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ABARES

# **Regional socio-economic profiling of the forestry industry**

## **Recommendations report**

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

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# Summary

This project provides advice on developing better socio-economic profiling and reporting for the forest and wood products industries. The precursor to this report is the ABARES discussion paper *Social indicators for Australia's forest and wood products industries* (Schirmer et al. 2013a) which presented a range of proposed indicators for reporting social dimensions for the forestry industry, under categories including employment, contributions of industry to community, workers' wellbeing and workforce diversity. This methodology and indicator framework provided a basis for including social indicators in ABARES Australian forest and wood products statistics (AFWPS) series. The indicators framework and the reporting areas used have been reviewed, since they had been included in AFWPS in 2012.

This project reveals that existing data sources provide a partial set of data on social dimensions of the forest and wood products industries, with gaps remaining in the availability and reliability of key forms of data. The report sets out recommendations for further work that could improve the collection and reporting of socio-economic data. This is important for better understanding the forestry industry, and to help stakeholders consider the development of, support for, and coordination of future collections and studies.

The project was sponsored by Forest and Wood Products Australia, which is a key national body investing in research and development services for forest and wood products industries. However the recommendations from this project are provided for all stakeholders, including industry organisations, government agencies at different levels, and researchers.

High quality information is required in order to understand the connection industry has with regions and communities through direct employment, and through the contributions and characteristics of the forest industry workforce. While data from the ABS Census of Population and Housing are adequate for reporting at 5 yearly intervals, other employment data collected more frequently would provide a more comprehensive understanding of trends in the industry. Currently, data from the Labour Force Survey provide limited options to produce reliable estimates for the forestry sector in the inter-census period.

This report presents:

- options for how new data collection strategies could be used to address key data gaps. Principal strategies are investigation and scoping of a comprehensive national survey of the forestry sector; improved coordination that encourages consistency across surveys and funders; and the development of new methods to improve employment data particularly relating to the importance of adjustment coefficients based on nationally representative surveys, instead of a limited number of state surveys.
- a framework of indicators used in reporting social dimensions of the industry in AFWPS, providing a reporting basis for national, regional and local area scale.
- a description of reporting regions for social indicator reporting.

The project concludes with four key recommendations to improve socio-economic profiling and reporting for the forest and wood products industries:

- **Recommendation 1.** Investigate in consultation with industry the feasibility of using a regular national survey of forest and wood products businesses in Australia to collect comprehensive socio-economic data.

- **Recommendation 2.** Build a consistent approach to socio-economic data collection, coordination of funding, and reporting of data from studies of the forest and wood products industries.
- **Recommendation 3.** Develop strategies and methods to allow a better time-coverage of employment data and understanding of employment dependency on native forest versus plantations as well as contracting sub-sectors.
- **Recommendation 4.** Report socio-economic data at Local Government Area level.

# 1 Introduction

This project began in 2011 with industry consultation investigating approaches to monitoring and reporting social dimensions of Australia's forest and wood products industries. In 2013 ABARES published a discussion paper on potential social indicators (Schirmer et al. 2013a) containing extensive background on the reporting of social dimensions for the industry and an analysis of data limitations. The paper included the rationale and methods referred to in this report.

This report is directly linked to the discussion paper (Schirmer et al. 2013a) and provides recommendations for future collection of socio-economic data on Australia's forest and wood products industries. These recommendations are based on findings by Schirmer et al. (2013a), who reviewed existing data, and additional work on social indicators by ABARES in consultation with the project steering committee. The recommendations are provided for all stakeholders, including industry organisations, government agencies at different levels, and researchers.

Key gaps in availability of socio-economic data to support reporting of social indicators are summarised below. Chapter 2 presents recommendations and options for addressing these gaps and barriers, through developing a national approach to industry-supported surveys or other methods. Chapter 3 presents an updated social indicators framework that was developed through the project utilising available data from the Australian Bureau of Statistics (ABS).

## Gaps in socio-economic data

The principal issue limiting regular reporting on social dimensions of Australia's forest and wood products industries is a lack of available socio-economic data. The key gap is limited employment data. This stems from the absence of a systematic and appropriately sequenced (for example year by year), comprehensive data collection, prohibiting adequate identification of social issues in the forest and wood products industries.

The critical gaps and limitations in relation to employment data are:

- time series information. Reliable data to a detailed geographic scale (for some sectors) are currently collected only once every five years in the Census of Population and Housing (Census). Forest and wood products industries stakeholders have communicated a strong desire for more regular information for tracking employment trends
- data identifying dependence of forest and wood products employment on native forests versus plantation timber resources
- data on some specific types of employment generated in the forest and wood products industries, specifically harvest and haulage contracting, roading work, and silvicultural contracting—which are effectively undercounted in industry categories used by the ABS.

These gaps arise because of limitations with the two principal sources of employment data. The Australian Bureau of Statistics (ABS) undertakes the Census and Labour Force Surveys. The Census provides detailed information on employment and socio-demographic characteristics of workers in the forest and wood products industries, at local, state and national scales. However, there is a five-year interval between Census datasets, and employment statistics do not differentiate between native forest and timber resources. Some parts of the industries are not well represented because of the industry classification attributed to contracting workers.

The ABS Labour Force Survey is conducted regularly between censuses, but does not produce reliable data on employment trends for the forest and wood products industries, as documented in Schirmer et al. (2013a). The Labour Force Survey sample covers 0.3 per cent of the Australian population to represent all industries, and so quarterly estimates for some specific industry sub-divisions are 'subject to sampling variability too high for most practical purposes' (ABS 2014).

Other than the ABS, data sources include various occasional studies examining social dimensions of the forest and wood products industries that have been conducted in recent years. However, these studies have typically focused on case studies within single regions, rather than across Australia. They produce data using differing methods, meaning data are often not comparable across studies even where they have examined similar topics.

Table A1 in Appendix A illustrates the coverage and differences between surveys that provide socio-economic information for the industries.

As well as the gaps in employment data, other gaps in social information include:

- data on social dimensions beyond socio-demographic characteristics of workers. The ABS Census enables a profile of key characteristics of workers (such as age, income and education) to be produced but does not enable monitoring of changes in the health and wellbeing, working conditions, retraining or other social dimensions of those workers' lives
- data on community impacts of industry changes. The ABS Census can provide some information such as volunteering hours, migration and age structure, which can infer changes at a community level when there is expansion or decline in forest and wood products industries. However Census data do not provide information on the direct and flow-on impacts that may occur in communities within a local context, such as changes in innovation and leadership activity, regional economic linkages, spending patterns, use of social services, social cohesion, involvement in community groups and quality of life.

These data gaps mean that a number of key questions about the contribution of Australia's forest and wood products industries to local communities and the effects of industry changes cannot be answered confidently.

## Barriers to addressing gaps in socio-economic data

Several barriers prevent these identified gaps being readily addressed. These include.

- Lack of consistent, regular data collection. A lack of funding and the short-term nature of funding when it is available, means consistent time series data are not being produced for the forest and wood products industries.
- Lack of coordination of existing data collection activities. Multiple organisations invest in occasional studies of social dimensions of forest and wood products industries, but do not coordinate efforts or use consistent, comparable methods.
- Low levels of response to surveys by industry. This can be the result of a range of factors such as general reluctance to participate, trust of the purpose, limited time, or survey fatigue. However, this can weaken the outcome as the data volume might not be representative across the sector.



## 2 Recommendations to address data gaps

This chapter outlines recommendations and options for further work aimed at improving reporting on social dimensions of Australia's forest and wood products industries, given the gaps noted in the introduction. The objective is to enable better ongoing monitoring of social dimensions of Australia's forest and wood products industries.

These actions would complement the adoption of the indicators framework developed through this project (see [Chapter 3](#)), which relies on 5-yearly ABS Census data.

### **Recommendation 1: Investigate the feasibility of a national survey to collect socio-economic data**

There is a need for consistent, reliable information collected over time on the forest and wood products industries in Australia. This project indicates that existing data sources provide only a partial set of data, and do not provide some of the key data that industry stakeholders are requesting.

A repeatable national survey would have the potential to address the multiple gaps highlighted in this report. A regular national survey would also have a range of other benefits. However, sources and levels of funding for such a survey are not clearly identifiable and would need to be determined.

Having a national survey enables reliable and comparable data to be generated for different regions and different segments of the forest and wood products industries, consistently over time. This type of data supports better decision making affecting the industry compared with currently available data, which are often out of date, have partial coverage, and leave key issues unanswered. A table illustrating the range and coverage of surveys currently undertaken is provided in Appendix A.

In addition, having a national survey enables the development of a 'trusted brand' and encourages wider industry participation. Brands such as ABARES have built trust through the regular farm survey and business surveys for the forests sector, which produce well recognised and valued/communicated outputs. A consistent survey that is conducted regularly would familiarise participants with the survey organisation or the value of the outputs to respondents and consequently enhance trust and participation. This is likely to result in more forest and wood products businesses participating in surveys.

Evidence for this can be seen in the experience of the Cooperative Research Centre for Forestry, which supported regular surveys of forest industries businesses in Tasmania. This achieved consistent and in some cases growing participation of businesses over time, and enabled a profile of industry change over time to be developed, as well as a data set that was used to inform multiple policy and industry processes (Schirmer 2008a, 2010, 2012; Schirmer et al. 2011). The use of a regular survey with a recognisable 'brand', from which results are reported back to participants, would substantially improve survey responses and the quality and quantity of data available. This would be supported best if the national survey was driven and coordinated by well regarded industry bodies.

The availability of an instrument for regular data collection provides a platform for assessing changes in the industry and industry response to new or emerging issues, through the addition of supplementary questions about issues as they arise.

Another benefit is that a survey could collect data on multiple issues for which there are currently no available data, or for which current data are not available for many regions or at small scales. For example, this includes data on working conditions for those employed in the industry; and data on community contributions made by businesses (rather than inferred contributions based on other data such as working hours and volunteering rates).

Finally, a national survey would be the key mechanism to address the data gaps identified—data in between Census years, employment in native versus plantation sectors, and Census undercounts. There are other lower-cost options to address these gaps (see under recommendation 3), but a comprehensive national survey would provide the most accurate and consistent data.

A national survey would need to have the following characteristics, based on the needs identified in this project:

- a more frequent component to provide accurate information on employment trends (for example, 12 monthly timeframe)
- a less frequent component on a broader range of social dimensions of the industries, including worker characteristics (for example, once between each 5 yearly Census).

Consideration should be given to a national survey including economic data collection (such as timber inputs and product output values, other production costs and capital investments)—where this could address gaps in current collections. This would complement core socio-economic items such as employment and employee income levels and add value for decision making purposes. This is particularly relevant given that existing funding for collection of economic data is often uncertain or short-term in nature.

Achieving this recommendation requires several component steps, outlined below.

### **Develop agreed scope**

An agreed scope for the survey should be developed through a consultation process with key industry stakeholders. This process needs to take into account that key stakeholders and issues shift over time. The scoping document needs to specify the following:

- industry sectors to be included in the survey
- type of data to be collected in the survey
- frequency of collection for each type of data
- costing of the survey based on estimates of number of businesses to be surveyed, length and complexity of survey, and frequency of proposed data collection.

### **Ensure industry buy-in**

This requires the agreement of key industry bodies to support the survey and encourage members to take part. Any issues with confidence or transparency need to be resolved in an open way. The success of an industry-wide socio-economic survey relies on industry support to ensure a high survey participation and response rate.

### **Identify sustainable funding**

A mechanism for funding the survey on a long-term basis needs to be found. Options to be considered should include formal collaboration between organisations currently funding occasional studies, each of which commit funding to cover the cost of the national survey for a particular jurisdiction or part of the industry.

### **Establish sampling strategy**

The survey needs to be designed to adequately estimate trends in key social issues such as employment in the industry. The Australian forest and wood products industries are characterised by diverse businesses, which vary considerably in size, technology use, and the type of wood and paper products produced. The heterogeneous nature of the industries limits achieving a comprehensive understanding of the industry based on a simplified or small sample of businesses. Different parts or sub-sets of the industry often need different sampling intensities in order to accurately identify trends, and produce data at meaningful local scales, such as Local Government Areas. Based on review of studies by Schirmer (2008, 2010) and Schirmer et al. (2011, 2012), the following should be considered the minimum sample necessary to represent different parts of the industries:

- Forest and plantation growers and managers
  - Surveying all businesses that specialise in the growing and management of forests and plantations is necessary to accurately track this part of the industry. This is because there are a relatively small number of large corporate growers (including government owned corporations), and these businesses are highly diverse, meaning that attempting to estimate the state of the industry from a small sample is unlikely to result in accurate estimates. Non-corporate growers such as individual farm foresters—an active part of the industry with a relative high number of business in some states—also need to be represented, ABS data usually classifies farm foresters under the agriculture industry.
- Silvicultural contractors, harvest and haulage contractors, roading contractors
  - A sample of these businesses should be surveyed, ensuring it is large enough to be representative of the full diversity of contracting businesses.
- Wood and paper manufacturing businesses
  - Surveying all businesses is necessary to accurately track trends. In recent years there has been a decline in the number of manufacturing businesses, with those that remain often being larger businesses than the typical ‘small sawmill’ that dominated production some decades ago. ABARES’ wood processing survey examines a sample of this industry sub-sector—see Appendix Table A1.
- Other businesses
  - Further exploration is needed of the nature and structure of other businesses contributing to the forest and wood products industries.

## Recommendation 2: Build a consistent approach to socio-economic data collection

Multiple studies have examined social dimensions of Australia's forest and wood products industries in different regions in recent years. The funds invested in these studies are considerable. However, the data collected and results are often not comparable because of inconsistencies in data collection methodologies, sample groups (individuals or businesses), spatial boundaries of forestry regions, and collection reference periods. Moreover, different studies define the forest and wood products industries in differing ways, and hence produce different employment estimates for the same time period. This can lead to confusion and discrepancies in industry workforce planning and policy contexts, when considering key parameters such as regional employment, skills availability and broader social interdependencies. While the inconsistencies in national level employment figures reflect different purposes of data sources, the discrepancies can be greater at state and regional levels because of absence of figures in some areas, as well as timing between studies. For example, CRC Forestry Industry surveys did not cover South Australian production areas. Schirmer et al. (2013a) highlighted an example of variability, in employment estimates for Tasmania, of more than 68 per cent between ABS Census and ForestWorks data sources. Appendix A illustrates the range of coverage of different surveys in more detail.

The Forestry Industry Database project (established by the Department of Agriculture and URS Australia in 2010) is an example of an effort to collate a mixture of datasets created for different purposes, into a central information source (URS 2010). However, the project highlighted the need for strategic coordination to address inconsistencies across surveys.

Currently, there is no nationally coordinated approach to the collection of socio-economic data for Australia's forest and wood products industries. Considerable improvement can be made in the short-term if occasional studies and processes of data collection are better coordinated. Improving coordination between organisations commissioning and funding studies, and hence between those who collect socio-economic data, would substantially increase the utility of data being collected on Australia's forest and wood products industries.

The establishment of an oversight committee is often considered an initial step to allow good coordination and communication between funders of research and data collection. Key actions of coordination are as follows:

- Establish stakeholder representation from industry representatives, organisations funding occasional research into social dimensions of forest and wood products industries, and experts in data collection and analysis (and possible representation from users of socio-economic data on the industry).
- Establish agreement on a mechanism for ongoing collaboration. Formation of a formal structure could facilitate regular communication between organisations and assist in ensuring consistent approaches are used for collection of socio-economic data.
- Further evaluate core data needs based on previous analyses undertaken. This documents what exact data, how often, and for what purpose they are required.
- Encourage adoption of consistent methodology and approaches for collecting and reporting socio-economic data, particularly addressing industry definitions and regional definitions. Having an agreed methodology will enable robust and comparable data to be collected, and summarised meaningfully for all sub-sectors, even if collected by separate organisations for different regions or at different times.

- Encourage joint funding arrangements between organisations investing in socio-economic data collection. This enables data to be collected across a wider number of regions consistently, and provide a platform for achieving a regular national survey.
- Support development of further methodologies to address specific gaps in socio-economic data of forest and wood products businesses (see [Recommendation 3](#)).
- Develop a repository of information on socio-economic studies and reports on Australia's forest and wood products industries.

The coordinating mechanism can be used as a clearing house where proposed studies are reviewed and data can be accessed (subject to appropriate confidentiality and privacy provisions).

### Recommendation 3: Develop strategies to address gaps in currently available data

This project has identified multiple gaps in the availability and reliability of key forms of data on social dimensions of the forest and wood products industries. The three most critical gaps to address are those relating to data on industry employment.

- Gap 1: data on forest industry employment at more regular intervals in the years between Censuses, enabling trends in employment to be more accurately determined.
- Gap 2: data on employment dependent on native forest versus plantation and other timber sources.
- Gap 3: data on employment sectors known to be undercounted in the ABS Census.

The following sections summarise options for methods to address each of these gaps. In each section the identified gap is briefly reviewed (detail is provided in Schirmer et al. 2013a), followed by discussion of potential options, including the advantages and limitations of each. Appendix B provides more details on the options and particular methods (except for national survey; see Recommendation 1).

#### Gap 1: Forest industry employment between Censuses

Schirmer et al. (2013a) identified that currently the only robust source of information on forest and wood products industries employment is the ABS Census (once every five years). Quarterly data from the ABS Labour Force Survey cannot be used as a reliable source of information on employment trends in the forest and wood products industries because estimates are subject to high sampling variability in some industry sectors and a comparison between Census and LFS estimates shows inconsistent differences over time, making adjustment very limited.

More regular and reliable information on forest industry employment between Censuses would allow estimating employment trends at a regional scale rather than state/territory or national scales. Options to address this and other data gaps are:

#### A regular national survey of forest and wood products businesses

This survey, as discussed in Recommendation 1, would be a comprehensive way of collecting data on employment on a regular basis. It is also the highest cost approach, requiring significant investment to cover all businesses in some industry sub-sectors, and produce regular results of high quality and reliability.

**Survey of 'keystone' businesses**

This refers to regularly surveying businesses identified as 'keystone' businesses, whose information can be reliably used to predict changes in employment through the value chain of the forest and wood products industries. This option may reduce costs of surveying businesses, but its utility for producing accurate and reliable data is unknown.

**Representative sample survey of businesses**

This refers to conducting a survey that covers a smaller proportion of forest industry businesses than in a national survey, while still including representation from all types of businesses across the value chain. Trends in employment data are inferred from the sample.

**Opinion survey of industry leaders**

Conducting a survey of industry leaders assists in identifying their opinions on current trends in employment and other socio-economic aspects of the industry.

**Delphi survey of industry leaders**

This option is different from the basic opinion survey, in that a group of industry leaders and experts take part in multiple rounds of surveying. At each stage they receive feedback on the trends reported by the group, and are asked to restate their views, until views converge.

**Inferring employment trends using other sources of industry data**

This refers to development of metrics that enable employment trends to be identified based on changes in other industry data, such as data on volumes of roundwood removals or volume of production of different products.

**Addition of employment questions to existing surveys**

Adding a small number of questions to existing surveys enables improvement in the availability of socio-economic data. This is only feasible for employment data, where a small number of questions can capture important employment information. The primary constraint to using this method is a lack of regular surveys of forest and wood products businesses to which questions could be added.

Table 1 compares the advantages and disadvantages of these options by assigning a rating against three criteria: cost, quality of data collected (asking 'is a precise estimate likely to be developed?'), and validity of data collected (asking 'will this method collect desired data that address this gap in information?'). The method enabling collection of relatively higher quality data would be a regular national survey of industry businesses; however, a representative sample survey of a smaller sample of businesses is an alternative option.

While they are lower cost, methods including surveying 'keystone' businesses or inferring employment from other industry data have more limitations, may not produce reliable and valid data, and require further development.

**Table 1 Comparison of methods to provide employment estimates between Censuses**

<b>Method a</b>	<b>Cost</b>	<b>Quality of data</b>	<b>Validity of data</b>
National industry survey	High	High	High
Survey of keystone businesses	Med	Unknown	Unknown
Representative sample survey of small proportion of businesses	Med	Med	Med
Opinion survey of industry leaders	Low	Low	Low
Delphi survey of industry leaders	Low-Med	Med	Low
Inference of employment from other industry data	Low	Unknown	Unknown
Addition of employment questions to existing surveys	Low	Med	Med

Note: a Refer to further detail on methods in Appendix B

## **Gap 2: Employment dependent on native forest, hardwood plantation and softwood plantation & other timber**

Currently available data on employment in the forest and wood products industries do not identify whether the employment is dependent on native forest, hardwood plantation, softwood plantation or other types of timber (other types include for example ‘special species’ timbers used for craftwood production). It also does not identify whether employment depends on domestically grown timber, or imported timber.

This creates some important knowledge gaps. It is particularly difficult to estimate the likely effects of policy or industry changes that might affect only one type of timber, for example changes in the area of native forest available for harvesting, or changes in the area of a particular type of plantation after bushfires or other changes. Feedback from industry stakeholders highlighted the need to better identify how much employment in the forest and wood products industries depends on different types of timber. Options to address this gap are (with some overlap with Gap 1):

### **A regular national survey of forest and wood products businesses**

This is a comprehensive way of collecting data that identifies the employment dependent on native forest versus plantations.

### **Survey of ‘keystone’ businesses**

‘Keystone’ businesses provide representative information on the native forest, softwood plantation, and hardwood plantation-dependent industries. However, this approach is relatively undeveloped, and may not be capable of producing robust data.

### **Representative sample survey of businesses**

This option will only address this gap if it is possible to represent sample businesses dependent on each of these sources of timber.

### **Inferring employment trends using other sources of industry data**

The development of metrics enable the identification of employment trends based on changes in other industry data, such as data on volumes of roundwood removals or volume of production of different products. Described in Appendix B, this approach is complex, requiring considerable additional analysis and validation to understand the dependencies between production of different timber types, different processing practices, and per-unit employment levels.

## **Addition of employment questions to existing surveys**

(see details under Gap 1).

The comparison provided in Table 1, using ratings of the methods against cost, quality of data collected and validity of data, also applies to this gap for differentiating employment dependent on timber type.

## **Gap 3: Forest industry employment not reported in Census data—identifying adjustment coefficients**

The estimates of forest and wood products industries employment produced as part of the ABS Census, using categories of the Australian and New Zealand Standard Industrial Classification 2006, have some known limitations. In particular, as described in Schirmer et al. (2013a), an employment undercount appears in two parts of the industry when reporting Census data:

- Silvicultural contracting
  - People working in this part of the industry are included as part of the ABS employment category ‘forestry support services’. However, the number of jobs appears to be underestimated in this category. The rate of underestimation is not consistent however, with Schirmer et al. (2013a) identifying differing rates of underestimation at different points of time and in different states.
- Harvest and haulage contracting
  - Some people working in this part of the industry are included as part of the ABS employment category ‘logging’. However, this category excludes much of the haulage employment in harvesting and transport of logs, and transport of processed products. Haulage employment is classified by the ABS in transport and freight industry categories. Again, there are varying differences between ABS estimates and estimates produced in other studies.

While there are also some differences in estimates produced by the ABS compared with individual studies for other parts of the industry, such as wood and paper processing, these differences are minor.

However, for accurate estimation of jobs generated by silvicultural contracting, and harvest and haulage contracting, appropriate coefficients can be used to adjust data. There are two options that could be considered to address this.

### **A regular national survey of forest and wood products businesses**

As with other data, a regular survey that encompasses contracting businesses in its scope would address this gap in a robust and reliable manner, by providing employment data to compare with ABS Census estimates. Achieving accurate data for these contracting sectors can be based on a sample of businesses, rather than a survey of all businesses (see sampling strategy in [Recommendation 1](#)). Using such survey results to reconcile with ABS Census data at a national scale, would cover all regions with a consistent timeframe and method.

### **Survey of sample of contracting businesses, and use of industry data to estimate employment**

This refers to a regular survey targeting a sample of contracting businesses, to identify the number of jobs typically generated per unit of business activity. The coefficients generated through this process would be used to identify total employment in the contracting sectors, and reconcile against Census estimates. The specific coefficients needed are:



- number of people employed in silvicultural contracting for establishing new areas of plantation, and in replanting/coppicing of harvested areas, with separate calculations for the softwood and hardwood plantation sectors. For hardwood plantation, calculations are required for both coppicing and replanting of plantations, the two primary methods of re-establishing plantations after harvest.
- number of people employed in harvest and haulage contracting per unit of harvest volume. This needs to be calculated separately for native forest, softwood and hardwood plantations; and the sample needs to include all types of harvesting sites and a range of haulage distances typically used, to be representative of this sector. If stable coefficients are identified, this method could be used to calculate estimated harvest and haulage employment using Australian forest and wood products statistics (AFWPS) log harvest estimates.

The second option has a cost and feasibility advantage over a national survey, as it involves a smaller targeted survey that is designed to address this specific gap in industry employment data. While feasible, as with the use of production data to infer employment dependencies by type of timber (Gap 2), there are complexities in using this method to reliably estimate contracting employment that require further testing. The coefficients linking establishment, production and harvesting processes to employment in silvicultural services and haulage contracting would need to be updated periodically to adjust for changes in technology (more detail in Appendix B).

The issues of coordination and gaining industry support raised in [Recommendation 2](#), would also need to be considered in developing the methods and strategies.

## Recommendation 4: Report socio-economic data at Local Government Area level

As well as reporting at state and national scales, socio-economic data should be reported for regions in a manner that is meaningful for local communities. Data on workforce social characteristics are commonly used to answer questions about how specific communities depend on the forest and wood products industries, and to plan at local scales. Therefore collection of socio-economic data should aim to incorporate capability to report at local scales, while also ensuring appropriate confidentiality and privacy of businesses that provide data.

The expanded coverage of social data in Australian forest and wood products statistics (AFWPS) (ABARES 2012) reported local scale data at the Statistical Local Area (SLA) geography. Data at this scale were also aggregated to report information for 11 identified forestry sector regions. The shift by the ABS to use a new geographical classification system means that SLA reporting will not be possible for Census data beyond 2011. To overcome this limitation, industry representatives indicated Local Government Area (LGA) as a suitable small-scale geography. Socio-economic data therefore, are best collected and reported at LGA scale to maximise utility and reliability. This allows for reporting meaningful data for a range of stakeholders, including local governments. Reporting for LGAs, where there is a forest sector workforce, enables detailed analysis and presentation of 'local stories' (with appropriate confidentiality protections)—for example about areas within a broader region that are changing in terms of workforce and economic diversity, wellbeing and community involvement.

LGAs can be aggregated into the forestry reporting regions identified in this project, or for other key assessment units. In previous projects such as the National Forestry Database, spatial

analysis at LGA scale has been used to align employment data, input from regional industry experts, and resource data on plantation and native forest areas according to National Plantation Inventory and Regional Forest Agreement regions (URS 2010). While National Plantation Inventory and Regional Forest Agreement regions are themselves not the most suitable geography for socio-economic reporting (being based around wood flows and location of forests rather than where forest sector workers reside) these regions are important in industry assessment and planning processes. Social indicators for LGAs can be aggregated to report on these regions taking into account some adjustments (such as where LGAs need splitting across boundaries).

LGAs are a well recognised administrative unit and continue to be supported by government agencies, including the ABS, and therefore provide a relatively stable basis to define regions of interest. The adoption of consistent regional definitions, such as those proposed in this project, is important for presenting a body of data over time as mentioned in Recommendation 2. The use of LGA for fine scale and aggregated region based reporting could be part of the solution for defining regions consistently.

A limitation is that reporting at this level of detail can only be done using Census data, or a comprehensive survey of the forest and wood products industries that covers a large enough number of businesses to not compromise confidentiality of individual forest and wood products businesses. The depth required presents a complication and potential cost impost compared with smaller surveys but may be worth investment in order to obtain reliable information.

[Chapter 3](#) provides some information on the revised [reporting regions](#) using Local Government Area scale, that were adopted for indicators using Census data published in AFWPS September and December quarters 2013 (ABARES 2014). It shows how LGA reporting provides simplification compared with SLA reporting, particularly in regional residential hubs such as Bendigo (Victoria) and Toowoomba (Queensland).

### 3 Revised indicator framework and reporting regions

Schirmer et al. (2013a) outlined the basis for a series of proposed indicators that could be used for reporting social dimensions of forest and wood products industries. The paper provided detailed background and reasoning for their inclusion. Indicators were organised in four categories:

- direct employment
- contributions of the forest and wood products industries to the community
- adaptive capacity of communities with high dependence on the industries
- human dimensions of industry sustainability (represented by indicators of workers' wellbeing and indicators of workforce diversity).

Some categories were refined or re-prioritised and indicators from the framework were presented as data sets in three issues of AFWPS published by ABARES in December 2012, June 2013 and May 2014 (series titles *March and June quarters 2012*, *September and December quarters 2012*, and *September and December quarters 2013*).

This chapter presents the revised framework defining all indicators. In contrast with Chapter 2, which discusses strategies and options for new data collection, the finalised indicator framework here is based on data that are available from the ABS Census. This is suggested for adoption in future reporting, in addition to other recommendations.

The chapter also discusses the revised geography for forestry regions reporting.

#### Revised indicators

The indicators proposed in Schirmer et al. (2013a) were refined before publishing as data sets in issues of AFWPS (initially ABARES 2012 and subsequently in ABARES 2014). An indicator on workers' wellbeing was added to provide additional information on the topic. Table 2 provides detailed definitions of all indicators while explanations on the prioritisation and reasoning process are shown in Appendix C.

Table 2 Definitions of indicators retained in framework

Indicator section	Indicator a	Definition and notes (b, c)
Employment & economic diversity	Employment – forestry and logging	Sum of persons classified in Industry of Employment (IND06P) category 'Forestry and Logging' (3 digit category 030) of ANZSIC06
	Employment – wood product manufacturing	Sum of persons classified in Industry of Employment (IND06P) categories Wood Product Manufacturing, nfd; Log Sawmilling and Timber Dressing; and Other Wood Product Manufacturing (3 digit categories 140, 141 and 149) of ANZSIC06
	Employment – pulp and paper product manufacturing	Sum of persons classified in Industry of Employment (IND06P) categories Pulp, Paper and Converted Paper Product Manufacturing, nfd; Pulp, Paper and Paperboard Manufacturing; Converted Paper Product Manufacturing (3 digit categories 150, 151 and 152) of ANZSIC06
	Employment – forestry support services	Sum of persons classified in Industry of Employment (IND06P) category 'Forestry Support Services' (3 digit category 051) of ANZSIC06
	Employment – timber wholesaling	Sum of persons classified in Industry of Employment (IND06P) category 'Timber Wholesaling' (4 digit category 3331) of ANZSIC06
	Forestry sector employment dependence (% workforce employed in industry)	Percentage of the total employed workforce working in forestry sector industry categories. Total employed workforce is the sum of persons in all Industry of Employment (IND06P) categories, other than 'not applicable' (includes those not working), 'not stated' and 'inadequately described', ANZSIC06
	Economic diversity index	Measures the variety of employment sectors within a LGA, relative to the Australian economy, on a scale between 0.0 and 1.0, with a score of 1.0 indicating the same diversity as the Australian economy (high diversity). It provides a relative ranking between geographic areas, at a point in time. (calculated as Hachmann Index, in Moore 2001)
Contribution of industry to community	Household dependence (forestry)	Percentage of occupied private dwellings in which one or more people are employed in the forestry sector (excludes 'Visitor Only' and 'Other Non-classifiable Households')
	Volunteering rate	Percentage of workers who stated they did voluntary work through an organisation or group in the 12 months prior to the census
	Workforce stability (forestry)	Percentage of (forestry) workers who lived in the same LGA 5 years before the census.
	Long working hours, >49 hrs/week (full and part time)	Percentage of workers (full and part-time) working 49 hours or more per week. Working long hours may potentially limit a person's ability to take part in community activities, however, some people working long hours are able to and do strongly participate in their community.
Workers' wellbeing	Long working hours, >49 hrs/week (full-time)	Percentage of full-time workers who worked 49 hours or more per week. Longer hours can contribute to stress, however is not necessarily negative; it may be a deliberate choice and have benefits. Part-time workers are excluded

Indicator section	Indicator a	Definition and notes (b, c)
	Household income <\$1250	Percentage of households with 'Equivalised total household income' below \$1250 per week. Equivalised household income is household income data that is adjusted to enable comparison between households of differing size and composition. \$1250 is used as the closest comparison point to the Australian median weekly household income of \$1234. Note that the Australian median weekly household income is based on the broader population and is only provided for comparison with the statistics presented in AFWPS tables.
	Education – high school (Yr 12)	Percentage of workers stating the highest year of school they completed was Year 12 or equivalent.
	Education – non-school	Percentage of workers who have one of the following as their highest non-school qualification: postgraduate degree, graduate diploma and graduate certificate, bachelor degree, advanced diploma and diploma, or certificate level (I-IV).
	Low income (full-time workers)	Percentage of full-time workers who earned <\$600 per week. In general, relatively higher income is considered a factor contributing to more positive wellbeing and financial capacity to adapt.
	High income (full-time workers)	Percentage of full-time workers who earned >\$1250 per week.
Workforce diversity	Age profile > 55 years	Percentage of workers above the age of 55
	Age profile < 25 years	Percentage of workers below the age of 25
	Female employment	Percentage of workers who are female
	Indigenous employment	Percentage of workers who identified themselves as Aboriginal, Torres Strait Islander, or both (not stated were excluded)
	Disability employment	Percentage of workers with a disability–defined as those who stated they need assistance with daily core activities

Note: **a** Table contains forestry sector indicators and notes as reported in Australian forest and wood products statistics (AFWPS) (ABARES 2014). **b** All indicators use ABS Census of Population and Housing data items. **c** ANZSIC06 is Australian New Zealand Standard Industrial Classification 2006. All employment numbers include full-time and part-time workers. Source: ABARES 2014

## Wellbeing indicators

The revision of wellbeing indicators was based in part on analysis of results of a survey of forest and wood products workers, conducted by the University of Canberra in 2012-2013 (Jacki Schirmer [Centre for Research and Action in Public Health], pers. comm., 11 June 2013). The survey aimed to improve understanding of the factors that influence the wellbeing of these workers and, in particular, whether working in the forest and wood products industries appears to be associated with any unique wellbeing-related issues. Wellbeing in this context was based on subjective measures of life satisfaction and overall health. The analysis helped identify the strength of correlations between indicators using ABS data (such as education, income and working hours) and subjective wellbeing measures.

The analysis suggested that while all indicators could provide useful information about aspects affecting health and life satisfaction, and still be included in socio-economic reporting, some had stronger correlations than others. The analysis concluded that a measure taking account of ability to meet living costs, such as equivalised household income, would have a stronger likely correlation with life satisfaction than a worker's individual income. This added indicator is explained below.

### **Equivalised household income**

It is widely reported that the higher a person's individual or household income, the higher their overall self-reported health and quality of life (Ecob & Davey Smith 1999, Economou & Theodossiou 2011 and Johnston et al. 2009). The analysis from the forest sector workers 'worker wellbeing' survey found that measures of their individual and household income are useful indicators of health, but less effective measures of overall quality of life. Income was not significantly correlated with overall life satisfaction. It is only when a person is asked to rate the extent they can cover their basic living costs, that life satisfaction is correlated with an income related measure—with people who report difficulty covering living costs also reporting lower overall life satisfaction. Considering living costs takes into account that different workers have highly varying financial obligations because of differences in where they live and their household size, among other factors. This suggests value in including a measure of household income adjusted for living costs, to provide additional information on wellbeing in the forestry workforce.

The ABS provides data on weekly equivalised household income in the Census (as counts of households with incomes in intervals from '\$1-\$199' to '\$2000 or more'). Equivalised total household income is total household income adjusted by the application of an equivalence scale enabling comparison of income levels between households of differing size and composition (ABS 2011). It is a useful indicator of the economic resources available to a household and allows for comparison of standards of living between households.

Equivalised household income has been included in the indicator framework because it is likely to be a stronger indicator of overall ability to meet living costs than measures of individual income. The measure used—the percentage of households with equivalised household income below \$1250 per week—is calculated by adding all households in the intervals up to '\$1000-\$1249' and dividing by the total number of households in the intervals up to '\$2000 or more'.

In further adoption of this framework, it is important to note that some indicators such as household income may have stronger correlations with wellbeing than others (see relative priorities listed in Appendix C).

## **Revised reporting regions**

Schirmer et al. (2013a) identified 11 forest sector reporting regions, based on clusters of forest sector employment. These regions were reported initially in AFWPS March and June quarters 2012, using data aggregated from the scale of SLAs.

The reporting regions were revised for publishing indicators in AFWPS September and December quarters 2013 (ABARES 2014). This was for two reasons. Firstly, the ABS is not producing Census data at SLA scale past the 2011 Census, hence a new scale is needed to enable reporting of social indicators for forestry regions in the future. The ABS will continue to produce Local Government Areas (LGA) data in the future. Consideration was also given to reporting data by structures in the new Australian Statistical Geography Standard (ASGS) being adopted by the ABS. The geographic coverage of structures in the ASGS system is comparable with coverage of

SLAs, but they are not identical. Secondly, feedback from industry consultation during this project indicated that LGA boundaries are more meaningful than structures in the less familiar ASGS system—and would therefore be useful to those who use the socio-economic data.

Reporting regions were revised to be based on local government areas (LGA) instead of statistical local areas (SLA). This allows reporting of meaningful data for a range of stakeholders, such as local governments, and ensures that socio-economic indicators data for reporting regions can be compared over time. The outer boundaries of regions on an LGA basis align closely with regions and map published in AFWPS (ABARES 2012) and the discussion paper (Schirmer et al. 2013a) (Map 1). There are minor exceptions such as where LGAs cross region boundaries.

Under the revision, there has been a considerable reduction in local scale units used to represent some regions—such as South East Queensland that has changed from 133 SLAs to 19 LGAs (Table 3). This is because of the larger size of LGAs in many areas. The change has improved clarity and is more meaningful. For example, instead of seven separate SLA parts covering the area in and around Bendigo in the Central Victoria-Murray region, there is now a single LGA of Greater Bendigo listed in region detail tables (Table 71 in ABARES 2014).

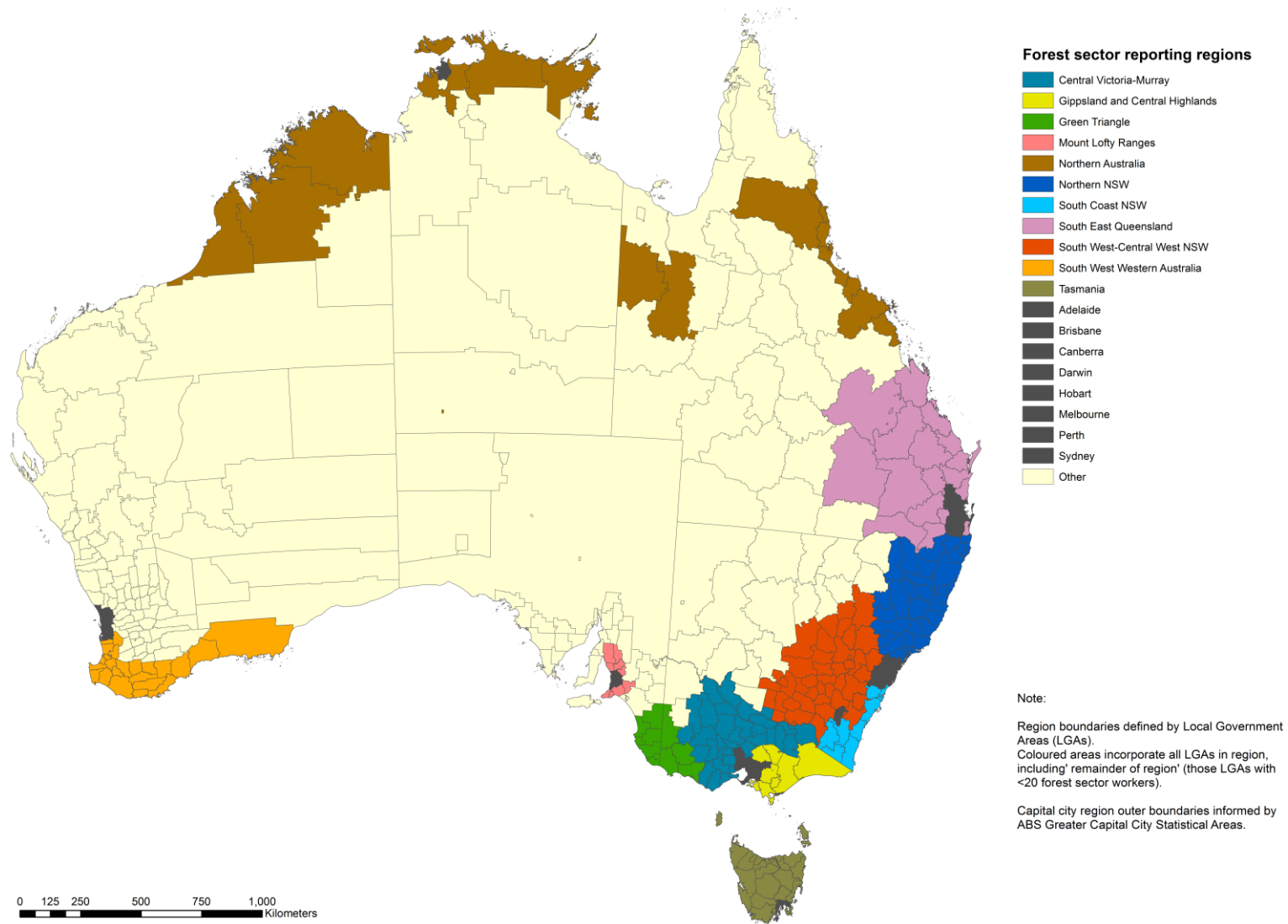
**Table 3 Comparison of reporting regions revised from SLA to LGA scale**

Reporting region	Number of SLAs	Number of LGAs
	<b>a</b>	<b>b</b>
Central Victoria-Murray	86	35
Gippsland and Central Highlands	28	9
Green Triangle	18	12
Mount Lofty Ranges	16	9
Northern Australia	62	18
Northern NSW	50	35
South Coast NSW	12	10
South East Queensland	133	19
South West and Central West NSW	52	44
South West Western Australia	30	24
Tasmania	35	23
Adelaide	55	20
Brisbane	221	7
Canberra	113	1
Darwin	42	3
Hobart	8	6
Melbourne	79	32
Perth	37	32
Sydney	64	43

Note: **a** For initial reporting, capital city social indicators were reported from single Statistical Division scale, except for employment which was summed from Statistical Local Areas (SLA). **b** Revised capital city reporting for all indicators used summed Local Government Area (LGA) data. A full list of LGAs within each reporting region is available from ABARES.



Map 1 Revised regions for Australian forest and wood products statistics reporting



Source: ABARES

# Appendix A: Range of current and past socio-economic surveys

**Table A1 Range and dimensions of socio-economic surveys relevant to Australian forestry sector**

<b>Data source</b>	<b>Data scales and geographic coverage</b>	<b>Time frame</b>	<b>Respondent type</b>	<b>Topic/ Variables</b>	<b>Definition of forestry sector industry/ employment a, b, c</b>	<b>Separation between native and plantation forestry</b>	<b>Other notes</b>
ABS Census of Population and Housing	Multiple scales, from town/local government area to national	5 yearly	Individual persons	Employment, age, sex, occupation, education, housing, religion, cultural, volunteering	ANZSIC industry classification (excludes some employment in silvicultural and transport contracting sectors; includes timber wholesaling)	No	5 yearly timeframe between samples.
ABS Labour Force Survey	National, state and capital city/balance of state scale	Quarterly	Households	Employment (estimates)	ANZSIC industry classification (excludes some employment in silvicultural and transport contracting sectors; excludes timber wholesaling)	No	Subject to sampling variability for some industry subdivision classifications
ABS Business Register	National and state data	Yearly	Businesses	Employment (estimates)	ANZSIC industry classification, to industry subdivision level only.	No	Identification of employment limited to subdivision classification level
ForestWorks Industry Workforce Survey	National, state and sub-state	2001 updated 2006	Businesses	Employment, skills and training needs	Industries split into: – forest growing and management – timber harvesting and haulage – sawmilling and timber processing – timber product manufacturing – wood panel and board production – pulp and paper manufacturing – timber merchandising – support service internal/external to industry.	No	Sub-state scales sometimes have low reliability and are subject to high sample error

Data source	Data scales and geographic coverage	Time frame	Respondent type	Topic/ Variables	Definition of forestry sector industry/ employment a, b, c	Separation between native and plantation forestry	Other notes
CRC for Forestry Forest Industry Survey	Western Australia (Data scale down to individual towns and local government areas)	2006, 2008, 2011	Businesses	Employment, business activity, forest/plantation type, age, sex	Industries defined as all activities reliant on management and production of wood and paper products, up to the point at which products include a large proportion of non-wood components. Includes employment in contracting; excludes timber wholesaling.	Yes	
CRC for Forestry Forest Industry Survey	Tasmania (Data scale down to individual towns and local government areas)	2006, 2008, 2010, 2011	Businesses	Employment, business activity, forest/plantation type, age, sex	Industries defined as all activities reliant on management and production of wood and paper products, up to the point at which products include a large proportion of non-wood components. Includes employment in contracting; excludes timber wholesaling.	Yes	
CRC for Forestry Forest Industry Survey	Victoria (Data scale down to individual towns and local government areas)	2009	Businesses	Employment, business activity, forest/plantation type, sex	Industries defined as all activities reliant on management and production of wood and paper products, up to the point at which products include a large proportion of non-wood components. Includes employment in contracting; excludes timber wholesaling.	Yes	
Victorian Department of Environment and Primary Industries	Victoria Data can be broken down to the scale of individual towns and local government areas	2012	Businesses	Employment, business activity, forest/plantation type, sex	Industries defined same way as for CRC for Forestry, Forest Industry Survey (Victoria)	Yes	
Tasmanian government Department of Industry Energy &	data to local government area	2013	Businesses	Employment, business activity, forest/plantation type, sex	Industries defined as all activities reliant on management and production of wood and paper products, up to the point at which products include a large proportion of non-wood components. Includes	Yes	Data not publically available

Data source	Data scales and geographic coverage	Time frame	Respondent type	Topic/ Variables	Definition of forestry sector industry/ employment a, b, c	Separation between native and plantation forestry	Other notes
Resources					employment in contracting; excludes timber wholesaling		
University of Canberra, Centre for Research and Action in Public Health	Australia (focus on Victoria and NSW)	2012	Workers (distributed via businesses)	Wellbeing (self-rated life satisfaction and overall health); working conditions; work-related injury and disease	Industries defined as all activities reliant on management and production of wood and paper products, up to the point at which products include a large proportion of non-wood components. Includes employment in contracting; excludes timber wholesaling	Yes	Online survey
ABARES national wood processing survey	National	2 yearly 2012 latest	Businesses	Log volume, production values, employment numbers and weekly hours	Sawmill wood processing sector only. No inclusion of harvest and haulage contractors.	No	It separated by hardwood / softwood processing

Note: List is not intended to cover past surveys comprehensively. **a** Forestry sector refers collectively to Australian forest and wood products industries. **b** No surveys cover employment in timber retail. **c** ANZSIC = Australian and New Zealand Standard Industrial Classification.

Sources: Schirmer et al. 2013a, Jacki Schirmer pers. comm., 28 May 2014, National Agricultural Statistics Review draft (2014)

## Appendix B: Description of methods to address gaps in available data

This appendix provides further description of methods referred to in Recommendation 3, which are aimed at addressing gaps in available data.

### **Survey of 'keystone' businesses**

This refers to regularly surveying businesses identified as 'keystone' businesses, whose information can be reliably used to predict changes in employment through the value chain of the forest and wood products industries. In other words, rather than survey all types of businesses, there is a comprehensive survey of only some parts of the industry known to be able to provide data that can be used to accurately predict trends in the remainder of the industry.

The approach has not yet been tested for the forest industry. This is therefore a suggestion for an experimental approach to estimating industry employment trends, to identify if it can be reliably implemented.

Specifically, forest growers and managers can be considered a keystone businesses for the forest industry. Growers – the businesses that grow and manage native forest and plantations – can provide information that enables estimation of employment in the supply chain to the point of logs entering processing; and can also provide data on trends in roundwood removal and supply that assist in estimating employment trends in the processing sector. A relatively small number of growers manage a large proportion of the native forest and plantations used for commercial timber production in Australia. A survey of growers can be used to identify employment in growing, and contracting businesses that conduct silvicultural, roading, harvest and haulage activities. Surveys of growers can be used to estimate contractor employment through asking growers to report their expenditure on these contractors. However, this relies on having reliable metrics that identify how many jobs are typically generated per unit of spending on different types of contracting activities—something that may require survey of a small sample of contractors.

The 'keystone' approach requires further research to better identify whether it is possible to accurately predict employment trends based on regular survey of only a relatively small group of businesses. This needs to be done through conducting these surveys at a time that enables comparison of results to either the ABS Census, or to findings of a larger survey of the forest industry.

### **Representative sample survey of businesses**

This refers to conducting a survey that samples a small proportion of all types of businesses across the value chain in the forest industry. Trends in employment data are inferred from the sample. This differs from the 'keystone' concept in that rather than comprehensively surveying one sector of the industry that can provide data enabling prediction of trends in other parts of the industry, a representative sample of businesses in each part of the industry is surveyed.

This approach relies on the assumption that it is possible to survey a representative sample of industry businesses, and to use this sample to estimate total employment. This assumption does not necessarily hold for the forest industry, where surveys in recent years have pointed to the lack of uniformity of business structure in any part of the industry. For example, whereas in the past there were a large number of relatively similar sized sawmills operating in Australia, recent work has identified rapid decline in the number of Australian sawmills, with those that remain

typically being larger businesses that specialise in particular products, and use differing production technologies (Burns & Burke 2012). This means that it is becoming more difficult to use a small sample of mills to obtain a representative estimate of employment change, as different mills target a range of markets (and thus will not be exposed to identical market trends that may influence employment), and will change their employment in different ways when there is a change in markets, as they use different production technologies. Similarly, there are a small number of businesses engaged in growing, but they include government owned corporations, large companies, and small professional firms undertaking management of forests on a contractual basis on behalf of the owners of trees. Given the small number of businesses, and diversity in type of business structures, it can be difficult to achieve a representative sample that can be used to estimate overall employment change. Even in the harvest and haulage contracting sector, Schirmer et al. (2013b) found that consolidation was resulting in a smaller number of larger firms. This would be a particular challenge for being able to collect and report data at the LGA scale consistently.

A further challenge for this method is that it requires having a comprehensive database of all businesses operating in the forest and wood products industries, to enable estimation of the proportion of employment represented by the sample of businesses surveyed. As the number of businesses operating in the industry changes over time, sometimes rapidly, this requires substantial ongoing work to maintain an up to date database.

### **Opinion survey of industry leaders**

This refers to conducting a survey of industry leaders that identifies their opinions on current trends in employment and other socio-economic aspects of the industry. Opinion surveys of industry leaders can be used to identify trends in industry employment, for example whether employment is growing or declining in a particular part of the industry. These surveys have the advantage of being small, generally cheap as they can be conducted using an online or emailed survey with relatively few questions, and relatively easy to conduct.

The major disadvantage of this approach is that while it is likely to accurately identify overall trends in employment, industry leaders are unlikely to be able to provide specific and accurate estimates of the magnitude of change in employment occurring during a given period of time, either for a given region or at the state or national scale.

The second disadvantage of this approach is that industry leaders may disagree on trends in employment, leading to difficulty estimating trends based on their survey responses.

### **Delphi survey of industry stakeholders**

This option is different to the opinion survey in that instead of being asked a single set of questions, a group of industry leaders are asked to take part in multiple rounds of surveying until they reach a consensus on trends in employment. At each stage they receive feedback on the trends reported by the group, and are asked to restate their views until views converge. Delphi surveys require iterations of opinion until group consensus is reached, so this can be time intensive. This can provide a more robust estimate of trends in employment compared to the opinion survey option, but is more time consuming for both those collecting data and those participating in the Delphi survey. It is also still subject to the disadvantage identified for opinion surveys: it can be used to identify trends in employment, but not to accurately estimate exact changes in employment numbers at any scale.

Additionally, it is likely that Delphi surveys may need to be conducted separately for different parts of the industry – industry leaders are often highly familiar with some, but not all, parts of

the industry, or are familiar with the industry in a specific region only. Overall, this method would be expected to accurately identify the direction of trends in employment between Censuses, and potentially can be used to identify the general magnitude of trends within a range.

### **Inferring employment trends using other sources of industry data**

It may be possible to develop metrics that enable identification of trends in employment based on changes in other industry data that are currently available, for example data on volumes of roundwood removals, or volume of production of different products. This method, if demonstrated to be robust, would be very low cost, and would leverage additional value from existing data collected for the forest and wood products industries. A challenge is it requires additional analysis and validation to better understand the dependencies between different production processes and employment levels—and how these might change with technology and between regions and over time.

This method of estimating employment has considerable appeal, but is more complex than may be at first apparent. The types of available information that could be used to infer employment are those currently included in the AFWPS publication series, namely:

- land area managed for commercial wood production
  - These data do not provide a useful basis for estimating employment, as they do not identify the volume of logs harvested in a given period, and depending on the age class of the estate, and market conditions, very different harvest levels may occur. However, data on the area of plantations established can be used to estimate employment in silvicultural contracting associated with plantation establishment, if the average number of silvicultural workers employed per area of plantation established is known.
- volume of logs harvested by type
  - This information may be helpful for inferring employment data in the harvest and haulage contracting sector and growing sectors of the forest industry. In particular, volume of logs harvested can be used to estimate harvest and haulage employment in the forest industry, if appropriate metrics are available that accurately identify typical employment generated per volume of different types of logs harvested. These metrics would need to be available for native forests, softwood plantations and eucalypt plantations, each of which may involve generation of differing levels of employment per volume of logs harvested due to differences in harvesting equipment and typical site characteristics. However, inferring employment data for other parts of the industry requires having further information beyond simple volumes of logs harvested, as the amount of employment generated by a given volume of harvested logs will depend on how that log is processed. For example, employment generated by woodchipping a log and exporting woodchips will be substantially lower compared to using the same volume of logs to produce sawn timber. If combined with other data, it may be possible to use this information to assist in estimating employment trends.
- volume of production of different wood and paper products
  - Products include veneer, sawnwood, woodchips, particleboard, fibreboard, newsprint, printing and writing papers, household and sanitary paper products, and packaging and industrial paper products. If reliable metrics are available that identify the typical employment generated per unit of each type of product produced, this may be able to be used to infer employment trends.



Two factors limit the potential utility of this approach. First, technology change can readily and rapidly lead to changes in the number of jobs generated per volume of plantation established, logs harvested, or wood and paper product manufactured. Second, different manufacturers may have very different production approaches, which involve widely varying numbers of people employed per unit of output produced.

To further identify the utility of this approach requires testing whether appropriate metrics can be identified for employment generated per area of plantation established, area of forest and plantation managed, volume of roundwood harvested, and volume of different products produced. If this is feasible, the next step is to develop a robust methodology for identifying how these metrics would be updated as production methods and technologies change, to ensure the metrics can be adjusted over time.

As a first step, the comparability of known trends in employment in key sectors, and in volumes of production estimated over the same period, were examined for two periods: 2006, and 2011. This analysis was limited, as available employment data are not available separately for the native forest, softwood plantation, and hardwood plantation sectors (as discussed in other parts of this report); and also do not fully represent employment in some parts of the industry. However, it provides some guide as to whether this methodology may have future utility.

From Table B1, it is evident that employment trends do not have a close or simple relationship to changes in the area of plantation established, volume of roundwood removals, or volume of different products manufactured in the forest and wood products industries. Specifically:

- the area of plantation being established fell substantially in 2011 compared to 2006, while employment in 'forestry support services', which includes many of the jobs generated by silvicultural contracting as part of plantation establishment, grew by 5.6 per cent
- the volume of roundwood removals fell slightly, by 0.6 per cent, while employment in forestry and logging, which includes harvesting contractors and management of forest and plantation areas being harvested, fell by 21.4 per cent during the same period
- the volume of sawnwood production and wood-based panel production fell by 9.5 per cent and 4.4 per cent respectively, while employment in wood manufacturing—the category that counts employment generated by these activities—fell by 11.9 per cent
- the volume of paper and paperboard production fell 1.6 per cent, while employment declined by 17.6 per cent.

This suggests that before attempting to use data on harvest or production volumes to estimate changes in employment, it is essential to further understand the relationship between the two, and in particular the role of changing technology and production efficiency in influencing employment, versus the influence of volumes of logs harvested and wood products manufactured.

**Table B1 Comparison of trends in forest and wood products employment and in key industry activities and production, 2006 to 2011**

Measure	2006 (2005-06 for harvest/ production estimates)	2011 (2010-11 for harvest/ production estimates)	% change 2006 to 2011
Area of plantation established	78 390 ha	9 580 ha	-87.8
Volume of roundwood removals (all types)	26 734 000 m <sup>3</sup>	26 567 000 m <sup>3</sup>	-0.6
Volume of sawnwood production	5 032 000 m <sup>3</sup>	4 556 000 m <sup>3</sup>	-9.5
Volume of wood-based panel production	1 948 000 m <sup>3</sup>	1 863 000 m <sup>3</sup>	-4.4
Volume of paper and paperboard production (all types)	3 207 000 m <sup>3</sup>	3 155 000 m <sup>3</sup>	-1.6
Employment in 'forestry support services'	2 051	2 166	5.6
Employment in 'forestry and logging'	6 872	5 399	-21.4
Employment in 'wood product manufacturing'	47 312	41 672	-11.9
Employment in 'pulp and paper product manufacturing'	23 485	19 356	-17.6

Source: JS Consulting 2014

Consideration was also given to whether the employment dependent on native forest, hardwood plantation and softwood plantation could be inferred based on data showing the proportion of roundwood removals of each type. The AFWPS include data identifying the volume of pulplogs, sawlogs and other logs removed for native forest, softwood plantations, and hardwood plantations.

Some recent studies have segmented the employment generated by the forest and wood products industries in Victoria and Tasmania based on whether it was dependent on native forest, softwood plantation, or hardwood plantation. These data were compared to information on roundwood removals and area of plantation by timber type for these two states. The results in Table B2 suggest that the employment generated by a given volume of logs harvested from native forest, hardwood plantation, and softwood plantation varies substantially; and also that the structure of employment varies significantly for different states. For example:

- the number of jobs generated per 1000m<sup>3</sup> native forest logs harvested differed over time, and also differed substantially between Tasmania and Victoria, suggesting that the different structure of the industry in each state, as well as change in the industry over time, leads to rapid change in numbers of jobs per unit of logs harvested
- the number of people employed per volume harvested and area managed of softwood plantations fell in Victoria between 2009 to 2012, largely a result of increasing exports of softwood logs harvested in that state to other states and countries, with processing within Victoria declining (Schirmer et al. 2013b). A similar trend was observed in Tasmania, although here the decline in number of people employed per unit of logs harvested is likely due to closure of two older softwood sawmills in the state in 2008 and 2009, with larger volumes instead being processed at a newer, more labour efficient facility (Schirmer et al. 2011)
- the number of people employed per area and volume of hardwood plantation fluctuated substantially in both states over time; this is likely to be due to the stage of development of this part of the industry, with new areas of hardwood plantations being established

through the 2000s and relatively small volumes being harvested, while by the late 2000s the new areas being established had declined substantially.

This analysis highlights the complexity of using data on characteristics such as plantation area or log harvest volumes to estimate employment. It is not possible to use simple metrics such as area of forest/plantation, or volume of logs harvested, to estimate employment in each sector unless further work is done to produce validated metrics that relate employment to harvest volumes for different regions. These would then need to be updated regularly over time to adjust for changes in the industry.

**Table B2 Employment generated per 1000 cubic metres harvested and per 100ha managed, for native forest, softwood plantation, and hardwood plantation**

State	Year	Native forest/ plantation	Employment	Volume of logs harvested a	Area managed for commercial timber production b	Number of people employed per '000m <sup>3</sup> harvested	Number of people employed per 100 ha of plantation managed
Victoria	2009	Native forest	2 770	1 779 000	Not published in AFWPS	1.6	No data
Victoria	2012	Native forest	2 284	1 549 000		1.5	
Victoria	2009	Softwood plantation	4 837	3 890 000	220 000	1.2	2.2
Victoria	2012	Softwood plantation	2 913	3 466 000	225 900	0.8	1.3
Victoria	2009	Hardwood plantation	1 187	601 000	202 700	2.0	0.6
Victoria	2012	Hardwood plantation	875	1 489 000	206 600	0.6	0.4
Tasmania	2006	Native forest	3 459	3 783 000	Not published in AFWPS	0.9	No data
Tasmania	2008	Native forest	3 172	4 275 000		0.7	
Tasmania	2011	Native forest	1 678	2 659 000		0.6	
Tasmania	2006	Softwood plantation	1 174	1 154 000	71 600	1.0	1.6
Tasmania	2008	Softwood plantation	1 397	1 372 000	77 000	1.0	1.8
Tasmania	2011	Softwood plantation	810	1 306 000	75 100	0.6	1.1
Tasmania	2006	Hardwood plantation	831	1 078 000	174 000	0.8	0.5
Tasmania	2008	Hardwood plantation	1 188	1 323 000	217 100	0.9	0.5
Tasmania	2011	Hardwood plantation	478	934 000	235 600	0.5	0.2

Note: **a** Harvest volumes in cubic metres (m<sup>3</sup>). **b** Area managed in hectares (ha).

Source: Employment data for Tasmania and Victoria drawn from Schirmer 2008; Schirmer 2010; Schirmer et al. 2013b. Data on log harvest volumes are drawn from the AFWPS.

### **Addition of employment questions to existing surveys**

Adding a small number of questions to existing surveys can enable improvement in availability of socio-economic data. This is only feasible for employment data, where a small number of questions can capture important employment information. The primary constraint to using this method is a lack of regular surveys of forest and wood products businesses to which questions could be added. If any regular survey of businesses is conducted, it is strongly recommended that a short number of questions identifying employment trends is included.

# Appendix C: Indicator framework revisions

This appendix summarises considerations used in refining the indicators proposed during the project, by ABARES and in consultation with the project steering committee. Some added explanations of lower priorities are provided below the table.

**Table C1 Revision of social indicators framework, using Census data**

<b>Indicator section</b>	<b>Indicator</b>	<b>Relative priority and reasoning used</b>
Employment & economic diversity	Employment – forestry and logging	Essential Provides core data on forest industry and direct/indirect community benefits.
	Employment – wood product manufacturing	Essential Provides core data on forest industry and direct/indirect community benefits.
	Employment – pulp and paper product manufacturing	Essential Provides core data on forest industry and direct/indirect community benefits.
	Employment – forestry support services	Essential Provides core data on forest industry and direct/indirect community benefits.
	Employment – timber wholesaling	Essential Provides core data on forest industry and direct/indirect community benefits.
	Forestry sector employment dependence (% workforce employed in industry)	Essential Provides core data about how forest industry contributes to communities.
	Economic diversity index	Essential Provides comparison at community level of industry employment diversity; this can influence positioning to respond to change.
Contribution of industry to community	Household dependence	Essential Provides core data about how forest industry contributes to communities.
	Volunteering rate	High Good predictor of both forest worker wellbeing and contribution to community.
	Workforce stability (living in same area 5 years earlier)	High Good predictor of attachment to community; and likely links to community contribution.
	Long working hours, >49 hrs/week (full and part time workers)	Medium Level of uncertainty in further link between long hours (correlated to wellbeing-health) and an individuals' contribution to community.
	Age profile < 25 / >55 years (indicating local services demand)	Exclude a Lesser confidence about link to services demand.
Workers' wellbeing	Long working hours, >49	High

Indicator section	Indicator	Relative priority and reasoning used
	hrs/week (full-time workers)	Reasonable predictor of worker wellbeing, as it is correlated to health.
	Household income (Equivalised, <\$1250 weekly)	High Good measure of forest worker wellbeing, through link between covering living costs and life satisfaction.
	Education – high school	High Good predictor of forest worker health, as well as industry capacity
	Education – non-school	High Good predictor of forest worker health, as well as industry capacity.
	Low income (full-time workers)	Medium Not as closely correlated with wellbeing as other measures such as household income.
	High income (full-time workers)	Medium Not as closely correlated with wellbeing as other measures such as household income.
	Marital status	Exclude <b>a</b> Lesser confidence about link to wellbeing and whether it is suitable in industry context.
Workforce diversity	Age profile > 55 years	High Good indicator of workforce profile .
	Age profile < 25 years	High Good indicator of workforce profile.
	Female employment	High Important indicator to track.
	Indigenous employment	High Important indicator to track.
	Disability employment	Medium While important, ABS data is for workers who need another person's assistance with daily core activities; somewhat restrictive as a measure of employment of people with the broader range of disabilities.
Community adaptive capacity	Composite of human capital, social capital and economic diversity sub-indexes	Exclude <b>a</b> Potential value but requires further resourcing to calculate dataset from 2011 Census. Contextual explanation needed beyond scope of AFWPS

Note: **a** Items marked 'Exclude' and some marked 'Medium' were proposed in the initial discussion paper, but were not included in ABARES Australian forest and wood products statistics publications from December 2012.

Source: ABARES and JS Consulting.

### Lower priorities and exclusions

Indicators based on marital status (to represent wellbeing), and young and older worker age profiles (to represent community contribution, through demand for local services), which were proposed in the initial discussion paper—were excluded from the indicator framework because of a low level of confidence of the relevance or correlation of this demographic data in relation to the concept being represented.

Working long working hours is considered to have a likely linkage to wellbeing in terms of life satisfaction and health (supported by analysis of wellbeing survey). However, there is more uncertainty about a further linkage between an individual's long working hours /life satisfaction and their contribution to the community, hence the relative priority of 'medium' compared with 'high' to represent wellbeing.

Adaptive capacity was excluded from the framework principally because resources were not available to construct this composite indicator with 2011 Census data (using 34 indicators for human capital). It is only relevant at detailed local scale such as LGA or SLA. It could be taken up in future if resources were available. A second reason was that complex explanation would be needed in AFWPS about the care required in applying it to make comparisons about how communities might respond to impacts, in the absence of information about other influencing factors. One of the three components, the economic diversity index is retained in the reporting framework.



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