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Socio-economics of the Forest & Forest Products Industry in Victoria

Prepared for Victorian Association of Forest
Industries

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GLOSSARY

AFFA	Agriculture Fisheries and Forestry Australia (Commonwealth Government Department)
AFS	Australian Forestry Standard
ca	An abbreviation for circa which is Latin for approximately
CFA	Country Fire Authority
Code	Code of practices for timber production in Victoria
CO ₂ -e	Carbon dioxide equivalent
DSE	Department of Sustainability and Environment
DPI	Department of Primary Industries
FMA	Forest Management Area
FSC	Forest Stewardship Council have an international standard of environmental performance
GRP	Grand Ridge Plantations
HVP	Hancock Victorian Plantations
ha	hectare
ISO14001	International Standard for measuring environmental performance including compliance
kwh	Kilo watt hour
LGA	Local Government Authority (mainly Shires)
Mixed Species	Name embracing native eucalypt species other than the Ash species (eg <i>E.obliqua</i>)
M	million
m ²	square metre
m ³	cubic metre
m ³ /ha/yr	cubic metres per hectare per year
MAI	Mean Annual Increment (annual growth rate expressed in m ³ /ha/yr)
MJ	Mega joule
net m ³	cubic metre of sawlog after subtracting an allowance for defect
NRE	Department of Natural Resources and Environment (split into DSE & DPI)
OFOF	Our Forest Our Future (Report by NRE 2002 on estimates of sawlog resources)
pa	Per annum (year)
RWE	Round Wood Equivalent (equivalent log volume under bark before processing losses)
Remanufacture	Secondary processing of wood products into more value-added wood products
Softwood	Generally coniferous species (mainly <i>Pinus radiata</i> with tiny amount of <i>P. pinaster</i>)
Hardwood	Mainly eucalypt species (plantations dominated by <i>E.globulus</i> , <i>E. regnans</i> & <i>E. nitens</i>)
SWG	Strzelecki Working Group
TTV	Timber Towns Victoria
t	tonne
Timber Industry	Forest & Forest Products industry embracing both growing and harvesting of native and plantation logs and their manufacture into wood products including pulp, paper, wood based panels and sawntimber and remanufacture into trusses and frames etc
VicForests	A new statutory authority to administer wood production in native forests from August 2004
VPP	Victorian Planning Provisions
\$	Australian dollars

EXECUTIVE SUMMARY

Victorian wood production and processing generates direct employment for 19 500 people and directly accounts for net value of production of \$3 034M pa. Direct payments to governments are about \$800 M pa in various taxes. The industry delivers employment for 39 200 people and output of \$6 080M pa including indirect effects. Native forests account for about 40% of the socio-economic impact and plantations for about 60%. The plantation impact will increase as the recently expanded young eucalypt plantations reach harvest age. Substantial socio-economic impacts are generated in the harvest, haul and processing of logs into paper, wood panels, sawntimber, posts and further manufacturing.

The socio-economic impact of production forests is generated from harvestable public native forest, private native forest and plantations occupying only 3%, 0.6% and 1.6% respectively of Victoria. Harvestable public native forests occupy only 8% of Victorian public forest and the 383 000ha of plantations are only 2.4% of freehold land in Victoria.

Nationally forests generate eleven times more value adding & direct jobs per hectare and five times more exports per hectare than agriculture on average. Victorian softwood plantations generate about five times as much employment per hectare and about seven times as much net value of output as farming at a state-wide level. In Gippsland where farming is more intense, softwood plantations generate almost three times as much direct employment and gross value of output as agriculture. On average conversion of Gippsland farmland to softwood plantations has the potential to generate additional direct employment of 12.4 jobs per 1 000 ha and gross value of output of \$4 464 per ha.

Wood processing accounts for 89% of forest industry jobs in Victoria and 69% of forest industry jobs in regional Victoria. Most of the processing jobs are long term and full time and help to alleviate higher unemployment and fewer full time jobs in rural Victoria. Forest management and harvesting provide work for farmers heavily dependent on off-farm income due to declining farm incomes. The forest industry is an important source of scarce employment opportunities in the bush for highly skilled people and also provides jobs and considerable training for those less qualified, helping to address the above average unemployment and lower proportion of qualified people in rural Victoria.

The average salary/wage of people working in the Gippsland forest industry is 13% higher than the mean for all Australian rural workers. Communities heavily reliant on the forest industry have above average levels of home ownership.

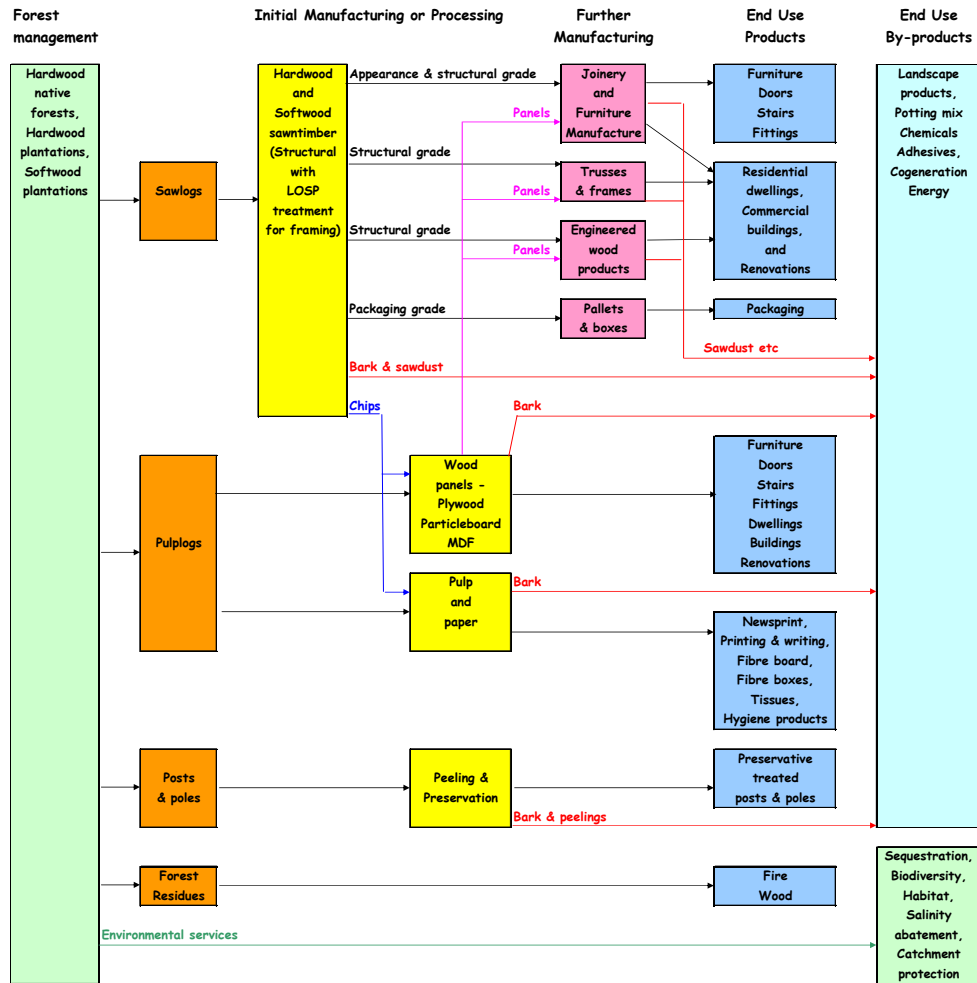
Victorian forests generate 2.9 jobs/thousand m³ and net value of output of \$450/m³ harvested. Including indirect effects employment is 5.8 jobs/thousand m³ and value of output \$900/m³. The reduction in native forest sawlog and pulplog supply of 1.1 million m³ pa under the 'Our Forests Our Future' policy will result in the potential loss of about 6 380 jobs and \$1.0 billion pa in economic output.

Replacement of 1.1 million m³ lost under OFOF requires the establishment of about 55 000 ha of new plantations, in addition to the 25 000ha per year of new planting called for under the 2020 vision. New planting in Victorian is inadequate and averaged only 10 660 ha pa for hardwood and 451 ha pa for softwood in the triennium to 2004. Loss of access to native forest and impediments to new planting are restricting desirable socio-economic impacts of the forest industry in Victoria.

1 INTRODUCTION

This report provides information on the socio-economic impact of the timber industry on national, state and regional economies. The timber industry embraces growing and harvesting of logs, manufacture of wood based products and some secondary processing (Figure 1). Secondary processing for example involves the remanufacture or conversion of sawntimber into truss and frames and conversion of sawntimber and wood panels into doors.

Figure 1: Key product flows for the Victorian forest industry



This report demonstrates how the timber industry provides a key driver for sustaining regional economies and how the initial processing underpins considerable secondary processing in Melbourne. The report comments on the linkages between regulation of land use and forest policy → industry cost and profit drivers → industry competitiveness → investment decisions → and sustainable socio-economic development.

Key drivers of socio-economic impact of the timber industry are sufficient land for timber production within economic haul of mills → increased volume production → enhanced log quality → more value-adding of wood. Future growth of the timber industry will depend on deregulation of land use to release land for increased plantation development, meeting the challenge of changes in log quality and enhanced value-adding. The potential growth of the industry is impeded by constant or declining supply of native forest logs resulting in increased haul, difficulties achieving world scale and changed log quality.

Land is a scarce resource and efficient and effective land use underpins sustainable development. Some socio-economic parameters are therefore expressed on a per hectare basis. This will facilitate evaluation of land use decisions against a better understanding of the socio-economic output for different land based options.

A brief summary of the extent, ownership and scale of public and private forestry in Victoria is presented.

Some commentary is provided on changes in the nature and quality of the Victorian forest resources and implication for further processing and further socio-economic development. Future development of the industry will be driven by sufficient volume along with other drivers including favourable location, species, age and quality of log resource. These other cost and profit drivers need to be sufficiently favourable to underpin new investment and economic development.

Data is presented for the five regions of Victoria - Gippsland, Central, North East, South West and North West and the Metropolitan area. Some information is also presented for Forest Management Area's (FMA's) and Local Government Authorities (LGA's).

About half of Victoria's regional (non-metropolitan) LGA's depend heavily on the forest and forest products (timber) industry. Reference source not found. with twenty of those LGA's being members of Timber Towns (Table 1).

Table 1: LGAs in traditionally recognised private forest regions of Victoria

Gippsland region	North East region	Central region	South West region	North West etc non-forest regions
Bass Coast	Alpine*	Ballarat	Ararat	Buloke
Baw Baw*	Benalla*	Colac Otway*	Glenelg*	Central Goldfields
Cardinia	Campaspe	Corangamite	Horsham	Greater Bendigo
Casey	Greater Shepparton	Golden Plains*	Moyne	Gunnawarra
East Gippsland*	Indigo*	Greater Geelong	South Grampians*	Hindmarsh
Latrobe*	Mansfield*	Hepburn*	Warrnambool	Loddon
Mornington Peninsula	Mitchell*	Hume	West Wimmera	Mildura
South Gippsland	Moira	Macedon Ranges		Mount Alexandra
Wellington*	Murrindindi*	Melton		Nillumbik
Yarra Ranges*	Strathbogie	Moorabool*		Northern Grampians
	Towong*	Pyrenees*		Swan Hill
	Wangaratta*	Queenscliff		West Wimmera
	Wodonga	Surf Coast		Whittlesea
		Wyndham		Yarriambiack

FOOTNOTES

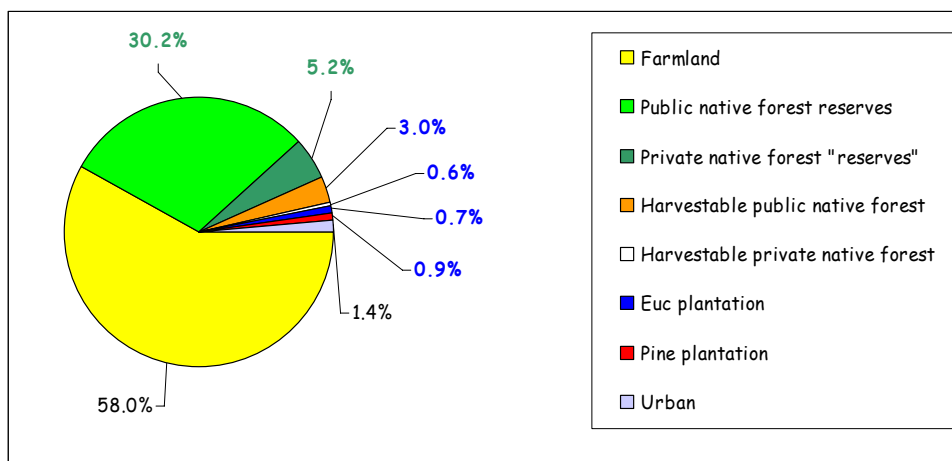
- A. Shires with significant areas of private forest activity shown in bold & 20 members of Timber Towns Victoria are shown with an asterisk
- B. Delatite Shire split into Benalla Rural City and Mansfield Shire from 2002

2 VICTORIAN LAND USE

2.1 TOTAL LANDUSE

Only 5.2% of Victorian land is currently used for timber production from multiple use public native forest, the harvestable portion of private native forest and pine and eucalypt plantations. Victorian current land use is dominated by farming with 58%, public native forest reserves with 30% and private native forest considered to be unavailable for commercial harvesting with 5% (Figure 2). Land set aside for timber production of 5.2% is small in relation to its contribution to regional socio-economic development. The proportion of Victorian land set aside in reserves for conservation is large by international standards.

Figure 2: Victorian landuse



2.2 VICTORIAN PUBLIC FOREST LAND USE

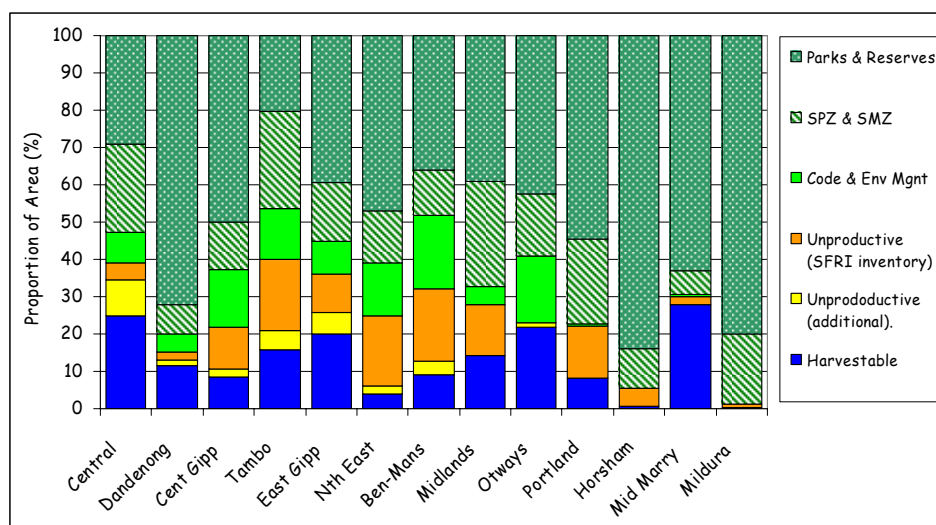
Victoria has 7.5mill ha of public land (mostly native forest), of which 4.2 million ha are parks and reserves managed principally for conservation and 3.4 million ha are state forest. The state forest contains substantial areas also managed for conservation and environmental objectives including 1 227 000 ha of special protection zones (SPZ) and special management zones (SMZ). Harvesting in the SPZ is prohibited and is only permitted in SMZs under very special conditions, such that the area effectively available for harvesting is likely to be very small. Another 596 000 ha are precluded from harvesting under the Code of Forest Practices (the Code) and environmental management plans. Allowing for unproductive areas of 873 000 ha, only 676,000 ha are essentially available for timber harvesting (DNRE 2002).

The harvestable area of 676 000 ha, or 614 000 ha after phasing out logging in the Midlands and Otway, is small in comparison to 1.4 million ha burnt in February 2003 in fires across North East, Tambo, East Gippsland and Dargo in Central Gippsland (incl. 0.2mill ha in adjoining NSW). The reduction in access to native forest has increased average haul distance, mill door cost and the supply risk for Victoria's forest products industry.

The proportion of public land (mostly forest) that is harvestable has declined considerably over the years. Over the last thirty years harvestable area has fallen from ca. 50% to 20% of state forest and from ca. 25% to 9% of all public land. There has been loss of harvestable area to SPZs and SMZs under the RFAs; new Code exclusions, new environmental guidelines and additions to unproductive area, under the state-wide forest resource inventory (SFRI) underpinning the OFOF supply projections. This includes losses of harvestable area under OFOF (DNRE 2002) that was unforeseen at the time of preparing the RFAs.

The 9% of Victoria's public land available for timber harvesting will soon reduce to 8% with the implementation of the announced closure of the Midlands and the Otways to logging. Native forest land use is dominated by conservation and environmental initiatives which account for 79% of Victorian public landuse. National parks and reserves account for 55%, SPZ & SMZ 16% and the Code and environmental management prescriptions account for 8%. Unproductive areas account for 11% (Figure 3).

Figure 3: Harvestable public native forest as a proportion of public land

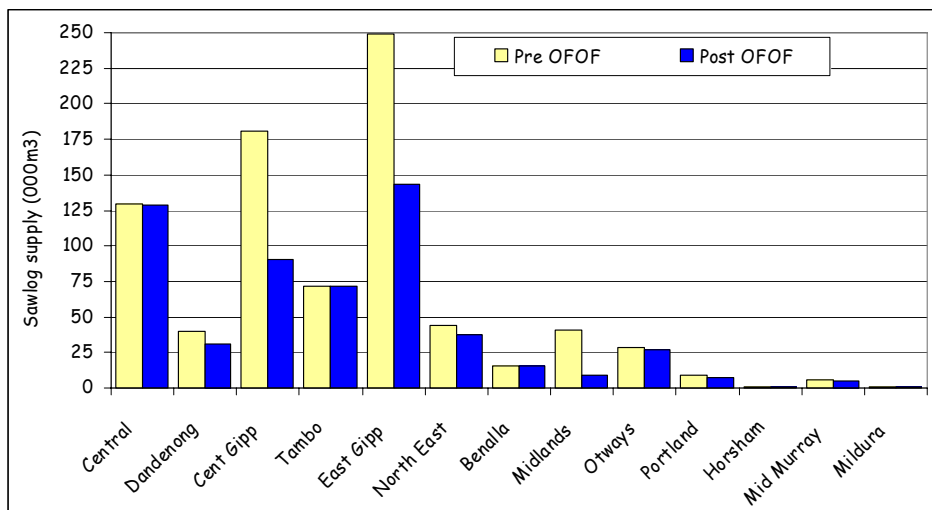


2.3 BUSINESS DRIVERS FOR PUBLIC NATIVE FOREST

2.3.1 Native forest sawlog supply

Sawlog supply from native forest is to decline by 31% from commitments of 817 000 m³ pa before Our Forests Our Future (OFOF) to 567000 m³ pa (Figure 4) after the implementation of the new supply commitments under OFOF (DNRE 2002). With the virtual phase out of harvesting in the Midlands and the Otways, sawlog commitments in Victoria will decline from pre-OFOF levels by 286 000 m³ pa or 35% to 532 000 m³ pa.

Figure 4: Impact of the new public native forest sawlog supply commitments under OFOF



The loss in availability of sawlog will be accompanied by a reduction in availability of other logs of about 780 000 m³ pa from integrated sawlog and pulplog operations across the state. This will lift the total loss of wood supply potentially available to sawmills, recovery log mills, pulp mills and chip export mills to almost 1.1 million m³ pa. Currently plantation grown pulplogs are perfectly substitutable for native forest pulplogs; however, plantation grown sawlogs are not completely substitutable for native forest sawlogs.

The substantial reduction in native forest supply will place increased emphasis on private forests and plantations to meet future wood supply in Victoria. The loss of 1.1 million m³ pa of native wood supply requires the establishment of about 55 000 ha of new plantations (assuming an MAI of 20 m³/ha/yr), in addition to the 25 000 ha pa of Victorian new planting called for under the 2020 vision, if the native supply is to be replaced with plantations. New planting is inadequate and averaged only 10 660 ha pa for hardwood and 451 ha pa for softwood in the triennium to 2004 (Figure 5).

2.3.2 Species and age composition of harvestable native forest

Most analysis of reduced access to public native forest has focused on the impact on harvestable area and sawlog availability but has given insufficient attention to the resulting species and age composition and its impact on mill costs, further investment and socio-economic growth.

Progressive reductions in access have left a harvestable native forest with suboptimal species composition and age profile. For example, Gippsland's harvestable public native forests are dominated by mixed species with 80% of the area (325 000 ha). Ash generally preferred for both pulping and sawntimber accounts for only 20% - Alpine ash with 11% (45 000 ha) and Mountain Ash only 9% (35 000 ha).

Victoria's harvestable native ash forest is complicated by tight harvestable area and exceptionally uneven area by age class which will impact on mill costs, future investment and socio-economic growth as industry adjusts to the associated changes in wood quality not fully considered in past landuse decisions. The 1939 regrowth is likely to be the mainstay of ash supply for the next 30-40 years followed by a transition to substantially younger regrowth.

Management of harvestable native mixed species forest is also complicated by uneven area by age. In Gippsland mature forest (now at least 150 years old) accounts for 56% and regeneration from harvesting over the last two completed decades (now 20 and 10 years old) accounts for 15% and 12% respectively of mixed species area.

2.4 PRIVATE NATIVE FOREST LANDUSE

The private native forest resource is poorly described but only about 130,000 ha of the 1.3 million ha of private native forest is thought to be harvestable. This is only 0.6% of the area of the state and varies from 0.4% across Central, South West and North West regions to 0.9% in Gippsland. Error! Reference source not found. Error! Reference source not found.. The area harvestable is based on allowing for biodiversity conservation, Code exclusions, regulatory requirements, unproductive areas, economics of harvest and haul, degradation due to grazing and owner intentions. Private native forest makes a small contribution to log production and the timber industry will remain heavily dependent on public native forest.

Private native forests are generally not actively managed for wood production and current wood supply from Victoria's private native forests is tiny.

2.5 VICTORIAN PLANTATIONS AND LANDUSE

2.5.1 State plantation area, ownership and scale

Victoria has 383 000 ha of plantation to 2004 representing 22% of the national estate of 1.7 million ha. WA also has 22% followed by NSW with 20%, Tasmania and Queensland with 13% and SA with 10%. Victoria's proportion of the national plantation estate is the largest of any state but still modest given the favourable climate and soils; extensive processing facilities (including Australia's largest pulp and paper mill at Maryvale); and proximity to the largest domestic markets of Melbourne and Sydney.

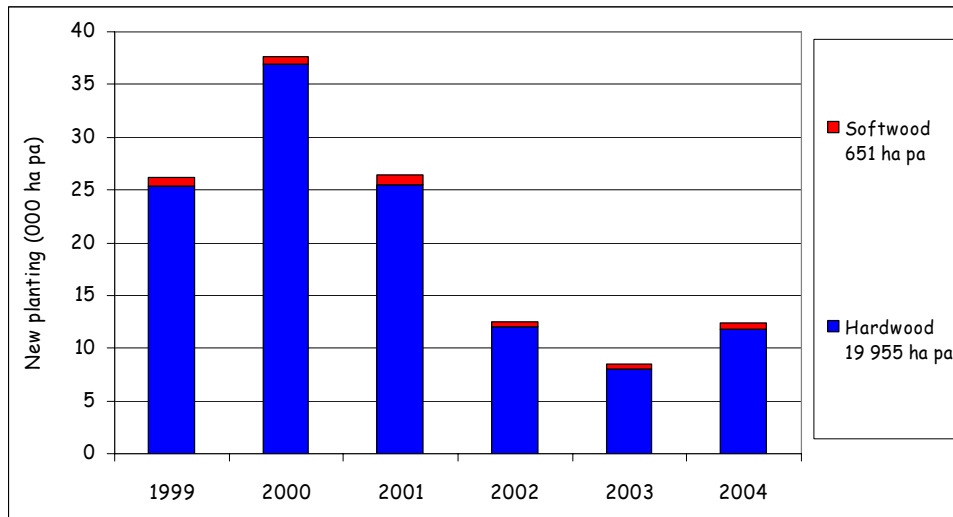
Victoria has one of the highest proportions of private ownership of plantations. Over 99% of Victoria's plantations are under private ownership, the largest proportion of all states except the Northern Territory which has 100%. About 93% of Victorian plantations are large scale industrial plantations and only 7% smaller scale farm woodlots, consistent with a national trend towards economies of scale. Large scale plantation development will underpin future socio-economic development in regional Victoria, and be augmented by farm woodlots.

2.5.2 New planting

In Australia, new planting averaged 68 642 ha pa for hardwood and 9 192 ha pa for softwood over six years to 2004. Softwood declined from 10 563 ha pa for the first triennium to only 7 821 ha pa for the second triennium to 2004 while new hardwood planting fell from 95 011 ha pa in the first triennium to 42 274 ha pa in the second triennium.

Victorian new planting has averaged 19 955 ha pa for hardwood and only 651 ha pa for softwood over the six years to 2004. Hardwood planting has shrunk from 29 250 ha pa over the first triennium to 10 660 ha pa over the second triennium to 2004. Softwood halved from 850 ha pa to 451 ha pa over the same period (Figure 5).

Figure 5: New hardwood and softwood planting in Victoria over the last six years



The decline in new planting is due to impediments (Cameron et al 2004b) including regulatory constraints on conversion of marginal farmland to plantations and high cost of other farmland.

2.6 VICTORIAN PLANTATIONS AND REGIONAL LAND USE

Victorian plantations occupy only a tiny proportion of the state. At December 2003 the 367 000 net ha was only 1.6% of Victoria (and 2.3% of freehold land) with 0.9% occupied by softwood and 0.7% by hardwood. Concentration of plantation varies from almost none in the North West to 4.3% of the area under plantation in the South West. Only in Latrobe and Glenelg LGAs do plantations occupy a significant but modest 16% of the LGA area, with plantations occupying less than about 5% of LGA area in all of 41 other LGAs.

3 VICTORIAN LOG PRODUCTION

About 40% of Victoria's log production (hardwood plus softwood) is generated from native forests (39% from public native forests) and 60% from private plantations. Native forests account for half log production in Gippsland and Central regions while private plantations generate two thirds of production in the North East and almost all output in the South West (Table 2).

Table 2: Annual Victorian log production by forest type and region

Source	Gippsland (000 m ³)	Nth East (000 m ³)	Central (000 m ³)	Sth West (000 m ³)	Nth West (000 m ³)	Total (000 m ³)	Proportion (%)
Public native production	1 466	465	658	22	55	2 666	39
Private native production	25		51.8			77	1
Plantation hardwood	250		30			280	4
Plantation softwood	1 298	964	492	990	7	3 751	55
Total wood production	3 039	1 429	1 231	1 012	62	6 773	100
<i>Proportion private (%)</i>	<i>51.8</i>	<i>67.5</i>	<i>46.6</i>	<i>97.9</i>	<i>10.9</i>	<i>60.6</i>	
<i>Proportion plantation (%)</i>	<i>50.9</i>	<i>67.5</i>	<i>42.4</i>	<i>97.9</i>	<i>10.9</i>	<i>59.5</i>	

FOOTNOTE

A. No log production in the metropolitan area with its employment and output generated fro further processing and remanufacturing.
Source: Gipp (Cameron et al 2004), NE (Wareing et al 2002), Central (Addicott 2003), SW (Drohan pers comm) & NW (Freeman 2003).

4 NATIONAL FORESTS SOCIOECONOMIC IMPACT

The forest industry is growing from a smaller base than agriculture but making a significant contribution to diversifying the socio-economic structure of rural areas, boosting regional investment, socio-economic development and arresting the depopulation experienced over many years. The industry can provide an economic boost to regional communities and achieve a net reduction in environmental problems caused by past intensive land use (NAFI 2003). Future growth of the forest industry will depend primarily on increased plantation development and enhanced value-adding due to the constant or declining supply of native forest logs under the RFAs and other government decisions.

Nationally the forest and forest products industry is a vital part of the economy. The industry produces 25.7 million m³ of logs annually, directly employs 86,400 people and directly generates gross product of \$15 billion pa with exports of \$2.1 billion pa (derived from ABARE 2003a, ABARE 2003b, ABARE 2004b and ABARE 2005d). Turnover has increased at about 5% pa over the last decade. Victoria conservatively accounts for about 23% of the national employment and 20% of national economic output of the sector.

Forest and forest products share of Australian exports has nearly doubled from 0.8% to 1.4% over the last 25 years (ABARE 2003a). As the area of new planting under the 2020 vision matures, the industry will be well placed to make a more substantial contribution to trade, regional development and employment.

Unlike traditional farm commodities that are over exposed and heavily dependent on volatile export markets, the prospects for Australia's forest products are more balanced with a substantial import replacement opportunity and also an export growth opportunity. Australia's trade deficit in forest products is currently \$2.02 billion similar to \$2.03 billion three years ago driven by exports growing as fast (\$2.06 billion to \$2.09 billion) as imports (\$4.09 billion to \$4.11 billion) (ABARE 2003b and ABARE 2005d).

Nationally, value adding for the forest industry is \$108 000 (primary production only) or \$79 000 per direct employee (including processing) which is higher than the agricultural sector of \$70 000 (primary production only) or \$75 000 per direct employee (including processing). Processing for the forest industry includes wood and paper products and processing for the agricultural sector includes food, beverages & tobacco plus textiles, clothing, footwear and leather. The wood and paper products sector is thought to include less and the agricultural sector is thought to include more 'tertiary' processing.

The forest industry tends to favour local value adding compared to many agricultural products exported primarily in unprocessed form (eg. wheat and wool). Over the last decade \$6.5 billion has been invested nationally in the forest sector with most in the plantation and plantation processing segments (AFFA 2003).

Forest development can provide an economic boost to rural communities by allowing opportunities for diversifying farm enterprises with income from wood production and processing complimenting traditional farm income. New employment opportunities occur with establishment, maintenance, harvesting and processing of tree crops.

At a national level, productive forests (harvestable native forest plus plantations) generate about eleven times more value adding, five times more exports and eleven times more direct employment per hectare than agriculture on average (Table 3 Error! Reference source not found.).

Table 3: Annual national direct socio-economic impacts of landuse (2004-05)

Socio-economic parameter	Agri-culture	Harvestable native forest	Plantation hardwood & softwood	Total forest	Agriculture plus forest land use
Primary sector gross value added (\$/ha)	50	93	474	188	53
Processing sector gross value added (\$/ha)	43	415	2,106	834	55
Total gross value added (\$/ha)	94	508	2,581	1,022	108
Exports (\$/ha)	62	152	771	306	66
Primary sector employment (No/1000ha)	0.7	0.9	4.4	1.7	0.7
Processing sector employment (No/1000ha)	0.5	5.6	28.5	11.3	0.7
Total Employment (No/1000ha)	1.2	6.5	32.8	13.0	1.4

FOOTNOTES

A. Socio-economic data for native forest and plantations are derived from total forest based on volume harvested
 Source: Derived from ABARE (2003a, 2003b, 2004a, 2004b & 2005a, 2005b, 2005c) & BRS (2005)

5 VICTORIAN FORESTS SOCIOECONOMIC IMPACT

5.1 SOCIO-ECONOMIC IMPACT ACROSS REGIONS

Victoria produced 7.2 million m³ of logs or about 25% of the national roundwood removals of 28.6 million m³ in 2002-03. Wood production and socio-economic data is available for regions in the state but from different years ranging from 2000-01 to 2003-04. These available data have been used to estimate the socio-economic impact of the industry across the state but the wood production understates current wood production by ca 6% and possibly the socio-economic impact is understated by a similar amount.

Production of ca 6.8 million m³ pa over the years of the socio-economic studies was estimated to generate direct employment for 19 500 people and directly account for net value of production of \$3 034M pa, including further processing and remanufacturing primarily in metropolitan Melbourne. Total direct plus indirect employment is 39 200 jobs and direct plus indirect value of output is \$6 080M pa (Table 4Error! Reference source not found.).

Table 4: Annual Log production, employment and economic output from Victorian forests

Region	Gippsland	Nth East	Central	Sth West	Nth West	Metro	Total
Log production (000 m³)	3 039	1 429	1 231	1 012	62		6 773
Direct employment in area (No)	3 124	1 717	976	1 081	213	12 407	19 518
Direct + indirect empl. (No)	6 419	3 434	1 952	2 162	416	24 814	39 197
Net value of output (\$M)	948	276	233	252	23	1 303	3 034
Total value of output (\$M)	1 907	552	466	504	45	2 605	6 080
Total value of output (\$/emp.)	297 102	160 745	238 730	233 146	108 840	105 000	155 110

FOOTNOTES

- A. Total log production of 6.8 million m³ is believed to be ca 7.5% below current production. North West wood production is sleepers.
 - B. South West Victorian log production assumed to be 37% of Green Triangle production (J. Drohan pers comm).
 - C. SW direct employment at 1.07 jobs/1000m³ & direct net value of production at \$249/m³. Direct + indirect assumes a multiplier of 2.0.
 - D. Total direct employment from ABS 2001 Census & Metro obtained by difference. Direct + indirect generally assumes multiplier of 2.0
 - E. Net value of output for Metro conservatively assumed to be \$105 000/employee. Total value of output assumes a multiplier of 2.0
- Source: Gipp (Cameron et al 2004), NE (Wareing et al 2002), Central (Addicott 2003), SW (Drohan pers comm) & NW (Freeman 2003).

Multipliers of 2.0 are considered appropriate to describe the expected total employment and demand in regional communities resulting from activity within the timber industry (Cameron et al 2004a). Multipliers derived for the forest industry based on input-output analysis have generally varied between 1.8 and 2.3 (Dwyer Leslie and Powell, 1995; Margules Groome Pöyry, 1995). Employment multipliers on the South West Slopes of NSW were 1.79 for plantation management and harvesting, 1.87 for sawmilling, 2.3 for pulp and paperboard production and 2.06 for other wood processing (Schirmer et al 2005a). A multiplier of 2.0 implies direct impact of 1.0 plus indirect impact of 1.0.

5.2 DIRECT SOCIO-ECONOMIC IMPACT BY WOOD SOURCE

5.2.1 Socio economic impact of the forest industry on Victoria

The direct socio-economic impact (ignoring indirect socio-economic impacts) has been estimated for the three wood sources - native hardwood, plantation hardwood and plantation softwood. Native forest generated direct employment for 7 700 people and net value of output of \$1.2 billion. This represented 40% of the direct employment and 38% of the net value of output, in line with native forests 40% contribution to Victorian log production. Plantations contributed to 60% of employment and 62% of output with most coming from softwood plantations. The contribution from hardwood plantations is very small but will increase as these young plantations reach harvest age (Table 5 Error! Reference source not found.).

Table 5: Annual direct socio-economic impact by wood source and region

Region & wood source	Gippsland	Nth East	Central	Sth West	Nth West	Metro	Total	Proportion (%)
a) Direct employment (No)								
Native hardwood	1 630	566	290	20	198	5024	7 728	39.6
Plantation hardwood	294	9	78		12	513	906	4.6
Plantation softwood	1 199	1 142	608	1 061	3	6 871	10 884	55.8
Total	3 124	1 717	976	1 081	213	12 407	19 518	100.0
b) Net value of output (\$M)								
Native hardwood	462	67	69	5	21.4	527	1 151	37.9
Plantation hardwood	167		5		0.9	54	226	7.5
Plantation softwood	318	209	160	247	0.4	721	1 657	54.6
Total	947	276	233	252	22.6	1 303	3 035	100.0

FOOTNOTE

A. Employment & net value of output for Central region is based on processing 866 600 m³ of logs from outside the region

B. Metro not traced to source of wood but prorated allocation on total volume production for Victoria.

The direct plus indirect impact of the native forest industry on Victoria is likely to be approximately 15 500 jobs and \$2.3 billion in value of output (assuming a multiplier of 2.0).

5.2.2 Per hectare direct socio-economic impact of the forest industry

Softwood plantations generate on a per hectare basis, about five times as much employment and economic output, than native forests, from growing, harvesting, processing and further manufacturing. This is not surprising as the higher plantation growth rates result in substantially higher harvest volumes (in m³/ha). It should also be noted that the native forest logs are generally sourced from multiple use forests that generate additional employment and economic output from the other uses not taken into account here (Table 6).

Direct employment attributed to the hardwood plantations of the Great Southern Region of WA ranged from 2.2 to 5.2 per 1 000 hectares during 1992-93 to 2003-04 (Schirmer et al 2005b). This is lower than 5.9 direct jobs per 1 000 hectares for Victoria hardwood

plantations, reflecting the higher level of harvesting and domestic processing in Victoria. Direct employment per hectare for Victorian hardwood plantations should continue to increase as harvesting, domestic processing and further manufacturing increase as more of the plantations reach harvest age. Direct employment attributed to the 'mature' softwood plantation estate of the South West Slopes of NSW ranged from 15.3 to 18.4 per 1 000 hectares during 1992-93 to 2003-04 (Schirmer et al 2005a). This is only slightly lower than 18.1 to 19.6 direct jobs per 1 000 hectares for the four softwood regions of Victoria.

Table 6: Per hectare socio-economic impact of the Victorian forest industry

Region & wood source	Gippsland	Nth East	Central	Sth West	Nth West	Metro	Victorian total
a) Direct employment (No/1000ha)							
Native HW	3.7	3.4	3.5	0.5	2.7	6.2	9.6
Plantation HW	10.5	7.2	3.1		4.9	3.3	5.9
Plantation SW	19.6	19.0	18.9	18.1	5.4	32.4	51.3
Total	5.8	7.6	7.0	5.5	2.8	10.6	16.6
b) Net value of output (\$/ha)							
Native HW	1 038	408	839	120	288	654	1 429
Plantation HW	5 952		185		362	348	1 464
Plantation SW	5 204	3 490	4 983	4 232	704	3 397	7 804
Total	1 773	1 225	1 682	1 282	293	1 111	2 587

FOOTNOTE

A. For Metro employment and output are expressed over harvestable area for the state

Source: Cameron et al 2004, Wareing et al 2002, Addicott 2003, Drohan pers comm, Freeman 2003 & DSE/DPI webpages.

The age profile of Victoria's softwood plantations is relatively mature with log production close to long term sustainable levels. Most of the States hardwood plantations are immature and per hectare employment and economic output for Victoria's hardwood plantations should approach that of softwood as the level of harvesting increases, particularly as the amount of domestic processing increases.

5.2.3 Per cubic metre socio-economic impact of the forest industry

The Victorian forest industry generates direct employment of 2.9 jobs/thousand m³, and direct net value of output of \$450/m³ harvested (Table 7). Including indirect effects, employment is 5.8 jobs/thousand m³ and value of output \$900/m³. The reduction in native forest sawlog and pulplog supply of 1.1 million m³ pa, under Our Forests Our Future (OFOF) will result in the potential loss of about 6 380 jobs and \$1.0 billion pa in economic output.

The above average employment and economic output for hardwood plantations relative to native hardwood is due to virtually all the hardwood plantation pulplogs being processed domestically into fine paper which involves considerable value adding. The above average contribution of hardwood plantations relative to softwood plantations is due to greater domestic value adding of the plantation hardwood pulplogs than plantation softwood

pulplogs. For example, at the Maryvale paper mill softwood pulplogs go into unbleached paper but plantation hardwood pulplogs go into the manufacture of bleached fine paper.

Table 7: Per cubic metre socio-economic impact of the Victorian forest industry

Region & wood source	Gippsland	Nth East	Central	Sth West	Nth West	Metro	Victorian total
a) Direct employment (No/1000m3)							
Native HW	1.09	1.22	0.41	0.93	3.60		2.82
Plantation HW	1.18		2.60				3.24
Plantation SW	0.92	1.18	1.24	1.07	0.45		2.90
Total	1.03	1.20	0.79	1.07	3.45	1.8	2.88
b) Net value of output (\$/m3)							
Native HW	310	144	97	224	389		420
Plantation HW	668		153				808
Plantation SW	245	217	326	250	59		442
Total	312	193	190	249	367	192	448

FOOTNOTE

A. Values for Victorian total include the impact of secondary processing in metropolitan Melbourne

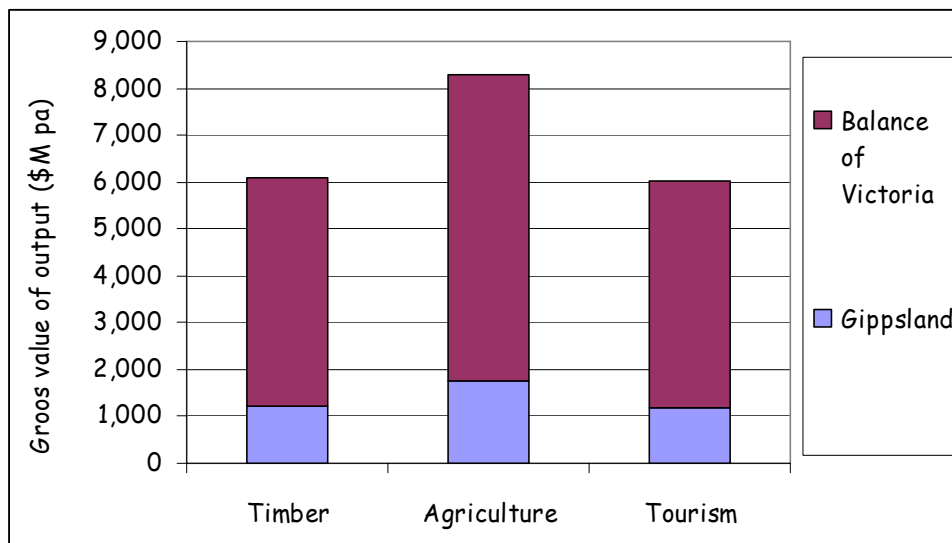
B. For Metro employment and output are expressed over harvestable volume for the state

Source: Cameron et al 2004, Wareing et al 2002, Addicott 2003, Drohan pers comm, Freeman 2003 & DSE/DPI webpages.

5.3 IMPACT OF FORESTRY, AGRICULTURE & TOURISM

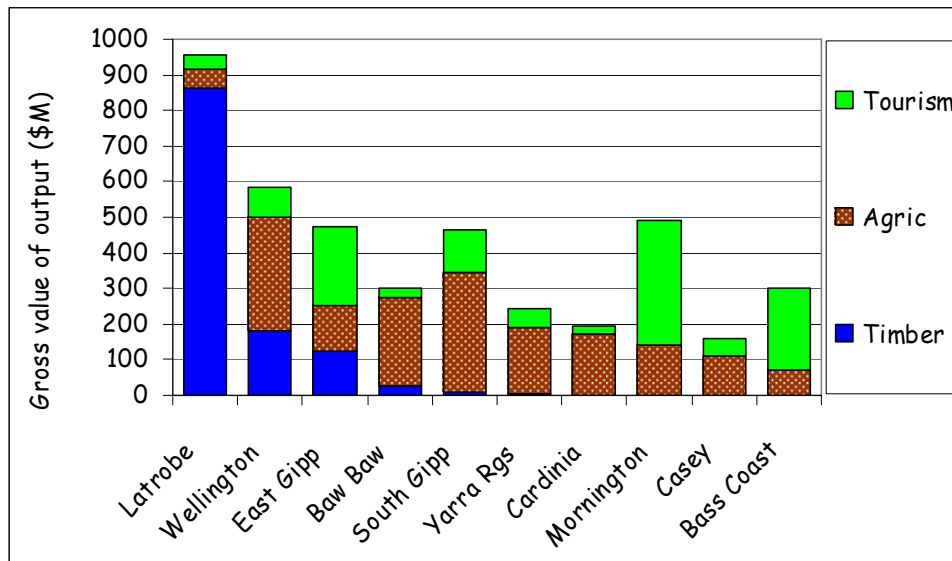
Gross value of output for the forest industry in Victoria is \$6 billion, the same as tourism and only \$2.1 billion lower than the agricultural industry despite occupying considerably less land than agriculture or national parks and reserves (**Figure 8**).

Figure 6: Comparative economic impact of forest, agricultural and tourist industries



In Gippsland gross value of output for the forest industry is \$1.2 billion, Agriculture \$1.7 billion & Tourism \$1.2 billion (20-21% of Victorian gross value of output). The forest industry is vital to Latrobe LGA accounting for 90% of the combined output from the three industries, due to conversion of marginal farmland to plantations in the Strzelecki's and the concentration of much value-added timber processing in that LGA. The forest industry accounts for 31% and 26% respectively of the combined output in Wellington and East Gippsland due to substantial areas of forest and some wood processing in those LGA's. Tourism is only a substantial proportion of the combined value of output in the coastal LGAs, particularly Mornington, Bass Coast and East Gippsland. Agricultural output is more evenly dispersed across the LGA's (Figure 7).

Figure 7: Economic impact of forest, agricultural and tourism industries in Gippsland LGAs



5.4 SOCIO-ECONOMIC IMPACT OF FORESTRY & AGRICULTURE

5.4.1 Socio-economic impact of forestry and agriculture in Victoria

Victorian softwood plantations generate about five times as much employment per hectare and about seven times as much net value of output as farming at a state-wide level. This comparison of socio-economic impacts on a per hectare basis is highly relevant given that land is a finite and scarce resource and in many instances plantations and agriculture are competing for land.

The harvestable proportion of Victorian native forests generate almost as many jobs as, agriculture and more economic output than agriculture on a per hectare basis (The native forest impacts ignore those benefits attributable to other uses of these multiple use forests). Plantation softwood generates about five times as many jobs and seven times as much net value of output (**Table 8**).

Table 8: Direct impact of landuse on employment and value of output in Victoria

Region & wood source	Victorian forestry	Victorian Agriculture
a) Direct employment (No/1000ha)		
Native HW	9.6	
Plantation SW	51.3	10.4
Total	16.6	
b) Net value of output (\$/ha)		
Native HW	1 429	
Plantation SW	7 804	1 140
Total	2 587	

FOOTNOTE

A. For Metro employment and output are expressed over harvestable area for the state

Source: Cameron et al 2004, Wareing et al 2002, Addicott 2003, Drohan pers comm, Freeman 2003 & DSE/DPI webpages.

Conversion of relatively small proportions of Victorian farmland to plantations is likely to result in a significant boost in employment and economic development of regional Victoria. However, Victorian land use regulations impede the conversion of farmland to plantations and poorly designed native vegetation guidelines effectively prevent the conversion of marginal farmland to plantations (Cameron et al 2004b).

Victoria's hardwood plantations are mostly unmerchantable (because of their young age) but when mature can be expected to generate per hectare employment and economic output like pine plantations if similar proportions of logs are processed domestically.

5.4.2 Socio-economic impact of forestry and agriculture in Gippsland

Victorian agricultural land contains some areas considered too marginal for plantations and also areas of intensive agricultural land never likely to be financially justifiable for plantation development. Despite these offsetting aspects, the state-wide comparison (Table 8), may be considered less relevant than a comparison within a region. A comparison of the impact of softwood plantations with agriculture in Gippsland is considered particularly relevant and perhaps almost weighted against plantations in that:

- Grazing and plantation land use are interchangeable based on biological suitability (rainfall, soils etc).
- Virtually all of the farmland is suitable for softwood plantations but generally it is only the more marginal grazing land that is converted to softwood plantations.
- The entire region receives reasonable rainfall and virtually all the grazing lands have pastures that support reasonable stocking levels (the region does not contain range lands with very low rainfall, unimproved pasture and low stocking intensities).
- The region includes areas of intensive agriculture including dairying, fruit, vegetables and flower production that generate high employment and output per hectare.

In Gippsland, softwood plantations generate almost three times as much direct employment and gross value of output than agriculture (Table 9). On average, conversion

of farmland to softwood plantations has the potential to generate additional direct employment of 12.4 jobs per 1 000 ha and gross value of output of \$4 464 per ha. The average incremental socio-economic impact of conversion of farmland to plantations may be greater, given that plantation developers generally focus on the lower priced marginal grazing land and some grazing normally takes place in established plantations.

Table 9: Annual direct impact of landuse on employment and value of output in Gippsland

Sector	Area (000 ha)	Direct Employment (No)	Gross value of output (\$M)	Direct Employment (No/1000ha)	Gross value of output (\$/ha)
Agriculture	1 219	8 718	3 180	7.2	2 609
Total forestry	534	3 124	1 207	5.8	2 259
Softwood plantation	61	1 199	444	19.6	7 255

FOOTNOTE

A. Gross value of output for Gippsland agriculture is farmgate value \$1.76B + Ag processing \$1.42B (both 21% of state)

B. Direct employment in Agriculture is from the 2001 census excluding forestry, fishing & hunting

Source: Derived from Cameron et al 2004a and Cameron et al 2004b

6 SOCIAL DIMENSIONS OF THE FOREST INDUSTRY

6.1 DIVERSE STACKHOLDER INVOLVEMENT

While the majority of wood production in Victoria is under concentrated management delivering economies of scale, the returns effectively benefit millions of "individual owners" or stakeholders. Wood production from Victorian native forests is predominantly managed by VicForest on behalf of the general public of Victoria and is complimented by small log volumes from hundreds of owners of private native forest.

Hancock Victorian Plantations manage about one third of Victorian plantations on behalf of thousands of members of several superannuation funds in Australia and USA. Most of Victoria's other plantations are managed by companies on behalf of thousands of individual investors under Managed Investment Schemes. Victorian plantation supply is topped up by logs drawn from hundreds of farm forestry woodlots where wood production has been integrated with farming. Farmers have been able to diversify their income through planting trees on their farms or undertaking silvicultural contracting for other plantation owners.

The Australian owned company Paperlinx accounts for most of the pulp and paper production with profits flowing to millions via 'mum and dad' investors and superannuation funds on the Paperlinx register.

Softwood sawmilling in Victoria is undertaken by private and public companies. Much of the hardwood sawmilling and timber treatment is carried out by family companies. Many of these family companies have operated for several generations and have maintained strong affinities with their local communities.

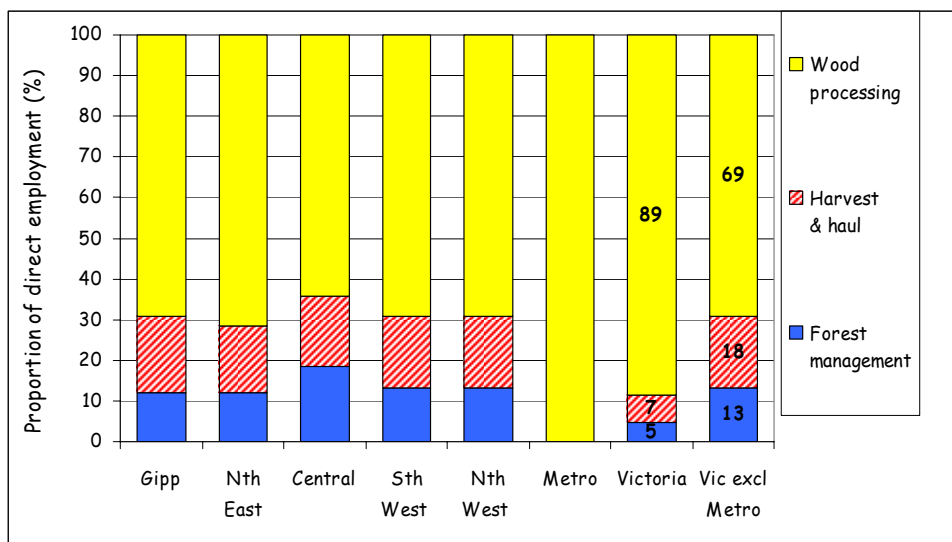
Forest harvest and haul has traditionally been undertaken by 'local' and family-owned small to medium sized enterprises. Increased outsourcing of forest establishment, maintenance and roading are providing growth opportunities for 'local' contractors and valuable off-farm income for farmers.

Victorian forest and forest products companies have a long track record of providing considerable cash and in-kind support to the local communities where they operate. They have actively provided sponsorship of community service, cultural and sporting organizations. Some of the larger forest and processing companies have voluntarily contributed to the construction and maintenance of local roads with one large integrated company providing over \$1 million dollars over ten years. A forest company provided over \$100 000 for the establishment of a local conservation park.

6.2 FOREST INDUSTRY EMPLOYMENT BY SECTOR

Victorian forest management, harvest and haul generate moderate levels of employment for local communities and underpin many other jobs processing wood into paper, sawntimber, wood panels and other manufacture wood products. Wood processing accounts 89% of forest industry jobs in Victoria and 69% of forest industry jobs in regional Victoria excluding the Melbourne metropolitan area (Figure 8). Most of the initial processing is undertaken in rural Victoria close to the forests, while a considerable amount of further processing is undertaken in metropolitan Melbourne close to markets for end-use products.

Figure 8: Forest industry employment by sector



6.3 CHARACTERISTICS OF FOREST INDUSTRY EMPLOYEES

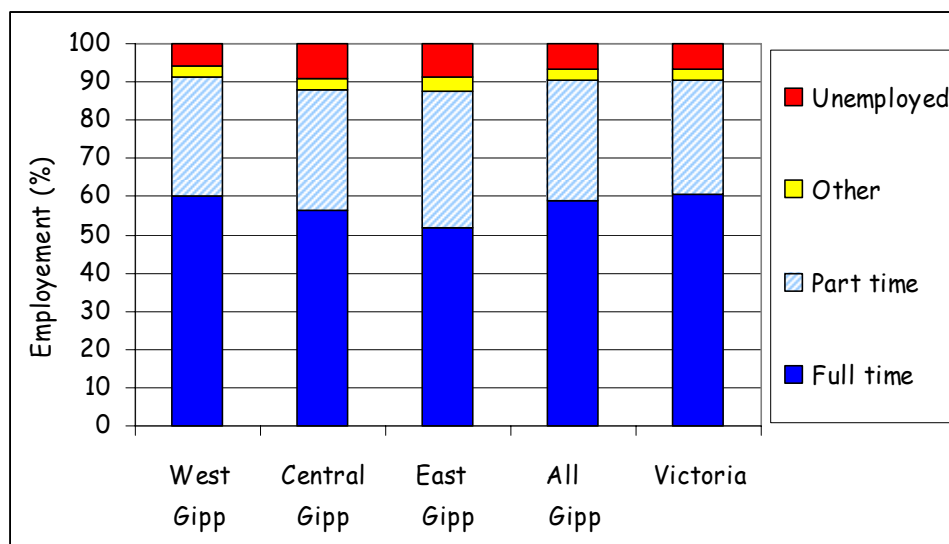
Secure access to native forests and further plantation development can arrest rural decline. Victoria’s forests and plantations support the development of considerable downstream processing and underpin secure, stable and sustainable employment in regional communities. A social assessment in North East Victoria (VicRFASC 1998) found:

- The majority of forest industry workers were employed on a full time basis (88%).
- The majority had high school education or TAFE/trade certificates.
- The average age of workers was 40 years. The median age of farmers increased from 47 in 1986 to 51 in 2001 (FWPRDC & BRS 2005a).
- The employees were employed long term in the industry with average employment in the industry being 13.2 years including an average 10.6 years with their current employer.
- Many employees (45.9%) had not worked in any other industry.
- The employees demonstrated a strong community attachment, residing in their communities for an average of 17 years.
- Most owned or were buying their own homes with 41% owning their homes outright, 29% paying mortgages and 29% renting accommodation.

6.4 RURAL EMPLOYMENT

Rural Victoria has experienced levels of unemployment above the state average. For example in 2001 when state-wide unemployment was 6.8%, unemployment in Gippsland was 6.6%, however, in East Gippsland unemployment was 8.8% and in Central Gippsland unemployment was 9.0%. East Gippsland has a high proportion of part-time employment consistent with seasonal work demands in agriculture, tourism and forestry (Figure 9).

Figure 9: Employment in Gippsland compared to the Victorian average



The capital intensive wood processing mills tend to work year round (some 365 days and 24 hour operation), providing greater full time employment opportunities in harvest, haul and mill operation. Planting in winter can help provide seasonal employment offsetting winter restrictions on harvesting in native forests.

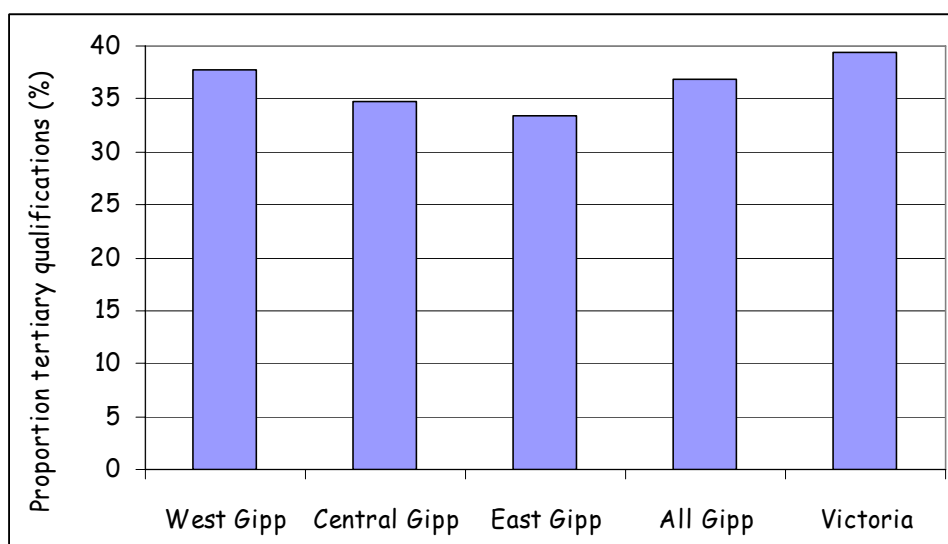
The provision of stable employment by the forest industry has been particularly important in mid-sized regional towns such as Alexandra, Benalla, Corryong, Myrtleford, Wangaratta, Sale, Rosedale, Yarram, Heyfield, Bairnsdale, Orbost, Colac Heywood and Portland; and in provincial cities such as Geelong, Ballarat, and Traralgon.

6.5 CREATING OPPORTUNITIES FOR LOW QUALIFIED

The labour force of regional/rural Victoria has relatively lower levels of skills (as measured by qualification) than averages across the State. This is due to a number of factors including fewer educational opportunities, the gravitation of more highly educated people to Melbourne and the concentration of service industries with high proportions of highly qualified people in Melbourne.

Rural and regional Victoria has lower levels of people in the labour force with a tertiary qualification. For example in East Gippsland only 33.4% of the labour force held some form of tertiary qualification compared to an average of 39.4% for all of Victoria (Figure 10).

Figure 10: Tertiary qualified labour force compared to the Victorian average

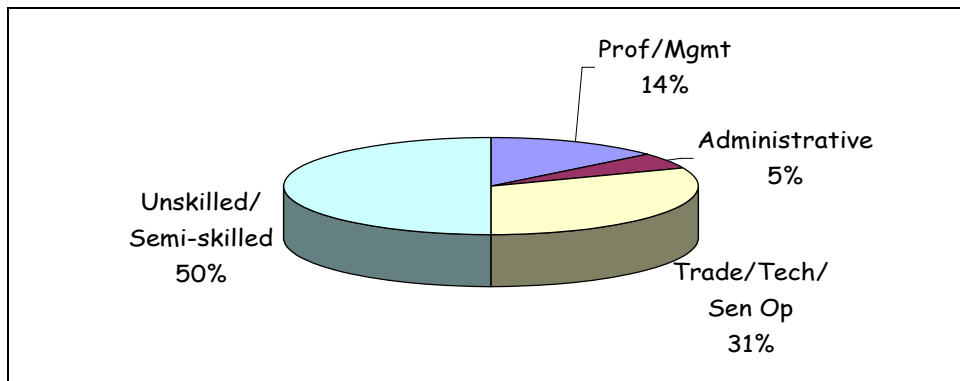


The forest industry creates jobs in regional communities for those less qualified and provides considerable training opportunities. The industry has a good track record on skill formation and set up FAFPESC, a national training body for the forest and forest products industry. FAFPESC implements comprehensive training programs that meet essential skills development components of quality systems. Training is flexible to meet specific workplace needs and is provided on or off the job and can lead to qualifications.

6.6 FOREST INDUSTRY EMPLOYMENT BY OCCUPATION

The forest industry is an important source of scarce employment opportunities for skilled people in the bush. The forest industry also provides opportunities for those with lower skill levels. In Gippsland (Cameron et al 2004a), half those employed in the industry are managers, professionals, administrative officers, tradesmen, technical officers or senior operators of sophisticated plant. The other half of all forest industry employees (across all sectors) are unskilled or semi-skilled (**Figure 11**). Most of this group are semi-skilled, mostly as a result of 'on-the-job' training rather than formal qualification. They would be likely to require extensive retraining if jobs were not available in the timber industry.

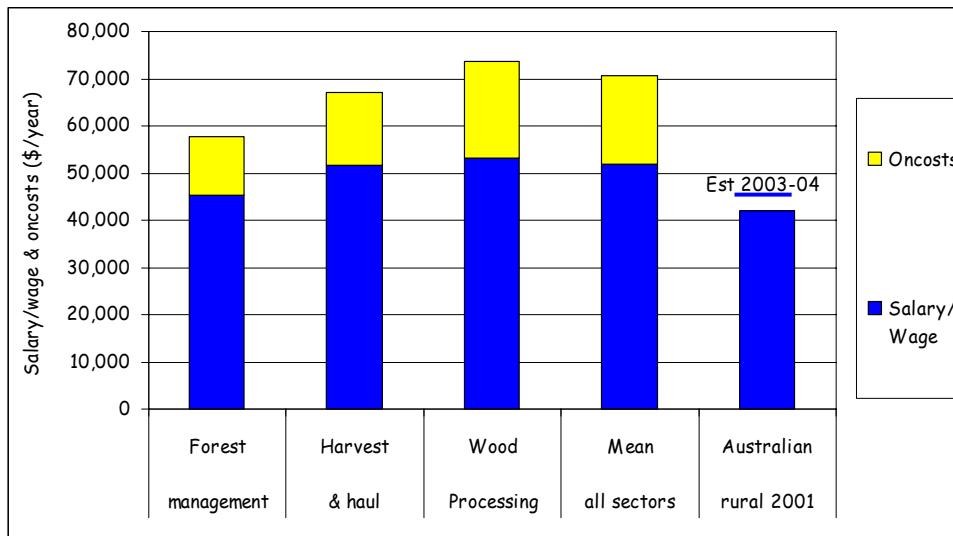
Figure 11: Proportion by occupation in the Gippsland forest industry labour force (%)



6.7 FOREST INDUSTRY INCOMES

The average salary/wage of people working in the forest industry in Gippsland in 2003-04 was almost \$52 000 pa (excluding on-costs such as superannuation). This is 13% higher than the mean for all Australian rural workers (non-capital cities), estimated to be almost \$46,000 pa in 2003-04 (**Figure 12**). Contract work in forest management operations and harvesting can help offset declining farm incomes in rural Australia and allow more families to remain on their farms. Since 1989-90, off-farm income has provided about 65% of household income on Australian broadacre farms (Productivity Commission 2005).

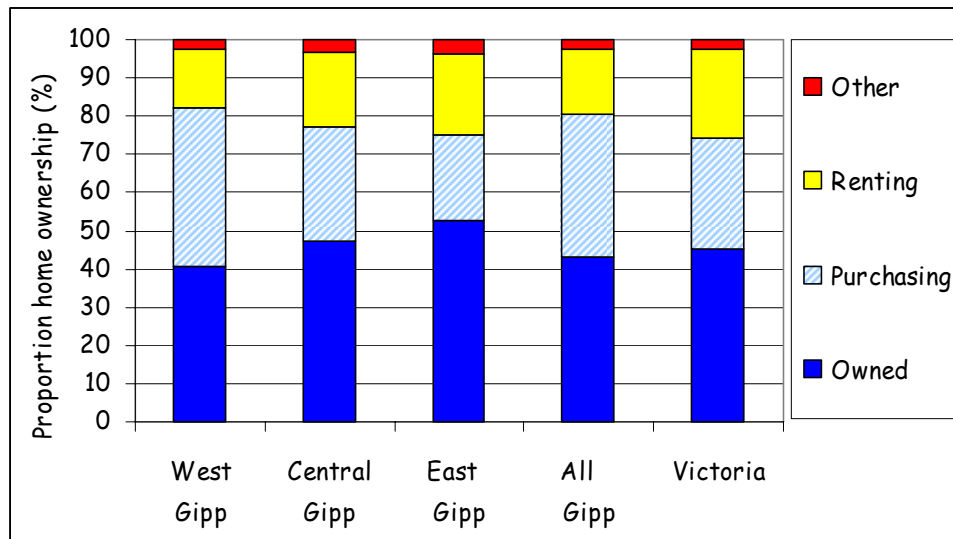
Figure 12: Comparison of income for forest industry and Australian rural employment



6.8 HOME OWNERSHIP

In East Gippsland and Central Gippsland home ownership is 53% and 47% respectively and above the Victorian average of 45%. The relatively high proportion renting and relatively low proportion buying homes in East Gippsland may be due to uncertainty created by forest policy decisions and associated sawmill closures (Figure 13).

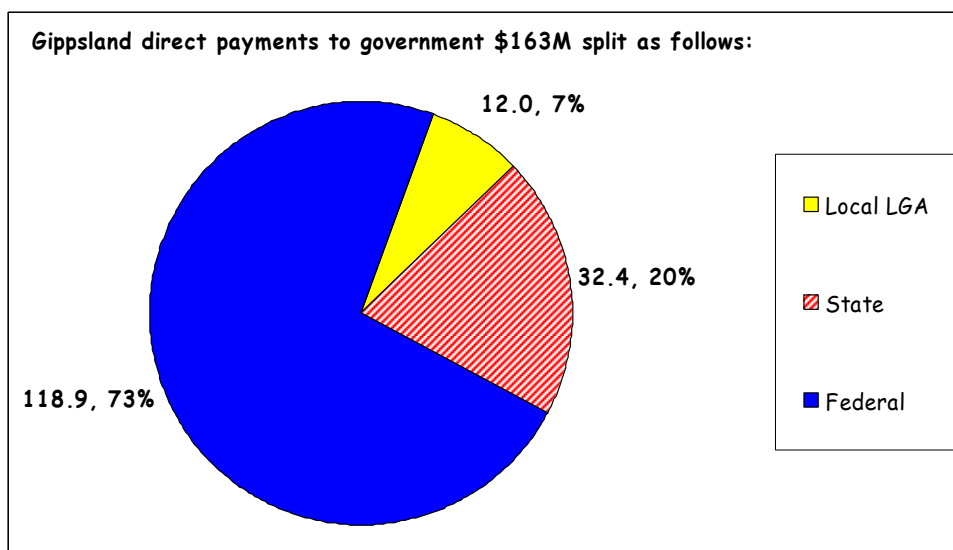
Figure 13: Proportion of home ownership in Gippsland compared to the Victorian average



6.9 FOREST INDUSTRY PAYMENTS TO GOVERNMENT

Payments to government by the forest industry is estimated to be about \$800M pa based on grossing up \$163M paid by the industry in Gippsland (Figure 14) assuming Gippsland represents 20% of the economic output of the forest industry in Victoria. The payments cover the three tiers of government and include local government rates; land lease payments, payroll tax, licence fees and other state charges; and income tax on wages/salaries, company tax, fuel tax and GST paid to the federal government.

Figure 14: Direct payments to the Government by the Gippsland forest industry



7 TRADITIONAL FARMING AND REGIONAL DECLINE

7.1.1 National decline in the socio-economic impact of farming

The agricultural sector is heavily export dependent, with exports accounting for 88% of gross product compared to only 14% for the forest sector. Agricultural commodities have also experienced decades of declining terms of trade with the index of farmers terms of trade half what it was forty years ago. Farm contribution to Australian merchandise exports is now a third of what it was in 1962-63 while forests contribution over the same periods has tripled. Farm contribution to Australian employment is also about a third of what it was forty years ago (ABARE 2003a).

The compression of farmer's terms of trade has resulted in farms getting bigger as farmers strive to increase productivity. The number of Victorians supported by one farm has grown from 20 in 1920 to 175 today. The decline in the number of farms (Nationally down 1.5% pa over recent decades) has led to an inevitable decline in population of small to medium sized country towns and growth of a limited number of regional centres. As

young adults leave seeking education, work and cultural experience the small towns with diminishing opportunities develop a large proportion of aged residents (Barr 2005).

The decline in local small towns has diminished their ability to meet the social needs of rural communities. Servicing such small towns has become difficult and many private and public service agencies have consolidated their services in major provincial towns (Barr 2005).

7.1.2 The Gippsland Experience

Gippsland's forest products industry grew on the back of abundant supply of commercial native forest including the prized ash species. The Maryvale pulpmill was built to use the logging residues from sawlog harvesting until the forests were burnt by the devastating bushfires of 1939. Pine and eucalypt plantations were developed to provide an alternate and more secure supply.

The development of pine and eucalypt plantations augmented supply from the regrowth forests (originating from the 1939 fires) and provided a platform for exceptional growth of a well integrated forest products sector, which contributes significantly to state and regional development and socio-economic development of Gippsland. This plantation program provided an opportunity to convert uneconomic and degraded farmland to commercial plantations delivering substantial socio-economic and environmental benefits.

A new future for the heartbreak hills

The "Heartbreak Hills" or the eastern Strzelecki Ranges in Gippsland were originally cleared and converted to farmland. The Bluegum ridges of the western Strzelecki's were followed by the more forbidding terrain and dense Ash forests of the eastern Strzelecki's which took two generations of self-denial to "break in" with axe, saw, shovel and fire. The early settler's battled mud, noxious weeds, rabbits and wildfire in 1898 and 1944. The eastern Strzelecki's was uneconomic to farm because of steep slopes, noxious weeds and rabbit infestation. As the land was too steep to work with tractor, farmers started to abandon their farms around the time of the First World War leaving an area with significant land degradation (Forest Commission Victoria undated).

Plantation development commenced by the government Forests Commission in the 1940s and by APM Forests Pty Ltd in 1960. The degraded stark bare hills of ring-barked dead trees were replaced with forest. The program provided employment for prisoners from nearby prisons at Morwell River and Won Wron. Australia's first eucalypt tree breeding program was launched by APM Forests in cooperation with the Australian Forest Research Institute to support the planting (Forest Commission Victoria undated).

The plantations delivered a new future for "The Heartbreak Hills" where farmers had battled for about a hundred years to eke out a very meagre existence on land that proved to be unsuitable for farming but suitable for plantations (Forest Commission Victoria undated).

The resultant plantations delivered a vital supply that underpinned the development of the pulp and paper and sawmilling industries in the region. The resource is one of the first in Australia to produce substantial commercial quantities of plantation-grown eucalypt

sawlogs. The plantations also delivered better catchment protection and helped conserve some of the original biodiversity of the region.

Development of a substantial integrated industry

Australia's largest pulp and paper mill at Maryvale has \$1.5 billion to \$2 billion invested (at replacement cost) in three pulp mills, a waste paper plant and five paper machines. The mill converts ca 1.5mill m3 pa into ca 600,000tpa of paper, helping to offset Australia's substantial trade deficit in forest products dominated by paper. Direct employment at the mill is almost 1 000 people.

Plans have recently been announced for an additional investment of \$0.6 billion in Gippsland on expanded production of bleached pulp, additional plantation development and a waste water recycling facility.

The region has several softwood sawmills to process a wide range of sawlog types into structural sawntimber, landscape timbers and packaging grades of sawntimber for the national market. Two of Australia's largest hardwood sawmills at Heyfield and Morwell complemented by about twenty smaller mills process primarily high grade sawlogs from native forest into value added appearance and structural sawntimber. One of these mills now saws significant commercial quantities of plantation-grown eucalypt sawlogs.

One of the strengths of the region is that most of the log production is processed domestically within the region. A large proportion of the value of production is spent within the region on salaries, wages, and payments for goods and services (Cameron et al 2004a). Those logs exported unprocessed are usually lower grade logs unsuitable for domestic processing into value-added products or are temporarily surplus to requirements such as pre-expansion.

Another strength of the region is the considerable interdependency of local processing with the pulpmill providing a profitable local market for sawmill residues while sawmills and pallet manufacturers in the region produce pallets for shipment of paper from the region.

This strong forest products industry is currently repositioning following the native forest resource reductions announced under OFOF in February 2002 (DNRE 2002). To minimise the long term socio-economic impact greater reliance will need to be placed on plantation development in the region.

7.1.3 THE GREEN TRIANGLE EXPERIENCE

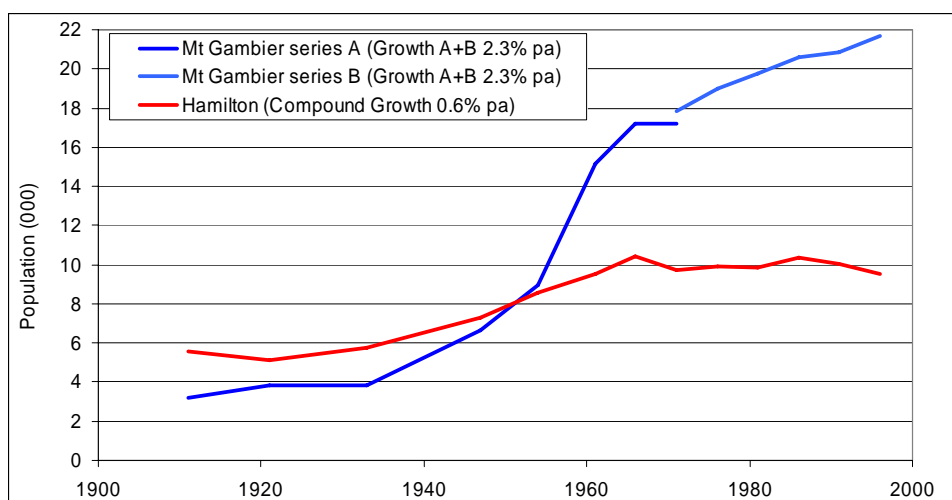
Unlike Gippsland, the Green Triangle of South East South Australia and South West Victoria, was not blessed with abundant commercial native forests and so pioneered the establishment of commercial softwood plantations in Australia over 100 years ago. As the plantations matured a range of processing mills developed including several sawmills and a pulpmill.

The plantation and associated processing sector is now by far the largest single contributor to the regional economy. The sector's 224,000ha of plantations occupies ca 4.1% of the land area but generates 29% of the regions gross product and 25% of its employment. The value of production from the plantation and wood products processing sector was almost \$1 billion and is probably significantly higher now (Stanton 2001).

The comparative population growth of Mt Gambier (traditional hub of the Green Triangle forest industry) and Hamilton (traditional hub of farming) provides an indication of the potential impact of the forest and forest products industry on regional communities. Both towns have similar climate, agricultural industries and distance from major cities.

Population of both centres remained steady until the late 1930s then population growth at Mt Gambier accelerated as three sawmills and one pulpmill commenced during 1931 to 1941 to process the maturing pine plantations developed earlier in the Mt Gambier region (GTRPC 2001). Over 85 years since 1911 population growth of Mt Gambier has been four times as fast as Hamilton. Growth was 2.3% pa in Mt Gambier and only 0.6% pa in Hamilton which remained heavily dependent on the traditional agricultural industries. Growth of Mt Gambier was 2.8% over the 63 years following commencement of processing (Figure 15).

Figure 15: Comparative population growth of Mt Gambier and Hamilton



8 ENVIRONMENTAL IMPACT OF FOREST INDUSTRY

Production chains involve impacts that are taken into account by the economy in pricing and external impacts (externalities) that may be adverse and not costed or fully taken into account in price such that the burden of such unfavourable externalities is not born equitably. Some externalities may seriously threaten long term global ecological sustainability and all externalities are likely to have an impact on equity between social groups and across generations.

Some externalities of forestry are favourable but are not priced. Forestry is also seen as a solution to un-costed adverse externalities created by agricultural landuse. Conventional socio-economic analysis may seriously understate the true economic impact. Consideration of socio-economic impacts should therefore also consider the environmental and ecological impacts. The environmental impacts should be considered holistically on a cradle to grave approach.

8.1 ENVIRONMENTAL IMPACT OF PRODUCTION FORESTS

Multiple use native forests make a valuable contribution to regional biodiversity delivering habitat, wildlife corridors and biolinks. Plantations can make a significant contribution to ecological sustainable development:

- Economic benefits include investment, value-adding, import replacement and contribution to infrastructure.
- Social benefits include regional development, regional employment and improved living standards.
- Environmental benefits include rehabilitation of degraded land and streams, salinity abatement, habitat enhancement, biodiversity contributions, carbon sequestration, production of a renewable resource and the delivery of raw materials for the production of environmentally friendly products (FIC 2000).

8.2 PLANTATIONS AND THE ENVIRONMENT

8.2.1 Land care

Plantations can be used to mitigate the damaging effects of storm flow on erosion and stream sedimentation through interception, infiltration and slower overland flow (FIC 2000). Plantations can help abate the damaging effects of dryland salinity and rising water tables caused by excessive clearing for farming.

There is convincing evidence that reforestation of farmland including agro-forests is likely to lead to significant improvements in water quality (Turner et al 2004). Roads and tracks rather than harvesting are the main potential source of stream sedimentation; however, excellent research by the CRC for catchment hydrology has delivered practical and effective solutions (Croke et al 1999). These solutions are currently embodied in roading prescriptions.

Fertiliser, weedicide and pesticide use in plantations pose very low risks of environmental impacts based on a review of their use (Ferguson et al 1996) and are unlikely to be a threat to water quality providing relevant prescriptions are applied (Turner et al 2004).

Soil loss from established forests is low due to infrequent cultivation - commonly 0.02 tonne/ha/yr compared with 0.05-0.37 tonne/ha/yr from pastures and 1.5 to more than 8 tonne/ha/yr for annual crops. The total area affected by cultivation for annual crops in Victoria each year is around 100 times that disturbed by forest establishment (Turner et al 2004). Plantation development can make a valuable contribution to arresting land degradation on farms where significant areas of land have become degraded through erosion and infestation of vermin and noxious weeds.

8.2.2 Contribution to biodiversity and habitat

Virtually all plantation owners manage remnant native vegetation on their estate. Under plantation management, remnant native vegetation is able to avert the degradation that typically occurs under grazing, sustainably regenerate and therefore serve as more effective areas for biodiversity conservation, habitat and wildlife corridors (FIC 2000).

Comment [HC1]: John, It is also worth mentioning FSC requirements to manage and protect remnant vegetation and requirement to manage portion of whole forest estate for conservation objectives (& protected from harvesting).

For example about 8 000ha on the Grand Ridge Plantations (GRP) estate in the Strzelecki Ranges has been identified as worthy of conservation by Biosis Research. The study report found that there was a conservation asset worthy of protection and essentially called for increased public good conservation on essentially private plantation land.

8.2.3 Carbon sequestration by plantations

Australian forests and plantations sequester 23.1Mt CO₂-e (carbon dioxide equivalent) per annum or 5% of our net national emissions and are significant sinks for greenhouse gasses.

Sequestering carbon in commercial plantations will be a key component of Australia's response to its international obligations to combat global warming. Plantations acting as 'sinks' for the storage (or sequestering) of carbon are now recognised as a key in the overall strategy to reduce atmospheric carbon levels from industrial activity. In NSW carbon emitters are required to reduce emissions or contribute to the sequestration of carbon by buying carbon credits on the market.

Trading in carbon credits will enhance the attractiveness of plantations as a profitable investment and increase their contribution to economic output. Carbon sequestered between 2008 and 2012, in new plantations established from 1990 on previously non-forested land, may be traded to credit against emissions under the Kyoto protocol. Pending the finalisation of international agreements and national emission controls, most trading to date has been in options to purchase carbon credits in the future. Forecast prices for the first commitment period of 2008-12 vary from A\$10 to A\$40/t CO₂-e. Recent trades in options to secure sequestered carbon have been from A\$0.08/t CO₂-e. Australia has not ratified Kyoto, and is therefore currently excluded from international Kyoto linked emissions trading.

Juvenile plantations grow vigorously and store carbon rapidly, but as they mature growth rates diminish and capacity to store additional carbon declines, eventually reaching equilibrium at the mature stage where sequestration from growth is offset by losses through respiration. Eventually, as forests begin to senesce, the size of the sink diminishes, as carbon is emitted back into the atmosphere through decomposition of dying trees and litter. Maintaining a cycle of establishment, growth, harvest and then reestablishment maximises the carbon sequestration. Commercially harvested native forests and plantations are managed under such a cycle. Harvesting for forest products such as sawntimber and wood panels used in construction, permits much of the carbon sequestered to be archived or stored in buildings to deliver additional greenhouse benefits.

8.3 ECOLOGICALLY SUSTAINABLE BENEFITS OF WOOD

Wood is a renewable raw material that is recyclable and whose manufacture into timber consumes less energy and contributes less to air emissions than alternative building materials (Table 10).

Table 10: Ecological sustainability of building materials

Material	Renewable	Recyclable	Bio-Degradable	Energy used in Manufacture (kwh/t)	Air Emissions (kg/t)
Sawntimber	Yes	Low (increasing)	Yes	1 600	ca. 0
Concrete	No	No/Low	No	2 100	12
Steel	No	50%	No	7 400	45
Plastic	No	50%	No	28 000	
Aluminium	No	33%	No	27 000 (from scrap) 91 000 (from ore)	

Source: Adapted from Resource Assessment Commission Report

Converting trees into sawntimber is greenhouse friendly. Production of sawntimber use less fossil fuel energy, releases less carbon in manufacture and stores more carbon in use (Table 11). Carbon stored in mild steel could be about 30kg/m³ assuming 0.4% carbon by weight and basic density of mild steel of 7,860kg/m³ but this is still only about one eighth of the carbon stored in sawntimber.

Table 11: Greenhouse characteristics of building materials

Material	Fossil energy in production (MJ/m ³)	Carbon Released (kg/m ³)	Carbon Stored (kg/m ³)
Timber	750	15	250
Concrete	4 800	120	0
Steel	266 000	5 320	0
Aluminium	1100 000	22 000	0

Source: RAC Report & Ferguson et al (1996)

The embodied energy in a house wall constructed of timber frames and timber cladding is about half that of alternatives despite the embodied energy incurred in maintaining the cladding by regular painting (Table 12).

Table 12: Embodied energy in standard house walls

Type of wall construction	Initial embodied energy (MJ)	Maintenance energy over 40yrs (MJ)	Total embodied energy (MJ)
Timber frame & cladding, painted	31 020	24 750	55 770
Timber frame, brick cladding, unpainted	92 565	0	92 565
Double brick, unpainted	141 900	0	141 900
Steel frame, fibro cement clad, painted	75 900	24 750	100 650

Source: Ferguson et al (1996)

9 FACT SHEET

Set out below are a list the key findings as "one liner" bullet points to facilitate communication.

- National plantation area is small at 1.7mill ha & only 0.2% of the area of Australia.
- With 2020 vision will reach 3.3mill ha or 0.4% of Aust & only 0.7% of agricultural area.
- Victorian farming occupies 58% and public native forest reserves 30% of Victoria.
- Private native forest considered unavailable for commercial harvesting is 5% of Victoria.
- Victoria has 7.5mill ha of public land (mostly native forest).
- Currently only 9% of Victoria's public land is available for timber harvesting.
- This will soon reduce to 8% with the closure of the Midlands and the Otways to logging.
- Conservation and environmental initiatives account for 79% of Victorian public landuse.
 - National parks and reserves account for 55%,
 - Special Purpose (SPZ) & Special Management Zones (SMZ) account for 16% and,
 - The Code and environmental management prescriptions account for 8%.
- Unproductive areas account for 11% of public (native forest) land.
- Harvestable public native forest is small, occupying only 3% of the state.
- This will reduce to only 2.7% with phasing out of harvesting in the Midlands and Otways.
- Loss of wood supply under OFOF requires 55 000ha of new plantations.
- This is in addition to the 25 000ha per year called for under the 2020 vision.
- Victorian land for timber production is only 5.2% - small in relation to its economic impact.
 - Harvestable public native is 3% or 2.7% with no harvesting in Midlands & Otways,
 - Harvestable private native forest is 0.6% and,
 - Plantations are 1.6% (softwood 0.9% and hardwood 0.7%) of Victoria.
- Plantations occupy less than 5% of LGAs except Latrobe & Glenelg where they occupy 16%.

- The 383 000ha of plantations are only 2.4% of freehold land in Victoria.
- Victorian softwood (SW) plantations generate five times as much employment per hectare.
- Victorian SW generates about seven times as much net value of output as farming.
- Gipp SW plantations generate three times as much employment & output as agriculture.
- Conversion to plantations generates additional direct employment of 12.4 jobs/ 1 000 ha,
- and gross value of output of \$4 464 per ha.
- Victorian harvestable native forests generate as much employment as agriculture,
- and slightly more economic output than agriculture on a per hectare basis.
- Nationally forests generate eleven times more value adding & direct jobs per hectare,
- and five times more exports per hectare than agriculture on average.
- Victoria's harvestable native forests and plantations produces ca 7 million m³ pa.
- This generates direct employment for 19 500 & net value of production of \$3 034M pa.
- Employment is 39 200 & output \$6 080M pa including indirect effects.
- Public native forests log production accounts for 40% of the socio-economic impact.
- Private SW & HW plantations account for 60% of the socio-economic impact.
- Plantation impact will increase as expanded eucalypt plantations reach harvest age.
- Victorian forests generate 2.9 jobs/m³ and net value of output of \$450/m³ harvested.
- Including indirect effects employment is 5.8 jobs/m³ and value of output \$900/m³.
- Wood processing accounts for most of the forest industry jobs - 69% in regional Victoria.
- Most of the processing jobs are full time and help to alleviate higher rural unemployment.
- The forest industry is an important source of scarce rural jobs for highly skilled people.
- and also provides jobs and training for less qualified rural workers.
- Salary/wage of forest industry workers is 13% higher than Australian rural workers.
- The Victorian forest industry pays governments about \$800M pa in taxes etc.
- Harvestable forests make a significant contribution to ecological sustainable development.
- Economic benefits are investment, value-adding, import replacement & infrastructure.
- Social benefits are regional development, employment & improved living standards.
- Environmental benefits are rehabilitation of degraded land/streams & salinity abatement.
- Private plantations contribute to habitat, biodiversity & carbon sequestration.
- Forests provide renewable resources for production of environmentally friendly products.
- Wood is a renewable raw material that is recyclable.
- Manufacturing wood into timber consumes less energy & contributes less to air emissions.
- Converting trees into sawntimber is greenhouse friendly.
- Private forestry is highly regulated by eight Commonwealth Acts and 29 Victorian Acts.
- Several other Acts have potential to impact on private forestry.

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