Farm Forestry Area and Resources in Australia

by URS Forestry

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Foreword

Farm forestry provides economic, social and environmental benefits around Australia and its development has been a focus for government investment for over a decade. The area of farm forestry in Australia continues to grow, however information to support and inform decision makers on progress has not kept up. The purpose of this report is to update information on the extent and nature of farm forestry and agroforestry across Australia. Farm forestry is defined to include plantations on farms (including agroforestry plantations such as mallee eucalypts), private native forests, and woody fodder crops.

The data presented in this report draw on farm forestry information collected by the Bureau of Rural Sciences (BRS), the Florasearch project (funded by JVAP and the Cooperative Research Centre for Plant-Based Management of Salinity), governments, industry representatives and stakeholders across the country. The compiled information will create a better awareness of farm forestry in Australia, and will be valuable to all farm forestry stakeholders. This report is complemented by two others from the same project, which evaluate markets for farm forestry products and explore potential pathways for the development of farm forestry by region.

The key finding of this report is that there is an estimated 155,000 ha of farm forestry plantations in Australia which has expanded from an estimated 67,000 ha when last assessed in 2001. Areas of private native forests (PNF) are more difficult to estimate due to a lack of information but PNF provides scope for further development of farm forestry. Areas of woody fodder crops are estimated to be around 400,000-500,000 ha.

The estimates provided in this report will help policy makers to understand the existing farm forestry resources around Australia, and provide a basis for considering how governments may further encourage growth. The estimates will also help assess the most effective ways of promoting farm forestry investment around Australia.

This project was funded by the Natural Heritage Trust and the Joint Venture Agroforestry Program (JVAP), which is supported by three R&D Corporations - Rural Industries Research and Development Corporation (RIRDC), Land & Water Australia (L&WA), and Forest and Wood Products Research and Development Corporation (FWPRDC). The R&D Corporations are funded principally by the Australian Government.

This report is an addition to RIRDC’s diverse range of over 1800 research publications. It forms part of our Agroforestry and Farm Forestry R&D program, which aims to integrate sustainable and productive agroforestry within Australian farming systems. The JVAP, under this program, is managed by RIRDC. Most of our publications are available for viewing, downloading or purchasing online through our website:


Peter O’Brien
Managing Director
Rural Industries Research and Development Corporation
Acknowledgments

The Bureau of Rural Sciences (BRS) and the Florasearch project collaborated with URS Forestry in this project. In particular the assistance of Mark Parsons (BRS) and Mike Bennell and Trevor Hobbs (Florasearch project) is acknowledged. Florasearch is co-funded by the Joint Venture Agroforestry Program, and the Cooperative Research Centre for Plant-Based Management of Dryland Salinity (now Cooperative Research Centre for Future Farm Industries).

This analysis would also not have been possible without the generous contributions of farm forestry stakeholders across the country. During data collection we received valuable advice from government departments, Private Forestry Development Committees representatives, and forestry businesses and contractors. We are extremely grateful for their help. In particular we would like to thank John McGregor-Skinner, Sean Ryan, Rob Willersdorf, David Thompson, Andy Warner, Jim Burgess, Dave Skelton, Louise Maud, Dan Huxtable, Scott Dalzell, Murray Bowles, Phil Mason, Murray Anning, John Kellas, David Fisken, Chick Robb and Helen Vaughan. Rosemary Lott provided review and editorial comment on this report.

Abbreviations

BRS     Bureau of Rural Sciences
CHH     Carter Holt Harvey
CRA     Comprehensive Regional Assessment
CRC     Cooperative Research Centre
CRRP    Community Rainforest Reforestation Program
DAFF    Australian Government Department of Agriculture, Fisheries and Forestry
DPI     Department of Primary Industries, Victoria
DPI&F   Queensland Department of Primary Industries and Fisheries
DSE     Victorian Department of Sustainability and the Environment
ESL     engineered strand lumber
FNSW    Forestry New South Wales
FPC     Forest Products Commission Western Australia
JVAP    Joint Venture Agroforestry Program
LVL     laminated veneer lumber
MDF     medium density fibreboard
MIS     managed investment scheme
NAS     Farm Forestry National Action Statement
NFFI    National Farm Forest Inventory
NFI     National Forest Inventory
NIFIG   Northern Inland Forest Investment Group
NPI     National Plantation Inventory
NRPF    Northern Rivers Private Forestry
pa      per annum
PFDC    Private Forest Development Committee
PFT     Private Forests Tasmania
PNF     private native forests
QDPI    Queensland Department of Primary Industries
RFA     Regional Forest Agreement
SERIC   South East Resource Information Centre
TQ      Timber Queensland
# Contents

Foreword ............................................................................................................................................... iii  
Acknowledgments ............................................................................................................................... iv  
Abbreviations ........................................................................................................................................ iv  
List of Figures ......................................................................................................................................... vi  
List of Tables ......................................................................................................................................... vi  
Executive Summary ............................................................................................................................ vii  

## Introduction ....................................................................................................................................... 1  
Regions analysed .................................................................................................................................. 1  
Farm forestry definition and data sources .......................................................................................... 2  
Report structure ...................................................................................................................................... 3  

## National overview of farm forestry areas ....................................................................................... 4  
  Farm forestry plantations ....................................................................................................................... 4  
  Private native forests ............................................................................................................................. 6  
  Woody fodder crops ............................................................................................................................... 6  

## Regional farm forestry resources ...................................................................................................... 7  
  Regional farm forestry plantations and private native forests ............................................................... 7  
    Queensland ...................................................................................................................................... 7  
    New South Wales ............................................................................................................................. 10  
    Victoria .......................................................................................................................................... 13  
    South Australia ............................................................................................................................... 15  
    Western Australia ............................................................................................................................ 17  
    Tasmania ......................................................................................................................................... 18  
    Northern Territory ............................................................................................................................ 19  
    Woody fodder crops ......................................................................................................................... 19  

## Conclusions and recommendations .................................................................................................. 21  

## Bibliography ...................................................................................................................................... 22  

## Appendix A: List of Private Forestry Development Committees ....................................................... 24
List of Figures

Figure 1: Australian plantation regions ................................................................. 2
Figure 2: Estimated farm forestry plantation area by State .................................. 4
Figure 3: Plantation development by independent landholders in South East Queensland .......... 9
Figure 4: Plantation development by independent landholders in South East New South Wales .... 12

List of Tables

Table 1: Estimated farm forestry plantation areas by region and forest category ....................... 5
Table 2: Comparison of farm forestry plantation and total plantation area .................................. 6
Table 3: Farm forestry plantations in Central and North Queensland ...................................... 8
Table 4: Farm forestry plantations in South East Queensland .................................................. 9
Table 5: Farm forestry plantations in the Murray Valley .......................................................... 11
Table 6: Farm forestry plantations in South East New South Wales ........................................ 12
Table 7: Farm forestry plantations in North West Victoria ...................................................... 14
Table 8: Farm forestry plantations in Central and Western Victoria ........................................ 14
Table 9: Farm forestry plantations in Gippsland ...................................................................... 15
Table 10: Farm forestry plantations in South East South Australia ......................................... 16
Table 11: Farm forestry plantations in Mt Lofty and Kangaroo Island ..................................... 16
Table 12: Farm forestry plantations in Western Australia ......................................................... 18
Table 13: Farm forestry plantations in Tasmania ..................................................................... 18
Table 14: Estimated woody fodder plantings in Australia ............................................................ 20
Executive Summary

What the report is about

The data presented in this report provide estimates of the extent and nature of farm forestry in Australia. For the purposes of this study farm forestry was considered within three broad categories: farm forestry plantations; private native forestry; and woody fodder crops. The estimates of the farm forestry areas provide a snapshot of the development of farm forestry in Australia.

Who is the report targeted at?

The estimates of farm forestry areas in this report have been prepared to inform investment priorities of the Joint Venture Agroforestry Program (JVAP), government and industry. The report will be of interest to government agencies and private investors involved in farm forestry around the country.

Background

The lack of readily available information on the nature and extent of farm forestry investment in Australia provides an obstacle to assessing resource available for products, and the effectiveness of government support for farm forestry. Knowledge of where investment has been made can also inform future investment priorities.

Aims/objectives

The aim of this report is to provide an update of the area of farm forestry across the regions of Australia. It updates previous estimates published by the National Plantation Inventory (NPI 2001).

Methods used

There is no single source of information on farm forestry resources available in Australia. Consequently a range of sources of information was used in deriving the areas of farm forestry. These included government publications and data (particularly from the Bureau of Rural Sciences), regional publications and consultations with government and farm forestry stakeholders.

Farm forestry was defined to include forest and woodland species planted on private land for commercial production as part of a broader farming system, native forests on privately owned land, and plantings of woody fodder crops including saltbush (Atriplex nummularia), tagasaste (Chamaecytisus palmensis) and Leucaena leucocephala that were integrated into agriculture. These categories of farm forestry are sometimes called agroforestry.

Results/Key findings

It is estimated that the total area of farm forestry plantations in Australia is 155,000 ha. The last comprehensive assessment of farm forestry in Australia was by the National Plantation Inventory in 2001, which estimated that there were 67,000 ha of farm forestry plantations. A key contributor to the increase is the inclusion of plantations on private farms established by managed investment schemes (MIS) that were excluded from the previous estimate. MIS plantations were considered to fit the definition of farm forestry where they were on farmer-owned leasehold land where a working farm continues to operate. It is estimated that MIS plantations account for 55,000 ha (35%) of the total area of farm forestry plantations. These are mostly in Western Australia and in the Western Victorian parts of the Green Triangle region. Excluding MIS plantations, the area of farm forestry plantations increased by 33,000 ha across Australia since the last estimate.
Western Australia (WA) has the largest area of farm forestry plantations, accounting for 39% of total farm forestry plantation area. This is followed by Victoria with 31,600 ha (20%) and New South Wales (NSW) with 28,000 ha (18%). Queensland has the smallest area of farm forestry plantations (4,800 ha). The area of farm forestry in WA reflects the extensive MIS hardwood pulpwood plantations established in South West WA as well as government programs aimed at promoting farm forestry investment in hardwood and softwood sawlog plantations in lower rainfall areas. Similarly, programs to promote investment in hardwood sawlog plantations in NSW, Tasmania and Victoria have played an important role in the development of farm forestry.

In addition to plantations, private native forests (PNF) provide a considerable resource in Australia. However, data on PNF in Australia are generally very poor and the area of PNF actively managed for forest production is uncertain across Australia. The total area of PNF potentially available for timber production in Australia is around 38 million ha. The Northern Territory has the largest area of PNF but much of this is considered unsuitable for commercial utilisation. The greatest commercial harvesting of PNF occurs in NSW, Queensland and Tasmania. It is estimated that around half of the native forest sawlogs processed by sawmills on the north coast of NSW are harvested from PNF. Tasmania harvests approximately 967,000 m$^3$ pa from PNF, NSW around 586,000 m$^3$ pa and Queensland around 280,000 m$^3$ pa. The NSW and Queensland PNF harvests are mostly sawlog while Tasmania’s harvest is mostly pulpwood.

The area of woody fodder planted in Australia is estimated to be between 400,000 and 500,000 ha. Western Australia has over half of these plantations with 200,000-300,000 ha. Queensland accounts for a further 150,000 ha. Smaller areas occur in the other States including an estimated 35,000 ha in NSW and 8,500 ha in South Australia. The most extensive fodder plantations are old man saltbush crops (*Atriplex nummularia*) with around 150,000-250,000 ha planted across Australia. The area of land planted with *Leucaena leucocephala* has been expanding rapidly in recent years with an estimated total area of 150,000 ha currently planted, mostly throughout Queensland.

**Implications for relevant stakeholders**

The increase in the area of farm forestry plantations illustrates significant new investment in farm forestry around Australia. The importance of MIS plantations in this new investment illustrates the potential for models other than direct investment by farmers to contribute to farm forestry. The expansion of woody fodder plantings also illustrates the potential for multiple benefits from farm forestry activities.

While farm forestry plantations have been expanding nationally there has been considerable variation in expansion rates around the country. It is clear that the greatest progress has been in WA and that direct government involvement in farm forestry plantations has played an important role in that region. Government involvement has also played an important role in farm forestry plantation development in NSW, Victoria and South East Queensland through a range of schemes. The data presented in this report will facilitate further investigation of what has contributed to the different rates of farm forestry investment around the country.
Recommendations

The success of government support and MIS in expanding farm forestry areas illustrates the importance of third party funding in generating new farm forestry investment. Accordingly, it is recommended that models capable of providing third party investment for farm forestry e.g. purchase of environmental services, be a focus for investigating possible means of expanding farm forestry.

There is also a general need to improve the quality of data on farm forestry across Australia. Data tends to be most accurate and available where governments have been directly involved in development. Private Forestry Development Committees (PFDCs) in some regions have conducted surveys that have assisted in identifying areas of both farm forestry plantations and PNF. It is recommended that PFDCs provide a focus for collection of regional plantation information.

Despite the fact that PNF supply significant volumes of wood to the forest products industry, particularly in northern NSW, South East Queensland and Tasmania, data on areas and management intention for PNF are very limited. There is a strong need to improve information on the area and productive potential of PNF around Australia.
Introduction

This report is one of three published from the ‘Agroforestry Industry Evaluation’ project commissioned by the Joint Venture Agroforestry Program (JVAP). The aim of the project is to improve understanding of the extent (area) of farm forestry and the opportunities for various markets including at a regional level. The project also aims to inform the setting of priorities for future investment in farm forestry by JVAP, governments and industry. This report provides information on the extent of agroforestry development across Australia as whole. A separate report evaluates market opportunities for farm forestry (URS Forestry, 2008).

This ‘Agroforestry Industry Evaluation’ project complements another project commissioned by JVAP, on ‘Prioritisation of Regional Opportunities for Agroforestry Investment’. That project has been undertaken by Ensis (during 2007-2008) and uses spatial analysis of plant productivity, infrastructure, transport distances and economics to evaluate at a national scale the regions where different forest systems, including plantings for carbon sequestration, are most productive and where returns might complement or exceed average returns from agriculture. In combination, the two projects will provide insight on the status and regional potential of farm forestry for different products and systems.

Regions analysed

This report provides an overview of farm forestry across major regions in Australia. It complements existing information provided in the National Plantations Inventory (NPI 2007). The National Plantation Inventory (NPI) includes estimates of farm forestry plantations defined as plantations on land of less than 1000 ha owned outright by individuals, but has not published separate farm forestry data since 2001 (NPI 2001). The regions used in the analysis generally correspond to the NPI (see Figure 1) and regions covered by Private Forestry Development Committees (PFDCs). In general, these are the same although some PFDCs cover areas that combine or extend NPI regions (a list of PFDCs is provided in Appendix A). Where there are differences between regions defined in this report and NPI/PFDC regions, the nature of these differences and the reasons for adopting them are outlined in the appropriate section.

The NPI and PFDC regions were chosen for this analysis as these sources have the most readily available information on plantations and native forests. It is possible that some PNF involving woodlands in drier areas is excluded from the analysis in this report, but commercial activities based on these forests would be small and there is very little information available on their use.

The regions considered span the higher rainfall zones and the wheat-sheep zone. They extend from Queensland in the north through NSW and Victoria to South Australia and Tasmania, South West Western Australia, and small areas of plantations in the Northern Territory.
Farm forestry definition and data sources

Farm forestry has been defined according to the Farm Forestry National Action Statement (DAFF 2005) which defines farm forestry as:

“the combination of forestry activity with cropping and/or livestock production’. The focus of the forestry activity is primarily commercial, although there may also be other objectives including shade or shelter or stock or crops, natural resource management including soil or water protection, habitat conservation, landscape and amenity values. Farm forestry can take many forms including plantations on farms, woodlots, timber belts, alleys, wide-spaced tree plantations and sustainably managed private native forests. Farm forestry plantations are predominantly of a smaller scale than industrial plantations and may have less emphasis on timber or fibre production as primary outputs” (DAFF 2005)

Although not specified in the Farm Forestry National Action Statement (NAS) definition, this report includes woody fodder plantings in the definition of farm forestry.

Information on the extent of farm forestry has been derived mostly from the NPI database (updated on an ongoing but ad hoc basis) maintained by the Bureau of Rural Sciences (BRS), PFDCs and State government agencies. Florasearch has also collected information on woody fodder plantings in the wheat-sheep zone. Data have been collated for the following categories of farm forestry:

- **Farm forestry plantations** – these include forest and woodland species on private land for commercial production as part of a broader farming system. They include agroforestry plantings such as shelter belts where it is intended to harvest wood for commercial use, and
mallee eucalypts in WA. Many of the farm forestry plantations are industrial forestry species and where possible, the major commodity species of *Pinus radiata*, *Eucalyptus globulus* and *E. nitens* have been identified separately. BRS only collects information on farm forestry plantations for production of traditional forestry products and only considers plantations of less than 1000 ha on farmer owned land to be farm forestry. As a result it does not include mallee eucalypts or plantings purely for environmental services (e.g. salinity control). Where possible the BRS data have been supplemented and updated using information from a range of sources including PFDCs and relevant State government agencies. Areas of plantations established by Managed Investment Schemes (MIS) have been included where they are on farmer-owned leasehold land where a working farm continues to operate. MIS plantations where a whole farm is leased or where farms have been purchased have not been included. Estimates of these areas were derived from discussions with MIS companies, PFDCs and Private Forestry Tasmania (MIS are mostly *E. globulus* or *E. nitens* pulpwood plantations). Plantations established as joint ventures on private farms mostly between government agencies and plantation owners have also been included.

- **Private native forests** – areas of private native forest (PNF) have been identified on a state-wide basis. There is very little information available on PNF and therefore areas reported represent privately owned native forests that have been identified through the National Forest Inventory (NFI) as potentially available for timber production. It is currently not possible to determine areas of PNF that are actively managed by owners, or areas harvested, either currently or on an historical basis. Actual productive capability of these areas would depend on landholder management intent, the economics of harvesting and management, and environmental constraints. For some regions such as the North Coast of NSW, additional information is available from specific regional studies. Where such information is available it is reported for the relevant region.

- **Woody fodder crops** – plantings of woody perennial fodder crops have been identified on a state-wide basis. This category includes mostly Tagasaste (*Chamaecytisus palmensis*) and old man saltbush (*Atriplex nummularia*) in drier regions, and *Leucaena leucocephala* in tropical areas. Some plantations of *Acacia saligna* and *Rhadodia preissii* in Western Australia have also been included. Information on fodder crops in the wheat-sheep zone was collected by the Florasearch project, which is being funded by the Joint Venture Agroforestry Program (JVAP) and the Cooperative Research Centre (CRC) for Plant-Based Management of Dryland Salinity. Information on fodder crops from other zones was collected from State government agencies.

**Report structure**

The next section of this report provides a national overview of farm forestry resources. Section 3 details the nature and extent of farm forestry plantings by regions within each State or Territory. Plantation areas are shown by species where possible. Areas of PNF are considered on a state-wide basis, reflecting the availability of data. Plantings of fodder are discussed separately. Conclusions regarding the development of farm forestry in Australia are made in the final chapter.
National overview of farm forestry areas

This section collates the estimates of farm forestry resources across forest regions and States to provide an overview of the area of farm forestry in Australia.

Farm forestry in Australia consists of 155,000 ha of farm forestry plantations, 400,000 to 500,000 ha of planted woody fodder, and a proportion of the total private native forests (PNF) area of 38 million ha.

Table 1 summarises farm forestry areas in Australia. The areas of farm forestry plantations are estimated using a range of data sources of varying quality. There are inconsistencies in how data are collected, for example some regions have detailed surveys while others estimate figures based on historic records. As a result, the certainty of data varies and must be interpreted with caution.

Farm forestry plantations

Farm forestry plantations represent about 9% of total forest plantation area across Australia, accounting for a total area of approximately 155,000 ha (Table 2).

The largest area of farm forestry plantation development has occurred in Western Australia (39% of total farm forestry plantation area). Victoria accounts for the next largest area (20%), followed by New South Wales (18%), Tasmania (14%) and South Australia (6%). Figure 2 outlines farm forestry plantation area by State.

Figure 2: Estimated farm forestry plantation area by State
Table 1: Estimated farm forestry plantation areas by region and forest category

<table>
<thead>
<tr>
<th>Region</th>
<th>Farm forestry plantations (ha)</th>
<th>PNF&lt;sup&gt;c&lt;/sup&gt; (ha)</th>
<th>Woody fodder crops (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central and North Queensland</td>
<td>1,375</td>
<td>-</td>
<td>130,000</td>
</tr>
<tr>
<td>South East Queensland</td>
<td>3,384&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
<td>20,000</td>
</tr>
<tr>
<td><strong>QUEENSLAND</strong></td>
<td><strong>4,759</strong></td>
<td><strong>10,213,000</strong></td>
<td><strong>150,000</strong></td>
</tr>
<tr>
<td>North Coast</td>
<td>7,632&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Northern and Central Tablelands</td>
<td>2,760</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Murray Valley</td>
<td>9,011</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Southern Tablelands</td>
<td>7,641</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>South East New South Wales</td>
<td>906</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>NEW SOUTH WALES</strong></td>
<td><strong>27,950</strong></td>
<td><strong>8,523,000</strong></td>
<td><strong>35,000</strong></td>
</tr>
<tr>
<td>North West Victoria</td>
<td>4,500</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Central and Western Victoria</td>
<td>1,330</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>+ leasehold MIS plantations on farms&lt;sup&gt;b&lt;/sup&gt;</td>
<td>20,200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gippsland</td>
<td>5,607</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>VICTORIA</strong></td>
<td><strong>31,637</strong></td>
<td><strong>1,298,000</strong></td>
<td><strong>2,000 - 5,000</strong></td>
</tr>
<tr>
<td>South East South Australia</td>
<td>671</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>+ leasehold MIS plantations on farms</td>
<td>6,700</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mt Lofty Ranges and Kangaroo Island</td>
<td>1,845</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>SOUTH AUSTRALIA</strong></td>
<td><strong>9,216</strong></td>
<td>-</td>
<td><strong>8,600</strong></td>
</tr>
<tr>
<td>South West Western Australia</td>
<td>38,680</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>+ leasehold MIS plantations on farms</td>
<td>22,000</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>WESTERN AUSTRALIA</strong></td>
<td><strong>60,680</strong></td>
<td><strong>1,639,000</strong></td>
<td><strong>200,000-300,000</strong></td>
</tr>
<tr>
<td>Tasmania</td>
<td>14,805</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>+ leasehold MIS plantations on farms</td>
<td>6,200</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TASMANIA</strong></td>
<td><strong>21,005</strong></td>
<td><strong>922,000</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>NORTHERN TERRITORY</strong></td>
<td><strong>44</strong></td>
<td><strong>15,511,000</strong></td>
<td><strong>2,000</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>155,291</strong></td>
<td><strong>38,106,000&lt;sup&gt;c&lt;/sup&gt;</strong></td>
<td><strong>400,000 - 500,000</strong></td>
</tr>
</tbody>
</table>

<sup>a</sup> Includes joint venture plantations on farm land.

<sup>b</sup> Areas of Managed Investment Schemes (MIS) plantations have been included as farm forestry where they are on farmer-owned leased land which forms part of a land holding on which farming practices are still undertaken.

<sup>c</sup> Total area of native forests on private land (PNF), of which a proportion is available for harvesting and a lower proportion is actively managed for timber production.
Table 2: Comparison of farm forestry plantation and total plantation area

<table>
<thead>
<tr>
<th>State</th>
<th>Farm forestry plantations a (ha)</th>
<th>Total plantation area (ha)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland</td>
<td>4,759</td>
<td>225,637</td>
<td>2.1</td>
</tr>
<tr>
<td>New South Wales</td>
<td>27,950</td>
<td>341,123 b</td>
<td>8.2</td>
</tr>
<tr>
<td>Victoria</td>
<td>31,367</td>
<td>384,599</td>
<td>8.2</td>
</tr>
<tr>
<td>South Australia</td>
<td>9,216</td>
<td>166,962</td>
<td>5.5</td>
</tr>
<tr>
<td>Western Australia</td>
<td>60,680</td>
<td>377,598</td>
<td>16.1</td>
</tr>
<tr>
<td>Tasmania</td>
<td>21,005</td>
<td>227,200</td>
<td>9.2</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>44</td>
<td>16,329</td>
<td>0.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>155,291</td>
<td>1,729,948</td>
<td>9.0</td>
</tr>
</tbody>
</table>

a – MIS plantations have been included in these figures where they are established on farmer-owned leasehold land where a working farm continues to operate.

b – Plantations in the ACT have been included in the plantation total for NSW.

Private native forests

There is about 38 million ha of private native forests across Australia, with the largest areas in the Northern Territory, Queensland and New South Wales most of which is not actively managed for commercial forestry production. Information regarding the amount of PNF commercially available for harvest is limited but has been included in the regional data where possible. Australia’s largest PNF-based industries are situated in Tasmania, Queensland and New South Wales. Tasmania harvests approximately 967,000 m$^3$ pa, compared with Queensland with 280,000 m$^3$ pa and New South Wales with 586,000 m$^3$ pa. Tasmania’s harvest is mostly pulpwood while New South Wales and Queensland PNF harvests are mostly sawlog.

Over recent years timber production from public native forests has decreased throughout Australia (ABARE 2007). Harvest from PNF has therefore become increasingly important as a source of native timber.

Woody fodder crops

Data on woody fodder crops are limited and difficult to source. Data on the wheat-sheep zone were collected by Florasearch and data from other regions were collected from a combination of ad hoc reports and industry contacts.

Woody fodder crops are planted throughout the country with five key species identified: tagasaste; old man saltbush (*Atriplex nummularia*); *Leucaena leucocephala*; *Acacia saligna*; and *Rhagodia preisii*). The majority of plantings are in Western Australia, mostly as a response to the difficulty of crop cultivation in areas affected by dryland salinity. Western Australia has 200,000-300,000 ha of fodder crops and Queensland has almost 150,000 ha. Smaller areas were estimated in the other States including 35,000 ha in NSW and 8,500 ha in South Australia.
Regional farm forestry resources

This section outlines areas of existing farm forestry in regions around Australia. Information is presented on a State by State basis. The Murray Valley region which covers parts of NSW and Victoria is included under NSW as it proved difficult to separate data by State. The Green Triangle region which includes parts of South Australia and Victoria is a single NPI/PFDC region but in this report has been reported separately for Central and Western Victoria and South East South Australia.

Regional farm forestry plantations and private native forests

Queensland

Queensland has the largest forest cover of all the States with a total area of 56 million ha of natural and planted forests (BRS 2007). Forest covers 32% of the State’s total land area. Plantation forests cover 225,637 ha or 0.5% of this area. At present 85% of plantations in Queensland are publicly owned (NPI 2006).

Most plantation forestry in Queensland is softwood, planted mainly in the south east. There are also some smaller softwood plantations around Cardwell in Far North Queensland. Over the last decade there has been an expansion of hardwood pulpwod plantations in the south east through private company investments and MIS, and in the last 2-3 years MIS have expanded their activities to areas in Central Queensland between Rockhampton and Mackay. In addition, State government initiatives to promote plantation hardwood sawlog production have also occurred, focussed on South East Queensland. These have included joint ventures with private landowners, and these are included in farm forestry plantation areas presented in this report. Most farm forestry plantations have been established in either South East or Far North Queensland.

There is considerable PNF production, particularly in South East Queensland. The harvest of native hardwood sawlogs over the past 20 years has shown steady decline with a total harvest volume from public forests in recent years around 150,000-200,000 m$^3$ pa (QDPI 2005). Harvest volumes from PNF are estimated to be approximately 250,000 m$^3$ pa. The steady decline in the harvest volume of public native forests is a result of government policy including the South East Queensland Forestry Agreement and the Western Hardwoods Plan. Under these plans harvesting in public native forests will cease in the Western Hardwoods region by 2012 and in South East Queensland by 2025.

The forest processing industry in Queensland is mostly located in the south east of the State. It includes extensive softwood plantation processing based around Caboolture and Maryborough that mostly utilises logs harvested from State-owned plantations. The two major softwood sawmilling companies are Hyne and Son, and Weyerhaeuser. The native sawn timber industry is also focussed on the south-east. There has been considerable adjustment in the native forest sector in recent years as the Queensland government has bought back some log supply licences as part of policy processes associated with declining native forest harvest volumes. There is only a small processing industry in Far North Queensland and in recent years logs harvested from State-owned softwood plantations around Cardwell have been exported from Townsville.

The two regions considered for farm forestry plantations in Queensland are Central and North Queensland and South East Queensland. Both areas correspond with the NPI regions. No data on farm forestry plantations have been reported for Central Western Queensland. BRS reports that the number of small-scale farm plantations in that region is likely to be very low.
Central and North Queensland

Central and North Queensland extends from north of Gladstone to the wet tropics of Far North Queensland. There is only a small forestry and forest products industry in this region. The major plantations in the region are the Cardwell softwood resources that are currently being harvested primarily for log export. There is limited processing in the region. Farm forestry plantings were originally focused on private land in Far North Queensland with an emphasis on high-value cabinet timbers. In recent years, MIS plantations have been established in the area between Rockhampton and Mackay, but these plantations are mostly on land purchased by MIS companies and so are not included in the region’s farm forestry resources.

Many of the farm forestry plantations were established during the period 1991-1995 when assistance was available through the Community Rainforest Reforestation Program (CRRP) (Erskine et al. 2005). Since that time plantation development has been slower but steady increases in area continue to be made. Limited monitoring means that there is considerable uncertainty associated with the current estimates. The effects of Cyclone Larry in 2006 are reported to have significantly reduced the estate e.g. Vize et al. (2005) estimated a larger areas of CRRP commercial plantations relative to the figures in Table 3.

Based on advice received from Private Forestry North Queensland that forests in the immediate path of cyclone Larry were destroyed, BRS’ previous estimate of the areas of farm forestry plantations has been reduced by 928 ha to 1,375 ha (see Table 3). In addition, the Queensland Department of Primary Industries (QDPI) reported that 162 ha of recently established joint venture plantations between government and private landowners in North Queensland were destroyed by Cyclone Larry.

Table 3: Farm forestry plantations in Central and North Queensland

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Araucaria cunninghamii</em></td>
<td>31</td>
</tr>
<tr>
<td><em>Pinus caribaea</em></td>
<td>220</td>
</tr>
<tr>
<td>Mixed hardwood species</td>
<td>784</td>
</tr>
<tr>
<td>Other unknown species</td>
<td>340</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,375</strong></td>
</tr>
</tbody>
</table>

*Includes some small areas of softwood plantations for which management status is unknown.*

South East Queensland

The South East Queensland region extends from the New South Wales border, north to Gladstone, and west beyond Toowoomba and Kingaroy. It is a major forestry region with extensive softwood plantation resources and associated processing. It also includes developing hardwood pulpwood and hardwood sawlog plantation estates. The sawlog plantations are supported by government programs and aim to provide the basis for the State’s hardwood sawmilling industry once native forest harvesting ends in 2025.

The area of farm forestry plantations in South East Queensland is estimated to be 3,384 ha. Table 4 summarises this area by species. The farm forestry plantations include rainforest cabinet wood (Lott et al. 2005, Vize et al. 2005), eucalypt and softwood plantations.
Table 4: Farm forestry plantations in South East Queensland

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araucaria spp.</td>
<td>94</td>
</tr>
<tr>
<td>Other softwood species</td>
<td>43</td>
</tr>
<tr>
<td>Eucalyptus species</td>
<td>2,777a</td>
</tr>
<tr>
<td>Other hardwood species</td>
<td>283</td>
</tr>
<tr>
<td>Mixed species</td>
<td>187</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,384</strong></td>
</tr>
</tbody>
</table>

a - includes joint venture plantations of 2,178 ha.

Farm forestry plantation development in South East Queensland was very low prior to the mid-1990s. After 1995, farm forestry plantation development increased substantially, with a large number of Eucalyptus and other hardwood species being established in plantations on farms. This sudden growth was partly due to initiatives of the Queensland government, mainly the establishment of joint venture farm plantations with local landowners. There are currently 2,178 ha of joint venture plantations across South East Queensland under 123 separate government-landowner projects (pers. comm. Ian Robb, Forestry Plantations Queensland). The major species in these plantations are spotted gum (Corymbia citriodora), and smaller areas of Gympie messmate (E. cloeziana) and Dunn’s white gum (E. dunnii). The Queensland government has also established around 2,800 ha of hardwood plantations on leased land. These areas have not been included in the farm forestry area as it was not possible to determine those areas that are part of a working farm.

Information available on non-government assisted farm forestry plantations is poor. To date, there has been no comprehensive assessment of farm forestry plantations in South East Queensland. Private Forestry Southern Queensland provided some data on the establishment over time of non-government assisted farm forestry plantations which are included in the above estimates, however, actual areas could be higher. Figure 3 shows a sharp increase in plantation development over the period 1996 to 2000. The figure does not include joint venture plantations, which have mainly been established since the mid-1990s.

![Figure 3: Plantation development by independent landholders in South East Queensland](source: BRS data bases. NB: Excludes government lease and joint venture plantations)
Private native forests in Queensland

Private native forests make a significant contribution to the forestry and forest products industry in Queensland. The total area of the resource potentially available for timber production is estimated at 10.2 million ha (NFI 2003). In 2006, a PNF harvest summary conducted by the Northern Inland Forestry Investment Group reported annual PNF harvest in Queensland as 280,000 m$^3$ (NIFIG 2006). This information was derived from QDPI data.

A comprehensive survey of PNF in South East Queensland was undertaken as a part of the comprehensive regional assessment (CRA) as part of the uncompleted regional forest agreement (RFA) (DAFF & TQ 2003). This survey identified 1.2 million ha of PNF in the region. Information obtained from Private Forestry Southern Queensland (PFSQ) indicates that this approximate area is under periodic harvest (pers. comm. Sean Ryan, PFSQ). PNF is estimated to supply around half of the native forest hardwood harvest in South East Queensland (DPI&F 2004). A substantial volume of wood is also harvested from PNF in the Western Hardwoods region but no estimates of volume could be obtained.

New South Wales

New South Wales (NSW) has a forest cover of 27 million ha, or 34% of its total land area (BRS 2007). Plantations account for 331,623 ha or 1.3% of total forest area (NPI 2006). Most of the plantations are owned by Forests NSW, who are the largest plantation owner in Australia and hold 73% of the State’s plantation area.

Plantations in NSW are dominated by softwood plantations with the major plantation regions being Bathurst-Oberon and the Murray Valley around Tumut and Tumbarumba. In addition, there are significant resources around Bombala in the south and Walcha on the Northern Tablelands as well as on the North Coast. State government programs over the last decade have promoted the development of hardwood sawlog plantations on the North Coast. This originally targeted joint ventures with landowners but later emphasised purchasing private land for plantation development.

There is an extensive plantation processing industry in NSW including sawn timber, composite board manufacture and production of pulp and paper products. NSW also has a significant native hardwood processing sector situated on the North Coast and South Coast of the State.

The regions outlined for NSW mostly correspond to NPI regions with the exception of Northern and Central Tablelands and South East NSW. Information for the Northern and Central Tablelands has been combined in this report due to data limitations. South East NSW is normally considered as part of the East Gippsland/Bombala NPI region which includes part of NSW and Victoria. However, as farm forestry plantation information was available for South East NSW it is considered separately in this report.

North Coast

The North Coast region extends from Newcastle to the Queensland border along the coast and west to the escarpment of the Northern Tablelands. It is sometimes divided into the upper and lower North Coast. The region includes the bulk of native hardwood sawmilling in the State.

Farm forestry plantation areas for the North Coast are reported by BRS (based on information supplied by Northern Rivers Private Forestry) to be 2,481 ha, of which 1,400 ha is mixed hardwood species.

Forests NSW have also established 5,151 ha of hardwood plantations through joint ventures with private landowners. It is thought that most of these plantations fit the definition of farm forestry (i.e. in combination with other farming activities). Forests NSW has also established 5,563 ha of hardwood plantations on leased land. These areas have not been included in the farm forestry area as it is not known what proportion meets the definition of farm forestry. The main species planted on the north coast of NSW are blackbutt (*E. pilularis*), spotted gum (*Corymbia maculata*), flooded gum (*E.
grandis) and Dunn’s white gum (E. dunnii). There are also some small areas of rainforest cabinet wood plantations (Vize et al. 2005, Lott et al. 2005).

**Northern and Central Tablelands**
The Northern and Central Tablelands cover an area extending from northern NSW to the south-west beyond Cowra and Oberon, including Lithgow. The major forestry activities in the region are around Bathurst-Oberon based on processing of plantation pine, although there are also smaller areas of native forest and plantation industries scattered across the region.

Only limited data exists for farm forestry in the Northern and Central Tablelands. Information available to BRS at present simply includes records of trial and demonstration areas, and plantations of P. radiata. The P. radiata plantations were mostly established in the 1970s to early 1980s and in 2006 covered a total area of 2,760 ha (BRS unpublished data).

**Murray Valley**
The Murray Valley includes areas around the Murray River in North East Victoria and southern NSW centred on the border towns of Albury-Wodonga and extending to Tumut and Tumbarumba in NSW and to Wangaratta, Myrtleford and Benalla in Victoria. The Murray Valley is one of the major forestry regions in Australia with extensive plantation processing, including world-scale sawmills, pulp and paper manufacturing, and medium density fibreboard (MDF) and particleboard manufacturing. There is also a small native forest-based processing industry in the region.

Table 5 shows farm forestry plantation estimates for the Murray Valley. These figures include some irrigated sites in the Deniliquin, Coleambally and Griffith irrigation areas. The ‘other hardwoods’ are mostly Eucalyptus planted in combination with Acacia and other species. Most of the eucalypts were planted under Victorian government supported programs, such as the ‘Trees for Profit’ program and the ‘Sawlogs for Salinity’ program.

The plantation area includes 6,021 ha of P. radiata, which are mostly small investment blocks.

**Table 5: Farm forestry plantations in the Murray Valley**

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. globulus, E. nitens</td>
<td>2,396</td>
</tr>
<tr>
<td>Other Eucalyptus species</td>
<td>491</td>
</tr>
<tr>
<td>Mixed species</td>
<td>61</td>
</tr>
<tr>
<td>P. radiata</td>
<td>6,021</td>
</tr>
<tr>
<td>Unknown</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>9,011</td>
</tr>
</tbody>
</table>

Source: BRS and Murray Riverina Farm forestry

There is around an additional 250 ha of private plantation forests in the Central West of NSW included in the above. Of this around 45 ha are E. camaldulensis. The remaining area is made up of a mix of species the most common of which include E. sideroxlyn, E. benthamii, E. occidentalis and hybrid species. Many of these plantings are trials including large numbers of seed lots.

**Southern Tablelands (including the ACT)**
The Southern Tablelands region extends from Boorowa, north-west across to the Moss Vale-Braidwood escarpment, and south to encompass the ACT.

Data on farm forestry plantations in the Southern Tablelands has been collected by the Southern Tablelands Farm Forestry Network. There is an estimated 416 ha of a varying mixture of Eucalyptus
and *Acacia* species. The record of planting shows a steady but minor increase in farm forestry plantation development since the mid-1980s. An estimated 7,225 ha of private *P. radiata* plantations have been identified in the region as farm forestry plantations. However, it is possible that a proportion of this *P. radiata* area could be considered outside the definition of farm forestry plantations used in this study.

**South East New South Wales**

South East NSW is not formally covered by the NPI although the far south coast is covered by the East Gippsland-Bombala NPI region. However there is a PFDC covering the region, which includes the coast from Wollongong to the Victorian border. South East NSW includes substantial native forest sawmilling operations and native woodchip export in the coastal regions. There is also a substantial public and private (MIS) softwood plantation resource around Bombala.

The South East NSW region is estimated to contain 906 ha of farm forestry plantations. Most of the plantations are hardwood species. Table 6 summarises the current plantation area by species.

**Table 6: Farm forestry plantations in South East New South Wales**

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardwoods</td>
<td>665</td>
</tr>
<tr>
<td>Softwoods</td>
<td>4</td>
</tr>
<tr>
<td>Mixed species</td>
<td>237</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>906</strong></td>
</tr>
</tbody>
</table>

In South East NSW, farm forestry plantation development peaked from 1996 to 2000 largely as a result of new plantations established by small growers with assistance from the South East New South Wales Private Forestry. Development over the period 2001 to 2005 slowed before it increased again after 2005 with an expansion in mixed species plantations (see Figure 4).

![Figure 4: Plantation development by independent landholders in South-East New South Wales](Source: BRS unpublished data; NB may include some hardwood plantations in East Gippsland)
Private native forests in New South Wales

NSW has an estimated 8.523 million ha of PNF resource potentially available for timber production. Several studies have quantified regional areas that are available for harvest but little detailed information is available. According to a study published through the Northern Rivers Forestry Development Committee, the total area of PNF available for harvest in Upper North Coast NSW is 512,000 ha. A smaller, regional survey of the Southern New England area of NSW produced an estimated harvestable area of 157,000 ha for the region (McDonald & Brandis 2001).

A survey of NSW processors completed by Northern Rivers Private Forestry estimates a PNF harvest volume of approximately 586,000 m$^3$ across NSW regions, around half of the total native forest harvest in the region (NRPF 2005). Most of the harvest volume is sourced from PNF in the North Coast region.

Victoria

Victoria has the second highest proportion of forest cover after Tasmania. Its 8 million ha of forests cover 36% of the State’s total land area (BRS 2007). The 384,599 ha forest plantations represent 4.8% of the total forest area. Most of Victoria’s plantation resource is privately owned of which around 66% is on public land (NPI 2006). This reflects the sale of the Victorian Plantations Corporation to Hancock Victorian Plantations in 1998 where plantations on public land were converted to long-term leasehold. Public forests account for 84% of the area of native forests in Victoria, and 16% is privately owned land (BRS 2007).

Victoria has an extensive plantation and native forest products industry with processing operations spread across the State. The native hardwood sawmilling sector is based primarily in the eastern half of the State and is heavily reliant on supplies from public forests. Softwood sawmills are located in Gippsland, the north-east and the south-west of the State. The Maryvale pulp mill in Gippsland produces pulp and paper products and there are particleboard and MDF manufacturers in the north-east. There are also softwood log and native hardwood and plantation softwood chip export operations from the Port of Geelong, and softwood chip and log export operations from the Port of Portland.

The regions used in this study more closely reflect PFDC regions than NPI regions. Central Western Victoria combines Central Victoria and the Victorian side of the Green Triangle NPI region, North West Victoria has been included as a separate region, and the Gippsland region in this report corresponds to Central Gippsland and the Victorian side of the East Gippsland–Bombala NPI region.

North West Victoria

North West Victoria covers the region from south of the Murray River to the SA border to Echuca in the east and extends south to include Horsham, Maryborough and Castlemaine. The major forestry and forest product industries in the region are based around the native box-ironbark and river red gum forests.

Table 7 provides estimates of current areas of farm forestry plantations provided by the Victorian Department of Primary Industries (DPI). This indicates a total area of around 4,500 ha.
Table 7: Farm forestry plantations in North West Victoria

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casuarina cunninghamiana</td>
<td>150</td>
</tr>
<tr>
<td>Eucalyptus sideroxylon</td>
<td>2,000-2,500</td>
</tr>
<tr>
<td>Eucalyptus cladocalyx</td>
<td>1,500</td>
</tr>
<tr>
<td>Eucalyptus occidentalis</td>
<td>200</td>
</tr>
<tr>
<td>Eucalyptus polybractea</td>
<td>240</td>
</tr>
<tr>
<td>Pinus pinaster</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,140 – 4,640</strong></td>
</tr>
</tbody>
</table>

Central and Western Victoria

Central and Western Victoria is located west of Melbourne, and stretches from the Otway Ranges, north to Castlemaine and west to the South Australian border. It includes Ballarat, Colac and Geelong, which play an important role as processing centres.

The region has both plantation and native forest industries although the native forest sector has declined in recent years as the Victorian government has created additional native forest conservation areas in the Otway region and assisted the exit of native forest processors.

There are an estimated 1,330 ha of non-MIS farm forestry plantations in Central and Western Victoria largely made up of native *Eucalyptus* species with some plantations of pine and ‘mixed species’ (Table 8). These data were sourced from a regional mapping project conducted by Central Victorian Farm Plantations (CVFP), which shows less farm forestry plantation resource than the 6,293 ha (excluding MIS) previously estimated by the National Farm Forestry Inventory (NFFI) (NPI 2001). It is possible that this earlier figure included some areas planted by companies in the region which did not fit the definition of farm forestry.

The Green Triangle contains substantial areas of plantations owned by MIS companies. Many of these plantations are planted on leasehold land in combination with an operating farm and as such these areas are considered to be farm forestry. Based on consultation with the MIS industry, plantations qualifying as farm forestry on the Victorian side of the Green Triangle were estimated to cover 20,200 ha.

Table 8: Farm forestry plantations in Central and Western Victoria

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eucalyptus globulus</td>
<td>344</td>
</tr>
<tr>
<td>Eucalyptus species</td>
<td>765</td>
</tr>
<tr>
<td>Pinus radiata</td>
<td>184</td>
</tr>
<tr>
<td>Mixed species</td>
<td>37</td>
</tr>
<tr>
<td>Leasehold MIS plantations on</td>
<td>20,200</td>
</tr>
<tr>
<td>farms</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21,530</strong></td>
</tr>
</tbody>
</table>

North East Victoria

Data on farm forestry plantations in North East Victoria are collected by Murray-Riverina Farm Forestry and have been included in the data for the Murray Valley (table 5).
**Gippsland**

The Gippsland region covers a large area extending from Melbourne in the west, across to the east as far as the NSW border, and north to the Great Dividing Range beyond Sale and Bairnsdale. It contains significant forest processing industries, including sawmilling and pulp and paper production utilising both plantation and native forest resources.

Table 9 shows that farm forestry plantations across the region total 5,607 ha, and consist mainly of *P. radiata* (4,294 ha). The unknown species reported are thought to mostly be plantations of *E. globulus*.

**Table 9: Farm forestry plantations in Gippsland**

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Pinus radiata</em></td>
<td>4,294</td>
</tr>
<tr>
<td><em>Eucalyptus nitens</em></td>
<td>187</td>
</tr>
<tr>
<td>Mixed species</td>
<td>303</td>
</tr>
<tr>
<td>Unknown</td>
<td>823</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,607</strong></td>
</tr>
</tbody>
</table>

**Private native forests in Victoria**

The NPI estimated a potential private native forest resource in Victoria of 1.298 million ha. However the Victorian Department of Sustainability and Environment (DSE) estimated that only 350,000 ha are available for harvest (DSE 2005).

Gippsland is estimated to have the largest area of PNF with approximately 400,000 ha. This is followed by North East Victoria with approximately 308,000 ha with the remaining area spread across the rest of the State (*pers. comm. Helen Vaughan, DPI*). There is little further information on the extent and management of PNF in Victoria, however, the Victorian DPI is reportedly planning to re-survey forests in the near future.

A 2006 summary of PNF harvest by the Northern Inland Forestry Investment Group estimated an annual PNF harvest in Victoria of 77,000 m³ (NIFIG 2006). Cameron (2005) estimated an annual PNF sawlog harvest of 5,000 m³ and a pulpwood harvest of 20,000 m³ for Gippsland.

**South Australia**

South Australia has a total forest cover of 11 million ha or 11% of total land area (BRS 2007). Plantations account for 166,962 ha or 1.5% of forest area (NPI 2006). The South Australian government does not allow harvesting of native timber on public land and tightly regulates the felling of native forestry on private land. South Australia’s forestry and forest products industry is entirely plantation-based with a strong focus on the Green Triangle region.

SA has an extensive forest product processing sector based in Mt Gambier and surrounding areas including a number of world-scale softwood sawmills owned by the Green Triangle Forest Products Company (Weyerhaeuser), Auspine and Carter Holt Harvey (CHH). CHH also has a particleboard production facility and Kimberly Clark Australia has softwood pulp and tissue production facilities in the region. The Green Triangle also supports softwood log and chip export from the Port of Portland in Victoria. There has been a rapid expansion of hardwood pulpwood plantations in the region over the last 5 to 10 years (NPI 2007). It is expected that pulpwood harvested from these plantations will be exported as woodchip. There is also potential for development of a pulp mill to utilise some of this resource.
The regions considered in SA are South East South Australia, which represents the South Australian side of the Green Triangle NPI/PFDC region, and Mt Lofty Ranges and Kangaroo Island, which corresponds to the NPI/PFDC regions.

**South East South Australia**

South East South Australia makes up the SA side of the Green Triangle. Data on farm forestry plantations in the Green Triangle were sourced from BRS statistics which are derived from a combination of information from the South Australian government, the South East Resource Information Centre (SERIC) and data collected by Central Victorian Farm Plantations for Western Victoria.

Table 10 summarises farm forestry plantings for South East South Australia. The Victorian areas of the Green Triangle are included in the section for Central and Western Victoria. The combined data suggest total farm forestry plantations of 2,001 ha in the Green Triangle. These consist of 671 ha on the SA side and 1,330 ha on the Victorian side.

The Green Triangle also contains areas of MIS plantations operating on leasehold land in combination with an operating farm and as such these areas are considered farm forestry. Based on consultation with the MIS industry, plantations qualifying as farm forestry on the SA side of the Green Triangle were estimated to cover 6,700 ha.

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Corymbia maculata</em></td>
<td>25</td>
</tr>
<tr>
<td><em>Eucalyptus cladocalyx</em></td>
<td>279</td>
</tr>
<tr>
<td>Other hardwoods</td>
<td>152</td>
</tr>
<tr>
<td>Unknown</td>
<td>215</td>
</tr>
<tr>
<td>Leasehold MIS plantations on farms</td>
<td>6,700</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,371</strong></td>
</tr>
</tbody>
</table>

The NFFI had previously identified 5,548 ha of farm forestry plantations in the Green Triangle region (NPI 2001), excluding MIS plantations. It is possible that this area included additional *P. radiata* or *E. globulus* plantations that were not farm forestry plantations.

**Mt Lofty Ranges and Kangaroo Island**

The Mt Lofty Ranges and Kangaroo Island region extends from Kangaroo Island to Fleurieu Peninsula and north-east beyond Adelaide.

The farm forestry plantation area for Mt Lofty and Kangaroo Island is summarised in Table 11. The total area of 1,845 ha is roughly split between *P. radiata* and *Eucalyptus*. Most plantations in the Mt Lofty Ranges and Kangaroo Island region have been established over the past 10 years.

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Pinus radiata</em></td>
<td>837</td>
</tr>
<tr>
<td><em>Eucalyptus globulus</em></td>
<td>370</td>
</tr>
<tr>
<td>Other <em>Eucalyptus</em> species</td>
<td>630</td>
</tr>
<tr>
<td>Other softwood species</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,845</strong></td>
</tr>
</tbody>
</table>
Western Australia

Western Australia has a forest area of 25 million ha, representing 10% of total land area (BRS 2007). It has 377,598 ha of plantations or 1.5% of total forest area.

Plantation land in WA is 82% privately and 18% publicly owned (NPI 2006). The dominance of private ownership reflects the large expansion of hardwood pulpwood plantations that has occurred in the region over the last decade. The development of hardwood plantations was initially promoted by the WA government in association with private companies but MIS companies rapidly became the major drivers of new plantation investment. Most of these plantations have been based on the export of hardwood chips for pulp and paper production.

While the WA Forest Products Commission (FPC) has relatively small areas of hardwood plantations, it is responsible for more than 60% of softwood plantations. The WA government has promoted the development of farm forestry plantations as a means of addressing increasing salinity in agricultural production areas. In particular, it has promoted the development of mallee eucalypt and maritime pine (P. Pinaster) in lower rainfall areas.

WA’s forest industry includes hardwood and softwood sawmilling, MDF and particleboard manufacture, woodchip export operations and a new laminated veneer lumber (LVL) operation utilising P. pinaster. Export woodchips based on plantation hardwood have been expanding rapidly in recent years.

A demonstration integrated wood processing plant aimed at utilising mallee eucalypts to produce activated carbon, Eucalyptus oil and electricity from biomass has been built by Western Power (now Verve Energy) at Narrogin in WA. The future of the plant is currently being assessed by Verve Energy. Another company, Lignor, is proposing the development of an engineered strand lumber (ESL) plant in WA, which would utilise plantation hardwood pulpwood. At the time of writing Lignor was seeking investor interest in construction of an ESL mill.

Farm forestry plantations in WA include significant areas of mallee eucalypts, P. pinaster and P. radiata plantations, the development of which has been largely driven by government programs. In more recent times there has been some development of oil mallee plantations by private investors.

The single NPI region of South West WA has been used for this study.

South West Western Australia

South West WA extends in a broad arc from north of Perth southwards to Esperance. The WA government has been a strong driver of farm forestry plantations in the region. In 1994 the WA government initiated the oil mallee project, which was supported by the National Landcare and Farm Forestry programs. The most recent initiative of the WA government is the Strategic Tree Farming project, which is jointly funded with the Commonwealth government and aims to establish 25 million trees on farms under farm share arrangements by 2008. Pine, eucalypt sawlog and sandalwood plantations are being established under this project.

The Corymbia, Eucalyptus and other softwood areas shown in Table 12 are based on the National Plantation Inventory information, which was compiled by the WA Department of Conservation and Land Management. The P. pinaster, P. radiata and sandalwood figures shown are share farm areas managed by the FPC. It is likely that there are some additional small areas – probably less than a few hundred hectares – of P. pinaster, sandalwood and other species on farmland in WA.
Table 12: Farm forestry plantations in Western Australia

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corymbia species</td>
<td>97</td>
</tr>
<tr>
<td>Other Eucalyptus species</td>
<td>924</td>
</tr>
<tr>
<td><em>Pinus pinaster</em></td>
<td>15,497</td>
</tr>
<tr>
<td><em>Pinus radiata</em></td>
<td>8,556</td>
</tr>
<tr>
<td>Other softwoods</td>
<td>32</td>
</tr>
<tr>
<td>Mallee eucalypts</td>
<td>12,126</td>
</tr>
<tr>
<td>Sandalwood</td>
<td>1,448</td>
</tr>
<tr>
<td>Leasehold MIS plantations on</td>
<td>22,000</td>
</tr>
<tr>
<td>farms</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60,680</strong></td>
</tr>
</tbody>
</table>

WA also has an estimated 22,000 ha of MIS plantations that are planted on leasehold land which forms part of a land holding on which farming practices are still undertaken.

**Private native forests in Western Australia**

The area of private native forests potentially available for timber production in WA is estimated as 1.639 million ha. The area of PNF located within RFA regions is estimated to be 303,000 ha. A relatively small amount of PNF harvesting occurs in WA. A 2006 summary of PNF harvest by Northern Inland Forestry Investment Group (NIFIG 2006) reported WA PNF annual harvest to be 14,589 m$^3$ of sawlogs and 23,135 tonnes of pulpwood. This compares to public native harvest volumes in 2006–07 of 203,960 m$^3$ of sawlogs and 335,649 m$^3$ of pulpwood and fuel wood in 2007.

**Tasmania**

Tasmania has 3.4 million ha of forests which is 46% of the State’s land area, the highest proportion of forested area of all States (BRS 2007). The Tasmanian plantation resource is 247,690 ha (NPI 2007) or 7% of Tasmania’s forest areas. Tasmania’s forest industry includes hardwood and softwood sawmilling as well as pulp and paper production. It also has a large woodchip export industry based on native forest residues and hardwood plantations. The Tasmanian region considered in this report corresponds to the NPI region, encompassing forestry across the whole State.

Private Forests Tasmania (PFT) estimates the area of non-MIS farm forestry plantations in the State to be 14,805 ha. This area consists of 9,363 ha of hardwood plantation and 5,442 ha of softwood plantation. Tasmania also has MIS plantations of which a portion is likely to meet the definition of farm forestry. Based on data provided by PFT and consultation with MIS companies, there is an estimated 6,200 ha of hardwood and 700 ha of softwood MIS plantations established on leased land where a working farm continues to operate. Based on this estimate the total area of farm forestry plantations in Tasmania is about 21,000 ha (see Table 13).

Table 13: Farm forestry plantations in Tasmania

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardwood</td>
<td>9,363</td>
</tr>
<tr>
<td>Softwood</td>
<td>5,442</td>
</tr>
<tr>
<td>Leased MIS plantations on</td>
<td>6,200</td>
</tr>
<tr>
<td>farms</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21,005</strong></td>
</tr>
</tbody>
</table>
Private native forests in Tasmania

Tasmania has a total area of PNF potentially available for timber production of approximately 922,000 ha (PFT 2006). During 2005–06 PNF supplied 40% of all harvested wood in Tasmania. Harvest for 2005–06 was reported at just under 1 million m$^3$ which comprised around 67,000 m$^3$ of sawlogs and 900,000 m$^3$ of pulpwood and small volumes of minor wood products (e.g. fuel wood) (PFT 2006). In 2005–06 Tasmanian PNF recorded a drop in harvest of 41% from the previous year. This fall in production was attributed to a downturn associated with native woodchip export markets.

Northern Territory

There is 32 million ha of forest across the Northern Territory (NT) accounting for 24% of land area. NT has a very low level of public forest ownership with 16 million ha of freehold native forest and 16 million ha under leasehold title (BRS 2007), the largest areas of PNF of all the States and Territories. However, the level of PNF harvest for commercial purposes is very low and information on the commercial value of native forests in the NT is poor.

Plantation forestry in the NT is undertaken on Melville Island offshore from Darwin. Some smaller plantation forestry also occurs in high rainfall parts of the northern mainland (NPI 2006). This distribution is reflected in the NPI regional boundaries, which encompass these northern areas, and has also been used in this study. The total area of commercial plantations in the NT is calculated by the NPI to be 16,329 ha.

The only record of farm forestry plantations in the NT is an estimated 44 ha based on the NFFI (NPI 2001). Farm forestry data has not been updated since this time.

Woody fodder crops

Information on woody perennial fodder crop plantations across Australia is inconsistently recorded. The major crops grown include tagasaste (*Chamaecytisus palmensis*) and old man saltbush (*Atriplex nummularia*) in lower rainfall zones, and *Leucaena leucocephala* in higher rainfall zones (de Koning and Milthorpe, 2008 and Toovey and Revell, forthcoming). Some smaller plantations of *Rhagodia preissii* and *Acacia saligna* are also grown. Fodder crops are generally grown as a defined plantation block or alleys within an individual farm. Because they are dispersed widely across agricultural/rainfall zones, fodder crops are difficult to categorise spatially and generally fall outside forestry regions.

Table 14 summarises known estimates of fodder plantations around Australia. Information has been obtained from Florasearch and a range of government and industry contacts. Fodder area has been measured as the gross area of land under crop, including the areas between crop rows. *Leucaena leucocephala* plantations represent the largest known fodder area, and are reportedly expanding by 12,000 ha per annum (pers. comm. Max Shelton and Scott Dalzell, University of Queensland).
Table 14: Estimated woody fodder plantings in Australia

<table>
<thead>
<tr>
<th>Fodder species</th>
<th>Estimated area (ha)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tagasaste (Chamaecytisus palmensis)</td>
<td>105,000</td>
<td>There are an estimated 100,000 ha in the northern agricultural region of WA (from Geraldton south to approximately 100-200 km from Perth).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approximately 2,000 ha are recorded in South Australia with approximately 1,300 ha known in mid-upper SE and additional, likely smaller areas around Murray Mallee and Eyre Peninsula.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approximately 2,000-5,000 ha are estimated to be planted in Victoria.</td>
</tr>
<tr>
<td>Old Man Saltbush (Atriplex nummularia)</td>
<td>140,000-240,000</td>
<td>There are an estimated 35,000 ha scattered throughout the wheat-sheep belt of NSW. Another 6,600 ha is estimated in SA, mainly in Murray Mallee, Eyre Peninsula and mid to northern agricultural districts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are 100,000-200,000 ha estimated to be scattered throughout saline parts of the WA agricultural zone (300-450 mm rainfall).</td>
</tr>
<tr>
<td>Leucaena leucocephala</td>
<td>150,000</td>
<td>Nearly all crops are located in Queensland. There is an estimated 127,500 ha in Central Queensland, 15,000 ha in Southern Queensland and 3,750 ha in Northern Queensland.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are also small areas of Leucaena leucocephala plantations in the NT and northern WA with approximately 1,900 ha in each.</td>
</tr>
<tr>
<td>Acacia saligna</td>
<td>5,000</td>
<td>All Acacia saligna crops are located within the agricultural zone of WA with approximately half in the northern sand plain of the agricultural zone.</td>
</tr>
<tr>
<td>Rhagodia preissii</td>
<td>240</td>
<td>Most plantations are concentrated around Geraldton in the WA agricultural zone.</td>
</tr>
<tr>
<td>Total</td>
<td>400,000 - 500,000</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Florasearch project (pers. comm. Mike Bennell), University of Queensland (pers. comm. Max Shelton and Scott Dalzell), CRC for Plant-Based Management of Dryland Salinity (pers. comm. Dan Huxtable).
Conclusions and recommendations

The National Farm Forestry Inventory (NFFI) undertaken over the period 1993 to 2001 estimated that there were 67,000 ha of farm forestry plantations (NPI 2001). Since this information was published there has been no further formal assessment of farm forestry plantations across Australia. The data gathered for this report suggest that the area of farm forestry plantations has now increased to 155,000 ha, although a large amount of this increase is attributable to the different definition of farm forestry used in this report. Excluding MIS plantations considered farm forestry, the area of farm forestry plantations has increased by around 33,000 ha since the 2001 report by NFFI, or an increase of 50%. Over the same period around Australia, hardwood plantation areas increased by 61%, softwood plantation areas by 3% and the total plantation area by 22%.

While farm forestry plantations have been expanding nationally there has been considerable variation around the country. It is clear that the greatest progress has been in WA and that direct government involvement in farm forestry plantations has played an important role in that region. Government involvement has also played an important role in farm forestry plantation development in NSW, Victoria and South East Queensland through a range of schemes. In Victoria this included the ‘Farm Forestry North East’ project and the ‘Trees for Profit’ program, whilst in NSW and Queensland government joint venture programs have resulted in significant development. The other major contributor to the expansion of farm forestry plantations has been the rapid development of plantations by MIS.

The success of government support and MIS in expanding farm forestry areas illustrate the importance of third party funding in generating new farm forestry investment. While governments have played an important role to date, there is a need to examine options for expanding private investment in farm forestry. Accordingly, it is recommended that models capable of providing third party investment for farm forestry e.g. purchase of environmental services, be a focus for investigating possible means of expanding farm forestry. This is happening to some extent though the development of carbon offset plantings, with more than 2,000 ha of mallee eucalypts planted for carbon offsets in NSW.

The level and accuracy of data collected on farm forestry plantations is best where governments have been directly involved in development. PFDCs in some regions have conducted surveys that have assisted in identifying areas of farm forestry plantations and PNF. However, in general data on farm forestry plantations are hard to source, are often collected on an ad hoc basis and must be considered somewhat unreliable. There is a general need to improve the quality of data on farm forestry across Australia. Where PFDCs have focussed on collecting regional farm plantation information they have been effective. It is therefore recommended that PFDCs provide a focus for collection of regional farm forestry plantation information. This will require cooperation among PFDC and farm forestry stakeholders.

Despite the fact that PNF supplies significant volumes of wood to the forest products industry, particularly in northern NSW, South East Queensland and Tasmania, data on areas and management intention of PNF are very limited. There is a strong need to improve information on the area and productive potential of PNF around Australia. PFDCs can assist in this process but the task is greater than the resources of PFDCs and will require direct inputs from State governments and potentially the Commonwealth government.

There is active investment in fodder crops in several regions across Australia. This is driven by individual farmers adopting new fodder crops with relatively little direct government involvement. Benefits include increased on-farm fodder production and greater drought resilience. This, along with the influence of government programs and MIS, demonstrates that economic drivers can be an important element in encouraging landowner innovation.
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Appendix A: List of Private Forestry Development Committees

Northern Inland Forestry Investment Group
Northern Rivers Private Forestry
South East NSW Private Forestry
Murray Riverina Private Forestry Development Committee
Southern Tablelands Farm Forestry Network Inc.
Green Triangle Regional Plantation Committee
Private Forestry Kangaroo Island
Mt Lofty Ranges Farm Forestry Group
Central Victorian Farm Plantation Committee
Gippsland Private Forestry
Plantations North East Inc.
Private Forestry Southern Queensland Inc.
Private Forestry North Queensland
Central Queensland Forestry Association
South East Forest Foundation Inc.
Timber 2020 Inc.
Trees South West
Trees Midwest
Avongro
Farm Forestry Area and Resources in Australia

The data presented in this report provide estimates of the extent and nature of farm forestry in Australia. For the purposes of this study farm forestry was considered within three broad categories: farm forestry plantations; private native forestry; and woody fodder crops. The estimates of the farm forestry areas provide a snapshot of the development of farm forestry in Australia.

The estimates of farm forestry areas in this report have been prepared to inform investment priorities of the Joint Venture Agroforestry Program (JVAP), government and industry. The report will be of interest to government agencies and private investors involved in farm forestry around the country.

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