

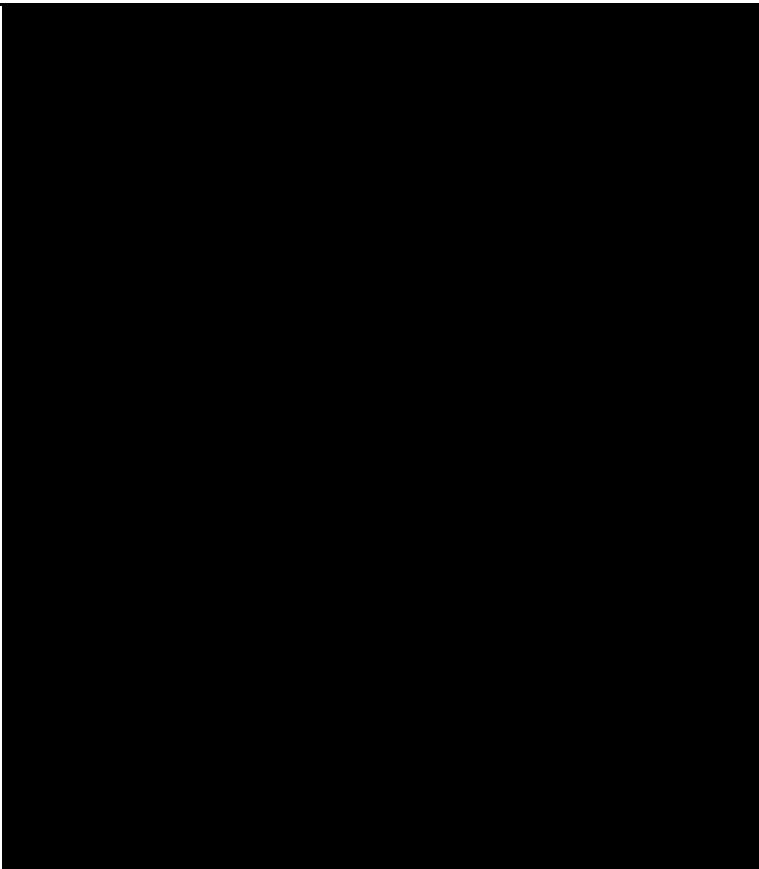


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# Regional Impact Assessment

Lower North East CRA Region  
A project undertaken as part of the NSW Comprehensive Regional  
Assessments  
May 1999

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# **REGIONAL IMPACT ASSESSMENT FOR THE LOWER NORTH EAST CRA REGION**

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**A project undertaken as part of the  
NSW Comprehensive Regional Assessments  
project numbers NL 08/ES & NA39/ES  
May 1999**

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# EXECUTIVE SUMMARY

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This working paper describes a project undertaken as part of the comprehensive regional assessments of forests in New South Wales. The comprehensive regional assessments (CRAs) provide the scientific basis on which the State and Commonwealth Governments will sign regional forest agreements (RFAs) for major forest areas of New South Wales. These agreements will determine the future of these forests, providing a balance between conservation and ecologically sustainable use of forest resources.

## **Project objectives**

This working paper has the objectives of detailing the socio-economic factors relevant to the negotiations on wood supply from State Forests. The aims are to:

- Provide an economic profile of the LNE CRA region and the forestry industry in that region.
- Provide a social profile of the communities that make up the LNE CRA region.
- Estimate the likely impact on the region of changes in the level of wood supplied from State Forests.

## **Methods**

The work entailed the development of a database of key economic variables and the interpretation of those data. A model of the forestry industry was also constructed to indicate how the various activities relate to each other and how changes in the amount of wood available from State Forests impact on other forestry activities.

An input-output model for the LNE CRA region was constructed. This model was used to estimate multipliers and the flow-on effects associated with the direct effects of forestry activities. A base case was constructed around the actual level of activity in 1997-98. A set of alternate economic impact estimates were made for several information points with the wood supply ranging from a level 11 per cent above the base case to 29 per cent below the base case.

The social characteristics of defined communities were examined using information from the 1996 Population Census. The communities where there was a high dependence on forestry activities were examined in terms of indexes reflecting unemployment and household income, education and occupation, family and housing conditions and age dependency.

## **Key results and products**

The LNE CRA region has been a high growth area in terms of population and employment, especially in the areas near to the coast and Sydney. However, unemployment remains high as more people are attracted to the region, and the

number of dependents is well above the average for NSW. Employment in 1996 was of the order of 370,000 and Gross Regional Product was \$21,878m.

The forestry industry appeared to have adjusted rapidly to the reductions in wood supply under the Interim Forestry Agreement that came into effect in July 1996. A combination of further value adding and additional wood supply from private land has offset the reductions in wood available from State Forests. The industry in 1997-98 involved processing 708,000 m<sup>3</sup> of wood while all forestry-based activities contributed, directly and indirectly, \$356m to Gross Regional Product (1.6 per cent of the economy) and almost 7,200 jobs (1.9 per cent of total employment). About 40 per cent of this contribution was associated with the growing, harvesting and processing of native hardwood.

The alternative wood supply scenarios were designed to provide an indication of the likely economic effects of changes in wood supply to the stakeholders involved in the CRA process. The alternatives studied involved changes in the wood processed of between a 11 per cent increase and a 29 per cent reduction in wood supply relative to the base case. The impacts of these changes on the regional economy varied between an increase in employment of 264 and a decrease of 767 jobs.

The social profiles identified a number of communities where forestry provided a significant level of employment. However, there was considerable variation among those communities in terms of other social characteristics that were used as indicators of the capacity of that community to adapt to changes in key industries and their economy.

Most forestry employment was found in the LGAs near the coast especially Bellingen, Hastings, Greater Taree, Nambucca, Kempsey and Great Lakes. The particular communities that appear to be most at risk are those hinterland centres including, Dorrigo, Bulahdelah, Dungog and Gloucester, where there is a high proportion of employment in the timber industry. Other centres on the coast are vulnerable by way of the high absolute numbers employed in the timber industry. That includes Taree, The Entrance, Gosford and Port Macquarie. Those results indicate that the local impact of changes in forestry will be variable among the centres in the CRA region.



# 1. INTRODUCTION

## 1.1. THE STUDY

The Lower North East (LNE) region is located on the NSW North Coast and includes some of the adjacent tablelands areas. The region extends from Dorrigo and Armidale in the north to Gosford in the south. The region takes in parts of the Mid-North Coast, Northern, Hunter and Sydney Statistical Divisions.

The LNE region has been the largest CRA supplier of hardwood timber in NSW and has supported a range of wood processing activities. The purpose of the socio-economic analysis is to document these aspects of the region and to prepare estimates of how changes in forestry policy may impact on the industry, the regional economy and particular localities.

The information and modelling results provided in this report have been derived by an independent Expert Panel for the Social and Economic Assessments, under the guidance of the NSW Coordinator from the Economic and Social Technical Committee. The Expert Panel membership is: Dr David James, Dr Roy Powell and Mr Rob Gillespie.

The analysts developed an Industry Response model and a Regional Economic Input-Output model to estimate the economic impacts of information points and policy options. The Economic and Social Technical Committee as part of the North East assessment process approved the development and application of both of these models. Social assessments have been conducted through a set of community profile analyses linked to the Industry Response and Input-Output models.

The modelled impacts reported by the Expert Panel focus on the direct timber industry impacts of a proposed change in the supply of public hardwood resource. The employment impact analysis excludes State Forests NSW (SFNSW) and private sector hardwood forest jobs and secondary processing (eg wall frames, truss and packing case manufacturing) as it is expected that the level of these activities will remain constant whatever the supply of wood from SFNSW.

## 1.2. THE CONTEXT

The LNE region has been a supplier of hardwood timber since the early days of settlement. In recent times, there has been a considerable adjustment within the forestry industry in the face of changing technology, changing wood products, changing industry organisation and ownership structures and changes in the balance of land use among timber production, conservation and recreational uses.

The need for commercial plantations of both softwood and hardwood to supplement supply from native forests is well established. The development of hardwood plantations in this region is not at a stage where they can be a major alternative supply of wood for the processing industry. The softwood plantations in the Walcha-Nundle area are yet to find commercial uses for the low-grade wood that is available. Some sawlogs are drawn from these plantations. Success in using these plantation supplies would boost the potential for an increase in softwood plantations in that area.

Within the LNE, there is a some use of low-grade wood and residues in processing into hardboard and as export woodchips. However, there is wood available to support further processing and use of the low-grade wood and wood residues.

There are also significant amounts of forest on privately owned lands. The size and nature of that resource is not as well documented as for the State Forest lands. However, recent changes in forest policy have induced more interest in the commercial potential of wood supply from private lands.

The development of Regional Forest Agreements within NSW has involved a number of studies over several years. A first step was taken in the Interim Forest Agreement (IFA) with implementation commencing in July 1996. That involved an integrated set of measures that reduced log supply from public land, increased log prices, gave added security of supply to processors and provided adjustment assistance to affected persons and businesses including support for value adding developments. Those changes have been impacting on the region since that time as the industry adjusts in various ways. This work has been carried out as part of the evaluation and negotiating process that seeks to finalise the regional agreements and set the framework for the industry over the next 20 years.

The work included in the various studies has developed profiles for the totality of the forestry and timber industries in the LNE region. These are presented in the context of the structure and trends in the LNE regional economy. The analysis also included the preparation of social profiles for the communities within the LNE as part of the assessment of the capacity of the various communities to adapt to changes that may result from the regional forest agreements and other trends in the economy.

A major part of the analysis was the preparation of estimates of the economic impacts of proposed changes in forest policy. These analyses included assessing how the various components of the timber industry may respond to changes in the supply of logs, and how that would impact on regional employment taking into account both the direct and indirect effects.

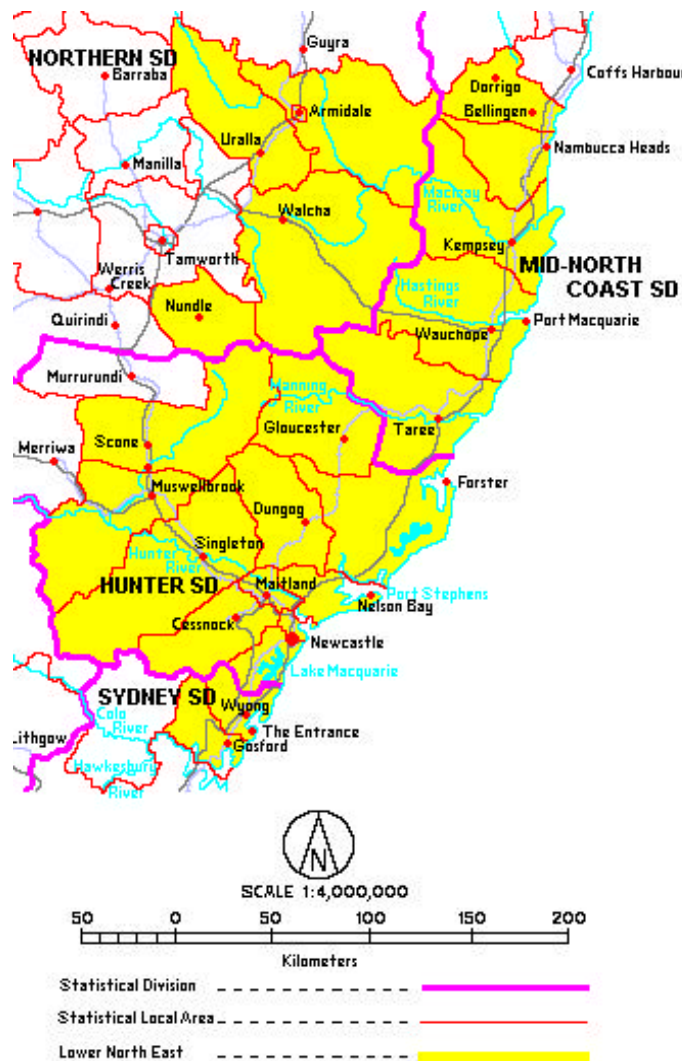
A consolidation of the socio-economic analysis for the LNE region is presented in this report. The following section provides a perspective on the LNE regional economy as a whole including a discussion of the structure of the regional economy and current trends in the development of the region. A social profile of the region is provided in Section 3 based on the analysis of data from the 1996 Population Census and information related to the forestry industry.

There is a discussion of the forestry industry in Section 4. This includes some background on the industry leading up to the 1996 Interim Forestry Agreement and the changes associated with that agreement. A profile of the forestry industry for 1997-98

is developed as a baseline against which further changes in the industry can be assessed. For the negotiations of future forest policy for the region, a number of information points, which referred to varying levels of wood supply, were developed. Each of these was evaluated in terms of the direct effect on the forest industry and the wider effects on the region. These results are reported in Section 5. An overview and summary of the study is presented in the final section.

The LNE region is defined as shown in Figure 1-A. The area includes the Local Government Areas (LGAs) of: Bellingen, Nambucca, Kempsey, Hastings and Greater Taree in the Mid-North Coast SD; Armidale, Dumaresq, Uralla, Walcha and Nundle in the Northern SD; Great Lakes, Port Stephens, Dungog, Gloucester, Scone, Muswellbrook, Singleton, Maitland, Cessnock, Newcastle and Lake Macquarie in the Hunter SD; and Gosford and Wyong in the Sydney SD.

FIGURE 1-A: THE LOWER NORTH EAST REGION



## 2. ECONOMIC PROFILE OF THE LNE CRA REGION

The economy of the LNE region is described in this section. This will provide a context for consideration of the forestry industry including information on the relative importance of the forestry industry to the region. An analysis of trends in the economy provides a perspective on its growth performance and an indication of the capacity of the region to absorb changes in the structure and operation of particular industries without major economic and social disruption.

The analysis in this section is based on an input-output table for the region and shift-share analysis of employment data for the region. The input-output table was compiled using conventional procedures and data as outlined in Attachment 1. The industry/sector classification outlined in Attachment 2 shows the 107-sector system used in compiling the table (it is identical to that used by the ABS in compiling the Australian National input-output table). A 52-sector system is also defined in Attachment 2 and is used in the presentation of a selection of the results in this report. The shift-share analysis has been carried out for 107 sectors with the detailed data shown in Attachment 3.

### **2.1. OVERVIEW OF THE LNE REGION ECONOMY**

The input-output table has been compiled using the most recent available data relating to 1995-96. By 1995-96, the NSW economy was well on the way to recovery from the early 1990s recession. It also relates to employment levels from the 1996 Population Census (held in August 1996) which would include only some of the early effects of the IFA implemented from July 1 1996. Thus, this is a description of the economy as it operated prior to the implementation of the IFA.

The base table is shown in Table 2-A in a highly aggregated form. More detailed sectoral structure charts based on 52 sectors are used to describe the economic structure of the UNE region.

The rows of the input-output table (Table 2-A) indicate how the output of an industry is allocated as sales to other industries, to households, to exports and other final demands (OFD, which includes stock changes, capital expenditure and government expenditure). The corresponding column shows the sources of inputs to produce that output. These include purchases of intermediate inputs from other industries, the use of labour

(household income), the returns to capital or Other Value Added (OVA, which includes gross operating surplus, depreciation and net indirect taxes and subsidies) and goods and services imported from outside the region. The number of people employed in each industry is also indicated in the final row. Forestry is included in the agriculture/forestry/fishing sector while wood processing is part of manufacturing.

**TABLE 2-A: GGREGATED INPUT-OUTPUT TABLE - LNE REGION 1995-96 (\$'000)**

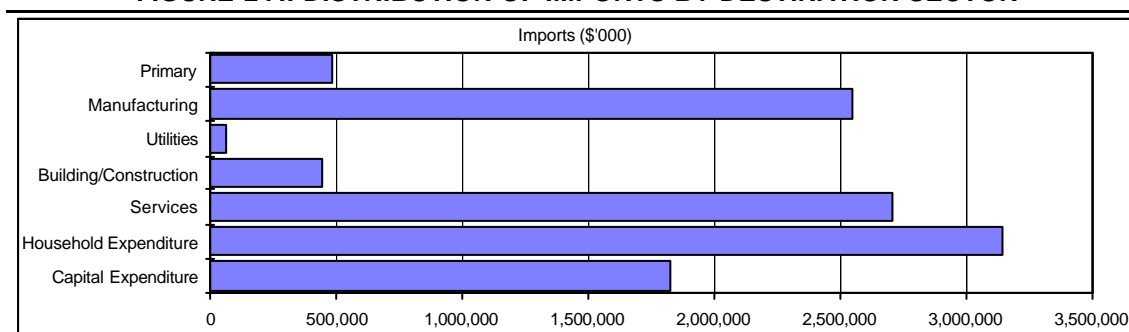
	Ag/Forest/Fish	Mining	Manufacturing	Utilities	Building	Services	TOTAL	H-hold Exp	O.F.D	Exports	Total
Ag/Forest/Fish	23076	1414	360207	22	710	40682	426111	131009	41652	138589	737361
Mining	1571	59770	259934	115207	12732	30992	480207	0	-6174	1957150	2431182
Manufacturing	63548	54258	2775590	44877	379583	1163537	4481393	1739645	533528	4220225	10974791
Utilities	11178	41234	162515	70174	5862	411249	702213	274628	10533	327693	1315067
Building	3928	5392	1829	1056	1210	478353	491767	0	1701888	28	2193683
Services	108433	191878	1275434	72252	316733	4063638	6028369	9827896	4166492	1616157	21638913
<b>TOTAL</b>	<b>211734</b>	<b>353946</b>	<b>4835510</b>	<b>303588</b>	<b>716831</b>	<b>6188451</b>	<b>12610059</b>	<b>11973177</b>	<b>6447918</b>	<b>8259843</b>	<b>39290997</b>
H-hold Income	321401	751287	1477109	227497	904257	7009654	10691205	0	0		10691205
O.V.A.	54045	991253	2114961	723969	131704	5733347	9749279	1163541	273868		11186689
Imports	150181	334696	2547211	60013	440891	2707462	6240454	3144517	1825037		11210007
<b>TOTAL</b>	<b>737361</b>	<b>2431182</b>	<b>10974791</b>	<b>1315067</b>	<b>2193683</b>	<b>21638913</b>	<b>39290997</b>	<b>16281235</b>	<b>8546823</b>	<b>8259843</b>	<b>72378898</b>
Employment	13845	10291	45912	5287	28332	267096	370763				

Gross Regional Product was \$21,878m that included \$10,691m paid to households as wages and salaries (including imputed payments to self-employed and employers).

Employment totalled 370,763 people and the average wage and salary earned was \$28,835 per person. This is lower than for NSW (the average for NSW was \$30,868), but higher than the UNE (\$24,224). This region includes much of the Hunter region and some of the Sydney region where there are a number of industries with high earnings (eg. mining). Within this region there is likely to be considerable variation in the economic strength among the communities as they range from relatively remote rural areas to areas with high levels of industrial activity.

The LNE region imports from overseas and the rest of Australia 1.5 times the level of its exports to overseas and the rest of Australia. It is more diverse in its economic structure than the UNE. Imports into the local region from all sources (overseas, inter-regional and interstate) are shown in aggregate in Figure 2-A and in detail by industry in Figure 2-I. In most regions the largest import items are goods for consumption by local households. This is also the case in the LNE region where 28.1 per cent of total imports to the local region were household consumables, although the relative significance in the LNE is somewhat lower than in the UNE. This is because the manufacturing sector is a significant importer, mostly of raw materials for steel and food processing, representing 22.7 per cent of total imports. The services sectors purchase a significant

**FIGURE 2-A: DISTRIBUTION OF IMPORTS BY DESTINATION SECTOR**





volume of imports, representing 24.2 per cent of the total. Expenditure on capital items represented 16.3 per cent of imports.

The LNE region includes most of the Hunter SD. Thus, it is relatively large as a region and has a high level of activity in mining, especially coal, and associated industries in manufacturing and utilities (mainly electricity generation). Thus, the LNE economy is similar to that of NSW in terms of manufacturing. The LNE earns a smaller share of GRP from services (Figure 2-B and Figure 2-C).

LNE households spend \$16,281m. This is 74 per cent of GRP of \$21,878m and more than the payments to households as wages and salaries. A number of factors contribute to this including a high proportion of non-working dependents (such as retirees), a high level of social welfare recipients, the earnings from investments and a likely significant 'informal' economy. These factors enable regional households to spend much more on consumption expenditure than they earn from wage and salary employment. The level of income transfers from outside the region in terms of social welfare payments, superannuation and investment earnings are lower than for the UNE region although some parts of the region would resemble the situation of the UNE.

The Department of Social Security (DSS) has made estimates for 1996 of some of these variables (Bray and Mudd 1998). LNE residents made income tax payments of \$2,451m and received DSS payments of \$2,065m. Overall, the region is a net loser in terms of the income tax/DSS payments balance. The region has a lower ratio of tax paid to benefits received (1.2) than that for NSW as a whole (1.7).

Within the LNE, there are 10 LGAs which gain more from DSS payments than are paid in tax (Bellingen, Nambucca, Hastings, Kempsey, Greater Taree, Walcha, Nundle, Gloucester, Great Lakes and Wyong). The higher earning regions are those in the Hunter associated with mining and electricity generation, and Newcastle. This is evidence of some considerable differences among parts of the LNE region.

The economic structure of the LNE region can be related to that for NSW through a comparison of Figure 2-B and Figure 2-C. The LNE region has a similar proportion of activity in agriculture, forestry and fishing but the industry is less dependent on exports of those products. Much of the strength of the region is related to the high levels of mining activities and a high level of coal exports. The LNE is also a source of a large proportion of electricity for NSW. Manufacturing and services occupy positions of importance in the LNE similar to those in NSW, although exports of manufactures are of more importance and the level of services and exports of services are of less importance than in NSW.

Key industries in the LNE economy include (refer to Figure 2-D through Figure 2-I):

- Coal mining
- Metal manufacturing
- Retail trade
- Wholesale trade
- Education
- Health

FIGURE 2-B: SUMMARY OF AGGREGATED SECTORS: LNE REGION 1995-96

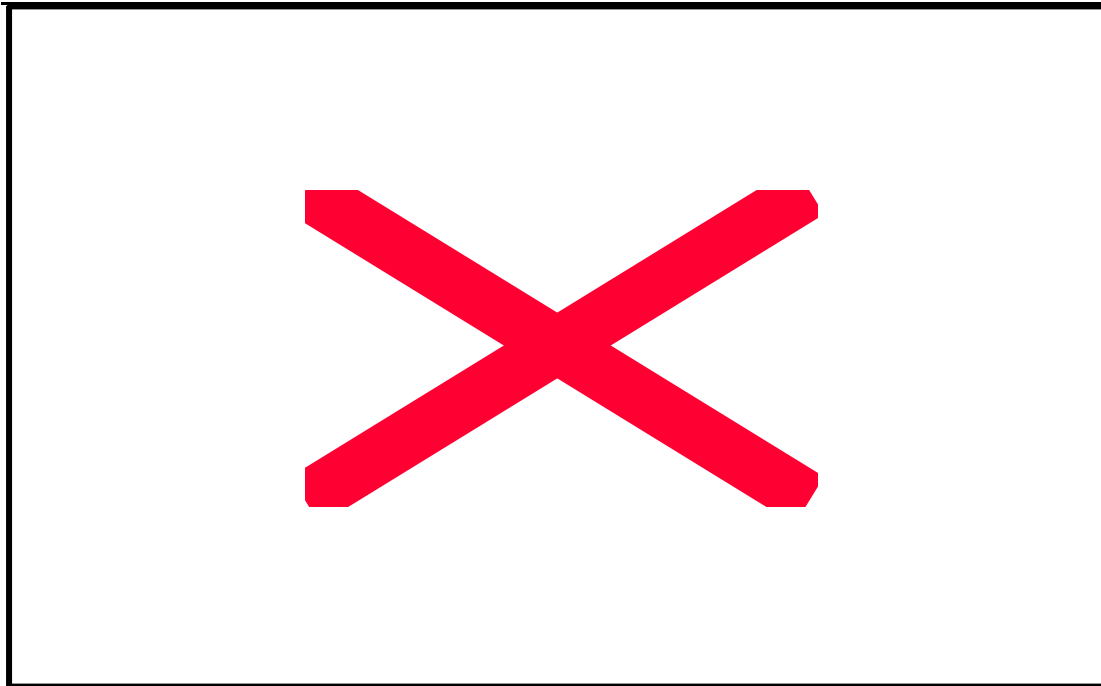
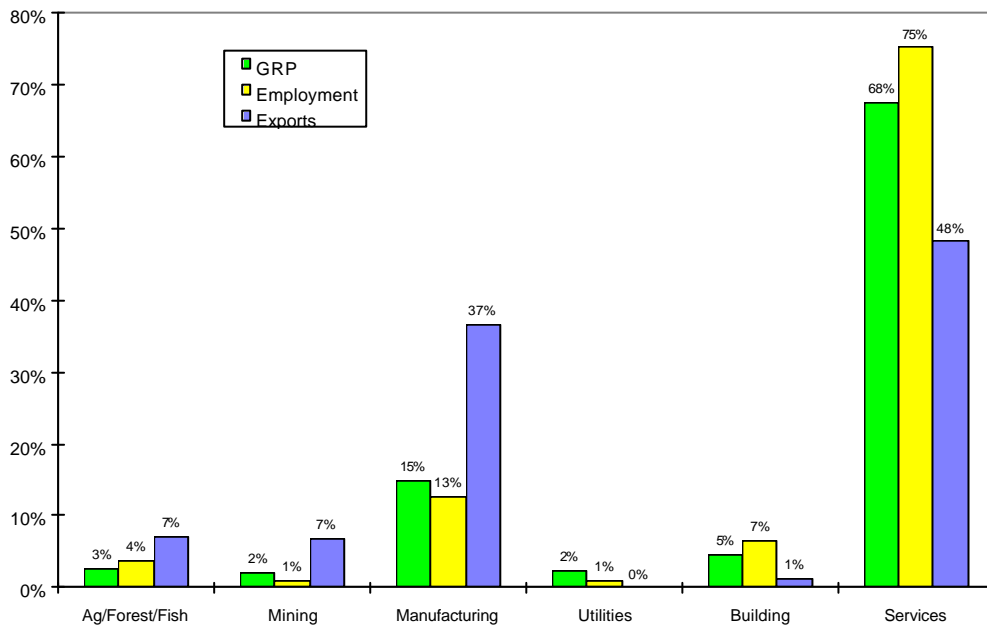


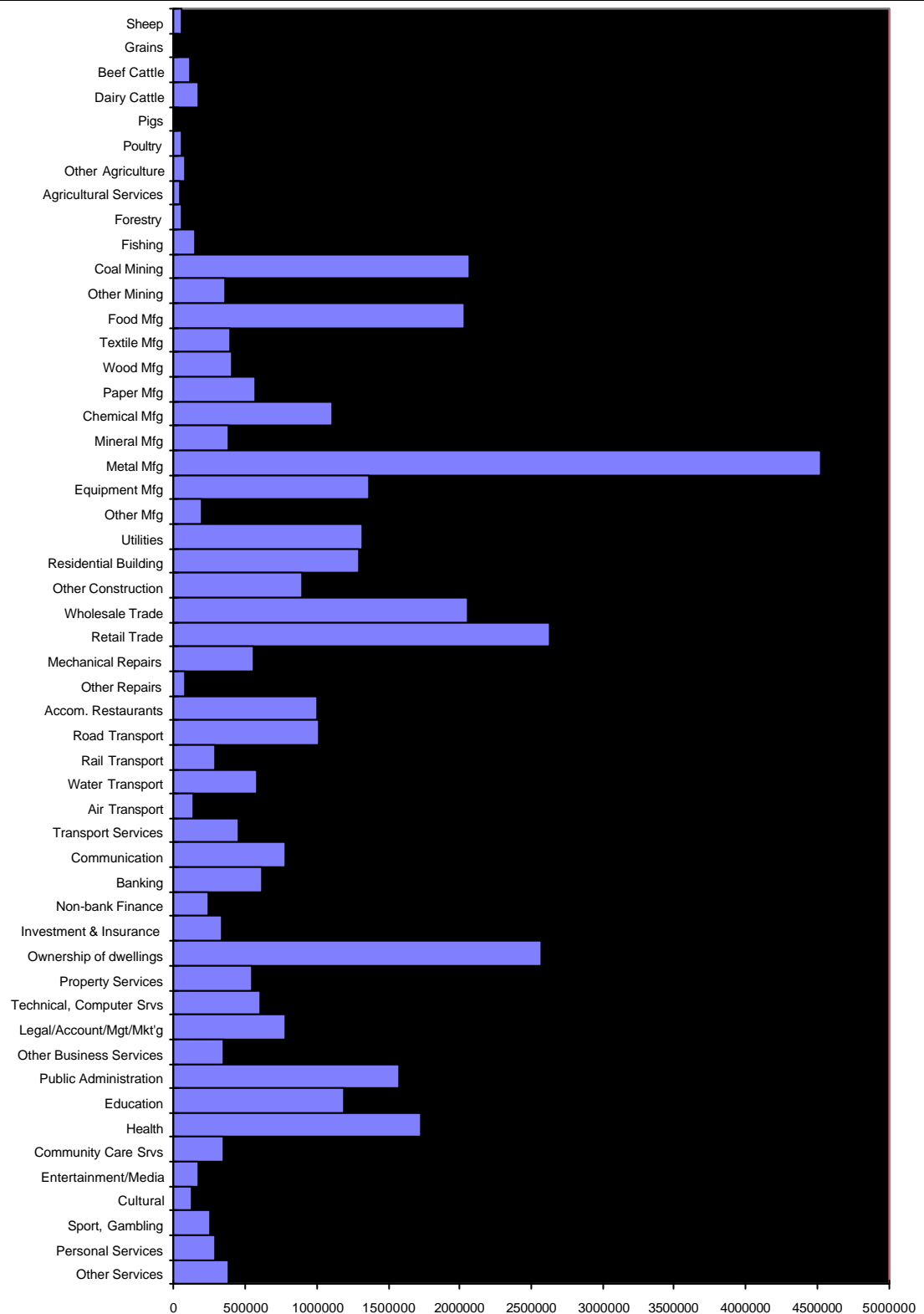
FIGURE 2-C: SUMMARY OF AGGREGATED SECTORS: NSW (1995-96)



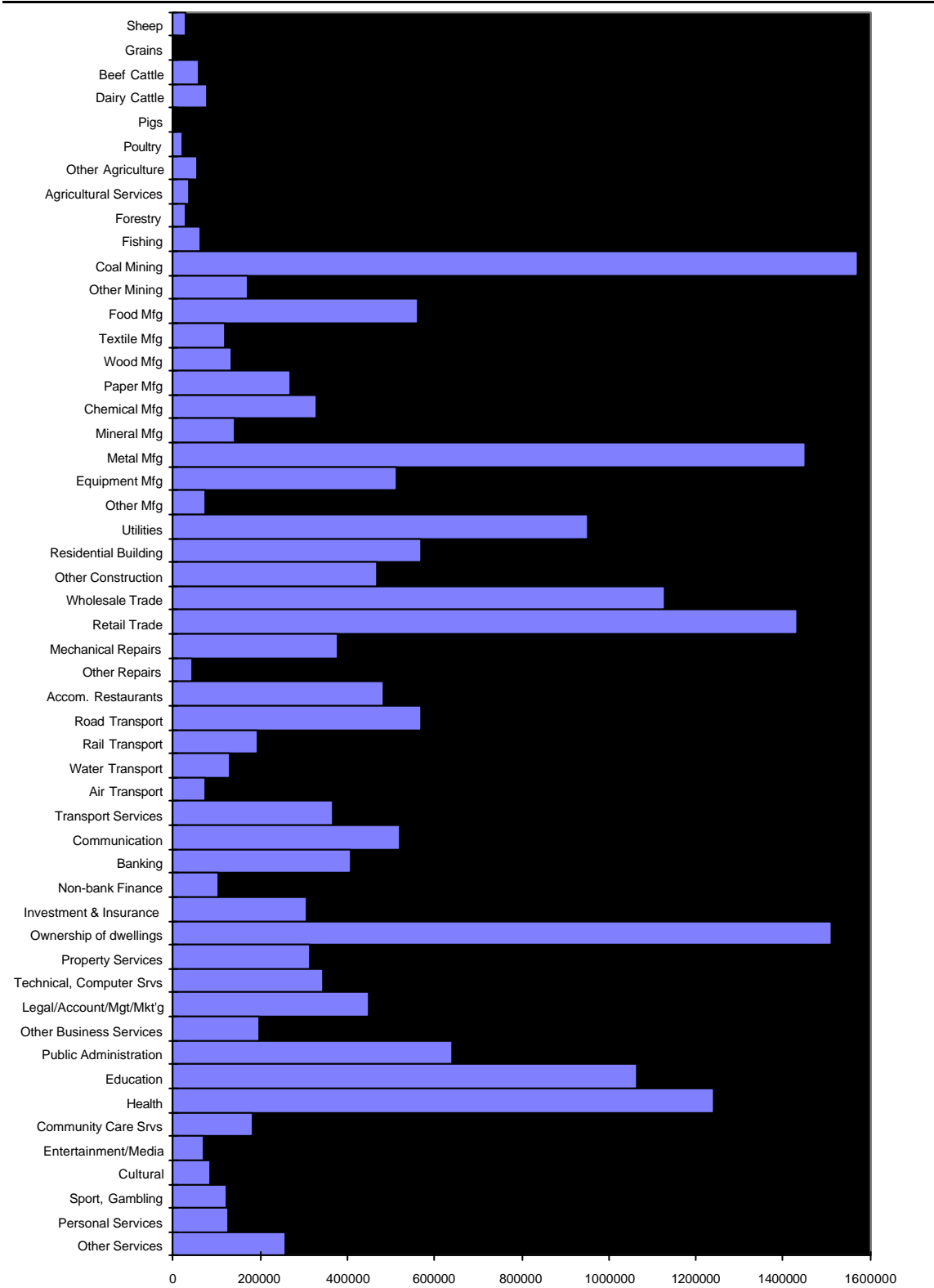
■ Utilities

Within the LNE CRA region, the forest industry and wood processing contribute \$162.49m (0.7 per cent) to the value added of the region and generate 3,762 jobs (1.0 per cent of regional employment). The LNE forestry-based industry is larger than that of the UNE, but because of the larger LNE economy, it represents a smaller share of the economy than it does in the UNE. While these shares may seem to be modest overall, it is significant in particular locations that are focused on forestry and wood processing.

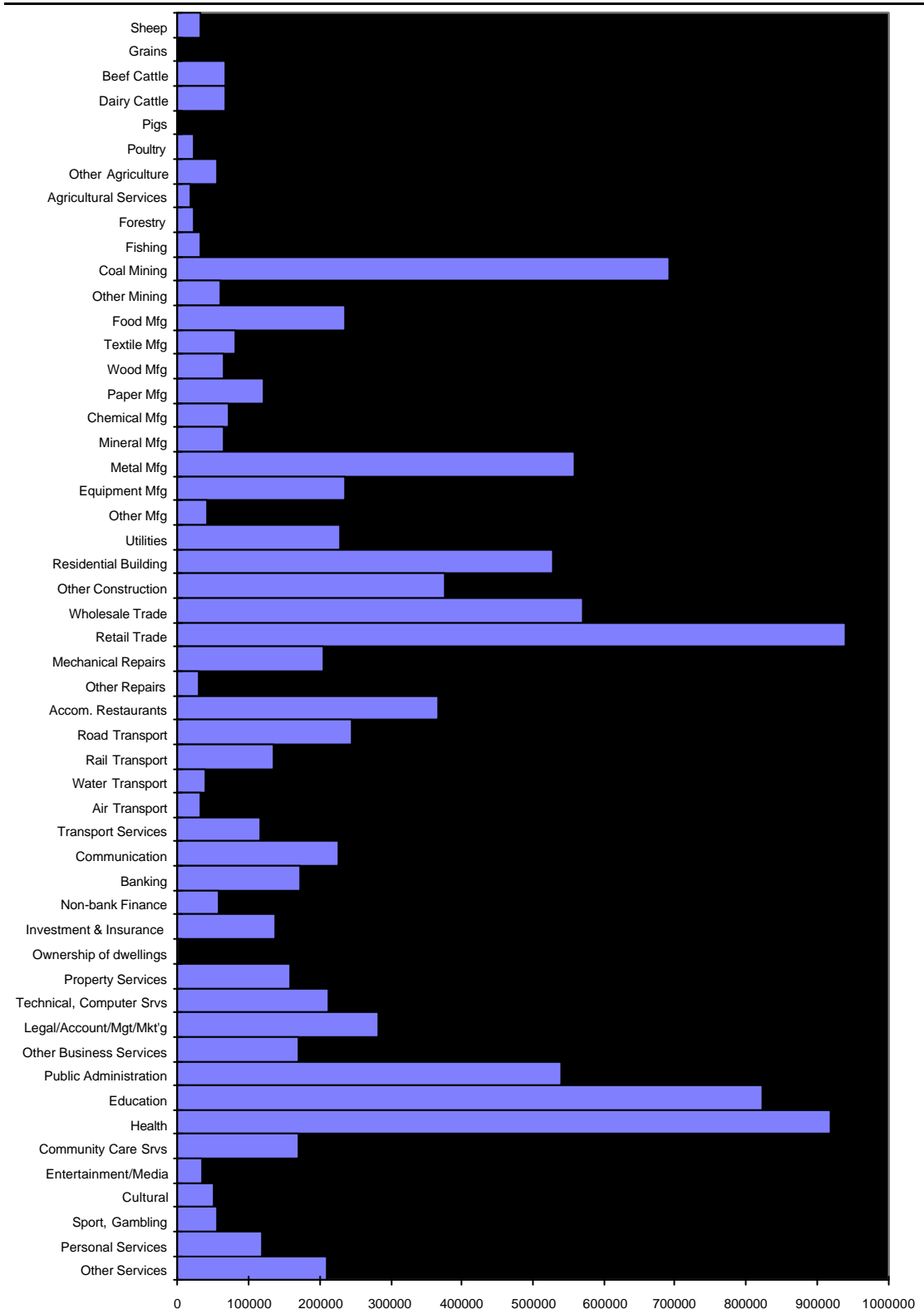
**FIGURE 2-D: SECTORAL DISTRIBUTION: GROSS OUTPUT, LNE REGION 1995-96 (\$'000)**



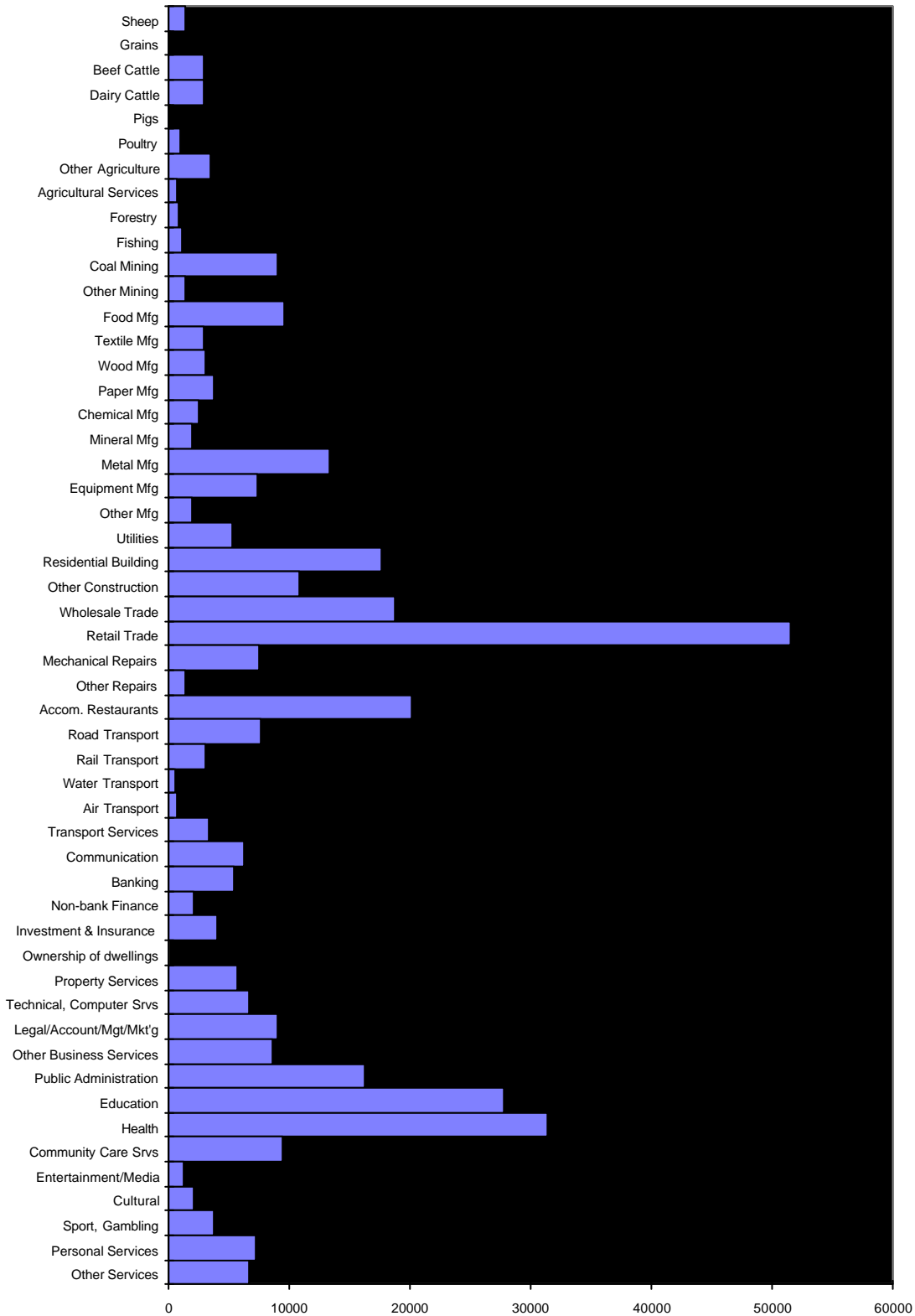
**FIGURE 2-E: SECTORAL DISTRIBUTION: VALUE ADDED (GRP), LNE REGION 1995-96, (\$'000)**



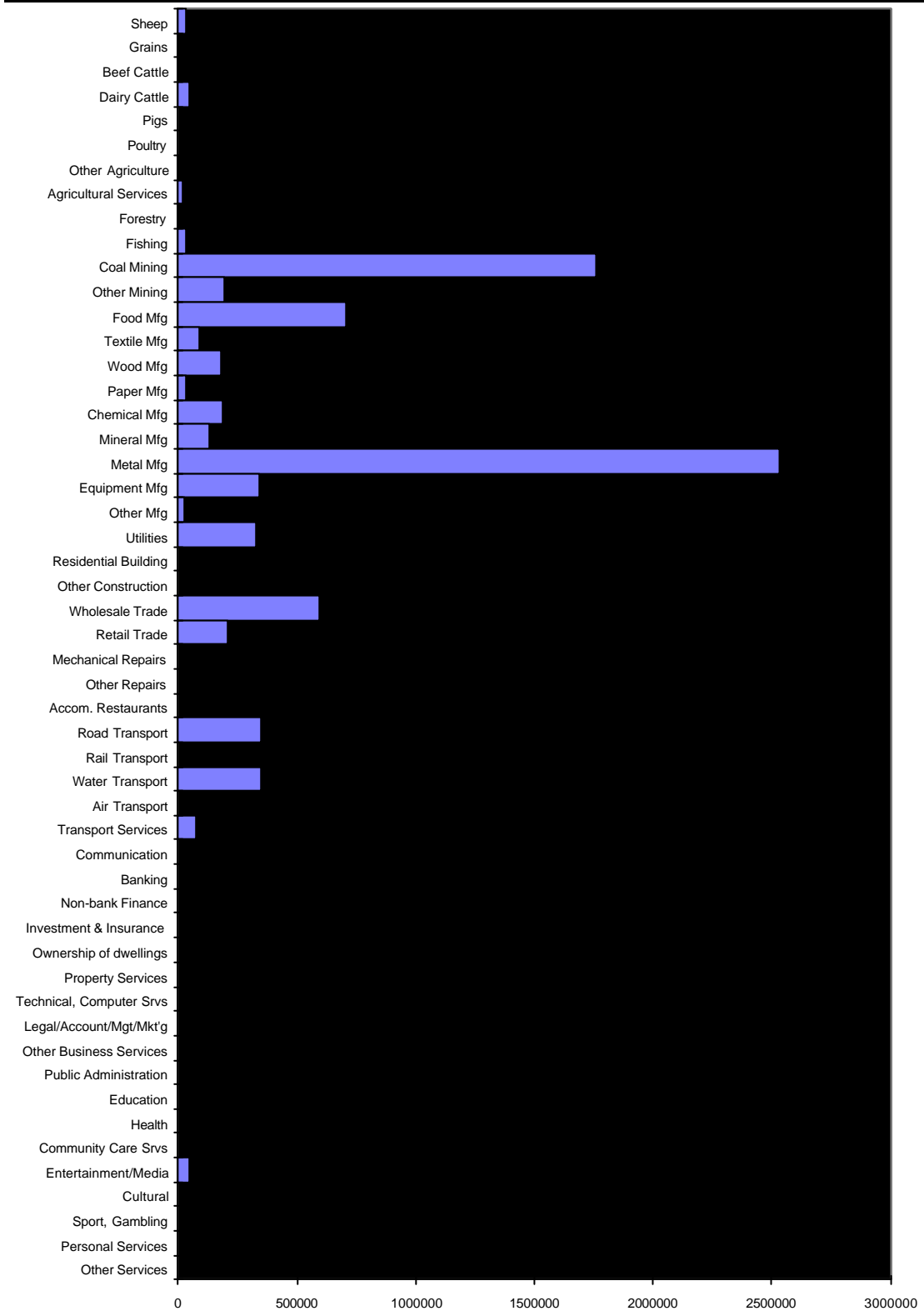
**FIGURE 2-F: SECTORAL DISTRIBUTION: HOUSEHOLD INCOME, LNE REGION 1995-96, (\$'000)**



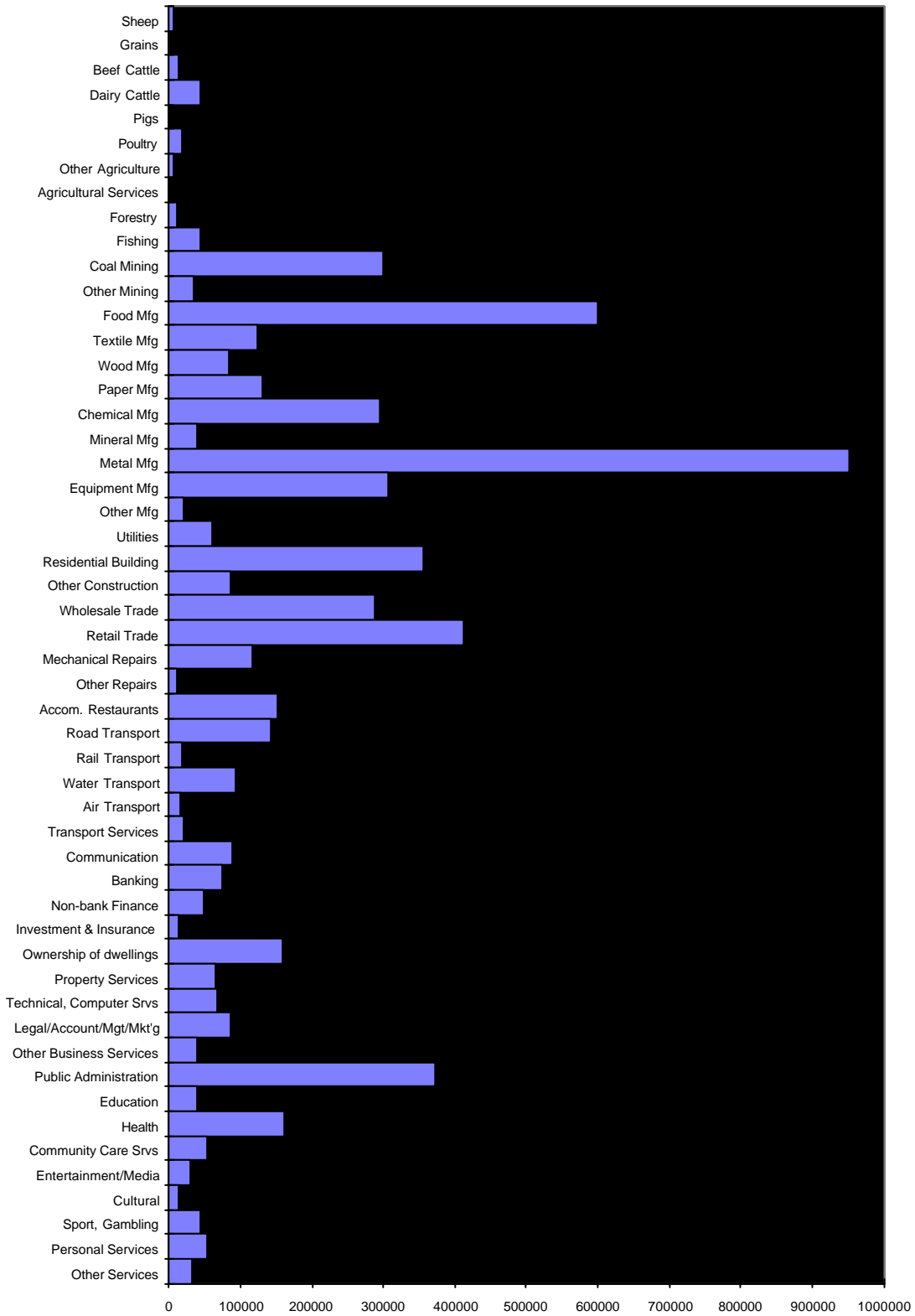
**FIGURE 2-G: SECTORAL DISTRIBUTION: EMPLOYMENT, LNE REGION 1995-96**



**FIGURE 2-H: SECTORAL DISTRIBUTION: EXPORTS, LNE REGION 1995-96, (\$'000)**



**FIGURE 2-I: SECTORAL DISTRIBUTION: IMPORTS, LNE REGION 1995-96, (\$'000)**





## 2.2. TRENDS IN THE REGIONAL ECONOMY

The previous section provided a snapshot of the LNE region in 1995-96. The analysis of the trends in those variables and some updating beyond 1995-96 is provided in this section. This also provides an opportunity to relate LNE performance for some measures to those for NSW.

The analysis is based on detailed employment by industry data obtained from the ABS Population Censuses. These data are the best available for the analysis of industry profiles and trends to provide a context for the analysis of the forest industry in the LNE region.

### 2.2.1. Regional Population and Employment

Data on population employment levels from the ABS Population Census form the basis for this section. The employment data represent residence based employment numbers. They are expressed as total employment - not full time equivalents, and are compared with population changes.

TABLE 2-B: TOTAL EMPLOYMENT: LOWER NORTH EAST

Census Year	Total Employment	Total Population	Employment Share of Population	Average Annual Change Between Census Years	
				Employment	Population
1981	292,200	774,750	37.7		
1986	294,485	847,300	34.8	0.19	2.26
1991	342,311	949,210	36.1	3.83	2.88
1996	370,768	1,014,318	36.6	2.02	1.67

Source: ABS (Population Census data)

It is apparent from Table 2-B that the 1986 to 1991 period was a boom period for the LNE region. Employment growth approached four per cent per year. This was about double that for NSW. This did result in a lower rate of unemployment. However, in the early years of the 1990s, the recession that affected Australia as a whole resulted in a slowing of employment growth and a rise in unemployment. There is evidence that since 1996, the rates of employment growth have been approaching the levels observed in the late 1980s. Again, the rate of unemployment has been falling.

The employment share of the population also varies over time and place. This ratio declined from 1981 reflecting both increases in unemployment and the number of retirees in the region. From 1986, the level has increased to be 36.6 in 1996. This is still lower than the level for NSW which was 41.3, reflecting the attractiveness of the UNE region as a place to live and retire to.

In Table 2-C the average annual rates of change between census years for population and employment are provided for the LNE region and compared with the UNE, NSW and the component Statistical Divisions (SDs) which form the LNE. In the LNE, population and employment have grown faster than the State levels since 1981. Between 1981 and 1986, employment growth could not keep pace with the population growth in the LNE, but since 1986, employment growth has outstripped the growth in

population. Growth in the LNE was fastest in the period from 1986 to 1991. The LNE has not grown as fast as the UNE region in either population or employment.

TABLE 2-C: AVERAGE ANNUAL RATES OF CHANGE BETWEEN CENSUS YEARS

	Population			Employment		
	1981 to 1986	1986 to 1991	1991 to 1996	1981 to 1986	1986 to 1991	1991 to 1996
UNE	3.31	3.91	2.38	0.17	4.96	2.39
<b>LNE</b>	<b>2.26</b>	<b>2.88</b>	<b>1.67</b>	<b>0.19</b>	<b>3.83</b>	<b>2.02</b>
<b>NSW</b>	<b>1.39</b>	<b>1.62</b>	<b>1.27</b>	<b>-0.14</b>	<b>2.04</b>	<b>1.58</b>
SYD SD	1.43	1.42	1.39	0.06	1.80	1.89
HUN SD	1.13	1.83	1.07	-0.76	2.51	1.27
MNC SD	4.05	3.88	2.16	0.88	4.46	1.83
R-T SD	3.50	4.27	2.81	-0.05	5.80	3.11
NTH SD	0.38	0.60	-0.93	-0.99	0.90	-0.97

Source: ABS (various population censuses)

Among the SDs in the LNE, the Northern SD has had the slowest growth. This is an initial indication that these areas do not have the same capacity to absorb industry adjustments as appears to be the case for the coastal regions where growth has been more rapid. The Hunter SD has also grown less rapidly than the Mid-North Coast area since 1981.

The inclusion of the Gosford/Wyong area (part of Sydney SD) somewhat skews the results for the LNE. Both employment and population growth in the Gosford/Wyong area were significantly greater than the average for the Sydney SD. For example, between 1986 and 1991 employment numbers grew by 7.18 per cent per year and between 1991 and 1996 employment grew by 4.32 per cent per year. Between 1986 and 1991 the population grew by 4.99 per cent per year and between 1991 and 1996 population grew by 3.05 per cent per year.

In all forms of policy consideration, employment effects are of high importance. Employment data are also used extensively in the analysis in this report. It is relevant to comment that it is generally becoming more difficult to interpret employment data. This is because of changes in the labour force which result in more flexible work arrangements, more people working from home in home-based businesses, a rise in the proportion that are self-employed and the likely growth in the 'informal' economy (defined as that not within the registered business systems). Thus, some form of 'standard job' or employment level is not easily defined or implemented.

On top of that is the general rise in labour productivity that tends to reduce employment over time. Thus, an increase in the level of business activity will be required to retain the same level of employment in any economy. There is continuous change and adjustment to employment that makes assessment of employment effects difficult.

## 2.2.2. The Labour Force

The following information on the total labour force and unemployment is sourced from the Department of Education, Employment and Training (DEET 1998). The unemployment data refer to the number of people receiving unemployment benefits as well as an estimate of those unemployed who do not receive benefits (eg. married spouses). That value is then expressed as a percentage of the local labour force derived from the ABS Labour Force Survey to provide an unemployment rate. From these values it is possible to estimate the level of employment.

These data do not have the accuracy of the ABS population census data, but the frequency permits the development of annual movements in employment. The resultant trends reflect a combination of macro-economic factors affecting Australia generally and local factors.

The information presented in Table 2-D and Figure 2-J indicate that there has been a steady growth in employment since the mid-1980s with a significant downturn in the 1992 to 1993 period. In June 1998, employment was estimated to be about 416,000, with a further 43,000 unemployed, or 9.3 per cent of the workforce. The unemployment rate in NSW at that time was 7.3 per cent.

### 2.2.3. Unemployment

The unemployment data are a useful starting point to indicate that there is some diversity within the LNE region in terms of the way local economies function. The differences are likely to flow through into the form and capacity of local areas to adapt to change. Using data for LGAs is a first approximation to identifying some important differences within the LNE region.

FIGURE 2-J: TOTAL LABOUR FORCE AND EMPLOYMENT TRENDS - LNE

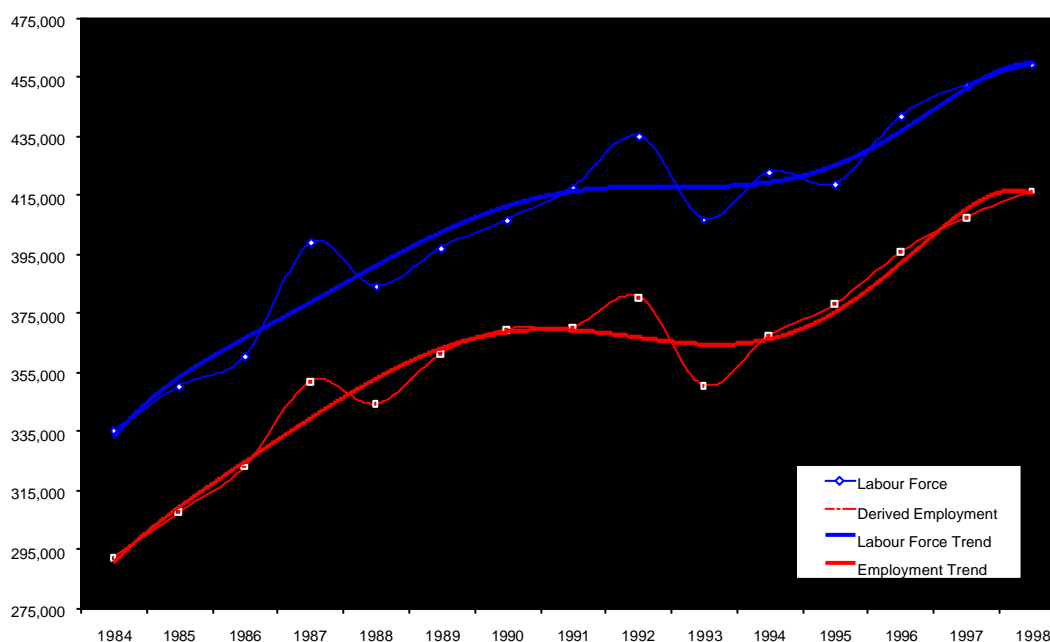


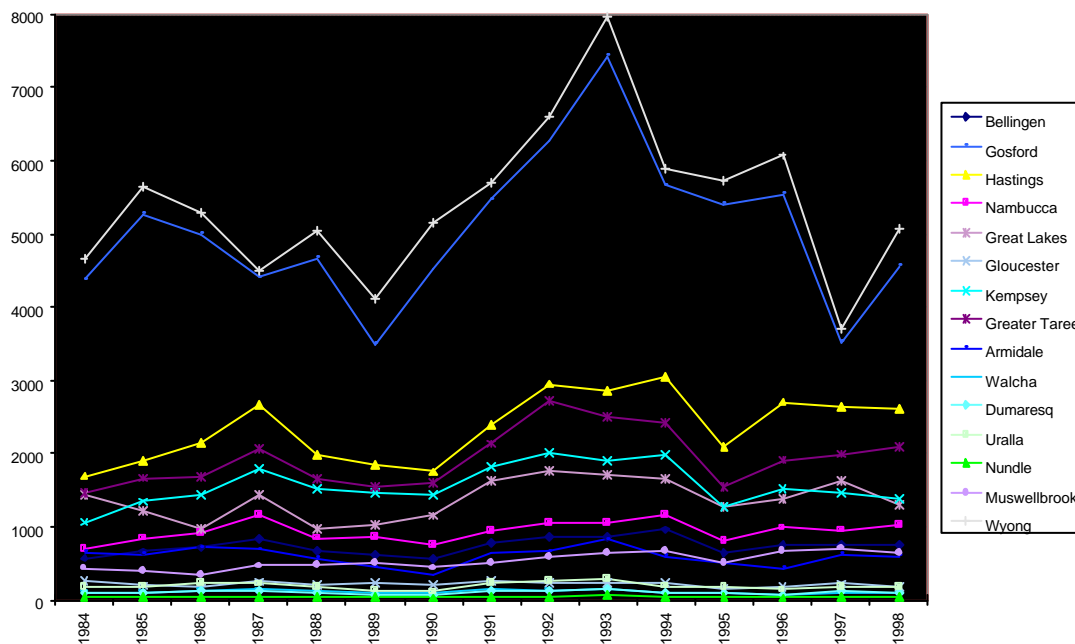
TABLE 2-D: LABOUR FORCE LNE

Year	Labour Force no.	Derived Employment no.	Unemployment no	%
1984	334,887	291,595	43,292	12.9
1985	349,892	307,146	42,746	12.2
1986	360,101	322,661	37,440	10.4
1987	398,642	351,594	47,048	11.8
1988	383,848	343,869	39,979	10.4
1989	396,823	360,839	35,984	9.1
1990	406,335	369,144	37,191	9.2
1991	417,485	369,969	47,516	11.4
1992	434,753	379,990	54,763	12.6
1993	406,638	350,041	56,597	13.9
1994	422,418	367,194	55,224	13.1
1995	418,556	377,783	40,773	9.7
1996	441,479	395,336	46,143	10.5
1997	452,022	407,156	44,866	9.9
1998	458,997	416,162	42,835	9.3

Source: DEET(1998)

The range of unemployment levels is shown for selected LGAs in Figure 2-K. The largest numbers of unemployed people are located in the Bellingen and Gosford LGAs. The next highest are in a number of coastal LGAs.

FIGURE 2-K: UNEMPLOYMENT NUMBERS

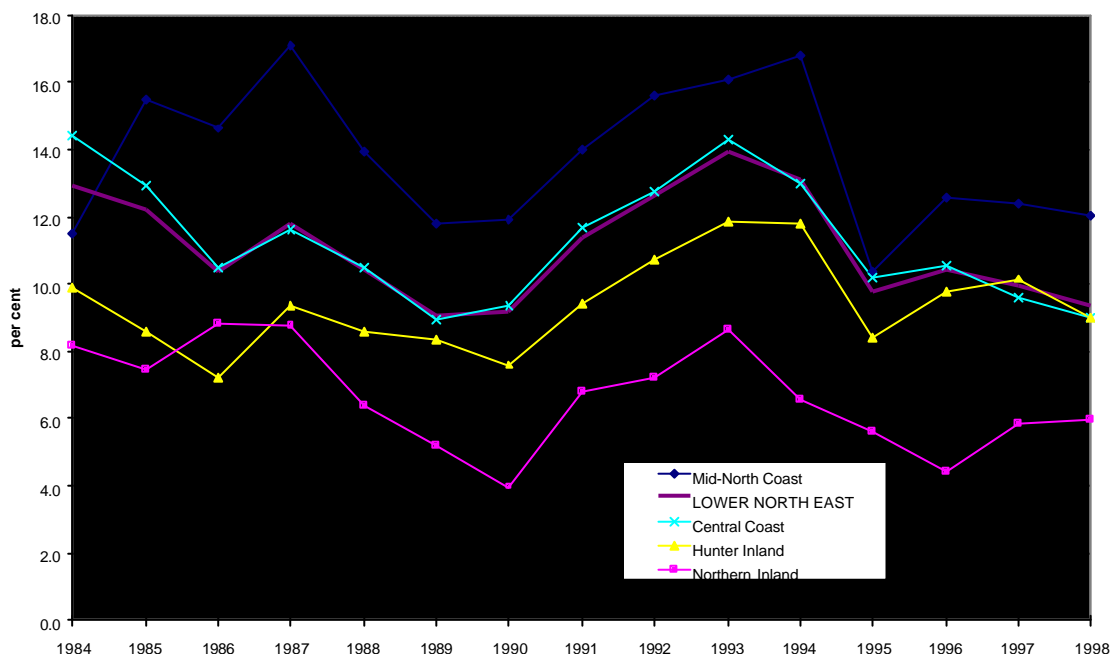


The LGAs have been grouped into four sub-regions containing LGAs with similar characteristics.

The Mid-North Coast	Bellingen, Nambucca, Kempsey, Hastings and Taree
The Northern Inland	Armidale, Dumaresq, Uralla, Walcha and Nundle
The Hunter Inland	Gloucester, Scone, Dungog, Muswellbrook, Singleton, Cessnock and Maitland
The Central Coast	Great Lakes, Port Stephens, Newcastle, Lake Macquarie, Wyong and Gosford

The unemployment rates for the sub-regions are shown in Figure 2-L. These vary considerably from the lowest in the Northern Inland at around six per cent to the highest in the Mid-North Coast at around 14 per cent although that rate has declined in recent years. Generally, the rates in the Hunter are lower than those for the Central Coast.

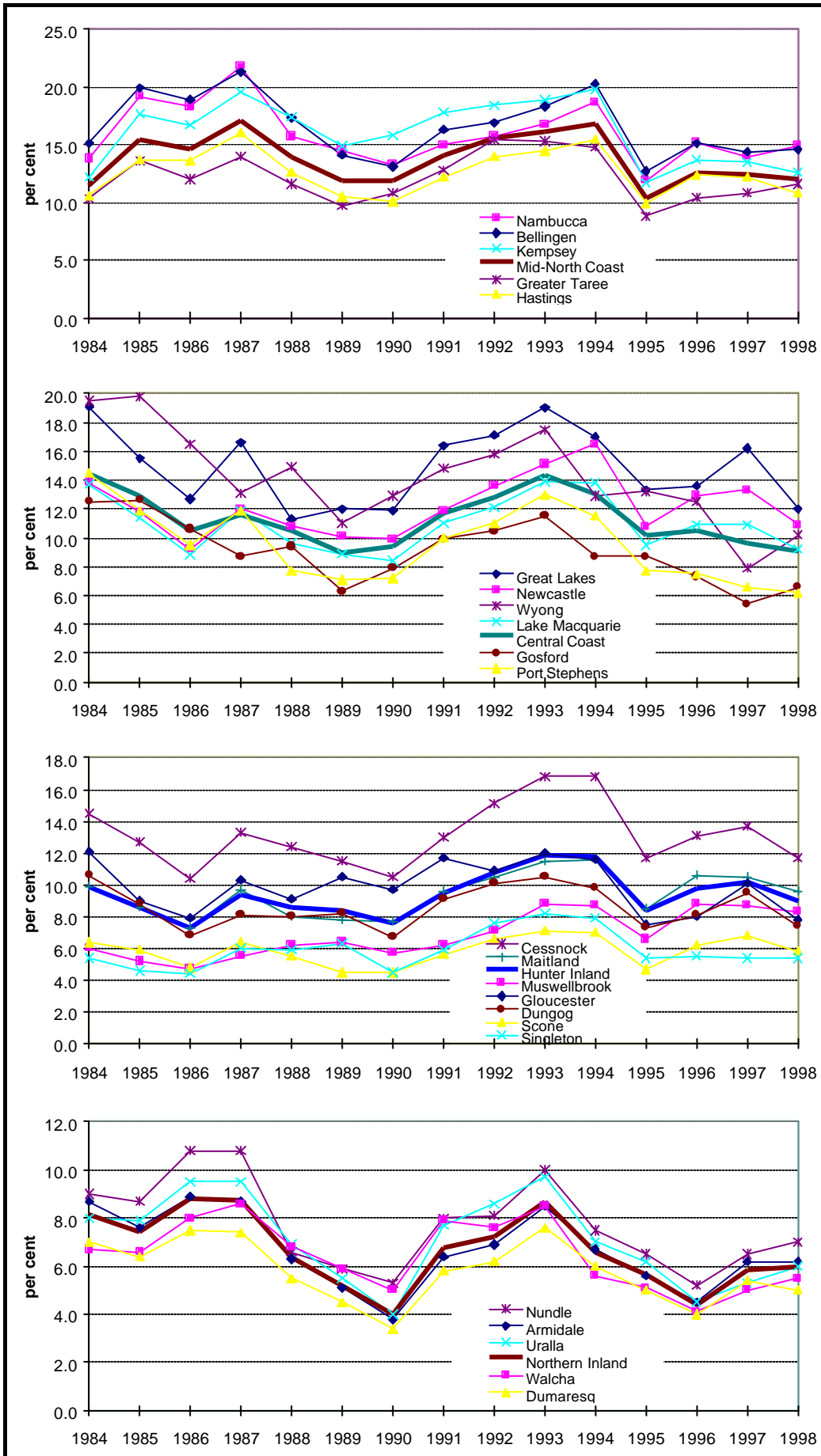
FIGURE 2-L: SUMMARY OF UNEMPLOYMENT RATES



Unemployment data have been compiled for each LGA as shown in Figure 2-M grouped by sub-region. (Note that the vertical scales are not the same for each of the sub-regions.) These charts indicate a considerable variation in unemployment rates among the LGAs. In 1998 the rates ranged from between 10 to 15 per cent in the Mid-North Coast LGAs; between 6 to 12 per cent in the Hunter and Central Coast LGAs; and between 5 to 7 per cent in the Northern Inland LGAs. They all, however follow a similar trend with the average for the whole region ranging between 9 and 14 per cent between 1984 and 1998. There would appear to be more homogeneity among the LGAs in the Mid-North Coast and Northern Inland areas than in the Hunter and Central Coast areas.

These data indicate that there are some fundamental differences among these sub-regions. The coastal LGAs generally have high levels of unemployment. They tend to be attractive places to live and continue to attract population. Variations in the level of

FIGURE 2-M: UNEMPLOYMENT RATES BY LGA AND SUB-REGION



employment are likely to be reflected mainly in a corresponding variation in the number unemployed.

The tablelands and inland areas have the lowest levels of unemployment. In these areas, there appears to be a tendency for variations in employment levels to result in migration and population adjustments, perhaps after some time lag.

There is an intermediate category of areas that are not so homogeneous that lie near the coast but have a lower attraction in terms of population growth. The level of unemployment is lower than on the coast, but higher than on the Tablelands. In these areas, variations in employment may induce some migration adjustments to population, but will include some change in unemployment levels. These areas are still highly attractive places to live and, together with the coastal areas, appear to have a significant 'informal' economy that provide opportunities for those not 'formally' employed. The unemployment rate in any particular LGA is likely to reflect employment opportunities in that area.

TABLE 2-E: LOCAL AREA UNEMPLOYMENT RATES AND TIMBER INDUSTRY EMPLOYMENT

LGA	Unemployment: 1996		1998 Rate	Timber Industry Employment		
	Number	Rate		1986	1991	1996
Bellingen	752	15.1	14.6	273	210	190
Nambucca	989	15.2	14.9	136	138	107
Hastings	2707	12.4	10.8	352	282	226
Kempsey	1522	13.7	12.6	182	124	112
Greater Taree	1916	10.4	11.6	258	183	173
<b>Mid-North Coast</b>	<b>7886</b>	<b>12.5</b>	<b>12.1</b>	<b>1201</b>	<b>937</b>	<b>808</b>
Armidale	436	4.5	6.2	31	28	43
Walcha	77	4.1	5.5	91	61	93
Dumaresq	86	4.0	5.0	18	3	7
Uralla	143	4.5	6.0	21	6	14
Nundle	35	5.2	7.0	23	14	14
<b>Northern Inland</b>	<b>777</b>	<b>4.4</b>	<b>6.0</b>	<b>184</b>	<b>112</b>	<b>171</b>
Gloucester	184	8.0	7.8	158	145	126
Muswellbrook	666	8.8	8.3	37	39	26
Scone	300	6.2	5.8	23	21	18
Singleton	589	5.5	5.4	12	6	16
Cessnock	2511	13.1	11.7	66	65	63
Dungog	276	8.1	7.4	82	67	64
Maitland	2297	10.6	9.6	71	41	20
<b>Hunter Inland</b>	<b>6823</b>	<b>9.8</b>	<b>9.0</b>	<b>449</b>	<b>384</b>	<b>333</b>
Great Lakes	1375	13.6	12.0	254	244	212
Newcastle	7900	12.9	10.9	48	30	40
Port Stephens	1430	7.5	6.2	130	59	57
Lake Macquarie	8342	10.9	9.2	73	49	81
Wyong	6070	12.5	10.2	123	85	76
Gosford	5540	7.3	6.6	78	74	72
<b>Central Coast</b>	<b>30657</b>	<b>10.5</b>	<b>9.0</b>	<b>706</b>	<b>541</b>	<b>538</b>
<b>LOWER NORTH EAST</b>	<b>46143</b>	<b>10.5</b>	<b>9.3</b>	<b>2540</b>	<b>1974</b>	<b>1850</b>

Source: DEET (1998) and ABS (Population Censuses)

Based on the employment data from the 1996 Population Census (see Table 2-E) over 70 per cent of the timber industry employment occurs in the LGAs classified as coastal.

Only 9 per cent occur in the Tablelands areas and 18 per cent is in the areas that may be described as coastal hinterland. A short list of LGAs with a high level of employment in the timber industry would include the coastal LGAs of Bellingen, Hastings, Taree, Nambucca, Kempsey and Great Lakes. Gloucester in the hinterland and Walcha on the Tablelands also have high levels of timber industry employment. Further analysis of local dependence on the timber industry is included in Section 3.

## **2.3. ANALYSIS OF INDUSTRY EMPLOYMENT**

This section provides details of the industry or sectoral structure of the economy. The analysis of the detailed employment by industry data obtained from the ABS Population Census is presented in this section. This provides an industry context and trends as background to the consideration of change in the timber industries.

The sectoral or industry classification used in this analysis is based on the Australia and New Zealand Standard Industry Classification (ANZSIC). The particular aggregation and description used in this work is shown in Attachment 2.

### **2.3.1. Sectoral Distribution – 1996**

The industry distribution of employment was presented in Figure 2-G. For a total employment of 370,768 persons, the main employing industries were (expressed in terms of the share of regional employment):

- The retail trade sector representing 13.9 per cent of total employment.
- The health sector employed 8.4 per cent.
- The education sector employed 7.5 per cent.
- The accommodation/restaurants/cafes/pubs/clubs employed 5.4 per cent.
- The wholesale trade sector employed 5.1 per cent.
- The residential building sector employed 4.7 per cent.
- The metal manufacturing sector employed 3.6 per cent.
- The forestry and wood manufacturing sectors employed 1.0 per cent.
- The remaining sectors employed 50 per cent of employment in the region.

These characteristics indicate a regional economy where the core is the provision of services to local residents and tourists. The most important of the primary and manufacturing industries is metal manufacturing. The following analyses provide a range of comparative and benchmarking information on the LNE economy.

### **2.3.2. Location Quotient Analysis**

A location quotient (LQ) is a ratio that shows the relative importance of sectors to the region, compared to that in Australia as a whole ie:

$$\frac{\% \text{ of local employment in sector } x}{\% \text{ of national employment in sector } x}$$



Where the local share is larger than the national share, the LQ is greater than one and where the local share is smaller, the value is less than one. Where the value is high (greater than 2) it indicates that those industries are likely to be key strengths in the region.

LQs are presented for the top 20 (out of 107) ranking sectors and some of the essential service sectors that are not included in the top 20 for the LNE region for 1991 and 1996 in Table 2-F. The LQs confirm the importance of the mining and manufacturing sectors to the region. Both sawmill products and forestry and logging are 40 per cent more important in this region than in Australia. However, the LQ for these industries has tended to decline. The poultry and wine and spirits sectors provide useful diversity to the agricultural industries in the region. There are only two services sectors, rail transport and non-bank finance, appearing in the top 20 sectors.

TABLE 2-F: LOCATION QUOTIENTS: LNE - 1981 TO 1996

Selected Sectors	LQs			
	1981	1986	1991	1996
Coal; oil and gas	6.3	7.0	6.0	5.9
Iron and steel	5.0	4.2	3.8	3.0
Electricity	1.9	2.1	2.1	2.3
Cosmetics and toiletries	0.3	0.3	1.2	2.2
Railway equipment	1.0	1.7	1.4	2.2
Basic non-ferrous metals etc	1.3	2.2	2.0	2.1
Poultry	2.1	2.1	2.1	1.9
Commercial fishing	2.2	2.1	2.0	1.8
Beef cattle	1.5	1.6	1.4	1.8
Rail & other transport	1.2	1.4	1.4	1.7
Wine and spirits	1.4	1.4	1.7	1.7
Meat and meat products	1.6	1.7	1.5	1.6
Structural metal products	1.5	1.2	1.2	1.6
Ships and boats	2.5	2.4	1.0	1.5
Non-bank finance	1.0	1.1	1.2	1.5
Sawmill products	1.8	1.6	1.9	1.4
Forestry and logging	1.5	1.5	1.3	1.4
Agricultural. minina etc machiner	0.6	0.7	1.2	1.4
Textile fibres, yarns etc	1.3	1.3	1.1	1.4
Cement, lime and concrete slurry	1.2	1.1	1.3	1.4
Retail Trade	1.0	1.1	1.1	1.2
Health	1.0	1.0	1.0	1.1
Education	1.0	1.0	1.0	1.0
Other Services	0.8	0.8	0.9	0.9
Banking	0.8	0.8	0.7	0.7
Legal, Accounting etc	0.7	0.6	0.7	0.6

Most of the top 20 sectors with LQs greater than one had increased between 1991 and 1996. The most significant sectors that increased their relative importance between 1991 and 1996 included the electricity, cosmetics/toiletries manufacturing, beef cattle, railway equipment manufacturing, rail and other transport and structural metal sectors. This may arise from faster growth in LNE than in the nation as a whole. However many of the primary industry sectors with LQs greater than one, including coal/oil/gas, poultry, fishing and sawmill products had decreased in relative importance between 1991 and 1996. Declines also occurred in iron and steel and the ships and boats

manufacturing sectors. This could have occurred because these sectors grew more slowly in the UNE than in the nation or because the decline in the employment share in these sectors in UNE was faster than the decline in the share of employment at the national level.

While the LQs for the three major employers, retail trade, health and education were also greater than one, they were constant or keeping pace with Australia-wide trends. Those trends are similar to those found in many regions in NSW. Regional areas have maintained their share of many public services but have not shared in the substantial growth of the business service industries to the same extent as the metropolitan areas.

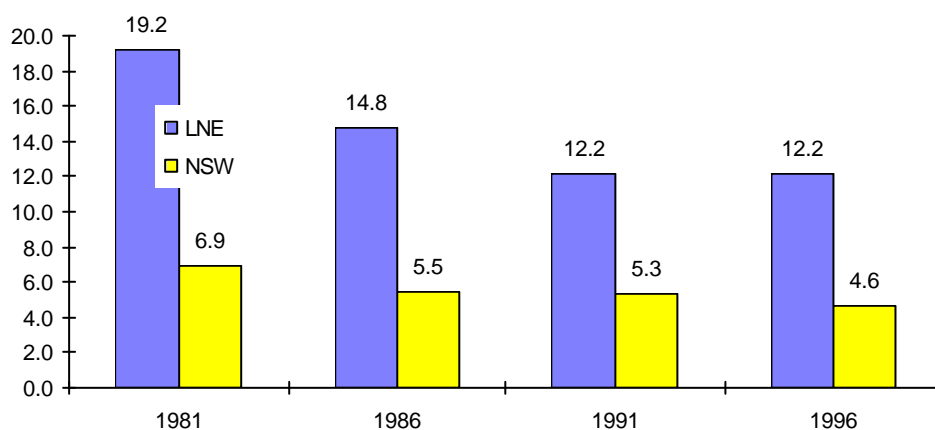
### 2.3.3. Coefficients of Specialisation (CS)

The CS is calculated as the sum of the differences between the proportions of local and national employment in each sector. The more the local economy emulates the structure of the national economy the lower (or closer to zero) the value of the CS as shown by the low CS for NSW. At the other extreme, the maximum CS is 100 indicating that a region has only one sector.

This measure can be used to gauge the extent of specialisation (or diversification) in an economy and how the value may change over time. Most economies tend to become more diversified over time. However, the rate of diversification varies among regions.

The CS for LNE and NSW are shown for four Population Census years in Figure 2-N. The LNE has diversified relatively slowly over the past 10 years in common with many regional areas of NSW.

FIGURE 2-N: COMPARISON OF COEFFICIENTS OF SPECIALISATION BETWEEN THE LNE AND NSW



For comparative purposes, the values for the LNE and UNE CRA regions are shown against some selected SDs in Table 2-G. The CS values for the LNE region lie between the Sydney (SYD) and the remaining regions (Hunter (HUN), the Mid North Coast (MNC), and the Northern (NTH) SDs) as it is a combination of the four. The LNE region is considerably more diverse than the UNE region, although this may not be the case for particular subregions within the LNE.

All of the regional economies in NSW have become more diversified over time. Of all of NSW SDs the Illawarra, Far-West, Mid-North Coast, Hunter, and Richmond-Tweed SDs have seen the most significant diversification since 1981.

TABLE 2-G: REGIONAL COEFFICIENTS OF SPECIALISATION

	1981	1986	1991	1996
<b>NSW</b>	<b>6.9</b>	<b>5.5</b>	<b>5.3</b>	<b>4.6</b>
SYD SD	12.8	11.7	11.2	10.7
<b>LNE</b>	<b>19.2</b>	<b>14.8</b>	<b>12.2</b>	<b>12.2</b>
HUN SD	23.0	17.9	15.6	15.1
MNC SD	27.1	20.3	18.6	18.0
<b>UNE</b>	<b>24.6</b>	<b>20.0</b>	<b>18.2</b>	<b>18.3</b>
R-T SD	25.7	22.5	19.7	19.2
NTH SD	27.6	24.5	23.0	22.9

The coefficients of specialisation for inland economies tend to be higher than for coastal economies because of the importance of agricultural industries. Other regions with lower values are diversified into manufacturing (Illawarra, Hunter); or manufacturing and services (Sydney); or have a large population of retirees or a large number of tourists (Coastal regions - Mid-North Coast, Richmond-Tweed).

#### 2.3.4. Population Employment Ratios

The servicing capacity of the LNE regional economy is shown in Figure 2-O as a Population-Employment Ratio (PER). Here, the servicing capacity is represented by the **number of residents serviced per employee** in a particular sector. This measures the share of the LNE region relative to NSW as a whole. The trend over time in the level of service is also measured. In all cases, the lower the PER, the more intensive is the service level and that may indicate a higher quality of service. These ratios are only calculated for service sectors.

The information in Table 2-H indicates that the LNE region as a whole compares fairly well with NSW. The PERs for retail trade, health, education, accommodation, community care, road transport and personal services are close to the NSW levels. These are mainly those services that are related to the population and their needs. What is notable is that those services related to business activity are generally provided at a much lower level than in NSW as a whole.

The shaded cells in Table 2-I show sectors that fell behind the 1991 level (indicating poorer servicing capabilities). For example in 1996 employees in the banking sector in the LNE region each served 19 more residents than they did in 1991.

There has been an across the board increase in the PERs for the banking sector with the more significant changes in the rural regions. On the other hand, there has been an across the board reduction in the education, community care and health sector PERs indicating an improvement in servicing in these sectors since 1991. There has also been an across the board decrease in PERs in the personal services and the accommodation and restaurants sectors as well as for the legal, accounting, etc. and other business services sectors and cultural services.

TABLE 2-H: REGIONAL POPULATION: EMPLOYMENT RATIOS 1996

Selected sectors	NSW	SYD	LNE	HUN	MNC	UNE	R-T	NTH
Retail trade	21	20	20	20	20	20	21	22
Health services	33	32	32	31	37	36	33	36
Education	35	35	37	37	39	36	35	26
Accom. & restaurants	47	50	50	50	42	39	40	51
Legal, accounting srvs	58	44	113	112	144	128	123	123
Residential building	62	61	58	59	71	60	56	89
Other business services	91	77	118	110	158	140	138	171
Banking	104	80	187	220	230	216	214	194
Community care services	108	109	108	113	118	106	98	96
Communication services	112	93	164	206	171	170	173	155
Road transport	123	127	135	122	141	132	128	110
Other services	131	119	153	161	199	184	192	171
Personal services	133	126	141	138	158	147	139	163
Other property services	163	146	181	185	180	173	167	286
Cultural services	330	284	500	513	485	404	378	501

TABLE 2-I: CHANGE BETWEEN 1991 AND 1996 PERS

Selected sectors	NSW	SYD	LNE	HUN	MNC	UNE	R-T	NTH
Retail trade	1	1	0	0	1	1	1	2
Health services	-2	-1	-4	-2	-4	-2	-2	-4
Education	-2	-1	-2	-2	-4	-5	-4	-1
Accom. & restaurants	-5	-7	-5	-6	-3	-2	0	-4
Legal, accounting srvs	-17	-12	-34	-42	-27	-32	-32	-21
Residential building	-8	-16	4	0	16	6	6	10
Other business services	-38	-33	-43	-38	-33	-59	-70	-65
Banking	7	4	19	16	45	44	35	30
Community care services	-48	-40	-61	-57	-65	-77	-73	-67
Communication services	-21	-23	-5	-6	3	-2	5	-2
Road transport	15	22	7	1	14	12	9	7
Other services	2	2	-1	8	-12	2	11	-25
Personal services	-27	-24	-39	-46	-12	-26	-28	-32
Other property services	4	7	-11	-13	-6	-9	-14	-43
Cultural services	-107	-74	-343	-415	-372	-277	-243	-527

There were widespread improvements in service level in the LNE since 1991 as shown in Figure 2-O including the following.

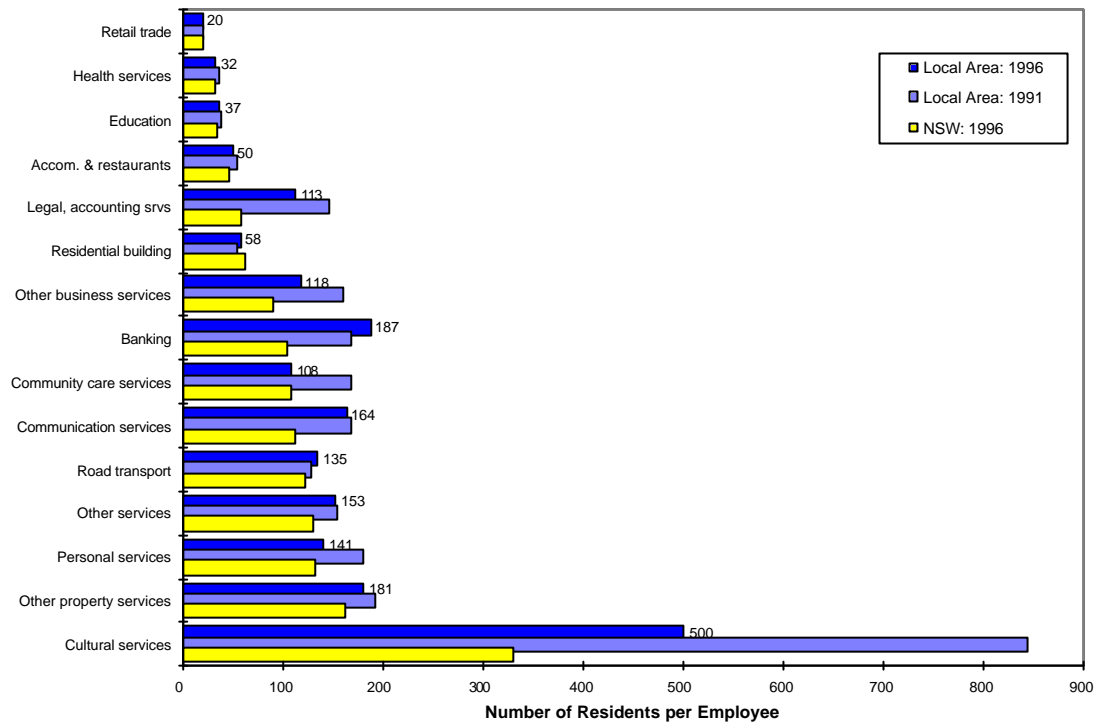
- Cultural services. (843 in 1991 to 500 in 1996).
- Community care services (child care, aged care, residential care etc. – from 169 in 1991 to 108 in 1996).
- Other business services (from 161 in 1991 to 118 in 1996).
- Personal services (dry-cleaning, laundries, hiring, film processing, photo studios, funeral directors, gardening, hairdressing etc. – from 180 to 141).
- Legal, accounting, management, marketing (from 147 to 113)

There were also minor improvements in the following sectors.

- Other property services (real estate and property developers – from 192 to 181).
- Communication (from 169 to 164)
- Accommodation, restaurants etc (from 56 to 50).

- Health services (from 36 to 32).
- Education (from 38 to 37).
- Other services (from 154 to 153)

FIGURE 2-O: POPULATION EMPLOYMENT RATIOS FOR LNE: 1991 &amp; 1996 &amp; NSW: 1996



Source: ABS Census

Sectors which fell behind the 1991 levels (which generally indicated poorer servicing capabilities) as shown by an increase in the PER between 1991 and 1996 included:

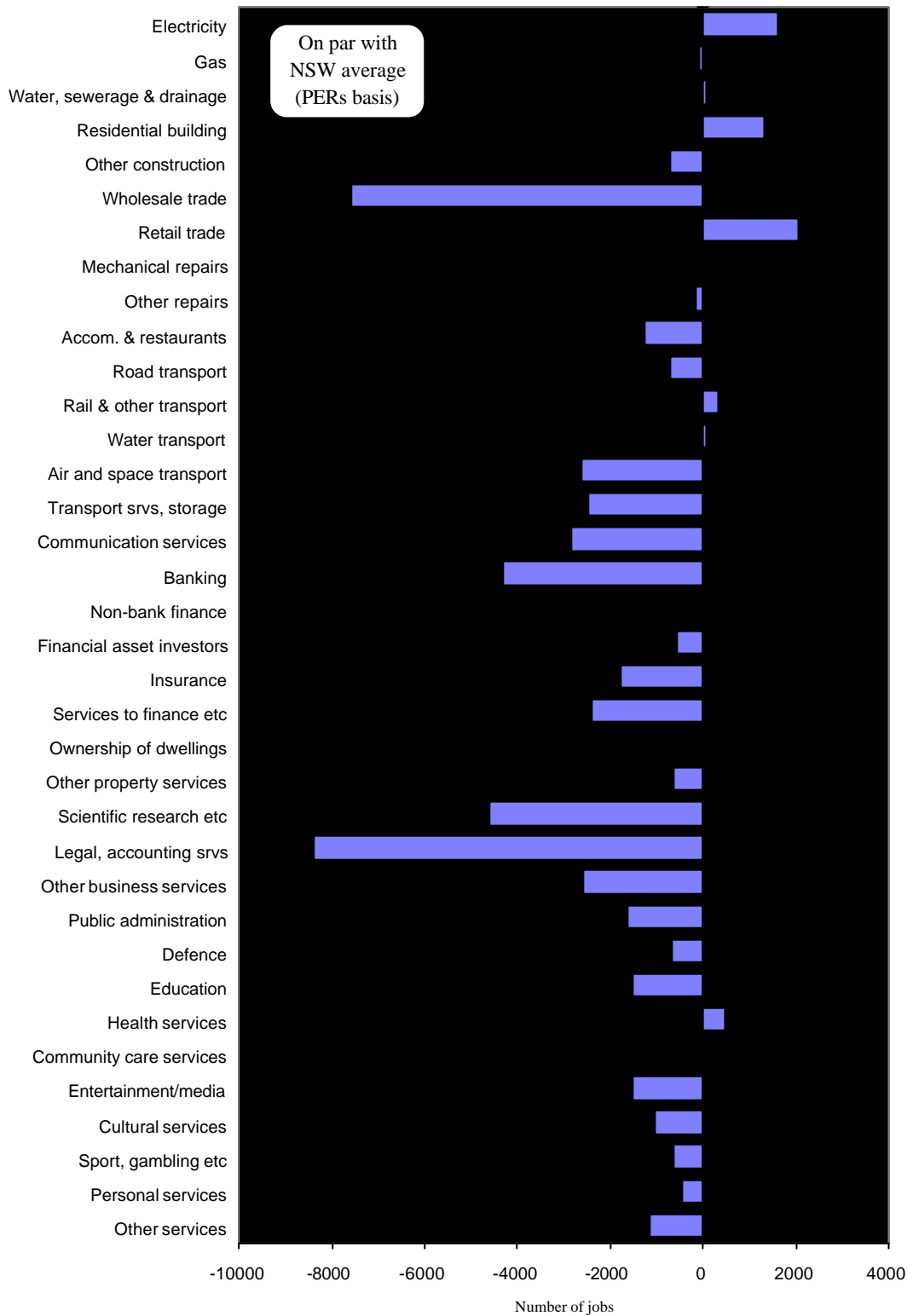
- Banking (from 168 to 187)
- Road transport (128 to 135)
- Residential building (from 54 to 58)

Apart from the decline in banking, the other changes are small and generally widespread within the north coast regions of NSW.

When compared to NSW as a whole, LNE has a lower level of service in almost all sectors as indicated by the higher PERs. The few exceptions show only minor differences from the level for NSW.

The extent to which the access to services in the LNE varies from the NSW level can be calculated as shown in Figure 2-P. The lower level of service is measured as the number of jobs that would be required in each sector to reach the NSW level of service.

FIGURE 2-P: LNE JOBS DEFICIT, 1996



The deficits are spread widely across the various sectors. The largest deficits appear to be associated with:

- leakages from the region as indicated by wholesale trade, personal and other services;
- the restructuring of some industries such as banking, transport and communications; and

- the highly specialised nature of some industries which tends to result in them being mostly located in large urban centres such as research and specialist financial and business services.

The information in Figure 2-P also shows those sectors where the PER is above the NSW average. There were few sectors in that category, the most notable being retail trade, electricity residential building and health.

### 2.3.5. Employment Change by Sector

The remainder of this section is focused on identifying industry trends in the LNE economy, and in comparing LNE with what is happening in NSW as a whole. The analysis is based on detailed employment data from recent ABS Population Censuses.

Based on the Population Census data for LNE, the following changes in total employment have occurred.

1991	342,311	1996	370,768
1981	<u>292,200</u>	1991	<u>342,311</u>
Diff.	50,111		28,457

These data (and the data in Table 2-B) indicate that employment grew in the 1990s at about one half of the strong growth in the late 1980s. The change in total employment between 1991 and 1996 was distributed across the sectors as shown in Figure 2-Q.

There is a clear pattern in the changes with employment losses in many of the primary industries and related manufacturing sectors (excluding food, paper, chemical and equipment manufacturing), utilities, residential building, rail transport, banking and finance and public administration. The gains have been concentrated in an array of service sectors with the largest changes associated with health, community care services and education as well as the trade sectors, other personal and recreational sectors, which are important to the overall quality of living in the LNE region. There have also been significant increases in the business service sectors.

There was a net loss of almost 1,000 jobs in agricultural employment over this time. Most of these losses were in the less intensive grazing operations with the intensive farming operations almost maintaining their employment levels. Thus, most of the losses would have occurred in the inland parts of the region.

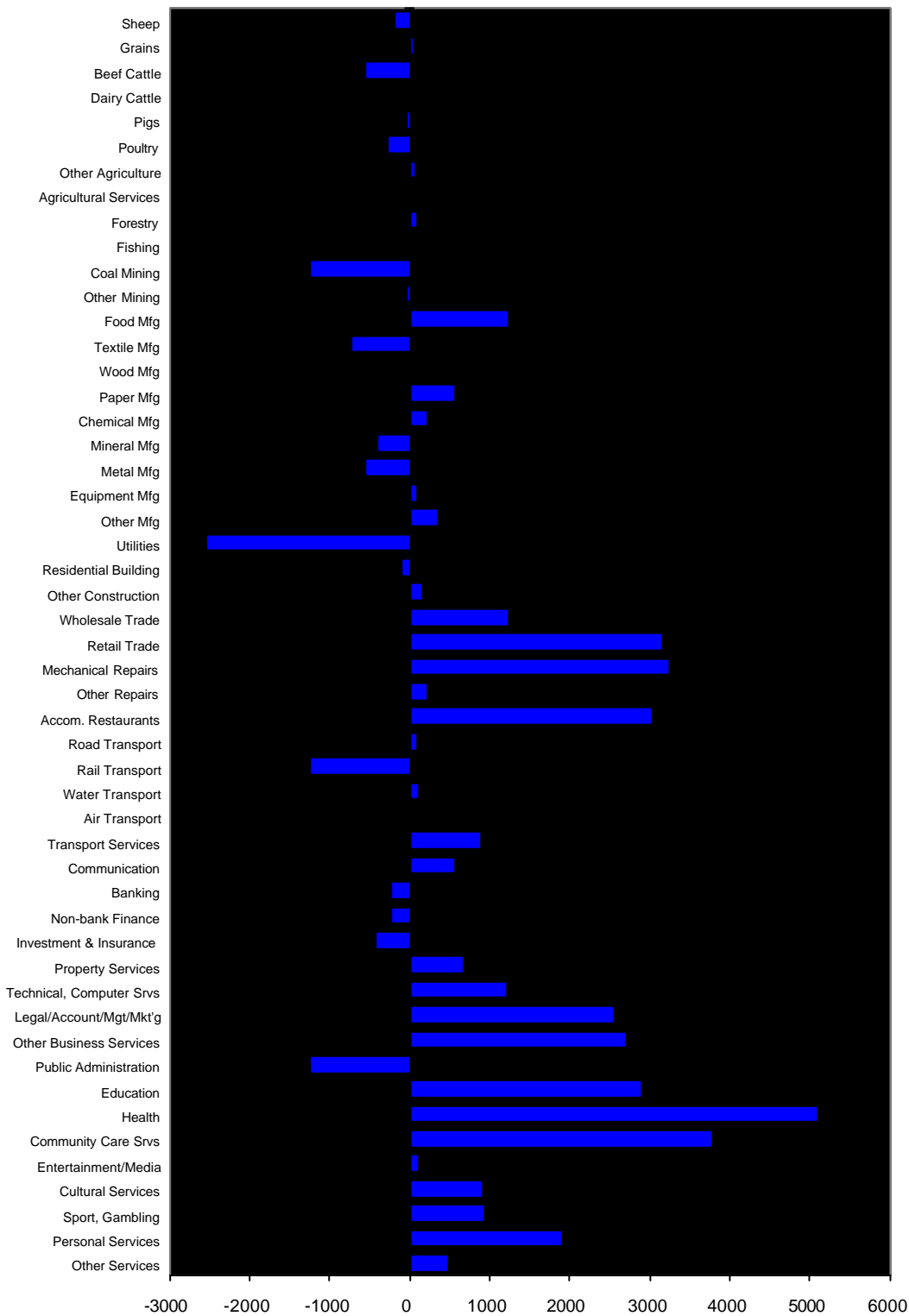
There was also a loss of 14 jobs in the aggregate wood manufacturing sector. There was a small gain of 91 jobs in the forestry sector.

The major job losses occurred in utilities (mostly electricity 2,552) with almost 1,260 jobs lost from each of the rail transport, coal mining and public administration sectors. In the remainder of the economy, there were net gains in employment, sufficient to offset these losses. As a result, there was a net employment growth over the period of 28,457.

It is possible to assess these changes against the changes that are occurring in NSW as a whole. This can be done using shift share analysis that compares regional growth with growth in the State and the growth in each industry. Not all industries grow at the same

rate and the particular mix of industries may favour some regions. As a result, regional growth is apportioned among overall State growth, industry mix effects and local factors.

FIGURE 2-Q: TOTAL CHANGE IN EMPLOYMENT BY SECTOR - 1991-1996



The results of the analysis are shown in detail in Attachment 3 and summarised in Table 2-J, for the period 1991 and 1996. If the LNE economy performed as well as the NSW economy over that period, then employment would have grown by 22,202 jobs. This



means that the LNE with a growth of 28,457 jobs has more than shared in the overall growth of employment in NSW.

TABLE 2-J: SUMMARISED SHIFT-SHARE ANALYSIS

	Component				Total Change
	State	Industry	Total State	Local	
	No.	No.	No.	No.	No.
Positive Effects	22,202	23,221	<b>45,423</b>	<b>19,556</b>	<b>64,978</b>
Negative Effects	-	(27,978)	<b>(27,978)</b>	<b>(8,543)</b>	<b>(36,521)</b>
<b>Total Effects</b>	<b>22,202</b>	<b>(4,757)</b>	<b>17,444</b>	<b>11,013</b>	<b>28,457</b>

The industry mix effects are relatively large and negative (4,757) suggesting that the LNE region has an industry mix that is biased toward low-growth industries.

The overall benchmark that is established is to measure the performance of the LNE against the overall trend in NSW and its industries. If the LNE were on this benchmark, then employment would have increased by 17,444 (Table 2-J). That benchmark for the LNE would have resulted in employment changes for each industry as shown in Figure 2-R. That indicates declines in employment in agriculture, coal mining, utilities, transport and public administration. Most of the growth would have occurred in the services sectors that support both households and business operations. Further, wood manufacturing employment in NSW has been growing and, if that had been shared in the LNE, would have seen that sector expand by around 70 jobs.

The combined state and industry effects provide a state benchmark of a 17,444 (22,202 - 4,757) job increase in the LNE region over 1991 to 1996. Since jobs actually grew in the local region by 28,457, the difference from the state benchmark suggests that local factors have been positive to the extent of a growth of 11,013 jobs (28,457 - 17,444). Those local factors could include localised seasonal and price conditions; gain of market share due to scale factors; significant population growth; major infrastructure provisions; and the choices made by members of the community and business sector about where they locate and make purchases. This analysis is not able to apportion the changes among these factors.

The shift-share analysis of employment between 1991 and 1996 indicates that some industries did **not** perform as well at the local level as the state benchmark (Figure 2-S). Thus, these industries lost some of their NSW market share and included:

- Residential building;
- Communication;
- Textile manufacturing;
- Technical, computer services (including research);
- Investment and insurance;
- Sport, gambling;
- Other business services;
- Entertainment/media;

- Rail transport;
- Banking;
- Poultry; and

FIGURE 2-R: STATE COMPONENT OF CHANGE 1991 - 1996

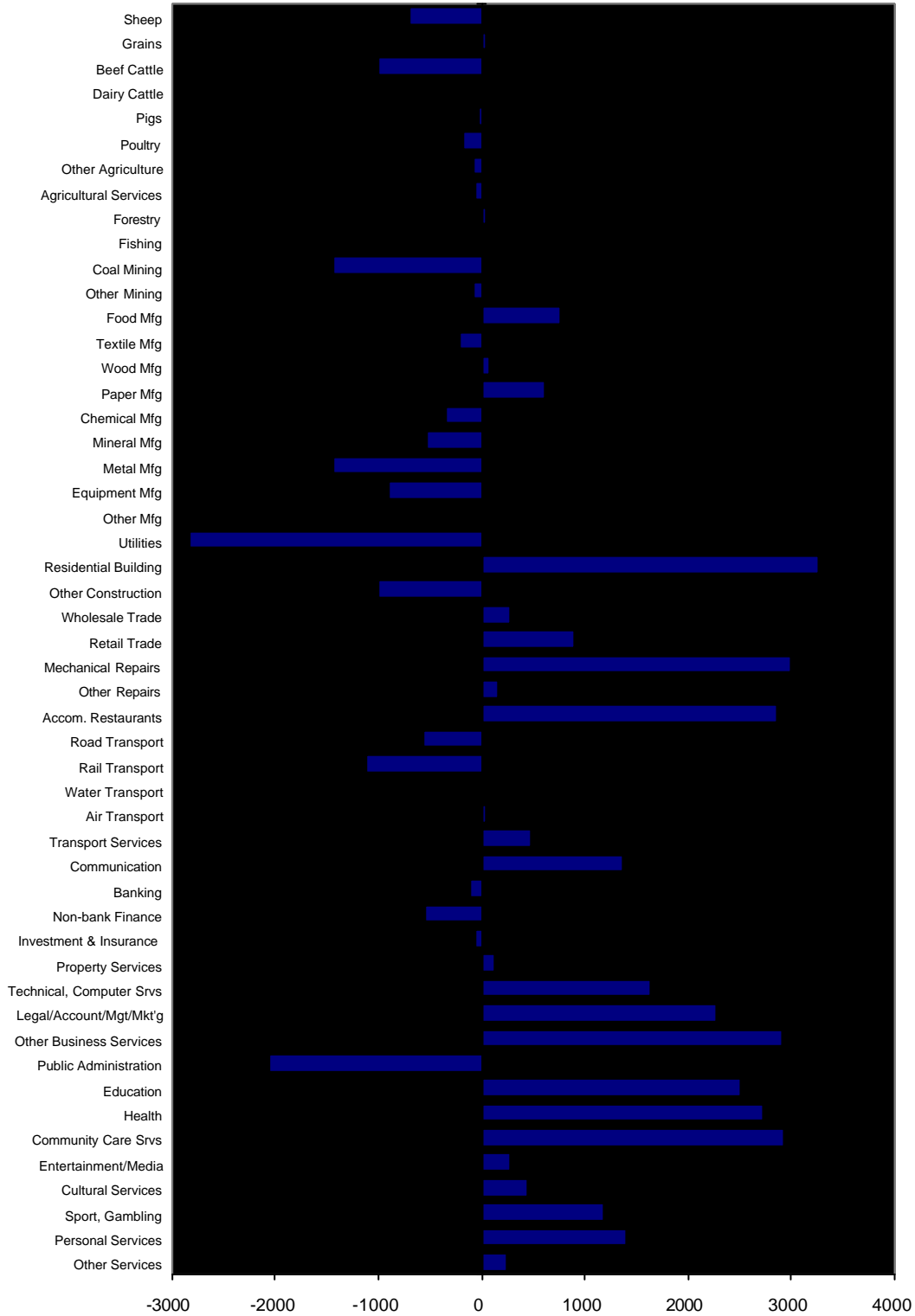
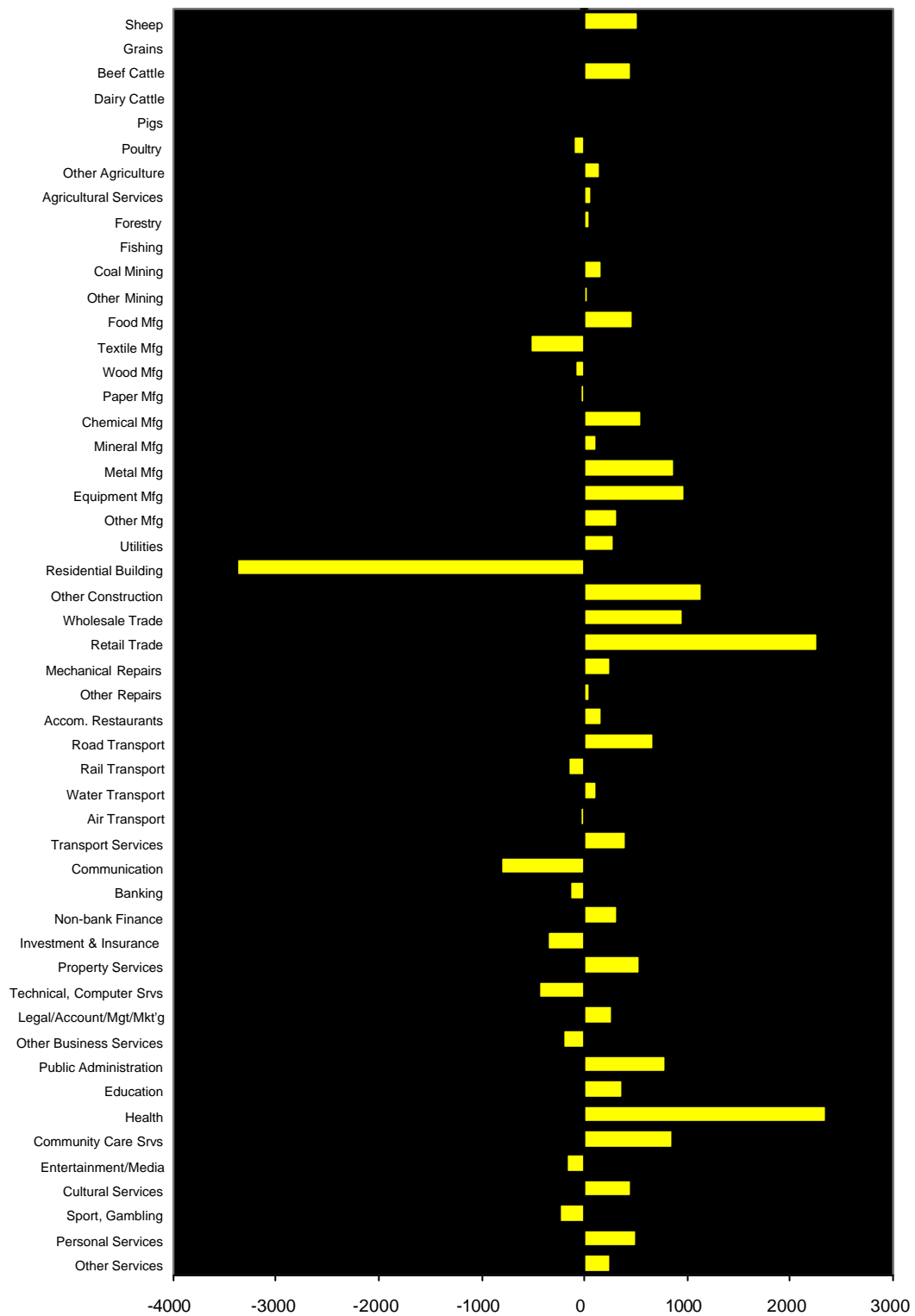


FIGURE 2-S: LOCAL INFLUENCES ON EMPLOYMENT CHANGE 1991 - 1996



■ Wood manufacturing.

Those industries that did well, and increased their share of that industry in NSW will normally equate with those that are competitive and can do well in other markets. Note that this can also result from the local industry declining more slowly than the industry in the state as a whole. There are many industries in this category which included:

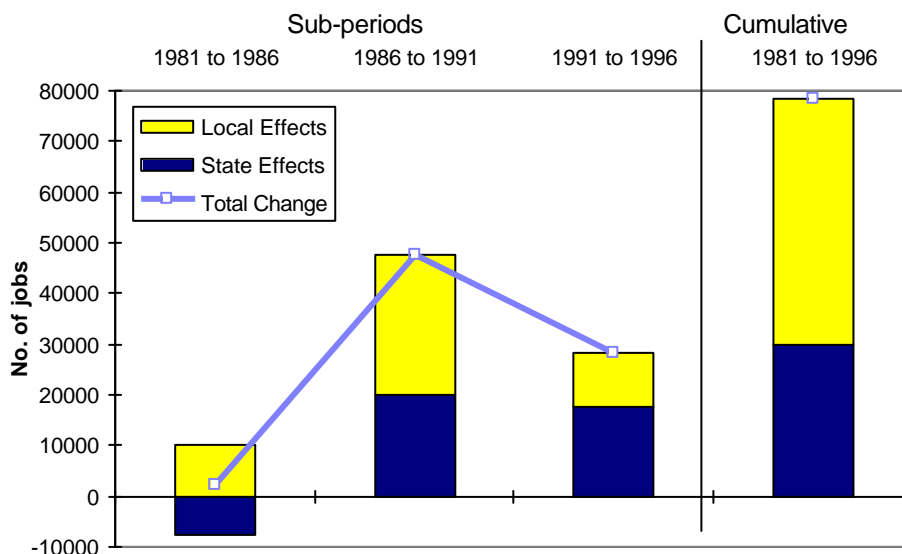
- Health;
- Retail trade;
- Other construction;
- Equipment manufacturing;
- Wholesale trade;
- Metal manufacturing;
- Community care services;
- Entertainment/media;
- Public administration; and
- Road transport.

To a lesser extent the sheep, beef cattle and many other manufacturing and services sectors performed better than the state average.

In NSW, both the forestry and wood manufacturing sectors showed a small increase in employment. Within the LNE region, local factors were negative for the wood manufacturing sector and slightly positive for forestry. That result is indicative of the adjustments that have been taking place in the timber industry in the LNE region for several years. The IFA is likely to have accelerated those trends in the period post the 1996 Population Census.

A similar shift-share analysis covering the census periods from 1981 is shown in Figure 2-T. While the state benchmark indicated negative effects on the employment level between 1981 and 1986, the positive local factors outweighed these to result in a slight net increase in actual employment levels in the LNE region. Between 1986 and 1991 there was rapid growth in the LNE region sharing state growth and with positive local factors. Since 1991, the slowdown in growth has been mainly associated with local factors.

FIGURE 2-T: TOTAL STATE AND LOCAL COMPONENTS OF CHANGE 1981 TO 1996



## 2.4. AVERAGE INCOMES

The ABS Population Census includes information on personal incomes. This provides the basis for comparing those incomes across the industries in which they work and from region to region. This information is provided in Table 2-K.

TABLE 2-K: INCOMES BY INDUSTRY 1996

1 Digit INDUSTRY	Median Annual Individual Incomes		
	LNE	NSW	LNE: NSW
	\$	\$	%
A Agriculture, Forestry & Fishing	17,400	18,035	96
B Mining	60,096	55,395	108
C Manufacturing	27,189	27,288	100
D Electricity, Gas & Water Supply	36,580	35,495	103
E Construction	26,087	27,430	95
F Wholesale Trade	26,348	28,612	92
G Retail Trade	15,884	17,571	90
H Accommodation, Cafes & Restaurants	16,255	18,014	90
I Transport and Storage	29,821	30,257	99
J Communication Services	32,156	32,965	98
K Finance and Insurance	26,724	31,574	85
L Property and Business Services	25,803	30,773	84
M Government Administration & Defence	30,678	32,593	94
N Education	31,961	32,286	99
O Health and Community Services	23,562	24,636	96
P Cultural & Recreational Services	19,658	25,485	77
Q Personal and Other Services	22,014	23,990	92
R Non-classifiable economic units	22,911	23,374	98
& Not stated	14,284	16,449	87
<b>Total</b>	<b>24,982</b>	<b>26,078</b>	<b>96</b>

Source: 1996 Census of Population and Housing

Note: Includes income of employed persons from all sources.

The LNE region has average incomes that are marginally below the NSW levels. In most the industries, incomes in the LNE region are lower than the NSW levels, however most are relatively close to the NSW averages. However, in the mining, manufacturing and electricity, gas and water supply sectors, they are equal to or higher than in NSW as a whole. The consequence of this is that the Hunter sub-region where these industries are concentrated is likely to enjoy higher average incomes than in the balance of the region. Elsewhere, the difficult conditions in farming, the lower earnings in some service sectors and a higher dependence on welfare payments are likely to lead to lower average incomes.

## 2.5. CONCLUSION

The LNE economy is one that is relatively large and growth has been substantial, especially in the second half of the 1980s. That growth has slowed down in the 1990s. There has been an improvement in the employment situation with a reduction in the unemployment rate. Overall, average incomes are near to those for NSW as a whole.

The LNE region is an amalgam of three disparate types of economies. As a result, the region appears to have a degree of diversity and robustness that may be misleading in

that the economic progress of the subregions may not be closely linked to each other. For example, the economic base derived from the mining, electricity and manufacturing of the Hunter may have little effect on the coastal and inland regions to the north of the Hunter.

The majority of the growth has occurred in the coastal areas, with population decline in inland areas such as Walcha, Armidale and Uralla. On the coast, fluctuations in the level of business activity are generally reflected in variations in the level of unemployment. In the inland areas, economic downturns are more likely to lead to people leaving the area so that the variations in unemployment are smaller. However, the loss of population threatens the continued existence of many of those communities.

The coastal areas have had a boost in population growth from retirees moving to the area. The coast is also attractive to visitors. In those parts of the region, there is strong growth in the range of services that support households and continued pressure on the provision of health and other welfare services.

In the Hunter area, there is a substantial mining, electricity and manufacturing industry that provides considerable diversity to the region as a whole. Some of these industries have been subject to rationalisation in recent years and contributed to a reduction in employment. However, they do provide a base for the development of new industries.

In this context, the forestry and wood processing industries have maintained their position up to 1996, relative to the trends in NSW as a whole. Since then, the IFA has generated further pressures for change that could be difficult to accommodate in some parts of the region. Further decline in the log supply would add to the level of unemployment in those areas in the short run. Subsequent developments in value adding and the processing of low-grade wood and existing softwood plantation wood are possible and would build employment in the industry.

Within the region as a whole, it would seem that adjustments in the availability of logs from SFNSW might only cause minor difficulties. However, there are parts of the region where an increase in business growth and employment will be difficult. That is likely to include the Timber Catchments 4 and 6 (see Figure 1-A) which have seen substantial cuts in log supply under the IFA. Some insights into these differences within the region are provided in the next section.

# 3. A SOCIAL PROFILE OF THE UNE REGION

## 3.1. INTRODUCTION

This chapter identifies:

- specific social catchments within the LNE CRA region;
- the demographic profiles of each social catchment;
- indicators of community sensitivity to change for each social catchment; and
- the number of forest and timber industry employees within each social catchment.

The information used in the analysis is based primarily on 1996 population census data and information on the location of licensed timber processing industries supplied by SFNSW.

## 3.2. DEFINITION OF SOCIAL CATCHMENTS

Social catchments represent geographically defined areas within the LNE CRA region that contain a network of interdependent towns that are likely to be related in terms of industry location, employee residential locations, local industry expenditure, employee household expenditure and the use of social infrastructure services by industry employees. The social catchment will often include a regional or sub regional centre and many smaller towns and communities which are dependent on these centres for the supply of goods and services to industry and industry employees.

Social catchments can best be described using survey data collected from industries and employees within a region, which provides locational information about the industries and industry expenditure and industry employees use of specific towns in the region (EBC, 1998). Without primary survey data to aid the definition and identification of social catchments, these catchments have to be defined through the use of other secondary information. In the following analysis, the social catchments for the LNE region were defined using information on

- the number of businesses, industries and other service providers located within specific towns (the number of functional units);
- the road network within the region;
- the distance between towns; and

- the density of towns and communities in the region.

### 3.2.1. Number of Functional Units in Towns

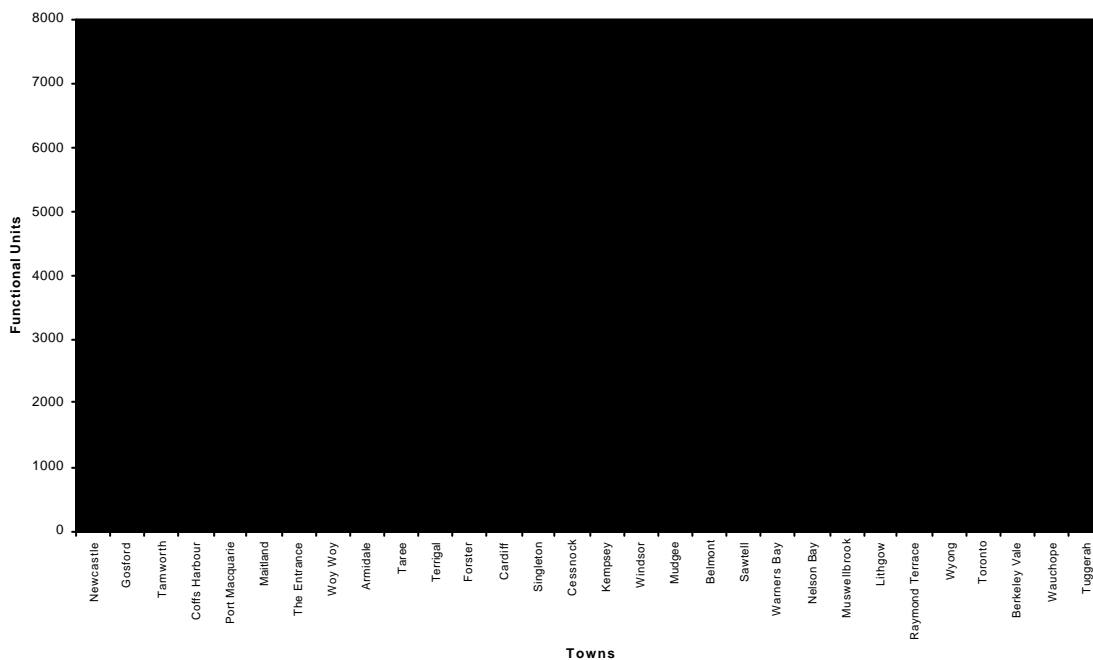
The Telstra Yellow Pages directory was examined in order to identify the number of functional units within towns in the LNE region. While the use of this directory is likely to underestimate the number of units within specific towns, it nevertheless provides a relative indication of the number of industries, businesses and service activities within towns. In addition to towns within the boundary of the LNE region other towns outside the boundary which may possibly affect towns within the region were also included. This included, for instance, the town of Tamworth.

Figure 3-A shows a plot of the number of functional units against specific towns within the LNE region. This figure, which shows towns with more than 300 functional units, suggests that a hierarchy of towns within the region exists, which consists of:

- major regional centres,
- regional centres and
- sub-regional centres.

Towns with less than 300 functional units represented small micro catchments within the region and included 45 towns with between 300 and 100 functional units, and 734 towns with less than 100 functional units.

FIGURE 3-A: NUMBER OF FUNCTIONAL UNITS IN TOWNS



The towns of Newcastle and Gosford are major regional centres for the LNE CRA region and are located at the top of the town hierarchy, representing major service centres for other towns in the region. Regional centres include the towns of Tamworth, Coffs Harbour, Port Macquarie, Maitland, The Entrance, Woy Woy, Armidale and



Taree. These towns have smaller catchments than the major regional centres, and service other smaller towns localised within the vicinity of each regional centre.

### 3.2.2. Identification of Social Catchments

The identification of social catchments is particularly important in defining a geographic area, which consists of communities and townships that are inter-dependent and inter-related. The use of LGAs or other geographic boundaries are often defined on the basis of specific administrative criteria and do not necessarily reflect the social and economic inter-dependencies at the local level. In addition, the use of larger administrative boundaries often masks important social and economic variation occurring within the region. In contrast to the use of existing administrative boundaries such as LGAs, an analysis of specific towns is also often too narrow to be of use as again many towns will be socially and economically interdependent within a specific geographic region.

The use of social catchments provides a meaningful unit of social and economic analysis at the local level, which is not artificial as is the case when other administrative boundaries are used, and which accounts for much of the inter-town dependencies at the local level. The social catchments that have been identified for the LNE region define approximate geographic regions at the local level which are likely to consist of towns or localities which include,

- the employees' place of employment,
- the employees' place of residence,
- towns from which employees access social infrastructure services and facilities, and
- locations in which employees source their household expenditure on goods and services. At the industry level, social catchments also often consist of those towns in which localised industry expenditure occurs.

Social catchments were defined through:

- an examination of the existing road network in the LNE region,
- the geographic distribution of towns, and
- the application of a gravity model to identify accurately the boundaries of town catchments across existing road networks.

When using the gravity model to identify the catchment boundary between two towns, the number of functional units within a town (Figure 3-A) was used to identify the attractive power of each town. The distance between each town was measured in relation to the number of road kilometres between towns. The gravity formula given below was used to identify the catchment boundary between major regional, regional and several sub regional towns as identified in Figure 3-A.

$$D_{AB} = \frac{T_{AB}}{1 + \sqrt{(S_B / S_A)}}$$

Where:  $D_{AB}$  is the distance of the catchment boundary in kilometres from town A to town B  
 $T_{AB}$  is the distance in kilometres between pairs of towns A and B  
 $S_A, S_B$  is the attractive power of towns A and B measured in relation to the number of functional units found within each town.

While the gravity model identified the approximate catchment boundary between towns on the basis of the existing road network, each catchment was also to be described using demographic information derived from the 1996 census. As the smallest unit of analysis for census data is the census collector district (CCD), the boundaries of census collector districts were ultimately used to define the catchment boundary. As such each catchment consisted on the aggregation of a number of census collector districts which approximated the catchment boundary as defined by the gravity model.

Through this procedure, and as shown in Figure 3-B, 27 social catchments were defined. For each social catchment, a demographic profile and timber and forest industry profile is also given in Attachment 4.

### 3.3. SOCIO-DEMOGRAPHIC PROFILES

Population Census information (1996) was used as the basis for identifying specific socio-demographic profiles. The 27 profiles selected are shown in Table 3-A. Several profiles were selected in order to provide descriptive information about the community. These profiles included population size, the number of occupied private dwellings, occupancy rate, employment in agriculture, forestry and fishing and employment in manufacturing industries. Other profiles were selected on the basis that they provided an indication of advantage or disadvantage within the community, or that they were indicators of community vulnerability or sensitivity to change. Such profiles included age dependency, unemployment rates, workforce participation, and family occupation, income and educational characteristics.

Figures 1 to 53 in Attachment 4 show the demographic profiles for each of the social catchments and the value for each profile relative to the LNE region and NSW rural areas. The value for each profile within each social catchment was also transformed into a standard score using a Z-score transformation, with a mean equal to zero and standard deviation of 1.00. Figures 1 to 53 in Attachment 4 show for each social catchment whether the profile for the catchment is within plus or minus 1.00 standard deviation from the mean. If so, it is therefore considered 'average' when compared to the region as a whole. Otherwise, the profile falls 'below average' when less than 1.00 standard deviation below the mean or is 'above average' when greater than 1.00 standard deviation above the mean. Visual inspection of the bar charts of standard score transformations shown for each catchment clearly show which specific socio-demographic profiles are below or above the average for the LNE region and NSW rural areas.

FIGURE 3-B: SOCIAL CATCHMENTS

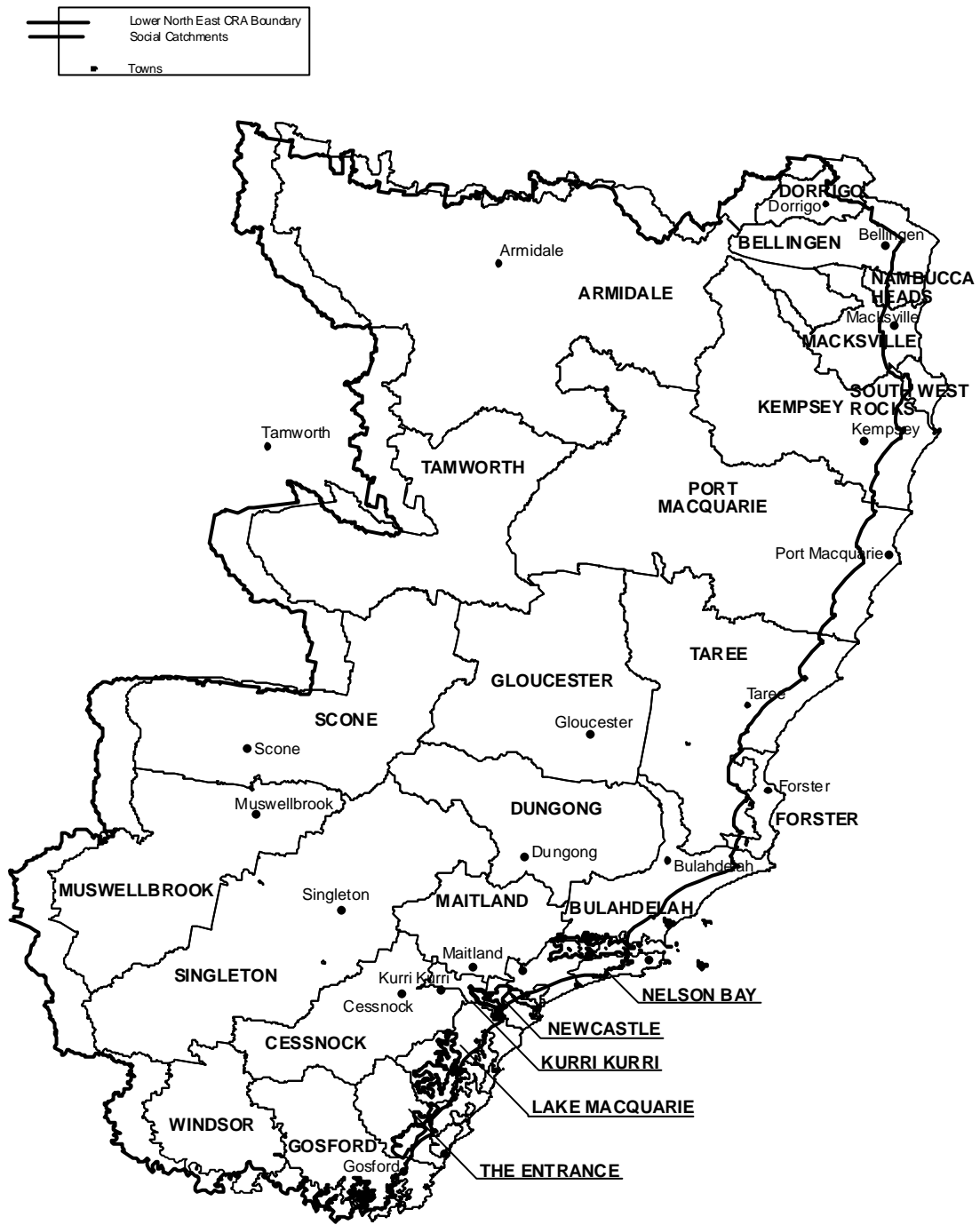


TABLE 3-A: SOCIO-DEMOGRAPHIC PROFILES

Socio-Demographic Profile	Definition
Number of Occupied Private Dwellings	
Resident Population	
Occupancy Rate	Resident population/Number of occupied private dwellings
Percent Rental Accommodation	As a percentage of all private dwellings
Percent Public Housing	As a percentage of all private dwellings
Percent Aged 14 and Below	As a percentage of the total resident population
Percent Aged 15 to 64	As a percentage of the total resident population
Percent Aged 65 and Above	As a percentage of the total resident population
Dependency Ratio	Ratio of the percentage of the population below 14 years of age and above 65 years of age to the percentage aged between 15 and 64 years. Scores in excess of 100 indicate more people in the dependency age groups (below 14 and over 65) than people in the non-dependency age group (15-64 years). Scores below 100 indicate more people in the non-dependency age group when compared to the dependency age groups.
Unemployment Rate	The number of all unemployed persons expressed as a percentage of the workforce.
Unemployment Rate (15-19 year olds)	The number of unemployed persons between 15 and 19 years of age expressed as a percentage of the workforce aged between 15 and 19 years of age.
Unemployment Rate (Males 25-44 years)	The number of unemployed males between 25 and 44 years of age expressed as a percentage of the male workforce aged between 25 and 44 years of age. This profile was included as the majority of timber industry employees are males between 25 and 44 years of age (EBC, 1997; 1998)
Workforce Participation Rate	The number of persons in the labour force expressed as a percentage of the total number of persons aged 15 years and over
Weekly Family Income Less than \$299	Percentage of all one family households with a weekly household income less than \$299
Percent Separated or Divorced	The number of all separated and divorced persons expressed as a percentage of all persons over 15 years of age.
Percent Speaking English Not at All or Poorly	The number of persons indicating they do not speak English or speak English poorly as a percentage of all persons born overseas and aged over 5 years.
Percent Left School Aged Less than 15 Or Never Attended	The number of persons who left school less than 15 years of age or never attended as a percentage of all persons over 15 years of age.
Percent Aged 15 years and Over With No Qualifications	The number of persons aged 15 years and over with no qualification as a percentage of the number of people aged 15 years and over.
Percent One Parent Families	The number of one parent families in occupied private dwellings as a percentage of all families in occupied private dwellings
Percent of One Family Households With No Motor Vehicle	The number of one family households with no vehicles as a percentage of all occupied private dwellings
Percent of Labourers and Related Workers	The number of labourers and related workers as a percentage of all employed persons
Percent Aboriginal and Torres Strait Islanders	The number of persons indicating Aboriginal, Torres Strait Islander or both Aboriginal and Torres Strait Islander origin as a percentage of all persons
Percent Employed in Agriculture, Forestry and Fishing	The number of persons employed in industries defined as agriculture, forestry or fishing as a percentage of all employed persons
Percent Employed in Manufacturing	The number of persons employed in industries defined as manufacturing as a percentage of all employed persons.

Source: ABS (1996).

Prepared by: EBC (1998).

### 3.3.1. Community Sensitivity Indices

In addition to describing specific socio-demographic profiles for each social catchment further analysis of these profiles was also undertaken in order to identify core indicators of community sensitivity to change or vulnerability.

Within the UNE and LNE Regions 2,646 census collector districts were identified and the value on 16 socio-demographic profiles identified for all census collector districts.

The matrix of 2,646 collector districts by 16 socio-demographic profiles was then clustered using a Wards Clustering Method based on a Euclidian distance function. Table 3-B shows the final cluster solution in the form of a dendrogram.

TABLE 3-B: CLUSTER ANALYSIS OF DEMOGRAPHIC PROFILES

	0	5	10	15	20	25
Indictors	+-----+-----+-----+-----+-----+					
Total unemployment	-------+					
Unemployed 24-44 yrs	--+	+-----+				
Family income < \$299	-----+			+-----+		
Left school less 15	-----+		I	I		
% With no qualification	-----+		+-----+		I	
% Labourer or related	-----+				+-----+	
% Rental Accommodation	---+	-----+		I	I	
% Families no vehicle	---+	+-----+		I	I	
% Separated or divorced	-----+			I	I	I
% One parent families	-----+			+-----+		I
% Aboriginal & Torres	-----++					I
% Unemployed 15-19yrs	-----+ I					I
% Speaking poor English	-----+					I
% Aged less 14 years	-----+-----+					I
Dependency ratio	-----+		+-----+			
% Aged over 65 years	-----++					

The cluster analysis presented in Table 3-B indicated that the demographic profiles clustered into four core groups. These included:

- Unemployment and Income,
- Education and Occupation,
- Family and Housing and
- Age Dependency.

Table 3-C shows the specific profiles within each of the four core groups.

The standard score transformation of each profile within each of the four clusters was summed and averaged which provided a single standard score for each of the four community sensitivity indices. Figures 1 to 53 in Attachment 4 show each of the four community sensitivity indices expressed as a standard score with a mean of zero and a standard deviation of 1.00. As was the case with the individual demographic profiles, Figures 1 to 53 in Attachment 4 also show each of the four community sensitivity indices for each social catchment. An index which is within plus or minus 1.00 standard deviation of the mean, is considered 'average' when compared to the region as a whole. Visual inspection of the bar charts for each of the four indices clearly shows which specific indices are below or above the average when compared to the LNE region as a whole or when compared to all NSW rural areas.

TABLE 3-C: FOUR CLUSTER SOLUTION OF DEMOGRAPHIC PROFILES

<b>Cluster</b>	
<b>Unemployment and Income</b>	<b>Family and Housing</b>
Total unemployment	Percent dwellings rented
Unemployment (25-22 years)	Percent families with no vehicle
Weekly family income <\$299	Percent separated and divorced
	Percent of one parent families
<b>Education and Occupation</b>	<b>Age Dependency</b>
Left school before 15 Years	Percent aged 14 years or less
Percent over 15 years with no qualifications	Percent aged 65 years or greater
Percent labourer or related workers	Dependency ratio

Source: *EBC (1998).*

FIGURE 3-C: COMMUNITY SENSITIVITY INDEX: UNEMPLOYMENT AND INCOME AGAINST NUMBER OF FOREST & TIMBER EMPLOYEES (LNE RELATIVE)

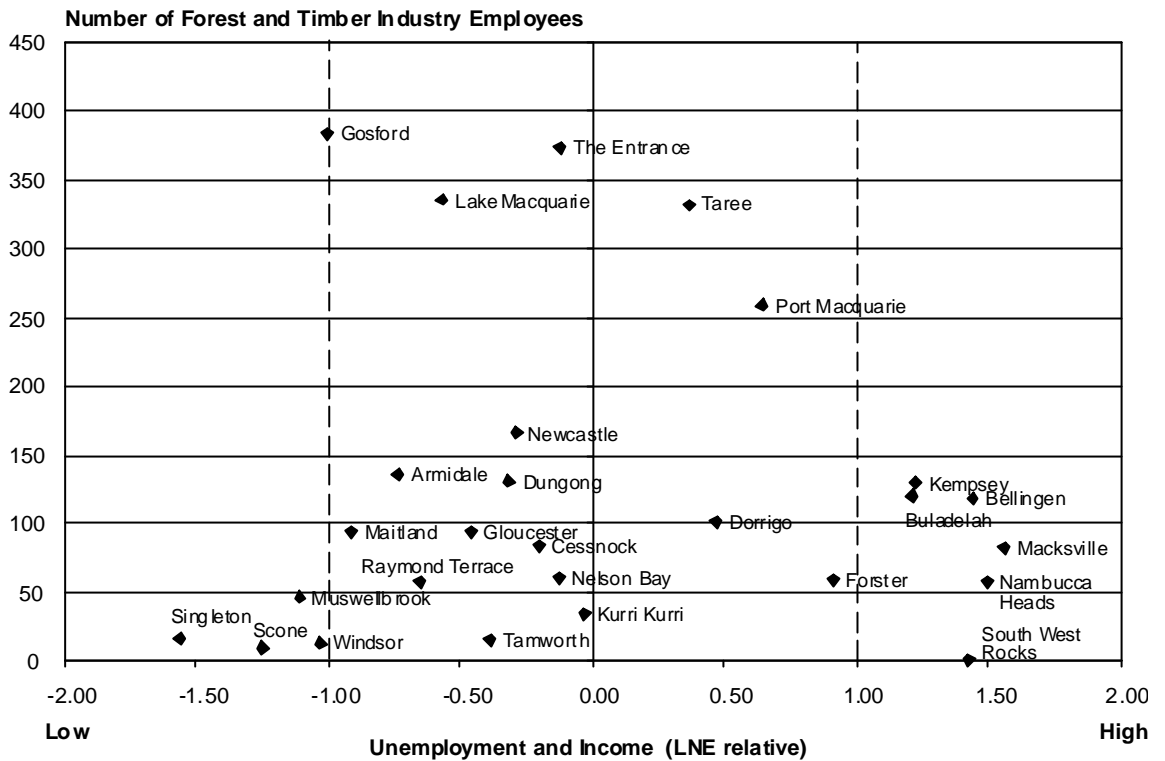


FIGURE 3-D: COMMUNITY SENSITIVITY INDEX: UNEMPLOYMENT AND INCOME AGAINST NUMBER OF FOREST & TIMBER EMPLOYEES (NSW RURAL RELATIVE)

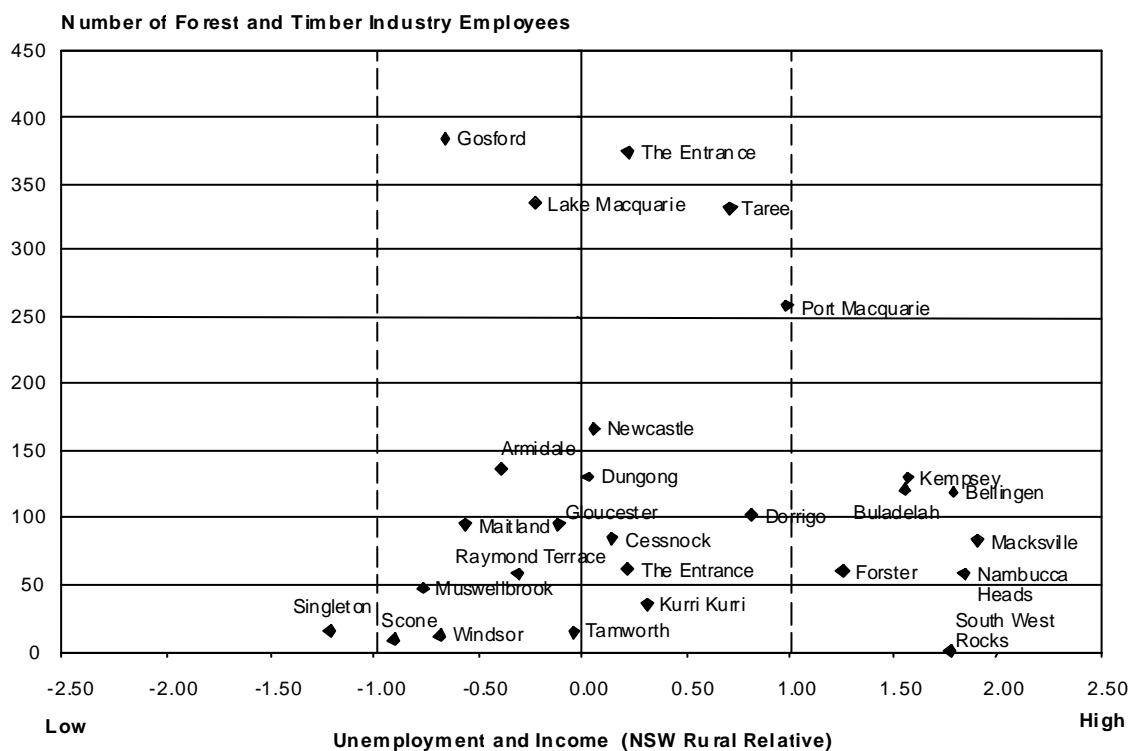


FIGURE 3-E: COMMUNITY SENSITIVITY INDEX: UNEMPLOYMENT AND INCOME AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN TIMBER INDUSTRY (LNE RELATIVE)

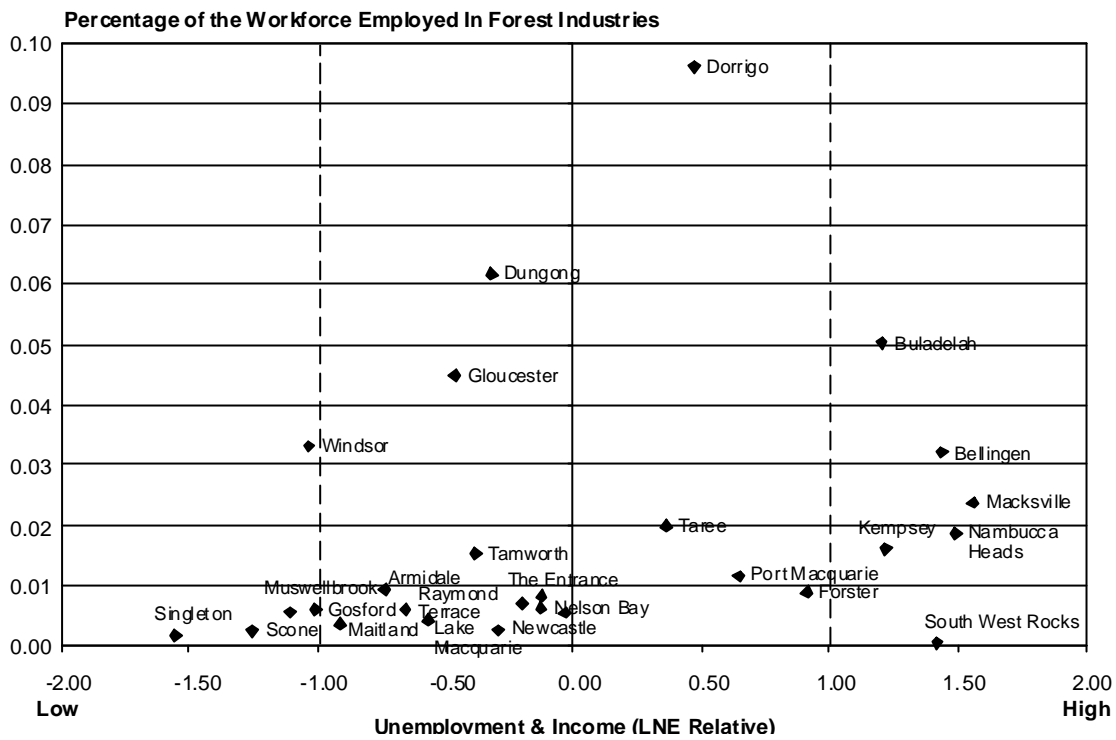


FIGURE 3-F: COMMUNITY SENSITIVITY INDEX: UNEMPLOYMENT AND INCOME AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN TIMBER INDUSTRY (NSW RURAL RELATIVE)

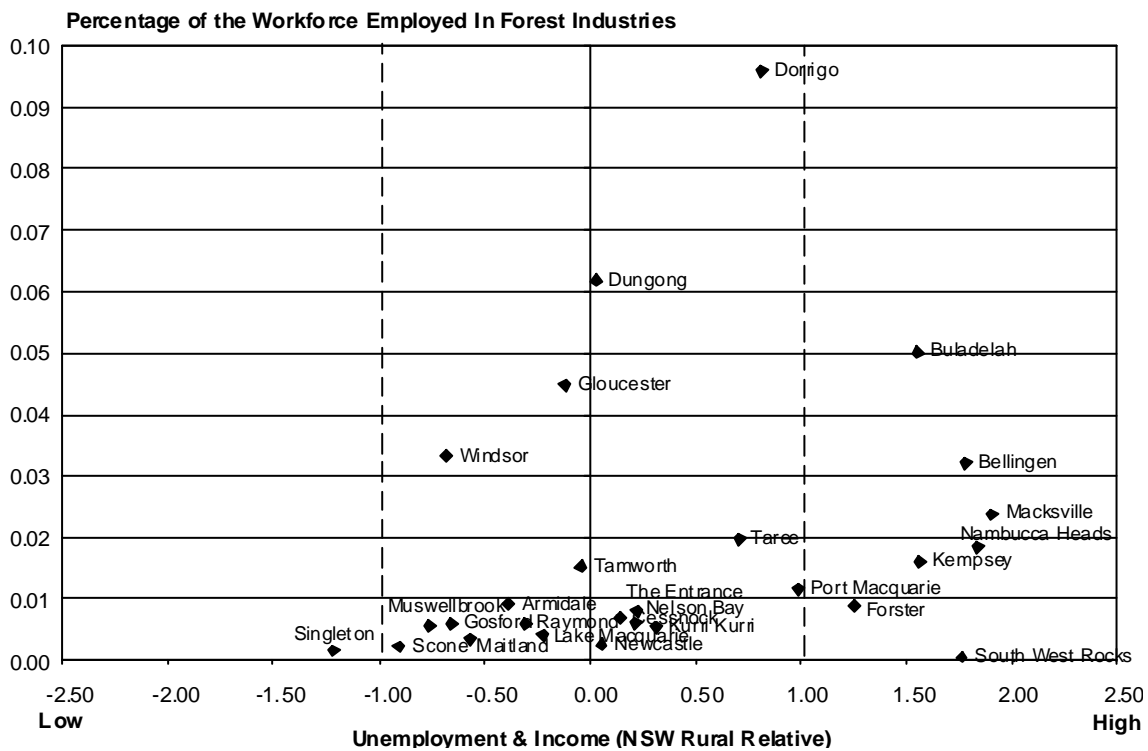




FIGURE 3-G: COMMUNITY SENSITIVITY INDEX: EDUCATION AND OCCUPATION AGAINST NUMBER OF FOREST & TIMBER EMPLOYEES (LNE RELATIVE)

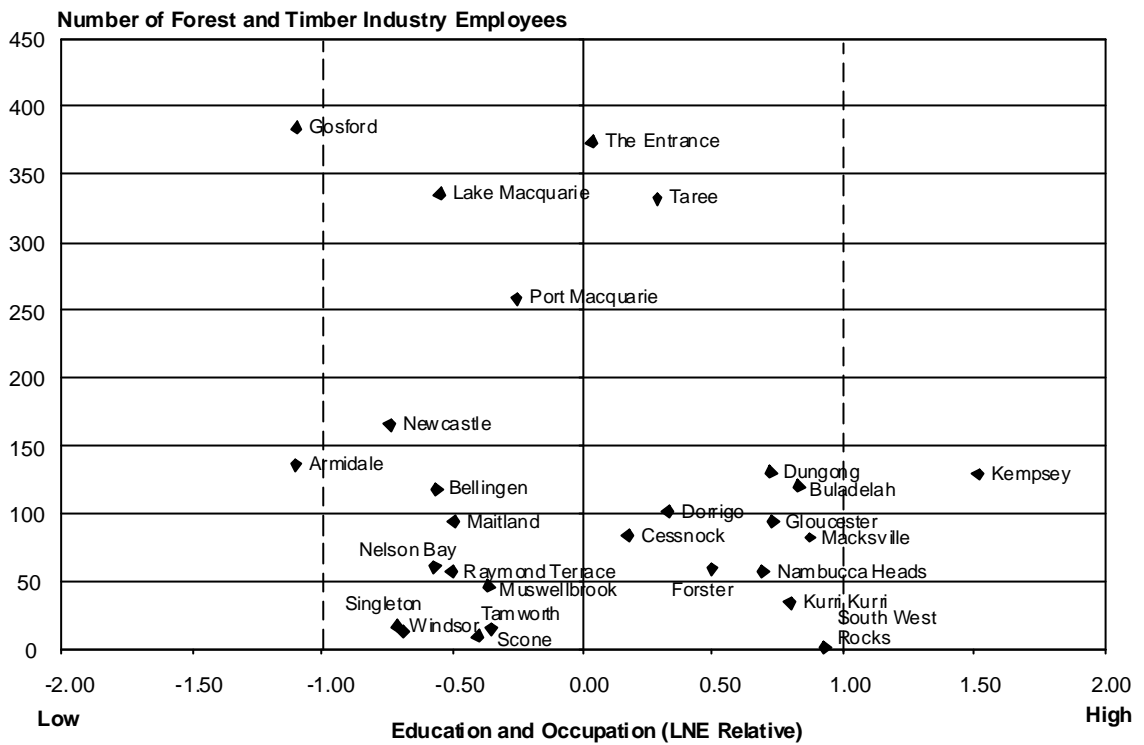


FIGURE 3-H: COMMUNITY SENSITIVITY INDEX: EDUCATION AND OCCUPATION AGAINST NUMBER OF FOREST & TIMBER EMPLOYEES (NSW RURAL RELATIVE)

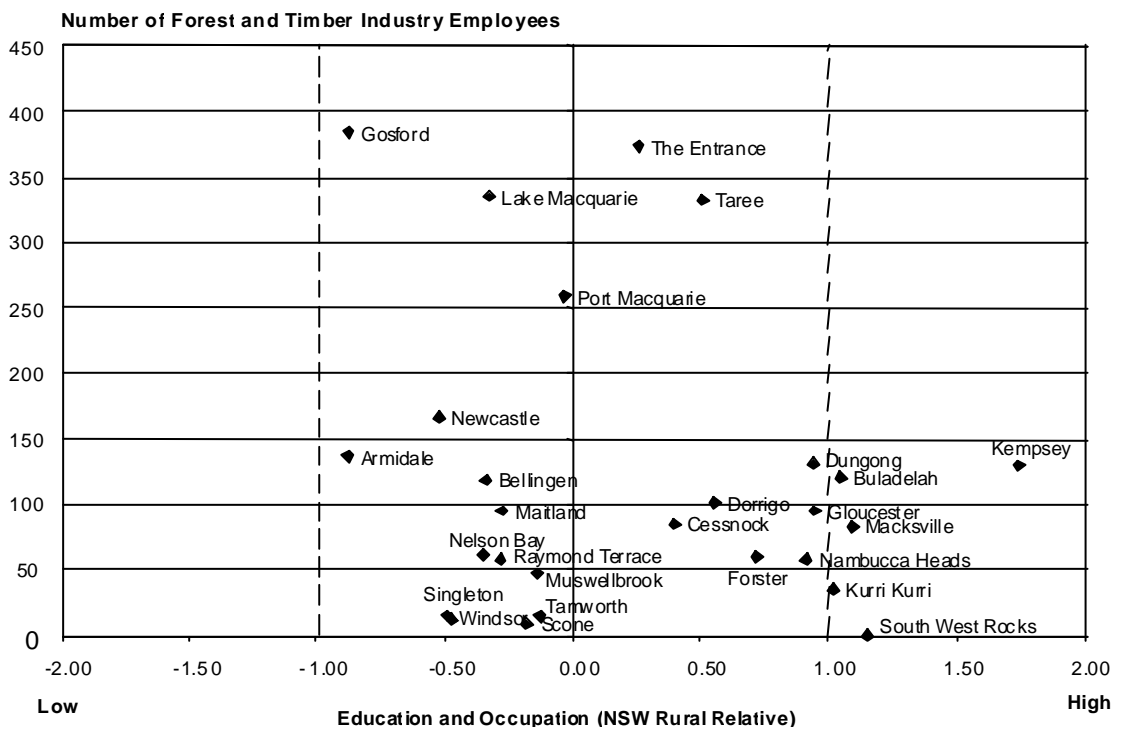


FIGURE 3-I: COMMUNITY SENSITIVITY INDEX: EDUCATION AND OCCUPATION AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (LNE RELATIVE)

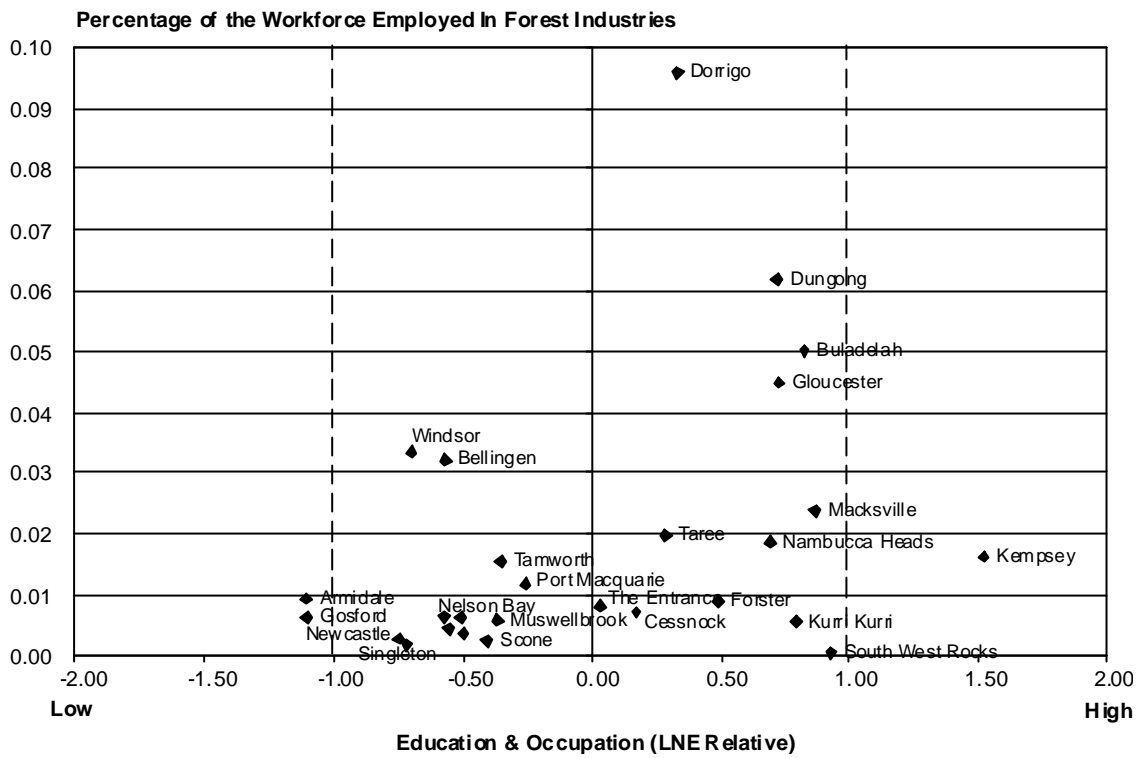


FIGURE 3-J: COMMUNITY SENSITIVITY INDEX: EDUCATION AND OCCUPATION AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (NSW RURAL RELATIVE)

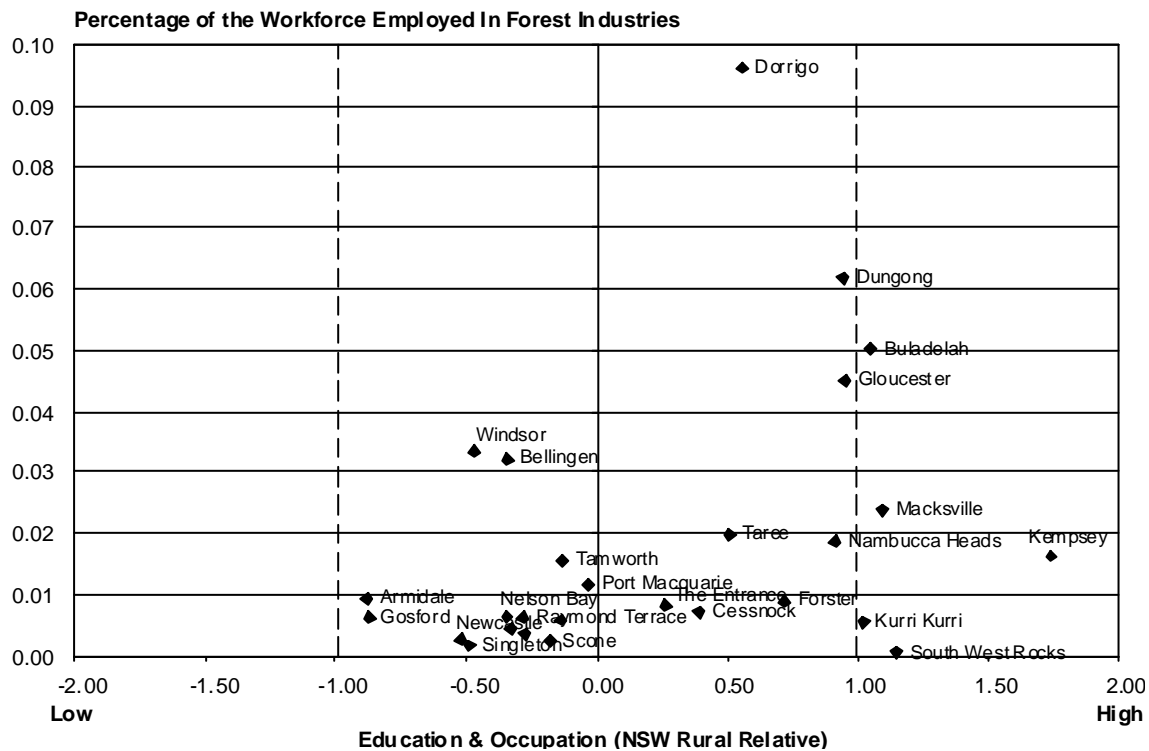


FIGURE 3-K: COMMUNITY SENSITIVITY INDEX: FAMILY AND HOUSING AGAINST NUMBER OF FOREST & TIMBER EMPLOYEES (LNE RELATIVE)

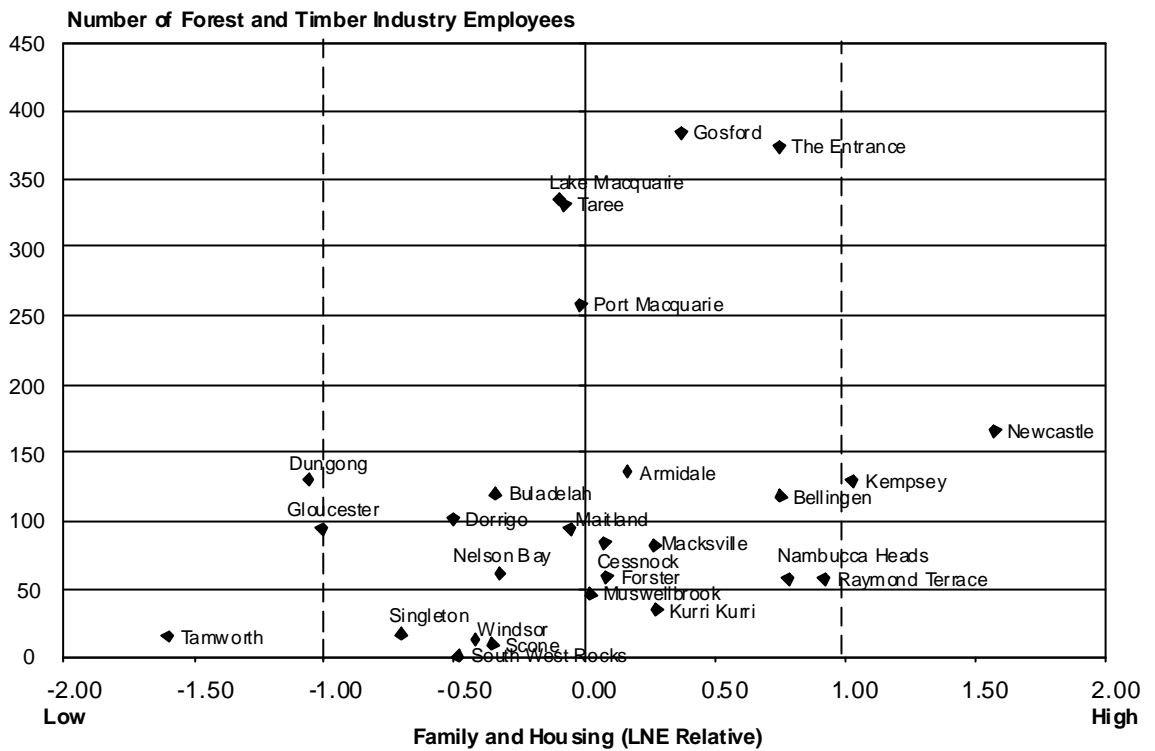


FIGURE 3-L: COMMUNITY SENSITIVITY INDEX: FAMILY AND HOUSING AGAINST NUMBER OF FOREST & TIMBER EMPLOYEES (NSW RURAL RELATIVE)

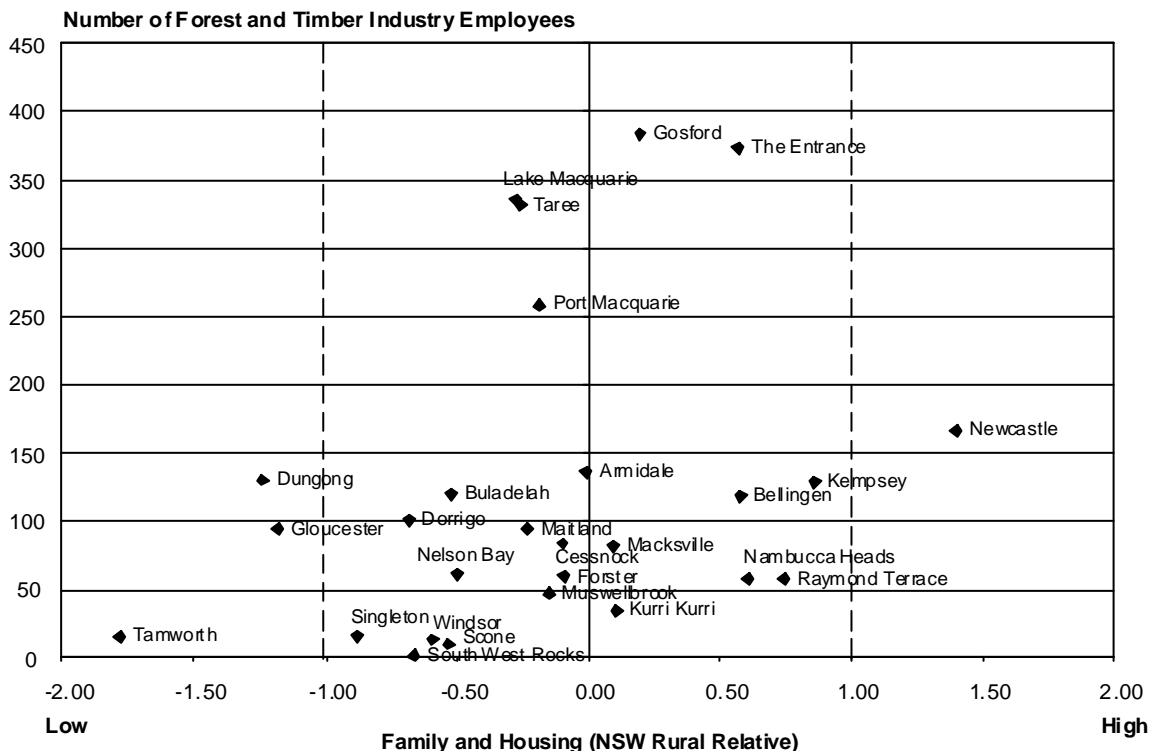


FIGURE 3-M: COMMUNITY SENSITIVITY INDEX: FAMILY AND HOUSING AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (LNE RELATIVE)

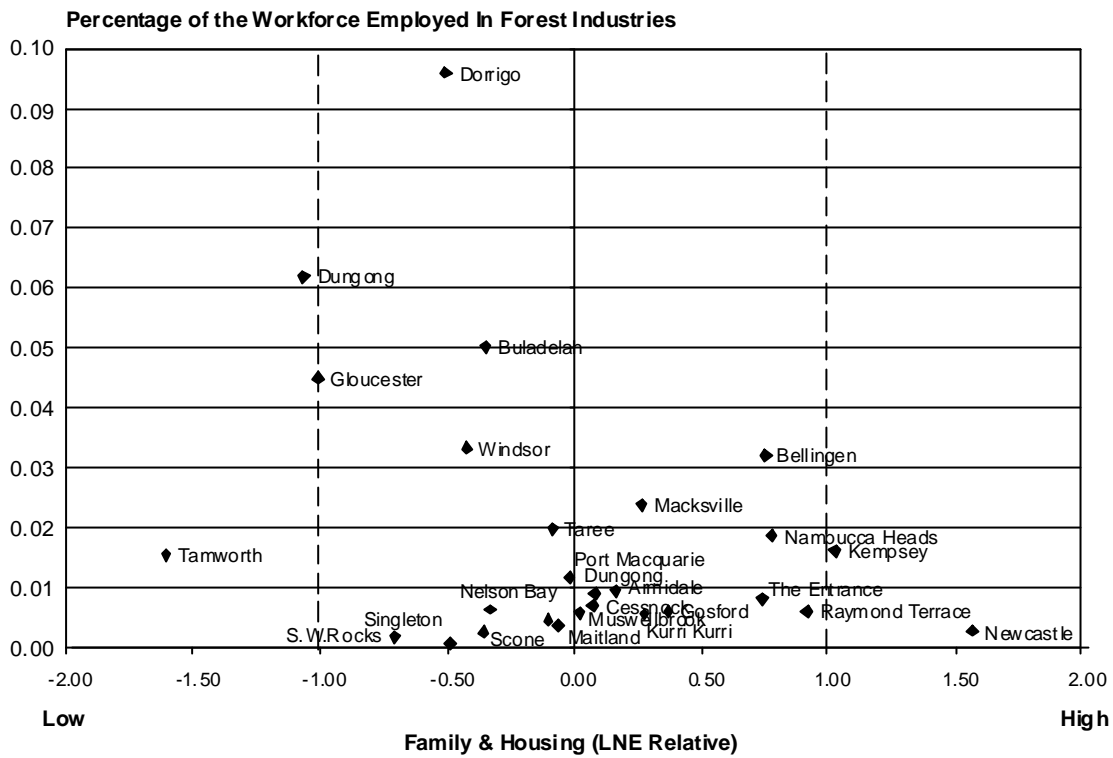


FIGURE 3-N: COMMUNITY SENSITIVITY INDEX: FAMILY AND HOUSING AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (NSW RURAL RELATIVE)

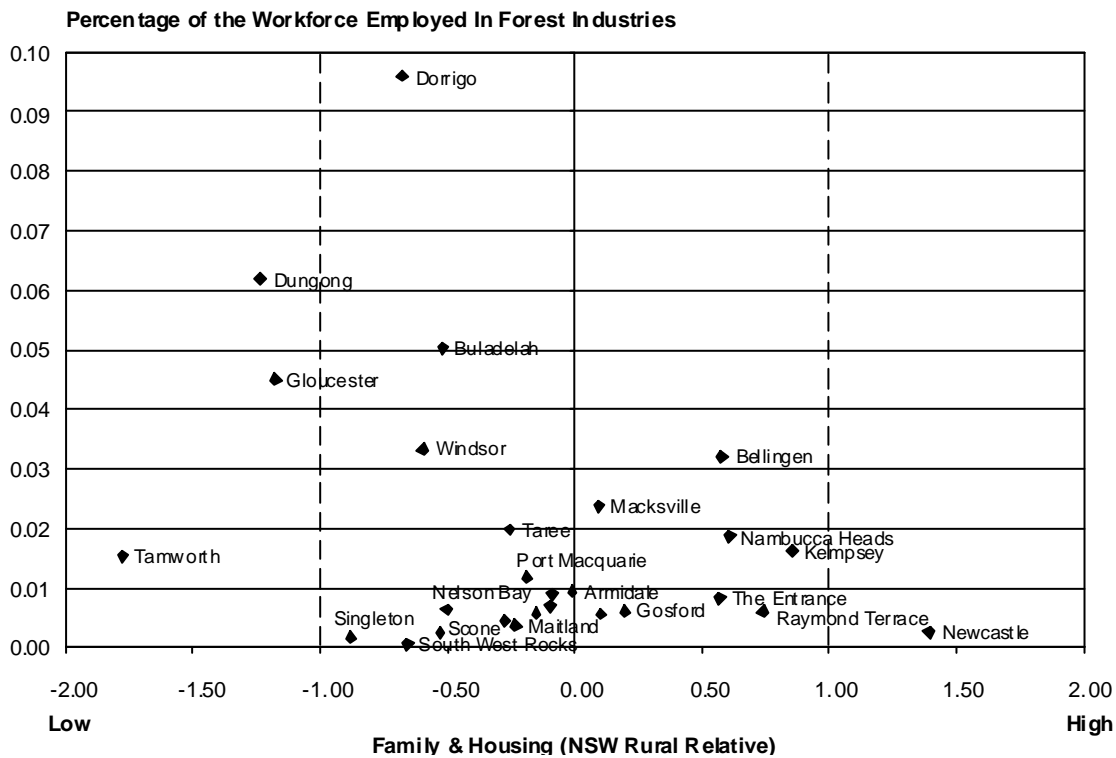


FIGURE 3-O: COMMUNITY SENSITIVITY INDEX: AGE DEPENDENCY AGAINST NUMBER OF FOREST & TIMBER EMPLOYEES (LNE RELATIVE)

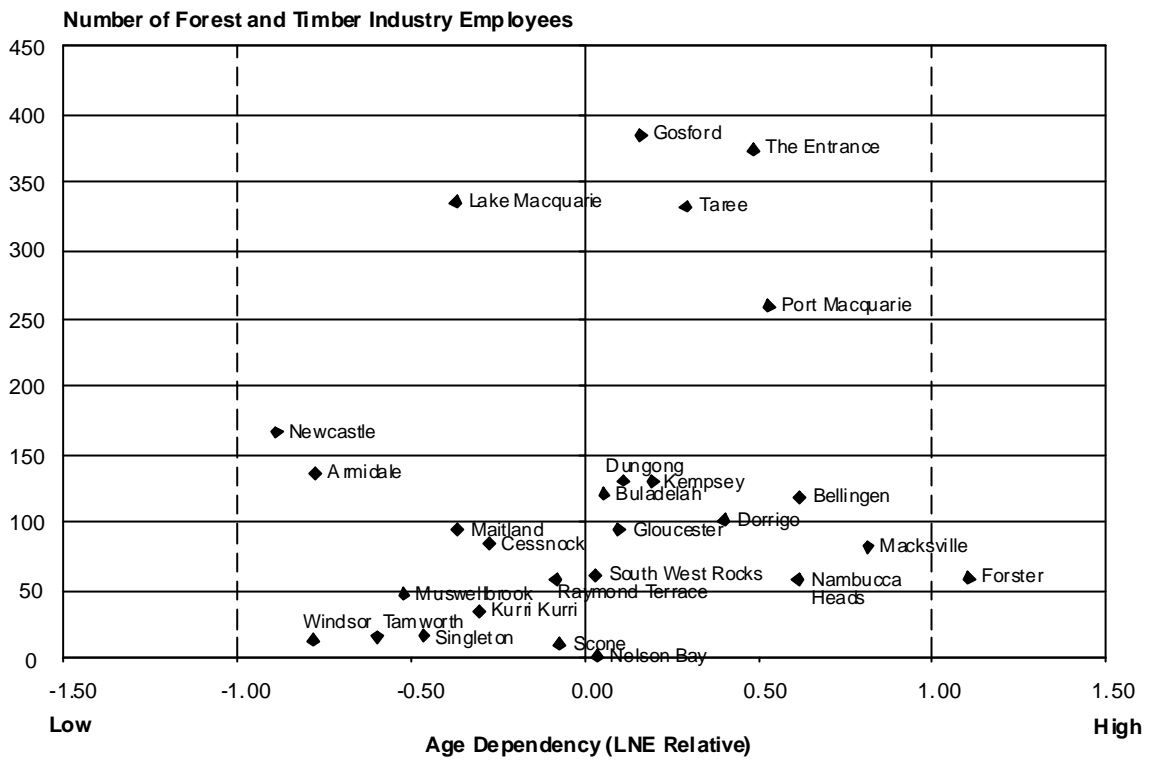


FIGURE 3-P: COMMUNITY SENSITIVITY INDEX: AGE DEPENDENCY AGAINST NUMBER OF FOREST & TIMBER EMPLOYEES (NSW RURAL RELATIVE)

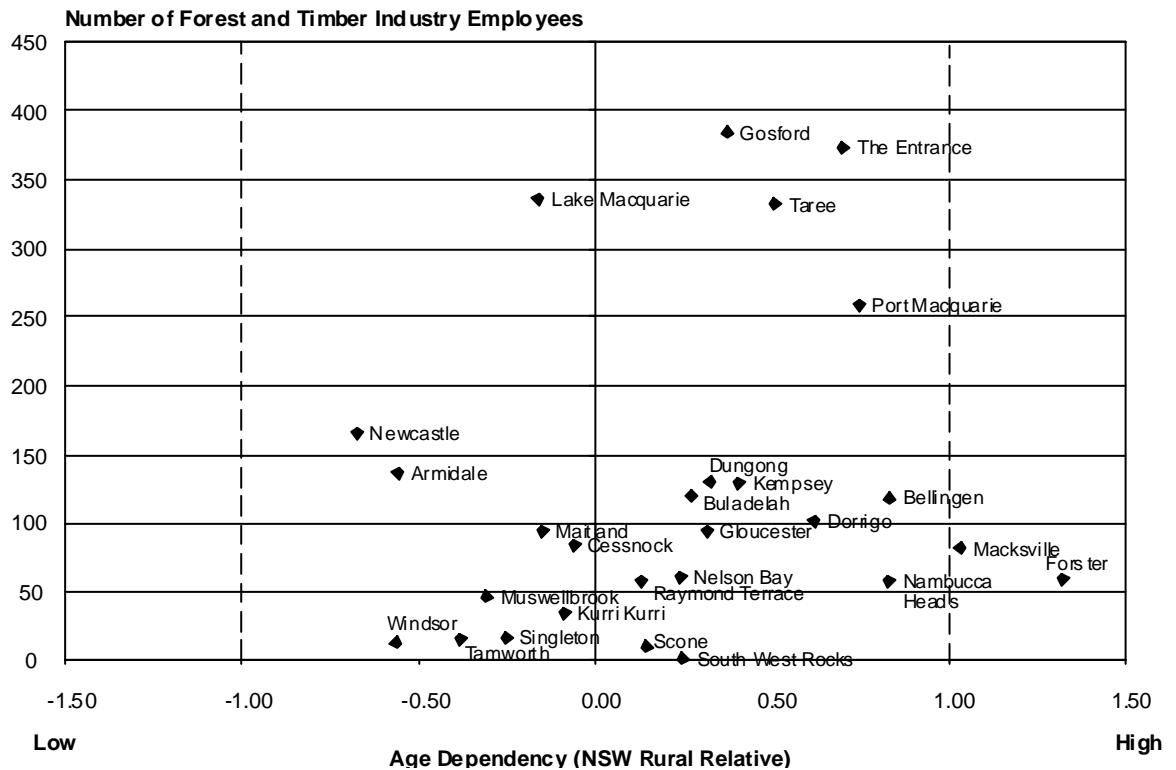


FIGURE 3-Q: COMMUNITY SENSITIVITY INDEX: AGE DEPENDENCY AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (LNE RELATIVE)

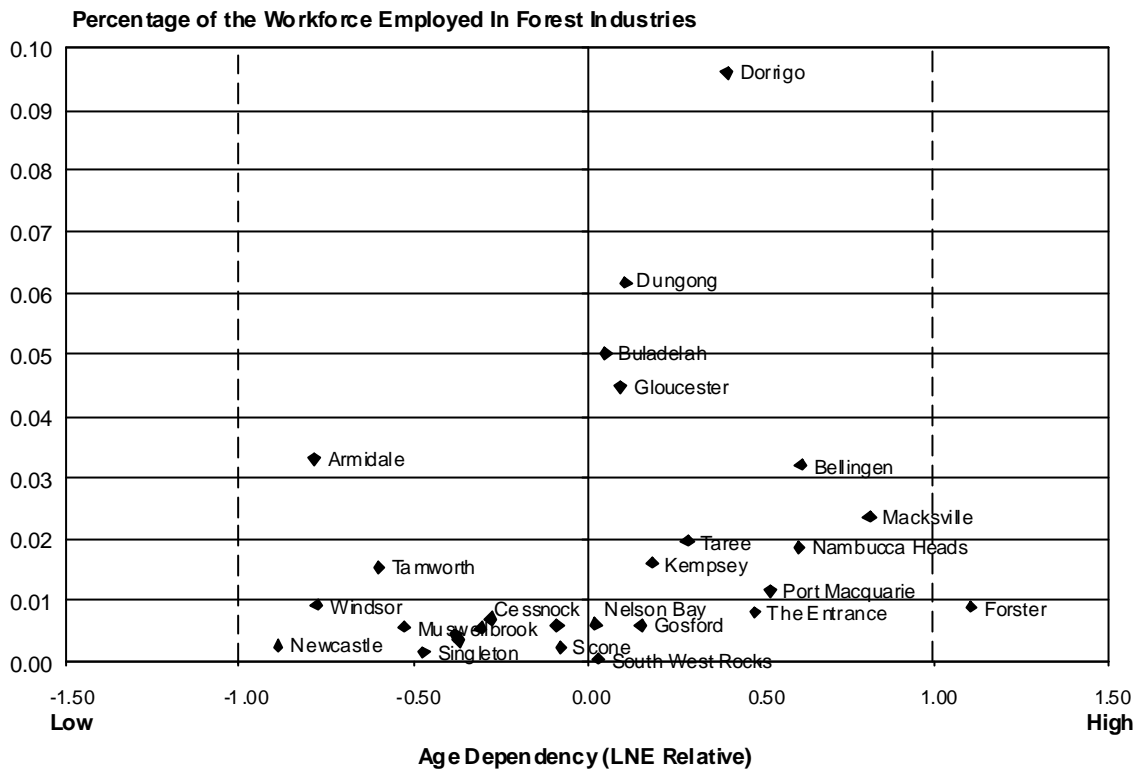


FIGURE 3-R: COMMUNITY SENSITIVITY INDEX: AGE DEPENDENCY AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (NSW RURAL RELATIVE)

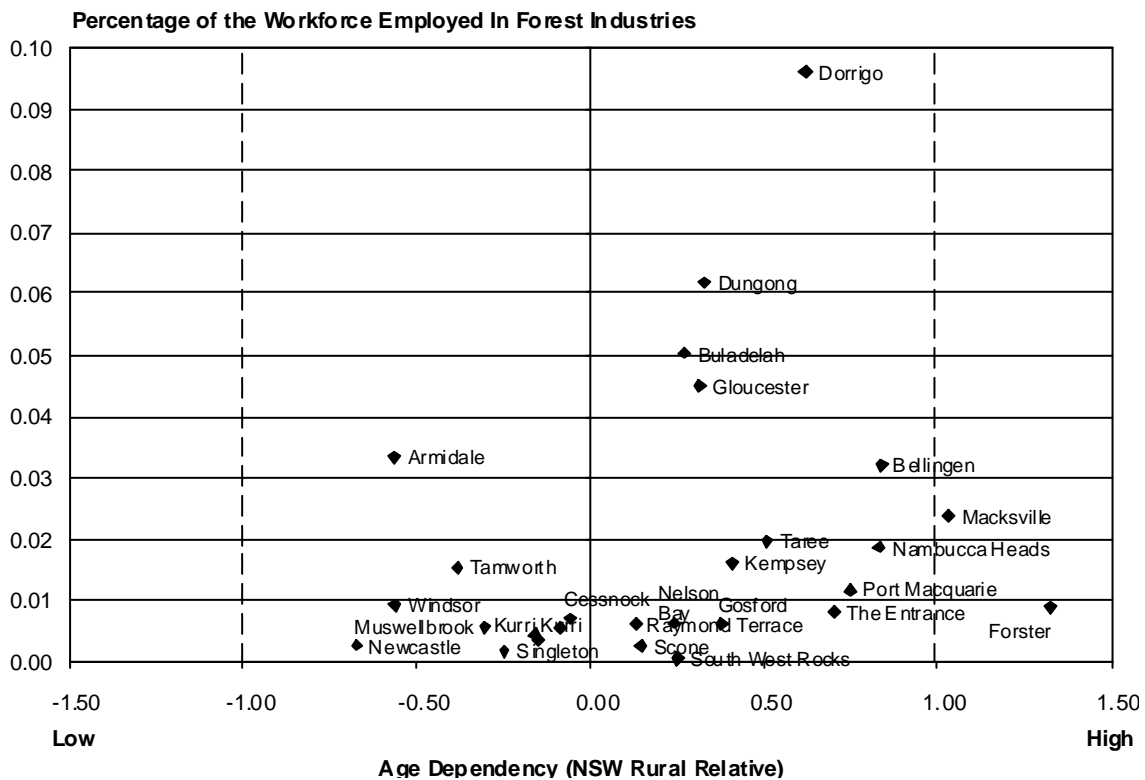


Figure 3-C shows the variation in unemployment and income across all social catchments in the LNE region in relation to the number of forest and timber industry employees within the catchment. The catchments of Macksville, Nambucca Heads, South West Rocks, Bellingen, Kempsey, Buladelah and Forster all have high levels of unemployment and low family incomes when compared to the UNE Region and all NSW rural areas. However, as shown in figure 3C, these catchments have relatively low numbers of forest and timber industry employees. On the other hand, the catchments of Port Macquarie, Taree and The Entrance have relatively moderate levels of unemployment and low family incomes and also have the highest absolute numbers of forest and timber industry employees. These catchments, as they have relatively moderate levels of unemployment and low family incomes, would be particularly sensitive to any further changes in the timber and forest industry workforce.

Figure 3-E also shows the variation in unemployment and income across all social catchments in the LNE region, but does so in relation to the percentage of the workforce employed in forest industries within each catchment, rather than the absolute numbers of forest and timber industry employees. The social catchments of Dorrigo and Buladelah have not only a number of forest and timber industry employees, but also a relatively high percentage of the total workforce employed in forest industries. This again suggests that these catchments maybe particularly sensitive to any further changes in the timber and forest industry workforce.

Figures 3-G and 3-H show the variation across social catchments in relation to education and occupation, with high sensitivity to change on this index reflecting low educational levels and a relatively unskilled workforce. As shown in these figures, the social catchments of The Entrance and Taree have not only relatively high absolute numbers of forest and timber industry employees but they are also catchments that are relatively sensitive to change in relation to education and occupation.

Although The Entrance and Taree catchments have high absolute numbers of forest and timber industry employees, when the percentage of the total workforce employed in forest industries is considered, the catchments of Dorrigo, Dungong, Buladelah and Gloucester are found to have a relatively high percentage of their workforce employed in forest industries (Figures 3-I and 3-J). These catchments are again moderately sensitive to change in relation to the education and occupation index when compared to the LNE region and all NSW rural areas.

Figures 3-K and 3-L show variation in the family and housing index across all social catchments in the LNE region. High sensitivity to change on this index is associated with a high percentage of rental dwellings, separated and divorced families and one-parent families. As shown in figures 3-K and 3-L, Gosford and The Entrance are catchments with high absolute numbers of forest and timber industry employees and with moderate sensitivity to change on this index. However, as shown in figures 3-M and 3-N, Gosford and The Entrance have relatively low percentages of the total workforce employed in forest industries. On the other hand, the social catchment of Bellingen, while it has moderately low absolute number of forest and timber industry employees when compared to other catchments, does have a high percentage of its workforce employed in forest industries. This catchment, as shown in figures 3-M and 3-N is also moderately sensitive to change in relation to the family and housing index.

Figures 3-O and 3-P show variation in age dependency across each of the social catchments in the LNE region. High sensitivity to change in age dependency is associated with a high percentage of younger (less than 14 years of age) and older (over 65 years of age) persons in the population relative to those aged between 15 and 64 years of age. Age dependency was found to be particularly high in the social catchments of Forster and Macksville, however, these catchments have relatively low numbers of forest and timber industry employees. On the other hand, Gosford, The Entrance, Taree, and Port Macquarie have moderate levels of age dependency and a relatively large absolute number of forest and timber industry employees (figures 3-O and 3-P). In contrast, figures 3-Q and 3-R show that it is the catchments of Dorrigo, Dungog, Bulahdelah and Gloucester which have a high percentage of the total workforce employed in forest industries and which also have moderate levels of age dependency.

Overall the catchments of Dorrigo, Bulahdelah, Dungog and Gloucester appear most sensitive to adjustments that might occur in the timber industry. The next but lower level of sensitivity would include Port Macquarie, Taree, Gosford and The Entrance.



# 4. THE LNE FORESTRY INDUSTRY

## 4.1. INTRODUCTION

The task in this section is to provide some background on the LNE forestry industry, recent developments affecting the industry and the preparation of a profile of the industry in 1997/98. The latter has been developed from a number of sources as explained in section 4.4 while the profile is presented in section 4.5. That provides the basis for the discussion in section 5 on how a selection of proposed changes to the industry will impact on the regional economy.

Early in this study, reference has been made to the contribution of the forestry industry to the LNE regional economy. It was also noted that there had been structural adjustments in the industry prior to 1996 related to the access to native forests in the region. Governments have been responding to changing community attitudes to forestry and to new ways in which the community may use native forests.

In 1996, the NSW Government initiated a review of the use of NSW forests. This was known as the Interim Assessment Process (as a first step in the process toward a Regional Forest Agreement). That included a consultative process among the various stakeholders and government agencies involved in forest management. It also included a number of studies to build scientific information about the forest areas and related industries.

Among the issues researched were the economic contribution of the forestry industries to the regional economies and the possible impact of a reduction in the supply of logs available to processors (CARE 1996). An important element in that research involved considering the ways in which processors may respond to a reduction in log supply. CARE identified the following possibilities:

- Operate on reduced throughput and lower variable costs and continue to operate until the need for major capital replacement arises, then make a decision about continuing to operate at all.
- Purchase additional entitlements from other firms that have decided to close or focus on some particular timber species/product.
- Sell reduced entitlements (and so close the business) to other processors that are seeking to maintain/expand their operations.
- Seek alternative sources of logs from plantations, private lands or imports.

- Expand into other types of timber processing.
- Seek to operate at a lower throughput but produce higher value products.
- Seek alliances/amalgamations with other similarly affected firms.
- Take over some operations that are currently out-sourced.
- Seek higher return niche markets.

These responses vary from actions that any miller may take unilaterally through to those actions that involve some collaboration among millers. But there would be a number of other factors that might influence the way particular mills might respond to the change in log supply including:

- SFNSW contractual arrangements,
- the objectives of the firm,
- the type of ownership,
- the location of the mill *vis-à-vis* timber supply,
- the products produced,
- production affiliations,
- the current technology and investments,
- the capacity of the firm and current operating levels,
- the capital structure and financial position,
- the family and business life cycle,
- the marketing systems and affiliations,
- the entrepreneurial capacity of management, and
- the nature of and Government Structural Adjustment Packages that are provided.

The subsequent survey of mills revealed a diversity of responses among mill owners. Some were willing to leave the industry, others were keen to invest in value adding activities while others could see the potential for industry restructuring which would lead to more efficient operations. But many highlighted the limited future for industry under the prevailing, uncertain wood supply arrangements.

In Figure 4-A and Figure 4-B the changes in the volume of high value large and small logs are shown for the four timber catchments in the LNE from 1994/95 to 1997/98. In Figure 4-C the changes in the volume of low value non-quota logs for the timber catchment areas of the whole North East CRA are shown from 1994-95 to 1997-98.

These charts indicate that there have been large reductions from Catchment 4 (includes the Gloucester and Bulahdelah areas) and from Catchment 6 (the Walcha-Styx area). This is especially for the high value large logs as shown in Figure 4-A.

FIGURE 4-A: VOLUME OF HIGH VALUE LARGE BY TIMBER CATCHMENT

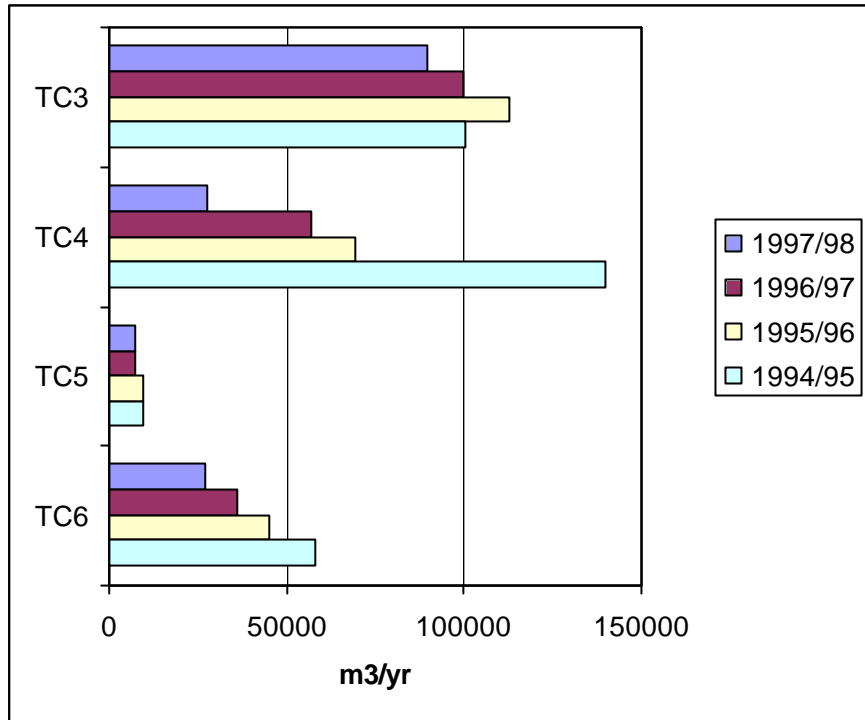


FIGURE 4-B: VOLUME OF HIGH VALUE SMALL BY TIMBER CATCHMENT

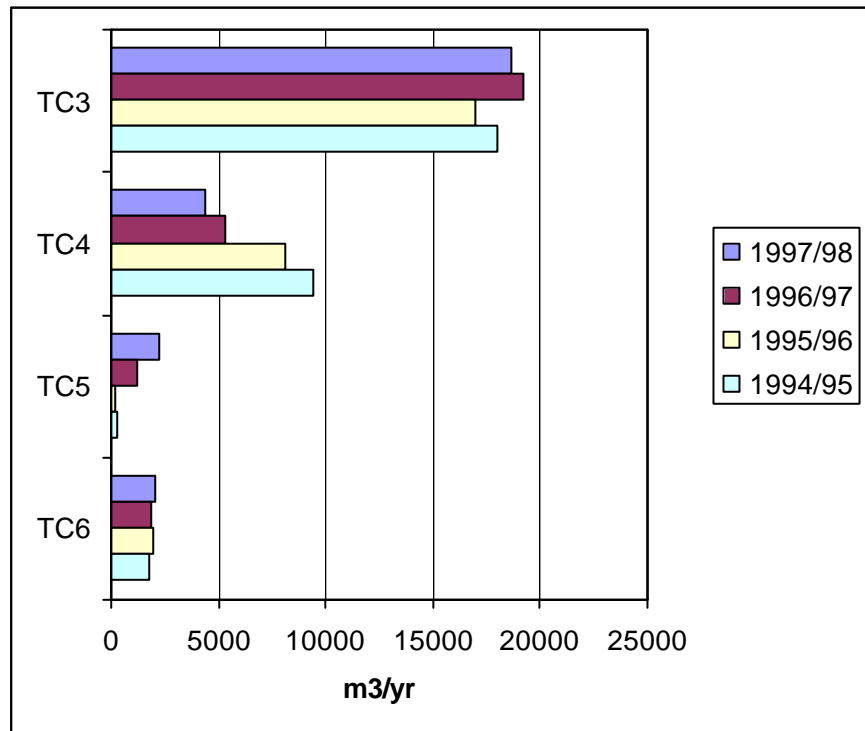
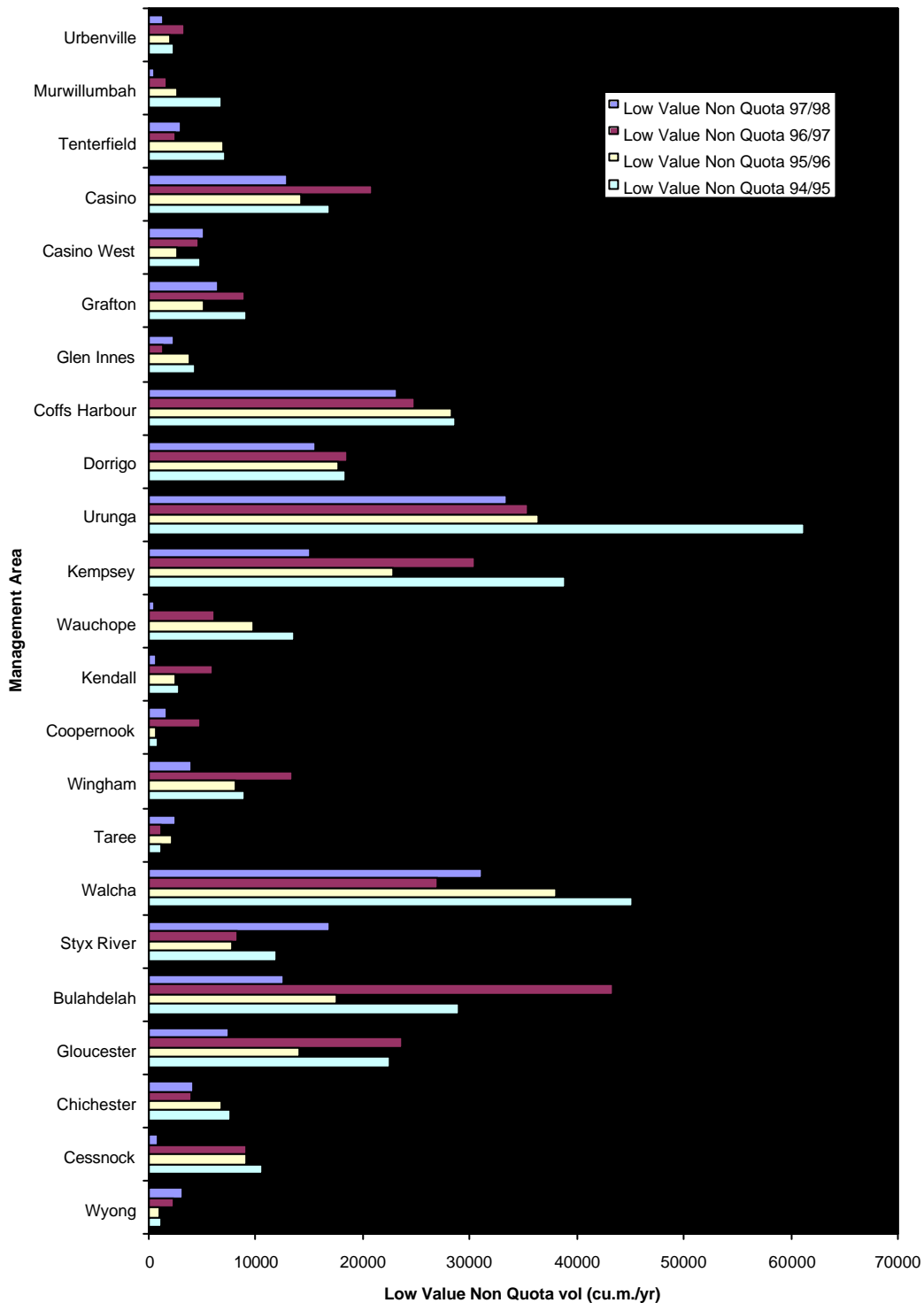


FIGURE 4-C: VOLUME OF LOW VALUE NON QUOTA BY MANAGEMENT AREA



**4.2. THE INTERIM FOREST AGREEMENT**

The Interim Forestry Assessment (IFA) of the NSW Government was the result of the deliberations. The key outcomes were a reduction in the supply logs to millers and processors, but the uncertainty of supply was also addressed. The main features of the IFA that impacted the NSW native hardwood timber industry were:

- Identified reductions in allocations of quota grade sawlogs to sawmills supplied under annual licenses for quota sawlogs, ie. 60 per cent of 1995/96 supply levels for sawmills in northern NSW and 65 per cent of 1995/96 levels in central and southern NSW.
- The granting of five-year tradeable term agreements, with an option for renewal for five years, to then holders of annual quota sawlog licenses for a proportion of the allocations. To date 5 trades have taken place with several others currently in progress.
- The introduction of an average price increase of approximately 30 per cent on quota grade sawlogs.
- The development of a Forest Industry Structural Adjustment Program (FISAP) with three components:
  - worker assistance – redundancy payment, retraining and relocation support,
  - business exit assistance, and
  - industry development assistance including interest rate subsidies on capital loans, establishment and development grants, consultancy subsidies, local government charges subsidies, and training and recruitment costs etc.
- Approval for SFNSW to develop and implement systems to allow the segregation of wood products and progressively take control of hardwood logging where opportunities for adding value to trees harvested are highest.

These outcomes of the IFA became elements of the joint Commonwealth/NSW deferred forest agreement.

The arrangements were implemented from July 1996 although in some cases it took some time for full implementation. The reductions in timber volume, tradeable term agreements, increased royalty prices and FISAP have all contributed to some rationalisation of the native hardwood timber industry around the available timber supplies based on the IFA decision. These have both impacted on the industry structure and operations, although some of the changes have not fully worked through the industry.

#### **4.3. THE POST IAP ENVIRONMENT**

The industry has been adapting rapidly to the IAP decisions. A detailed analysis has yet to be undertaken but the most notable responses have been:

- The closure of some mills, especially among those operators with more than one operating site;
- The augmentation of wood supply from forests on private property;
- Investment in a range of value-adding activities; and
- The building of a variety of alliances among firms in the industry.

Some of these responses are discussed further below. However, it is noted that there is still considerable scope and opportunity to make greater use of mill residues and low

grade wood that is available in the region. Some is used in hardboard manufacture and for wood chips, but more resource is available for use.

#### **4.3.1. Mill adjustments and closures**

Following the IAP process the forest-based industries generally suffered a decline in income. The cuts in log allocations were compensated for to some degree by access to logs from private property. However, for almost all the mills throughput decreased. The majority reduced staff and overheads initially, but this did not occur in direct proportion to the reduction in allocation. Many operations tried to keep employees at least in part-time employment.

The introduction of five-year wood supply agreements, combined with FISAP funding engendered both the capacity and willingness to invest in the industry on the part of the mills and their financiers.

Some mills purchased log allocations from mills that closed, others reduced the numbers of operating sites, concentrating on their most efficient operations. Some of the smaller mills, located closer to the resource, undertook green sawing operations for other operators who provided further value-adding in other locations. It is likely that there will be further developments along these lines because there may be fewer value-adding plants than milling plants. That will lead to a variety of industry processing chains and networks among millers and value adding operators.

A number of mills received FISAP funding to either upgrade or install value-adding equipment. For these mills, this frequently involved further investment and possibly borrowings. The higher level of debt associated with installing the improved value-adding equipment means that the operators are very sensitive to any further reduction in log throughput.

The mills are also wary of the changes to the way contractors are employed. While the smaller mills believe that there will be fewer problems of the larger mills taking the best logs, all the mills dislike the reduction in the level of control over the type of logs being supplied.

This restructuring did come with a cost attached. The percentage reduction in wood supply in the LNE resulted in the closure of several mills and the transfer of some wood supply agreements. A rationalisation of the number of sites on which mills operated also occurred, resulting in the closure of some older mills and the transfer of operations to more efficient sites. For example, the Beechwood Timbers mill closed and Kempsey Timbers purchased its allocation; likewise R A Sweetman & Sons purchased K L Smith's allocation when the mill closed. Boral closed their mills at Gloucester and Mt George (near Wingham) and Fennings rationalised their Armidale and Walcha operations. These changes highlight that operators with more than one site have adjustment options not available to single site operations.

#### **4.3.2. Timber sourced from private property**

The information on wood supplied from private property is incomplete and of low reliability. Further, the extent and quality of the resource is not as well known as that available from public lands.

Prior to the IAP, there were many mills, mostly small, who operated entirely by using wood from private property. Many of the larger mills accessed some of their supply from private property or had the potential to access wood from that source.

In the two years following the IAP some of the log shortfall was replaced with timber from private property. This was a logical response to a reduction in supply from SFNSW. In the LNE, it is likely that the proportion of wood supplied from private property is around 20 per cent of the wood used (see below).

The limited amount of information available to CARE for nine mills in the LNE region (representing around 15 per cent of the industry) showed that the amount of wood taken from private property had increased by 23 per cent from 1994-95 to 1996-97. Private property wood represented 52 per cent of their wood supply in 1996-97. This is a relatively small sample of mills and they do indicate a higher reliance on private property wood than is used below for the base case (1997-98).

There have been a number of factors that contributed to the increased availability of timber including:

- An increased stumpage price paid by the mills consistent with an increase in log prices by SFNSW;
- The reduction or removal of discounts for small parcels of logs;
- An increase in the range of log quality accepted by the mills;
- The development of environmentally-sensitive harvesting practices that reduce disturbance to logged areas; and
- An increased willingness on the part of many landholders to sell logs to the mills due to the impact of drought and low commodity prices.

Estimates of timber from private property have been as high as 150,000m<sup>3</sup> annually. The sustainability of that supply is uncertain and will depend on the continued management and access to the resource by landowners. Some owners may be unwilling to log because they seek to maximise the aesthetic value of the timbered land and other areas may not be economically logged because of access, terrain or quality factors.

However, there is little doubt that logs from private property are an important element in the future of the wood processing industry in the LNE region. This would appear to be an important buffer that has minimised adverse effects on the economy from the IAP. It will fill a gap while private plantations and joint venture plantations are established and begin production. It will also assist in maintaining the level of economic activity in the timber industry while new value-adding initiatives and new industry alliances and networks are being developed.

#### **4.3.3. Impacts on State Forest's operations**

SFNSW perceive that their role has changed to a greater focus on active resource management. To this end they are in the process of altering their external relationships, with both mills and contractors and also the internal relationships within the organisation.

SFNSW have undergone a reorganisation of their operations. While only some of the changes are directly related to structural change in the industry, the reorganisation is consistent with changes to operational policy. SFNSW have withdrawn almost all of their administrative staff into the regional centres (Wauchope, Taree and Walcha).

The remaining offices are now operating centres with staff for reception, various forestry operations and planning. In net terms the number of staff remains basically unchanged, however the geographic distribution of staff has changed.

In terms of SFNSW's operational functions, the reduced areas available for logging has meant a reduction in the staff in the native forests section. However, the development of the log merchandising section (which includes the management of the contractors where applicable) has meant that many staff have been moved from the native forests section. There have also been some increases in the plantation section.

#### **4.3.4. Impacts on logging and transport contractors**

SFNSW are trialing contracting the logging and haulage contractors directly, in contrast to the traditional method where the contractors were employed or contracted by the mills. However, instead of retaining the cut, snig and haul processes as part of one contract, they have split cutting and snigging from the hauling contracts.

SFNSW have indicated that employing the contractors themselves provides greater control over the management and harvest of the resource and is consistent with their operational policy. The long-term objectives are to be able to manage the provision of timber resources to the mills in accordance with the wood supply agreements and with greater control over log quality.

SFNSW predict that contracting will also change significantly, becoming more professional. They believe this will result in a reduction in one-man operations and an increase in large operations. Increased capacity to improve safety, better quality equipment and increased standards of operator training will see a number of smaller operators leave the industry as they are unable to compete.

These changes, combined with lower log volumes from public lands, have meant that the number of contractors working in the industry has reduced. Some are now working clearing private property, building dams and clearing and ripping for plantations. Some have left the industry while others are working on private property forests.

#### **4.3.5. Future trends**

Firms in the timber industry can be classified into two dissimilar groups.

- those who recognise the trends within the industry and are prepared to keep up with or even get in front of the trends, and
- those who are fighting a concerted rear guard action to protect their current position.

There are several mills (mostly the larger players) that are participating in value-adding and developing networks with other mills that provide them with green-sawn product.



Their employment levels are now at or above the level pre IAP, but they all report that the situation is finely poised. The majority of these mills are focused on producing a specific product for a niche market, rather than the usual strategy of commodity production. They are distinctly markets oriented rather than production oriented.

State Forests predict the same trend in milling as is evident in contracting. They believe the trend is to larger, more efficient operations able to optimise the value of the resource. The small mills will either develop a distinct market niche for their own value added product or become associated with one of the larger operations, supplying them with a particular product. These types of networks are likely to increase in frequency, as will networks that consist of individual mills sharing value-adding operations.

Future trends in the management of sawmill waste and low-grade wood also provide opportunities. Some of these products are used in the manufacture of hardboard products at Raymond Terrace while there is a woodchip export operation operating out of Newcastle. These consume some of the low grade woods and residues but there is still a significant amount of these materials available.

State Forests are interested in investigating the feasibility of green residue power production based on the use of low-grade wood and residues. Further research is needed. The technology to produce power in this manner is already in existence and these types of small power plants already operate in Europe and the USA.

Green waste power production has many potential benefits including:

- reduced smoke and carbon emissions resulting from the current practise of burning waste,
- cost effective power production,
- improved returns from the timber resource, and
- the location of power plants in more remote areas, with the capacity to provide power locally and back into the grid. In addition, the location of these plants, some distance from the major power source, could enable local power provision in times of disruption.

#### **4.4. INDUSTRY RESPONSE MODELLING AND ESTIMATED DIRECT IMPACTS**

##### **4.4.1. Introduction**

The “industry response study” commissioned by the Resource and Conservation Division (RACD) of the NSW Department of Urban Affairs and Planning had two main requirements:

- The development of a profile of the hardwood milling sector (with associated information on contractors and SFNSW management); and
- The assessment of the industry’s likely response to changes in hardwood timber resource.

To meet these requirements, the study involved the development of both a mill database and a simulation model. The data base and simulation model were used to describe the 1997/98 milling sector and provide estimates of the contribution that hardwood milling made to regional employment and output. The simulation model was also used to estimate the likely direct employment and output effects of various timber harvesting scenarios (referred to as “reference points”).

The mill survey conducted by ABARE was not generally available for this work. The information was not collected for the 1997/98 year and the information was collected on the basis that it was confidential. The summary information that would have been available from the previous year would not have provided sufficient detail for the purposes of this analysis and discussions among stakeholders. As a result, a range of information sources and methods have been used as described in this section.

The results of the industry response study were also utilised in a number of other studies undertaken as part of the CRA process for the region.

The estimated direct employment and output effects of the hardwood milling sector in 1997/98 and for the identified reference points were relevant to:

- an assessment of the total regional economic impacts associated with various timber harvesting regimes as described in Section 5; and
- assistance in the identification of social catchments that may be sensitive to changes in wood supplied, as described in Section 3.

The simulation models enabled estimation of the producers’ surplus impacts of reference points and hence were directly relevant to the Benefit Transfer Threshold Value Analysis of Non-Use Values of Forest Preservation.<sup>1</sup>

#### **4.4.2. Method**

##### **Mill Database**

A mill database was collated by SFNSW and Gillespie Economics for the most recent financial year - 1997/98. This database was then adjusted to have regard to changes known by SFNSW to have occurred in relation to mill closures or redirection of SFNSW wood supply since the collection of that data.

The database contained general information in relation to mills that had a licence from SFNSW, locational information on these mills, private and public timber supply data for each mill and employment data.

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<sup>1</sup> Dr Jeff Bennett undertook this analysis. Producers’ surplus is the difference between the costs of the inputs used in the production process (economic cost to producers including a normal return on investment) and the price received for the finished product (total benefit to producers). By subtraction, the financial models were used to identify the producers’ surplus (assuming both 10 per cent of sales value and 20 per cent of sales value as a normal return on investment) associated with the base case and for the reference points that were examined.

Specifically the following information was collated:

- General information such as:
  - Licence name of mill;
  - Licence number;
  - Information on the type of plant ie. whether the mill is a sawmill, chip mill, a pole plant, a value adding plant, etc.; and
  - Information on purchases made by the mill, ie. hardwood, softwood, private or public.
- Locational information including:
  - East and north positioning;
  - CRA region within which the mill is located;
  - Postal address for mill;
  - Local Government Area in which the mill is located; and
  - Forestry district in which the mill is located.
- Public timber supply information including purchases by each mill from SFNSW in 1997/98 in the following log grades:
  - Quota
  - Smalls
  - Salvage logs
  - Girders
  - Piles
  - Poles
  - Veneer
  - Chips.

As well as total purchases by mills of each log grade, the mill database also contained this information in a spatial context ie. the source of the timber in terms of the six timber catchment zones in the north east of NSW. Timber catchment zones are spatial areas identified by SFNSW that each contains a number of management areas

- A consultant, on a confidential basis, provided private timber supply information. The information included the estimated total volume of private timber obtained by mills. Based on this advice, it was assumed that 40 per cent of the total private hardwood supply was high quality large (HQL), 20 per cent was high quality small (HQS) and 40 per cent was low quality (LQ).
- Employment data were obtained from SFNSW's annual survey of licensed mills. It included, for each mill, estimates of employment engaged in the following:
  - Saw and veneer mills, native
  - Saw and veneer mills, softwood
  - Roundwood, native
  - Roundwood, softwood
  - Extraction, native
  - Extraction, softwood
  - Exclusive contractors, native
  - Exclusive contractors, softwood

- SFNSW management

It should be noted that the information did not include all employment involved in fall/snigging/logging and haulage as the survey was not able to quantify non-exclusive contractor employment, ie. where a number of mills use the same contractor. To obtain an estimate of the total employment levels involved in fall/snigging/logging and haulage average employment ratios were used.

### **Financial/Simulation Models**

A series of financial models were then developed to:

- estimate the direct output value of the 1997/98 native hardwood milling sector; and
- estimate the likely direct output value of the native hardwood milling sector under different logging scenarios (reference points)

The financial models were based on the SFNSW log value-pricing model developed in conjunction with the native hardwood timber industry. The log value-pricing model is a residual value-pricing model, originally devised to help derive quota log prices<sup>2</sup>. The model does, however, contain indicative information on the following:

- the product mixes obtained per cubic metre of quota log processed;
- average royalty costs per cubic metre of quota log;
- average fall, snig and logging costs per cubic metre of quota log;
- average recovery rates for green milling and average recovery cost for further dry processing;
- average green milling costs
- dry freight costs to a further value adding processor;
- dry finance costs;
- dry milling costs;
- dry administration costs;
- green freight costs to market;
- dry freight costs to market; and
- weighted average market prices of different products.

This information was built into a linear spreadsheet model, that was used to estimate the indicative final product mix<sup>3</sup>, the volume of sawn timber output, the value of output and the regional expenditure profile associated with the processing of quota logs at quota mills.

The expenditure profiles were further expanded by obtaining, from industry and SFNSW, indicative expenditure breakdowns of aggregate green milling and dry milling processing costs and aggregate logging costs into items such as wages, electricity, fuel, maintenance, materials handling, insurance, accounting, etc.

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<sup>2</sup> Note that information contained in the log value-pricing model relates to quota logs processed at quota mills.

<sup>3</sup> Product mixes included boards, scantling, pallets, palings, joinery, F17, F27, junk structural, chips for export, panels, girders, poles, piles, veneer and mill residues.

Gillespie Economics then developed separate linear financial spreadsheet models for each of the following:

- Quota logs processed at non-quota mills;
- Salvage logs processed at quota mills;
- Salvage logs processed at non-quota mills;
- Small logs processed at quota mills;
- Small logs processed at non-quota mills;
- Pulp processed for panels;
- Pulp processed for export wood chips;
- Processing of girders;
- Processing of poles and piles;
- Processing of veneer; and
- Mill residues.

The assumptions contained in these models were developed via an iterative process of consultation with SFNSW, representatives from the native hardwood timber industry and industry economists.

The key input information that was required to run the financial models and determine the direct output value of the industry and the regional expenditure profile, was the volume of different log grades processed by different types of mills. For the analysis of the industry in 1997/98 this information was obtained by aggregating the detailed timber supply information contained in the mill database.

To facilitate estimation of the likely direct economic impacts of the reference points in the LNE region the following steps were taken:

1. The log grade information from the SFNSW timber resource estimation model (FRAMES), adjusted for imports and exports, was converted into a log grade breakdown of quota, smalls, salvage, girders, veneer, poles/piles and pulp to facilitate its input into the series of financial models.
2. Assumptions were made about the percentage of salvage grade logs and smalls volumes that would be processed by quota and non-quota mills in each CRA region.
3. Estimated employment levels for the milling sector were adjusted on the basis of average employment ratios per 1000 cubic metres of timber processed. The estimated employment levels in the logging sector were adjusted on the basis of average employment ratios per 1000 cubic metres of timber harvested.
4. It was assumed that forest management employment levels, would remain unchanged in accordance with a State Government announcement.
5. No increase in NPWS staff, to manage additional reserve areas, was incorporated into the analysis.

#### **4.5. FOREST INDUSTRY PROFILE 1997/98**

In this section, a profile of the timber industry for the base situation is developed. This was determined to be the actual level of wood produced and processed in the 1997/98

year. As indicated previously, this incorporated the reduced supply levels associated with the implementation of the IFA. It should be noted that not all of the adjustments to the IFA had occurred by this time.

Table 4-A shows the volume of SFNSW hardwood resource supplied from the State Forests of the LNE region in 1997/98. Overall wood usage was 708,000m<sup>3</sup> of which almost 80 per cent was supplied from SFNSW and the remainder was sourced from private land. Almost all of the pulp was produced from SFNSW land and was exported for processing through Newcastle.

TABLE 4-A: VOLUME OF HARDWOOD RESOURCE SUPPLIED AND PROCESSED IN THE LNE CRA REGION IN 1997/98

	HQL	HQS	LQ	Pulp	Total
<b>SFNSW resource supplied</b>	152,305	26,689	131,810	193,894	<b>504,698</b>
<b>LNE resource processed</b>					
<b>SFNSW</b>	161,956	22,480	150,723	222,765	<b>557,924</b>
<b>Private</b>	60,000	30,000	52,500	7,500	<b>150,000</b>
<b>Total</b>	<b>221,956</b>	<b>52,480</b>	<b>203,223</b>	<b>230,265</b>	<b>707,924</b>

For the purpose of regional economic impact assessment and social impact assessment it is also important to identify the quantities of timber actually processed in each of the CRA regions. This is because the regional economic impact of the milling component of the production process is based on processed volumes rather than volumes of timber grown and harvested. On the other hand, the regional economic impacts of the forest management and harvesting component of the production process is directly related to volumes supplied rather than processed.

Based on the identified regional export and import patterns in 1997/98, Table 4-A gives an indication of the total volume of native hardwood processed in the LNE CRA region in 1997/98. In total over 50,000m<sup>3</sup> of logs from SFNSW were imported from other regions for processing (almost all of it from the UNE region).

The information includes an estimate of private property wood supply. This amount represented a substantial increase since the implementation of the IAP agreement. Industry analysts indicate that the level of about 150,000m<sup>3</sup> would be close to the sustainable yield of private sector forests. All wood from private land was assumed to be processed in the same CRA region.

In the LNE region, the identified native hardwood resource was processed by about 146 mills, comprising 73 mills that received some SFNSW resource (including five that only took pulp) and in the order of 78 mills that solely processed private property resource. There is uncertainty about the number of mills as not all mills operate every year or all year, and not all mills using SFNSW wood take wood every year from SFNSW.

Some green sawn timber was further processed at two separate value adding plants at Maxwell Creek and Gloucester.

On the basis of the assumptions made in the financial models and the available employment data, the direct annual output associated with the milling of native

hardwood timber in the LNE region is provided in Table 4-B. Estimates of direct employment in milling, contract logging and SFNSW management are also provided.

TABLE 4-B: DIRECT ANNUAL OUTPUT VALUE AND EMPLOYMENT LEVELS FOR THE NATIVE HARDWOOD TIMBER INDUSTRY 1997/98

Item	LNE
Hardwood Output Value*	\$138,086,540
Hardwood Mill Employment	1038
Hardwood Logging Employment	226
SF Hardwood Employment	247

\*\*In this table output is valued at the final user market.

\*\*Includes all employment and output of the mill which also processes softwood.

In Figure 4-D, Figure 4-E, Figure 4-F and Figure 4-G species mix cut in the LNE region are shown for each of the four timber catchments respectively. Timber Catchments 3 to 6 are in the LNE region. Timber Catchment 4 displays the most diversity of species while Timber Catchment 3 has the greatest concentration on a particular species.

FIGURE 4-D: SPECIES MIX: TIMBER CATCHMENT 3 (LNE)

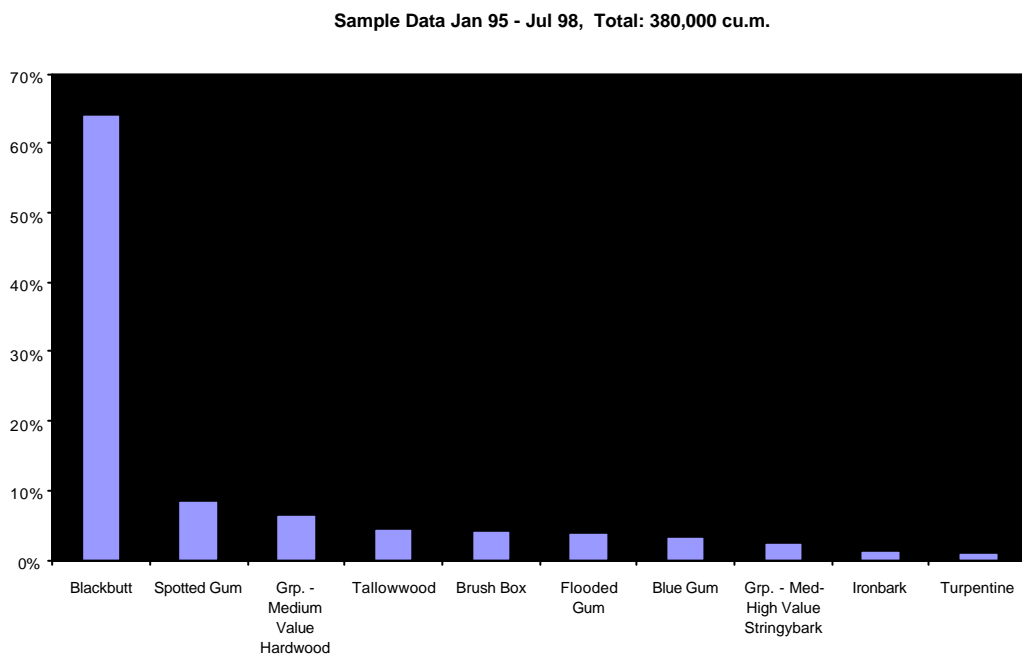


FIGURE 4-E: SPECIES MIX: TIMBER CATCHMENT 4 (LNE)

Sample Data Jan 95 to Jul 98, Total: 213,000 cu.m.

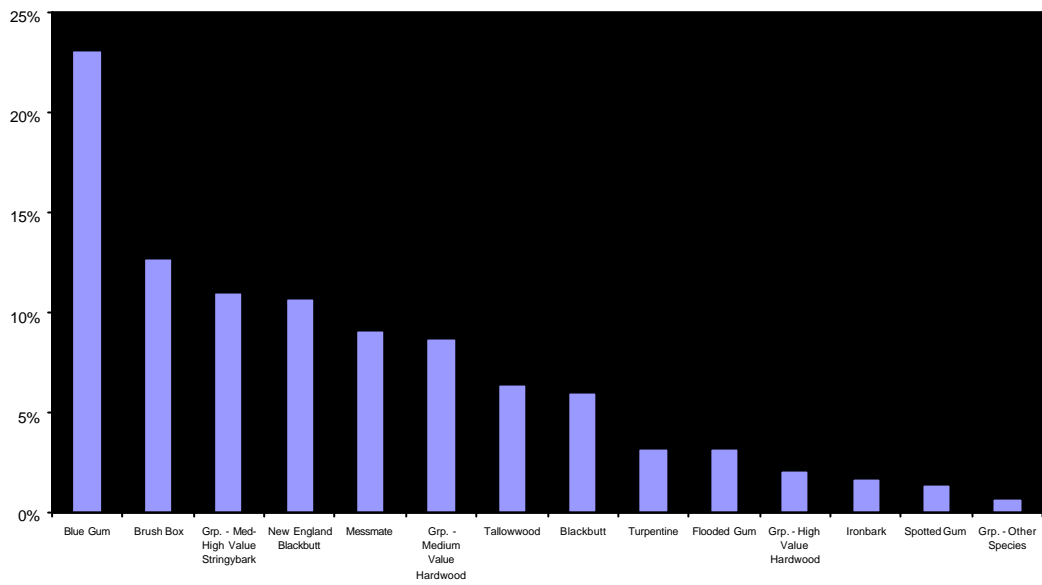


FIGURE 4-F: SPECIES MIX: TIMBER CATCHMENT 5 (LNE)

Sample Data Jan 95 - Jul 98, Total: 75,000 cu.m.

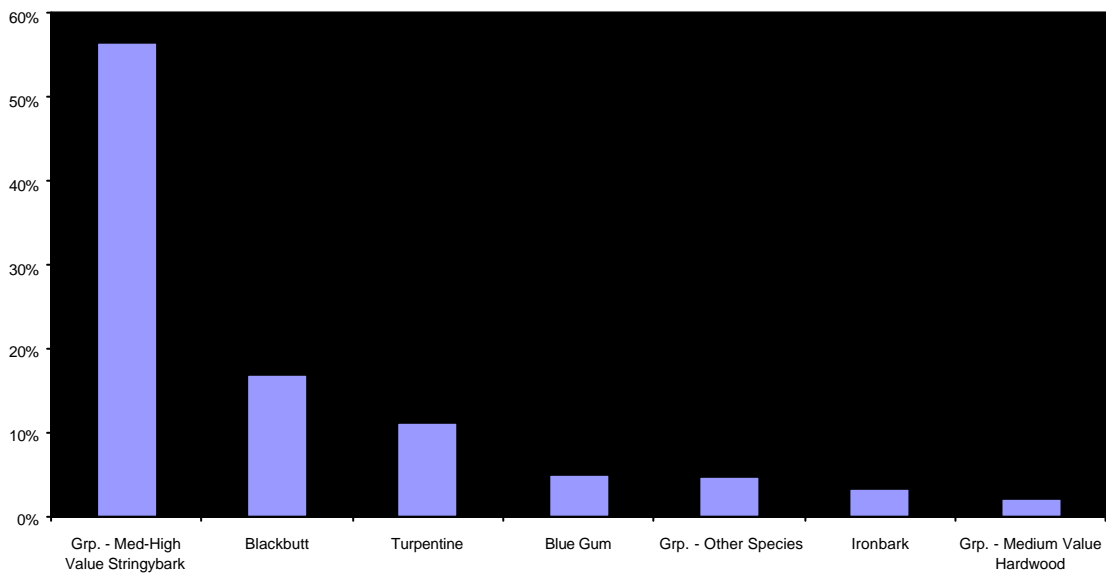
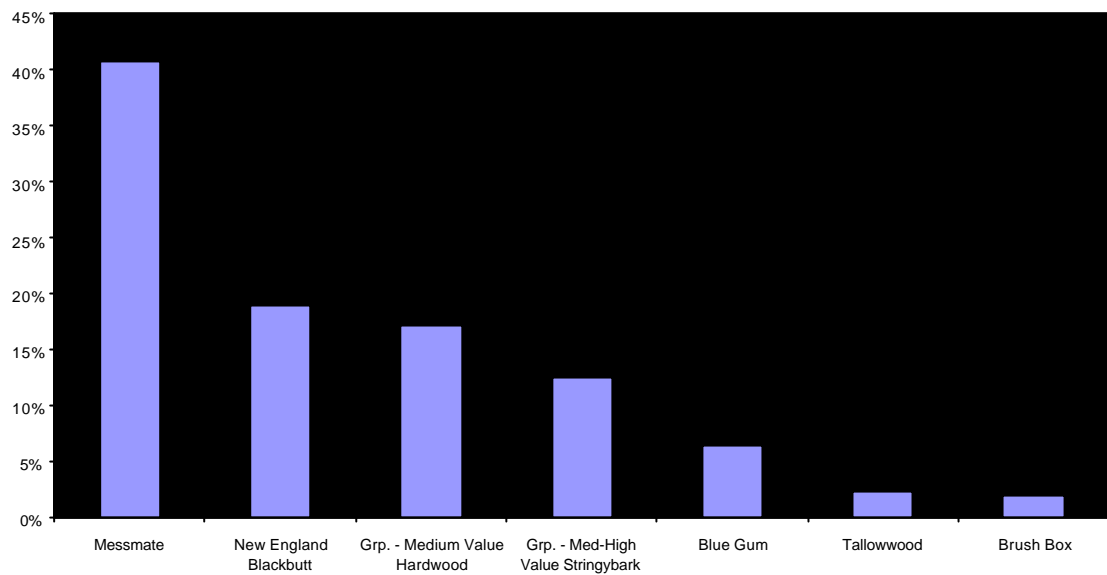




FIGURE 4-G: SPECIES MIX: TIMBER CATCHMENT 6 (LNE)

Sample Data Jan 95 to Jul 98, Total 175,000 cu.m.



#### 4.6. RESERVE DESIGN AND WOOD SUPPLY REFERENCE POINTS

Stakeholders were provided with indicative information on a number of possible reserve designs and wood supply arrangements from SFNSW. This information was provided in the form of “reference points” to inform stakeholder negotiations and decision-makers of the likely outcomes for the industry and the region. The reference points were identified in terms of the amount of high quality quota logs that were interpreted in terms of the amounts supplied of all types of logs from SFNSW.

The reference points selected for analysis included the base case represented by actual 1997/98 levels, the full JANIS and the maximum wood supply points. These were indicative of the range of likely values considered in the negotiations. Two intermediate

points were also included in the analysis above and below the base case. A reference point that represents the position negotiated among State agencies for the UNE region was also analysed.

For each of these reference points (and associated reserve configurations), SFNSW modelled the likely resultant timber yields and provided information in relation to four log grades: HQL, HQS, LQ and pulp. Because the focus of FRAMES was on maximising HQL timber and obtaining supplies of other log grade groupings as a byproduct of HQL harvesting, there was a tendency to underestimate the likely available supplies of pulp that could be obtained via a separate harvest. To account for this, pulp was considered not to be limited to the levels identified by FRAMES and was held constant during the analysis. The supply of wood from private land was also held constant over all of the reference points, based on the advice from industry analysts that the levels of privately supplied hardwood in 1997/98 were close to the sustainable yield of private sector forests. The timber supply estimates for each of the reference points are shown in Table 4-C.

TABLE 4-C: ALTERNATIVE SCENARIOS FOR WOOD SUPPLY AND PROCESSING IN THE LNE CRA REGION

Scenario	HQL	HQS	LQ	Pulp	Total
<b>180,000 m<sup>3</sup> (Maximum wood supply)</b>					
SFNSW resource supplied	181,537	37,638	152,158	193,894	565,227
LNE resource processed					
SFNSW	200,954	36,518	175,061	222,765	635,298
Private	60,000	30,000	52,500	7,500	150,000
Total	260,954	66,518	227,561	230,265	785,298
<b>152,000 m<sup>3</sup></b>					
SFNSW resource supplied	153,257	30,485	129,167	193,894	506,803
LNE resource processed					
SFNSW	167,752	34,073	148,550	222,765	573,140
Private	60,000	30,000	52,500	7,500	150,000
Total	227,752	64,073	201,020	230,265	723,140
<b>160,000 m<sup>3</sup> (State preferred scenario)</b>					
SFNSW resource supplied	160,242	55,715	101,824	193,894	511,675
LNE resource processed					
SFNSW	140,620	49,922	128,210	222,765	541,517
Private	60,000	30,000	52,500	7,500	150,000
Total	200,620	79,922	180,710	230,265	691,517
<b>100,000 m<sup>3</sup></b>					
SFNSW resource supplied	100,326	18,077	80,496	193,894	392,793
LNE resource processed					
SFNSW	110,196	19,610	92,976	222,765	445,547
Private	60,000	30,000	52,500	7,500	150,000
Total	170,196	49,610	145,476	230,265	595,547
<b>64,000m<sup>3</sup> (Full JANIS)<sup>a</sup></b>					
SFNSW resource supplied	62,118	15,428	50,378	222,765	350,689
LNE resource processed					
SFNSW	62,118	15,428	50,378	222,765	350,689
Private	60,000	30,000	52,500	7,500	150,000
Total	122,118	45,428	102,878	230,265	500,689

<sup>a</sup> Under this scenario, there is no trade in wood and all of the wood produced in this region is processed in the region.

To enable estimation of the direct regional economic impacts of reference points it was also necessary to identify likely volumes of timber processed in the LNE region. Adjustments had to be made to account for the trade in wood among the CRA regions. For 1997/98, a net amount of 50,000 cubic metres of wood was traded from the UNE to the LNE region. For the alternative reference points, except the State position and maximum JANIS, the level of exports and imports by log grade were been maintained at the same proportions as occurred in 1997/98.

In contrast to the other reference points the State position involved net exports in HQL logs since the LNE regions was disproportionately advantaged by the reference point, compared to the UNE region. Advice was obtained from SFNSW on the likely allocation of total available SFNSW timber supplies between the LNE region and the

UNE region. It was assumed that some quota quality logs, smalls, girders, poles/piles and veneer would be exported from the LNE region to be processed in the UNE CRA region. It was also assumed that some salvage logs and pulp would be exported from the UNE region to be processed in the LNE region. No trade in wood was included in the maximum JANIS case.

Relative to the base case, the SFNSW wood supply levels, from the LNE region, for the different reference points would vary between 635,000 cubic metres (14 per cent above the 1997/98 level) and 351,000 cubic metres (37 per cent of the 1997/98 level). The total wood levels that could be processed in the LNE region for the different reference points would vary from 6 per cent above the 1997/98 level to 30 per cent below the 1997/98 level.

The variation in the amount of wood processed is much smaller than the variation in SFNSW wood supplies, because of the assumptions about the constant supply of pulp from State forests and constant supply of wood from private property. It is unlikely that these sources of supply could be increased on a continuing basis. It is also unlikely that there would be any decreases as they are not dependent on the level of supply of sawlogs from SFNSW.

As identified above, the FRAMES model determines the volume of various grades of logs that are produced and processed for different reference points. While some focus has been on the volume of HQL timber supplies, it is the supply of all log grades that ultimately influences the direct regional economic impacts of reference points. For example, for the State reference point in the LNE, there is predicted to be an increase in SFNSW's supply of high quality large and high quality smalls but also a decrease in the supply of low quality logs.

#### **4.7. INDUSTRY RESPONSES**

For each reference point, a direct regional economic impact can be estimated. However, these impacts will depend directly on how the firms in the industry respond to the changes in the level of wood supply. For those components that are assumed to be constant (eg. pulp) there will be no change. For relatively small changes in the wood supply, it is likely that they will be accommodated through fine-tuning of various operations and the economic impacts will be small.

The main impacts on industry structure are likely to occur where there are large changes to wood supply levels to milling operations. The results of the IFA decision provide some insight into how industry responds to large-scale changes.

In reality, the industry changes as a result of the IFA have not been as large as they might have been because of the scope to substitute wood supplied from private land for that for SFNSW. Advice indicates, however, that further substitution is unlikely because the limit of private wood supply has been reached. Given this situation, it is likely that the focus of industry responses will be on measures that rationalise the number of plants, that build alliances among processors and those that facilitate effective value adding operations. The immediate response may be to reduce throughput and employment pending the implementation of new initiatives outlined above.

Estimates of the value of output and employment for the reference points were developed as shown in Table 4-D with the changes from the 1997/98 position shown in Table 4-E.

TABLE 4-D: DIRECT OUTPUT AND EMPLOYMENT IMPACTS OF THE SCENARIOS ON THE LNE CRA REGION

Scenario	Mill Output Value*	Mill Employment	Logging Employment	Total Employment
	\$m	No.	No.	No.
Base case	138.085	1,038	226	1,264
180,000 m <sup>3</sup>	153.563	1,151	251	1,402
152,000 m <sup>3</sup>	140.917	1,060	231	1,291
State	134.832	1,014	228	1,242
100,000 m <sup>3</sup>	116.520	873	190	1,063
64,000 m <sup>3</sup>	99.831	734	160	894

- In this table, output is valued at the market.

TABLE 4-E: CHANGE IN SCENARIO DIRECT IMPACTS FROM THE BASE CASE

Scenario	Mill Output Value*	Mill Employment	Logging Employment	Total Employment
	\$m	No.	No.	No.
180,000 m <sup>3</sup>	15.478	113	25	138
152,000 m <sup>3</sup>	2.832	22	5	27
State	-3.253	-24	2	-22
100,000 m <sup>3</sup>	-21.565	-165	-36	-201
64,000 m <sup>3</sup>	-38.254	-304	-66	-370

It should be noted that the results reported above relate to aggregate impacts. It is conceivable that the changes in log volumes and grades analysed may have various spatial implications within the region. For example, as a result of mills closing in one area and their remaining timber allocation going to other mills, there may be job losses in one location while another area experiences an increase in employment, even though the net effect may be a loss of jobs.

While some information on possible individual mill response was obtained from an industry survey and industry expertise, the information gathered was insufficient to enable detailed modelling of individual mill responses. Consequently, it was not possible to examine the micro-spatial implications of the various reference points for the timber industry.

The social profile analysis of the UNE region reported in section 3 did, however, utilise the mill database information to help identify the social catchments that may be most sensitive to changes in wood supplies.

The next task is to analyse how these “reference point” changes may impact on the regional economy.

# 5. REGIONAL IMPACT ANALYSIS

## 5.1. ECONOMIC IMPACTS: LNE

### 5.1.1. The General Approach

In analyses of this type, the task is to compare the alternatives with a specified base case. In this study, the base case is established as the activities taking place in the year 1997-98. This represents the most recent year for which data are available. It is also a year which reflects many of the adjustments consequent to the IAP and should be a situation which can readily be related to by the stakeholders.

Both direct and indirect (or flow-on) effects are estimated. The indirect effects are estimated using an input-output table for the LNE compiled for 1995-96. Multipliers are estimated in this model and applied to the 1997-98 direct values. Hence, all impacts are valued in terms of 1997-98, but refer to a general economic structure for 1995-96 (a structure that is unlikely to have changed significantly in a short period of time).

The level of each activity was estimated from information supplied to CARE either from SFNSW, other agencies or other studies associated with the CRA investigation.

The economic impacts are presented in terms of the:

- value of gross output (equivalent to business turnover),
- value added (equivalent to the measure of gross national product – using the income method of summing wages and salaries, gross operating surplus and taxes net of subsidies),
- payments to households of wages and salaries and imputed incomes to self employed, and
- level of employment.

There are reservations about the level of employment measures as there is growing flexibility in labour markets associated with levels of skills, hours worked and employment conditions. It is an almost impossible task to reduce all of that variation into a single measure of employment. The only practical way of doing that is to refer to the total wages and salaries paid to all workers in the industry, including an imputed wage or salary to the self-employed persons and employers.

This summary is presented in three parts.

- A definition of the sectors used in the analysis and the data sources.
- Economic impact estimates for the base case of 1997-98.
- Economic estimates for five other information points involving different levels of log supply.

### 5.1.2. Sector Definitions and Data Sources

The activities were compiled in four groups.

- Those related to hardwood log supply and milling (primary or first stage processing).
- Those related to softwood log supply and milling (primary or first stage processing).
- Those activities that relate to the further fabrication of timber products (secondary processing) including structural framing, door frames, pallets etc. but excluding furniture and prefabricated buildings (or final stage processing).
- Those activities that occur in state forest areas that are not related to local milling in the LNE.

They are discussed in turn and in reference to the associated tables.

#### **Hardwood log supply and milling**

The base data were derived from SFNSW data. These were then included in a pricing model to estimate the value of mill output, royalty payments and the costs of the main activities as outlined in Section 4.

For the base year, the total volume of hardwood processed was 707 924 m<sup>3</sup>. This resulted in hardwood products valued at \$130.405m (ex mill gate).

The freight associated with freighting those products to their markets (either traders or processors) is shown separately as 'downstream freight', which amounted to \$7.681m.

The wood supply for processing was derived from two sources:

- LNE HWD Forestry is the log supply from the LNE State Forests that is processed in the LNE region.
- LNE PP Forestry is the supply of logs from private property in the LNE.

A specific sector including costs structures and sales patterns (ie, a separate row and column in the input-output table) has been compiled for each of these supply operations. They have been based on expenditure data provided from SFNSW for their supply. The private property supply has been estimated on the basis of the forest operations of SFNSW. This does not allow for any overhead/administration costs and is designed to reflect relatively low levels of forest management in most items apart from labour.

There is also a specific sector to indicate the log, snig and haul costs – LNE Logging/Haulage – which relates to that timber logged in the LNE region and milled in the LNE region. That component of the timber that is logged in the LNE region but milled in the UNE or other regions falls in the LNE Logging/Haulage (other sales) sector.

In summary, the hardwood operations (excluding downstream freight) include:

Log supplies to the value of:	\$15.565m
Log, snig and haul cost of:	\$25.301m
Milling operations (net of log and logging costs) to the value of:	\$89.540m

For the base case, these comprise a total ex-mill value of: **\$130.405m**

The hardwood operations described also contributed:

- \$89.409m to value added,
- \$37.521m of payments to households, and
- employment for 1,509 people.

### **Softwood plantation management**

While no softwood was logged in the LNE there are softwood plantations. The softwood management activities are all plantation based and comprise only the forestry management operations. In the base case, the management expenditure on softwood forestry was \$2.395m.

The softwood management operations contributed:

- \$1.088m to value added,
- \$0.496m of payments to households, and
- employment for 26 people.

### **Secondary processing of timber products**

These activities are included to complete the picture of wood-related activities in the region. In some cases, these activities are closely linked to primary processing, in others they are completely separate activities. There is also variable dependence on the supply of local wood products.

These activities have not been the subject of specific studies and have been estimated on the basis of information on manufacturing and employment from a range of ABS sources. These activities were estimated to contribute:

- \$179.984m to gross output net of the amount of local wood used.
- \$67.097m to value added.
- \$40.635m to household wage and salary earnings.

- Employment for 1892 people.

### **Activities not related to LNE log milling**

The activities fall into two groups, namely:

- Those related to other SFNSW operations and management, and
- Those related to other activities.

Other SFNSW operations include:

The establishment of additional hardwood plantations was represented by a separate sector in the input-output model – LNE HWD Plantation Establishment. This is an active program mainly involving the establishment of new hardwood plantations on private property under a variety of business arrangements. This involved an expenditure of over \$3.5m in 1997-98, but does not lead to any production within the scope of this investigation.

SFNSW administration for the LNE that is of an overhead nature has been included in the estimates for the UNE where the main office is located.

The amount of logs exported out of LNE (LNE HWD Forestry (other sales)) amounted to \$1.637m plus \$1.074m of other licence fees earned by SFNSW; and associated logging activities (LNE HWD Logging (other Sales)) of \$1.181m.

The non-wood activities include:

**Visitation to State Forests** by either visitors to the region (tourism) or locals (recreation) is represented in the input-output model by the SF Visitors sector. The number of visitors per year has been estimated in other studies (850,000) along with an estimate of their daily expenditure (\$43.53) associated with the visit to a State Forest. Total expenditure was therefore estimated at \$37m. The expenditure of tourists does not include any costs associated with their travel to the region or their accommodation. Thus all visitors have been treated as ‘day visitors’. The expenditures were allocated across motor vehicle costs (to and from the recreation area only), meals, shopping and other categories. These expenditure items were then disaggregated into various cost components (Attachment 5) and allocated to the respective input-output sectors. The estimated local expenditure (net of imported components and taxes) associated with these visitors amounted to \$23.993m in 1997-98.

**Grazing in State Forests** is normally conducted in association with other land used for commercial grazing. To estimate the value and costs of these activities, the total grazing operation of 7,050 head of cattle has been used and a proportion allocated to the State Forests on the basis of the proportion of the grazing requirements provided by the State Forests leases. In 1997-98, this was estimated to have a gross value of \$0.462m that was derived from information in an associated study by Hassall and Associates. However, the value used in estimating the indirect impact in the input-output model needed to be adjusted for selling costs and the local value of \$0.392m (LVAP: excluding selling costs) was calculated (Hassall and Associates used a \$10 per head selling cost).



**Apiary activities:** Hassall and Associates estimated a value of \$0.990m for 1997-98 apiary activities in State Forests in an associated study.

**Mining activities in State Forests** were estimated by the Department of Mineral Resources to be worth \$0.4m in 1997-98.

### 5.1.3. The Multipliers

The attached tables also include the multiplier values for all of the activities. The multipliers for gross output, value added and household income are all expressed in terms of the impact per \$1 of gross output. Employment is expressed as the number of jobs per \$1000 of gross output.

The Type II ratios express the relationship between the total impact and the direct impact.

The multipliers are used to estimate the flow-on effects of economic activities. Those flow-on effects are of two types:

- *Production-induced effects* that are associated with the industry purchasing inputs from other industries, and
- *Consumption-induced effects* associated with employed households spending their earnings on consumer goods and services.

The consumption-induced effects are somewhat conjectural when dealing with changes in activities. This is because they indicate the effect of new households being established or existing households leaving as employment changes. In that sense, they represent long-run impacts when there has been population movements to adjust to job opportunities.

In the following estimates of the economic impacts, the full consumption-induced effects have been included. This is legitimate in the description of the existing industry structure, but will involve an overestimation of the short-run impacts of changes in the industry. There is limited information available for estimating the short-run impacts and so no attempt has been made to estimate them. However, in the full tables in Attachment 7, the consumption effects are separately shown so as to enable analysts to adjust those values in accord with their purpose and knowledge of household behaviour.

The multipliers reflect the strength of an industry's linkages with other industries through the use of intermediate inputs and the capacity of industries in the local region to supply those intermediate inputs. Thus, detailed expenditure data and information on the source of inputs are critical in estimating multipliers. The multipliers are included in Attachment 6.

## 5.2. THE BASE CASE

The base case has been specified in detail in the attached set of tables (Attachment 6) with one table for each of gross output, value added, household income and

employment. A summary is provided in Table 5-A along with an indication of the contributed share of the LNE region.

- Overall, the forest-related activities represent around 1.7 per cent of the LNE economy.
- The general relationship between total and direct impacts is in the 1.6 to 1.9 range.
- Hardwood forestry operations generate approximately 36-43 per cent of the total impact.
- Secondary processing is also an important activity along with hardwood milling.

TABLE 5-A: SUMMARY OF ECONOMIC IMPACTS: BASE CASE, 1997-98

	Direct Effect		Total Impact		LNE TOTAL
	Value	% of LNE	Value	% of LNE	
<b>Gross Output (\$m)</b>					
Hardwood Milling etc.	138.1	0.4	251.7	0.6	
Softwood Milling etc.	2.4	0.0	5.5	0.0	
Other Activities	33.2	0.1	71.8	0.2	
Secondary Processing	180.0	0.5	362.6	0.9	
<b>Total</b>	<b>353.7</b>	<b>0.9</b>	<b>691.6</b>	<b>1.8</b>	<b>39,291.0</b>
<b>Value Added (\$m)</b>					
Hardwood Milling etc.	93.7	0.4	155.9	0.7	
Softwood Milling etc.	1.1	0.0	2.8	0.0	
Other Activities	16.1	0.1	36.9	0.2	
Secondary Processing	67.1	0.3	161.1	0.7	
<b>Total</b>	<b>178.0</b>	<b>0.8</b>	<b>356.7</b>	<b>1.6</b>	<b>21,877.9</b>
<b>Household Income (\$m)</b>					
Hardwood Milling etc.	39.4	0.4	70.1	0.7	
Softwood Milling etc.	0.5	0.0	1.5	0.0	
Other Activities	9.9	0.1	20.3	0.2	
Secondary Processing	40.6	0.4	85.6	0.8	
<b>Total</b>	<b>90.4</b>	<b>0.8</b>	<b>177.5</b>	<b>1.7</b>	<b>10,691.2</b>
<b>Employment (no.)</b>					
Hardwood Milling etc.	1,566	0.4	2,733	0.7	
Softwood Milling etc.	26	0.0	61	0.0	
Other Activities	467	0.1	864	0.2	
Secondary Processing	1,892	0.5	3,530	1.0	
<b>Total</b>	<b>3,950</b>	<b>1.1</b>	<b>7,187</b>	<b>1.9</b>	<b>370,763</b>

Although there are some difficulties in comparing these results with earlier periods, some comparison with the August 1996 population census employment data is possible. This is indicated below.

<b>Population Census (1996) employment in forestry, logging and processing</b>	<b>3530</b>
Total employment in impact estimates	3950
Less employment in private property, apiary, tourism, mining, grazing and downstream freight	<u>525</u>
<b>CRA for LNE equivalent employment estimate</b>	<b>3425</b>

This suggests a small decrease in employment in the forestry-related industries in the LNE since the Population Census. However, in the 1996 Census, there has been some reclassification of the employment in hauling logs to the mills into the transport sector (rather than logging). This would have the effect of reducing the census estimates relative to the estimates made in this study.

The picture that emerges over this period confirms earlier comments on key trends. The industry declined initially following the implementation of the IAP. Subsequently, there has been a rising volume of logs from private property sources that has compensated somewhat for the reduced take from State Forests. In addition, some further value adding in the secondary processing activity may have occurred. The net result of these trends is that the level of employment in the industry overall in 1998 is similar to that which prevailed prior to the implementation of the IAP.

These results for the base case suggest that it is possible for a range of industry adjustments to occur that can counter the loss of some wood supply from public lands. In this case, alternate sources from private land have been used, but appear to be near their limit. Thus, future compensatory adjustments are likely to have to come from further value adding and from access to plantation forestry. These will not be able to be accessed as readily as additional supplies from private land have been in the past. To avoid losses in employment in the adjustment process, the implementation of further reductions in logs from SFNSW may need to occur over a period of several years.

### **5.3. OTHER INFORMATION POINTS**

Five other information point levels of log supply have been investigated in terms of the economic impacts. The levels of supply for processing have been estimated from the response model (see Section 4.4) and are summarised below:

From the response model new estimates of the supply of logs and the values of production from those logs were compiled. Those information points are:

- 152,000m<sup>3</sup> of quota logs. This translates to the processing of 723,140m<sup>3</sup> of logs, or an increase in total log supply of 15,216m<sup>3</sup> equivalent to an increase of 2.1 per cent on the 1997/98 base case.
- 100,000m<sup>3</sup> of quota logs. This translates to the processing of 595,547m<sup>3</sup> of logs, or a reduction in total log supply of 112,377m<sup>3</sup> equivalent to a reduction of 15.9 per cent from the 1997/98 base case.
- 180,000m<sup>3</sup> of quota logs. This translates to the processing of 785,298m<sup>3</sup> of logs, or an increase in total log supply of 77,374m<sup>3</sup> equivalent to an increase of 10.9 per cent on the 1997/98 base case.

- 64,000m<sup>3</sup> of quota logs. This translates to the processing of 500,689m<sup>3</sup> of logs, or a reduction in total log supply of 207,235m<sup>3</sup> equivalent to a reduction of 29.3 per cent from the 1997/98 base case.
- 160,000m<sup>3</sup> of quota logs equivalent to the State position. This translates to the processing of 691,517m<sup>3</sup> of logs or a reduction in total log supply of 19,791m<sup>3</sup> equivalent to a reduction of 2.4 per cent from the 1997/98 base case.

These data were then entered into the economic impact model to estimate the total impacts for all of those activities that had changed. These were then compared with the base case estimates to obtain the tables shown Attachment 7 and summarised in Table 5-B. In those tables, only the activities that have changed have been included.

For the State position (109 000m<sup>3</sup>) in the LNE, the effects, compared with the 1997-98 base case, are a 0.9 per cent reduction in employment, 0.7 percent reduction in household income and a 0.1 per cent reduction in value added. Those changes would translate into around 27 jobs at an average earning of almost \$20,000.

For the 152,000m<sup>3</sup> point, there are only minor increases in the impacts of around one per cent depending on the measure used.

The 100,000m<sup>3</sup> point indicates reductions that are larger than those for the State position at between five and six percent or around 370 jobs.

The larger changes are shown for the 180,000m<sup>3</sup> and the 64,000m<sup>3</sup> points. These relatively large changes are likely to induce a number of structural changes in the industry that are difficult to anticipate and model. As a result, the estimates need to be interpreted carefully but are likely to be indicative of the general extent of the changes.

For the 180,000m<sup>3</sup> point, the increases are in the order of 9.2 per cent increase in household income to a 10.4 per cent increase in value added.

For the 64,000m<sup>3</sup> point, the reductions are in the order of 25.6 per cent reduction in household income to a 25.9 per cent reduction in value added. Those changes would translate into around 770 jobs at an average earning of \$24 440.

TABLE 5-B: SUMMARY OF THE INFORMATION POINT IMPACT CHANGES FROM THE BASE CASE: HARDWOOD TIMBER INDUSTRY

Information Point	Direct Effect	Total Flow-on	<b>TOTAL IMPACT</b>
<b>GROSS OUTPUT IMPACTS (\$m)</b>			
180,000	15.6	11.8	27.4
152,000	2.7	2.2	4.9
State	-3.5	-0.6	-4.1
100,000	-22.5	-16.2	-38.8
64,000	-41.1	-31.3	-72.4
<b>VALUE ADDED IMPACTS (\$m)</b>			
180,000	10.2	6.5	16.7
152,000	1.6	1.2	2.8
State	-0.9	-0.3	-1.2
100,000	-14.8	-8.9	-23.7
64,000	-24.6	-17.1	-41.7
<b>HOUSEHOLD INCOME IMPACTS (\$m)</b>			
180,000	3.5	3.2	6.8
152,000	0.7	0.6	1.3
State	-0.3	-0.1	-0.5
100,000	-4.7	-4.4	-9.1
64,000	-10.3	-8.4	-18.7
<b>EMPLOYMENT IMPACTS (No.)</b>			
180,000	141	122	264
152,000	28	23	50
State	-23	-5	-28
100,000	-206	-164	-371
64,000	-446	-321	-767

# 6. SUMMARY AND CONCLUSIONS

The LNE is a diverse region with a rich natural resource base that has supported a number of primary industries including forestry. In the Hunter area, there is a large coal mining industry, power generation and manufacturing industry. In other parts of the region, the native forests are a key component in the development of the regional economy.

There has been an evolution in the role played by native forests in the region. Some adjustments have been driven by changes in the supply of logs for processing as land has been cleared for both primary production and urban purposes. Other changes arise because of changes in the way in which native forests may be used – for example, they have become an important attraction for recreation and tourist activities. Technology also has a hand in development by influencing transport systems, the location of processing plants, the types of products that are produced and so on.

A major challenge in the development of the coastal and inland parts of the LNE region is to be able to maintain the significant contribution of the forest industries to the regional economy and at the same time meet the other demands being made on native forests. The approach adopted to date has been to reserve selected areas from logging. That leads to a contraction of log supply so that it is now recognised that the development of plantation forestry will be needed to replace the supply that previously came from native forests. But that will take at least a generation.

At the same time, it is possible to make more from the logs that are available by producing higher value products and turning what may previously have been wasted into valuable processed products. This too becomes an important element of forest policy, but it relies on private investment, the availability of markets for the products and a high level of security on the supply of logs of suitable quality.

Further, the forestry industry has provided a base of economic activity in the many small communities in the forest areas and supported substantial processing operations in the major centres. This pattern has been changing over many years under the pressures of competition and the application of technology. Perhaps there may still be merit in developing some ways to maintain a wide geographic spread of the economic benefits from the industry within the region.

In short, an integrated approach to the development of the forest-based industry is needed to ensure that this industry can play a significant part in the development of the LNE region. This study is focused on providing an analytical basis for these

considerations, albeit limited by the scope and quality of the data and analytical methods available to the study team. The work provides an economic and social perspective on the forestry industry in the LNE region.

Over recent decades, the LNE region has experienced a growth in population that is among the fastest in NSW. But that growth has not been matched by a similar growth in business activity resulting in relatively high levels of unemployment and low household incomes. Further, the growth has been concentrated in the coastal areas (including Gosford) and the Hunter Valley while much of the hinterland and adjacent tableland areas have seen little or negative growth in population and employment. Many communities have disappeared and many more are threatened by further adjustments in industry. Even some of the medium-sized towns have been threatened by the contraction of forestry operations, particularly where the other major farming activities have been performing poorly.

The LNE economy has grown and become much more diversified over the past decades. The Hunter Valley portion of the region has long been a major industrial area based around the coal industry. In recent times, the region has experienced rapid growth of the tertiary or service sector, especially those that meet the needs of retirees and visitors to the region. Few of the traditional industries have been able to match the growth of the service industries although but the wine industry and poultry industry provide depth and diversity to agriculture in the region.

Employment in the region was about 370,000 in 1996. Unemployment continues to be relatively high at around 46,000 and is concentrated in the coastal areas.

The timber industry provides almost 4,000 jobs directly and over 3,000 jobs indirectly. Most of these jobs are located in the coastal areas with some concentrations in a few timber industry towns in the hinterland and tablelands. Thus, there is a coincidence of areas with high unemployment and high timber industry employment in the coastal areas. In many parts of the region, especially the Hunter area, there are significant employment opportunities in the manufacturing and service industries.

In the early 1990s, the timber industry in the LNE has been contracting slightly with most of the decline in the manufacturing of wood products. This decline was faster than in NSW as a whole.

The present review of forestry was initiated in 1995 leading initially to the IFA that came into effect from July 1996. The IFA involved a reduction in wood supply of 40 per cent and the conversion of a portion of those entitlements into wood supply agreements for up to 10 years, subject to some conditions. Log prices were also increased by about 30 per cent. In addition, an adjustment program provided assistance to those firms and employees exiting the industry and to businesses investing in value adding processing.

The IFA boosted industry restructuring with a variety of responses by businesses in the industry that reflected the different situations that firms found themselves in. The main categories of response included the following.

- An initial contraction in throughput and employment associated with the reduction in the supply of logs from SFNSW.

- The closure of some mills, especially where owners operated from multiple sites. This allowed those operators to rationalise out of their operations plants that were old or poorly located.
- A substantial effort to secure alternative log supplies focused on private property. This was assisted by an increase in the price of logs from SFNSW and mediocre returns from other farming operations.
- The development of a variety of arrangements among mills in the region to improve the efficiency of milling and to achieve the benefits from further value adding.

In addition there has been a restructuring of the operations of SFNSW that involves a greater concentration of staff in regional offices, and a relative expansion of their merchandising and plantations divisions.

The net outcome of these developments appears to have resulted in the industry in 1997-98 being of a similar size to that of 1995-96. Further value adding and an increase in the supply of logs from private property have offset the loss of logs from SFNSW and the rationalisation within the industry. However, there has been a trend toward concentration into a smaller number of operations at fewer sites so that a number of communities did suffer plant closures and loss of jobs.

This work involved the analysis of data from a range of sources to estimate the level and types of all operations in the industry, the value of production and the level of employment. These estimates were included in an input-output model for the LNE region to estimate the flow-on effects associated with the timber industry.

In 1997-98, it was estimated that 707,924 m<sup>3</sup> of logs were processed in the region of which 150,000 m<sup>3</sup> was sourced from private property.

In 1997-98, the timber industry was estimated to contribute \$178m directly to Gross Regional Product and employ almost 3,950 people. This amounted to about 1.0 per cent of the economy and employment. This was boosted by flow-on effects of a further \$178m to Gross Regional Product and 3,240 jobs. In total, the industry represented about 1.9 per cent of the UNE economy.

The secondary processing of wood products contributed about 50 per cent of the contribution to the economy followed by the native hardwood industry at around 40 per cent. Softwood plantations and other activities in forests (visitors, apiary, grazing and mining) accounted for around 10 per cent in terms of Gross State Product.

Much of the LNE region has the potential to ship woodchips for export through the port of Newcastle or to supply wood for the hardboard plant at Raymond Terrace. However, that would not utilise all of the available low-grade material. In addition, the plantation softwood in the Walcha-Nundle area is yet to be used in a significant way for processed wood products.

The information compiled for 1997-98 represented a base situation against which a range of future development scenarios could be assessed. Five alternatives were considered that involved variation in the supply of logs from SFNSW ranging between 14 per cent more than the base case to 37 per cent less. The scenario negotiated among the various State agencies associated with forestry involved a reduction in logs from



SFNSW of three per cent. Those changes also included some variation in the mix of log quality and, consequently, variations in the final product mix and value of production.

For the above cases, it was assumed that the level of logs supplied for pulp and logs from private property remained constant. It is expected that the maximum level of log supply from private property has been reached at 150,000m<sup>3</sup>. This resulted in the variation in the amount of wood processed being smaller than the variation in wood supply from SFNSW. The variation in total wood processed ranged from an increase of 6 per cent to a reduction of 30 per cent. The State agency scenario involved a reduction in log supply of two per cent to provide a total of 691,517m<sup>3</sup> for processing.

The total impacts of these scenarios for hardwood milling, relative to the base case, ranged from an increase in Gross Regional Product of \$27.4m (7.7%) to a reduction of \$72.4m (20.8%), while the State scenario was a decrease of \$4.1m (1.2%). In employment terms, the change ranged from an increase of 264 jobs (3.7%) to a decline of 767 jobs (10.7%) with the State scenario involving a loss of 28 jobs (0.4%).

The above values can be related to the economy as a whole, which in 1995-96 produced a Gross Regional Product of \$21,878m and employed 370,763 people.

The work also involved an analysis of the social characteristics of the LNE region. This involved identifying major social catchments focused on Newcastle, Tamworth, Coffs Harbour, Port Macquarie, Maitland, The Entrance, Woy Woy, Armidale and Taree. In addition, community catchments were defined and their characteristics were profiled. The purpose was to develop some indicators of the capacity of those communities to adapt to change and to assess their socio-economic status relative to the region and non-metropolitan NSW.

The community profiles are important in identifying where particular adjustment problems might occur. The regional economic analysis indicates effects at a regional level. But those effects are not likely to be spread evenly within the region. The community profiles provide an indication of those communities that are especially dependent on the timber industry. Further, they give an indication of the capacity of those communities to adapt to changes in the timber industry in their community.

Because the analysis was constrained to the use of secondary data only, these indicators are only of a general nature.

Both Dorrigo and Bulahdelah appear to be highly vulnerable on several counts and they have a high proportion of their employment in the timber industry. Dungog and Gloucester would also appear to be vulnerable but to a lesser extent.

In terms of the absolute number of people employed in the timber industry, those that appear to be most vulnerable are Taree and The Entrance. Those on the next level of vulnerability are Port Macquarie and Gosford.

These findings are indicative of a situation where the impacts of changes in forestry policy and in the forestry industry will have differential impacts among the communities within the LNE region.

## ATTACHMENT 1: INPUT-OUTPUT METHODS

### INTRODUCTION

An input-output or transactions table is the basic component of input-output analysis. A descriptive 'snapshot' of any selected region for a particular year (financial or calendar) is provided in an input-output table. Within the table the economy is represented in terms of aggregated commodity groups, industries or sectors. Any input-output table can be as aggregated or disaggregated as required. The level of sector disaggregation is generally determined by the availability of data and the purposes of the study.

The intersectoral transactions for a given period are summarised in the table which is conventionally presented in a ( $n \times n$  square) matrix form which shows the general accounting framework of the economy. The sales from sector,  $i$ , to all other sectors are shown in the  $i$ th row of the matrix and the purchases by sector,  $j$ , from all other sectors are included in the  $j$ th column. Hewings (1985, p23) states that these:

are sales and purchases made on the current account and represent stages in the processing of intermediate goods. Current account purchases are those that a firm needs for the production of its commodities in any given year. Intermediate goods are those that are sold to other firms for further processing (or value-adding) prior to sale to final consumers.

An input-output table is divided into four main quadrants. In the table transactions between sectors are shown in the intermediate quadrant. Import requirements and purchases from local households (labour income or wages and salaries) are included in the primary inputs quadrant. Exports out of the region, and sales to households are part of the final demand quadrant. Other value added cells in the primary inputs quadrant incorporate gross operating surplus, depreciation, taxes, subsidies, import duties; and other final demand cells include government expenditure, capital expenditure and changes in stocks. The final quadrant includes the primary inputs into the final demand categories. Sectoral employment numbers are also provided in an input-output table.

TABLE 1: INPUT-OUTPUT TABLE QUADRANTS

1 Intermediate Quadrant	3 Final Demand Quadrant
2 Primary Inputs Quadrant	4

Once a transaction table has been developed for a particular region, simple mathematical procedures can be applied to derive multipliers for each sector of the economy. The main function of input-output tables is to analyse problems involving the intersectoral linkages using the derived multipliers. In an input-output transactions table a consistent and disaggregated accounting system is provided for a regional economy.

Therefore, 'in the regional policy and planning context the transactions table gives both a general understanding of the economy of a particular region and important information on particular aspects of the regional economy' (Leslie and Powell 1990, p16).

## COMPILATION OF INPUT-OUTPUT TABLES

The compilation of some 200 input-output tables by CARE has followed the same procedure as those compiled in many other impact studies in Australia.

Input-output tables can be constructed by:

- (i) collecting detailed data from all firms in the economy using direct survey methods;
- (ii) using various types of statistical and estimation methods involving essentially no survey work; or
- (iii) any level of combination of both (i) and (ii).

Some form of method (iii) is usually chosen since:

- detailed surveys are costly in terms of data collection, processing and the lengthy period of time to produce such a table, and
- entire non-survey methods are not generally statistically accurate although the tables are less expensive and quicker to produce.

The challenge to find cheaper methods of constructing tables, particularly at the regional level, existed in Australia. This was taken up by a research group at the University of Queensland and led to the so-called GRIT (Generation of Regional Input-output Tables) method. This is appropriately termed a "hybrid" method and utilises both survey, or superior data, and computer methods to generate tables. It allows the analyst to exercise judgement as to how much primary data are needed to construct a table suitable for the task at hand and to focus resources on the important elements/sectors. This method has come to dominate the construction of regional input-output tables in Australia.

The following provides a brief overview of the GRIT method and is drawn mainly from Jensen and West (1986). The initial comprehensive report was that of Jensen, Mandeville and Karunaratne (1979).

The GRIT system was designed to:

- combine the benefits of survey based tables (accuracy and understanding of the economic structure) with those of non-survey tables (speed and low cost);
- enable the tables to be compiled from other recently compiled tables;
- allow tables to be constructed for any region for which certain minimum amounts of data were available;
- develop regional tables from national tables using available region-specific data;

- produce tables consistent with the national tables in terms of sector classification and accounting conventions;
- proceed in a number of clearly defined stages; and
- provide for the possibility of ready updates of the tables.

The resultant GRIT procedure has a number of well-defined steps. Of particular significance are those that involve the analyst incorporating region-specific data and information specific to the objectives of the study. The analyst has to be satisfied about the accuracy of the information used for the 'important' sectors. The method allows the analyst to allocate available research resources to improving the data for those sectors of the economy that are most important for the particular study. It also means that the method should be used by an analyst who is familiar with the economy being modelled, or at least someone with that familiarity should be consulted.

An important characteristic of GRIT-produced tables relates to their accuracy. In the past, survey-based tables involved gathering data for every cell in the table, thereby building up a table with considerable accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some are not important because they are of very small value and, therefore, have no possibility of having a significant effect on the estimates of multipliers and economic impacts. Others are not important because of the lack of linkages that relate to the particular sectors that are being studied. Therefore, the GRIT procedure involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. These represent the main targets for the allocation of research resources in data gathering. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen 1980). That means a generally accurate representation of the economy is provided by the table, but does not guarantee the accuracy of any particular cell.

A summary of the steps involved in the GRIT process is shown in Table 2. The parent table used to generate the 1995-96 input-output tables for NSW and the 12 SDs was the national input-output table for 1993-94 (ABS 1997).

TABLE 2: THE GRIT METHOD

Step	Action
PHASE I	ADJUSTMENTS TO NATIONAL TABLE
1	Selection of national input-output table. (107-sector table with indirect allocation of all imports, in basic values).
2	Adjustment of national table for updating.
3	Adjustment for international trade.
PHASE II	ADJUSTMENTS FOR REGIONAL IMPORTS
	(Steps 4-14 apply to each region for which input-output tables are required)
4	Calculation of "non-existent" sectors.
5	Calculation of remaining imports.
PHASE III	DEFINITION OF REGIONAL SECTORS
6	Insertion of disaggregated superior data.
7	Aggregation of sectors.
8	Insertion of aggregated superior data.
PHASE IV	DERIVATION OF PROTOTYPE TRANSACTIONS TABLES
9	Derivation of transactions values.
10	Adjustments to complete the prototype tables.
11	Derivation of inverses and multipliers for prototype tables.
PHASE V	DERIVATION OF FINAL TRANSACTIONS TABLES
12	Final superior data insertions and other adjustments.
13	Derivation of final transactions tables.
14	Derivation of inverses and multipliers for final tables.

Source: Table 2 in Bayne and West (1988)

### Methods Used

The input-output tables developed at CARE are constructed using the GRIT method supplemented by data gathered from a variety of other sources as detailed in the reference list. These tables should be considered in the context of 'holistic' accuracy whereby they are considered to be generally representative of the sectors in the economies even though no particular cell may be necessarily accurate.

Once the input-output tables were developed using the GRIT procedure (phases I to IV in Table A1.1) other adjustments and refinements that were made to the tables (phase V in Table A1.1) were undertaken in the IO7 (Input-Output Analysis Version 7.1) program. This program was developed by West (1992) from earlier versions of the GRIMP (Generation of Regional IMPacts) program, also developed by West. This software is also used to generate multipliers from the input-output tables.

Data were gathered from a variety of mostly secondary sources. The following description applies to the construction of the set of 1995-96 input-output tables for NSW.

### ***Employment***

For the 1995-96 input-output tables employment data were obtained from the Australian Bureau of Statistics (ABS 1998). These data were allocated to the respective 107 national input-output sectors on the basis of Appendix B in ABS (1997). Undefined, not stated and non-classifiable units were proportionately allocated to these 107 sectors.

### ***Gross Output***

Gross output for the agricultural, mining and manufacturing sectors was sourced from the ABS (1997a, g, d and e). For the other sectors where this was not available, total output or production was estimated using the ratio of wage and salaries paid in each sector to the total output of each sector, Or the ratio of employment in each sector to total output in each sector - depending upon the stability of the estimates. The ratios were obtained from the Australian national input-output tables (ABS 1997b) and applied to the total estimated wage and salaries earned in each sector or total employment in each sector. For example:

$$A_{NSW_i} = A_{AUS_i} / W_{AUS_i} * W_{NSW_i}$$

where:  $i = 1...109$

$A_{NSW_i}$  = sector  $i$  output in NSW

$A_{AUS_i}$  = sector  $i$  output in Australia

$W_{NSW_i}$  = estimated wages and salaries paid in sector  $i$  in NSW

$W_{AUS_i}$  = total wages and salaries paid in sector  $i$  in Australia.

The agricultural output values were collected from the ABS (1997a) and converted into local values of production (excluding marketing and transport of the commodities after they leave the farm gate) using State data from the ABS (1997g).

Manufacturing sector outputs were estimated using sector aggregates from the Manufacturing Industry Survey for 1995-96 (ABS 1997d) and applying them to the sector details from the Manufacturing Industry Census for 1993-94 (ABS 1996c). The employment census data were used to adjust these data to estimate total sectoral output.

Mining sector outputs were obtained from the ABS (1997e) for NSW. For the regions the relationships between employment and output in NSW were applied to regional employment to estimate regional outputs.

### ***Household Income***

Wages and salaries paid in each sector were calculated by multiplying the number of wage and salary earners employed in each sector by the average earnings paid in NSW in May 1996 (ABS 1996d). The average wage and salary calculated for 1995-96 equalled annual gross earnings by total employed wage and salary earners divided by the average number of wage and salary earners. For the regional tables the NSW earnings were adjusted using information from the ABS (1998b) which provided information on incomes by industry division for each region.

In general, total household income generated by each sector was calculated by multiplying the average earnings for NSW above, by the total number of people 'employed' in each sector.

Therefore the household income row in the regional tables is different from that compiled in the national input-output table. A wage has been imputed for non-wage and salary earners in the regional tables. This imputed wage is part of gross operating surplus in the national table. The rest of the primary inputs sectors (excluding imports) is included in the other value added row (O.V.A) of the regional input-output tables.

### *Household Expenditure*

The procedure for collecting and manipulating household expenditure data was that outlined in Morison and West (1988) which is detailed below. In following this procedure ABS publications (1993-1997 various quarters, 1996a, b and 1997b,c,f) were used.

For the rural areas in NSW detailed household expenditure data for NSW (ABS 1996b) were converted to NSW 'country' values (total outside capital city) using the relationship between the two areas at the broad expenditure group level (Table 20, ABS 1996b). That is:

$${}^a C_{bread} = {}^a NSW_{bread} * A_{C_{Food}} / A_{NSW_{Food}}$$

where:

<i>a</i>	=	<i>average weekly expenditure on a particular item</i>
<i>A</i>	=	<i>average weekly expenditure on broad expenditure group</i>
<i>C</i>	=	<i>country households</i>
<i>NSW</i>	=	<i>all households in NSW.</i>

The detailed household expenditure data for each region were then aggregated into the appropriate 107 input-output sectors. These values were in purchasers' prices and needed to be converted into basic values for use in input-output tables. To do this, commodity taxes and marketing margins needed to be separated and allocated to the appropriate sectors. The allocation of margins and taxes was undertaken by applying the national reconciliation of flows at basic values and purchasers' prices for final private consumption expenditure (ABS 1997b). From each item purchased taxes/subsidies were allocated to O.V.A. (other value added row) and margins were proportionately allocated to the margin sectors (trade, transport, personal services). The remaining basic values of the commodities/services and the allocated margins were then adjusted for imports. Imports were calculated using location quotients (LQs). Where:

$$LQ_i = R_i / R * N / N_i$$

where:

<i>i</i>	=	<i>sector 1....109</i>
<i>R</i>	=	<i>regional employment</i>
<i>N</i>	=	<i>national employment.</i>

If the sectoral location quotient is greater than one then all the commodity/service can potentially be supplied from within the local region, given that the ratio of national employment can meet the demands of the country. If the location quotient is less than one then local supplies will not meet all the demands of the local region. In this case

some proportion of the commodity/service will need to be purchased from outside the region (that is, imported). For example, if  $LQ = 0.60$  then potentially 60 per cent may be purchased locally but at least 40 per cent of the requirements will need to be imported from outside the local region.

These location quotients provide minimum import requirement levels - that is, more of certain commodities/services may need to be imported than indicated by the LQs. This may arise when exports of locally produced products are not considered or cheaper imports make the locally produced product less attractive. Adjustments to imports are made when the total regional household expenditure per sector is compared with the total output of each sector. Further adjustments are made in GRIMP after the initial input-output table has been generated when combined household expenditure and intermediate purchases from each sector are compared with the total output and exports of that sector.

The State Accounts (ABS 1997c) provided the basis for updating the household expenditure from the 1993-94 Household Expenditure Survey to 1995-96 values. Data were also adjusted to be consistent with the national accounting framework in the national input-output table by adjusting the state estimates by a ratio of the national estimates derived following this procedure and those that appear in the national input-output table.

Once the local weekly household expenditure patterns were developed for 107 sectors these were multiplied up to annual values and further multiplied by the number of households in the region. From these manipulations a total annual regional household expenditure pattern was derived. The number of households in the region were calculated by dividing the population (ABS 1997f) by the estimated number of people per household obtained from ABS (1996b).

### ***Other Final Demand and Exports***

Other final demand (O.F.D.) is a combination of government current expenditure, government capital expenditure, private capital expenditure, public capital expenditure and the change in stocks. The State Accounts (ABS 1997c) provide aggregates of these, annually. These aggregates were then allocated across the sectors on the basis of the relationships in the national input-output table. For regions, the expenditure was estimated based on the relative proportion of the regional share of gross state product with adjustments using location quotients for spatial allocation.

Initially, exports were calculated as the residue of the total value of output for a sector less the sales made by that sector, to other sectors (including households and other final demand) within the region. The actual values attributed to exports from the primary and secondary sectors were estimated from ABS (1997b).

Note that exports from NSW (or any regional input-output model) also includes sales to other states/regions of Australia (ie exports equals all sales outside the region covered by the input-output model).

Once the input-output tables were generated using the GRIT program several consistency checks were made, resulting in further data checks and changes and several runs of the GRIT program for the input-output table. Final refinements were made to the



tables in the GRIMP program. The NSW input-output table was also rationalised against the State Accounts ABS (1995).

### Input-Output Sectors

The NSW 1995-96 input-output table is compatible with the recently released national 1993-94 input-output table which has 107 sectors and is based on the ANZIC. While the input-output tables are available at the 107 sector level, equivalent with the 1995-96 national input-output table which is based on ASIC, a typical sector aggregation is shown in Attachment 2 with the corresponding 107 sector description.

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**ATTACHMENT 2: SECTOR CLASSIFICATION**

Sector Aggregation	107 IO Sectors
Sheep	Sheep for meat and wool
Grains	Grains inc. cereals, oilseeds, legumes
Beef Cattle	Beef cattle
Dairy Cattle	Dairy cattle
Pigs	Pigs
Other Agriculture	Poultry for meat and eggs Other agriculture, inc. nurseries, vegetables, fruit, cotton, tobacco, sugar cane, herbs, hay, goats, horses, deer, beekeeping, pet breeding.
Services to agriculture	Cotton ginning, shearing and wool classing, aerial ag services, contract harvesting, seed grading, land clearing; hunting
Forestry & Fishing	Forestry and logging Commercial fishing and aquaculture
Mining	Coal; oil and gas Iron ores Non-ferrous metal ores Other mining inc. construction materials Services to mining inc. exploration
Food Mfg	Meat and meat products Dairy products Fruit and vegetable products Oils and fats Flour and cereal foods Bakery products Confectionery Other food products inc sugar, seafood, animal/bird feed, spices, herbs, savoury snacks, tea, honey - blended etc. Soft drinks, cordials, syrups Beer and malt Wine and spirits Tobacco products
Textile Mfg	Textile fibres, yarns and woven fabrics Textile products inc. blinds, awnings, curtains, sails, tents, carpets, rugs, ropes, nets, string, cord, bags, sacks etc. Knitting mill products Clothing Footwear Leather and leather products
Wood Mfg	Sawmill products inc sawn timber, woodchips, dressed timber Plywood, veneer, fabricated boards Other wood products inc. structural components - windows, doors, trusses, frames, containers, pallets, cases, log preservation.
Printing/Publishing	Pulp, paper and paper-board Paper bags and products Printing; services to printing Publishing; recorded media etc
Chemical Mfg	Petroleum and coal products Basic chemicals inc. fertilisers, industrial gas/chemicals, synthetic resins, dyes, acid, salt, urea, fluoride, chlorine etc. Paints Pharmaceuticals etc inc. drugs, medicines, medicinal preparations Soap and detergents Cosmetics and toiletries Other chemical products inc. explosives, ink, glue, polish, cleaners Rubber products Plastic products
Mineral Mfg	Glass and glass products Ceramic products Cement, lime and concrete slurry Plaster; other concrete products Non-metallic mineral. products nec inc. abrasives, chalk, stone products, insulation materials, ag/hydrated/quick lime,
Metal Mfg	Iron and steel rolling, galvanising, casting, forging, pipes and tubes Basic non-ferrous metals inc alumina, aluminium, copper, silver, lead, zinc, gold, bronze, nickel, tin – smelting, refining, rolling, drawing, extruding, casting, forging Structural metal products inc girders, reo-mesh, architectural products, doors, gates, windows etc Sheet metal products inc. containers, guttering, downpipes, tanks Fabricated metal products inc. tools, general hardware, springs, wire, nails, nuts, bolts, screws, rivets, metal coating, non-ferrous pipe fittings, miscellaneous metal products
Mach/Equip Mfg	Motor vehicles and parts etc Ships and boats

Sector Aggregation	107 IO Sectors
	Railway equipment Aircraft Scientific etc equipment inc photographic, optical, medical, surgical Electronic equipment inc. computer, telecommunication, radio, TV Household appliances Other electrical equipment inc. cable, wire, batteries, lights, signs, fuses, electric motors, generators, welding equip. etc Agricultural, mining, construction machinery inc lifting/handling Other machinery and equipment inc. food processing, machine tool/part, pumps/compressors, commercial heating/cooling equip.
Other Mfg	Prefabricated buildings Sheet metal, wooden and upholstered furniture, mattresses, pillows, cushions (not rubber) Other manufacturing inc jewellery, toy, sporting goods, brushes, miscellaneous goods
Utilities	Electricity generation, distribution and supply Gas distribution and town gas mfg/dist. Via mains Water supply, sewerage and drainage services
Resident. Building Other Construction	Residential building Non-residential building, Non-building construction inc. road/bridge, earthmoving, irrigation, mitigation
Wholesale Trade	Resale of new or used goods to business or institutional users.
Retail Trade	Resale of new or used goods to final consumers for personal or household consumption eg main-street establishments
Mechanical Repairs	Mechanical repairs
Other Repairs	Other repairs in. household equipment repairs etc
Accommodation Restaurants	Accommodation inc. hotels, motels, guest houses, youth hostels, student residences, camping grounds, caravan parks; cafes & restaurants; hospitality clubs, pubs, taverns and bars
Road Transport	Road freight and passenger transport
Rail Transport	Rail; pipeline; other inc. cable car, chair lift etc
Water Transport	International, coastal, inland water transport inc sea freight, cruise operation, boat charter, ferry.
Air Transport	Scheduled domestic and international air transport and non-scheduled air & space transport.
Transport Services	Services to road, water and air transport; travel agency, freight forwarding, customs agency; storage
Communication	Postal, courier, telecommunications
Banking	Reserve Bank; development, savings and trading banks
Non-bank Finance	Building societies, credit unions, money market dealers, deposit taking financiers etc
Investment & Insurance	Financial asset investors Insurance and services Services to finance and investment inc. brokers
Ownership of dwellings	Residential Property Operators
Property Services	Commercial property operators and developers, real estate agents, non-financial asset investors, machinery and equipment hiring and leasing
Technical, Computer Services	Scientific research, architectural, surveying, consultant engineering, other technical services, data processing, information storage and retrieval, computer maintenance and consultancy services.
Legal/Account/Mgt/Mkt'g	Legal, accounting, advertising, commercial art and display, market research, business administration and management services
Other business services	Employment placement, contract staff, secretarial, pest control, cleaning, packing, etc.
Public Administration	Federal, state, local government administration; justice Defence
Education	Education
Health	Hospitals, nursing homes, medical and health services; veterinary services
Community Care Services	Child care, accommodation for the aged, residential care services, non-residential care services eg meals on wheels, counselling.
Entertainment/ Media	Motion picture, film and video, radio and television
Cultural	Libraries, museums, parks and gardens, arts
Sport, Gambling	Sport, gambling and other recreation services
Personal Services	Personal and household goods hiring; laundries, drycleaners; photographic studios and processing, funeral directors etc, gardening, hairdressing etc; private households employing staff
Other Services	Religious organisations; Interest groups - business and professional associations; Public order and safety

**ATTACHMENT 3: DETAILED SHIFT-SHARE ANALYSIS**

Sector		Employment		Growth		Component				Total Local Change
		1996	1991	NSW Gni	Local Gri	State	Industry	Total State	Local	
Sheep	0.8	1330	1514	0.54	0.88	98	-796	<b>-698</b>	514	<b>-184</b>
Grains	0.0	80	41	2.20	1.96	3	46	<b>49</b>	-10	<b>39</b>
Beef cattle	1.8	2803	3352	0.70	0.84	217	-1223	<b>-1005</b>	456	<b>-550</b>
Dairy cattle	1.3	2807	2834	1.00	0.99	184	-187	<b>-4</b>	-23	<b>-27</b>
Pigs	0.3	75	116	0.83	0.65	8	-28	<b>-20</b>	-21	<b>-41</b>
Poultry	1.9	917	1197	0.86	0.77	78	-248	<b>-170</b>	-110	<b>-280</b>
Other agriculture	0.7	3434	3369	0.98	1.02	218	-302	<b>-84</b>	149	<b>65</b>
Services to agric.; hunting	0.6	586	579	0.91	1.01	38	-89	<b>-51</b>	59	<b>7</b>
Forestry and logging	1.4	769	678	1.07	1.13	44	4	<b>48</b>	43	<b>91</b>
Commercial fishing	1.8	1044	1061	1.00	0.98	69	-74	<b>-5</b>	-11	<b>-16</b>
Coal; oil and gas	5.9	8916	10175	0.86	0.88	660	-2093	<b>-1433</b>	175	<b>-1259</b>
Iron ores	0.0	7	0	0.00	0.00	0	0	<b>0</b>	7	<b>7</b>
Non-ferrous metal ores	0.3	369	542	0.74	0.68	35	-178	<b>-143</b>	-29	<b>-172</b>
Other mining	1.1	598	567	1.11	1.05	37	27	<b>64</b>	-33	<b>31</b>
Services to mining	0.5	408	316	1.03	1.29	20	-10	<b>10</b>	82	<b>92</b>
Meat and meat products	1.6	3619	3182	1.14	1.14	206	251	<b>457</b>	-20	<b>437</b>
Dairy products	1.1	789	728	0.94	1.08	47	-92	<b>-45</b>	106	<b>62</b>
Fruit and vegetable products	0.6	244	143	1.04	1.70	9	-3	<b>6</b>	94	<b>100</b>
Oils and fats	0.8	65	16	0.88	4.13	1	-3	<b>-2</b>	51	<b>49</b>
Flour and cereal foods	1.2	519	498	1.02	1.04	32	-20	<b>12</b>	9	<b>21</b>
Bakery products	1.3	2566	2263	1.00	1.13	147	-143	<b>4</b>	299	<b>303</b>
Confectionery	0.5	190	133	0.96	1.43	9	-14	<b>-5</b>	62	<b>57</b>
Other food products	0.4	497	453	1.18	1.10	29	54	<b>83</b>	-38	<b>44</b>
Soft drinks, cordials, syrups	0.5	152	189	0.94	0.81	12	-24	<b>-12</b>	-24	<b>-36</b>
Beer and malt	0.2	37	51	0.67	0.74	3	-20	<b>-17</b>	3	<b>-13</b>
Wine and spirits	1.7	773	554	1.52	1.39	36	253	<b>289</b>	-71	<b>218</b>
Tobacco products	0.2	25	31	0.69	0.81	2	-12	<b>-10</b>	4	<b>-6</b>
Textile fibres, yarns etc	1.4	813	898	0.92	0.90	58	-127	<b>-69</b>	-17	<b>-86</b>
Textile products	0.6	395	491	0.74	0.80	32	-161	<b>-130</b>	34	<b>-96</b>
Knitting mill products	0.0	7	22	0.56	0.32	1	-11	<b>-10</b>	-5	<b>-15</b>
Clothing	0.7	1491	1922	1.04	0.78	125	-49	<b>76</b>	-507	<b>-431</b>
Footwear	0.1	20	92	0.68	0.22	6	-35	<b>-29</b>	-42	<b>-71</b>
Leather and leather products	0.7	185	210	0.80	0.88	14	-55	<b>-41</b>	16	<b>-25</b>
Sawmill products	1.4	1101	924	1.38	1.19	60	290	<b>350</b>	-173	<b>177</b>
Other wood products	1.2	1892	2083	0.87	0.91	135	-416	<b>-281</b>	90	<b>-191</b>
Pulp, paper and paperboard	0.1	39	36	0.81	1.09	2	-9	<b>-7</b>	10	<b>3</b>
Paper bags and products	0.1	68	72	1.16	0.95	5	7	<b>11</b>	-15	<b>-4</b>
Printing; services to printing	0.6	1746	1630	1.08	1.07	106	20	<b>126</b>	-11	<b>116</b>
Publishing; recorded media etc	0.8	1852	1398	1.34	1.33	91	385	<b>476</b>	-21	<b>455</b>
Petroleum and coal products	0.6	182	112	0.84	1.62	7	-25	<b>-18</b>	87	<b>69</b>
Basic chemicals	0.9	624	644	0.74	0.97	42	-208	<b>-167</b>	146	<b>-20</b>
Paints	0.2	54	85	0.92	0.63	6	-13	<b>-7</b>	-24	<b>-31</b>
Pharmaceuticals etc	0.4	249	260	1.08	0.96	17	4	<b>20</b>	-31	<b>-11</b>
Soap and detergents	0.6	96	133	0.58	0.73	9	-64	<b>-56</b>	19	<b>-36</b>
Cosmetics and toiletries	2.2	372	187	0.98	1.99	12	-15	<b>-3</b>	188	<b>185</b>
Other chemical products	1.2	274	196	0.79	1.40	13	-53	<b>-41</b>	119	<b>78</b>
Rubber products	0.4	158	99	1.22	1.59	6	15	<b>22</b>	37	<b>59</b>
Plastic products	0.3	489	567	0.84	0.86	37	-125	<b>-89</b>	10	<b>-79</b>
Glass and glass products	0.4	177	132	0.89	1.34	9	-23	<b>-14</b>	60	<b>45</b>

Sector		Employment		Growth		Component				Total Change
		1996	1991	NSW Gni	Local Gri	State	Industry	Total State	Local	
Ceramic products	1.2	530	791	0.78	0.67	51	-226	<b>-175</b>	-86	<b>-261</b>
Cement, lime and concrete slurry	1.4	449	649	0.66	0.69	42	-261	<b>-219</b>	20	<b>-199</b>
Plaster; other concrete products	1.0	511	477	0.77	1.07	31	-142	<b>-111</b>	145	<b>34</b>
Non-metallic min. products nec	0.7	200	221	0.98	0.90	14	-18	<b>-4</b>	-18	<b>-21</b>
Iron and steel	3.0	4856	6531	0.86	0.74	424	-1354	<b>-931</b>	-745	<b>-1676</b>
Basic non-ferrous metals etc	2.1	2285	2247	0.81	1.02	146	-573	<b>-427</b>	464	<b>37</b>
Structural metal products	1.6	2461	1968	0.93	1.25	128	-260	<b>-133</b>	626	<b>493</b>
Sheet metal products	0.8	759	691	0.98	1.10	45	-60	<b>-15</b>	84	<b>68</b>
Fabricated metal products	1.3	2909	2383	1.03	1.22	155	-81	<b>74</b>	451	<b>525</b>
Motor vehicles and parts etc	0.3	1016	802	0.92	1.27	52	-118	<b>-66</b>	281	<b>214</b>
Ships and boats	1.5	919	527	0.68	1.74	34	-202	<b>-168</b>	561	<b>392</b>
Railway equipment	2.2	639	656	0.56	0.97	43	-331	<b>-289</b>	271	<b>-17</b>
Aircraft	0.2	108	85	1.35	1.28	5	24	<b>29</b>	-6	<b>24</b>
Scientific etc equipment	0.7	380	277	1.12	1.37	18	16	<b>34</b>	69	<b>103</b>
Electronic equipment	0.6	620	626	0.95	0.99	41	-69	<b>-29</b>	23	<b>-6</b>
Household appliances	0.2	131	190	0.77	0.69	12	-57	<b>-44</b>	-15	<b>-59</b>
Other electrical equipment	1.1	1179	1303	0.69	0.90	85	-490	<b>-405</b>	281	<b>-124</b>
Agricultural, mining etc machinery	1.4	1410	622	2.26	2.27	40	743	<b>784</b>	4	<b>788</b>
Other machinery and equipment	0.7	970	2204	0.66	0.44	143	-883	<b>-740</b>	-494	<b>-1234</b>
Prefabricated buildings	1.1	172	0	0.00	0.00	0	0	<b>0</b>	172	<b>172</b>
Furniture	0.5	1107	813	1.23	1.36	53	134	<b>186</b>	108	<b>294</b>
Other manufacturing	0.7	541	656	0.76	0.82	43	-197	<b>-155</b>	40	<b>-115</b>
Electricity	2.3	3982	5868	0.67	0.68	381	-2323	<b>-1943</b>	56	<b>-1886</b>
Gas	0.6	171	260	0.68	0.66	17	-101	<b>-84</b>	-5	<b>-89</b>
Water, sewerage & drainage	1.2	1134	1710	0.53	0.66	111	-915	<b>-805</b>	228	<b>-577</b>
Residential building	1.2	17556	17666	1.18	0.99	1146	2120	<b>3266</b>	-3375	<b>-110</b>
Other construction	1.0	10776	10627	0.91	1.01	689	-1680	<b>-991</b>	1141	<b>149</b>
Wholesale trade	0.9	18776	17542	1.02	1.07	1138	-864	<b>274</b>	960	<b>1233</b>
Retail trade	1.2	51484	48317	1.02	1.07	3134	-2231	<b>903</b>	2264	<b>3167</b>
Mechanical repairs	1.1	7462	4219	1.71	1.77	274	2724	<b>2998</b>	246	<b>3243</b>
Other repairs	1.0	1270	1047	1.16	1.21	68	100	<b>167</b>	55	<b>223</b>
Accom. & restaurants	1.1	20118	17091	1.17	1.18	1108	1755	<b>2863</b>	164	<b>3027</b>
Road transport	1.0	7536	7440	0.92	1.01	483	-1050	<b>-568</b>	664	<b>97</b>
Rail & other transport	1.7	3043	4300	0.74	0.71	279	-1386	<b>-1107</b>	-151	<b>-1258</b>
Water transport	1.2	563	446	1.01	1.26	29	-25	<b>4</b>	113	<b>118</b>
Air and space transport	0.3	615	603	1.08	1.02	39	8	<b>47</b>	-35	<b>12</b>
Transport srvs, storage	0.7	3336	2455	1.20	1.36	159	328	<b>487</b>	394	<b>881</b>
Communication services	0.8	6199	5623	1.24	1.10	365	1013	<b>1377</b>	-800	<b>577</b>
Banking	0.7	5419	5660	0.98	0.96	367	-474	<b>-107</b>	-134	<b>-241</b>
Non-bank finance	1.5	2040	2275	0.76	0.90	148	-694	<b>-547</b>	312	<b>-235</b>
Financial asset investors	0.4	204	140	1.58	1.45	9	72	<b>81</b>	-18	<b>64</b>
Insurance	0.8	2353	2570	0.90	0.92	167	-420	<b>-254</b>	37	<b>-217</b>
Services to finance etc	0.5	1467	1730	1.07	0.85	112	1	<b>113</b>	-376	<b>-263</b>
Ownership of dwellings	0.0	0	0	0.00	0.00	0	0	<b>0</b>	0	<b>0</b>
Other property services	1.1	5603	4936	1.03	1.14	320	-191	<b>130</b>	537	<b>667</b>
Scientific research etc	0.7	6544	5339	1.31	1.23	346	1290	<b>1637</b>	-431	<b>1205</b>
Legal, accounting srvs	0.6	9016	6468	1.35	1.39	419	1853	<b>2273</b>	275	<b>2548</b>
Other business services	0.9	8600	5897	1.49	1.46	382	2531	<b>2913</b>	-210	<b>2703</b>
Public administration	0.9	12857	14070	0.90	0.91	913	-2305	<b>-1393</b>	180	<b>-1213</b>
Defence	0.9	3400	3446	0.81	0.99	223	-882	<b>-659</b>	613	<b>-46</b>
Education	1.0	27698	24808	1.10	1.12	1609	908	<b>2517</b>	373	<b>2890</b>
Health services	1.1	31314	26222	1.10	1.19	1701	1034	<b>2735</b>	2357	<b>5092</b>

Sector		Employment		Growth		Component				Total
		1996	1991	NSW Gni	Local Gri	State	Industry	Total State	Local	Change
Community services	1.1	9400	5617	1.52	1.67	364	2570	<b>2934</b>	849	<b>3783</b>
Motion picture, radio etc	0.7	1253	1136	1.25	1.10	74	208	<b>282</b>	-165	<b>117</b>
Libraries, museums, arts	0.8	2028	1126	1.39	1.80	73	368	<b>441</b>	461	<b>902</b>
Sport, gambling etc	0.8	3673	2738	1.43	1.34	178	999	<b>1177</b>	-242	<b>935</b>
Personal services	1.0	7190	5280	1.27	1.36	342	1067	<b>1409</b>	501	<b>1910</b>
Other services	0.9	6635	6150	1.04	1.08	399	-162	<b>237</b>	249	<b>485</b>
<b>TOTAL</b>	<b>1.0</b>	<b>370768</b>	<b>342311</b>	<b>1.06</b>	<b>1.08</b>	<b>22202</b>	<b>-4757</b>	<b>17444</b>	<b>11013</b>	<b>28457</b>

**ATTACHMENT 4: DETAILED SOCIAL IMPACTS TABLES**



**ATTACHMENT 5: VISITOR EXPENDITURE ALLOCATIONS**

	LOWER NORTH EAST	
<b>Visitor Numbers:</b>		
National Parks		
State Forests		
<b>Total</b>	<b>1</b>	<b>850,000</b>
Expenditure per visitor	43.53	43.53
	\$	\$'000
<b>Expenditure Item:</b>		
Car	10.62	9027.000
Fares	0.00	0.000
Accommodation	0.00	0.000
Meals	9.58	8143.000
Shopping	8.49	7216.500
Other	14.84	12614.000
<b>Total</b>	<b>43.53</b>	<b>37000.500</b>
<b>Cost Components:</b>		
<b>Car</b>		
Fuel (imports)	3.40	2888.64
Taxes	4.89	4152.42
Retail margin	2.23	1895.67
Transport Margin	0.11	90.27
<b>Shopping</b>		
Shopping (imports)	4.67	3969.08
Taxes	1.10	938.15
Retail margin	2.59	2201.03
Transport Margin	0.13	108.25
<b>Other</b>		
Other (imports)	1.04	882.98
Taxes	0.21	176.60
Retail margin	1.63	1387.54
Transport Margin	0.09	75.68
Communication	0.74	630.70
Health	0.74	630.70
Entertainment	10.39	8829.80
<b>Accommodation</b>	<b>0.00</b>	<b>0.00</b>
<b>Meals from cafes etc</b>	<b>9.58</b>	<b>8143.00</b>
<b>Transport</b>	<b>0.00</b>	<b>0.00</b>
<b>Total</b>	<b>43.53</b>	<b>37000.50</b>
<b>Allocation to IO Sectors:</b>		
RETAIL	6.45	5484.24
ACCOM/REST	9.58	8143.00
TRANSPORT	0.32	274.20
COMMUNICATION	0.74	630.70
HEALTH	0.74	630.70
ENTERTAINMENT	10.39	8829.80
TAXES	6.20	5267.16
IMPORTS	9.11	7740.70
<b>TOTAL</b>	<b>43.53</b>	<b>37000.50</b>
<b>Summary:</b>		
Local Impacts	28.23	23,992.64
Imports/Taxes: No Impacts	15.30	13,007.86
<b>TOTAL</b>	<b>43.53</b>	<b>37,000.50</b>

**ATTACHMENT 6: BASE CASE ECONOMIC IMPACTS – UNE**

	GROSS OUTPUT IMPACTS (\$'000)				TOTAL IMPACT	GROSS OUTPUT MULTIPLIERS					Type II Ratio
	Direct Effect	Production Induced	Consumption Induced	Total Flow- on		Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL IMPACT	
<b>Local LNE hardwood milling:</b>											
LNE HWD Forestry	11,027	5,381	10,784	16,164	<b>27,191</b>	1.000	0.488	0.978	1.466	2.466	2.466
LNE SWD Forestry	0	0	0	0	<b>0</b>	0.000	0.000	0.000	0.000	0.000	0.000
LNE PP Forestry	4,538	1,677	3,896	5,573	<b>10,110</b>	1.000	0.369	0.859	1.228	2.228	2.228
LNE Logging/Haulage	25,301	8,459	15,922	24,381	<b>49,682</b>	1.000	0.334	0.629	0.964	1.964	1.964
LNE Milling (net)	89,540	20,462	39,875	60,337	<b>149,877</b>	1.000	0.229	0.445	0.674	1.674	1.674
<b>TOTAL (mill gate)</b>	<b>130,405</b>	<b>35,979</b>	<b>70,477</b>	<b>106,455</b>	<b>236,860</b>	<b>1.000</b>	<b>0.276</b>	<b>0.540</b>	<b>0.816</b>	<b>1.816</b>	<b>1.816</b>
Downstream Freight	7,681	3,118	4,041	7,159	<b>14,839</b>	1.000	0.406	0.526	0.932	1.932	1.932
<b>TOTAL LNE HWD MILLING</b>	<b>138,085</b>	<b>39,096</b>	<b>74,517</b>	<b>113,614</b>	<b>251,699</b>	<b>1.000</b>	<b>0.283</b>	<b>0.540</b>	<b>0.823</b>	<b>1.823</b>	<b>1.823</b>
<b>Activities not directly related to local milling:</b>											
<i>SF Visitors</i>	23,993	12,339	15,911	28,251	<b>52,243</b>	1.000	0.514	0.663	1.177	2.177	2.177
<i>SF Grazing</i>	392	141	330	471	<b>863</b>	1.000	0.361	0.842	1.203	2.203	2.203
<i>SF Apiary</i>	990	284	685	970	<b>1,960</b>	1.000	0.287	0.692	0.979	1.979	1.979
<i>SF Mining</i>	400	136	127	262	<b>662</b>	1.000	0.339	0.317	0.656	1.656	1.656
LNE HWD Plantation Establishment	3,530	2,352	1,180	3,532	<b>7,062</b>	1.000	0.666	0.334	1.001	2.001	2.001
LNE HWD Forestry Office Exp	0	0	0	0	<b>0</b>	0.000	0.000	0.000	0.000	0.000	0.000
LNE HWD Forestry (Other sales)	2,711	1,323	2,651	3,974	<b>6,684</b>	1.000	0.488	0.978	1.466	2.466	2.466
LNE Logging/Haulage (Other sales)	1,181	395	743	1,138	<b>2,319</b>	1.000	0.334	0.629	0.964	1.964	1.964
<b>Local LNE Softwood Milling:</b>											
LNE SWD Forestry	2,395	1,575	1,549	3,124	<b>5,519</b>	1.000	0.658	0.647	1.305	2.305	2.305
LNE Logging/Haulage	0	0	0	0	<b>0</b>	0.000	0.000	0.000	0.000	0.000	0.000
LNE Milling (net)	0	0	0	0	<b>0</b>	0.000	0.000	0.000	0.000	0.000	0.000
<b>TOTAL (mill gate)</b>	<b>2,395</b>	<b>1,575</b>	<b>1,549</b>	<b>3,124</b>	<b>5,519</b>	<b>1.000</b>	<b>0.658</b>	<b>0.647</b>	<b>1.305</b>	<b>2.305</b>	<b>2.305</b>
Downstream Freight	0	0	0	0	<b>0</b>	0.000	0.000	0.000	0.000	0.000	0.000
<b>TOTAL LNE SWD MILLING</b>	<b>2,395</b>	<b>1,575</b>	<b>1,549</b>	<b>3,124</b>	<b>5,519</b>	<b>1.000</b>	<b>0.658</b>	<b>0.647</b>	<b>1.305</b>	<b>2.305</b>	<b>2.305</b>
Secondary Processing (net)	179,984	91,553	91,091	182,645	<b>362,629</b>	1.000	0.509	0.506	1.015	2.015	2.015

[May 1999]

Regional Socio-Economic Impacts: LNE

**VALUE ADDED IMPACTS (\$'000)**

	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>Local LNE hardwood milling:</b>					
LNE HWD Forestry	6,214	2,963	5,872	8,835	<b>15,049</b>
LNE SWD Forestry	0	0	0	0	<b>0</b>
LNE PP Forestry	2,977	939	2,121	3,061	<b>6,038</b>
LNE Logging/Haulage	16,086	4,748	8,670	13,418	<b>29,505</b>
LNE Milling (net)	64,132	11,235	21,714	32,949	<b>97,081</b>
<b>TOTAL (mill gate)</b>	<b>89,409</b>	<b>19,886</b>	<b>38,377</b>	<b>58,263</b>	<b>147,672</b>
Downstream Freight	4,332	1,697	2,200	3,897	<b>8,230</b>
<b>TOTAL LNE HWD MILLING</b>	<b>93,741</b>	<b>21,583</b>	<b>40,577</b>	<b>62,160</b>	<b>155,901</b>
<b>Activities not directly related to local milling:</b>					
<i>SF Visitors</i>	11,654	6,587	8,664	15,251	<b>26,906</b>
<i>SF Grazing</i>	166	75	180	254	<b>420</b>
<i>SF Apiary</i>	694	164	373	538	<b>1,232</b>
<i>SF Mining</i>	269	68	69	137	<b>406</b>
LNE HWD Plantation Establishment	1,055	1,150	643	1,793	<b>2,848</b>
LNE HWD Forestry Office Exp	0	0	0	0	<b>0</b>
LNE HWD Forestry (Other sales)	1,528	728	1,443	2,172	<b>3,699</b>
LNE Logging/Haulage (Other sales)	751	222	405	626	<b>1,377</b>
<b>Local LNE Softwood Milling:</b>					
LNE SWD Forestry	1,088	892	844	1,735	<b>2,824</b>
LNE Logging/Haulage	0	0	0	0	<b>0</b>
LNE Milling (net)	0	0	0	0	<b>0</b>
<b>TOTAL (mill gate)</b>	<b>1,088</b>	<b>892</b>	<b>844</b>	<b>1,735</b>	<b>2,824</b>
Downstream Freight	0	0	0	0	<b>0</b>
<b>TOTAL LNE SWD MILLING</b>	<b>1,088</b>	<b>892</b>	<b>844</b>	<b>1,735</b>	<b>2,824</b>
Secondary Processing (net)	67,097	44,369	49,602	93,971	<b>161,067</b>

**VALUE ADDED MULTIPLIERS (per\$direct O/P effect)**

	Flow-on Effects				TOTAL IMPACT	Type II Ratio
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on		
LNE HWD Forestry	0.564	0.269	0.532	0.801	1.365	2.422
LNE SWD Forestry	0.000	0.000	0.000	0.000	0.000	0.000
LNE PP Forestry	0.656	0.207	0.468	0.675	1.331	2.028
LNE Logging/Haulage	0.636	0.188	0.343	0.530	1.166	1.834
LNE Milling (net)	0.716	0.125	0.243	0.368	1.084	1.514
<b>TOTAL (mill gate)</b>	<b>0.686</b>	<b>0.152</b>	<b>0.294</b>	<b>0.447</b>	<b>1.132</b>	<b>1.652</b>
Downstream Freight	0.564	0.221	0.286	0.507	1.071	1.900
<b>TOTAL LNE HWD MILLING</b>	<b>0.679</b>	<b>0.156</b>	<b>0.294</b>	<b>0.450</b>	<b>1.129</b>	<b>1.663</b>
<b>Activities not directly related to local milling:</b>						
<i>SF Visitors</i>	0.486	0.275	0.361	0.636	1.121	2.309
<i>SF Grazing</i>	0.424	0.190	0.459	0.649	1.073	2.532
<i>SF Apiary</i>	0.701	0.166	0.377	0.543	1.244	1.774
<i>SF Mining</i>	0.672	0.169	0.173	0.342	1.014	1.508
LNE HWD Plantation Establishment	0.299	0.326	0.182	0.508	0.807	2.699
LNE HWD Forestry Office Exp	0.000	0.000	0.000	0.000	0.000	0.000
LNE HWD Forestry (Other sales)	0.564	0.269	0.532	0.801	1.365	2.422
LNE Logging/Haulage (Other sales)	0.636	0.188	0.343	0.530	1.166	1.834
<b>Local LNE Softwood Milling:</b>						
LNE SWD Forestry	0.454	0.372	0.352	0.725	1.179	2.595
LNE Logging/Haulage	0.000	0.000	0.000	0.000	0.000	0.000
LNE Milling (net)	0.000	0.000	0.000	0.000	0.000	0.000
<b>TOTAL (mill gate)</b>	<b>0.454</b>	<b>0.372</b>	<b>0.352</b>	<b>0.725</b>	<b>1.179</b>	<b>2.595</b>
Downstream Freight	0.000	0.000	0.000	0.000	0.000	0.000
<b>TOTAL LNE SWD MILLING</b>	<b>0.454</b>	<b>0.372</b>	<b>0.352</b>	<b>0.725</b>	<b>1.179</b>	<b>2.595</b>
Secondary Processing (net)	0.373	0.247	0.276	0.522	0.895	2.401

**H-HOLD INCOME IMPACTS (\$'000)**

	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>Local LNE hardwood milling:</b>					
LNE HWD Forestry	5,711	1,527	2,893	4,420	<b>10,131</b>
LNE SWD Forestry	0	0	0	0	<b>0</b>
LNE PP Forestry	2,131	484	1,045	1,530	<b>3,660</b>
LNE Logging/Haulage	8,191	2,495	4,272	6,767	<b>14,958</b>
LNE Milling (net)	21,488	5,340	10,701	16,041	<b>37,529</b>
<b>TOTAL (mill gate)</b>	<b>37,521</b>	<b>9,847</b>	<b>18,911</b>	<b>28,758</b>	<b>66,279</b>
Downstream Freight	1,866	847	1,084	1,931	<b>3,796</b>
<b>TOTAL LNE HWD MILLING</b>	<b>39,386</b>	<b>10,694</b>	<b>19,995</b>	<b>30,689</b>	<b>70,075</b>
<b>Activities not directly related to local milling:</b>					
<i>SF Visitors</i>	7,294	3,385	4,269	7,654	<b>14,948</b>
<i>SF Grazing</i>	185	37	88	125	<b>310</b>
<i>SF Apiary</i>	359	101	184	285	<b>644</b>
<i>SF Mining</i>	54	31	34	65	<b>119</b>
LNE HWD Plantation Establishment	207	585	317	902	<b>1,109</b>
LNE HWD Forestry Office Exp	0	0	0	0	<b>0</b>
LNE HWD Forestry (Other sales)	1,404	375	711	1,087	<b>2,490</b>
LNE Logging/Haulage (Other sales)	382	116	199	316	<b>698</b>
<b>Local LNE Softwood Milling:</b>					
LNE SWD Forestry	496	544	416	960	<b>1,455</b>
LNE Logging/Haulage	0	0	0	0	<b>0</b>
LNE Milling (net)	0	0	0	0	<b>0</b>
<b>TOTAL (mill gate)</b>	<b>496</b>	<b>544</b>	<b>416</b>	<b>960</b>	<b>1,455</b>
Downstream Freight	0	0	0	0	<b>0</b>
<b>TOTAL LNE SWD MILLING</b>	<b>496</b>	<b>544</b>	<b>416</b>	<b>960</b>	<b>1,455</b>
Secondary Processing (net)	40,635	20,558	24,441	45,000	<b>85,634</b>

**H-HOLD INCOME MULTIPLIERS (per\$direct O/P effect)**

	Flow-on Effects				TOTAL IMPACT	Type II Ratio
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on		
LNE HWD Forestry	0.518	0.138	0.262	0.401	0.919	1.774
LNE SWD Forestry	0.000	0.000	0.000	0.000	0.000	0.000
LNE PP Forestry	0.470	0.107	0.230	0.337	0.807	1.718
LNE Logging/Haulage	0.324	0.099	0.169	0.267	0.591	1.826
LNE Milling (net)	0.240	0.060	0.120	0.179	0.419	1.746
<b>TOTAL (mill gate)</b>	<b>0.288</b>	<b>0.076</b>	<b>0.145</b>	<b>0.221</b>	<b>0.508</b>	<b>1.766</b>
Downstream Freight	0.243	0.110	0.141	0.251	0.494	2.035
<b>TOTAL LNE HWD MILLING</b>	<b>0.285</b>	<b>0.077</b>	<b>0.145</b>	<b>0.222</b>	<b>0.507</b>	<b>1.779</b>
<b>Activities not directly related to local milling:</b>						
<i>SF Visitors</i>	0.304	0.141	0.178	0.319	0.623	2.049
<i>SF Grazing</i>	0.472	0.094	0.226	0.320	0.791	1.677
<i>SF Apiary</i>	0.362	0.102	0.186	0.288	0.650	1.796
<i>SF Mining</i>	0.136	0.077	0.085	0.162	0.298	2.197
LNE HWD Plantation Establishment	0.059	0.166	0.090	0.256	0.314	5.364
LNE HWD Forestry Office Exp	0.000	0.000	0.000	0.000	0.000	0.000
LNE HWD Forestry (Other sales)	0.518	0.138	0.262	0.401	0.919	1.774
LNE Logging/Haulage (Other sales)	0.324	0.099	0.169	0.267	0.591	1.826
<b>Local LNE Softwood Milling:</b>						
LNE SWD Forestry	0.207	0.227	0.174	0.401	0.608	2.935
LNE Logging/Haulage	0.000	0.000	0.000	0.000	0.000	0.000
LNE Milling (net)	0.000	0.000	0.000	0.000	0.000	0.000
<b>TOTAL (mill gate)</b>	<b>0.207</b>	<b>0.227</b>	<b>0.174</b>	<b>0.401</b>	<b>0.608</b>	<b>2.935</b>
Downstream Freight	0.000	0.000	0.000	0.000	0.000	0.000
<b>TOTAL LNE SWD MILLING</b>	<b>0.207</b>	<b>0.227</b>	<b>0.174</b>	<b>0.401</b>	<b>0.608</b>	<b>2.935</b>
Secondary Processing (net)	0.226	0.114	0.136	0.250	0.476	2.107

**EMPLOYMENT IMPACTS (no.)**

	Flow-on Effects				<b>TOTAL IMPACT</b>
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>Local LNE hardwood milling:</b>					
LNE HWD Forestry	185	54	117	171	<b>357</b>
LNE SWD Forestry	0	0	0	0	<b>0</b>
LNE PP Forestry	69	17	42	59	<b>128</b>
LNE Logging/Haulage	216	87	173	260	<b>476</b>
LNE Milling (net)	1,038	173	432	605	<b>1,643</b>
<b>TOTAL (mill gate)</b>	<b>1,509</b>	<b>331</b>	<b>764</b>	<b>1,095</b>	<b>2,603</b>
Downstream Freight	57	28	44	72	<b>130</b>
<b>TOTAL LNE HWD MILLING</b>	<b>1,566</b>	<b>359</b>	<b>808</b>	<b>1,167</b>	<b>2,733</b>
<b>Activities not directly related to local milling:</b>					
<i>SF Visitors</i>	355	120	172	292	<b>648</b>
<i>SF Grazing</i>	8	1	4	5	<b>12</b>
<i>SF Apiary</i>	35	4	7	11	<b>46</b>
<i>SF Mining</i>	1	1	1	2	<b>4</b>
LNE HWD Plantation Establishment	11	19	13	32	<b>44</b>
LNE HWD Forestry Office Exp	0	0	0	0	<b>0</b>
LNE HWD Forestry (Other sales)	46	13	29	42	<b>88</b>
LNE Logging/Haulage (Other sales)	10	4	8	12	<b>22</b>
<b>Local LNE Softwood Milling:</b>					
LNE SWD Forestry	26	18	17	35	<b>61</b>
LNE Logging/Haulage	0	0	0	0	<b>0</b>
LNE Milling (net)	0	0	0	0	<b>0</b>
<b>TOTAL (mill gate)</b>	<b>26</b>	<b>18</b>	<b>17</b>	<b>35</b>	<b>61</b>
Downstream Freight	0	0	0	0	<b>0</b>
<b>TOTAL LNE SWD MILLING</b>	<b>26</b>	<b>18</b>	<b>17</b>	<b>35</b>	<b>61</b>
Secondary Processing (net)	1,892	651	987	1,638	<b>3,530</b>

**EMPLOYMENT MULTIPLIERS (per \$'000 direct O/P effect)**

	Flow-on Effects				<b>TOTAL IMPACT</b>	Type II Ratio
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on		
	0.017	0.005	0.011	0.016	0.032	1.923
	0.000	0.000	0.000	0.000	0.000	0.000
	0.015	0.004	0.009	0.013	0.028	1.852
	0.009	0.003	0.007	0.010	0.019	2.203
	0.012	0.002	0.005	0.007	0.018	1.583
	<b>0.012</b>	<b>0.003</b>	<b>0.006</b>	<b>0.008</b>	<b>0.020</b>	<b>1.726</b>
	0.007	0.004	0.006	0.009	0.017	2.260
	<b>0.011</b>	<b>0.003</b>	<b>0.006</b>	<b>0.008</b>	<b>0.020</b>	<b>1.745</b>
	0.015	0.005	0.007	0.012	0.027	1.822
	0.019	0.003	0.009	0.012	0.032	1.635
	0.035	0.004	0.007	0.011	0.047	1.322
	0.004	0.002	0.003	0.006	0.009	2.642
	0.003	0.006	0.004	0.009	0.012	3.818
	0.000	0.000	0.000	0.000	0.000	0.000
	0.017	0.005	0.011	0.016	0.032	1.923
	0.009	0.003	0.007	0.010	0.019	2.203
	0.011	0.008	0.007	0.015	0.025	2.336
	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
	<b>0.011</b>	<b>0.008</b>	<b>0.007</b>	<b>0.015</b>	<b>0.025</b>	<b>2.336</b>
	0.000	0.000	0.000	0.000	0.000	0.000
	<b>0.011</b>	<b>0.008</b>	<b>0.007</b>	<b>0.015</b>	<b>0.025</b>	<b>2.336</b>
	0.011	0.004	0.005	0.009	0.020	1.866



**ATTACHMENT 7: INFORMATION POINTS ECONOMIC IMPACTS – LNE**

**LOWER NORTH EAST: REGIONAL ECONOMIC IMPACTS 100,000 INFORMATION POINT**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	7,940	3,931	10,027	13,957	21,897
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	4,538	1,677	3,896	5,573	10,110
UNE Logging/Haulage	21,409	7,158	13,473	20,631	42,040
UNE Milling (net)	75,690	17,357	33,972	51,329	127,019
<b>TOTAL (mill gate)</b>	<b>109,576</b>	<b>30,122</b>	<b>61,367</b>	<b>91,489</b>	<b>201,066</b>
Downstream Freight	6,944	2,819	3,654	6,472	13,417
<b>TOTAL UNE HWD MILLING</b>	<b>116,520</b>	<b>32,941</b>	<b>65,021</b>	<b>97,962</b>	<b>214,482</b>
UNE HWD Forestry (Other sales)	2,142	1,060	2,705	3,765	5,906
UNE Logging/Haulage (Other sales)	794	266	500	766	1,560
<b>TOTAL GROSS OUTPUT</b>	<b>119,457</b>	<b>34,267</b>	<b>68,225</b>	<b>102,492</b>	<b>221,949</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	4,469	2,170	5,460	7,629	12,098
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,977	939	2,121	3,061	6,038
UNE Logging/Haulage	13,611	4,018	7,336	11,354	24,965
UNE Milling (net)	54,520	9,536	18,499	28,035	82,555
<b>TOTAL (mill gate)</b>	<b>75,577</b>	<b>16,663</b>	<b>33,417</b>	<b>50,080</b>	<b>125,657</b>
Downstream Freight	3,917	1,534	1,989	3,524	7,441
<b>TOTAL UNE HWD MILLING</b>	<b>79,494</b>	<b>18,197</b>	<b>35,406</b>	<b>53,603</b>	<b>133,097</b>
UNE HWD Forestry (Other sales)	1,205	585	1,473	2,058	3,263
UNE Logging/Haulage (Other sales)	505	149	272	421	926
<b>TOTAL VALUE ADDED</b>	<b>81,204</b>	<b>18,932</b>	<b>37,151</b>	<b>56,083</b>	<b>137,287</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	5,603	1,127	2,690	3,817	9,420
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,131	484	1,045	1,530	3,660
UNE Logging/Haulage	6,931	2,112	3,615	5,726	12,657
UNE Milling (net)	18,324	4,533	9,117	13,650	31,974
<b>TOTAL (mill gate)</b>	<b>32,988</b>	<b>8,256</b>	<b>16,467</b>	<b>24,723</b>	<b>57,711</b>
Downstream Freight	1,687	765	980	1,746	3,432
<b>TOTAL UNE HWD MILLING</b>	<b>34,675</b>	<b>9,021</b>	<b>17,447</b>	<b>26,469</b>	<b>61,143</b>
UNE HWD Forestry (Other sales)	1,511	304	726	1,030	2,541
UNE Logging/Haulage (Other sales)	257	78	134	213	470
<b>TOTAL HOUSEHOLD INCOME</b>	<b>36,443</b>	<b>9,404</b>	<b>18,307</b>	<b>27,711</b>	<b>64,154</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	182	41	109	149	331
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	69	17	42	59	128
UNE Logging/Haulage	183	74	146	220	403
UNE Milling (net)	873	147	368	515	1,388
<b>TOTAL (mill gate)</b>	<b>1,308</b>	<b>278</b>	<b>665</b>	<b>943</b>	<b>2,251</b>
Downstream Freight	52	26	40	65	117
<b>TOTAL UNE HWD MILLING</b>	<b>1,359</b>	<b>304</b>	<b>705</b>	<b>1,008</b>	<b>2,368</b>
UNE HWD Forestry (Other sales)	49	11	29	40	89
UNE Logging/Haulage (Other sales)	7	3	5	8	15
<b>TOTAL EMPLOYMENT</b>	<b>1,415</b>	<b>317</b>	<b>739</b>	<b>1,057</b>	<b>2,472</b>

**IMPACT CHANGES FROM BASE CASE (1997-98)**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	-3,087	-1,450	-757	-2,207	-5,294
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	-3,892	-1,301	-2,450	-3,751	-7,642
UNE Milling (net)	-13,850	-3,105	-5,903	-9,008	-22,858
<b>TOTAL (mill gate)</b>	<b>-20,829</b>	<b>-5,856</b>	<b>-9,109</b>	<b>-14,966</b>	<b>-35,794</b>
Downstream Freight	-736	-299	-387	-686	-1,422
<b>TOTAL UNE HWD MILLING</b>	<b>-21,565</b>	<b>-6,155</b>	<b>-9,497</b>	<b>-15,652</b>	<b>-37,217</b>
UNE HWD Forestry (Other sales)	-569	-263	54	-209	-778
UNE Logging/Haulage (Other sales)	-386	-129	-243	-372	-759
<b>TOTAL GROSS OUTPUT</b>	<b>-22,521</b>	<b>-6,547</b>	<b>-9,686</b>	<b>-16,233</b>	<b>-38,754</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	-1,745	-793	-412	-1,205	-2,950
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	-2,475	-730	-1,334	-2,064	-4,539
UNE Milling (net)	-9,612	-1,699	-3,214	-4,914	-14,526
<b>TOTAL (mill gate)</b>	<b>-13,832</b>	<b>-3,223</b>	<b>-4,960</b>	<b>-8,183</b>	<b>-22,015</b>
Downstream Freight	-415	-163	-211	-374	-789
<b>TOTAL UNE HWD MILLING</b>	<b>-14,248</b>	<b>-3,386</b>	<b>-5,171</b>	<b>-8,557</b>	<b>-22,804</b>
UNE HWD Forestry (Other sales)	-322	-143	29	-114	-436
UNE Logging/Haulage (Other sales)	-246	-72	-132	-205	-451
<b>TOTAL VALUE ADDED</b>	<b>-14,815</b>	<b>-3,601</b>	<b>-5,274</b>	<b>-8,875</b>	<b>-23,691</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	-107	-401	-203	-603	-711
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	-1,261	-384	-657	-1,041	-2,301
UNE Milling (net)	-3,165	-807	-1,584	-2,391	-5,556
<b>TOTAL (mill gate)</b>	<b>-4,533</b>	<b>-1,591</b>	<b>-2,444</b>	<b>-4,035</b>	<b>-8,568</b>
Downstream Freight	-179	-81	-104	-185	-364
<b>TOTAL UNE HWD MILLING</b>	<b>-4,712</b>	<b>-1,672</b>	<b>-2,548</b>	<b>-4,220</b>	<b>-8,932</b>
UNE HWD Forestry (Other sales)	107	-72	14	-57	50
UNE Logging/Haulage (Other sales)	-125	-38	-65	-103	-228
<b>TOTAL HOUSEHOLD INCOME</b>	<b>-4,730</b>	<b>-1,782</b>	<b>-2,599</b>	<b>-4,380</b>	<b>-9,110</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	-3	-14	-8	-22	-25
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	-33	-13	-27	-40	-73
UNE Milling (net)	-165	-26	-64	-90	-255
<b>TOTAL (mill gate)</b>	<b>-201</b>	<b>-53</b>	<b>-99</b>	<b>-152</b>	<b>-353</b>
Downstream Freight	-5	-3	-4	-7	-12
<b>TOTAL UNE HWD MILLING</b>	<b>-206</b>	<b>-56</b>	<b>-103</b>	<b>-159</b>	<b>-365</b>
UNE HWD Forestry (Other sales)	3	-2	1	-2	2
UNE Logging/Haulage (Other sales)	-3	-1	-3	-4	-7
<b>TOTAL EMPLOYMENT</b>	<b>-206</b>	<b>-59</b>	<b>-105</b>	<b>-164</b>	<b>-371</b>

Roundino errors may occur

**LOWER NORTH EAST: REGIONAL ECONOMIC IMPACTS 152,000 INFORMATION POINT**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	11,373	5,549	10,960	16,509	27,882
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	4,538	1,677	3,896	5,573	10,110
UNE Logging/Haulage	25,782	8,620	16,226	24,846	50,628
UNE Milling (net)	91,501	21,011	40,912	61,923	153,424
<b>TOTAL (mill gate)</b>	<b>133,193</b>	<b>36,856</b>	<b>71,994</b>	<b>108,850</b>	<b>242,043</b>
Downstream Freight	7,724	3,135	4,064	7,199	14,923
<b>TOTAL UNE HWD MILLING</b>	<b>140,917</b>	<b>39,992</b>	<b>76,057</b>	<b>116,049</b>	<b>256,966</b>
UNE HWD Forestry (Other sales)	2,622	1,279	2,527	3,806	6,429
UNE Logging/Haulage (Other sales)	1,147	383	722	1,105	2,252
<b>TOTAL GROSS OUTPUT</b>	<b>144,686</b>	<b>41,654</b>	<b>79,306</b>	<b>120,960</b>	<b>265,646</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	6,409	3,055	5,968	9,023	15,432
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,977	939	2,121	3,061	6,038
UNE Logging/Haulage	16,392	4,839	8,835	13,674	30,066
UNE Milling (net)	65,298	11,536	22,279	33,815	99,113
<b>TOTAL (mill gate)</b>	<b>91,077</b>	<b>20,370</b>	<b>39,203</b>	<b>59,573</b>	<b>150,650</b>
Downstream Freight	4,357	1,707	2,213	3,919	8,276
<b>TOTAL UNE HWD MILLING</b>	<b>95,434</b>	<b>22,077</b>	<b>41,416</b>	<b>63,492</b>	<b>158,926</b>
UNE HWD Forestry (Other sales)	1,478	704	1,376	2,081	3,558
UNE Logging/Haulage (Other sales)	729	215	393	608	1,337
<b>TOTAL VALUE ADDED</b>	<b>97,640</b>	<b>22,996</b>	<b>43,185</b>	<b>66,181</b>	<b>163,821</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	5,781	1,575	2,941	4,515	10,297
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,131	484	1,045	1,530	3,660
UNE Logging/Haulage	8,347	2,543	4,353	6,896	15,243
UNE Milling (net)	22,044	5,483	10,979	16,462	38,506
<b>TOTAL (mill gate)</b>	<b>38,303</b>	<b>10,085</b>	<b>19,318</b>	<b>29,403</b>	<b>67,706</b>
Downstream Freight	1,876	851	1,090	1,942	3,818
<b>TOTAL UNE HWD MILLING</b>	<b>40,179</b>	<b>10,937</b>	<b>20,408</b>	<b>31,345</b>	<b>71,524</b>
UNE HWD Forestry (Other sales)	1,333	363	678	1,041	2,374
UNE Logging/Haulage (Other sales)	371	113	194	307	678
<b>TOTAL HOUSEHOLD INCOME</b>	<b>41,883</b>	<b>11,413</b>	<b>21,280</b>	<b>32,693</b>	<b>74,576</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	188	56	119	175	362
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	69	17	42	59	128
UNE Logging/Haulage	221	89	176	265	486
UNE Milling (net)	1,060	177	443	621	1,681
<b>TOTAL (mill gate)</b>	<b>1,538</b>	<b>339</b>	<b>780</b>	<b>1,119</b>	<b>2,658</b>
Downstream Freight	58	29	44	73	130
<b>TOTAL UNE HWD MILLING</b>	<b>1,596</b>	<b>368</b>	<b>824</b>	<b>1,192</b>	<b>2,788</b>
UNE HWD Forestry (Other sales)	43	13	27	40	84
UNE Logging/Haulage (Other sales)	10	4	8	12	22
<b>TOTAL EMPLOYMENT</b>	<b>1,649</b>	<b>384</b>	<b>859</b>	<b>1,244</b>	<b>2,893</b>

**IMPACT CHANGES FROM BASE CASE (1997-98)**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
UNE HWD Forestry	346	168	177	345	690
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	482	161	303	464	946
UNE Milling (net)	1,961	548	1,037	1,586	3,547
<b>TOTAL (mill gate)</b>	<b>2,788</b>	<b>877</b>	<b>1,517</b>	<b>2,395</b>	<b>5,183</b>
Downstream Freight	43	18	23	41	84
<b>TOTAL UNE HWD MILLING</b>	<b>2,832</b>	<b>895</b>	<b>1,540</b>	<b>2,435</b>	<b>5,267</b>
UNE HWD Forestry (Other sales)	-89	-43	-124	-167	-256
UNE Logging/Haulage (Other sales)	-34	-11	-22	-33	-67
<b>TOTAL GROSS OUTPUT</b>	<b>2,709</b>	<b>840</b>	<b>1,395</b>	<b>2,235</b>	<b>4,944</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	195	93	96	189	384
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	306	90	165	255	562
UNE Milling (net)	1,166	301	565	866	2,032
<b>TOTAL (mill gate)</b>	<b>1,668</b>	<b>484</b>	<b>826</b>	<b>1,310</b>	<b>2,978</b>
Downstream Freight	25	10	12	22	47
<b>TOTAL UNE HWD MILLING</b>	<b>1,692</b>	<b>494</b>	<b>839</b>	<b>1,332</b>	<b>3,025</b>
UNE HWD Forestry (Other sales)	-50	-24	-67	-91	-141
UNE Logging/Haulage (Other sales)	-22	-6	-12	-18	-40
<b>TOTAL VALUE ADDED</b>	<b>1,621</b>	<b>463</b>	<b>759</b>	<b>1,223</b>	<b>2,844</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	71	48	47	95	166
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	156	47	81	129	285
UNE Milling (net)	555	143	278	421	976
<b>TOTAL (mill gate)</b>	<b>782</b>	<b>238</b>	<b>407</b>	<b>645</b>	<b>1,427</b>
Downstream Freight	11	5	6	11	21
<b>TOTAL UNE HWD MILLING</b>	<b>793</b>	<b>243</b>	<b>413</b>	<b>656</b>	<b>1,449</b>
UNE HWD Forestry (Other sales)	-71	-12	-33	-46	-116
UNE Logging/Haulage (Other sales)	-11	-3	-6	-9	-20
<b>TOTAL HOUSEHOLD INCOME</b>	<b>711</b>	<b>227</b>	<b>374</b>	<b>601</b>	<b>1,312</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	2	2	2	4	6
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	5	2	3	5	10
UNE Milling (net)	22	5	11	16	38
<b>TOTAL (mill gate)</b>	<b>30</b>	<b>8</b>	<b>16</b>	<b>24</b>	<b>54</b>
Downstream Freight	0	0	0	0	1
<b>TOTAL UNE HWD MILLING</b>	<b>30</b>	<b>8</b>	<b>17</b>	<b>25</b>	<b>55</b>
UNE HWD Forestry (Other sales)	-2	0	-1	-2	-4
UNE Logging/Haulage (Other sales)	0	0	0	0	-1
<b>TOTAL EMPLOYMENT</b>	<b>28</b>	<b>8</b>	<b>15</b>	<b>23</b>	<b>50</b>

Rounding errors may occur



**LOWER NORTH EAST: REGIONAL ECONOMIC IMPACTS 180,000 INFORMATION POINT**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	13,280	6,521	11,698	18,220	31,500
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	4,538	1,677	3,896	5,573	10,110
UNE Logging/Haulage	28,053	9,382	17,656	27,038	55,091
UNE Milling (net)	99,581	22,876	44,453	67,329	166,910
<b>TOTAL (mill gate)</b>	<b>145,452</b>	<b>40,455</b>	<b>77,704</b>	<b>118,159</b>	<b>263,611</b>
Downstream Freight	8,112	3,293	4,268	7,560	15,672
<b>TOTAL UNE HWD MILLING</b>	<b>153,563</b>	<b>43,748</b>	<b>81,972</b>	<b>125,720</b>	<b>279,283</b>
UNE HWD Forestry (Other sales)	2,503	1,229	2,205	3,435	5,938
UNE Logging/Haulage (Other sales)	1,469	491	925	1,416	2,885
<b>TOTAL GROSS OUTPUT</b>	<b>157,536</b>	<b>45,469</b>	<b>85,101</b>	<b>130,570</b>	<b>288,106</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	7,487	3,595	6,370	9,965	17,451
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,977	939	2,121	3,061	6,038
UNE Logging/Haulage	17,836	5,266	9,614	14,880	32,717
UNE Milling (net)	71,048	12,558	24,207	36,765	107,813
<b>TOTAL (mill gate)</b>	<b>99,349</b>	<b>22,358</b>	<b>42,312</b>	<b>64,670</b>	<b>164,019</b>
Downstream Freight	4,576	1,792	2,324	4,116	8,692
<b>TOTAL UNE HWD MILLING</b>	<b>103,924</b>	<b>24,150</b>	<b>44,636</b>	<b>68,787</b>	<b>172,711</b>
UNE HWD Forestry (Other sales)	1,411	678	1,201	1,879	3,290
UNE Logging/Haulage (Other sales)	934	276	503	779	1,713
<b>TOTAL VALUE ADDED</b>	<b>106,269</b>	<b>25,104</b>	<b>46,340</b>	<b>71,444</b>	<b>177,714</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	5,986	1,866	3,138	5,004	10,990
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,131	484	1,045	1,530	3,660
UNE Logging/Haulage	9,083	2,768	4,737	7,504	16,587
UNE Milling (net)	23,941	5,968	11,930	17,897	41,839
<b>TOTAL (mill gate)</b>	<b>41,141</b>	<b>11,086</b>	<b>20,850</b>	<b>31,936</b>	<b>73,077</b>
Downstream Freight	1,970	894	1,145	2,039	4,009
<b>TOTAL UNE HWD MILLING</b>	<b>43,111</b>	<b>11,980</b>	<b>21,995</b>	<b>33,975</b>	<b>77,086</b>
UNE HWD Forestry (Other sales)	1,128	352	592	943	2,072
UNE Logging/Haulage (Other sales)	476	145	248	393	869
<b>TOTAL HOUSEHOLD INCOME</b>	<b>44,715</b>	<b>12,476</b>	<b>22,835</b>	<b>35,311</b>	<b>80,026</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	194	67	127	194	388
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	69	17	42	59	128
UNE Logging/Haulage	238	97	191	288	526
UNE Milling (net)	1,151	193	482	675	1,826
<b>TOTAL (mill gate)</b>	<b>1,653</b>	<b>373</b>	<b>842</b>	<b>1,216</b>	<b>2,869</b>
Downstream Freight	61	30	46	76	137
<b>TOTAL UNE HWD MILLING</b>	<b>1,714</b>	<b>403</b>	<b>888</b>	<b>1,292</b>	<b>3,006</b>
UNE HWD Forestry (Other sales)	37	13	24	37	73
UNE Logging/Haulage (Other sales)	12	5	10	15	28
<b>TOTAL EMPLOYMENT</b>	<b>1,763</b>	<b>421</b>	<b>922</b>	<b>1,343</b>	<b>3,106</b>

**IMPACT CHANGES FROM BASE CASE (1997-98)**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	2,253	1,141	915	2,056	4,308
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	2,752	923	1,734	2,657	5,409
UNE Milling (net)	10,042	2,413	4,579	6,992	17,033
<b>TOTAL (mill gate)</b>	<b>15,047</b>	<b>4,477</b>	<b>7,227</b>	<b>11,704</b>	<b>26,751</b>
Downstream Freight	431	175	227	402	833
<b>TOTAL UNE HWD MILLING</b>	<b>15,478</b>	<b>4,652</b>	<b>7,454</b>	<b>12,106</b>	<b>27,584</b>
UNE HWD Forestry (Other sales)	-207	-93	-446	-539	-746
UNE Logging/Haulage (Other sales)	288	96	181	278	566
<b>TOTAL GROSS OUTPUT</b>	<b>15,559</b>	<b>4,655</b>	<b>7,190</b>	<b>11,845</b>	<b>27,404</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	1,273	632	498	1,130	2,403
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	1,750	518	944	1,462	3,212
UNE Milling (net)	6,916	1,322	2,493	3,816	10,732
<b>TOTAL (mill gate)</b>	<b>9,939</b>	<b>2,472</b>	<b>3,936</b>	<b>6,408</b>	<b>16,347</b>
Downstream Freight	243	95	124	219	462
<b>TOTAL UNE HWD MILLING</b>	<b>10,183</b>	<b>2,568</b>	<b>4,059</b>	<b>6,627</b>	<b>16,809</b>
UNE HWD Forestry (Other sales)	-116	-51	-243	-293	-410
UNE Logging/Haulage (Other sales)	183	54	99	153	336
<b>TOTAL VALUE ADDED</b>	<b>10,250</b>	<b>2,571</b>	<b>3,915</b>	<b>6,486</b>	<b>16,736</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	275	339	245	584	859
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	892	272	465	737	1,629
UNE Milling (net)	2,453	628	1,229	1,856	4,309
<b>TOTAL (mill gate)</b>	<b>3,620</b>	<b>1,239</b>	<b>1,939</b>	<b>3,178</b>	<b>6,798</b>
Downstream Freight	105	48	61	108	213
<b>TOTAL UNE HWD MILLING</b>	<b>3,725</b>	<b>1,286</b>	<b>2,000</b>	<b>3,286</b>	<b>7,011</b>
UNE HWD Forestry (Other sales)	-275	-24	-120	-143	-419
UNE Logging/Haulage (Other sales)	93	28	49	77	170
<b>TOTAL HOUSEHOLD INCOME</b>	<b>3,543</b>	<b>1,291</b>	<b>1,929</b>	<b>3,220</b>	<b>6,763</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	9	13	10	22	31
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	22	10	19	28	51
UNE Milling (net)	113	20	50	70	183
<b>TOTAL (mill gate)</b>	<b>145</b>	<b>42</b>	<b>78</b>	<b>121</b>	<b>265</b>
Downstream Freight	3	2	2	4	7
<b>TOTAL UNE HWD MILLING</b>	<b>148</b>	<b>44</b>	<b>81</b>	<b>125</b>	<b>273</b>
UNE HWD Forestry (Other sales)	-9	-1	-5	-6	-15
UNE Logging/Haulage (Other sales)	2	1	2	3	5
<b>TOTAL EMPLOYMENT</b>	<b>141</b>	<b>44</b>	<b>78</b>	<b>122</b>	<b>264</b>

Roundina errors may occur

Note: SF employment in forests has been held constant. Therefore, some 'switching' of employment between 'local' sales and 'other' sales occurs as 'local' sales become relatively more important than 'other' sales to SF. Therefore, some negative effects in employment and household income and associated consumption-induced effects for the hardwood forestry 'other' sales occur.

**LOWER NORTH EAST: REGIONAL ECONOMIC IMPACTS 64,000 INFORMATION POINT**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	6,495	3,180	7,778	10,958	17,453
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	4,538	1,677	3,896	5,573	10,110
UNE Logging/Haulage	20,226	6,763	12,728	19,491	39,717
UNE Milling (net)	62,037	14,660	28,849	43,510	105,546
<b>TOTAL (mill gate)</b>	<b>93,295</b>	<b>26,280</b>	<b>53,251</b>	<b>79,531</b>	<b>172,826</b>
Downstream Freight	6,537	2,653	3,439	6,093	12,629
<b>TOTAL UNE HWD MILLING</b>	<b>99,831</b>	<b>28,933</b>	<b>56,691</b>	<b>85,624</b>	<b>185,455</b>
UNE HWD Forestry (Other sales)	1,075	526	1,288	1,814	2,889
UNE Logging/Haulage (Other sales)	0	0	0	0	0
<b>TOTAL GROSS OUTPUT</b>	<b>100,906</b>	<b>29,460</b>	<b>57,978</b>	<b>87,438</b>	<b>188,345</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	3,650	1,751	4,235	5,987	9,636
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,977	939	2,121	3,061	6,038
UNE Logging/Haulage	12,859	3,796	6,931	10,727	23,586
UNE Milling (net)	47,630	8,059	15,710	23,769	71,399
<b>TOTAL (mill gate)</b>	<b>67,116</b>	<b>14,546</b>	<b>28,998</b>	<b>43,544</b>	<b>110,660</b>
Downstream Freight	3,687	1,444	1,873	3,317	7,004
<b>TOTAL UNE HWD MILLING</b>	<b>70,803</b>	<b>15,990</b>	<b>30,871</b>	<b>46,861</b>	<b>117,664</b>
UNE HWD Forestry (Other sales)	604	290	701	991	1,595
UNE Logging/Haulage (Other sales)	0	0	0	0	0
<b>TOTAL VALUE ADDED</b>	<b>71,407</b>	<b>16,280</b>	<b>31,572</b>	<b>47,852</b>	<b>119,260</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	4,317	903	2,087	2,990	7,307
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,131	484	1,045	1,530	3,660
UNE Logging/Haulage	6,547	1,995	3,415	5,410	11,958
UNE Milling (net)	15,578	3,832	7,742	11,574	27,153
<b>TOTAL (mill gate)</b>	<b>28,573</b>	<b>7,215</b>	<b>14,289</b>	<b>21,504</b>	<b>50,077</b>
Downstream Freight	1,588	721	923	1,643	3,231
<b>TOTAL UNE HWD MILLING</b>	<b>30,161</b>	<b>7,935</b>	<b>15,212</b>	<b>23,147</b>	<b>53,308</b>
UNE HWD Forestry (Other sales)	715	149	345	495	1,210
UNE Logging/Haulage (Other sales)	0	0	0	0	0
<b>TOTAL HOUSEHOLD INCOME</b>	<b>30,876</b>	<b>8,085</b>	<b>15,557</b>	<b>23,642</b>	<b>54,518</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	140	32	84	116	257
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	69	17	42	59	128
UNE Logging/Haulage	160	70	138	208	368
UNE Milling (net)	734	124	313	437	1,171
<b>TOTAL (mill gate)</b>	<b>1,103</b>	<b>243</b>	<b>577</b>	<b>820</b>	<b>1,923</b>
Downstream Freight	49	24	37	61	110
<b>TOTAL UNE HWD MILLING</b>	<b>1,152</b>	<b>267</b>	<b>614</b>	<b>881</b>	<b>2,033</b>
UNE HWD Forestry (Other sales)	23	5	14	19	42
UNE Logging/Haulage (Other sales)	0	0	0	0	0
<b>TOTAL EMPLOYMENT</b>	<b>1,175</b>	<b>272</b>	<b>628</b>	<b>900</b>	<b>2,076</b>

**IMPACT CHANGES FROM BASE CASE (1997-98)**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	-4,532	-2,200	-3,006	-5,206	-9,739
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	-5,075	-1,696	-3,194	-4,890	-9,965
UNE Milling (net)	-27,503	-5,802	-11,025	-16,828	-44,331
<b>TOTAL (mill gate)</b>	<b>-37,110</b>	<b>-9,699</b>	<b>-17,225</b>	<b>-26,924</b>	<b>-64,034</b>
Downstream Freight	-1,144	-464	-602	-1,066	-2,210
<b>TOTAL UNE HWD MILLING</b>	<b>-38,254</b>	<b>-10,163</b>	<b>-17,827</b>	<b>-27,990</b>	<b>-66,244</b>
UNE HWD Forestry (Other sales)	-1,636	-796	-1,363	-2,160	-3,795
UNE Logging/Haulage (Other sales)	-1,181	-395	-743	-1,138	-2,319
<b>TOTAL GROSS OUTPUT</b>	<b>-41,071</b>	<b>-11,354</b>	<b>-19,933</b>	<b>-31,287</b>	<b>-72,358</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	-2,564	-1,212	-1,637	-2,848	-5,412
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	-3,227	-952	-1,739	-2,691	-5,918
UNE Milling (net)	-16,502	-3,176	-6,004	-9,180	-25,681
<b>TOTAL (mill gate)</b>	<b>-22,293</b>	<b>-5,340</b>	<b>-9,379</b>	<b>-14,719</b>	<b>-37,012</b>
Downstream Freight	-645	-253	-327	-580	-1,225
<b>TOTAL UNE HWD MILLING</b>	<b>-22,938</b>	<b>-5,592</b>	<b>-9,707</b>	<b>-15,299</b>	<b>-38,237</b>
UNE HWD Forestry (Other sales)	-923	-438	-742	-1,181	-2,104
UNE Logging/Haulage (Other sales)	-751	-222	-405	-626	-1,377
<b>TOTAL VALUE ADDED</b>	<b>-24,612</b>	<b>-6,253</b>	<b>-10,854</b>	<b>-17,106</b>	<b>-41,718</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	-1,393	-624	-806	-1,431	-2,824
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	-1,644	-500	-857	-1,357	-3,001
UNE Milling (net)	-5,910	-1,508	-2,959	-4,467	-10,377
<b>TOTAL (mill gate)</b>	<b>-8,948</b>	<b>-2,633</b>	<b>-4,622</b>	<b>-7,254</b>	<b>-16,202</b>
Downstream Freight	-278	-126	-161	-287	-565
<b>TOTAL UNE HWD MILLING</b>	<b>-9,225</b>	<b>-2,759</b>	<b>-4,783</b>	<b>-7,542</b>	<b>-16,767</b>
UNE HWD Forestry (Other sales)	-689	-226	-366	-592	-1,281
UNE Logging/Haulage (Other sales)	-382	-116	-199	-316	-698
<b>TOTAL HOUSEHOLD INCOME</b>	<b>-10,297</b>	<b>-3,101</b>	<b>-5,348</b>	<b>-8,449</b>	<b>-18,746</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	-45	-22	-33	-55	-100
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	-56	-17	-35	-52	-108
UNE Milling (net)	-304	-49	-120	-168	-472
<b>TOTAL (mill gate)</b>	<b>-405</b>	<b>-88</b>	<b>-187</b>	<b>-275</b>	<b>-680</b>
Downstream Freight	-9	-4	-7	-11	-19
<b>TOTAL UNE HWD MILLING</b>	<b>-414</b>	<b>-93</b>	<b>-193</b>	<b>-286</b>	<b>-700</b>
UNE HWD Forestry (Other sales)	-22	-8	-15	-23	-45
UNE Logging/Haulage (Other sales)	-10	-4	-8	-12	-22
<b>TOTAL EMPLOYMENT</b>	<b>-446</b>	<b>-105</b>	<b>-216</b>	<b>-321</b>	<b>-767</b>

Rounding errors may occur

**LOWER NORTH EAST: REGIONAL ECONOMIC IMPACTS STATE POSITION**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	11,681	5,699	11,077	16,776	28,457
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	4,538	1,677	3,896	5,573	10,110
UNE Logging/Haulage	25,717	8,598	16,185	24,784	50,501
UNE Milling (net)	86,703	20,424	39,121	59,545	146,248
<b>TOTAL (mill gate)</b>	<b>128,639</b>	<b>36,398</b>	<b>70,279</b>	<b>106,677</b>	<b>235,316</b>
Downstream Freight	7,497	3,043	3,944	6,988	14,485
<b>TOTAL UNE HWD MILLING</b>	<b>136,136</b>	<b>39,441</b>	<b>74,224</b>	<b>113,665</b>	<b>249,801</b>
UNE HWD Forestry (Other sales)	2,606	1,271	2,471	3,742	6,348
UNE Logging/Haulage (Other sales)	1,027	343	646	989	2,016
<b>TOTAL GROSS OUTPUT</b>	<b>139,768</b>	<b>41,055</b>	<b>77,341</b>	<b>118,396</b>	<b>258,165</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	6,583	3,138	6,032	9,170	15,753
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,977	939	2,121	3,061	6,038
UNE Logging/Haulage	16,351	4,827	8,813	13,640	29,991
UNE Milling (net)	63,818	11,217	21,303	32,521	96,338
<b>TOTAL (mill gate)</b>	<b>89,729</b>	<b>20,122</b>	<b>38,270</b>	<b>58,391</b>	<b>148,121</b>
Downstream Freight	4,229	1,656	2,148	3,804	8,033
<b>TOTAL UNE HWD MILLING</b>	<b>93,958</b>	<b>21,778</b>	<b>40,418</b>	<b>62,196</b>	<b>156,154</b>
UNE HWD Forestry (Other sales)	1,469	700	1,345	2,045	3,514
UNE Logging/Haulage (Other sales)	653	193	352	545	1,197
<b>TOTAL VALUE ADDED</b>	<b>96,079</b>	<b>22,671</b>	<b>42,115</b>	<b>64,786</b>	<b>160,865</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	5,817	1,618	2,972	4,589	10,406
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	2,131	484	1,045	1,530	3,660
UNE Logging/Haulage	8,326	2,536	4,342	6,879	15,205
UNE Milling (net)	20,990	5,331	10,499	15,830	36,820
<b>TOTAL (mill gate)</b>	<b>37,264</b>	<b>9,970</b>	<b>18,858</b>	<b>28,828</b>	<b>66,092</b>
Downstream Freight	1,821	826	1,058	1,885	3,705
<b>TOTAL UNE HWD MILLING</b>	<b>39,085</b>	<b>10,796</b>	<b>19,916</b>	<b>30,712</b>	<b>69,797</b>
UNE HWD Forestry (Other sales)	1,298	361	663	1,024	2,321
UNE Logging/Haulage (Other sales)	332	101	173	275	607
<b>TOTAL HOUSEHOLD INCOME</b>	<b>40,715</b>	<b>11,258</b>	<b>20,753</b>	<b>32,011</b>	<b>72,726</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	189	58	120	178	366
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	69	17	42	59	128
UNE Logging/Haulage	220	89	175	264	484
UNE Milling (net)	1,014	173	424	597	1,610
<b>TOTAL (mill gate)</b>	<b>1,492</b>	<b>335</b>	<b>762</b>	<b>1,097</b>	<b>2,589</b>
Downstream Freight	56	28	43	70	126
<b>TOTAL UNE HWD MILLING</b>	<b>1,548</b>	<b>363</b>	<b>804</b>	<b>1,168</b>	<b>2,715</b>
UNE HWD Forestry (Other sales)	42	13	27	40	82
UNE Logging/Haulage (Other sales)	9	4	7	11	19
<b>TOTAL EMPLOYMENT</b>	<b>1,598</b>	<b>379</b>	<b>838</b>	<b>1,218</b>	<b>2,816</b>

**IMPACT CHANGES FROM BASE CASE (1997-98)**

IMPACTS	Flow-on Effects				TOTAL IMPACT
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	
<b>GROSS OUTPUT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	654	318	293	612	1,266
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	417	139	263	402	819
UNE Milling (net)	-2,837	-39	-753	-792	-3,629
<b>TOTAL (mill gate)</b>	<b>-1,766</b>	<b>419</b>	<b>-197</b>	<b>222</b>	<b>-1,544</b>
Downstream Freight	-184	-74	-96	-171	-355
<b>TOTAL UNE HWD MILLING</b>	<b>-1,950</b>	<b>345</b>	<b>-294</b>	<b>51</b>	<b>-1,899</b>
UNE HWD Forestry (Other sales)	-105	-51	-180	-232	-337
UNE Logging/Haulage (Other sales)	-154	-52	-97	-148	-302
<b>TOTAL GROSS OUTPUT</b>	<b>-2,209</b>	<b>242</b>	<b>-570</b>	<b>-329</b>	<b>-2,538</b>
<b>VALUE ADDED IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	370	175	160	335	705
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	265	78	143	221	486
UNE Milling (net)	-314	-18	-410	-428	-742
<b>TOTAL (mill gate)</b>	<b>320</b>	<b>236</b>	<b>-107</b>	<b>129</b>	<b>449</b>
Downstream Freight	-104	-41	-52	-93	-197
<b>TOTAL UNE HWD MILLING</b>	<b>217</b>	<b>195</b>	<b>-160</b>	<b>36</b>	<b>252</b>
UNE HWD Forestry (Other sales)	-59	-28	-98	-126	-185
UNE Logging/Haulage (Other sales)	-98	-29	-53	-82	-180
<b>TOTAL VALUE ADDED</b>	<b>60</b>	<b>138</b>	<b>-310</b>	<b>-172</b>	<b>-113</b>
<b>HOUSEHOLD INCOME IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	106	90	79	169	275
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	135	41	71	112	247
UNE Milling (net)	-498	-9	-202	-211	-709
<b>TOTAL (mill gate)</b>	<b>-257</b>	<b>123</b>	<b>-53</b>	<b>70</b>	<b>-187</b>
Downstream Freight	-45	-20	-26	-46	-91
<b>TOTAL UNE HWD MILLING</b>	<b>-301</b>	<b>102</b>	<b>-79</b>	<b>24</b>	<b>-278</b>
UNE HWD Forestry (Other sales)	-106	-15	-48	-63	-169
UNE Logging/Haulage (Other sales)	-50	-15	-26	-41	-91
<b>TOTAL HOUSEHOLD INCOME</b>	<b>-458</b>	<b>73</b>	<b>-153</b>	<b>-80</b>	<b>-538</b>
<b>EMPLOYMENT IMPACTS (\$'000)</b>					
<b>Local UNE hardwood milling:</b>					
UNE HWD Forestry	3	3	3	6	10
UNE SWD Forestry	0	0	0	0	0
UNE PP Forestry	0	0	0	0	0
UNE Logging/Haulage	4	1	3	4	8
UNE Milling (net)	-24	0	-8	-8	-33
<b>TOTAL (mill gate)</b>	<b>-17</b>	<b>4</b>	<b>-2</b>	<b>2</b>	<b>-15</b>
Downstream Freight	-1	-1	-1	-2	-3
<b>TOTAL UNE HWD MILLING</b>	<b>-18</b>	<b>4</b>	<b>-3</b>	<b>0</b>	<b>-18</b>
UNE HWD Forestry (Other sales)	-3	-1	-2	-2	-6
UNE Logging/Haulage (Other sales)	-1	-1	-1	-2	-3
<b>TOTAL EMPLOYMENT</b>	<b>-23</b>	<b>3</b>	<b>-6</b>	<b>-4</b>	<b>-27</b>

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