Regional Impact Assessment

Upper North East CRA Region

A project undertaken as part of the NSW Comprehensive Regional Assessments

April 1999

REGIONAL IMPACT ASSESSMENT FOR THE UPPER NORTH EAST CRA REGION

CENTRE FOR AGRICULTURAL AND REGIONAL ECONOMICS
Roy Powell
Linden Chalmers
Janet Bailey

GILLESPIE ECONOMICS
Rob Gillespie

ENVIRONMENT & BEHAVIOUR CONSULTANTS
Mark Fenton

A project undertaken as part of the NSW Comprehensive Regional Assessments project numbers NU 12/ES & NA 39/ES
April 1999

For more information and for information on access to data contact the:

Resource and Conservation Division, Department of Urban Affairs and Planning

GPO Box 3927
SYDNEY NSW 2001

Phone: (02) 9228 3166
Fax: (02) 9228 4967

Forests Taskforce, Department of the Prime Minister and Cabinet

3-5 National Circuit
BARTON ACT 2600

Phone**:** 1800 650 983
Fax: (02) 6271 5511

© Crown copyright [April 1999]

This project has been funded by the New South Wales Government and managed through the Resource and Conservation Division, Department of Urban Affairs and Planning.

The project has been overseen and the methodology has been developed through the Economic and Social Technical Committee which includes representatives from the New South Wales and Commonwealth Governments and stakeholder groups.

ISBN 1 74029 021 6

Disclaimer
While every reasonable effort has been made to ensure that this document is correct at the time of printing, the State of New South Wales, its agents and employees, and the Commonwealth of Australia, its agents and employees, do not assume any responsibility and shall have no liability, consequential or otherwise, of any kind, arising from the use of or reliance on any of the information contained in in this document.

CONTENTS

Tables

Figures

CONTENTS

EXECUTIVE SUMMARY

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 UNE CRA region and the forestry industry in that region.
- Provide a social profile of the communities that make up the UNE 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 UNE 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 15 per cent above the base case to 35 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 UNE CRA region has been a high growth area in terms of population and employment, especially in the areas near to the coast. 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 110,000 and Gross Regional Product was $4,948m.

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 445,000 m^3 of wood while all forestry-based activities contributed, directly and indirectly, $250m to Gross Regional Product (4.2 per cent of the economy) and 5,000 jobs (4.5 per cent of total employment. One-half 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 15 per cent increase and a 35 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 286 and a decrease of 749 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.

While most forestry employment was found in the medium-sized centres of Grafton, Kyogle and Coffs Harbour, the dependence on forestry was most important in Grafton and Kyogle. The smaller centres of Tenterfield, Dorrigo and Urbenville also appeared vulnerable because of a high proportion of employment in the forestry industry and low education levels and occupational skills. 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 Upper North East (UNE) region adjoins the Queensland border, extends south to include Coffs Harbour and west to include part of the Northern Tablelands (see Figure 1-A). It is an area that has relatively high rainfall and is mainly naturally covered with timber.

The forest areas in the UNE remain as a major natural resource for the region and the timber industry remains as a notable source of employment, especially in those areas where there is a major processing operation(s). 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 UNE 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 plantations in this region is not at a stage where they can be a major alternative supply of wood for the processing industry.

There are also significant amounts of forest on privately owned lands but its use in commercial processing has been limited. The size and nature of that resource is not as well documented as for the State Forest lands. 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 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 UNE region. These are presented in the context of the structure and trends in the UNE regional economy. The analysis also included the preparation of social profiles for the communities within the UNE 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.

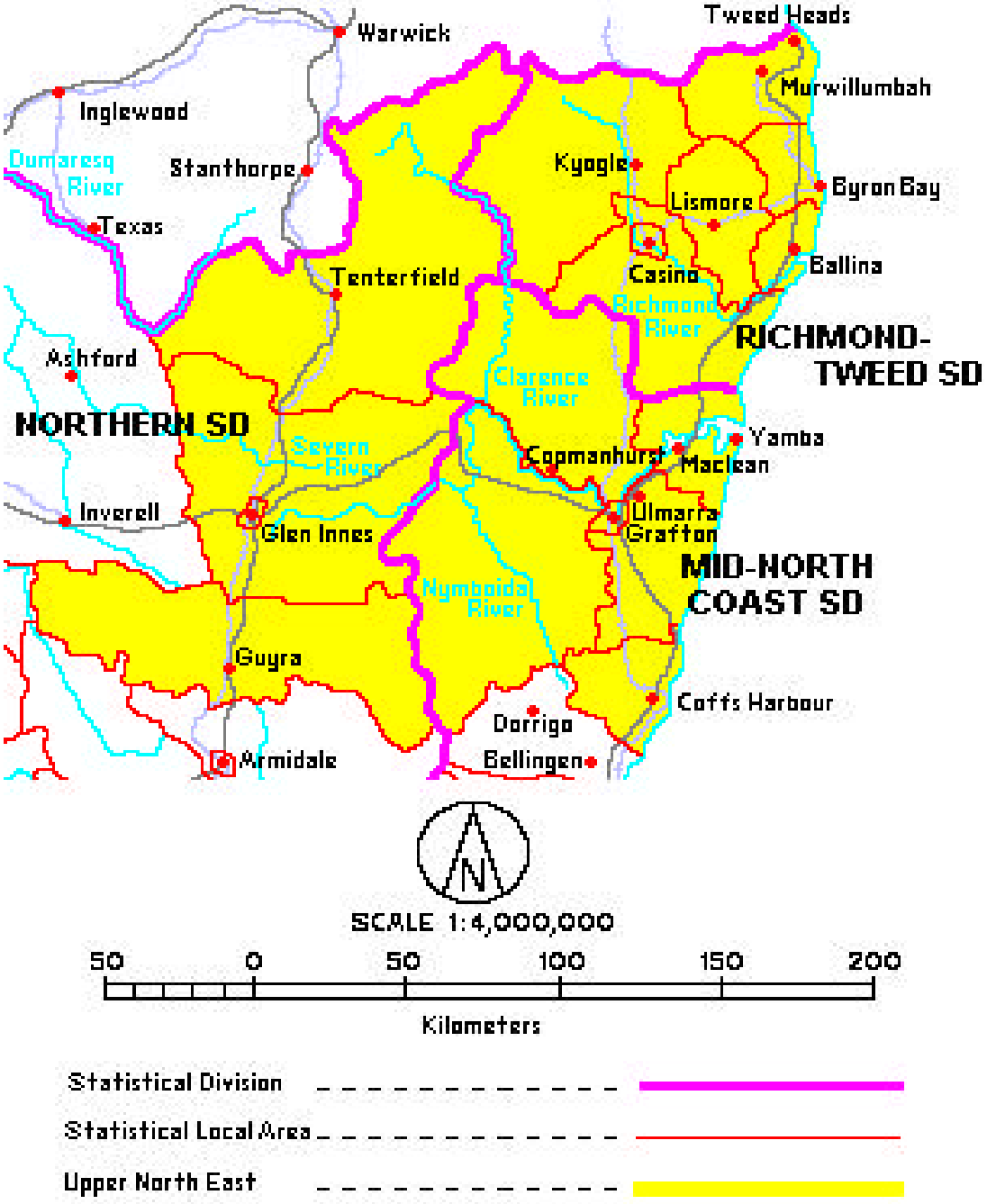
A major part of the analysis was the preparation of estimates of the economic impacts of proposed changes in forest policy. These analyses included assessing how the various components of the timber industry may respond to changes in the supply of logs, and how that would impact on regional employment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

A consolidation of the socio-economic analysis for the UNE region is presented in this report. The following section provides a perspective on the UNE region 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 UNE region is defined as shown in Figure 1-A. The area includes the Local Government Areas (LGAs) of: Tweed, Byron, Ballina, Lismore, Kyogle, Casino and Richmond River, in the Richmond-Tweed SD; Copmanhurst, Maclean, Grafton, Ulmarra, Nymboida and Coffs Harbour, in the Mid-North Coast SD; and Tenterfield, Severn, Glen Innes and Guyra in the Northern SD.

FIGURE 1-A: THE UPPER NORTH EAST REGION



2. ECONOMIC PROFILE OF THE UNE REGION

The economy of the UNE 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 UNE 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: AGGREGATED INPUT-OUTPUT TABLE - UNE REGION 1995-96 ($'000)

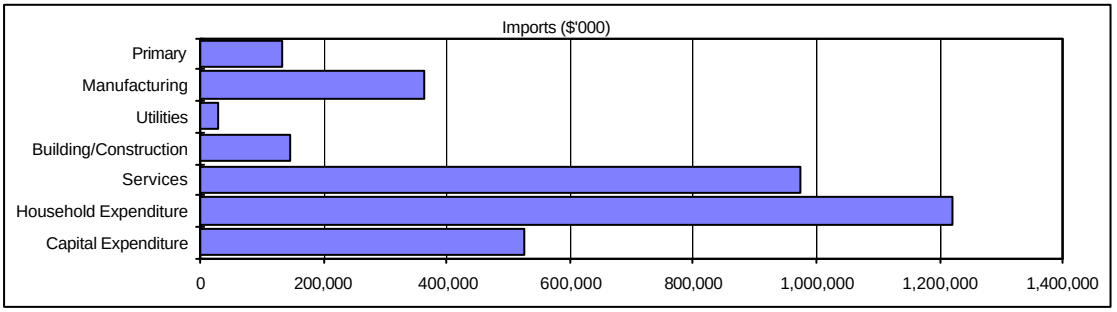
	Ag/Forest/Fish	Mining	Manufacturing	Utilities	Building	Services	TOTAL	H-hold Exp	O.F.D	Exports	Total
Ag/Forest/Fish	21861	12	217829	9	373	23781	263864	72531	26488	186441	549323
Mining	75	2814	12529	119	2433	2350	20320	0	-1325	30203	49197
Manufacturing	16900	1912	157974	3420	74814	159720	414739	476452	44954	408970	1345116
Utilities	5647	828	8370	6525	1040	82893	105302	64322	2346	0	171971
Building	1767	259	199	108	270	145979	148582	0	404655	1294	554530
Services	67082	5160	155582	7218	73830	868527	1177399	3020384	1114392	311109	5623284
TOTAL	113332	10984	552482	17399	152759	1283249	2130206	3633689	1591508	938017	8293421
H-hold Income	250960	5276	244653	29780	229874	1915971	2676514	0	0		2676514
O.V.A.	60038	23477	184385	94468	26705	1448858	1837930	373548	60486		2271964
Imports	124992	9461	363597	30325	145192	975206	1648771	1219764	526647		3395182
TOTAL	549323	49197	1345116	171971	554530	5623284	8293421	5227001	2178642	938017	16637081
Employment	10918	282	10461	861	7974	79994	110490				

Gross Regional Product was $4,948m that included $2,677m paid to households as wages and salaries (including imputed payments to self-employed persons and employers).

Employment totalled 110,490 people and the average wage and salary earned was $24,224 per person. This is among the lowest levels of any region in NSW where the average was $30,868.

The trade in goods and services between the UNE region and the rest of the world strongly favours imports. Imports totalled $3,395m that was 3.6 times the level of exports at $938m. The destination of imports into the local region from all sources is shown by major category 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 UNE region where 42.4 per cent of total imports to the local region were household consumables. Expenditure on capital items represented 12.5 per cent of imports.

FIGURE 2-A: DISTRIBUTION OF IMPORTS BY DESTINATION SECTOR



The food manufacturing industry in the UNE region is large and uses a high level of imported products. Otherwise, there is a wide dispersion of imports among the industries in the region as shown in Figure 2-I. The level of imports by the forestry industry is small. The wood manufacturing sector is an important importer as this is

mainly logs from the adjoining Lower North East (LNE) region that are processed in the UNE.

A further feature of the UNE region is the high level of household expenditure estimated to be $5,227m. This is more than GRP of $4,948m. 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 economy also includes strong sectors that provide goods and services to households relative to those that support other business activity.

The Department of Social Security (DSS) has made estimates for 1996 of some of these variables (Bray and Mudd 1998). UNE residents made income tax payments of $594m and received DSS payments of $815m. This provides a net boost to household disposable income of $221m. The high level of importance of DSS payments in the UNE region is indicated by the income tax paid/DSS benefits ratio which is 0.7 and can be compared with 1.6 for NSW as a whole.

The economic structure of the UNE region may also be compared with that for NSW through a comparison of Figure 2-B and Figure 2-C. This reveals that in the UNE region, the agriculture/forestry/fishing industry is more important than in NSW while the mining and manufacturing industries are less important than in NSW. The relative importance of the building, utilities and services industries are similar in UNE to NSW. It is also notable that the agriculture/forestry/fishing industry and manufacturing industry are more important contributors to exports in the UNE than they are in NSW.

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

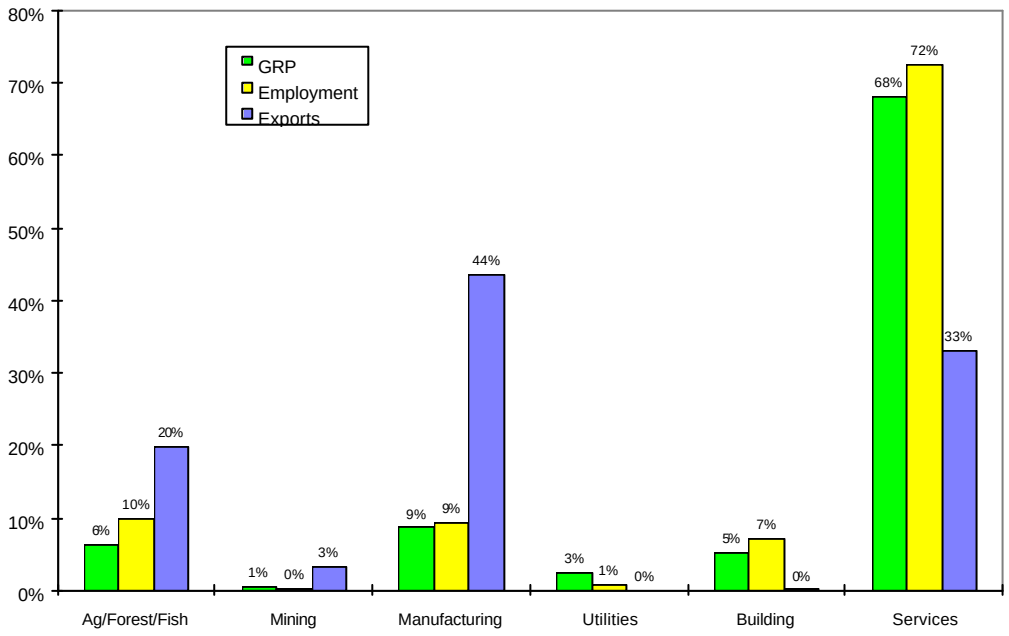
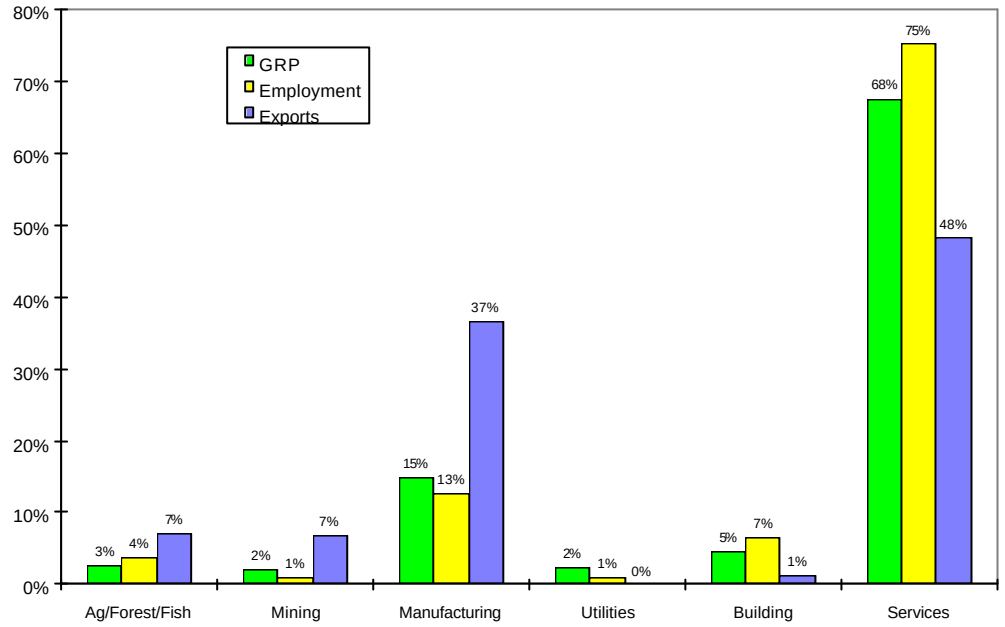


FIGURE 2-C: SUMMARY OF AGGREGATED SECTORS: NSW (1995-96)



The identification of key industries in the UNE economy can be made with reference to Figure 2-D through Figure 2-I. Importance does vary in terms of the measures used but the following sectors stand out as among the most important to the economy.

- Other agriculture (including sugar and horticulture)
- Food manufacturing
- Wholesale and Retail trade
- Accommodation & restaurants
- Education
- Health
- Public administration

The charts indicate that there is diversity in the economy, especially among the service industries meeting consumer needs.

Overall, the forest industry and wood processing contribute $136.5m (2.7 per cent) to the value added of the region and generate 2,389 jobs (2.2 per cent of regional employment). These contributions become more important in some of the local areas where there is a concentration of wood processing activities. These issues are discussed further in the sections below.

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

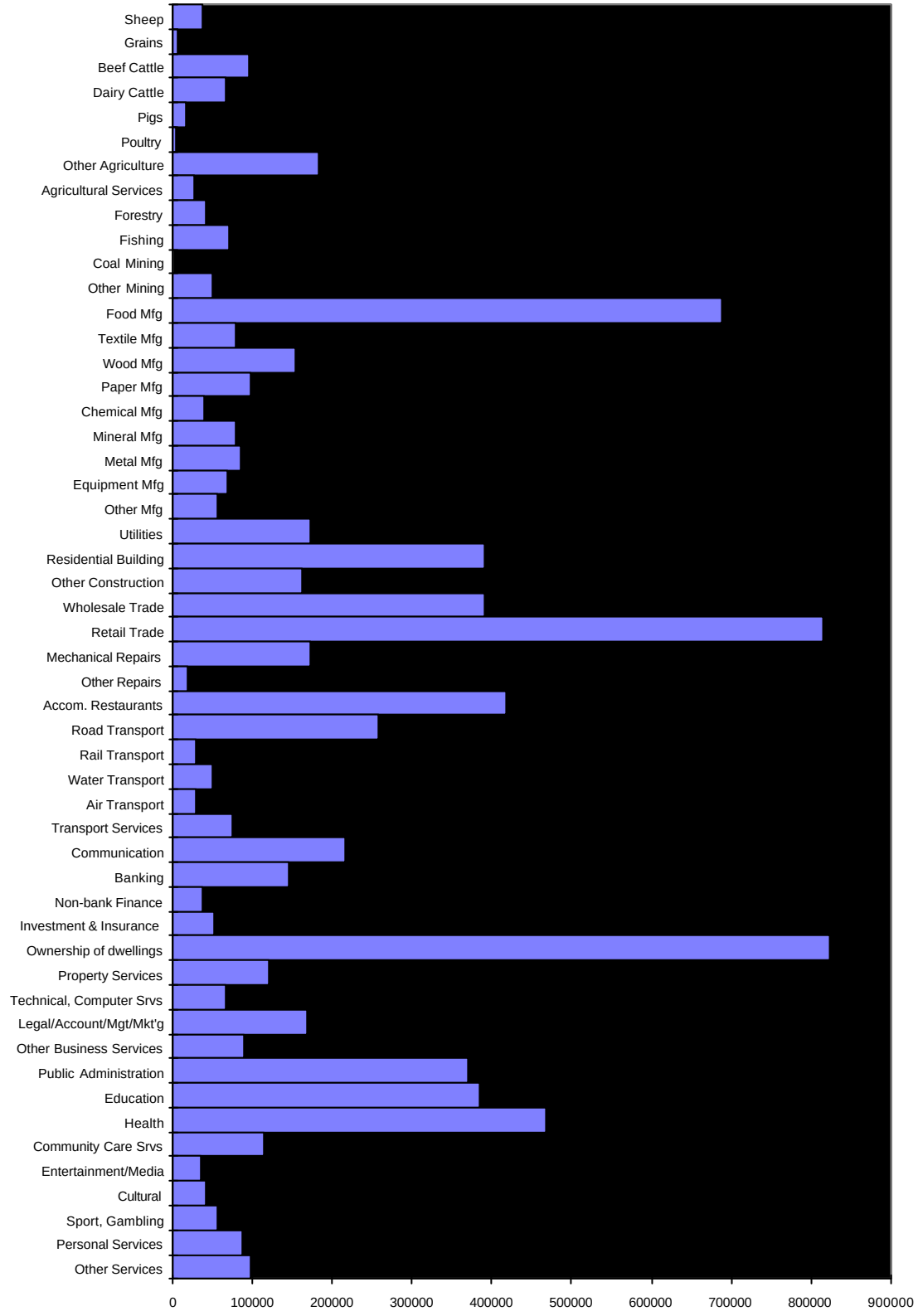


FIGURE 2-E: SECTORAL DISTRIBUTION: VALUE ADDED (GRP), UNE REGION 1995-96, ($'000)

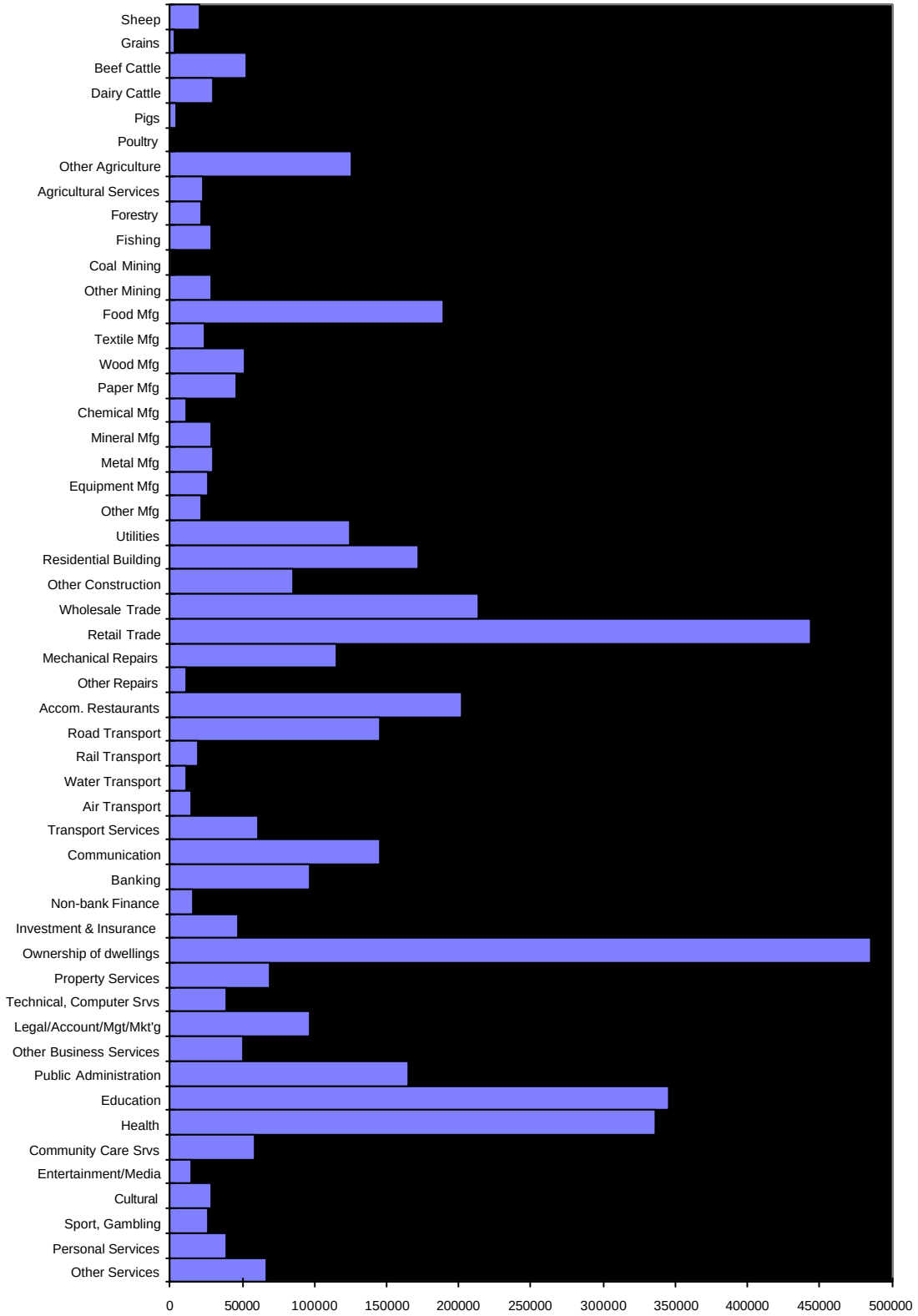


FIGURE 2-F: SECTORAL DISTRIBUTION: HOUSEHOLD INCOME, UNE REGION 1995-96, ($'000)

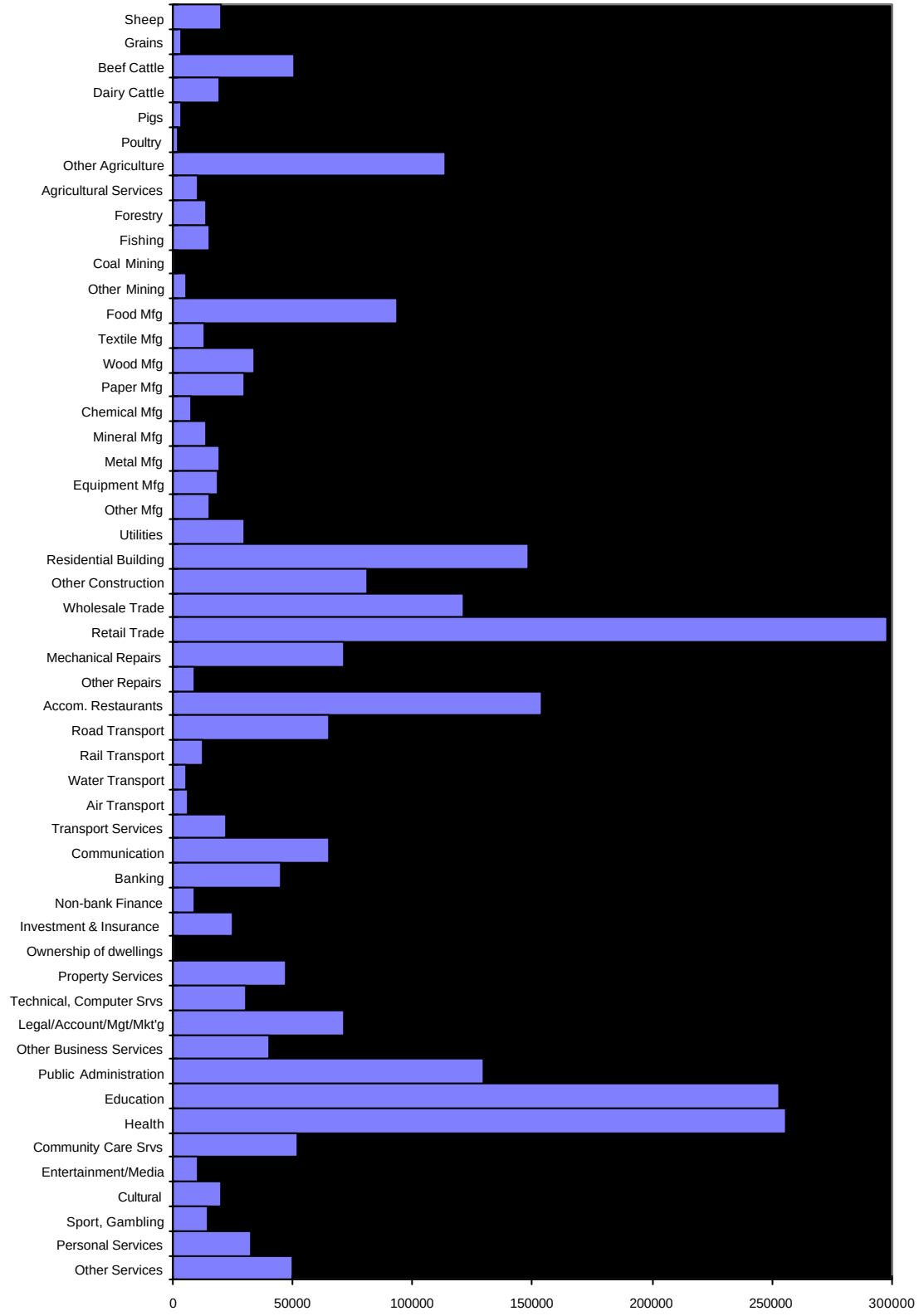


FIGURE 2-G: SECTORAL DISTRIBUTION: EMPLOYMENT, UNE REGION 1995-96

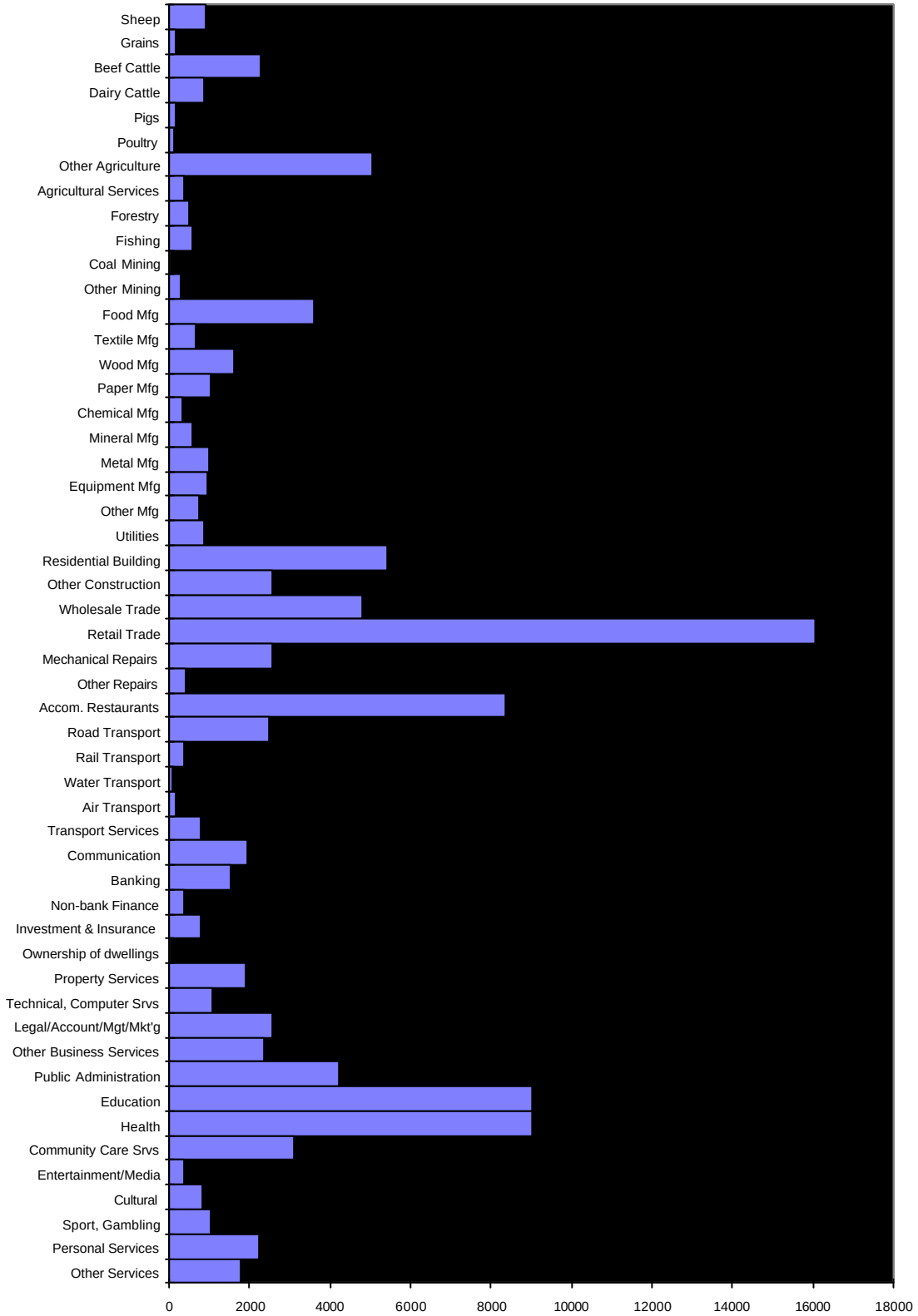


FIGURE 2-H: SECTORAL DISTRIBUTION: EXPORTS, UNE REGION 1995-96, ($'000)

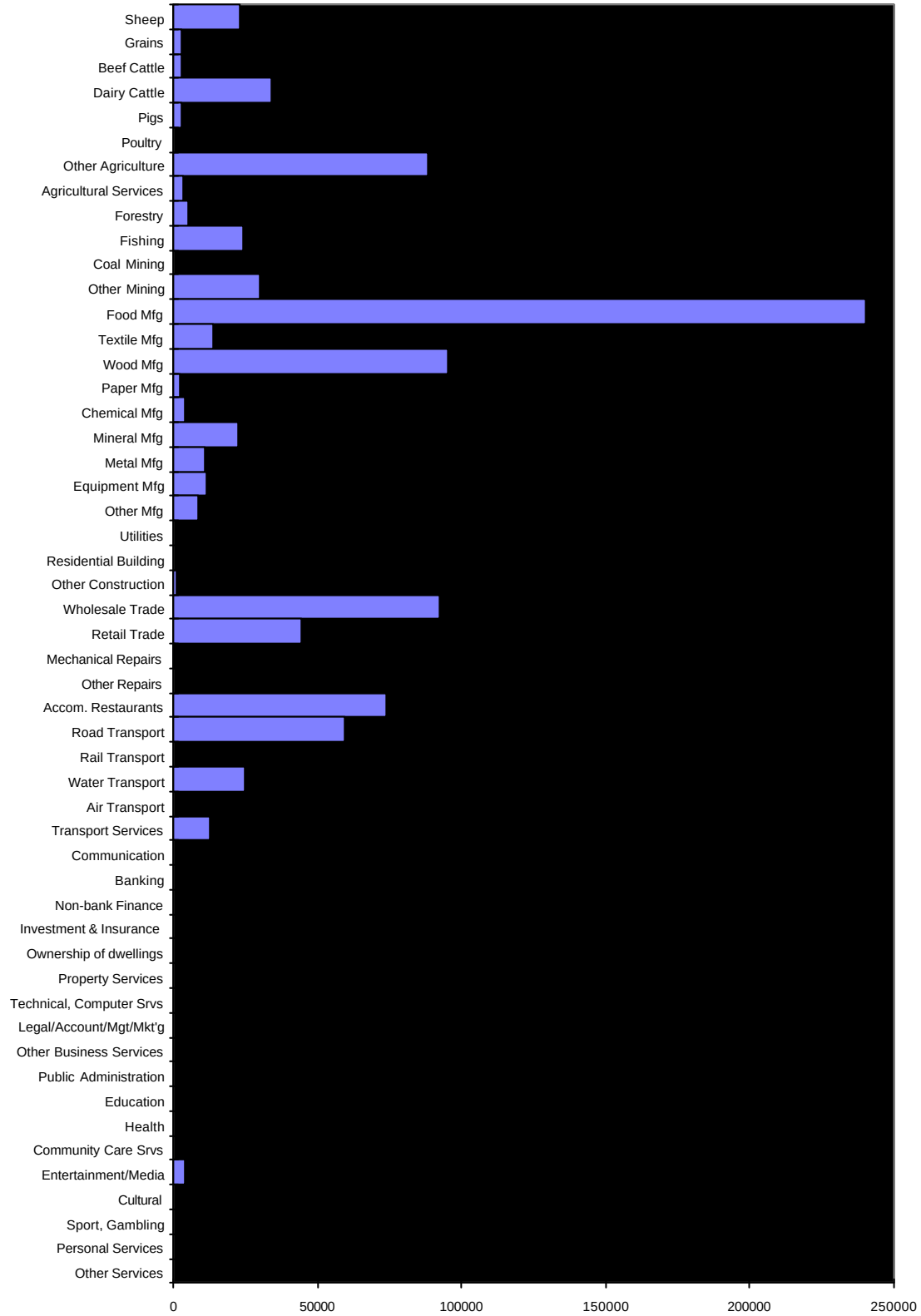
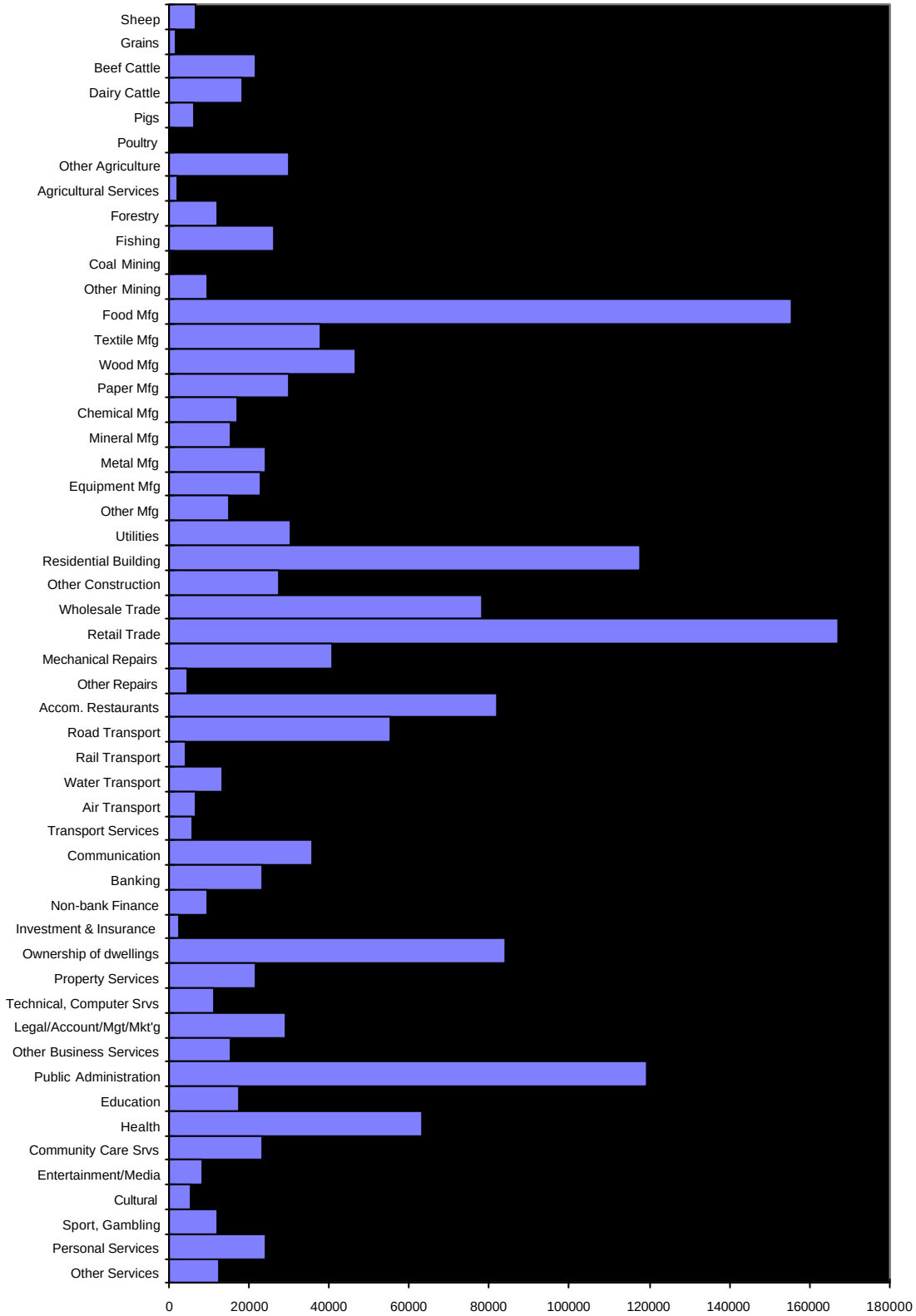


FIGURE 2-I: SECTORAL DISTRIBUTION: IMPORTS, UNE REGION 1995-96, ($'000)



2.2. TRENDS IN THE REGIONAL ECONOMY

The previous section provided a snapshot of the UNE region for 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 UNE 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 UNE 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: UPPER NORTH EAST

Census Year	Total Employment	Total Population	Employment Share of Population	Average Annual Change Between Census Years	
				Employment	Population
			%	%	%
1981	82,310	223,150	36.9		
1986	82,865	254,160	32.6	0.17	3.31
1991	100,559	296,350	33.9	4.96	3.91
1996	110,502	325,641	33.9	2.39	2.38

Source: ABS (Population Census data)

It is apparent from Table 2-B that the 1986 to 1991 period was a boom period for the UNE region. Employment growth approached five per cent per year and exceeded population growth. In the previous period to 1986, employment growth was small relative to population growth. In the early part of the 1990s, there was an approximate balance between employment and population growth.

Throughout the 1980s and 1990s, there has been a high rate of unemployment in the region. This reflects conditions in Australia as a whole where it has proved difficult to lower the national jobless rate. It also reflects local characteristics that result in the UNE region ranking highly as a place to live and work. Thus it tends to attract additional people regardless of the local employment situation and results in some movement of people within the region toward the coast.

The employment share of the population also varies over time and place. This ratio declined from 1986 reflecting both increases in unemployment and the number of retirees in the region. The 1996 level of 33.9 is low compared to the NSW value of 41.3, reflecting the attractiveness of the UNE region as a place to live and retire to.

The average annual rates of change between census years for population and employment for the UNE region vary among parts of the region. Some comparisons are also made with other regions as shown in Table 2-C (see map in Section 1). In the

UNE, population and employment have grown faster than the State levels since 1981. The most rapid growth has occurred in the Richmond-Tweed SD followed by the Mid-North Coast SD. It is also notable that the Northern SD has had slow growth relative to all other SDs. This is an initial indication that there are variations in the capacity to absorb industry adjustments within the UNE region.

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**
LNE	2.26	2.88	1.67	0.19	3.83	2.02
NSW	**1.39**	**1.62**	**1.27**	**-0.14**	**2.04**	**1.58**
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 (Population censuses)

In all forms of policy consideration, employment effects are of high importance. Employment data are also use 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.

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

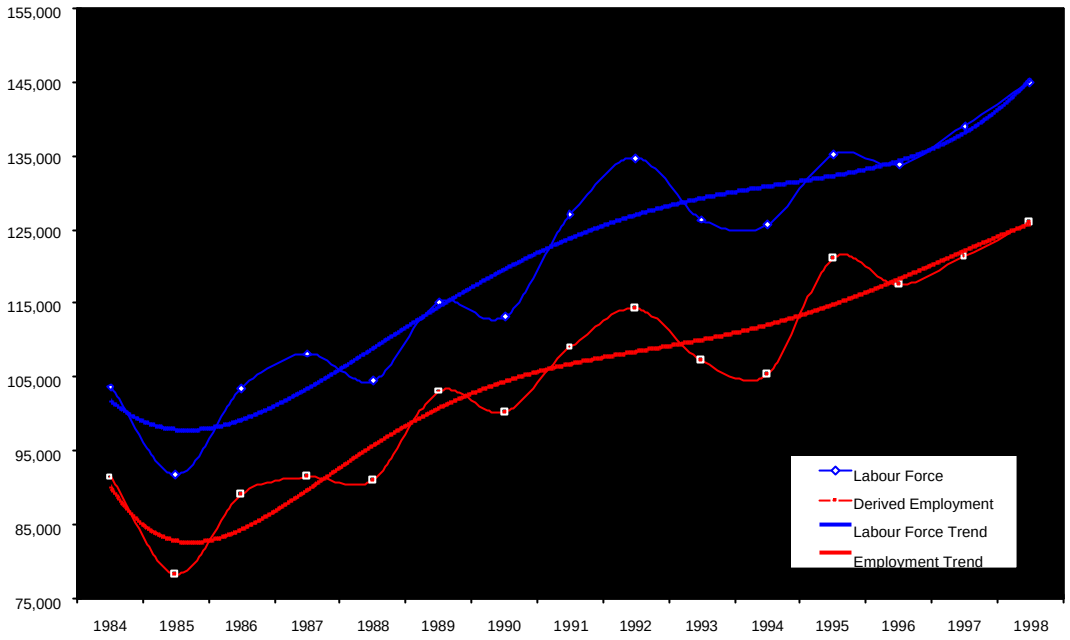


TABLE 2-D: LABOUR FORCE UNE

Year	Labour Force no.	Derived Employment no.	Unemployment no	%
1984	103,619	91,402	12,217	11.8
1985	91,793	78,287	13,506	14.7
1986	103,448	89,075	14,373	13.9
1987	108,208	91,460	16,748	15.5
1988	104,470	91,090	13,380	12.8
1989	115,166	103,071	12,095	10.5
1990	113,172	100,267	12,905	11.4
1991	126,946	109,009	17,937	14.1
1992	134,742	114,311	20,431	15.2
1993	126,347	107,212	19,135	15.1
1994	125,613	105,363	20,250	16.1
1995	135,171	121,150	14,021	10.4
1996	133,771	117,496	16,275	12.2
1997	139,053	121,349	17,704	12.7
1998	144,969	126,007	18,962	13.1

Source: DEET(1998)

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 1994 period. In June 1998, employment was estimated to be about 126,000, with a further 19,000 unemployed. At that level, the unemployment rate in the region is among the highest in NSW.

2.2.3. Unemployment

The unemployment data are a useful starting point to indicate that there is some diversity within the UNE 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 UNE region.

The unemployment data shown in Figure 2-K and Figure 2-L provide the basis for identifying three types of areas on the basis of the unemployment level. 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 employment are likely to be reflected mainly in a corresponding variation in the number unemployed.

The coastal hinterland areas generally have 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 Tablelands 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.

FIGURE 2-K: UNEMPLOYMENT RATES BY SUB-REGION

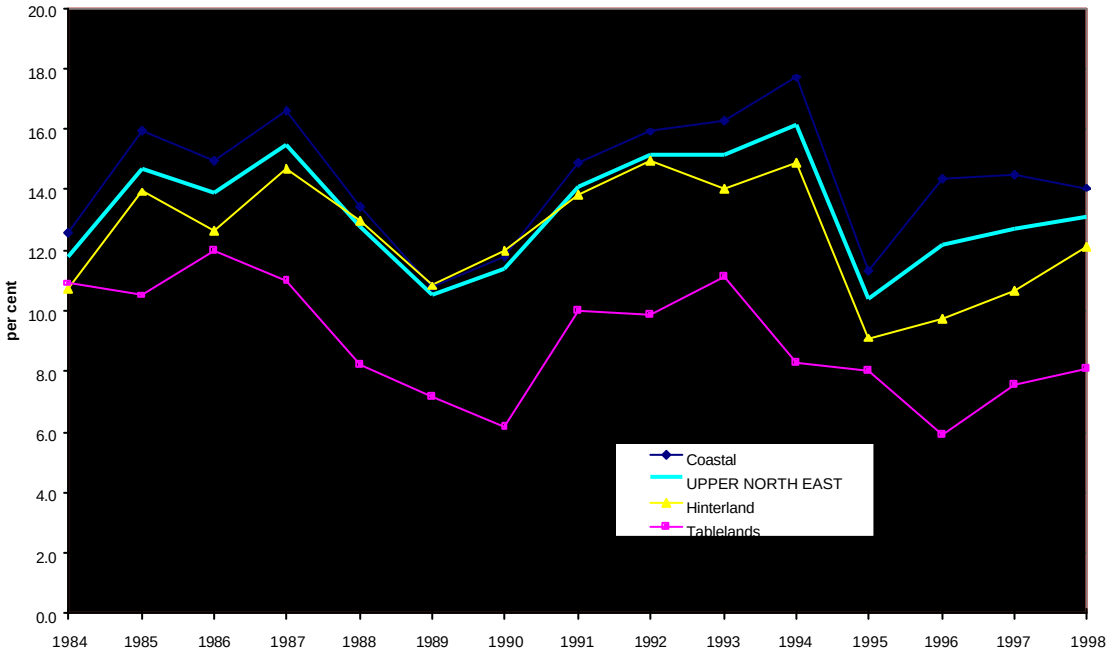
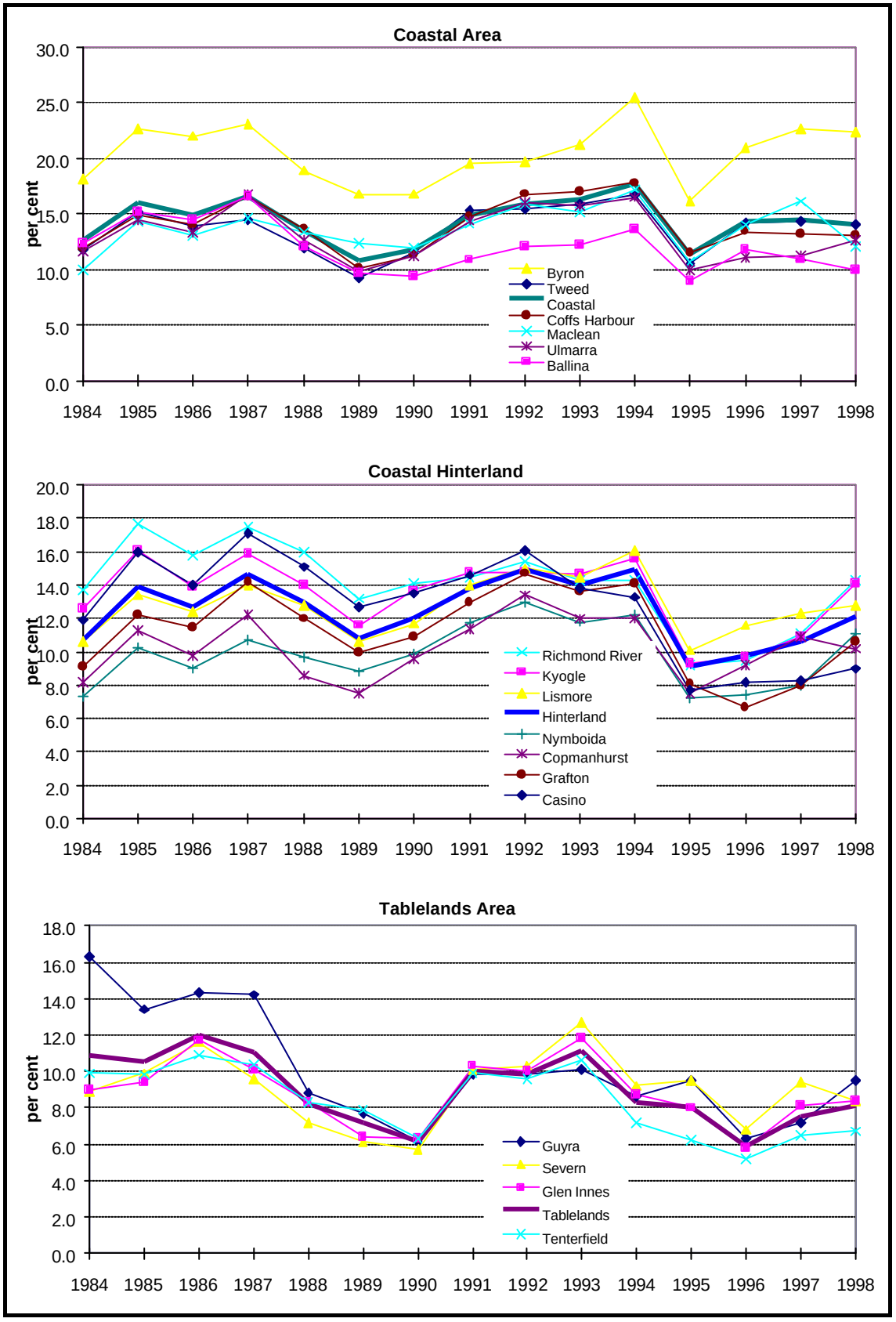


FIGURE 2-L: UNEMPLOYMENT RATES BY LGA AND SUB-REGION



Based on the employment data from the 1996 Population Census (see Table 2-E) 58 per cent of the timber industry employment occurs in the LGAs classified as coastal hinterland. Only 10 per cent occur in the Tablelands areas and 32 per cent is on the

coast. A short list of LGAs with a high level of employment in the timber industry would include Coffs Harbour (both administration and processing), Kyogle, Grafton/Copmanhurst, Tenterfield and Casino. Further analysis of local dependence on the timber industry is included in Section 3.

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

LGA	Unemployment: 1996		1998	Timber Industry Employment		
	Number	Rate	Rate	1986	1991	1996
Tweed	3352	14.2	14.1	129	73	63
Ballina	1509	11.8	10.0	12	22	26
Byron	2154	21.0	22.4	14	15	35
Maclean	739	14.0	12.1	33	20	33
Ulmarra	274	11.1	12.6	106	75	62
Coffs Harbour	3268	13.4	13.1	359	321	244
Coastal	**11296**	**14.3**	**14.1**	**653**	**526**	**463**
Guyra	153	6.3	9.5	20	9	11
Glen Innes	168	5.8	8.4	50	29	31
Severn	102	6.8	8.4	6	9	15
Tenterfield	153	5.2	6.7	122	109	96
Tablelands	**576**	**5.9**	**8.1**	**198**	**156**	**153**
Casino	389	8.2	9.0	122	113	82
Kyogle	431	9.7	14.1	152	224	253
Lismore	2343	11.6	12.8	47	42	49
Richmond River	400	9.5	14.3	67	91	77
Copmanhurst	177	9.2	10.2	92	92	92
Grafton	523	6.7	10.6	235	239	233
Nymboida	140	7.4	11.1	44	61	69
Hinterland	**4403**	**9.7**	**12.1**	**759**	**862**	**855**
UPPER NORTH EAST	**16275**	**12.2**	**13.1**	**1610**	**1544**	**1471**

Source: DEET (1988) and ABS (Population censuses)

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 110,502 persons, the main employing industries were (expressed in terms of the share of regional employment):

- The retail trade sector representing 14.5 per cent of total employment.
- The education and health sectors each employed 8.2 per cent.

- The accommodation/restaurants/cafes/pubs/clubs sector employed 7.5 per cent.
- The residential building sector employed 4.9 per cent.
- The other agriculture sector employed 4.6 per cent.
- The food manufacturing sector employed 3.3 per cent.
- The remaining sectors employed 49 per cent.
- The forestry and wood manufacturing industries employed 2.2 per cent.

These characteristics indicate a regional economy where the core is the provision of services to local residents, agriculture and related manufacturing industries, and tourists. The following analyses provide a range of comparative and benchmarking information on the UNE 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:

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

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 UNE region for 1991 and 1996 in Table 2-F. The LQs confirm the importance of the primary industries to the region. Both sawmill products and forestry and logging are at least three times more important in this region than in Australia. However, the LQ for these industries has tended to decline over the 1981 to 1996 period.

The most significant sectors that increased their relative importance between 1991 and 1996 included the beef cattle, other agriculture, other food products, sheep and dairy products sectors. This may arise from faster growth in UNE than in the nation as a whole. Many of the sectors with LQs greater than one, including the sawmill products, forestry and logging, other wood products, fishing, meat products, dairy cattle, services to agriculture, accommodation, etc. and residential building had decreased in relative importance between 1991 and 1996. 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 rural areas of NSW. Rural 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.

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

	LQs			
Selected Sectors	**1981**	**1986**	**1991**	**1996**
Beef cattle	4.9	4.9	4.2	4.9
Sawmill products	4.1	3.0	4.2	3.6
Commercial fishing	4.6	4.4	4.0	3.3
Other agriculture	3.7	3.6	3.2	3.3
Forestry and logging	3.3	2.9	3.3	3.0
Meat and meat products	1.8	2.2	2.6	2.5
Pigs	3.6	2.4	2.0	2.0
Other food products	2.3	1.3	1.8	2.0
Sheep	1.3	1.6	1.3	1.9
Other wood products	2.4	2.5	2.3	1.7
Dairy products	1.8	1.9	1.4	1.7
Accom. & restaurants	1.9	1.8	1.7	1.6
Other mining	1.4	0.8	1.0	1.4
Cement, lime and concrete slurry	1.4	1.1	1.2	1.4
Beer and malt	2.6	2.1	1.2	1.4
Other manufacturing	0.7	0.9	1.0	1.4
Services to agric.; hunting	1.7	1.5	1.5	1.3
Dairy cattle	2.1	2.0	1.4	1.3
Residential building	2.1	1.4	1.7	1.3
Mechanical repairs	1.3	1.2	1.2	1.3
Retail Trade	1.2	1.2	1.2	1.2
Education	1.0	1.0	1.0	1.1
Health	1.0	1.0	1.0	1.1
Other Services	0.6	0.7	0.8	0.8
Banking	0.9	0.9	0.8	0.7
Legal, Accounting etc	0.7	0.7	0.6	0.6

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 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 UNE and NSW are shown for four Population Census years in Figure 2-M. After falling rapidly to 1886, the UNE has diversified relatively slowly over the past 10 years in common with many regional areas. For comparative purposes, the values for the UNE and LNE regions are shown against some selected SDs in Table 2-G.)

FIGURE 2-M: COMPARISON OF COEFFICIENTS OF SPECIALISATION BETWEEN THE UNE AND NSW

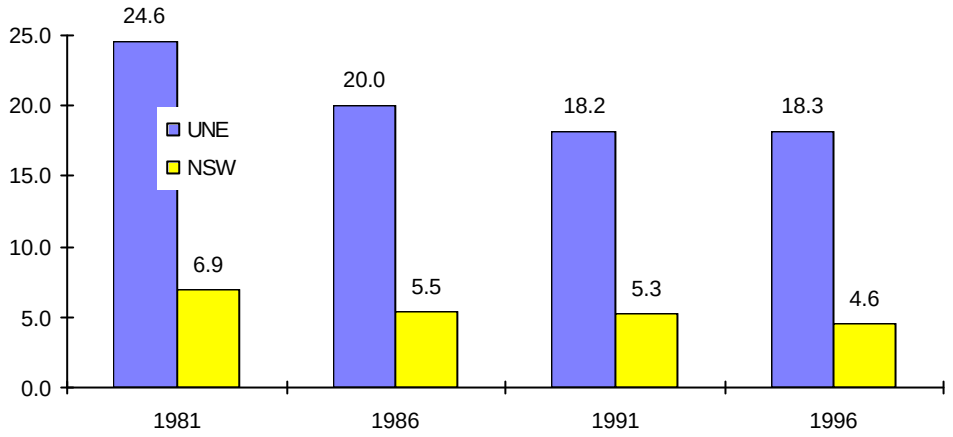


TABLE 2-G: REGIONAL COEFFICIENTS OF SPECIALISATION

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

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.

2.3.4. Population Employment Ratios

The servicing capacity of the UNE regional economy is shown in Figure 2-N 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 UNE 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 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 UNE 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 that 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 UNE region each served 44 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 sectors (except in the South-East) 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 (except Murray SD) sectors as well as for the legal, accounting, etc. and other business services sectors and cultural services.

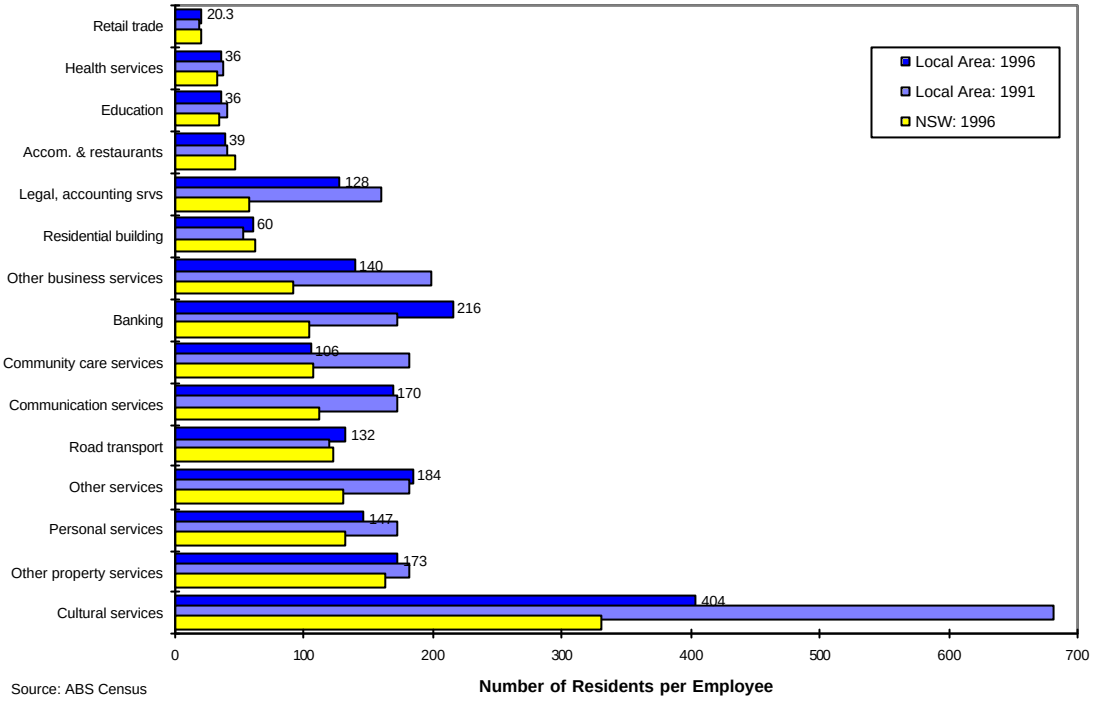
TABLE 2-H: REGIONAL POPULATION: EMPLOYMENT RATIOS 1996

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

FIGURE 2-N: POPULATION EMPLOYMENT RATIOS FOR UNE: 1991 & 1996 & NSW: 1996



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

- Cultural services (681 in 1991 to 404 in 1996).
- Community care services (child care, aged care, residential care etc. – from 182 in 1991 to 106 in 1996).
- Other business services (from 198 in 1991 to 140 in 1996).
- Legal, accounting, management, marketing (from 160 to 128)
- Personal services (dry-cleaning, laundries, hiring, film processing, photo studios, funeral directors, gardening, hairdressing etc. – from 173 to 147).

There were also minor improvements in the following sectors.

- Other property services (real estate and property developers – from 182 to 173).
- Education (from 41 to 36).
- Health services (from 38 to 36).
- Accommodation, restaurants etc (from 41 to 39).

These represent improvements for the UNE region.

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 172 to 216)
- Road transport (120 to 132)

- Residential building (from 54 to 60)
- Other services (from 182 to 184)
- Retail trade (from 19.5 to 20.3)

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, the UNE has a lower level of service in almost all sectors as indicated by the higher population-employment ratios. The exceptions where the UNE region is comparatively well serviced compared with other areas of NSW due to significant demand generated by local residents and visitors include the following.

- Accommodation/restaurants (in NSW the PER was 47 and in UNE the PER was 39).
- Community care services (in NSW the PER was 108 and in UNE the PER was 106).
- Residential building (in NSW the PER was 62 and in UNE the PER was 60).
- Retail trade (in NSW the PER was 21 and in UNE the PER was 20).

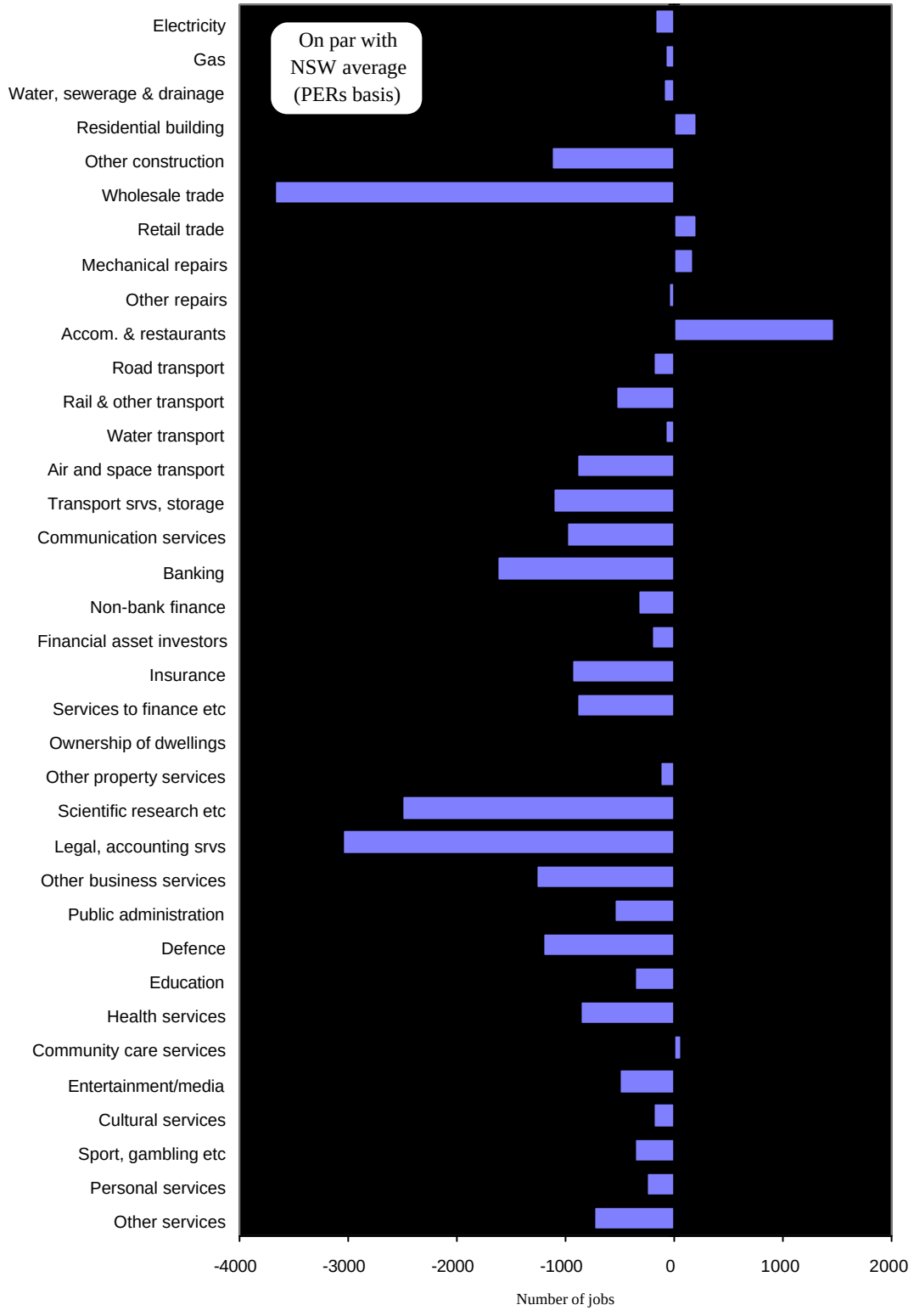
Otherwise, the UNE region is serviced at a lower level than for NSW as shown in Figure 2-O. In that figure, the size of the lower servicing is measured as the number of jobs required in each sector to reach the NSW level.

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.

In some cases where there is a large public sector funding component, political action may be effective. It might be noted that where these services are provided on a per capita basis, then the level is usually not too far from the State average (eg. public administration, education, health, community care and cultural services). The service levels in these sectors appear to be relatively uniform across NSW.

FIGURE 2-O: UNE JOBS DEFICIT, 1996



2.3.5. Employment Change by Sector

The remainder of this section is focused on identifying industry trends in the UNE economy, and in comparing the UNE 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 UNE, the following changes in total employment have occurred.

1991	100,559	1996	110,502
1981	82,310	1991	100,559
Diff.	18,249		9,943

These data (and the data in Table 2-B) indicate that employment grew in the 1990s at about one-half the rate of the stronger growth in the late 1980s. The change in total employment between 1991 and 1996 was distributed across the sectors as shown in Figure 2-P. There is a clear pattern of structural change in the data with employment losses in many of the primary industries and related manufacturing sectors (excluding other agriculture and other food product 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 education, health and community care services as well as other personal and recreational sectors, which are important to the overall quality of living in the UNE region.

There was a loss of 195 jobs in the aggregate wood manufacturing sector. The other major job losses occurred in rail transport (326), utilities (mostly electricity 266) and banking (213). 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 9,943.

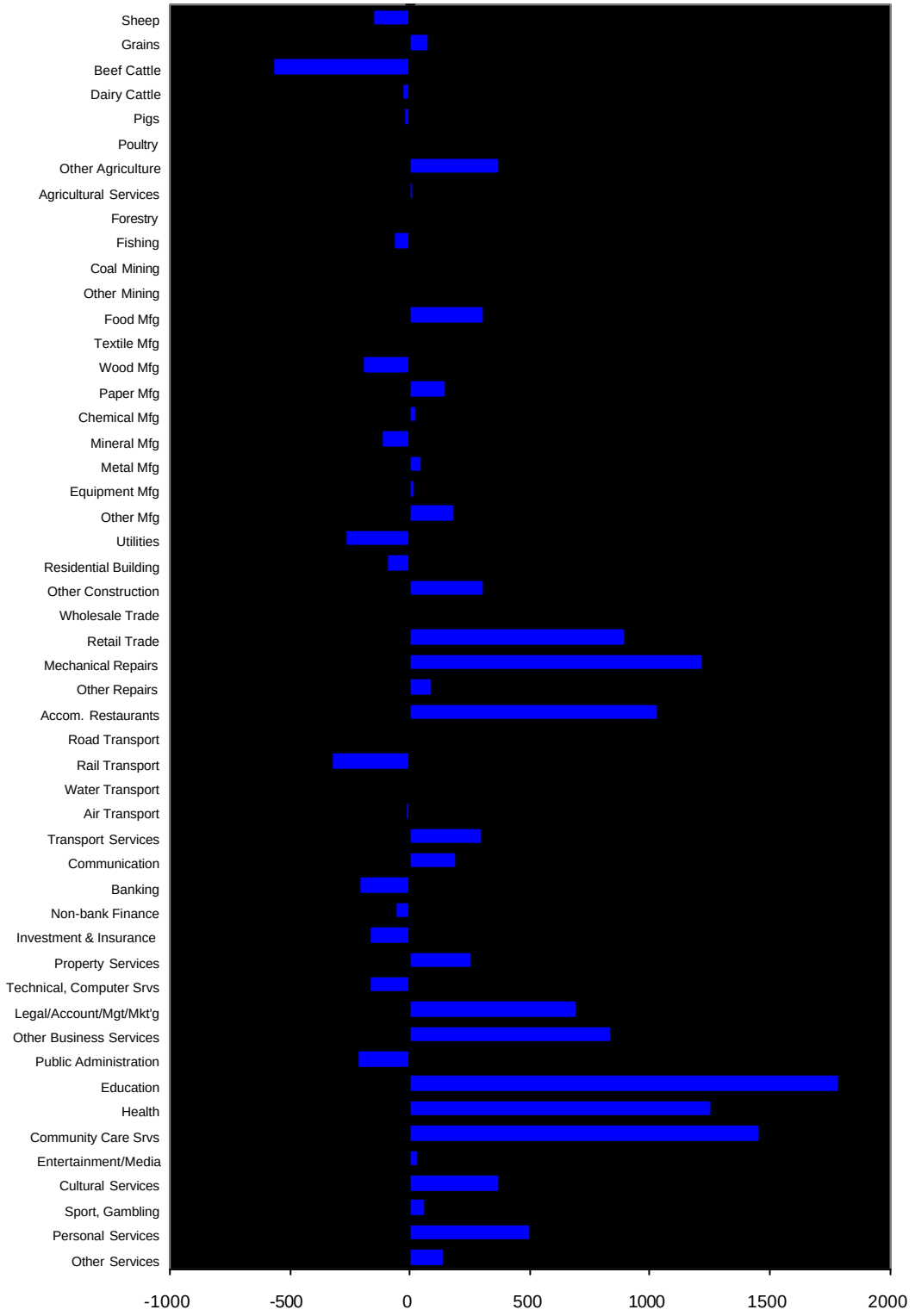
It is possible to assess these changes against the changes that are occurring in NSW as a whole. This can be done using shift share analysis that compares regional growth with growth in the State and the growth in each industry. Not all industries grow at the same rate and the particular mix of industries may favour some regions. As a result, regional growth is apportioned among overall State growth, industry mix effects and local factors.

TABLE 2-J: SUMMARISED SHIFT-SHARE ANALYSIS

	Component				**Total**
	State	Industry	**Total State**	**Local**	**Change**
	No.	No.	**No.**	**No.**	**No.**
Positive Effects	6,522	7,244	**13,766**	**7,227**	**20,993**
Negative Effects	-	(6,889)	**(6,889)**	**(4,161)**	**(11,050)**
Total Effects	**6,522**	**355**	**6,877**	**3,066**	**9,943**

The results for the UNE region are shown in detail in Attachment 3 and summarised in Table 2-J, for the period 1991 and 1996. If the UNE economy performed as well as the NSW economy over that period, then employment would have grown by 6,522 jobs.

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



The industry mix effects were only small (suggesting a similar mix to the State) but would have added 355 jobs to the region.

The overall benchmark that is established is to measure the performance of the UNE against the overall trend in NSW and its industries. If the UNE were on this benchmark, then employment would have increased by 6,877 (Table 2-J). That benchmark for the UNE would have resulted in employment changes for each industry as shown in Figure

2-Q. That indicates greater declines in employment in some agricultural sectors. Most of the services sectors that have shown growth in the UNE have been growing in NSW as a whole. Further, wood manufacturing employment in NSW has been growing and, if that had been shared in the UNE region would have seen that sector expand by almost 65 jobs.

The combined state and industry effects provide a state benchmark of a 6,877 (6,522 + 355) job increase in the UNE region over 1991 to 1996. Since jobs actually grew in the local region by 9,943, the difference between the state benchmark suggests that local factors have been positive to the extent of a growth of 3,066 jobs (9,943 - 6,877). 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 to 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-R). Thus, these industries lost some of their NSW market share and included:

- Residential building
- Technical, computer services (including research)
- Sport, gambling
- Wood manufacturing
- Communication
- Accommodation, restaurants, clubs etc.
- Banking

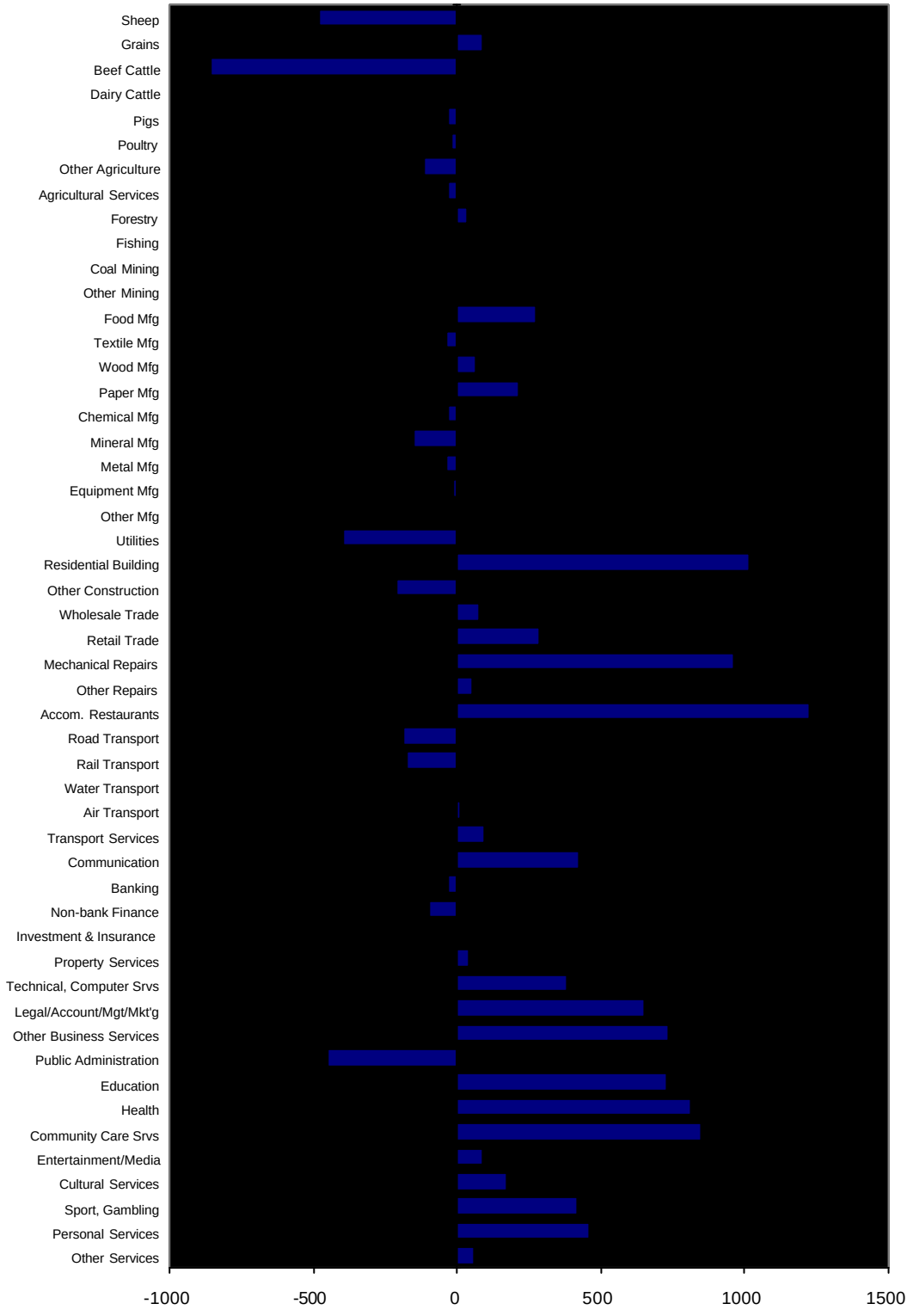
Those industries that did well, and increased their share of that industry in NSW will normally equate with those that are competitive and can do well in other markets. Note that this can also result from the local industry declining more slowly than the industry in the state as a whole. Those industries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

- Education
- Community care services
- Retail trade
- Other construction
- Other agriculture
- Health

In NSW, both the forestry and wood manufacturing sectors showed a small increase in employment. But within the UNE region, local factors were negative for both sectors and especially for wood manufacturing. That result is indicative of the adjustments that have been taking place in the timber industry in the UNE region for several years.

A similar shift-share analysis covering the census periods from 1981 is shown in Figure 2-S. Between 1981and 1986 there was a slight net increase in employment in the UNE region. While there was a neutral effect from state and industry factors this was enhanced by positive local factors.

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



While there was limited growth in employment between 1981 and 1986 in the UNE region, growth in employment since 1986 has been significant and influenced almost equivalently by state and local effects in aggregate.

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

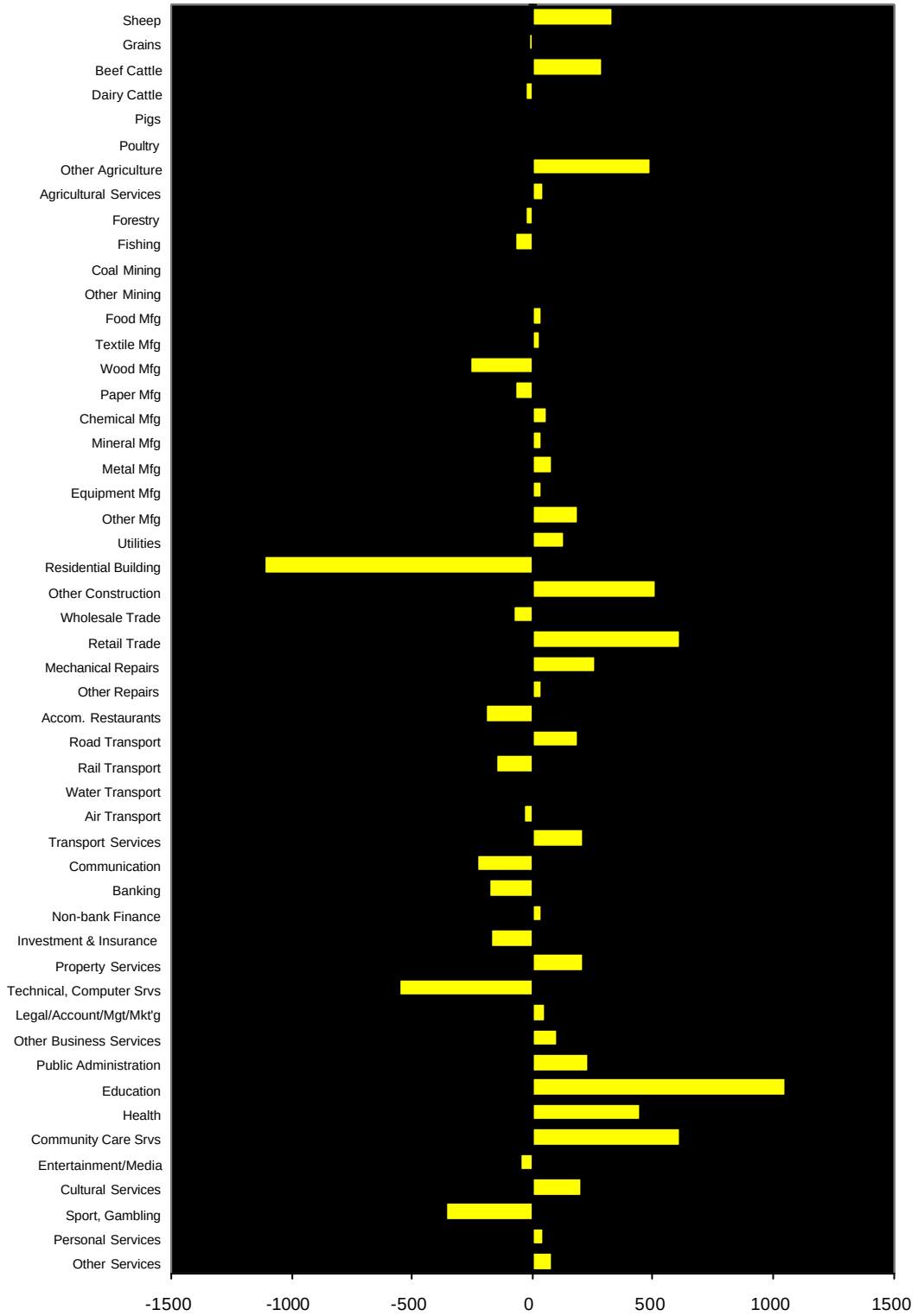
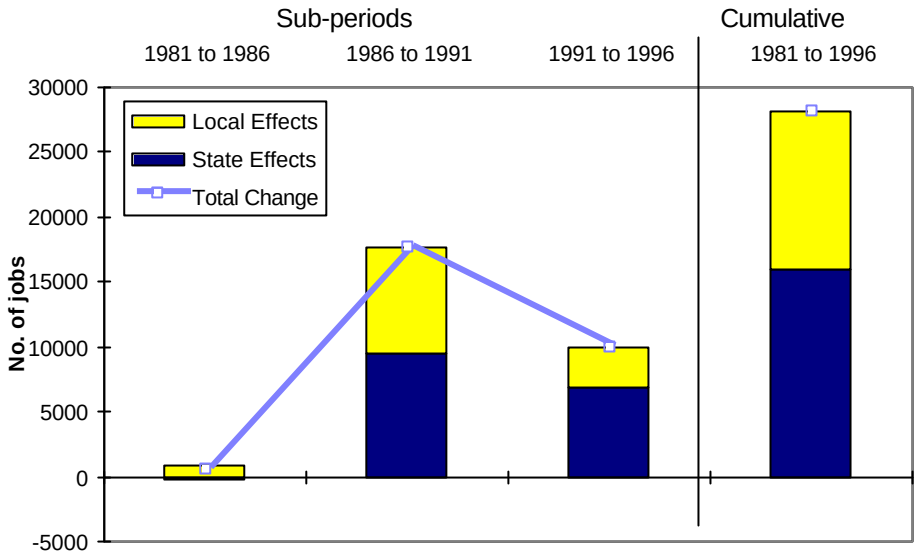


FIGURE 2-S: TOTAL STATE AND LOCAL COMPONENTS OF CHANGE 1981 TO 1996



2.4. AVERAGE INCOMES

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

TABLE 2-K: INCOMES BY INDUSTRY 1996

	Median Annual Individual Incomes		
1 Digit INDUSTRY	UNE	NSW	UNE: NSW
	$	$	%
A Agriculture, Forestry & Fishing	15,989	18,035	89
B Mining	28,896	55,395	52
C Manufacturing	22,199	27,288	81
D Electricity, Gas & Water Supply	29,512	35,495	83
E Construction	23,876	27,430	87
F Wholesale Trade	22,510	28,612	79
G Retail Trade	16,031	17,571	91
H Accommodation, Cafes & Restaurants	16,294	18,014	90
I Transport and Storage	24,417	30,257	81
J Communication Services	29,738	32,965	90
K Finance and Insurance	24,866	31,574	79
L Property and Business Services	23,140	30,773	75
M Government Administration & Defence	27,979	32,593	86
N Education	30,160	32,286	93
O Health and Community Services	22,792	24,636	93
P Cultural & Recreational Services	19,185	25,485	75
Q Personal and Other Services	20,036	23,990	84
R Non-classifiable economic units	18,641	23,374	80
& Not stated	12,574	16,449	76
Total	**21,218**	**26,078**	**81**

Source: 1996 Census of Population and Housing
Note: Includes income of employed persons from all sources.

This information confirms that in rural areas, average incomes tend to be lower than in metropolitan areas. The average income in the UNE region is 81 per cent of the state average. In all the industries, incomes in the UNE region are lower than the NSW levels.

It is notable that those sectors where there is substantial public funding, such as education and health and community services, show the smallest differences between UNE and NSW average levels. The retail trade, accommodation/cafes/restaurants and communication sectors also show earning levels within 10 per cent of the State average. In all other industries earnings in the UNE region are more than 10 per cent below the level for NSW. The mining, cultural and recreation, and property and business services sectors have the lowest levels relative to NSW.

2.5. CONCLUSION

The UNE economy is one where growth has been substantial, especially in the second half of the 1980s. That growth appears to have slowed down in the 1990s although the rate is still faster than in NSW as a whole. While employment has been growing, the levels of unemployment remain high relative to NSW as a whole and average earnings are about 20 per cent below the average NSW levels.

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

The UNE region has been restructuring away from traditional primary and related activities toward the provision of services to an expanded population and more visitors. While many of these services are being supplied at levels equivalent to NSW as a whole (as indicated by the PERs), the relatively low employment/population ratios would suggest that the supply of those services is likely to be overtaxed in some places. Furthermore, a recent slowdown in visitor numbers and in regional population growth ABS 1999, Cat 3218.0) would indicate that economic growth in the UNE region might be slower than in the past.

Employment growth has generally been slower than the growth in population. Unemployment is higher than the state average, especially near to the coast, and includes a high level of youth unemployment. Employment in agriculture and forest industries has declined over time. This has been offset by an increase in person-related employment, but these jobs are located mainly on the coast.

The rapid growth in the services sector in the early nineties has slowed significantly. Banking services and business services have tended to centralise in regional centres and the metropolitan area, reducing their staff in regional areas. Services to traditional agriculture have decreased, but there appears to be a growth in services specifically targeted at the small and hobby farm market. This is most evident in rural and semi rural areas adjacent to the coast.

The majority of business activity in the region is service related, providing services to agriculture, other local businesses, residents and tourists. Services are also provided to the relatively small local manufacturing industry.

In this context, the forestry and wood processing industries have been declining relative to the trends in NSW as a whole. This is likely to have notable effects especially in the inland areas where further population losses may occur. In the coastal areas, further decline would add to the level of unemployment. Developments in value adding, the processing of low-grade wood and the expansion of plantations are likely to lead to employment growth as these initiatives are implemented.

3. A SOCIAL PROFILE OF THE UNE REGION

3.1. INTRODUCTION

This chapter identifies:

- specific social catchments within the UNE 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 UNE 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 (Fenton, 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 UNE 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

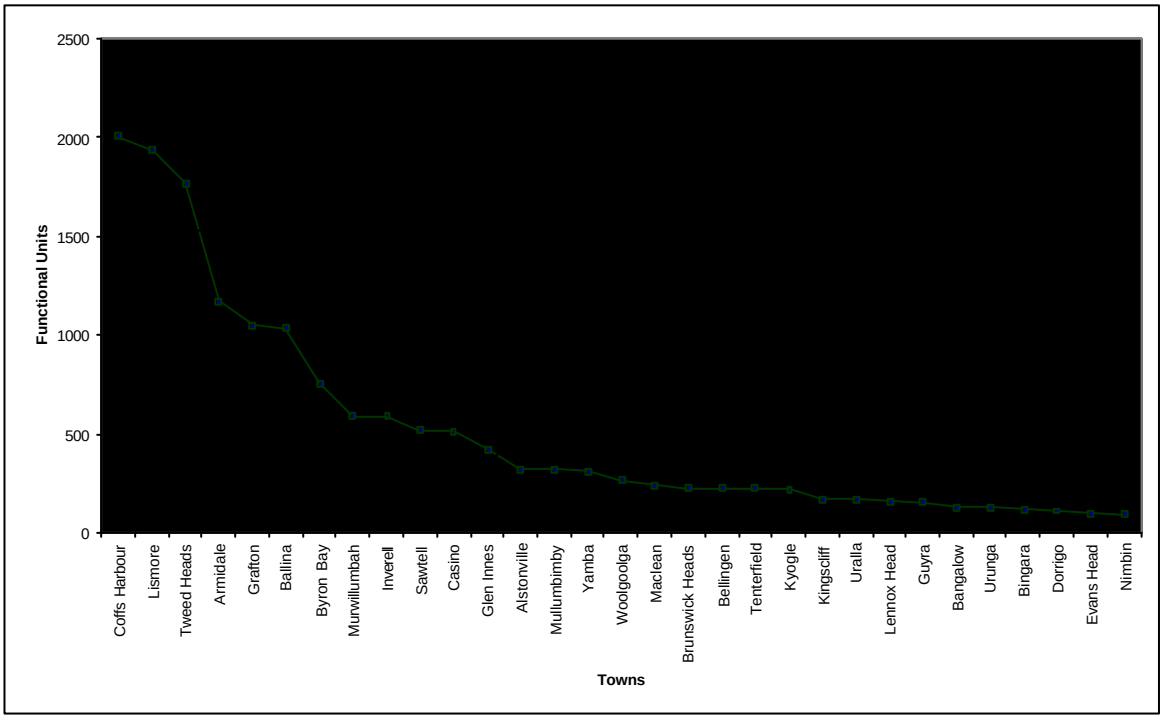
The Telstra Yellow Pages directory was examined in order to identify the number of functional units within towns in the UNE region. While the use of this directory is likely to underestimate the number of units within specific towns, it nevertheless provides a relative indication of the number of industries,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

Figure 3-A shows a plot of the number of functional units against specific towns within the UNE region. This figure, which shows towns with more than 70 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 70 functional units represented small micro catchments within the region and included 51 towns with between 69 and 20 functional units, and 143 towns with between 19 and 5 functional units.

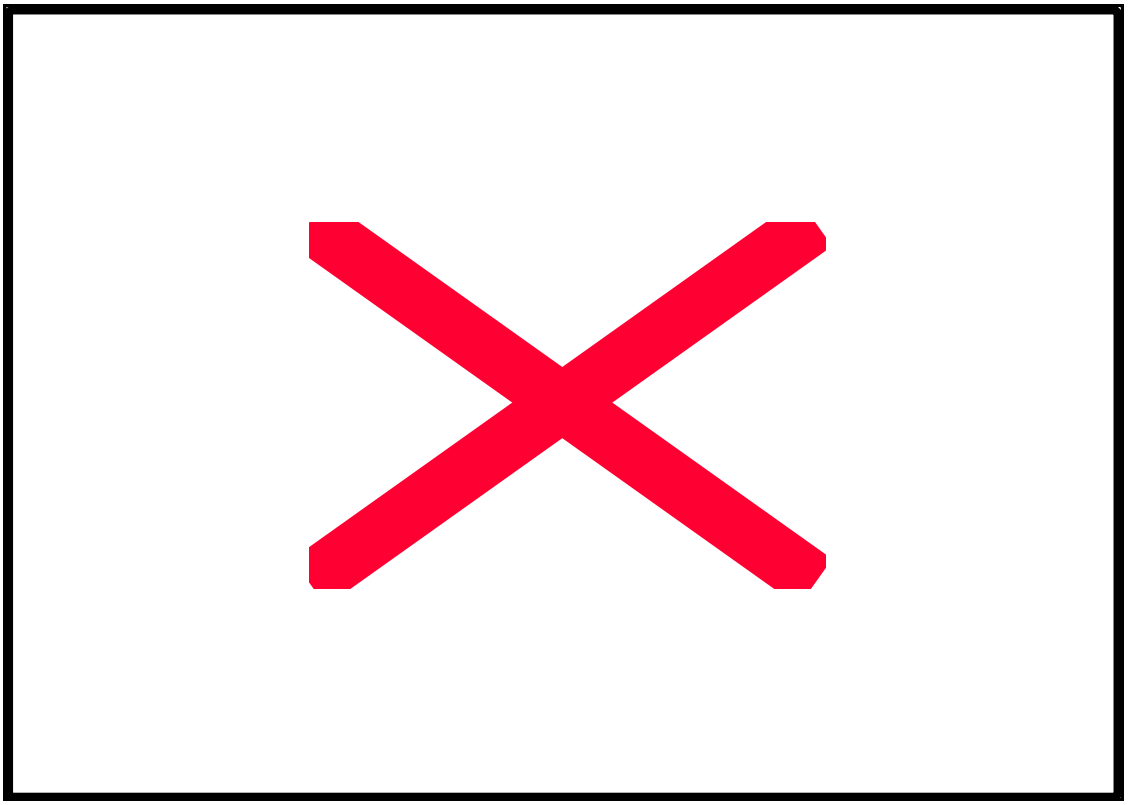
FIGURE 3-A: NUMBER OF FUNCTIONAL UNITS IN TOWNS



The towns of Coffs Harbour, Lismore and Tweed Heads are major regional centres within the UNE region and are located at the top of the town hierarchy, representing

major service centres for other towns in the region. The likely catchment for the three major regional centres is shown in Figure 3-B. Regional centres include the towns of Armidale, Grafton, Ballina, Byron Bay, Murwillumbah, Inverell, Sawtell, Casino and Glen Innes. These towns have smaller catchments than the major regional centres, and service other smaller towns located within the vicinity of each regional centre.

FIGURE 3-B: MAJOR REGIONAL CATCHMENTS



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 interdependent and inter-related. The use of Local Government Areas or other geographic boundaries are often defined on the basis of specific administrative criteria and do not necessarily reflect the social and economic interdependencies 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 local government areas, an analysis of specific towns is also often too narrow to be of use as again may 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 intertown dependencies at the local level. The social catchments that have been identified for the UNE 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 UNE region,
- the geographic distribution of towns, and
- the application of a gravity model to accurately identify 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

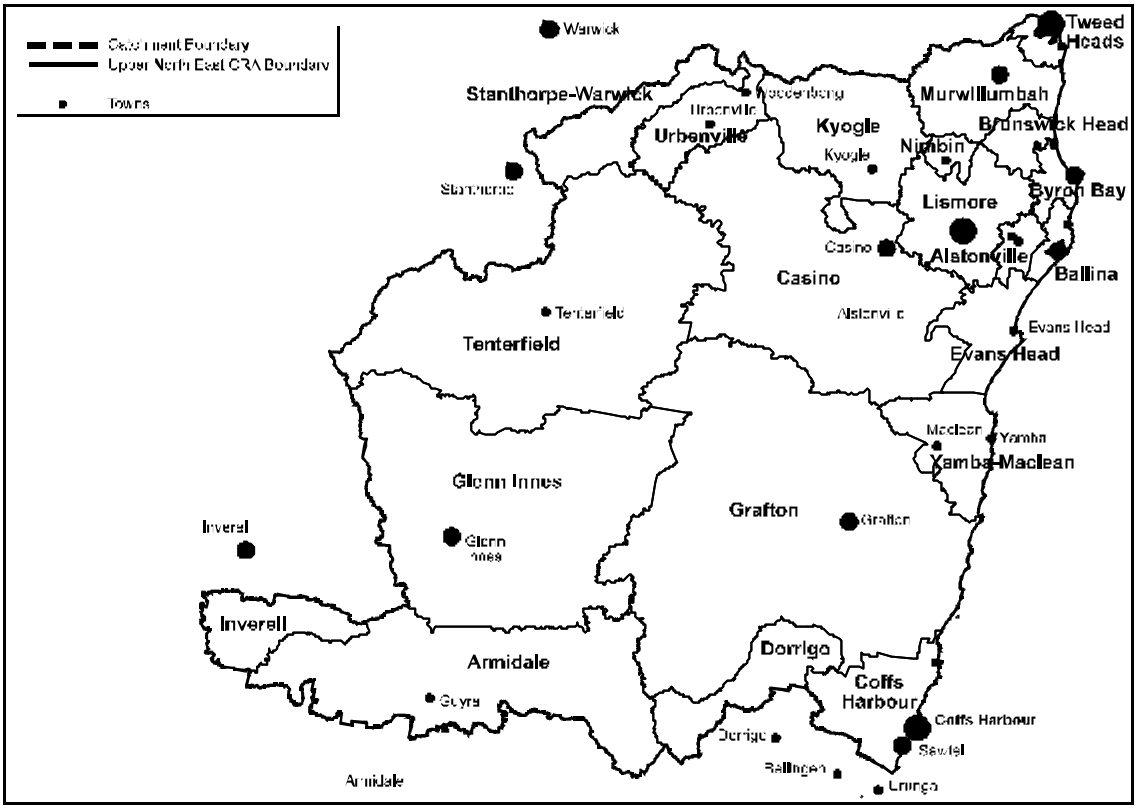
T_{AB} is the distance in kilometres between pairs of towns A and B

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-C, 21 social catchments were defined. For each social catchment, Figure 3-C also shows the likely major regional centre, regional centre, sub regional centre and micro-catchments associated with each social catchment.

FIGURE 3-C: SOCIAL CATCHMENTS



Regional Social Catchment	Major Regional Centre	Regional Centres	Sub-Regional Centres	Micro-Catchments
Alstonville	Lismore	Ballina	Alstonville Wollongbar	
Armidale	Coffs Harbour	Armidale	Guyra	Ben Lomond
Ballina	Lismore	Ballina	Lennox Head	Wardell
Brunswick Head	Lismore	Byron Bay	Mullumbimby Brunswick Heads	Billinudgel Burringbar
Byron Bay	Lismore	Byron Bay	Bangalow	Suffolk Park Tintenbar Ewingsdale Newrybar
Casino	Lismore	Casino		Bonalbo Tabulam
Coffs Harbour	Coffs Harbour	Sawtell	Woolgoolga	Sandy Beach Emerald Beach Nana Glen Coramba Mullaway Moonee Beach
Dorrigo	Coffs Harbour		Dorrigo	
Evans Head	Lismore		Evans Head	Corakai Woodburn
Glenn Innes	Coffs Harbour	Glenn Innes		Broadwater Deepwater Emmaville
Grafton	Coffs Harbour	Grafton		Ulmarra Wooli Coutts Crossing
Inverell	Coffs Harbour	Inverell		Tingha
Kyogle	Lismore		Kyogle	
Lismore	Lismore			Clunes Dunoon Rosebank Wyrallah Federal The Channon
Murwillumbah	Lismore	Murwillumbah		Uki Bogangar Condong Tyalgum
Nimbin	Lismore		Nimbin	
Stanthorpe-Warwick	Lismore	Stanthorpe		
Tenterfield	Lismore		Tenterfield	
Tweed	Tweed Heads		Kingscliff	Chinderah Terranora Cudgen
Urbenville	Lismore			Urbenville Woodenbong
Yamba-Maclean	Lismore		Yamba Maclean	Iluka

Micro-catchments have greater than 20 functional units

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.

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	The number of persons indicating they do not speak English or speak
Not at All or Poorly	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).*

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.

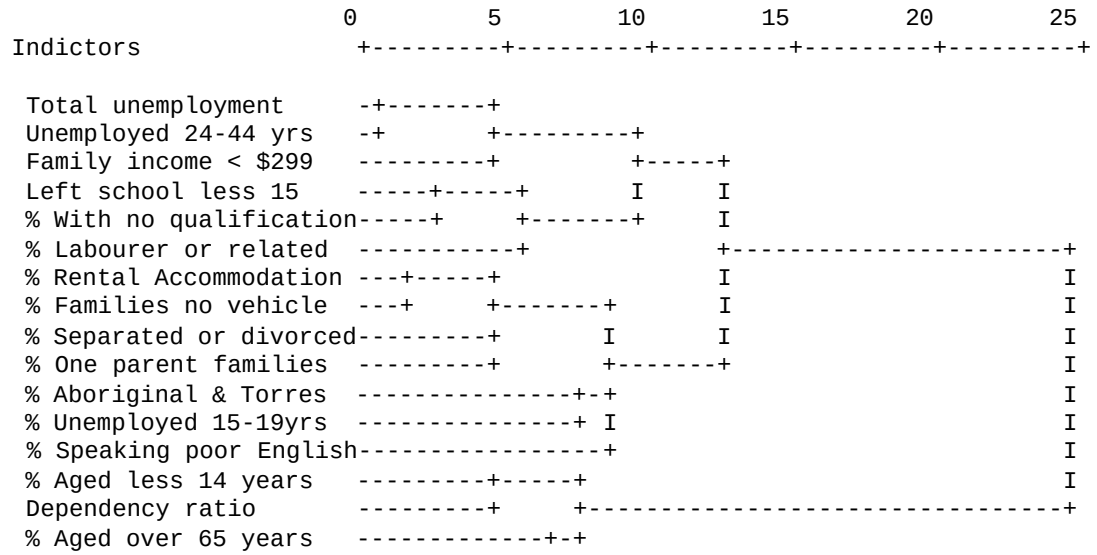
Figures 8 to 49 in Attachment 4 show the demographic profiles for each of the social catchments and the value for each profile for the UNE Region as a whole. The value for each profile within each social catchment was also transformed into a standard score using a Z-score transformation, with a mean equal to zero and standard deviation of 1.00. Figures 8 to 49 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 (Figures 8 to 49 in Attachment 4), clearly show which specific socio-demographic profiles are below or above the average for the UNE region as a whole.

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 Upper North East and Lower North East CRA 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 dendogram.

TABLE 3-B: CLUSTER ANALYSIS OF DEMOGRAPHIC PROFILES



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 41 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 41 in Attachment 4 also show each of the four community sensitivity indices for each social catchment. An index that 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 UNE region as a whole.

TABLE 3-C: FOUR CLUSTER SOLUTION OF DEMOGRAPHIC PROFILES

Cluster	
Unemployment and Income	**Family and Housing**
Total unemployment	Percent dwellings rented
Unemployment (22-45 years)	Percent families with no vehicle
Weekly family income <$299	Percent separated and divorced
	Percent of one parent families
Education and Occupation	**Age Dependency**
Left school before 15 Years	Percent aged 14 years of less
Percent over 15 years with no qualifications	Percent aged 65 years or greater
Percent labourer or related workers	Dependency ratio

Source: *EBC (1998).*

Figures 3-D to 3-S show each of the four community sensitivity indices plotted against the number of forest and timber industry employees and the percentage of the population over 15 years of age employed in forest industries.

Figure 3-D shows the variation in unemployment and income across all social catchments in the UNE region in relation to the number of forest and timber industry employees within the catchment. The catchments of Inverell, Dorrigo and Nimbin 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 3-D these catchments have relatively low numbers of forest and timber industry employees. On the other hand, the catchments of Grafton, Coffs Harbour and Kyogle, 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-F also shows the variation in unemployment and income across all social catchments in the UNE 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 Kyogle and Grafton have not only a high absolute 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. What is of particular note in relation to Figure 3-F is the social catchments of Dorrigo and Tenterfield. While the social catchment of Dorrigo and Tenterfield have relatively few forest and timber industry employees when compared to other catchments, they nevertheless represent a significant percentage of the workforce within these catchments, which as shown in Figure 3-F are also sensitive to change in unemployment and income.

Figures 3-H and 3-I 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 Table 3-H, the social catchments of Grafton, Kyogle and Casino 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.

When the three catchments of Grafton, Kyogle and Casino are compared in relation to the percentage of the total workforce employed in forest industries and in relation to education and occupation, the catchments of Grafton and Kyogle are found to have a relatively high percentage of their workforce employed in forest industries (Figures 3-J and 3-K). These two catchments are again moderately sensitive to change in relation to the education and occupation index when compared to the UNE region and all NSW rural areas. Figure 3-J also shows that when the percentage of forest industry employees within the workforce is considered, the catchments of Urbenville, Dorrigo, Stanthorpe-Warwick and Tenterfield not only have a high percentage of the workforce employed in forest industries, but these catchments are also sensitive to change in relation to the education and occupation index.

Figures 3-L and 3-M show variation in the family and housing index across all social catchments in the UNE 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 Figure 3-L, Coffs Harbour is the only catchment with high absolute numbers of forest and timber industry employees and with moderate sensitivity to change on this index. However, as shown in Figure 3-N, Coffs Harbour has a relatively low percentage of the total workforce employed in forest industries. On the other hand, the social catchment of Urbenville, while it has relatively 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 Figure 3-N is also moderately sensitive to change in relation to the family and housing index.

Figures 3-P and 3-Q show variation in age dependency across each of the social catchments in the UNE 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 Tweed and Evans Head, however, these catchments have a relatively low number of forest and timber industry employees. On the other hand, Grafton, Coffs Harbour and Kyogle have moderate levels of age dependency and a relatively large number of forest and timber industry employees (Figure 3-P). In addition, Kyogle and Grafton not only have a relatively high number of forest and timber industry employees, but forest industry employees also comprise a significant percentage of the total workforce (Figure 3-Q). Although the social catchment of Urbenville has relatively low absolute numbers of forest and timber industry employees, these employees nevertheless represent a significant percentage of the total workforce (Figures 3-R and 3-S) and has a relatively high sensitivity to change on the age dependency index (Figures 3-R and 3-S).

FIGURE 3D - COMMUNITY SENSITIVITY INDEX: UNEMPLOYMENT & INCOME AGAINST FOREST INDUSTRY EMPLOYEES (UNE RELATIVE)

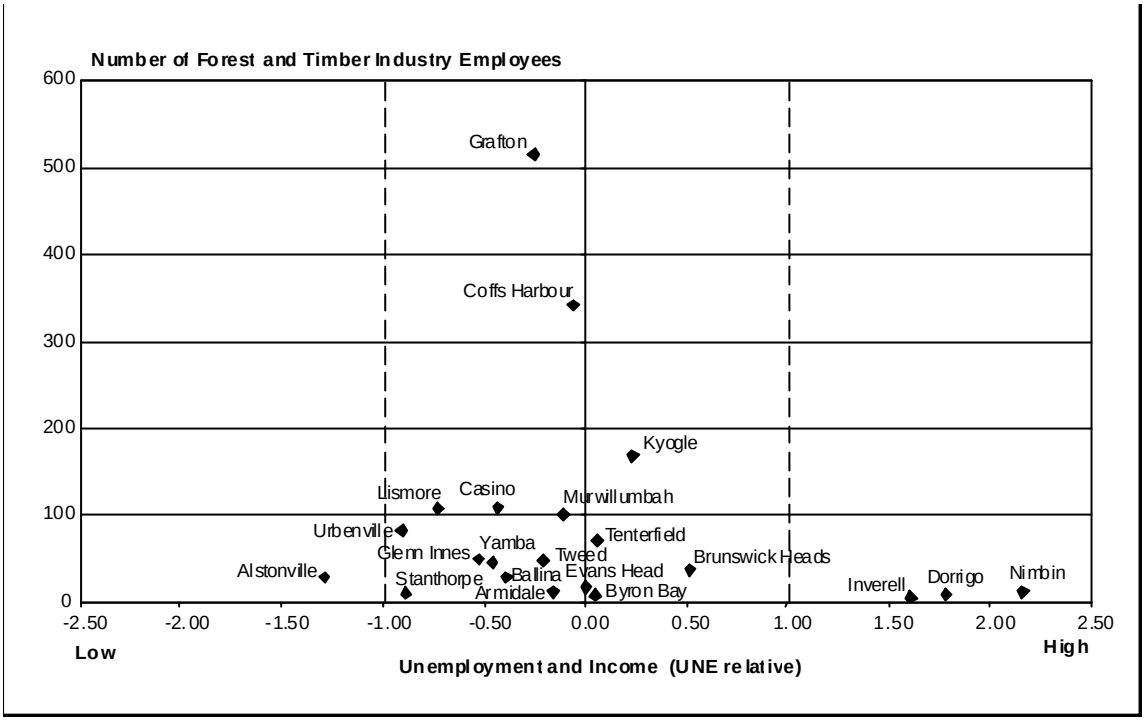


FIGURE 3E - COMMUNITY SENSITIVITY INDEX: UNEMPLOYMENT & INCOME AGAINST FOREST INDUSTRY EMPLOYEES (NSW RURAL RELATIVE)

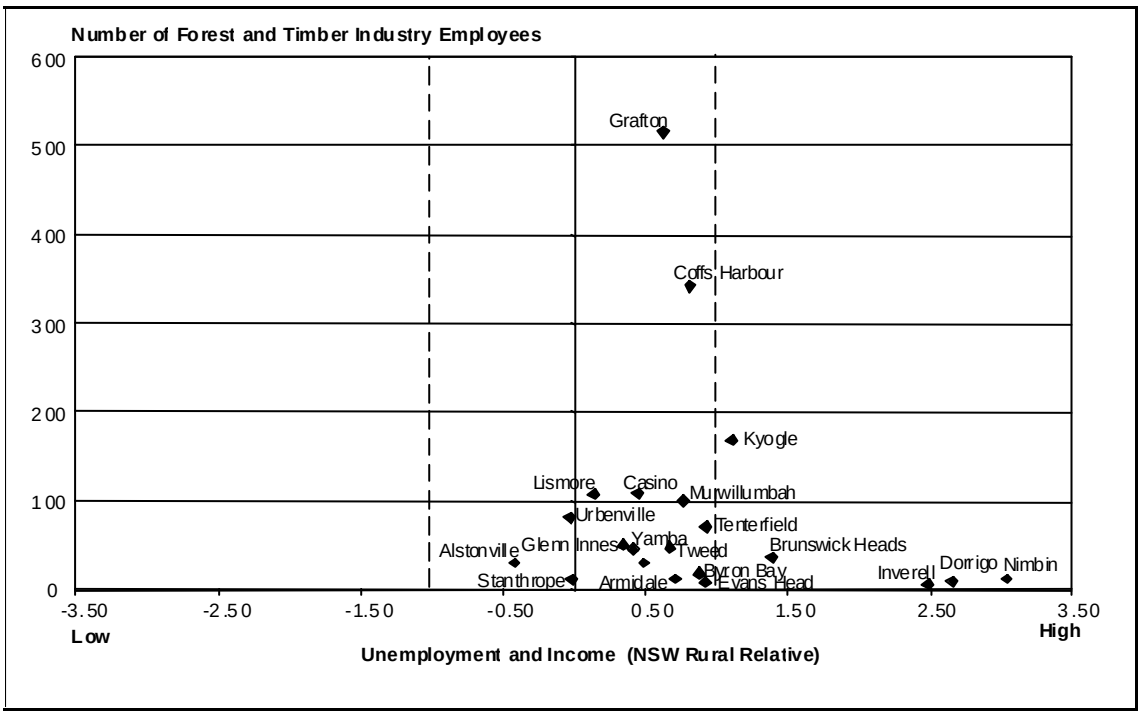


FIGURE 3F - COMMUNITY SENSITIVITY INDEX: UNEMPLOYMENT & INCOME AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (NSW RURAL RELATIVE)

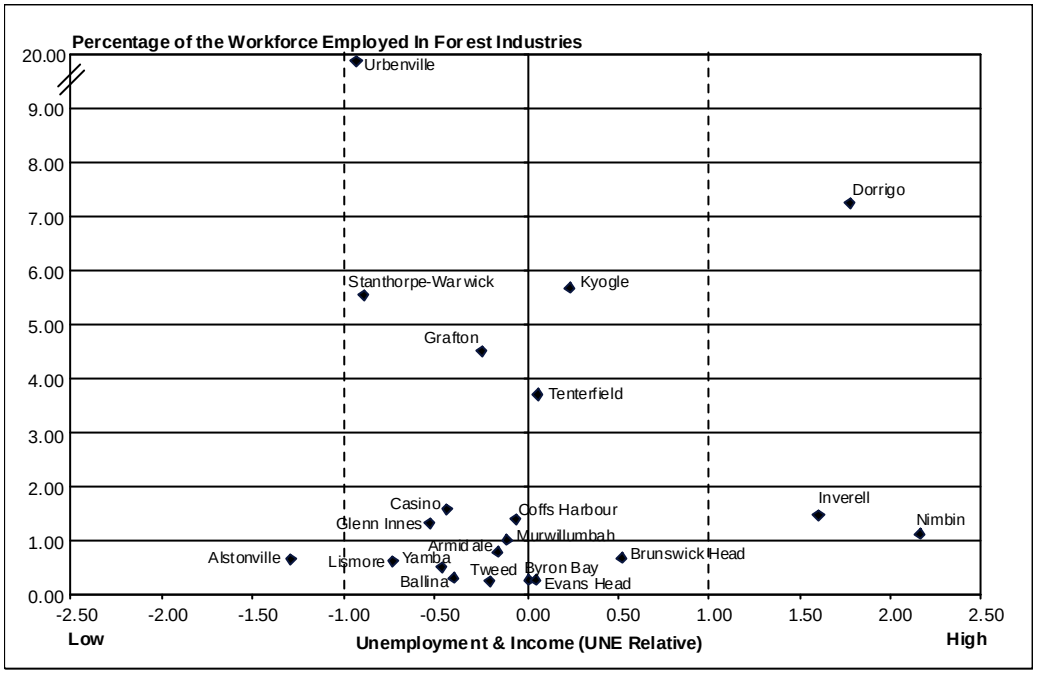


FIGURE 3G - COMMUNITY SENSITIVITY INDEX: UNEMPLOYMENT & INCOME AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (NSW RURAL RELATIVE)

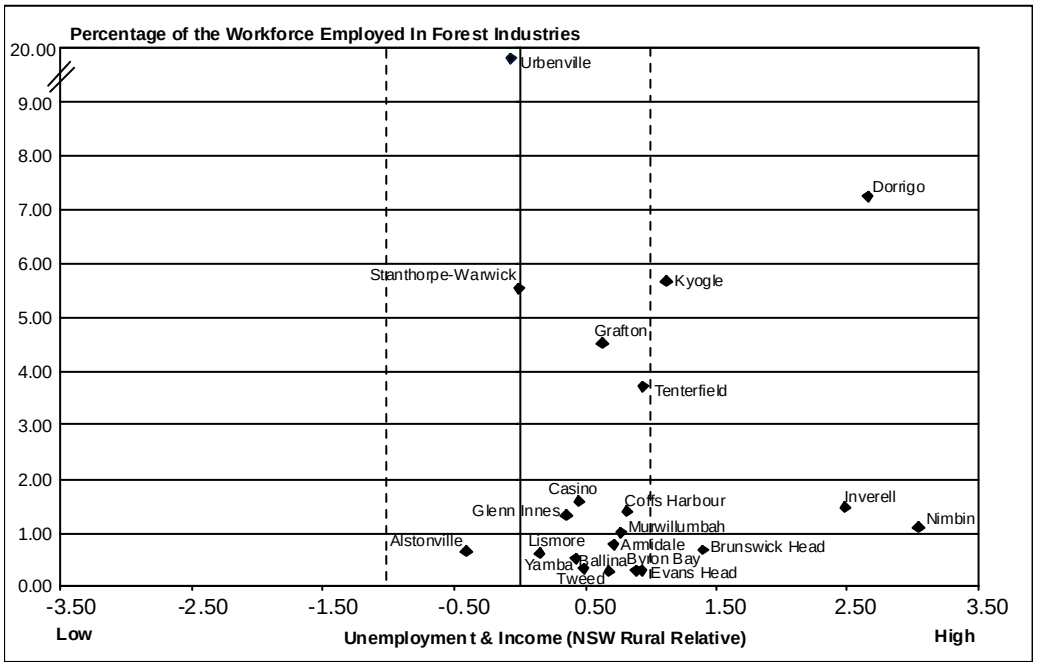


FIGURE 3H - COMMUNITY SENSITIVITY INDEX: EDUCATION & OCCUPATION AGAINST FOREST & TIMBER INDUSTRY EMPLOYEES (UNE RELATIVE)

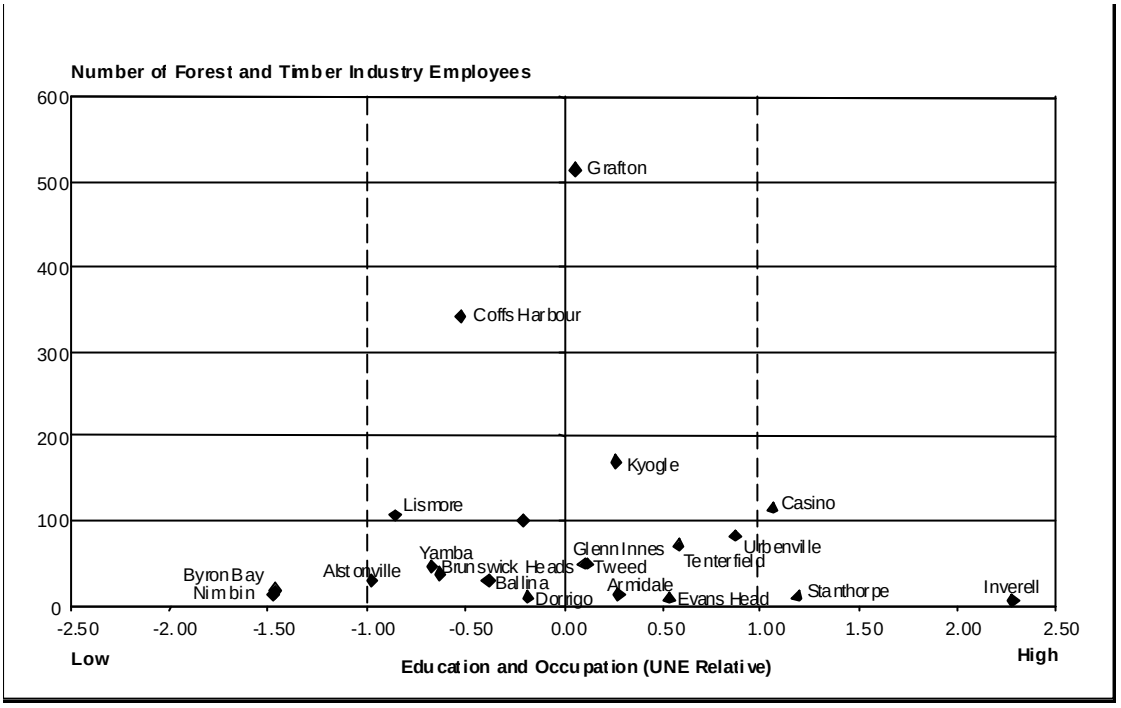


FIGURE 3I - COMMUNITY SENSITIVITY INDEX: EDUCATION & OCCUPATION AGAINST FOREST & TIMBER INDUSTRY EMPLOYEES (NSW RURAL RELATIVE)

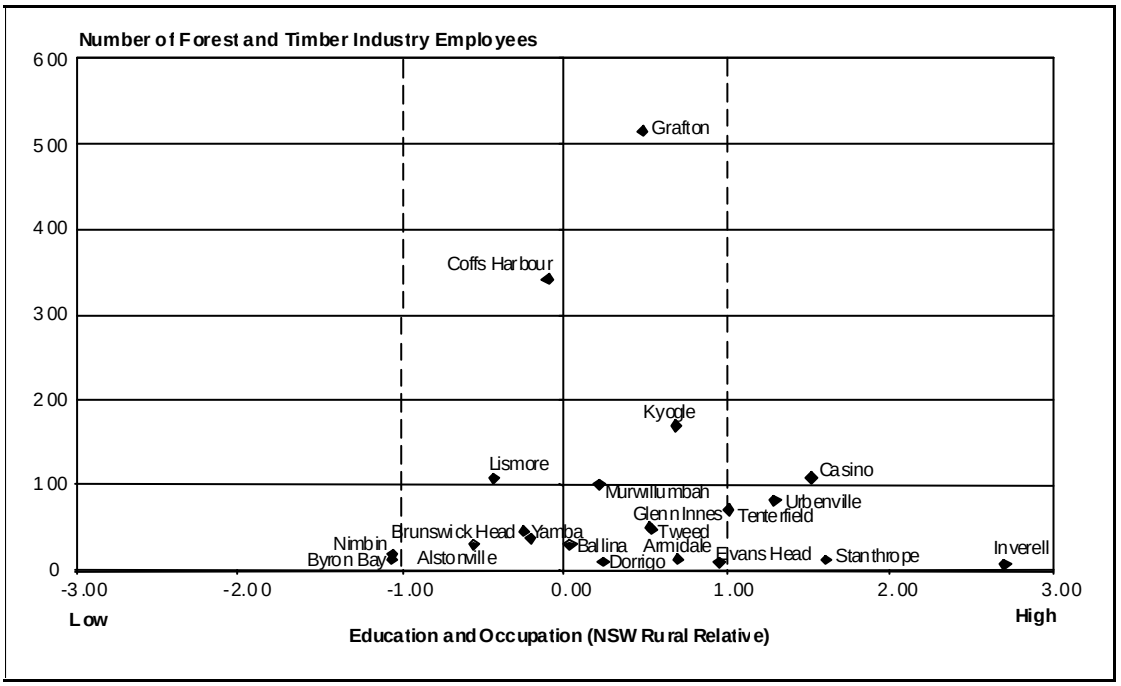


FIGURE 3J - COMMUNITY SENSITIVITY INDEX: EDUCATION & OCCUPATION AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (UNE RELATIVE)

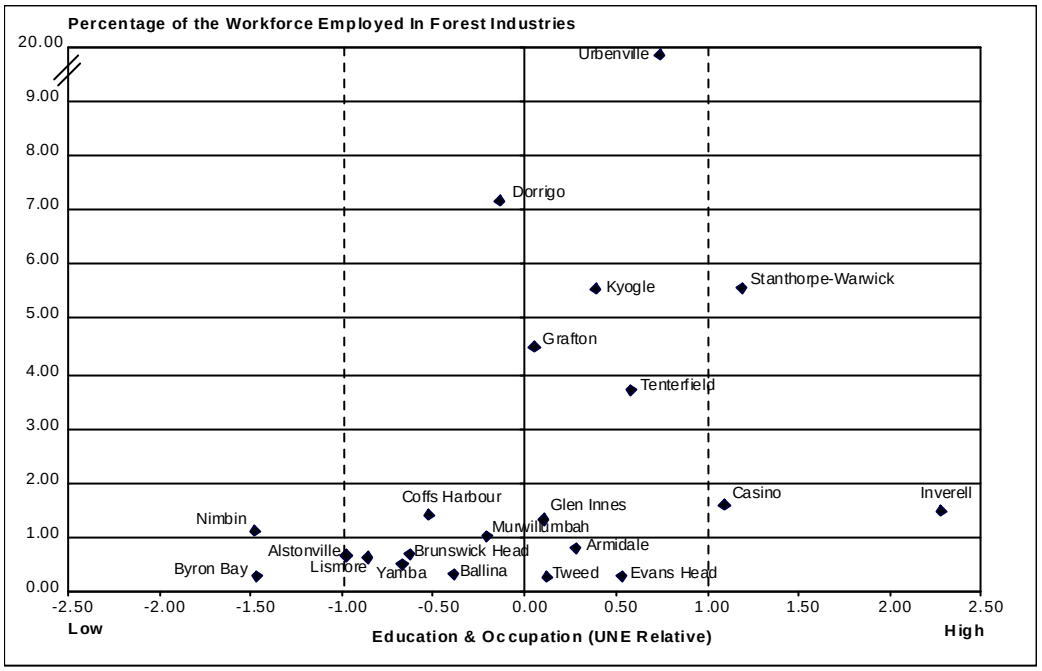


FIGURE 3K - COMMUNITY SENSITIVITY INDEX: EDUCATION & OCCUPATION AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (NSW RURAL RELATIVE)

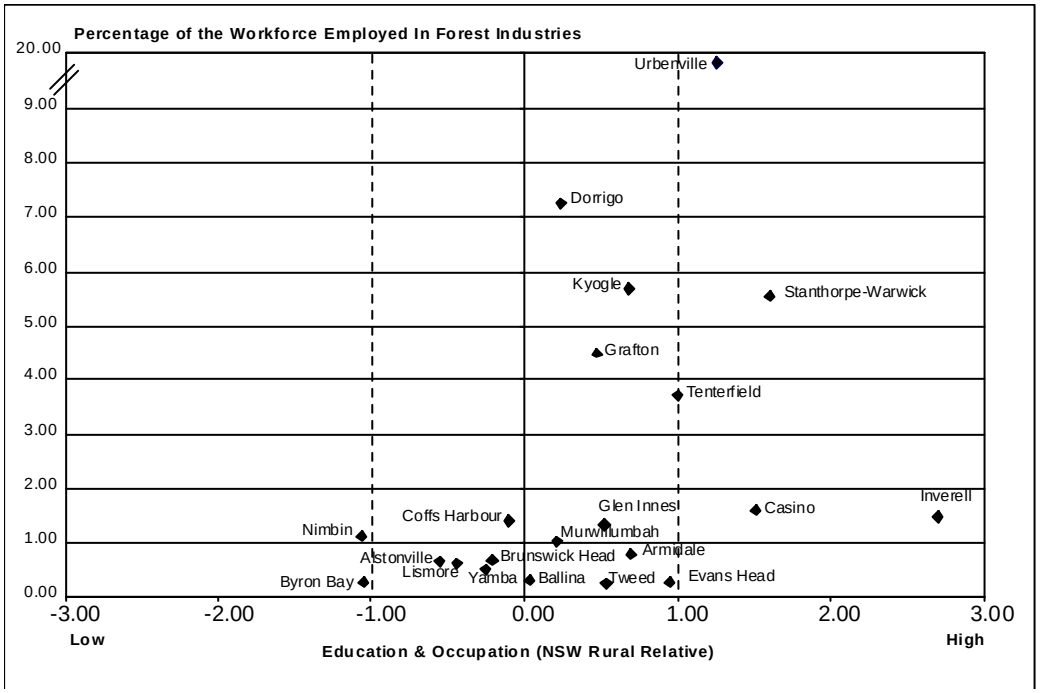


FIGURE 3L - COMMUNITY SENSITIVITY INDEX: FAMILY & HOUSING AGAINST NUMBER OF TIMBER INDUSTRY EMPLOYEES (UNE RELATIVE)

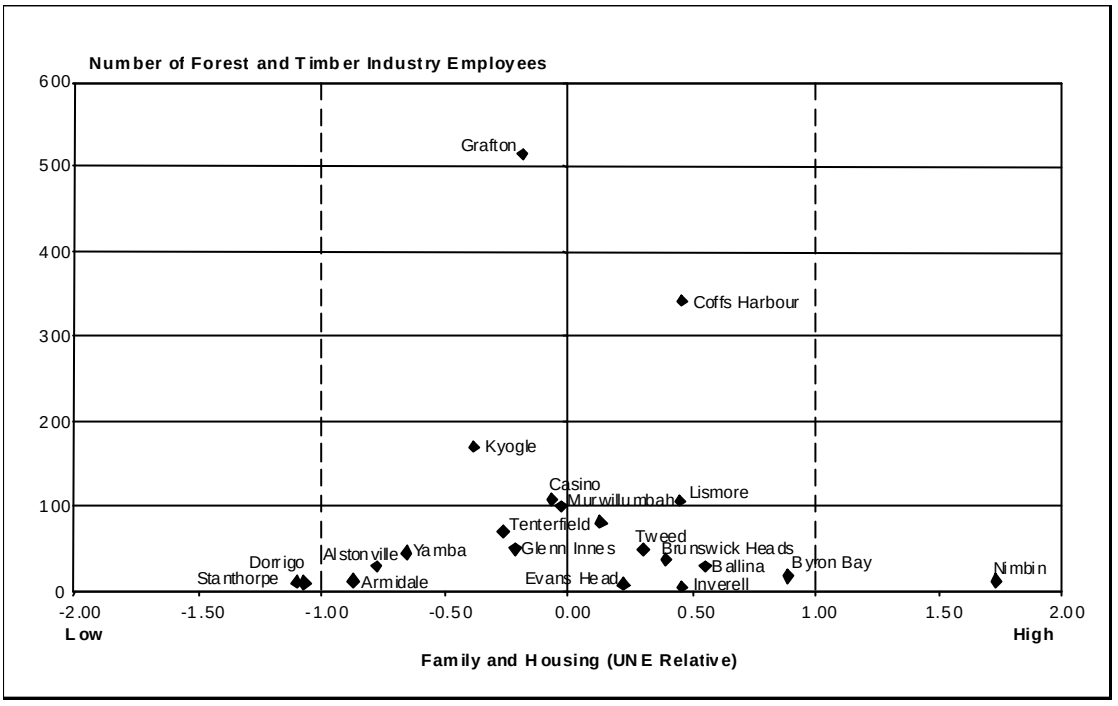


FIGURE 3M - COMMUNITY SENSITIVITY INDEX: FAMILY & HOUSING AGAINST NUMBER OF FOREST INDUSTRY EMPLOYEES (NSW RURAL RELATIVE)

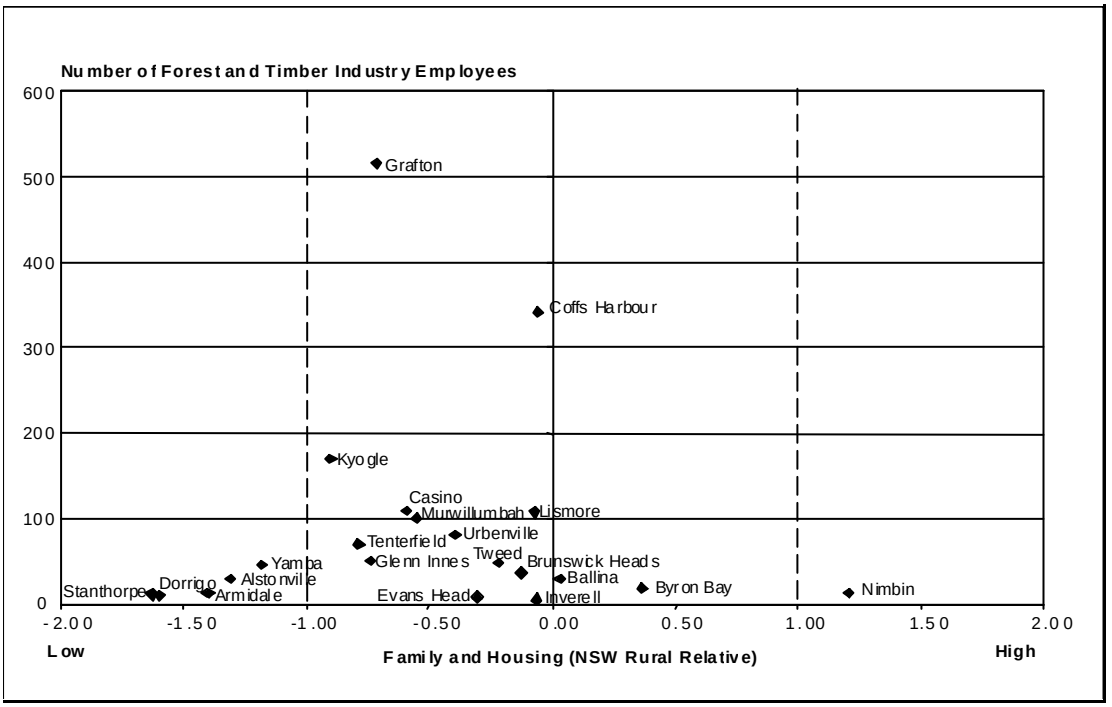


FIGURE 3N - COMMUNITY SENSITIVITY INDEX: FAMILY & HOUSING AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (UNE RELATIVE)

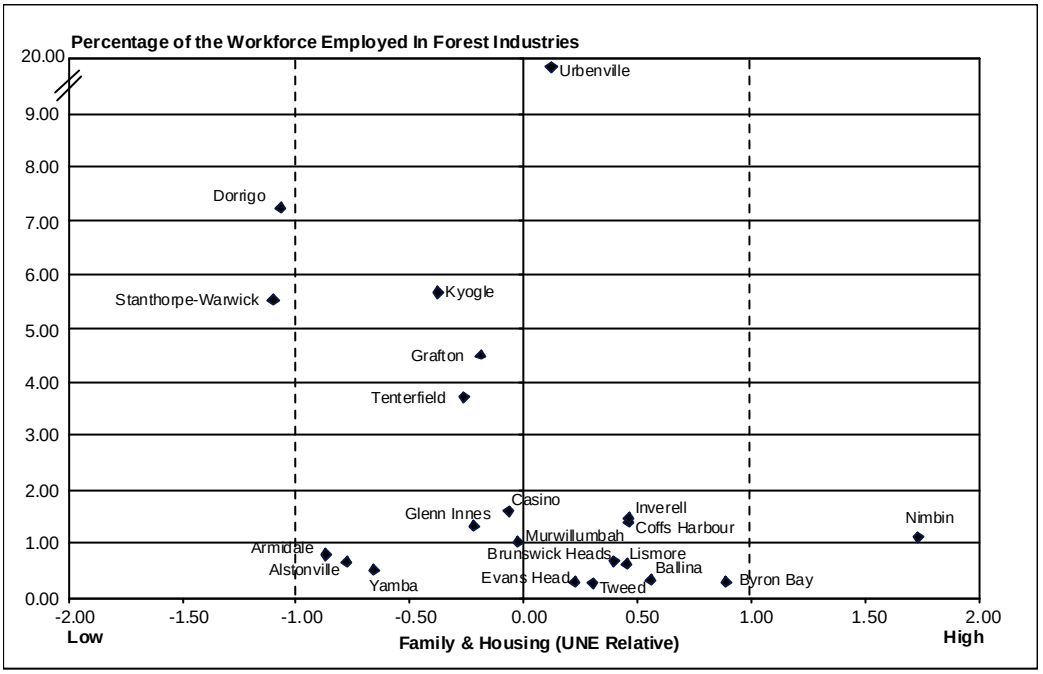


FIGURE 3O - COMMUNITY SENSITIVITY INDEX: FAMILY & HOUSING AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (NSW RURAL RELATIVE)

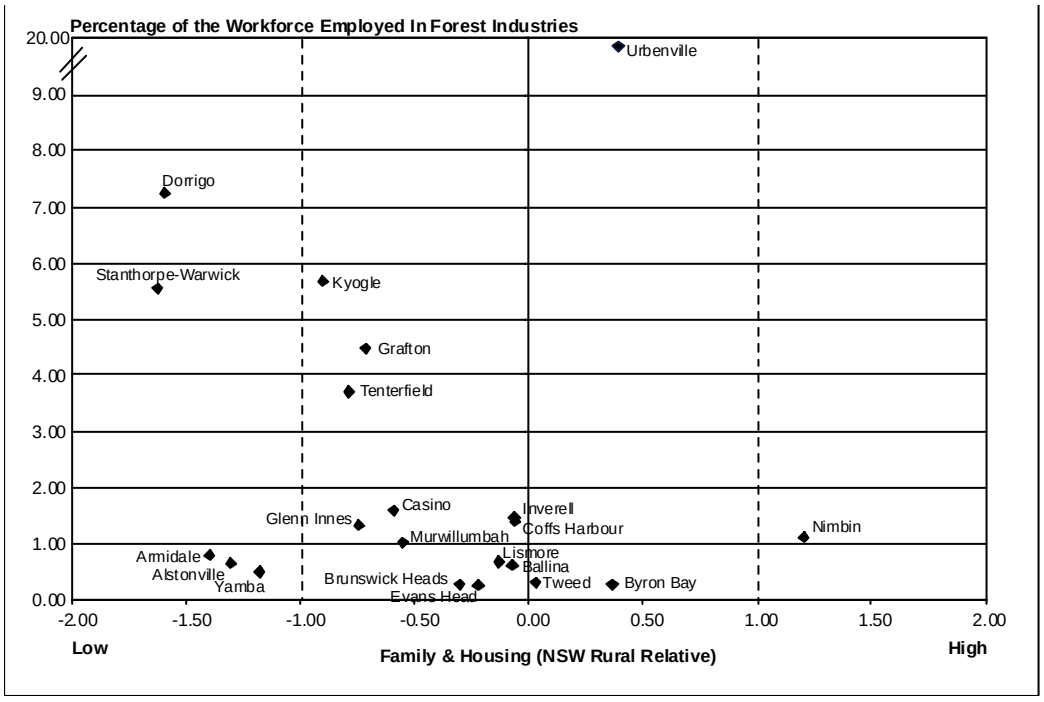


FIGURE 3P - COMMUNITY SENSITIVITY INDEX: AGE DEPENDENCY AGAINST NUMBER OF TIMBER INDUSTRY EMPLOYEES (UNE RELATIVE)

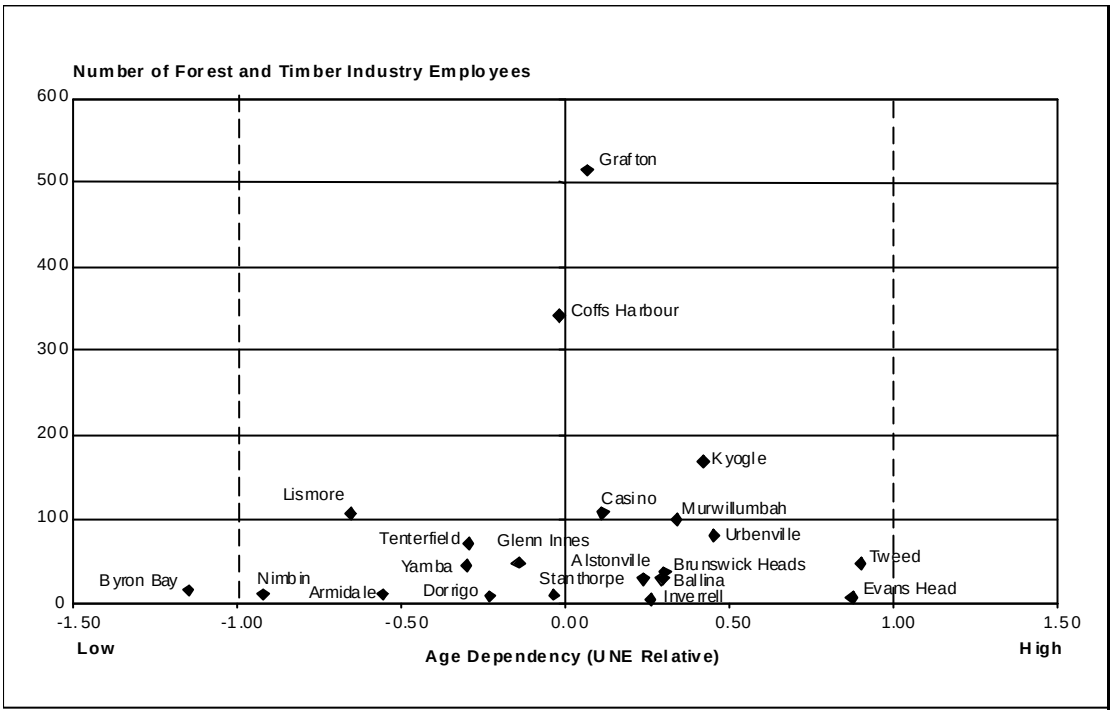


FIGURE 3Q - COMMUNITY SENSITIVITY INDEX: AGE DEPENDENCY AGAINST NUMBER OF TIMBER INDUSTRY EMPLOYEES (NSW RURAL RELATIVE)

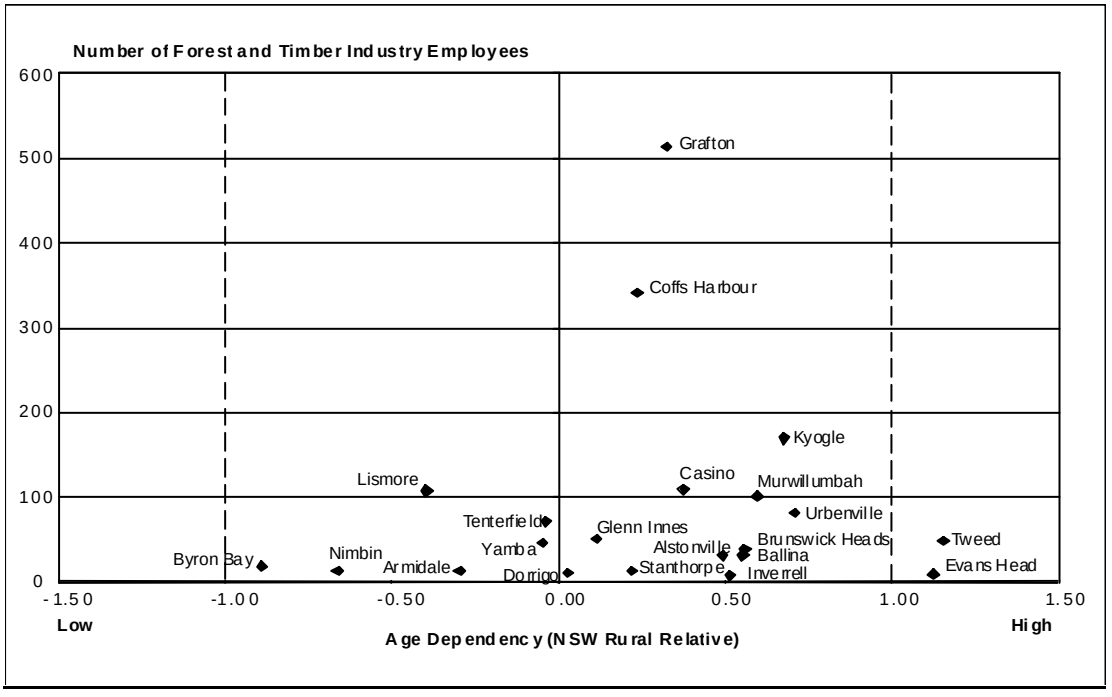


FIGURE 3R - COMMUNITY SENSITIVITY INDEX: AGE DEPENDENCY AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (UNE RELATIVE)

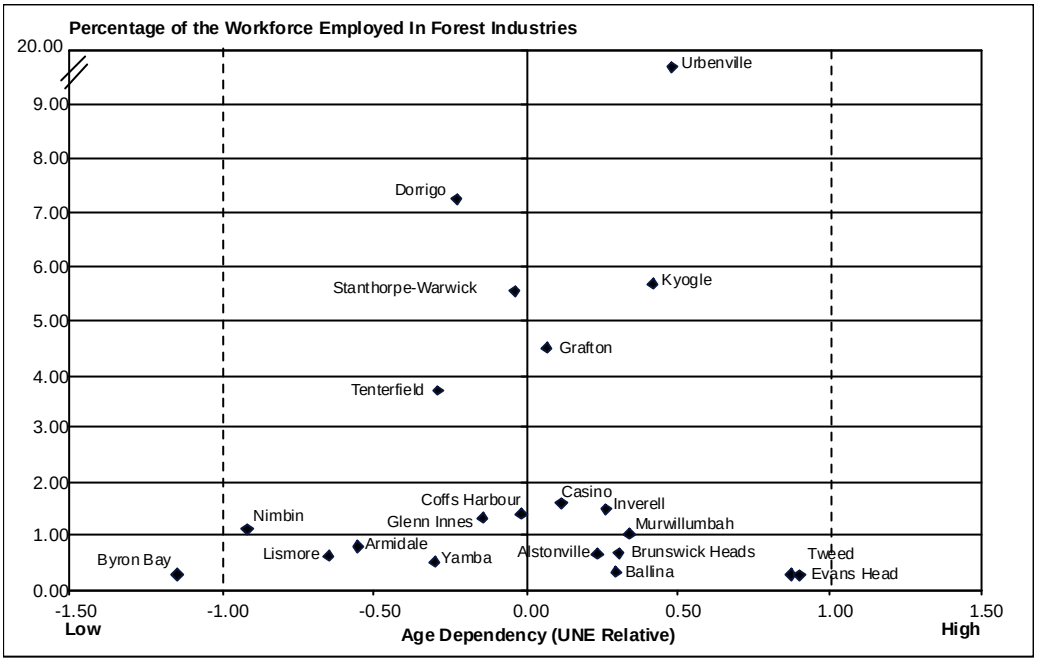
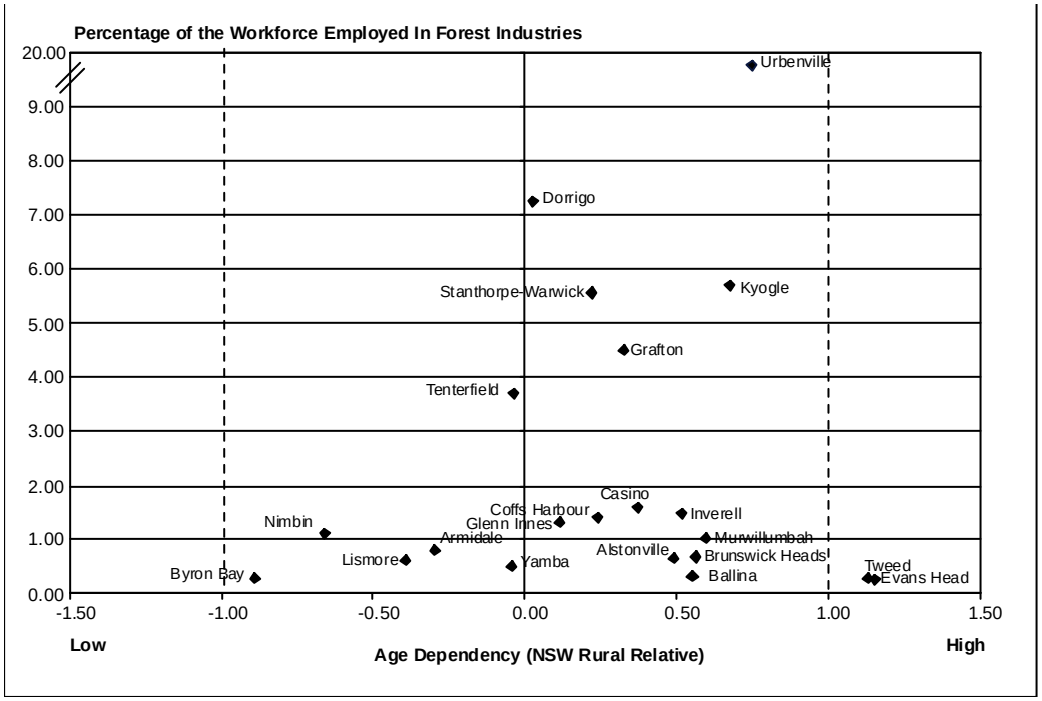


FIGURE 3S - COMMUNITY SENSITIVITY INDEX: AGE DEPENDENCY AGAINST PERCENTAGE OF WORKFORCE EMPLOYED IN FOREST INDUSTRIES (NSW RURAL RELATIVE)



4. THE UNE FORESTRY INDUSTRY

4.1. INTRODUCTION

The task in this section is to provide some background on the UNE 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 UNE 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.

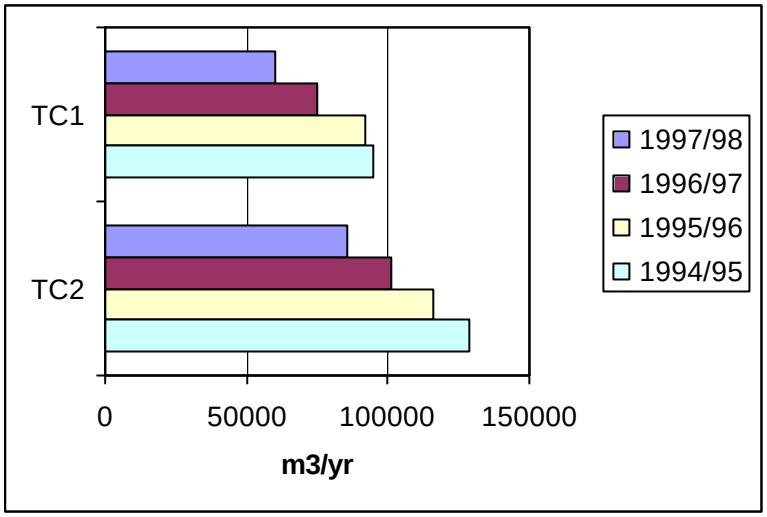
- Expand into other types of timber processing.
- Seek to operate at a lower throughput but produce higher value products.
- Seek alliances/amalgamations with other similarly affected firms.
- Take over some operations that are currently out-sourced. or
- Seek higher return niche markets.

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 including those associated with FISAP,
- 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 management entrepreneurial capacity, and
- the nature of and Government Structural Adjustment Packages that were 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 the industry under the prevailing, uncertain wood supply arrangements.

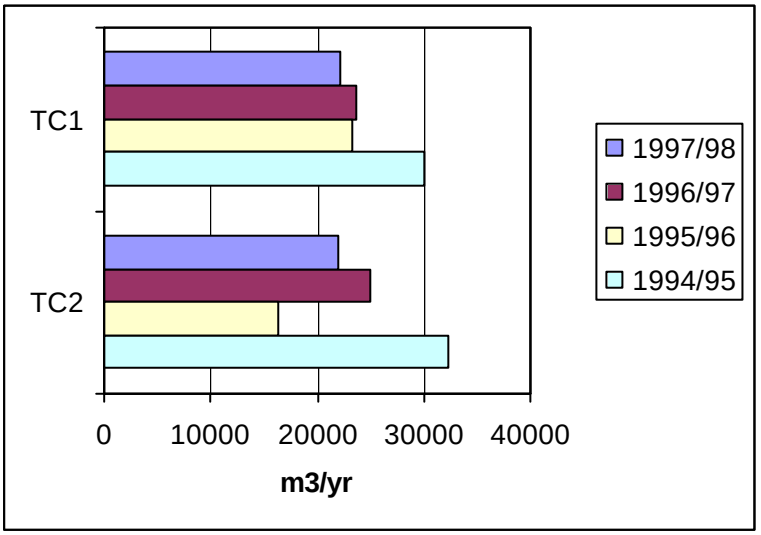
FIGURE 4-A: VOLUME OF HIGH VALUE LARGE BY TIMBER CATCHMENT



Source: State Forests NSW

In Figure 4-A and Figure 4-B the changes in the volume of high value large and small logs are shown for the two timber catchments in the UNE 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.

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



Source: State Forests NSW

4.2. THE INTERIM FOREST AGREEMENT

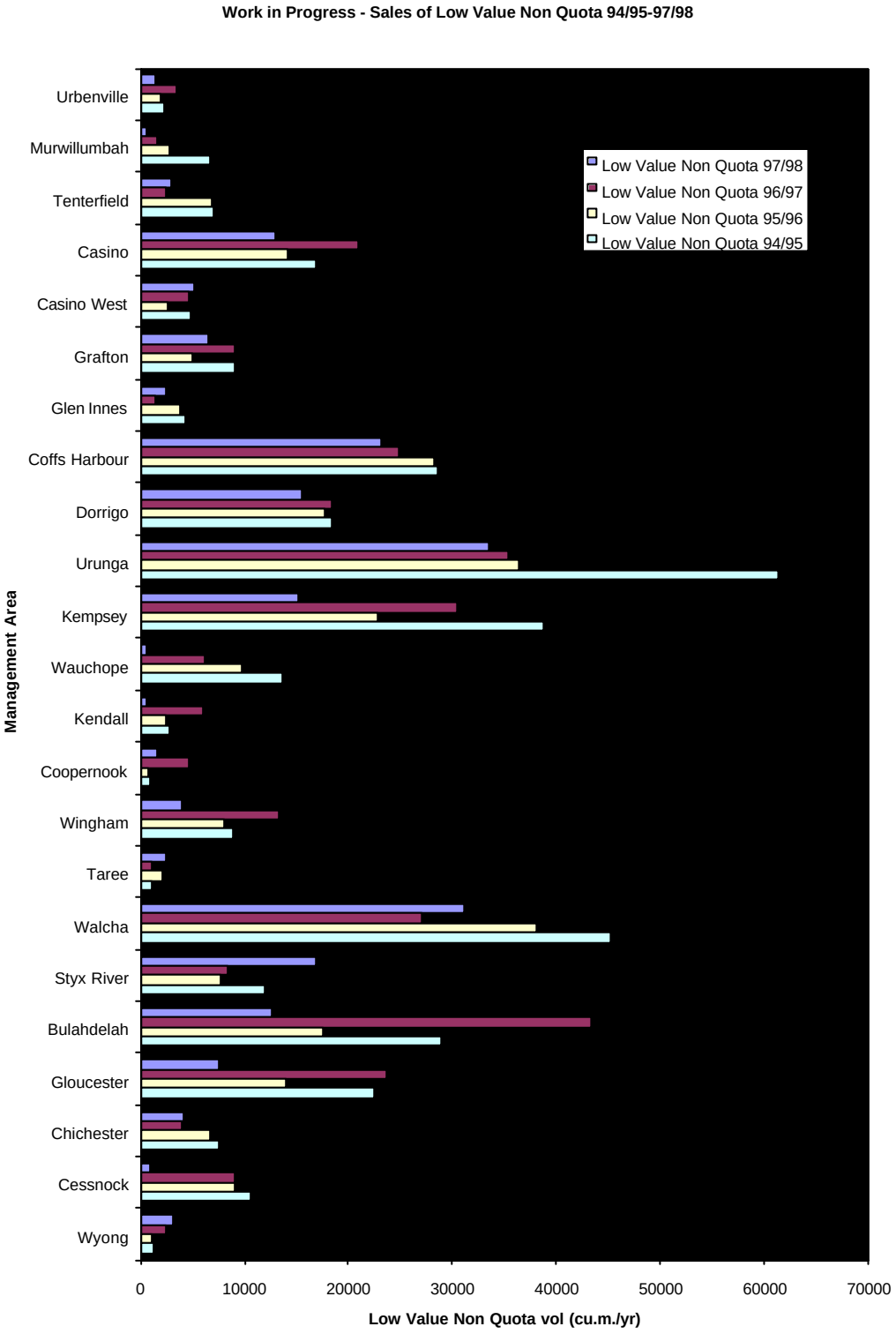
The Interim Forestry Assessment (IFA) of the NSW Government was the result of the investigation. The key outcomes of the Governments deliberations were a reduction in the supply logs to millers and processors, but the uncertainty of supply was also addressed. The main features of the IFA that impacted 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. there was 60 per cent reduction in

sawlog supply in the Northern region, a 65 per cent reduction in the Southern region and a 31 per cent reduction in the Eden region relative to the 1995/96 levels.

- 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 five 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 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.

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



Source: State Forests NSW

- Approval for State Forests NSW 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 notable that as yet, there have not been any major initiatives in this region to make use of the mill residues and low grade wood that presently is mostly unused. The limited use of this resource distinguishes this region from other regions in NSW where either wood chipping or processing into board products occurs.

4.3.1. Mill adjustments and closures

The forest-based industries generally suffered a decline in income in adapting to the IAP decisions. For most mills, there was a decrease in throughput and reduced employment, although many endeavoured to keep most staff at least partly employed.

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. Furthermore, increased access to wood from private property forests has allowed many operators to subsequently increase throughput and employment.

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 will be less 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 by SFNSW. 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 by SFNSW.

These restructuring did come with a cost attached. The percentage reduction in wood supply in the UNE 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, Ford Timbers closed the Drake site and transferred operations to the Urbenville plant; Fennings closed their Armidale operations in favour of Walcha; and a number of plants were closured within the Boral network. 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 not as well known or readily available as that from public lands. Further, the extent and quality of the resource is not as well know 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 UNE, it is likely that the proportion of wood supplied from private property is approaching 50 per cent of the wood used (see below).

The limited amount of information available to CARE for seven mills in the UNE region (about 25 per cent of the industry) showed that the amount of wood taken from private property had increased by 65 per cent from 1994-95 to 1996-97. Private property wood represented 31 per cent of their wood supply in 1996-97.

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 200,000m^3 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 UNE 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. State Forests have withdrawn almost all of their administrative staff into the regional centres (Casino and Coffs Harbour in the Upper North East and Wauchope, Taree and Walcha in the Lower North East).

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 State Forests' 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 market oriented rather than production oriented.

SFNSW predict the same trend in milling 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. State Forests are interested in investigating the feasibility of green residue power production. They believe this is a possibility that has not been adequately researched.

Currently, most of the residue that is not being burnt is being exported out of Newcastle or Brisbane as chip. This appears to be the extent of the current management of sawmill waste. 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.[1]

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.

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

[1] 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.

- 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[2]. The model does, however, contain indicative information on the following:

[2] Note that information contained in the log value-pricing model relates to quota logs processed at quota mills.

- 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[3], 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.

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

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

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 UNE CRA 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 UNE region in 1997/98. Overall wood usage was 445,000m^3 of which more than half 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 outside the North East regions.

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

	HQL	HQS	LQ	Pulp	Total
SFNSW resource supplied	145,476	51,807	70,853	29,699	**297,835**
UNE resource processed					
SFNSW	135,826	56,016	51,939	827	**244,608**
Private	80,000	40,000	80,000	0	**200,000**
Total	**215,826**	**96,016**	**131,939**	**827**	**444,608**

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 UNE CRA region in 1997/98. In total almost 50,000m^3 of logs from SFNSW was exported to other regions for processing (almost all of it destined to the LNE 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 200,000m^3 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.

Some green sawn timber was further processed at two separate board plants at Kyogle and Murwillumbah. One mill uses both hardwood and softwood in their operations. The amount of softwood used has been included in the estimates of the amount of wood processed in the UNE region.

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 UNE 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

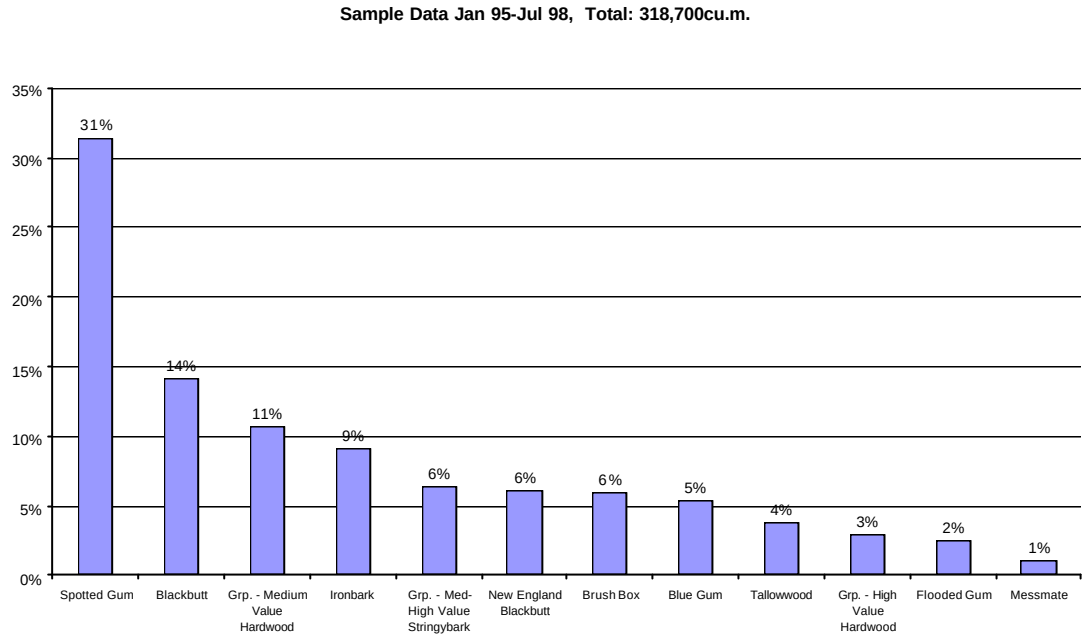
Item	UNE
Hardwood Output Value*	$117,558,155**
Hardwood Mill Employment	811
Hardwood Logging Employment	177
SF Hardwood Employment	191

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

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

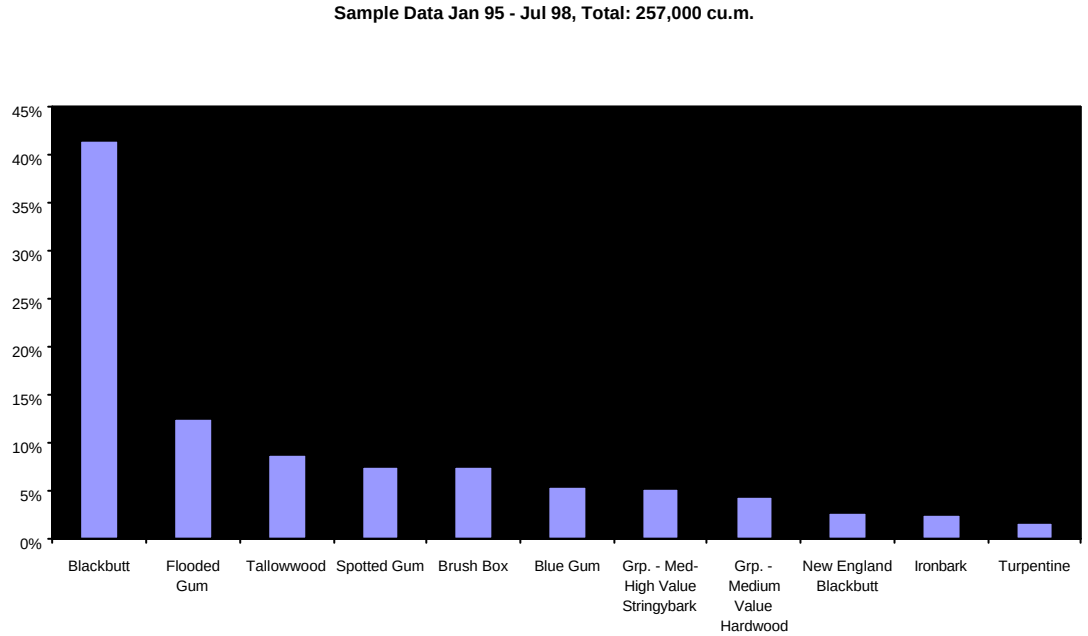
In Figure 4-D and Figure 4-E the species mix cut in the UNE region are shown for each timber catchment respectively. In both catchments, there is a range of species available for milling providing an opportunity for mills to specialise and to match particular species to particular market requirements.

FIGURE 4-D: SPECIES MIX: TIMBER CATCHMENT 1 (UNE)



Source: SFNSW

FIGURE 4-E: SPECIES MIX: TIMBER CATCHMENT 2 (UNE)



Source: SFNSW

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 CRA 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 the FRAMES model 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.

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 UNE region. Adjustments had to be made to account for the trade in wood among the CRA regions. For 1997/98, a net amount of 50,000m^3 of wood was traded from the UNE to the LNE CRA region. For the alternative reference points, except the State position and maximum JANIS, the level of exports and imports by log grade were maintained at the same proportions as occurred in 1997/98.

In contrast to the other reference points the State position involved net imports of HQL logs since the UNE regions was disproportionately affected by the reference point. Advice was obtained from SFNSW on the likely allocation of total available SFNSW timber supplies between the UNE CRA region and the LNE CRA region. It was assumed that some quota quality logs, smalls, girders, poles/piles and veneer would be exported from the LNE CRA 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 CRA region to be processed in the LNE CRA region. No trade in wood was included in the maximum JANIS case.

Relative to the base case (298,000 m^3), the SFNSW wood supply levels, from the UNE CRA region, for the different reference points vary between 365,000 m^3 (23 per cent above the 1997/98 level) and 88,000 m^3 (30 per cent of the 1997/98 level). The total wood levels that could be processed in the UNE CRA region for the different reference points would vary from 15 per cent above the 1997/98 level to 35 per cent below the 1997/98 level.

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

Scenario	HQL	HQS	LQ	Pulp	Total
178,000m^3 (Maximum wood supply)					
SFNSW resource supplied	182,354	65,503	87,147	29,699	364,703
UNE resource processed					
SFNSW	172,944	72,952	62,419	827	309,141
Private	80,000	40,000	80,000	0	200,000
Total	252,944	112,952	142419	827	509,141
129,000m^3					
SFNSW resource supplied	133,804	47,934	65,245	29,699	276,682
UNE resource processed					
SFNSW	119,946	53,415	58532	827	232,720
Private	80,000	40,000	80,000	0	200,000
Total	199,946	93,415	138532	827	432,720
109,000m^3 (State preferred scenario)					
SFNSW resource supplied	108,800	37,407	78,754	29,699	254,660
UNE resource processed					
SFNSW	128,422	43,200	52,368	827	224,817
Private	80,000	40,000	80,000	0	200,000
Total	208,422	83,200	132,368	827	424,817
104,000m^3					
SFNSW resource supplied	103,866	37,304	49,699	29,699	220,568
UNE resource processed					
SFNSW	98,273	42,012	34,825	827	175,937
Private	80,000	40,000	80,000	0	200,000
Total	178,273	82,012	114,825	827	375,937
46,000m^3 (Full JANIS)[a]					
SFNSW resource supplied	45,835	17,252	23,804	827	87,718
UNE resource processed					
SFNSW	45,835	17,252	23,804	827	87,718
Private	80,000	40,000	80,000	0	200,000
Total	125,835	57,252	103,804	827	287,718

[a] Under this scenario, there is no trade in wood and all of the wood produced in this region is processed in the region.

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 UNE, there is predicted to be a decline in

SFNSW's supply of high quality large and high quality smalls but also a small increase 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. Initially, that is likely to involve reduced throughput and employment pending the implementation of new industry developments.

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 UNE CRA REGION

Scenario	Mill Output Value*	Mill Employment	Logging Employment	Total Employment
	$m	No.	No.	No.
Base case (135,826 m^3)	117.558	811	177	988
178,000m^3	135.650	922	201	1123
129,000m^3	113.854	790	173	963
109,000m^3	111.536	777	162	939
104,000m^3	100.846	692	151	843
46,000m^3	76.569	540	118	658

- In this table, output is valued at the market. It includes the processing of some softwood by one mill.

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.	% change
178,000m^3	18.092	111	24	135	13.7
129,000m^3	-3.704	-21	-4	-25	-2.5
109,000m^3	-6.022	-34	-15	-49	-5.0
104,000m^3	-16.712	-119	-26	-145	-14.9
46,000m^3	-40.989	-271	-59	-212	-21.5

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: UNE

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 UNE 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 UNE 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, 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 that are related to forestry were compiled into 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 UNE.

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 0.

For the base year, the total volume of hardwood processed was 444,608 m^3. This resulted in hardwood products valued at $110.158m (ex mill gate). Included in that production was a small amount of softwood for one plant using both hardwood and softwood.

The freight associated with shipping those products to their markets (either traders or processors) is shown separately as ‘downstream freight’, which amounted to $7.398m.

The wood supply for processing was derived from three sources:

- UNE HWD Forestry is the log supply from the UNE, SFNSW that is processed in the UNE region.
- UNE SWD Forestry is the supply of softwood logs to those predominantly hardwood processors.
- UNE PP Forestry is the supply of logs from private property in the UNE CRA region.

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 the 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 – UNE Logging/Haulage – which relates to that timber logged in the UNE region and milled in the UNE region. That component of the timber that is logged in the UNE region but milled in the LNE or other regions falls in the UNE Logging/Haulage (other sales) sector.

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

Log supplies to the value of:	\$16.835m
Log, snig and haul cost of:	\$17.929m
Milling operations (net of log and logging costs) to the value of:	\$75.393m
For the base case, these comprise a total ex-mill value of:	**\$110.158m**

The hardwood operations described also contributed:

- \$78.158m to value added,
- \$29.264m of payments to households, and
- employment for 1191 people.

Softwood log supply and milling

These activities are all plantation-based and comprise the forestry operations, log, snig and haul, and milling activities. In the base case, the softwood forestry totalled \$5.111m of which \$1.04m was supplied to hardwood mills. Logging operations for the supply to softwood mills amounted to \$4.192m and the milling operations were valued at \$26.078m, net of log and logging costs.

The softwood operations contributed:

- \$25.265m to value added,
- \$8.805m of payments to households, and
- employment for 269 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 number of ABS sources. These activities were estimated to contribute:

- $56.355m to gross output net of the value of local wood used.
- $22.800m to value added.
- $15.586m to household wage and salary earnings.
- employment for 759 people.
-

Activities not related to UNE 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 – UNE 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 $20m in 1997-98, but does not lead to any forest product outputs within the scope of this investigation.

SFNSW has some administration in the UNE that is of an overhead nature and not directly attributed to the production of logs. The Regional Office operations at Coffs Harbour was shown separately in this analysis (UNE HWD Forestry Office Exp) and involved an expenditure in 1997-98 of $4.753m.

The export of logs between the UNE and LNE (UNE HWD Forestry (other sales)) amounted to $1.978m plus $0.733m of other licence fees earned by SFNSW; and associated logging activities (UNE HWD Logging (other Sales)) of $3.345m.

Thus, in this analysis, the economic activities of log processing have been defined as those that occur in the region irrespective of the source of logs - the UNE processing sector includes the processing of both UNE sourced logs and some logs imported from the LNE.

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 (380,000) along with an estimate of their daily expenditure ($43.53) associated with the visit to a State Forest.

Total expenditure was therefore estimated at $16.541m. 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 $10.726m 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 19,200 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 $1.26m 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 to determine the local value of $1.068m (LVAP: excluding selling costs estimated by Hassall and Associates at $10 per head).

Hassall and Associates that indicated a value of $2.158m for 1997-98 estimated **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 $0.5m 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 **Error! Reference source not found.** along with an indication of the contributed share of the UNE region.

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

	Direct Effect		Total Impact		UNE
	Value	% of UNE	Value	% of UNE	TOTAL
Gross Output ($m)					
Hardwood Milling etc.	117.6	1.4	193.7	2.3	
Softwood Milling etc.	35.1	0.4	57.2	0.7	
Other Activities	46.0	0.6	90.3	1.1	
Secondary Processing	56.4	0.7	95.9	1.2	
Total	**255.1**	**3.1**	**437.2**	**5.3**	**8,293.4**
Value Added ($m)					
Hardwood Milling etc.	82.3	1.4	124.7	2.1	
Softwood Milling etc.	25.7	0.4	38.0	0.6	
Other Activities	17.6	0.3	42.6	0.7	
Secondary Processing	22.8	0.4	44.2	0.7	
Total	**148.5**	**2.5**	**249.5**	**4.2**	**5,948.5**
Household Income ($m)					
Hardwood Milling etc.	31.1	1.2	54.2	2.0	
Softwood Milling etc.	9.0	0.3	15.7	0.6	
Other Activities	10.1	0.4	24.3	0.9	
Secondary Processing	15.6	0.6	27.1	1.0	
Total	**65.8**	**2.5**	**121.3**	**4.5**	**2,676.5**
Employment (no.)					
Hardwood Milling etc.	1,262	1.1	2,234	2.0	
Softwood Milling etc.	277	0.3	557	0.5	
Other Activities	385	0.3	973	0.9	
Secondary Processing	759	0.7	1,252	1.1	
Total	**2,683**	**2.4**	**5,017**	**4.5**	**110,490**

- Overall, the forest-related activities represent around 4.5 per cent of the UNE economy.
- The general relationship between total and direct impacts is in the 1.7 to 1.9 range.
- Hardwood forestry operations generate approximately 40-45 per cent of the total impact.
- Secondary processing is the next most important activity after hardwood milling.

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.

Population Census employment in forestry, logging and processing	**2089**
Total employment in impact estimates	2683
Less employment in private property, apiary, tourism, mining, grazing and downstream freight	440
CRA for UNE equivalent employment estimate	**2240**

This suggests a small increase in employment in the forestry-related industries in the UNE since the 1996 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 wood sources from private land have been accessed but there will be a limit to that opportunity. 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 achieved as readily as the additional supplies of wood from private land have been in the recent 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 Table 4-C) and are summarised below:

- 129,000m^3 of quota logs. This translates to the processing of 432,720m^3 of logs or a reduction in total log supply of 11,888m^3 equivalent to a reduction of 2.7 per cent from the 1997-98 base case.
- 104,000m^3 of quota logs. This translates to the processing of 375,937m^3 of logs or a reduction in total log supply of 68,671m^3 equivalent to a reduction of 15.4 per cent from the 1997-98 base case.
- 178,000m^3 of quota logs. This translates to the processing of 509,141m^3 of logs or an increase in total log supply of 64,890m^3 equivalent to an increase of 14.6 per cent on the 1997-98 base case.
- 46,000m^3 of quota logs. This translates to the processing of 287,718m^3 of logs or a reduction in total log supply of 156,533m^3 equivalent to a reduction of 35.2 per cent from the 1997-98 base case.
- 109,000m^3 of quota logs equivalent to the State position. This translates to the processing of 424,817m^3 of logs or a reduction in total log supply of 19,791m^3 equivalent to a reduction of 4.5 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 in Attachment 7 and summarised in **Error! Reference source not found.**. (Note that the base case included 135,800 m^3 of quota logs and the processing of 444,600 m^3 in total).

For the State position (109,000 m^3) in the UNE, the effects, compared with the 1997-98 base case, were a 4.5 per cent reduction in employment, 4.2 percent reduction in household income and a 6.3 per cent reduction in value added. Those changes would translate into around 106 jobs at an average earnings of almost $22,700.

The 104,000 m^3 point indicates reductions slightly larger than those for the State position.

The 129,000 m^3 point is little removed from the base case and shows only minor changes relative to the base level.

The larger changes are shown in the 178,000 m^3 and 46,000 m^3 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.

In the case of an increase in the supply of quota logs to 178,000 m^3, the effects are in the range of 12.8 per cent increase in household income to a 14.9 per cent increase in value added.

For the decrease in quota log supply to the full JANIS level of 46,000 m^3, the effects are in the range of a 32 per cent reduction in household income to a 35 per cent reduction in value added. Those changes would translate into around 750 jobs at an average earnings of almost $24,900.

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

Information Point	Direct Effect	Total Flow-on	**TOTAL IMPACT**
GROSS OUTPUT IMPACTS ($m)			
178,000	19.5	11.2	30.7
129,000	-3.9	-2.2	-6.1
State	-8.5	-4.1	-12.6
104,000	-17.9	-10.2	-28.1
46,000	-46.3	-27.4	-73.7
VALUE ADDED IMPACTS ($m)			
178,000	13.4	6.2	19.6
129,000	-2.8	-1.2	-4.0
State	-6.0	-2.3	-8.3
104,000	-12.3	-5.7	-17.9
46,000	-31.0	-15.2	-46.2
HOUSEHOLD INCOME IMPACTS ($m)			
178,000	4.0	3.4	7.4
129,000	-0.7	-0.7	-1.4
State	-1.1	-1.3	-2.4
104,000	-3.6	-3.1	-6.7
46,000	-10.3	-8.3	-18.6
EMPLOYMENT IMPACTS (No.)			
178,000	143	143	286
129,000	-24	-28	-53
State	-53	-53	-106
104,000	-151	-131	-282
46,000	-398	-351	-749

6. SUMMARY AND CONCLUSIONS

The UNE region is one with a rich natural resource base that has supported a number of primary industries including forestry. The native forests of the region have been 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 and the types of products that are produced.

A major challenge in the development of the UNE 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. To date the approach adopted has been to reserve selected areas from logging, resulting in a contraction of log supply. It is now recognised that the development of plantation forestry will be needed to replace the shortfall from native forests. SFN\SW estimate that to replace this shortfall will take between 15 and 25 years.

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. Forest policy can play a major role in encouraging value adding. However, successful value adding 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 throughout the region from the many small communities in the forest areas to 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 UNE 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 UNE region.

Over recent decades, the UNE 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 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.

The disparity in trends among communities is a reflection of the economic development opportunities available to them. The social profiles have indicated those that currently have a high dependence on the forestry industry in some form. These include Kyogle, Grafton, Tenterfield, Dorrigo, Urbenville and Casino. It is likely that changes in forest policy will have an noticeable effect on these communities. Those effects may be positive in cases where firms concentrate their activities, eg. Urbenville and Kyogle, or negative where there is a mill closure, eg. Tenterfield.

The UNE economy has grown and become much more diversified over the past decades. The growth focus has shifted from primary and manufacturing industries to 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 there has been a diversification into new farm crops and related processing and marketing.

Employment in the region was about 110,000 in 1996. Unemployment continues to be relatively high at around 20,000 and concentrated in the coastal areas. A reduction in unemployment will involve actions throughout the region, as displaced workers from inland areas tend to drift to the coastal areas.

The timber industry, with over 2,000 jobs directly and 1,700 jobs indirectly support jobs widely distributed throughout the region. Thus, this industry can be significant in assisting to reduce unemployment particularly as it is a key industry in many of the hinterland and tableland areas where job growth has been low.

In the early 1990s, the timber industry in the UNE 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 an Interim Forest Agreement (IFA) that came into effect from July 1996. The IFA involved a reduction in wood supply of 35 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 processing and marketing operations.

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 a sharp 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.

The 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 UNE region to estimate the flow-on effects associated with the timber industry.

In 1997-98, it was estimated that 444,608 m^3 of logs were processed in the region of which 200,000 m^3 was sourced from private property.

In 1997-98, the timber industry was estimated to contribute $149m directly to Gross Regional Product and employ almost 2,700 people. This amounted to about 2.5 per cent of the economy and employment. This was boosted by flow-on effects of a further $100m to Gross Regional Product and 2,300 jobs. In total, the industry represented about 4.5 per cent of the UNE economy.

About one-half of the timber industry contribution to Gross Regional Product was made by the growing, harvesting and processing of native hardwood. Softwood plantations, secondary processing of wood products and other activities in forests (visitors, apiary, grazing and mining) each contributed around 16 per cent of the timber industry contribution to Gross Regional Product.

It is notable that as yet, the UNE region has had limited opportunities to extract value from the various types of low-grade wood and mill residues from either native forests or plantation sources. That represents further development opportunities for the forestry industry.

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 27 per cent more than the base case to 64 per cent less. The scenario negotiated among the various State agencies involved in forestry involved a reduction in logs from SFNSW of eight 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 200,000m^3. 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 15 per cent to a reduction of 35 per cent. The State agency scenario involved a reduction in log supply of five per cent to provide a total of 424,817m^3 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 $19.6m (15.7%) to a reduction of $46.2m (37%), while the State scenario was a decrease of $8.3m (6.6%). In employment terms, the change ranged from an increase of 286 jobs (12.8%) to a decline of 749 jobs (33.5%) with the State scenario involving a loss of 106 jobs (4.7%).

The above values can be related to the economy as a whole, which in 1995-96 produced a Gross Regional Product of $4,948m and employed 110,490 people.

The work also involved an analysis of the social characteristics of the UNE region. This involved identifying major social catchments focused on Tweed Heads, Lismore and Coffs Harbour. In addition, 27 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.

The communities of Grafton and Kyogle had high absolute numbers of people working in the forestry industry, high numbers relative to total employment, relatively low educational levels and a relatively unskilled workforce and a high age dependency. This combination would indicate a high sensitivity to change in their economy.

Dorrigo and Tenterfield have a high level of forestry employment relative to total employment and low education levels and a relatively unskilled workforce. This suggests a high sensitivity to changes in employment, particularly in Dorrigo where unemployment is high.

Casino has a high absolute level of forestry employment and low education levels and a relatively unskilled workforce.

Coffs Harbour has a high absolute number of people working in the forestry industry and a high age dependency.

Urbenville, while not high in absolute or relative dependence on forestry employment is characterised by low education levels and a relatively unskilled workforce, a high age dependence and a high sensitivity to family and housing values.

These findings are indicative of a situation where the impacts of changes in forestry policy and in the forest industry will have differential impacts among the communities within the UNE CRA 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*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 *ith* row of the matrix and the purchases by sector, *j*, from all other sectors are included in the *jth* 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 IMPpacts) 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:

a	=	*average weekly expenditure on a particular item*
A	=	*average weekly expenditure on broad expenditure group*
C	=	*country households*
NSW	=	*all households in NSW.*

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	=	*sector 1....109*
R	=	*regional employment*
N	=	*national employment.*

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.

References

ABS (1993-1997 various quarters), *Consumer Price Index,* Australian Government Publishing Service, Canberra. Catalogue No. 6401.0.

ABS (1996a), *1993-94 Household Expenditure Survey, Australia: Detailed Expenditure Items,* Australian Government Publishing Service, Canberra. 6535.0

ABS (1996b), *1993-94 Household Expenditure Survey, Australia: States and Territories,* Australian Government Publishing Service, Canberra. Cat 6533.0.

ABS (1996c), *Manufacturing Industry, New South Wales, 1993-94,* Australian Government Publishing Service, Sydney. Catalogue No. 8221.1.

ABS (1996d), *Survey of Employee Earnings and Hours, Australia,* Unpublished Average Weekly Earnings data for NSW and the 4 digit Industry Level, May 1996

ABS(1997a), *Agstats, Small Area Agricultural Commodity Data, 1995-96,* Australian Government Publishing Service, Canberra. Catalogue No. 7119.0

ABS (1997b), *Australian National Accounts: Input-Output Tables, 1993-94,* Australian Government Publishing Service, Canberra. Catalogue No. 5209.0.

ABS (1997c), *Australian National Accounts: State Accounts, 1995-96,* Australian Government Publishing Service, Canberra. Catalogue No. 5220.0.

ABS (1997d), *Manufacturing Industry, New South Wales, 1995-96,* Australian Government Publishing Service, Sydney. Catalogue No. 8221.1.

ABS (1997e), *Mining Industry, Australia, 1995-96,* Australian Government Publishing Service, Canberra. 8414.0.

ABS (1997f), *Regional Statistics, New South Wales: 1997,* Australian Government Publishing Service, Canberra.1304.1.

ABS (1997g), *Value of Agricultural Commodities Produced, New South Wales, 1995-96,* Australian Government Publishing Service, Sydney. Catalogue No. 7503.1

ABS (1998a), *1996 Census of Population and Housing,* Customised Table - Employed Labour Force - Industry by Labour Force Status, Sydney.

ABS (1998b), *1996 Census of Population and Housing,* Customised Table - Median Individual Income by Employed Persons by Industry Division for NSW SDs and SLAs, Sydney.

Bayne, B.A. and West, G.R. (1988), *GRIT - Generation of Regional Input-Output Tables: User's Reference Manual, Australian Regional Developments No. 15,* Office of Local Government, Department of Immigration, Local Government and Ethnic Affairs, Australian Government Publishing Service, Canberra.

Fenton, D.M. (1998) - *Resource, forest industry and employee catchment analysis for the South East Queensland RFA Region,* Report prepared for the Department of Primary Industries and Energy, Canberra.

Hewings, G.J.D. (1985), *Regional Input-Output Analysis, Volume 6. Scientific Geography Series,* Sage Publications, Beverley Hills.

Jensen, R.C. (1980), 'The concept of accuracy in input-output models', *International Regional Science Review 5(2),* 139-54.

Jensen, R.C., Mandeville, T.D. and Karunaratne, N.D. (1979), *Regional Economic Planning: Generation of Regional Input-Output Analysis,* Croom Helm London.

Jensen, R.C. and West, G.R. (1986), *Input-Output for Practitioners, Vol.1, Theory and Applications,* Office of Local Government, Department of Local Government and Administrative Services, AGPS, Canberra.

Leslie, D. and Powell, R.A. (1990), *Rural Community Development Study: Oberon, Year One Report: The Economic Impact of Forestry,* Forestry Commission of New South Wales, Bathurst.

Morison, J.B. and West, G.R. (1988), *An Input-Output Table for the Canberra Community,* National Capital Development Commission, Canberra.

West, G.R. (1992), *Input-Output Analysis for Practitioners: Version 7 User's Guide,* Department of Economics, University of Queensland, Brisbane.

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, architectual 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
		1996	1991	NSW Gni	Local Gri	State	ndustry	**Total State**	Local	**Change**
Sheep	1.9	892	1042	0.54	0.86	68	-548	**-480**	330	**-150**
Grains	0.2	156	76	2.20	2.04	5	87	**92**	-12	**79**
Beef cattle	4.9	2283	2855	0.70	0.80	185	-1041	**-856**	285	**-571**
Dairy cattle	1.3	854	886	1.00	0.96	57	-59	**-1**	-30	**-32**
Pigs	2.0	144	164	0.83	0.88	11	-39	**-28**	8	**-20**
Poultry	0.7	100	111	0.86	0.91	7	-23	**-16**	5	**-10**
Other agriculture	3.3	5060	4686	0.98	1.08	304	-420	**-117**	490	**373**
Services to agric.; hunting	1.3	372	359	0.91	1.04	23	-55	**-32**	45	**13**
Forestry and logging	3.0	496	488	1.07	1.02	32	3	**35**	-26	**8**
Commercial fishing	3.3	561	631	1.00	0.89	41	-44	**-3**	-67	**-70**
Coal; oil and gas	0.0	0	0	0.86	0.00	0	0	**0**	0	**0**
Iron ores	0.0	0	0	0.00	0.00	0	0	**0**	0	**0**
Non-ferrous metal ores	0.1	32	95	0.74	0.34	6	-31	**-25**	-38	**-63**
Other mining	1.4	224	138	1.11	1.62	9	7	**16**	70	**85**
Services to mining	0.1	26	60	1.03	0.43	4	-2	**2**	-36	**-34**
Meat and meat products	2.5	1659	1619	1.14	1.02	105	128	**233**	-192	**40**
Dairy products	1.7	368	302	0.94	1.22	20	-38	**-19**	84	**66**
Fruit and vegetable products	0.7	95	56	1.04	1.69	4	-1	**2**	37	**39**
Oils and fats	0.7	18	21	0.88	0.87	1	-4	**-2**	0	**-3**
Flour and cereal foods	0.0	3	0	1.02	0.00	0	0	**0**	3	**3**
Bakery products	1.0	582	579	1.00	1.00	38	-37	**1**	2	**3**
Confectionery	0.1	13	7	0.96	1.81	0	-1	**0**	6	**6**
Other food products	2.0	772	567	1.18	1.36	37	67	**104**	101	**205**
Soft drinks, cordials, syrups	0.2	20	35	0.94	0.56	2	-4	**-2**	-13	**-15**
Beer and malt	1.4	83	124	0.67	0.67	8	-49	**-41**	1	**-40**
Wine and spirits	0.0	6	3	1.52	1.99	0	1	**2**	2	**3**
Tobacco products	0.1	4	0	0.69	0.00	0	0	**0**	4	**4**
Textile fibres, yarns etc	0.1	14	19	0.92	0.75	1	-3	**-1**	-3	**-5**
Textile products	0.6	121	72	0.74	1.67	5	-24	**-19**	68	**48**
Knitting mill products	0.1	8	8	0.56	1.01	1	-4	**-4**	4	**0**
Clothing	0.6	406	438	1.04	0.93	28	-11	**17**	-50	**-33**
Footwear	0.3	29	30	0.68	0.95	2	-11	**-10**	8	**-2**
Leather and leather products	1.0	82	101	0.80	0.81	7	-26	**-20**	1	**-19**
Sawmill products	3.6	834	593	1.38	1.41	38	186	**225**	16	**241**
Other wood products	1.7	759	1195	0.87	0.63	78	-239	**-161**	-275	**-437**
Pulp, paper and paperboard	0.0	0	6	0.81	0.00	0	-2	**-1**	-5	**-6**
Paper bags and products	0.1	10	10	1.16	0.99	1	1	**2**	-2	**0**
Printing; services to printing	0.4	365	306	1.08	1.20	20	4	**24**	36	**60**
Publishing; recorded media etc	1.0	663	569	1.34	1.16	37	157	**194**	-100	**94**
Petroleum and coal products	0.2	16	16	0.84	0.98	1	-4	**-3**	2	**0**
Basic chemicals	0.1	27	31	0.74	0.89	2	-10	**-8**	5	**-3**
Paints	0.2	18	20	0.92	0.90	1	-3	**-2**	0	**-2**
Pharmaceuticals etc	0.1	26	19	1.08	1.39	1	0	**1**	6	**7**
Soap and detergents	0.4	21	3	0.58	5.97	0	-2	**-1**	19	**17**
Cosmetics and toiletries	0.7	37	34	0.98	1.06	2	-3	**-1**	3	**2**
Other chemical products	1.1	77	35	0.79	2.23	2	-9	**-7**	50	**42**
Rubber products	0.2	24	28	1.22	0.85	2	4	**6**	-10	**-4**
Plastic products	0.2	91	121	0.84	0.75	8	-27	**-19**	-11	**-30**
Glass and glass products	0.7	87	89	0.89	0.98	6	-16	**-10**	8	**-2**

Sector		Employment		Growth		Component				Total
		1996	1991	NSW Gni	Local Gri	State	ndustry	**Total State**	Local	**Change**
Ceramic products	0.8	106	172	0.78	0.62	11	-49	**-38**	-28	**-66**
Cement, lime and concrete slurry	1.4	137	174	0.66	0.79	11	-70	**-59**	22	**-37**
Plaster; other concrete products	1.1	170	184	0.77	0.93	12	-54	**-43**	29	**-13**
Non-metallic min. products nec	0.6	51	48	0.98	1.06	3	-4	**-1**	4	**3**
Iron and steel	0.3	159	127	0.86	1.25	8	-26	**-18**	50	**32**
Basic non-ferrous metals etc	0.1	23	3	0.81	7.00	0	-1	**-1**	20	**19**
Structural metal products	0.8	390	399	0.93	0.98	26	-53	**-27**	18	**-9**
Sheet metal products	0.2	67	68	0.98	0.97	4	-6	**-2**	0	**-2**
Fabricated metal products	0.6	366	361	1.03	1.01	23	-12	**11**	-6	**5**
Motor vehicles and parts etc	0.2	176	171	0.92	1.03	11	-25	**-14**	19	**5**
Ships and boats	0.6	103	107	0.68	0.96	7	-41	**-34**	30	**-4**
Railway equipment	0.1	7	3	0.56	2.01	0	-2	**-2**	5	**3**
Aircraft	0.4	52	64	1.35	0.82	4	18	**22**	-34	**-12**
Scientific etc equipment	0.5	83	54	1.12	1.54	4	3	**7**	22	**29**
Electronic equipment	0.2	65	72	0.95	0.90	5	-8	**-3**	-4	**-7**
Household appliances	0.1	18	38	0.77	0.47	2	-11	**-9**	-11	**-20**
Other electrical equipment	0.2	66	77	0.69	0.86	5	-29	**-24**	13	**-11**
Agricultural, mining etc machinery	0.5	143	94	2.26	1.52	6	113	**119**	-70	**49**
Other machinery and equipment	0.5	218	227	0.66	0.96	15	-91	**-76**	67	**-9**
Prefabricated buildings	1.1	53	0	0.00	0.00	0	0	**0**	53	**53**
Furniture	0.6	384	273	1.23	1.40	18	45	**63**	48	**111**
Other manufacturing	1.4	295	275	0.76	1.07	18	-83	**-65**	85	**20**
Electricity	1.2	599	917	0.67	0.65	59	-363	**-304**	-14	**-318**
Gas	0.1	10	36	0.68	0.28	2	-14	**-12**	-14	**-26**
Water, sewerage & drainage	0.9	252	175	0.53	1.44	11	-94	**-82**	160	**77**
Residential building	1.3	5415	5508	1.18	0.98	357	661	**1018**	-1111	**-93**
Other construction	0.8	2559	2256	0.91	1.13	146	-357	**-210**	514	**303**
Wholesale trade	0.7	4802	4805	1.02	1.00	312	-237	**75**	-79	**-3**
Retail trade	1.2	16077	15179	1.02	1.06	985	-701	**284**	614	**898**
Mechanical repairs	1.3	2578	1355	1.71	1.90	88	875	**963**	260	**1223**
Other repairs	1.1	415	325	1.16	1.28	21	31	**52**	38	**90**
Accom. & restaurants	1.6	8339	7307	1.17	1.14	474	750	**1224**	-192	**1032**
Road transport	1.1	2462	2463	0.92	1.00	160	-348	**-188**	188	**0**
Rail & other transport	0.6	350	676	0.74	0.52	44	-218	**-174**	-152	**-326**
Water transport	0.6	92	94	1.01	0.98	6	-5	**1**	-2	**-1**
Air and space transport	0.2	150	168	1.08	0.89	11	2	**13**	-31	**-18**
Transport srvs, storage	0.5	765	467	1.20	1.64	30	62	**93**	206	**298**
Communication services	0.9	1920	1725	1.24	1.11	112	311	**423**	-227	**195**
Banking	0.7	1510	1723	0.98	0.88	112	-144	**-33**	-181	**-213**
Non-bank finance	0.8	348	405	0.76	0.86	26	-124	**-97**	40	**-58**
Financial asset investors	0.4	56	62	1.58	0.91	4	32	**36**	-41	**-6**
Insurance	0.4	386	535	0.90	0.72	35	-88	**-53**	-96	**-149**
Services to finance etc	0.4	348	361	1.07	0.96	23	0	**24**	-36	**-13**
Ownership of dwellings	0.0	0	0	0.00	0.00	0	0	**0**	0	**0**
Other property services	1.2	1885	1630	1.03	1.16	106	-63	**43**	211	**254**
Scientific research etc	0.4	1077	1244	1.31	0.87	81	301	**381**	-549	**-167**
Legal, accounting srvs	0.6	2550	1852	1.35	1.38	120	531	**651**	48	**698**
Other business services	0.9	2333	1494	1.49	1.56	97	641	**738**	101	**839**
Public administration	0.9	4103	4297	0.90	0.95	279	-704	**-425**	231	**-194**
Defence	0.1	105	128	0.81	0.83	8	-33	**-24**	2	**-22**
Education	1.1	9010	7225	1.10	1.25	469	264	**733**	1052	**1785**
Health services	1.1	9037	7779	1.10	1.16	505	307	**811**	446	**1257**

Sector		Employment		Growth		Component				Total
		1996	1991	NSW Gni	Local Gri	State	ndustry	**Total State**	Local	**Change**
Community services	1.2	3086	1626	1.52	1.90	105	744	**849**	611	**1460**
Motion picture, radio etc	0.7	385	347	1.25	1.11	23	64	**86**	-48	**38**
Libraries, museums, arts	1.1	807	435	1.39	1.85	28	142	**171**	201	**371**
Sport, gambling etc	0.8	1035	975	1.43	1.06	63	356	**419**	-359	**60**
Personal services	1.1	2215	1715	1.27	1.29	111	346	**458**	43	**500**
Other services	0.8	1768	1625	1.04	1.09	105	-43	**63**	81	**143**
TOTAL	**1.0**	**110502**	**100559**	**1.06**	**1.10**	**6522**	**355**	**6877**	**3066**	**9943**

ATTACHMENT 4: DETAILED SOCIAL IMPACTS TABLES

ATTACHMENT 5: VISITOR EXPENDITURE ALLOCATIONS

	UPPER NORTH EAST	
Visitor Numbers:		
National Parks		
State Forests		
Total	**1**	**380,000**
Expenditure per visitor	43.53	43.53
	$	$'000
Expenditure Item:		
Car	10.62	4035.600
Fares	0.00	0.000
Accommodation	0.00	0.000
Meals	9.58	3640.400
Shopping	8.49	3226.200
Other	14.84	5639.200
Total	43.53	16541.400
Cost Components:		
Car		
Fuel (imports)	3.40	1291.39
Taxes	4.89	1856.38
Retail margin	2.23	847.48
Transport Margin	0.11	40.36
Shopping		
Shopping (imports)	4.67	1774.41
Taxes	1.10	419.41
Retail margin	2.59	983.99
Transport Margin	0.13	48.39
Other		
Other (imports)	1.04	394.74
Taxes	0.21	78.95
Retail margin	1.63	620.31
Transport Margin	0.09	33.84
Communication	0.74	281.96
Health	0.74	281.96
Entertainment	10.39	3947.44
Accommodation	0.00	0.00
Meals from cafes etc	9.58	3640.40
Transport	0.00	0.00
Total	**43.53**	**16541.40**
Allocation to IO Sectors:		
RETAIL	6.45	2451.78
ACCOM/REST	9.58	3640.40
TRANSPORT	0.32	122.58
COMMUNICATION	0.74	281.96
HEALTH	0.74	281.96
ENTERTAINMENT	10.39	3947.44
TAXES	6.20	2354.73
IMPORTS	9.11	3460.55
TOTAL	**43.53**	**16541.40**
Summary:		
Local Impacts	28.23	10,726.12
Imports/Taxes: No Impacts	15.30	5,815.28
TOTAL	**43.53**	**16,541.40**

ATTACHMENT 6: BASE CASE ECONOMIC IMPACTS – UNE

GROSS OUTPUT IMPACTS ($'000)

	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	**TOTAL IMPACT**
Local UNE hardwood milling:					
UNE HWD Forestry	9,141	2,845	4,937	7,782	**16,923**
UNE SWD Forestry	1,040	214	150	363	**1,403**
UNE PP Forestry	6,654	2,374	4,548	6,923	**13,577**
UNE Logging/Haulage	17,929	4,735	9,678	14,413	**32,342**
UNE Milling (net)	75,393	13,198	28,109	41,307	**116,700**
TOTAL (mill gate)	**110,158**	**23,365**	**47,422**	**70,787**	**180,945**
Downstream Freight	7,398	2,042	3,324	5,367	**12,765**
TOTAL UNE HWD MILLING	**117,556**	**25,408**	**50,746**	**76,154**	**193,710**
Activities not directly related to local milling:					
SF Visitors	10,726	4,308	6,580	10,889	**21,615**
SF Grazing	1,068	230	664	894	**1,962**
SF Apiary	2,158	478	1,107	1,585	**3,743**
SF Mining	500	92	107	199	**699**
UNE HWD Plantation Establishment	20,781	12,935	7,603	20,538	**41,319**
UNE HWD Forestry Office Exp	4,753	1,770	3,425	5,195	**9,948**
UNE HWD Forestry (Other sales)	2,711	843	1,464	2,307	**5,018**
UNE Logging/Haulage (Other sales)	3,345	883	1,805	2,689	**6,033**
TOTAL					
Local UNE Softwood Milling:					
UNE SWD Forestry	4,071	836	586	1,422	**5,493**
UNE Logging/Haulage	4,192	1,120	2,229	3,349	**7,540**
UNE Milling (net)	26,078	5,203	11,485	16,689	**42,767**
TOTAL (mill gate)	**34,341**	**7,160**	**14,300**	**21,460**	**55,801**
Downstream Freight	799	220	359	579	**1,378**
TOTAL UNE SWD MILLING	**35,140**	**7,380**	**14,659**	**22,039**	**57,179**
Secondary Processing (net)	56,355	14,184	25,387	39,571	**95,926**

GROSS OUTPUT MULTIPLIERS

	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT	Type II Ratio
Local UNE hardwood milling:						
UNE HWD Forestry	1.000	0.311	0.540	0.851	1.851	1.851
UNE SWD Forestry	1.000	0.205	0.144	0.349	1.349	1.349
UNE PP Forestry	1.000	0.357	0.684	1.040	2.040	2.040
UNE Logging/Haulage	1.000	0.264	0.540	0.804	1.804	1.804
UNE Milling (net)	1.000	0.175	0.373	0.548	1.548	1.548
TOTAL (mill gate)	**1.000**	**0.212**	**0.430**	**0.643**	**1.643**	**1.643**
Downstream Freight	1.000	0.276	0.449	0.725	1.725	1.725
TOTAL UNE HWD MILLING	**1.000**	**0.216**	**0.432**	**0.648**	**1.648**	**1.648**
Activities not directly related to local milling:						
SF Visitors	1.000	0.402	0.613	1.015	2.015	2.015
SF Grazing	1.000	0.215	0.622	0.837	1.837	1.837
SF Apiary	1.000	0.221	0.513	0.734	1.734	1.734
SF Mining	1.000	0.184	0.215	0.399	1.399	1.399
UNE HWD Plantation Establishment	1.000	0.622	0.366	0.988	1.988	1.988
UNE HWD Forestry Office Exp	1.000	0.372	0.721	1.093	2.093	2.093
UNE HWD Forestry (Other sales)	1.000	0.311	0.540	0.851	1.851	1.851
UNE Logging/Haulage (Other sales)	1.000	0.264	0.540	0.804	1.804	1.804
TOTAL						
Local UNE Softwood Milling:						
UNE SWD Forestry	1.000	0.205	0.144	0.349	1.349	1.349
UNE Logging/Haulage	1.000	0.267	0.532	0.799	1.799	1.799
UNE Milling (net)	1.000	0.200	0.440	0.640	1.640	1.640
TOTAL (mill gate)	**1.000**	**0.208**	**0.416**	**0.625**	**1.625**	**1.625**
Downstream Freight	1.000	0.276	0.449	0.725	1.725	1.725
TOTAL UNE SWD MILLING	**1.000**	**0.210**	**0.417**	**0.627**	**1.627**	**1.627**
Secondary Processing (net)	1.000	0.252	0.450	0.702	1.702	1.702

	VALUE ADDED IMPACTS ($'000)					VALUE ADDED MULTIPLIERS (per$direct O/P effect)					
		Flow-on Effects					Flow-on Effects				
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	**TOTAL IMPACT**	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL IMPACT	Type II Ratio
Local UNE hardwood milling:											
UNE HWD Forestry	6,002	1,604	2,721	4,324	**10,326**	0.657	0.175	0.298	0.473	1.130	1.720
UNE SWD Forestry	808	127	82	210	**1,018**	0.777	0.122	0.079	0.202	0.979	1.259
UNE PP Forestry	3,889	1,358	2,507	3,864	**7,753**	0.584	0.204	0.377	0.581	1.165	1.994
UNE Logging/Haulage	11,421	2,773	5,342	8,115	**19,536**	0.637	0.155	0.298	0.453	1.090	1.711
UNE Milling (net)	56,038	7,362	15,489	22,851	**78,890**	0.743	0.098	0.205	0.303	1.046	1.408
TOTAL (mill gate)	**78,158**	**13,224**	**26,141**	**39,365**	**117,523**	**0.710**	**0.120**	**0.237**	**0.357**	**1.067**	**1.504**
Downstream Freight	4,173	1,211	1,832	3,043	**7,216**	0.564	0.164	0.248	0.411	0.975	1.729
TOTAL UNE HWD MILLING	**82,332**	**14,435**	**27,973**	**42,408**	**124,739**	**0.700**	**0.123**	**0.238**	**0.361**	**1.061**	**1.515**
Activities not directly related to local milling:											
SF Visitors	5,210	2,384	3,626	6,010	**11,221**	0.486	0.222	0.338	0.560	1.046	2.154
SF Grazing	452	141	366	507	**960**	0.424	0.132	0.343	0.475	0.899	2.121
SF Apiary	1,598	290	610	900	**2,498**	0.740	0.134	0.283	0.417	1.157	1.563
SF Mining	336	52	59	111	**447**	0.672	0.104	0.118	0.223	0.895	1.331
UNE HWD Plantation Establishment	3,303	7,517	4,190	11,707	**15,011**	0.159	0.362	0.202	0.563	0.722	4.544
UNE HWD Forestry Office Exp	2,838	1,021	1,888	2,909	**5,747**	0.597	0.215	0.397	0.612	1.209	2.025
UNE HWD Forestry (Other sales)	1,780	476	807	1,282	**3,062**	0.657	0.175	0.298	0.473	1.130	1.720
UNE Logging/Haulage (Other sales)	2,107	512	986	1,498	**3,605**	0.630	0.153	0.295	0.448	1.078	1.711
Local UNE Softwood Milling:											
UNE SWD Forestry	3,165	498	323	821	**3,986**	0.777	0.122	0.079	0.202	0.979	1.259
UNE Logging/Haulage	2,642	654	1,228	1,882	**4,524**	0.630	0.156	0.293	0.449	1.079	1.712
UNE Milling (net)	19,459	2,905	6,330	9,235	**28,694**	0.746	0.111	0.243	0.354	1.100	1.475
TOTAL (mill gate)	**25,265**	**4,057**	**7,881**	**11,938**	**37,203**	**0.736**	**0.118**	**0.229**	**0.348**	**1.083**	**1.473**
Downstream Freight	450	131	198	328	**779**	0.564	0.164	0.248	0.411	0.975	1.729
TOTAL UNE SWD MILLING	**25,716**	**4,188**	**8,079**	**12,266**	**37,982**	**0.732**	**0.119**	**0.230**	**0.349**	**1.081**	**1.477**
Secondary Processing (net)	22,800	7,407	13,991	21,398	**44,198**	0.405	0.131	0.248	0.380	0.784	1.938

	H-HOLD INCOME IMPACTS ($'000)					H-HOLD INCOME MULTIPLIERS (per$direct O/P effect)					
		Flow-on Effects					Flow-on Effects				
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	**TOTAL IMPACT**	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL IMPACT	Type II Ratio
Local UNE hardwood milling:											
UNE HWD Forestry	2,872	969	1,429	2,398	**5,270**	0.314	0.106	0.156	0.262	0.576	1.835
UNE SWD Forestry	37	79	43	123	**160**	0.036	0.076	0.042	0.118	0.154	4.301
UNE PP Forestry	2,705	833	1,317	2,150	**4,855**	0.407	0.125	0.198	0.323	0.730	1.795
UNE Logging/Haulage	5,808	1,721	2,802	4,523	**10,330**	0.324	0.096	0.156	0.252	0.576	1.779
UNE Milling (net)	17,842	4,047	8,138	12,184	**30,027**	0.237	0.054	0.108	0.162	0.398	1.683
TOTAL (mill gate)	**29,264**	**7,648**	**13,729**	**21,378**	**50,642**	**0.266**	**0.069**	**0.125**	**0.194**	**0.460**	**1.731**
Downstream Freight	1,865	721	962	1,684	**3,548**	0.252	0.098	0.130	0.228	0.480	1.903
TOTAL UNE HWD MILLING	**31,129**	**8,370**	**14,692**	**23,062**	**54,190**	**0.265**	**0.071**	**0.125**	**0.196**	**0.461**	**1.741**
Activities not directly related to local milling:											
SF Visitors	3,646	1,473	1,905	3,378	**7,024**	0.340	0.137	0.178	0.315	0.655	1.926
SF Grazing	437	79	192	271	**709**	0.410	0.074	0.180	0.254	0.664	1.621
SF Apiary	679	182	321	503	**1,182**	0.315	0.084	0.148	0.233	0.547	1.740
SF Mining	56	28	31	59	**114**	0.112	0.055	0.062	0.117	0.229	2.051
UNE HWD Plantation Establishment	1,270	4,645	2,201	6,847	**8,116**	0.061	0.224	0.106	0.329	0.391	6.393
UNE HWD Forestry Office Exp	2,042	623	992	1,614	**3,656**	0.430	0.131	0.209	0.340	0.769	1.791
UNE HWD Forestry (Other sales)	852	287	424	711	**1,563**	0.314	0.106	0.156	0.262	0.576	1.835
UNE Logging/Haulage (Other sales)	1,083	321	523	844	**1,927**	0.324	0.096	0.156	0.252	0.576	1.779
Local UNE Softwood Milling:											
UNE SWD Forestry	145	310	170	480	**626**	0.036	0.076	0.042	0.118	0.154	4.301
UNE Logging/Haulage	1,327	406	645	1,052	**2,379**	0.317	0.097	0.154	0.251	0.568	1.792
UNE Milling (net)	7,333	1,605	3,326	4,930	**12,263**	0.281	0.062	0.128	0.189	0.470	1.672
TOTAL (mill gate)	**8,805**	**2,321**	**4,141**	**6,462**	**15,267**	**0.256**	**0.068**	**0.121**	**0.188**	**0.445**	**1.734**
Downstream Freight	201	78	104	182	**383**	0.252	0.098	0.130	0.228	0.480	1.903
TOTAL UNE SWD MILLING	**9,007**	**2,399**	**4,244**	**6,644**	**15,650**	**0.256**	**0.068**	**0.121**	**0.189**	**0.445**	**1.738**
Secondary Processing (net)	15,586	4,194	7,352	11,546	**27,132**	0.277	0.074	0.130	0.205	0.481	1.741

	EMPLOYMENT IMPACTS (no.)					EMPLOYMENT MULTIPLIERS (per $'000 direct O/P effect)					
		Flow-on Effects					Flow-on Effects				
	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	**TOTAL IMPACT**	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL IMPACT	Type II Ratio
Local UNE hardwood milling:											
UNE HWD Forestry	118	38	62	101	**219**	0.013	0.004	0.007	0.011	0.024	1.854
UNE SWD Forestry	2	3	2	5	**7**	0.002	0.003	0.002	0.005	0.007	3.411
UNE PP Forestry	111	33	58	90	**201**	0.017	0.005	0.009	0.014	0.030	1.814
UNE Logging/Haulage	149	67	122	190	**339**	0.008	0.004	0.007	0.011	0.019	2.271
UNE Milling (net)	811	162	356	518	**1,329**	0.011	0.002	0.005	0.007	0.018	1.638
TOTAL (mill gate)	**1,191**	**303**	**600**	**903**	**2,094**	**0.011**	**0.003**	**0.005**	**0.008**	**0.019**	**1.758**
Downstream Freight	71	27	42	69	**140**	0.010	0.004	0.006	0.009	0.019	1.981
TOTAL UNE HWD MILLING	**1,262**	**330**	**642**	**973**	**2,234**	**0.011**	**0.003**	**0.005**	**0.008**	**0.019**	**1.771**
Activities not directly related to local milling:											
SF Visitors	174	59	83	143	**316**	0.016	0.006	0.008	0.013	0.030	1.822
SF Grazing	20	3	8	11	**31**	0.018	0.003	0.008	0.011	0.029	1.580
SF Apiary	54	7	14	21	**75**	0.025	0.003	0.006	0.010	0.035	1.394
SF Mining	3	1	1	2	**6**	0.006	0.002	0.003	0.005	0.011	1.773
UNE HWD Plantation Establishment	41	180	96	276	**317**	0.002	0.009	0.005	0.013	0.015	7.763
UNE HWD Forestry Office Exp	31	25	43	68	**99**	0.007	0.005	0.009	0.014	0.021	3.199
UNE HWD Forestry (Other sales)	35	11	19	30	**65**	0.013	0.004	0.007	0.011	0.024	1.854
UNE Logging/Haulage (Other sales)	28	13	23	35	**63**	0.008	0.004	0.007	0.011	0.019	2.271
Local UNE Softwood Milling:											
UNE SWD Forestry	8	12	7	19	**27**	0.002	0.003	0.002	0.005	0.007	3.411
UNE Logging/Haulage	29	16	28	44	**73**	0.007	0.004	0.007	0.011	0.017	2.516
UNE Milling (net)	232	64	145	210	**442**	0.009	0.002	0.006	0.008	0.017	1.903
TOTAL (mill gate)	**269**	**92**	**181**	**273**	**542**	**0.008**	**0.003**	**0.005**	**0.008**	**0.016**	**2.014**
Downstream Freight	8	3	5	7	**15**	0.010	0.004	0.006	0.009	0.019	1.981
TOTAL UNE SWD MILLING	**277**	**95**	**186**	**280**	**557**	**0.008**	**0.003**	**0.005**	**0.008**	**0.016**	**2.013**
Secondary Processing (net)	759	172	321	493	**1,252**	0.013	0.003	0.006	0.009	0.022	1.650

Rounding errors may occur

ATTACHMENT 7: INFORMATION POINTS ECONOMIC IMPACTS – UNE

UPPER NORTH EAST: ECONOMIC IMPACTS 104.000 INFORMATION POINT

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	6,623	1,886	4,406	6,291	**12,915**
UNE SWD Forestry	1,041	214	150	364	**1,404**
UNE PP Forestry	6,654	2,374	4,548	6,923	**13,577**
UNE Logging/Haulage	15,420	4,073	8,323	12,396	**27,816**
UNE Milling (net)	64,368	11,410	24,378	35,788	**100,156**
TOTAL (mill gate)	**94,107**	**19,956**	**41,805**	**61,762**	**155,868**
Downstream Freight	6,738	1,860	3,027	4,887	**11,626**
TOTAL UNE HWD MILLING	**100,845**	**21,816**	**44,833**	**66,649**	**167,494**
UNE HWD Forestry (Other sales)	2,231	635	1,484	2,119	**4,349**
UNE Logging/Haulage (Other sales)	2,685	709	1,449	2,158	**4,843**
TOTAL GROSS OUTPUT	**105,760**	**23,160**	**47,766**	**70,926**	**176,686**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	4,542	1,063	2,428	3,491	**8,034**
UNE SWD Forestry	809	127	83	210	**1,019**
UNE PP Forestry	3,889	1,358	2,507	3,864	**7,753**
UNE Logging/Haulage	9,806	2,381	4,587	6,968	**16,774**
UNE Milling (net)	47,881	6,367	13,435	19,802	**67,683**
TOTAL (mill gate)	**66,927**	**11,296**	**23,039**	**34,335**	**101,262**
Downstream Freight	3,801	1,103	1,669	2,771	**6,572**
TOTAL UNE HWD MILLING	**70,728**	**12,399**	**24,708**	**37,107**	**107,834**
UNE HWD Forestry (Other sales)	1,530	358	818	1,176	**2,706**
UNE Logging/Haulage (Other sales)	1,707	414	799	1,213	**2,920**
TOTAL VALUE ADDED	**73,965**	**13,171**	**26,324**	**39,496**	**113,460**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	2,785	642	1,276	1,918	**4,703**
UNE SWD Forestry	37	79	43	123	**160**
UNE PP Forestry	2,705	833	1,317	2,150	**4,855**
UNE Logging/Haulage	4,995	1,480	2,410	3,890	**8,885**
UNE Milling (net)	15,477	3,501	7,058	10,559	**26,036**
TOTAL (mill gate)	**26,000**	**6,535**	**12,104**	**18,639**	**44,639**
Downstream Freight	1,698	657	877	1,534	**3,232**
TOTAL UNE HWD MILLING	**27,698**	**7,192**	**12,981**	**20,173**	**47,871**
UNE HWD Forestry (Other sales)	938	216	430	646	**1,584**
UNE Logging/Haulage (Other sales)	870	258	420	677	**1,547**
TOTAL HOUSEHOLD INCOME	**29,506**	**7,666**	**13,830**	**21,496**	**51,001**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	114	25	56	81	**196**
UNE SWD Forestry	2	3	2	5	**7**
UNE PP Forestry	111	33	58	90	**201**
UNE Logging/Haulage	129	58	105	163	**292**
UNE Milling (net)	692	140	309	448	**1,141**
TOTAL (mill gate)	**1,049**	**259**	**529**	**788**	**1,836**
Downstream Freight	64	25	38	63	**128**
TOTAL UNE HWD MILLING	**1,113**	**284**	**567**	**851**	**1,964**
UNE HWD Forestry (Other sales)	39	9	19	27	**66**
UNE Logging/Haulage (Other sales)	22	10	18	28	**51**
TOTAL EMPLOYMENT	**1,174**	**302**	**605**	**907**	**2,081**

Rounding errors may occur

IMPACT CHANGES FROM BASE CASE (1997-98)

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-2,518	-959	-531	-1,490	**-4,008**
UNE SWD Forestry	1	0	0	0	**2**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-2,509	-663	-1,355	-2,017	**-4,526**
UNE Milling (net)	-11,025	-1,788	-3,731	-5,519	**-16,543**
TOTAL (mill gate)	**-16,051**	**-3,409**	**-5,616**	**-9,026**	**-25,076**
Downstream Freight	-660	-182	-297	-479	**-1,139**
TOTAL UNE HWD MILLING	**-16,711**	**-3,592**	**-5,913**	**-9,505**	**-26,216**
UNE HWD Forestry (Other sales)	-480	-208	20	-189	**-669**
UNE Logging/Haulage (Other sales)	-660	-174	-356	-531	**-1,191**
TOTAL GROSS OUTPUT	**-17,851**	**-3,974**	**-6,250**	**-10,224**	**-28,075**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-1,460	-541	-292	-833	**-2,293**
UNE SWD Forestry	1	0	0	0	**1**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-1,615	-392	-755	-1,147	**-2,762**
UNE Milling (net)	-8,157	-995	-2,054	-3,050	**-11,207**
TOTAL (mill gate)	**-11,231**	**-1,928**	**-3,102**	**-5,030**	**-16,261**
Downstream Freight	-372	-108	-163	-271	**-644**
TOTAL UNE HWD MILLING	**-11,604**	**-2,036**	**-3,265**	**-5,301**	**-16,905**
UNE HWD Forestry (Other sales)	-250	-118	11	-107	**-357**
UNE Logging/Haulage (Other sales)	-400	-97	-187	-284	**-685**
TOTAL VALUE ADDED	**-12,254**	**-2,250**	**-3,442**	**-5,692**	**-17,946**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-86	-326	-154	-480	**-567**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-813	-241	-392	-633	**-1,446**
UNE Milling (net)	-2,365	-546	-1,080	-1,626	**-3,991**
TOTAL (mill gate)	**-3,264**	**-1,113**	**-1,625**	**-2,739**	**-6,003**
Downstream Freight	-166	-64	-86	-150	**-317**
TOTAL UNE HWD MILLING	**-3,431**	**-1,178**	**-1,711**	**-2,889**	**-6,319**
UNE HWD Forestry (Other sales)	86	-71	6	-65	**21**
UNE Logging/Haulage (Other sales)	-214	-63	-103	-166	**-380**
TOTAL HOUSEHOLD INCOME	**-3,558**	**-1,312**	**-1,808**	**-3,120**	**-6,678**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-4	-13	-7	-20	**-23**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-20	-9	-17	-27	**-47**
UNE Milling (net)	-119	-22	-47	-69	**-188**
TOTAL (mill gate)	**-143**	**-44**	**-71**	**-115**	**-258**
Downstream Freight	-6	-2	-4	-6	**-13**
TOTAL UNE HWD MILLING	**-149**	**-47**	**-75**	**-121**	**-270**
UNE HWD Forestry (Other sales)	4	-3	0	-3	**1**
UNE Logging/Haulage (Other sales)	-5	-2	-5	-7	**-12**
TOTAL EMPLOYMENT	**-151**	**-52**	**-79**	**-131**	**-282**

Rounding errors may occur

UPPER NORTH EAST: ECONOMIC IMPACTS 129,000 INFORMATION POINT

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	8,340	2,540	4,763	7,303	**15,643**
UNE SWD Forestry	1,041	214	150	364	**1,405**
UNE PP Forestry	6,654	2,374	4,548	6,923	**13,577**
UNE Logging/Haulage	17,441	4,606	9,413	14,019	**31,460**
UNE Milling (net)	72,933	12,768	27,234	40,002	**112,935**
TOTAL (mill gate)	**106,409**	**22,503**	**46,108**	**68,611**	**175,020**
Downstream Freight	7,444	2,055	3,345	5,400	**12,844**
TOTAL UNE HWD MILLING	**113,853**	**24,557**	**49,453**	**74,010**	**187,863**
UNE HWD Forestry (Other sales)	2,593	790	1,481	2,271	**4,863**
UNE Logging/Haulage (Other sales)	3,307	873	1,785	2,658	**5,965**
TOTAL GROSS OUTPUT	**119,753**	**26,221**	**52,718**	**78,939**	**198,692**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	5,536	1,432	2,625	4,057	**9,594**
UNE SWD Forestry	809	127	83	210	**1,019**
UNE PP Forestry	3,889	1,358	2,507	3,864	**7,753**
UNE Logging/Haulage	11,091	2,693	5,188	7,881	**18,972**
UNE Milling (net)	54,089	7,123	15,008	22,131	**76,221**
TOTAL (mill gate)	**75,415**	**12,733**	**25,411**	**38,144**	**113,558**
Downstream Freight	4,199	1,218	1,843	3,062	**7,261**
TOTAL UNE HWD MILLING	**79,614**	**13,952**	**27,254**	**41,206**	**120,819**
UNE HWD Forestry (Other sales)	1,721	445	816	1,261	**2,983**
UNE Logging/Haulage (Other sales)	2,103	511	984	1,494	**3,597**
TOTAL VALUE ADDED	**83,438**	**14,907**	**29,054**	**43,961**	**127,399**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	2,840	865	1,379	2,244	**5,085**
UNE SWD Forestry	37	79	43	123	**160**
UNE PP Forestry	2,705	833	1,317	2,150	**4,855**
UNE Logging/Haulage	5,649	1,674	2,726	4,399	**10,049**
UNE Milling (net)	17,285	3,916	7,885	11,801	**29,086**
TOTAL (mill gate)	**28,517**	**7,367**	**13,350**	**20,717**	**49,234**
Downstream Freight	1,876	726	968	1,694	**3,570**
TOTAL UNE HWD MILLING	**30,393**	**8,093**	**14,318**	**22,411**	**52,804**
UNE HWD Forestry (Other sales)	883	269	429	698	**1,581**
UNE Logging/Haulage (Other sales)	1,071	317	517	834	**1,905**
TOTAL HOUSEHOLD INCOME	**32,347**	**8,679**	**15,264**	**23,943**	**56,290**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	117	34	60	94	**211**
UNE SWD Forestry	2	3	2	5	**7**
UNE PP Forestry	111	33	58	90	**201**
UNE Logging/Haulage	145	65	119	184	**329**
UNE Milling (net)	791	157	345	501	**1,292**
TOTAL (mill gate)	**1,165**	**292**	**584**	**875**	**2,041**
Downstream Freight	71	28	42	70	**141**
TOTAL UNE HWD MILLING	**1,236**	**319**	**626**	**945**	**2,182**
UNE HWD Forestry (Other sales)	36	11	19	29	**66**
UNE Logging/Haulage (Other sales)	27	12	23	35	**62**
TOTAL EMPLOYMENT	**1,300**	**342**	**667**	**1,009**	**2,310**

Rounding errors may occur

IMPACT CHANGES FROM BASE CASE (1997-98)

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-801	-304	-174	-478	**-1,279**
UNE SWD Forestry	1	0	0	0	**2**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-489	-129	-264	-393	**-882**
UNE Milling (net)	-2,460	-430	-876	-1,305	**-3,765**
TOTAL (mill gate)	**-3,749**	**-863**	**-1,314**	**-2,176**	**-5,925**
Downstream Freight	46	13	20	33	**79**
TOTAL UNE HWD MILLING	**-3,703**	**-850**	**-1,293**	**-2,144**	**-5,846**
UNE HWD Forestry (Other sales)	-118	-54	17	-37	**-155**
UNE Logging/Haulage (Other sales)	-38	-10	-20	-30	**-68**
TOTAL GROSS OUTPUT	**-3,858**	**-914**	**-1,297**	**-2,211**	**-6,069**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-466	-171	-96	-267	**-733**
UNE SWD Forestry	1	0	0	0	**1**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-330	-80	-154	-235	**-565**
UNE Milling (net)	-1,949	-239	-481	-720	**-2,669**
TOTAL (mill gate)	**-2,744**	**-490**	**-731**	**-1,221**	**-3,965**
Downstream Freight	26	8	11	19	**45**
TOTAL UNE HWD MILLING	**-2,718**	**-483**	**-719**	**-1,202**	**-3,920**
UNE HWD Forestry (Other sales)	-59	-30	9	-21	**-79**
UNE Logging/Haulage (Other sales)	-5	-1	-2	-3	**-8**
TOTAL VALUE ADDED	**-2,781**	**-514**	**-712**	**-1,226**	**-4,007**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-31	-104	-50	-154	**-185**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-158	-47	-76	-123	**-282**
UNE Milling (net)	-557	-131	-253	-384	**-941**
TOTAL (mill gate)	**-747**	**-281**	**-380**	**-661**	**-1,408**
Downstream Freight	12	4	6	10	**22**
TOTAL UNE HWD MILLING	**-735**	**-277**	**-374**	**-650**	**-1,386**
UNE HWD Forestry (Other sales)	31	-18	5	-13	**18**
UNE Logging/Haulage (Other sales)	-12	-4	-6	-10	**-22**
TOTAL HOUSEHOLD INCOME	**-716**	**-299**	**-375**	**-673**	**-1,390**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-1	-4	-2	-6	**-8**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-4	-2	-3	-5	**-9**
UNE Milling (net)	-20	-5	-11	-16	**-37**
TOTAL (mill gate)	**-26**	**-11**	**-17**	**-28**	**-54**
Downstream Freight	0	0	0	0	**1**
TOTAL UNE HWD MILLING	**-25**	**-11**	**-16**	**-27**	**-53**
UNE HWD Forestry (Other sales)	1	-1	0	-1	**1**
UNE Logging/Haulage (Other sales)	0	0	0	0	**-1**
TOTAL EMPLOYMENT	**-24**	**-12**	**-16**	**-28**	**-53**

Rounding errors may occur

UPPER NORTH EAST: REGIONAL ECONOMIC IMPACTS 178,000 INFORMATION POINT

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	11,600	3,769	5,511	9,280	**20,881**
UNE SWD Forestry	1,041	214	150	364	**1,405**
UNE PP Forestry	6,654	2,374	4,548	6,923	**13,577**
UNE Logging/Haulage	20,222	5,371	10,835	16,206	**36,429**
UNE Milling (net)	87,967	15,228	32,380	47,608	**135,575**
TOTAL (mill gate)	**127,485**	**26,957**	**53,425**	**80,381**	**207,866**
Downstream Freight	8,164	2,254	3,668	5,922	**14,086**
TOTAL UNE HWD MILLING	**135,649**	**29,210**	**57,093**	**86,303**	**221,952**
UNE HWD Forestry (Other sales)	2,778	902	1,320	2,222	**5,000**
UNE Logging/Haulage (Other sales)	4,735	1,258	2,537	3,794	**8,529**
TOTAL GROSS OUTPUT	**143,161**	**31,370**	**60,949**	**92,319**	**235,481**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	7,441	2,125	3,037	5,162	**12,603**
UNE SWD Forestry	809	127	83	210	**1,019**
UNE PP Forestry	3,889	1,358	2,507	3,864	**7,753**
UNE Logging/Haulage	12,805	3,137	5,972	9,109	**21,914**
UNE Milling (net)	65,242	8,497	17,845	26,341	**91,583**
TOTAL (mill gate)	**90,185**	**15,244**	**29,443**	**44,687**	**134,872**
Downstream Freight	4,605	1,336	2,022	3,358	**7,963**
TOTAL UNE HWD MILLING	**94,790**	**16,580**	**31,465**	**48,045**	**142,835**
UNE HWD Forestry (Other sales)	1,782	509	727	1,236	**3,018**
UNE Logging/Haulage (Other sales)	2,998	735	1,398	2,133	**5,131**
TOTAL VALUE ADDED	**99,570**	**17,824**	**33,590**	**51,414**	**150,983**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	3,004	1,283	1,596	2,879	**5,883**
UNE SWD Forestry	37	79	43	123	**160**
UNE PP Forestry	2,705	833	1,317	2,150	**4,855**
UNE Logging/Haulage	6,479	1,950	3,137	5,087	**11,567**
UNE Milling (net)	20,539	4,669	9,375	14,043	**34,582**
TOTAL (mill gate)	**32,765**	**8,815**	**15,468**	**24,282**	**57,047**
Downstream Freight	2,058	796	1,062	1,858	**3,915**
TOTAL UNE HWD MILLING	**34,822**	**9,611**	**16,530**	**26,140**	**60,962**
UNE HWD Forestry (Other sales)	719	307	382	689	**1,409**
UNE Logging/Haulage (Other sales)	1,517	457	735	1,191	**2,708**
TOTAL HOUSEHOLD INCOME	**37,058**	**10,375**	**17,646**	**28,021**	**65,079**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	123	51	70	120	**244**
UNE SWD Forestry	2	3	2	5	**7**
UNE PP Forestry	111	33	58	90	**201**
UNE Logging/Haulage	163	76	137	213	**376**
UNE Milling (net)	922	187	410	596	**1,519**
TOTAL (mill gate)	**1,322**	**349**	**676**	**1,025**	**2,347**
Downstream Freight	78	30	46	77	**155**
TOTAL UNE HWD MILLING	**1,400**	**379**	**723**	**1,102**	**2,502**
UNE HWD Forestry (Other sales)	30	12	17	29	**58**
UNE Logging/Haulage (Other sales)	38	18	32	50	**88**
TOTAL EMPLOYMENT	**1,468**	**409**	**771**	**1,181**	**2,648**

Rounding errors may occur

IMPACT CHANGES FROM BASE CASE (1997-98)

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
Local UNE hardwood milling:					
UNE HWD Forestry	2,459	925	574	1,499	**3,958**
UNE SWD Forestry	2	0	0	1	**2**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	2,293	636	1,158	1,794	**4,086**
UNE Milling (net)	12,574	2,031	4,271	6,301	**18,875**
TOTAL (mill gate)	**17,327**	**3,591**	**6,003**	**9,594**	**26,922**
Downstream Freight	766	211	344	555	**1,320**
TOTAL UNE HWD MILLING	**18,093**	**3,803**	**6,347**	**10,149**	**28,242**
UNE HWD Forestry (Other sales)	67	59	-144	-85	**-19**
UNE Logging/Haulage (Other sales)	1,390	374	732	1,106	**2,496**
TOTAL GROSS OUTPUT	**19,550**	**4,236**	**6,934**	**11,170**	**30,720**
Local UNE hardwood milling:					
UNE HWD Forestry	1,439	521	317	838	**2,277**
UNE SWD Forestry	1	0	0	0	**2**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	1,384	364	629	994	**2,377**
UNE Milling (net)	9,203	1,135	2,355	3,490	**12,693**
TOTAL (mill gate)	**12,027**	**2,021**	**3,302**	**5,322**	**17,349**
Downstream Freight	432	125	190	315	**747**
TOTAL UNE HWD MILLING	**12,459**	**2,146**	**3,491**	**5,637**	**18,096**
UNE HWD Forestry (Other sales)	2	33	-79	-46	**-44**
UNE Logging/Haulage (Other sales)	890	223	412	635	**1,526**
TOTAL VALUE ADDED	**13,351**	**2,402**	**3,824**	**6,226**	**19,577**
Local UNE hardwood milling:					
UNE HWD Forestry	132	315	166	481	**613**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	672	230	335	565	**1,236**
UNE Milling (net)	2,697	622	1,237	1,859	**4,555**
TOTAL (mill gate)	**3,501**	**1,166**	**1,738**	**2,905**	**6,405**
Downstream Freight	193	75	99	174	**367**
TOTAL UNE HWD MILLING	**3,693**	**1,241**	**1,838**	**3,079**	**6,772**
UNE HWD Forestry (Other sales)	-132	20	-42	-22	**-154**
UNE Logging/Haulage (Other sales)	434	136	212	347	**781**
TOTAL HOUSEHOLD INCOME	**3,995**	**1,397**	**2,008**	**3,405**	**7,399**
Local UNE hardwood milling:					
UNE HWD Forestry	5	12	7	20	**25**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	14	9	15	24	**38**
UNE Milling (net)	112	25	54	79	**190**
TOTAL (mill gate)	**131**	**46**	**76**	**122**	**253**
Downstream Freight	7	3	4	7	**14**
TOTAL UNE HWD MILLING	**138**	**49**	**80**	**129**	**268**
UNE HWD Forestry (Other sales)	-5	1	-2	-1	**-6**
UNE Logging/Haulage (Other sales)	10	5	9	15	**25**
TOTAL EMPLOYMENT	**143**	**55**	**88**	**143**	**286**

Rounding 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.

UPPER NORTH EAST: REGIONAL ECONOMIC IMPACTS 46,000 INFORMATION POINT

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	3,757	724	2,987	3,711	**7,468**
UNE SWD Forestry	1,041	214	150	364	**1,404**
UNE PP Forestry	6,654	2,374	4,548	6,923	**13,577**
UNE Logging/Haulage	12,715	3,358	6,863	10,221	**22,936**
UNE Milling (net)	46,768	8,799	18,921	27,720	**74,488**
TOTAL (mill gate)	**70,935**	**15,470**	**33,469**	**48,939**	**119,873**
Downstream Freight	5,634	1,555	2,531	4,087	**9,720**
TOTAL UNE HWD MILLING	**76,568**	**17,025**	**36,000**	**53,025**	**129,593**
UNE HWD Forestry (Other sales)	735	142	584	726	**1,461**
UNE Logging/Haulage (Other sales)	-	-	-	-	**-**
TOTAL GROSS OUTPUT	**77,303**	**17,166**	**36,585**	**53,751**	**131,055**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	2,998	416	1,646	2,063	**5,061**
UNE SWD Forestry	809	127	83	210	**1,019**
UNE PP Forestry	3,889	1,358	2,507	3,864	**7,753**
UNE Logging/Haulage	8,086	1,963	3,783	5,746	**13,831**
UNE Milling (net)	35,684	4,911	10,427	15,338	**51,022**
TOTAL (mill gate)	**51,466**	**8,775**	**18,445**	**27,220**	**78,686**
Downstream Freight	3,178	922	1,395	2,317	**5,495**
TOTAL UNE HWD MILLING	**54,643**	**9,698**	**19,840**	**29,538**	**84,181**
UNE HWD Forestry (Other sales)	587	81	322	404	**990**
UNE Logging/Haulage (Other sales)	-	-	-	-	**-**
TOTAL VALUE ADDED	**55,230**	**9,779**	**20,162**	**29,941**	**85,171**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	2,074	250	865	1,115	**3,188**
UNE SWD Forestry	37	79	43	123	**160**
UNE PP Forestry	2,705	833	1,317	2,150	**4,855**
UNE Logging/Haulage	4,119	1,220	1,987	3,208	**7,326**
UNE Milling (net)	12,027	2,702	5,478	8,180	**20,207**
TOTAL (mill gate)	**20,961**	**5,085**	**9,691**	**14,776**	**35,737**
Downstream Freight	1,420	549	733	1,282	**2,702**
TOTAL UNE HWD MILLING	**22,381**	**5,634**	**10,424**	**16,058**	**38,439**
UNE HWD Forestry (Other sales)	406	49	169	218	**624**
UNE Logging/Haulage (Other sales)	-	-	-	-	**-**
TOTAL HOUSEHOLD INCOME	**22,787**	**5,683**	**10,593**	**16,276**	**39,063**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	85	10	38	48	**133**
UNE SWD Forestry	2	3	2	5	**7**
UNE PP Forestry	111	33	58	90	**201**
UNE Logging/Haulage	118	48	87	134	**252**
UNE Milling (net)	540	108	239	348	**888**
TOTAL (mill gate)	**856**	**201**	**424**	**625**	**1,481**
Downstream Freight	54	21	32	53	**107**
TOTAL UNE HWD MILLING	**910**	**222**	**456**	**678**	**1,588**
UNE HWD Forestry (Other sales)	17	2	7	9	**26**
UNE Logging/Haulage (Other sales)	-	-	-	-	**-**
TOTAL EMPLOYMENT	**927**	**224**	**463**	**687**	**1,614**

Rounding errors may occur

IMPACT CHANGES FROM BASE CASE (1997-98)

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-5,384	-2,120	-1,950	-4,070	**-9,454**
UNE SWD Forestry	1	0	0	0	**1**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-5,214	-1,377	-2,814	-4,191	**-9,406**
UNE Milling (net)	-28,625	-4,398	-9,189	-13,587	**-42,212**
TOTAL (mill gate)	**-39,223**	**-7,896**	**-13,953**	**-21,848**	**-61,071**
Downstream Freight	-1,765	-487	-793	-1,280	**-3,045**
TOTAL UNE HWD MILLING	**-40,988**	**-8,383**	**-14,746**	**-23,129**	**-64,116**
UNE HWD Forestry (Other sales)	-1,975	-702	-879	-1,581	**-3,557**
UNE Logging/Haulage (Other sales)	-3,345	-883	-1,805	-2,689	**-6,033**
TOTAL GROSS OUTPUT	**-46,308**	**-9,968**	**-17,430**	**-27,399**	**-73,706**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-3,004	-1,187	-1,074	-2,262	**-5,265**
UNE SWD Forestry	1	0	0	0	**1**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-3,335	-810	-1,560	-2,370	**-5,705**
UNE Milling (net)	-20,354	-2,451	-5,062	-7,513	**-27,868**
TOTAL (mill gate)	**-26,693**	**-4,448**	**-7,696**	**-12,144**	**-38,837**
Downstream Freight	-996	-289	-437	-726	**-1,721**
TOTAL UNE HWD MILLING	**-27,688**	**-4,737**	**-8,133**	**-12,870**	**-40,558**
UNE HWD Forestry (Other sales)	-1,193	-394	-485	-879	**-2,072**
UNE Logging/Haulage (Other sales)	-2,107	-512	-986	-1,498	**-3,605**
TOTAL VALUE ADDED	**-30,989**	**-5,643**	**-9,604**	**-15,246**	**-46,235**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-798	-719	-564	-1,283	**-2,081**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-1,689	-500	-815	-1,315	**-3,004**
UNE Milling (net)	-5,816	-1,344	-2,660	-4,004	**-9,819**
TOTAL (mill gate)	**-8,303**	**-2,563**	**-4,039**	**-6,602**	**-14,905**
Downstream Freight	-445	-172	-229	-402	**-846**
TOTAL UNE HWD MILLING	**-8,747**	**-2,736**	**-4,268**	**-7,004**	**-15,751**
UNE HWD Forestry (Other sales)	-446	-238	-255	-493	**-939**
UNE Logging/Haulage (Other sales)	-1,083	-321	-523	-844	**-1,927**
TOTAL HOUSEHOLD INCOME	**-10,277**	**-3,295**	**-5,045**	**-8,340**	**-18,617**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-33	-28	-25	-53	**-86**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-31	-20	-36	-55	**-86**
UNE Milling (net)	-271	-54	-116	-170	**-441**
TOTAL (mill gate)	**-335**	**-102**	**-177**	**-278**	**-613**
Downstream Freight	-17	-7	-10	-17	**-33**
TOTAL UNE HWD MILLING	**-352**	**-108**	**-187**	**-295**	**-647**
UNE HWD Forestry (Other sales)	-18	-9	-11	-21	**-39**
UNE Logging/Haulage (Other sales)	-28	-13	-23	-35	**-63**
TOTAL EMPLOYMENT	**-398**	**-130**	**-221**	**-351**	**-749**

Rounding errors may occur

UPPER NORTH EAST: REGIONAL ECONOMIC IMPACTS STATE POSITION

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	8,109	2,360	5,151	7,511	**15,621**
UNE SWD Forestry	1,041	214	150	364	**1,405**
UNE PP Forestry	6,654	2,374	4,548	6,923	**13,577**
UNE Logging/Haulage	17,256	4,557	9,314	13,871	**31,127**
UNE Milling (net)	71,428	12,848	27,379	40,227	**111,656**
TOTAL (mill gate)	**104,489**	**22,354**	**46,543**	**68,896**	**173,385**
Downstream Freight	7,046	1,945	3,166	5,111	**12,157**
TOTAL UNE HWD MILLING	**111,535**	**24,299**	**49,708**	**74,007**	**185,542**
UNE HWD Forestry (Other sales)	1,315	383	836	1,218	**2,534**
UNE Logging/Haulage (Other sales)	2,263	598	1,222	1,819	**4,082**
TOTAL GROSS OUTPUT	**115,113**	**25,279**	**51,766**	**77,045**	**192,158**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	5,505	1,331	2,839	4,170	**9,674**
UNE SWD Forestry	809	127	83	210	**1,019**
UNE PP Forestry	3,889	1,358	2,507	3,864	**7,753**
UNE Logging/Haulage	10,973	2,664	5,133	7,797	**18,771**
UNE Milling (net)	52,733	7,169	15,089	22,258	**74,991**
TOTAL (mill gate)	**73,909**	**12,649**	**25,650**	**38,299**	**112,208**
Downstream Freight	3,975	1,153	1,745	2,898	**6,873**
TOTAL UNE HWD MILLING	**77,884**	**13,802**	**27,395**	**41,197**	**119,081**
UNE HWD Forestry (Other sales)	893	216	461	676	**1,569**
UNE Logging/Haulage (Other sales)	1,439	349	673	1,023	**2,462**
TOTAL VALUE ADDED	**80,216**	**14,368**	**28,528**	**42,896**	**123,112**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	3,204	804	1,492	2,295	**5,499**
UNE SWD Forestry	37	79	43	123	**160**
UNE PP Forestry	2,705	833	1,317	2,150	**4,855**
UNE Logging/Haulage	5,589	1,656	2,697	4,353	**9,942**
UNE Milling (net)	17,374	3,941	7,927	11,867	**29,241**
TOTAL (mill gate)	**28,909**	**7,313**	**13,476**	**20,788**	**49,697**
Downstream Freight	1,776	687	917	1,604	**3,380**
TOTAL UNE HWD MILLING	**30,685**	**8,000**	**14,392**	**22,392**	**53,077**
UNE HWD Forestry (Other sales)	520	130	242	372	**892**
UNE Logging/Haulage (Other sales)	733	217	354	571	**1,304**
TOTAL HOUSEHOLD INCOME	**31,938**	**8,347**	**14,988**	**23,335**	**55,273**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	132	32	65	97	**229**
UNE SWD Forestry	2	3	2	5	**7**
UNE PP Forestry	111	33	58	90	**201**
UNE Logging/Haulage	143	65	118	182	**325**
UNE Milling (net)	777	158	347	504	**1,281**
TOTAL (mill gate)	**1,164**	**290**	**589**	**879**	**2,043**
Downstream Freight	67	26	40	66	**134**
TOTAL UNE HWD MILLING	**1,232**	**316**	**629**	**945**	**2,177**
UNE HWD Forestry (Other sales)	21	5	11	16	**37**
UNE Logging/Haulage (Other sales)	19	8	15	24	**43**
TOTAL EMPLOYMENT	**1,272**	**329**	**655**	**984**	**2,256**

Rounding errors may occur

IMPACT CHANGES FROM BASE CASE (1997-98)

IMPACTS	Direct Effect	Flow-on Effects: Production Induced	Flow-on Effects: Consumption Induced	Flow-on Effects: Total Flow-on	TOTAL IMPACT
GROSS OUTPUT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-1,032	-485	214	-270	**-1,302**
UNE SWD Forestry	1	0	0	0	**2**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-674	-178	-364	-542	**-1,215**
UNE Milling (net)	-3,965	-349	-730	-1,079	**-5,044**
TOTAL (mill gate)	**-5,669**	**-1,012**	**-879**	**-1,891**	**-7,560**
Downstream Freight	-352	-97	-158	-256	**-608**
TOTAL UNE HWD MILLING	**-6,021**	**-1,109**	**-1,038**	**-2,146**	**-8,168**
UNE HWD Forestry (Other sales)	-1,395	-461	-628	-1,089	**-2,484**
UNE Logging/Haulage (Other sales)	-1,081	-286	-584	-869	**-1,951**
TOTAL GROSS OUTPUT	**-8,498**	**-1,855**	**-2,250**	**-4,105**	**-12,603**
VALUE ADDED IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	-497	-273	118	-155	**-652**
UNE SWD Forestry	1	0	0	0	**1**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-448	-109	-209	-318	**-766**
UNE Milling (net)	-3,305	-193	-401	-594	**-3,898**
TOTAL (mill gate)	**-4,249**	**-574**	**-491**	**-1,066**	**-5,315**
Downstream Freight	-199	-58	-87	-145	**-343**
TOTAL UNE HWD MILLING	**-4,448**	**-632**	**-579**	**-1,211**	**-5,658**
UNE HWD Forestry (Other sales)	-887	-260	-346	-606	**-1,493**
UNE Logging/Haulage (Other sales)	-668	-162	-313	-475	**-1,143**
TOTAL VALUE ADDED	**-6,003**	**-1,054**	**-1,237**	**-2,291**	**-8,294**
HOUSEHOLD INCOME IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	332	-165	62	-103	**229**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-218	-65	-105	-170	**-388**
UNE Milling (net)	-469	-106	-211	-317	**-786**
TOTAL (mill gate)	**-355**	**-336**	**-254**	**-589**	**-944**
Downstream Freight	-89	-34	-46	-80	**-169**
TOTAL UNE HWD MILLING	**-444**	**-370**	**-299**	**-669**	**-1,113**
UNE HWD Forestry (Other sales)	-332	-157	-182	-339	**-671**
UNE Logging/Haulage (Other sales)	-350	-104	-169	-273	**-623**
TOTAL HOUSEHOLD INCOME	**-1,126**	**-631**	**-650**	**-1,281**	**-2,407**
EMPLOYMENT IMPACTS ($'000)					
Local UNE hardwood milling:					
UNE HWD Forestry	14	-7	3	-4	**10**
UNE SWD Forestry	0	0	0	0	**0**
UNE PP Forestry	0	0	0	0	**0**
UNE Logging/Haulage	-6	-3	-5	-7	**-13**
UNE Milling (net)	-34	-4	-9	-14	**-48**
TOTAL (mill gate)	**-27**	**-13**	**-11**	**-25**	**-51**
Downstream Freight	-3	-1	-2	-3	**-7**
TOTAL UNE HWD MILLING	**-30**	**-15**	**-13**	**-28**	**-58**
UNE HWD Forestry (Other sales)	-14	-6	-8	-14	**-28**
UNE Logging/Haulage (Other sales)	-9	-4	-7	-11	**-21**
TOTAL EMPLOYMENT	**-53**	**-25**	**-29**	**-53**	**-106**

Rounding errors may occur

REFERENCES

Bray,J.R. and Mudd, W. (1998), *The Contribution of DSS Payments to Regional Income,* Technical Series Number 2, Department of Social Security, Canberra.

CARE (1996), *Micro-economic and Regional Impact Analysis*, NSW Regional Forestry Agreements Interim Assessment, Report to the Resource and Conservation Assessment Council, Sydney.

ABS (1997), *Regional Statistics, New South Wales, 1998*, Canberra, Catalogue No. 1304.1.

ABS (1998), *1996 Census of Population and Housing, Employment by SLA by 4 digit industry by usual place of residence, Australia*, Customised Matrix, Canberra. (also the equivalent from the 1981, 1986 and 1991 Censuses)

DEET (1998), *Small Area Labour Markets*, Economic Analysis Branch, Economic and Policy Analysis Section, Department of Employment, Education and Training.

DUAP (1994), *Population Projections: Non-metropolitan Areas in NSW 1991 to 2021*, Department of Urban Affairs and Planning - NSW, Sydney. (due to be updated in December 1998)

Fenton, Mark (1998), *Resource, Forest Industry and Employee Cathcment Analysis for the South East Queensland RFA region*. Report prepared for the Department of Primary Industries adnd Enegry, Canberra.