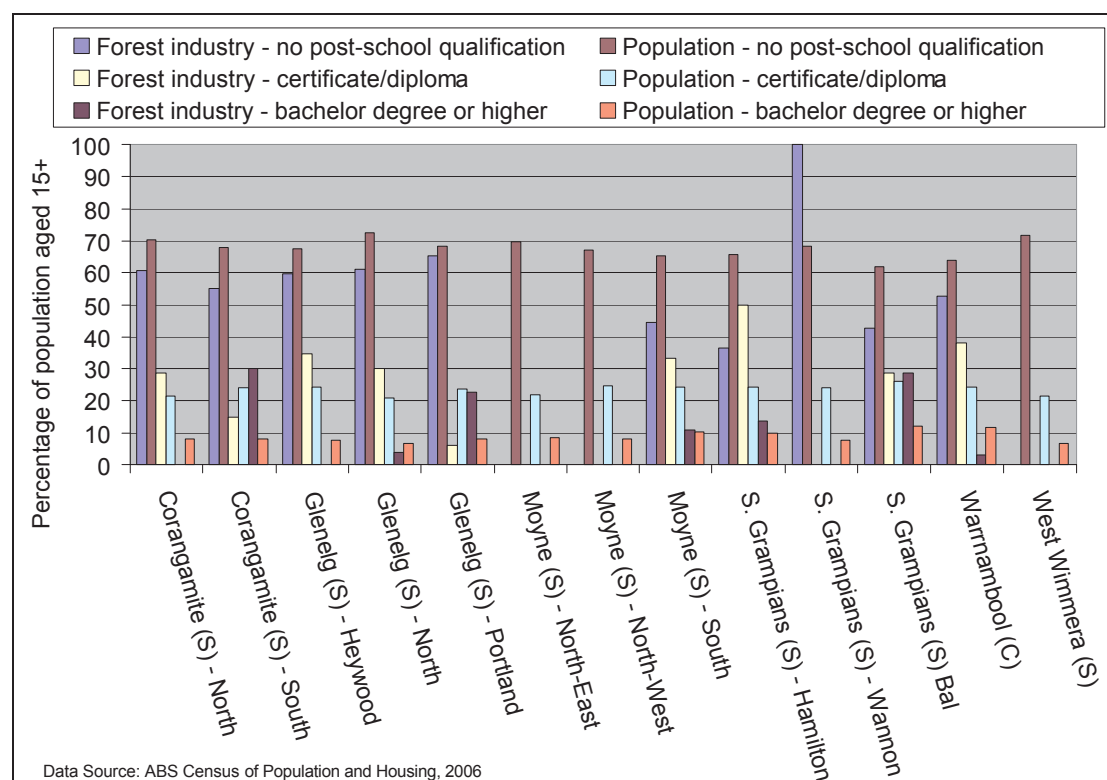


Figure A3.4: Proportion of population with different types of educational qualification – forest industry and total population aged over 15, 2006, Western District and Wimmera - Victoria

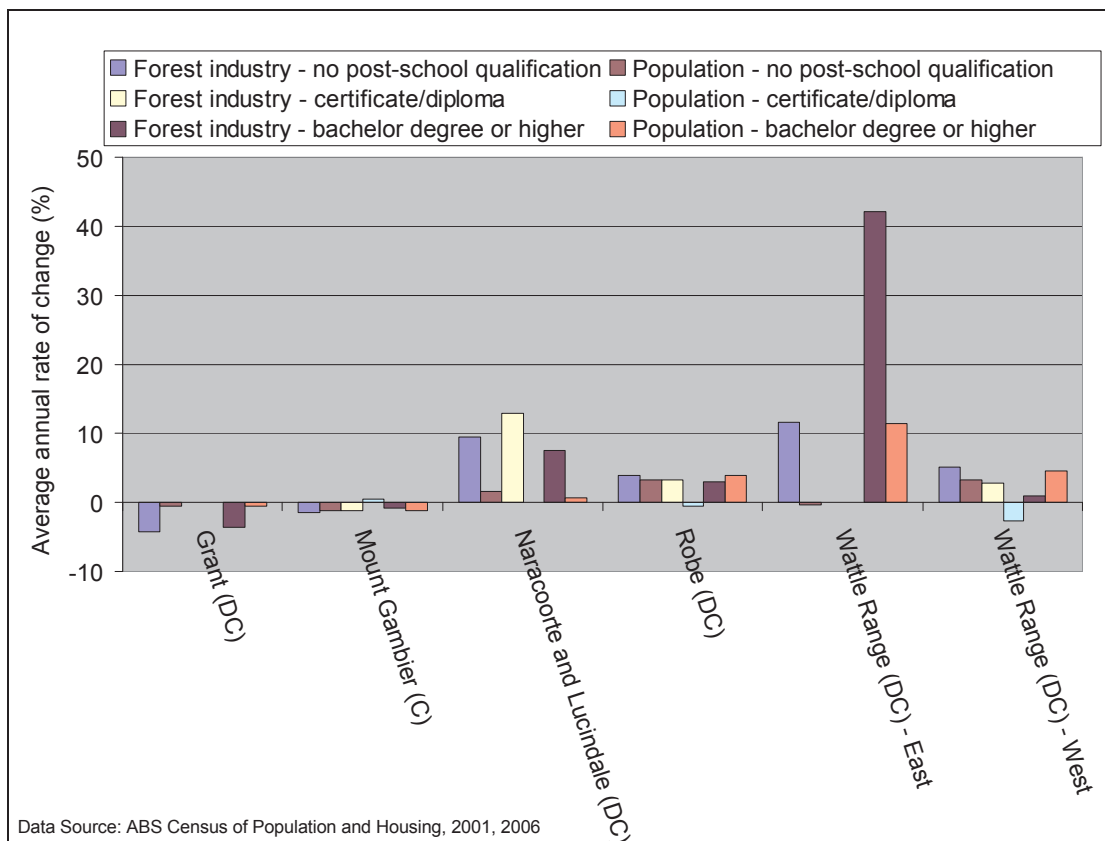


Figure A3.5: Average annual rate of change of population with different types of educational qualifications, 2001-2006, South East – South Australia

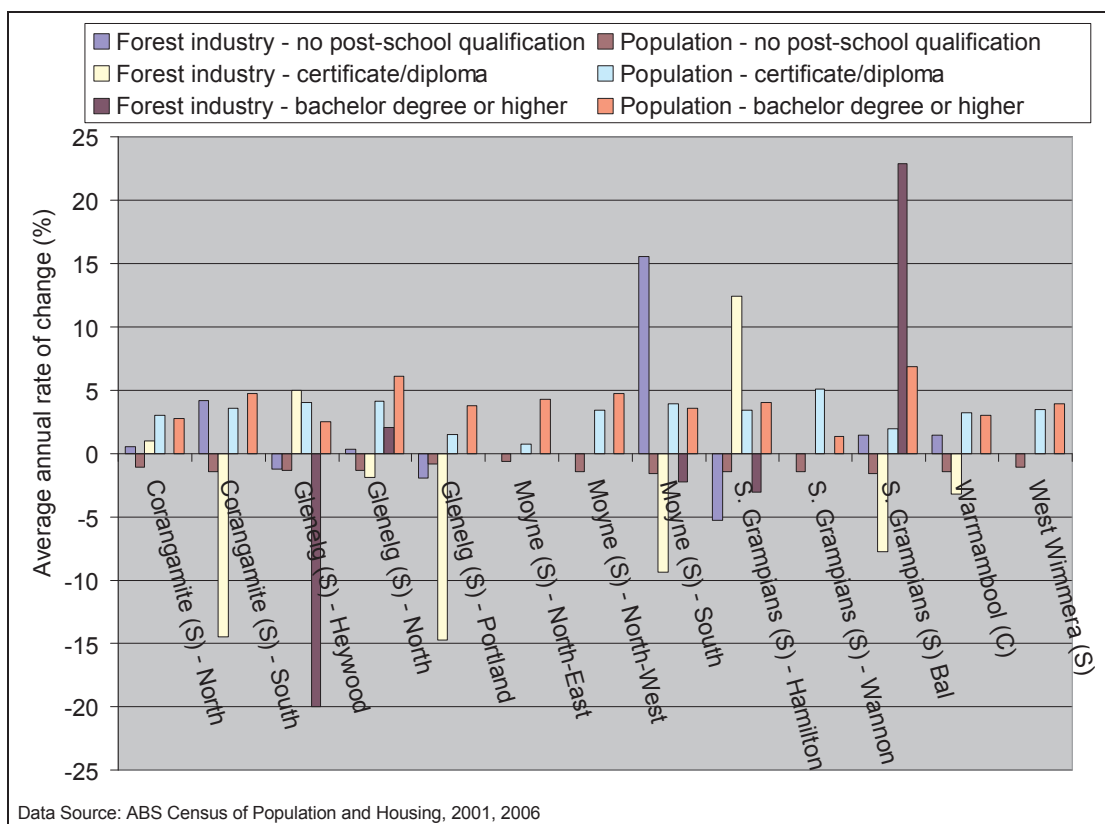


Figure A3.6: Average annual rate of change of population with different types of educational qualifications, 2001-2006, Western District and Wimmera - Victoria