

# **INDUSTRY AND REGION ECONOMIC PROFILES**

**NSW WESTERN REGIONAL ASSESSMENTS**

SEPTEMBER 2002

**Brigalow Belt  
South**

**Stage 2**

Resource and Conservation  
Assessment Council

# **INDUSTRY AND REGION ECONOMIC PROFILES**

**NSW WESTERN REGIONAL  
ASSESSMENTS**

**BRIGALOW BELT SOUTH  
BIOREGION (STAGE 2)**

**Centre for Agricultural and Regional  
Economics and Gillespie Economics**

A project undertaken for the  
Resource and Conservation Assessment Council  
NSW Western Regional Assessments  
Project number WRA / 28

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# PROJECT SUMMARY

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This report describes a project undertaken for the Resource and Conservation Assessment Council as part of the regional assessments of western New South Wales. The Resource and Conservation Assessment Council advises the State Government on broad-based land use planning and allocation issues. An essential process for the Western Regional Assessments is to identify gaps in data information and the best ways in which to proceed with data gathering and evaluation.

## **Project objectives**

This project is one of three in the general area of socioeconomic assessment of the Brigalow Belt South Bioregion (BBSB). The work in this project has two broad functions:

- To provide descriptive and analytic information on the BBSB that offers a context in which discussion about conservation and natural resource management can take place.
- To develop a set of analytical tools that can be used to assess proposed changes in the way land is managed in the region. Three specific tools have been developed. They are:
  - Models of timber processing operations to examine the impact of proposed changes in timber milling and log supply on the industry.
  - Models of farming systems to analyse alternative land management systems on private land.
  - An input-output model with supporting data on Local Government Areas (LGAs) to undertake regional economic impact assessments of proposed changes that will affect business activity in the region.

## **Key results and products**

There is an extensive overview of the BBSB economy. The economy in total has experienced patchy economic conditions throughout the 1990s. There is little doubt that the BBSB has not shared in the growth in NSW that has been high and sustained since 1994. Growth has been concentrated in Sydney, the surrounding areas and parts of the coast. In recent times, there is evidence of an accelerated outmigration from the inland in spite of better economic circumstances in agriculture. It appears that the competitive strength of the high growth areas is impacting on inland regions through simultaneous reductions in population, employment and unemployment.

The implication of the demographic and employment change is a faster loss of people from the 15 to 25 year age group. With an impending rise in 'baby boom' retirements, further employment and population loss is likely in the coming years. There is also the possibility that regions will suffer a net loss of skills as they concentrate into the major

growth areas along with economic activity. The inland regions will fall further behind in terms of capturing scale economies and the income differentials relative to the NSW average level widens.

Within the region, there is great variation among the LGAs. The strongest being Dubbo, gaining from the large hinterland it serves and the role as a regional centre. That strength has some benefits for the southern area of the BBSB. At the other extreme, the small LGAs of Coolah, Merriwa and Yallaroi have a high dependence on broadacre agriculture and are not located on major traffic corridors that provide other business opportunities. Their capacity to reverse the negative trends is limited. The remaining LGAs have some prospects associated with their highway location and or the diversity of the agriculture they service or other factors. Most have been declining in recent times, but there is a basis for a return to growth with appropriate support and strategy.

It is notable that the region has low levels of employment in business services relative to NSW. This has implications for the capacity of the regions to develop their economy and to support their community.

The data have been used to provide the perspective on the regional economy and to build analytic models. There is an array of input-output models that can be used to assess the regional economic impacts of proposed changes on the economy.

The information on the timber industry has been updated to current levels. Since 1999, there has been an increase in the amount of cypress milled and a decrease in the ironbark. The amount logged in 2002 is planned to be 85,980 m<sup>3</sup> and is used in 13 mills, 11 of which are located in the BBSB. The estimated value of production from the BBSB mills is \$22.3m and employment in milling in the region is 209 and other supporting activities in the region bring total direct employment to 263.

The total impacts including flow-on effects amount to \$41.5m of gross output, 472 jobs and \$10.9 m in wages and salaries. This represents 1.2 percent of the BBSB economy and around 4 percent of the Coonabarabran economy where much of the activity is concentrated.

The forest areas are also used for grazing and apiary activities that have been estimated to have a value of around \$10m. The firewood and other timber producing activities that operate in the forest have not been valued at this time.

A microeconomic model of the timber industry has also been developed so that proposed changes to the industry can be assessed. That model is linked to the regional economic models to assess regional impacts of proposed changes.

Agriculture is a core industry in the BBSB and outside of Dubbo accounts for around one-half of all jobs directly and indirectly. In 1996, the value of production was \$1,916m from 4,301 establishments. The available data indicates that there has been little improvement in the values until the last two years. That improvement will be short-lived given the severe drought conditions.

Over the BBSB, broadacre grazing and cereal production is the main industry and these generate relatively weak links to other industries. In the northern areas, there is considerable diversity in the array of grain crops produced along with irrigation that provides a strong base for those economies and supporting industries.

Agricultural land use is closely linked to a range of environmental issues and there has been a substantial cultural change toward 'conservation farming' methods. The extent and significance of those changes is poorly documented, while their application in

farming appears to have been curtailed because of the modest financial situation of many farmers through the 1990s.

The work has involved the development of a set of farm models to provide a basis for understanding how conservation measures impact on farm performance. The development of these models is continuing.

A common set of data and comments has been compiled for each of the LGAs in the BBSB. This recognises that there is considerable variation among the LGA in terms of their economic structure, performance and potential. It is an important step toward refined approaches to development that tailor the actions to the needs and potential of each area.



# 1. THE STUDY AND THE BRIGALOW BELT SOUTH BIOREGION

## 1.1 THE STUDY

This report describes a project undertaken for the Resource and Conservation Assessment Council (RACAC) as part of the regional assessments of Western New South Wales. The RACAC advises the State Government on broad-based land use planning and allocation issues. An essential process for the Western Regional Assessments is to identify gaps in data information and the best ways in which to proceed with data gathering and evaluation.

This project is one of three in the general area of socioeconomic assessment of the Brigalow Belt South Bioregion (BBSB). The work in this project has two broad functions:

- To provide descriptive and analytic information on the BBSB that offers a context in which discussion about conservation and natural resource management can take place.
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  - Models of farming systems to analyse alternative land management systems on private land.
  - An input-output model with supporting data on Local Government Areas (LGAs) to undertake regional economic impact assessments of proposed changes that will affect business activity in the region.

This work builds on the work of Stage 1 in a number of ways. There is an extension of the information included in the economic profile by way of additional data, more information relating to LGAs, updating of information where possible and the further development of the analytic modelling capability. In addition, the coverage has been extended to include three more LGAs and to include a focus on private land as well as public land.

The result is that this report contains information that was included in the Stage 1 report. In most cases it has been updated or augmented with additional commentary. The

repetition that does exist occurs because it was considered desirable to provide the socioeconomic information and models in a single source document.

The work has been constrained by the flow of information from key sources. Information from the 2001 Population Census is becoming available. The economic analysis depends on detailed employment information that has been released in September that has enabled much of the basic profile information to be updated since the circulation of a draft of this report. Some further time will be needed to understand all of the implications of those analyses. The ABS undertook an agricultural census for the year 2000-01 that will provide detailed output data at the LGA level. This information is not yet available. Where possible, other sources have been used to develop an understanding of the likely developments since 1996.

## 1.2 THE REGION

The BBSB region is shown in Figure 1-1. This map indicates the boundaries of the region, the local government boundaries and other key features. The region includes a number of important river systems that flow to the west.

The originally developed transport systems operated like a funnel channelling the trade flows to the east through either the Hunter Valley or over the Blue Mountains into Sydney. In more recent times, the Newell Highway has been developing as a major north-south freight corridor that is of increasing importance to the region's economy. That structure will be enhanced with the further development of the rail system that will initially link Melbourne and Brisbane through the region. It is foreshadowed that the rail connection will be extended through to Darwin. Those developments will provide new economic opportunities for the region in the future.

The region includes substantial parts of the following LGAs (those added since Stage 1 are indicated with \*):

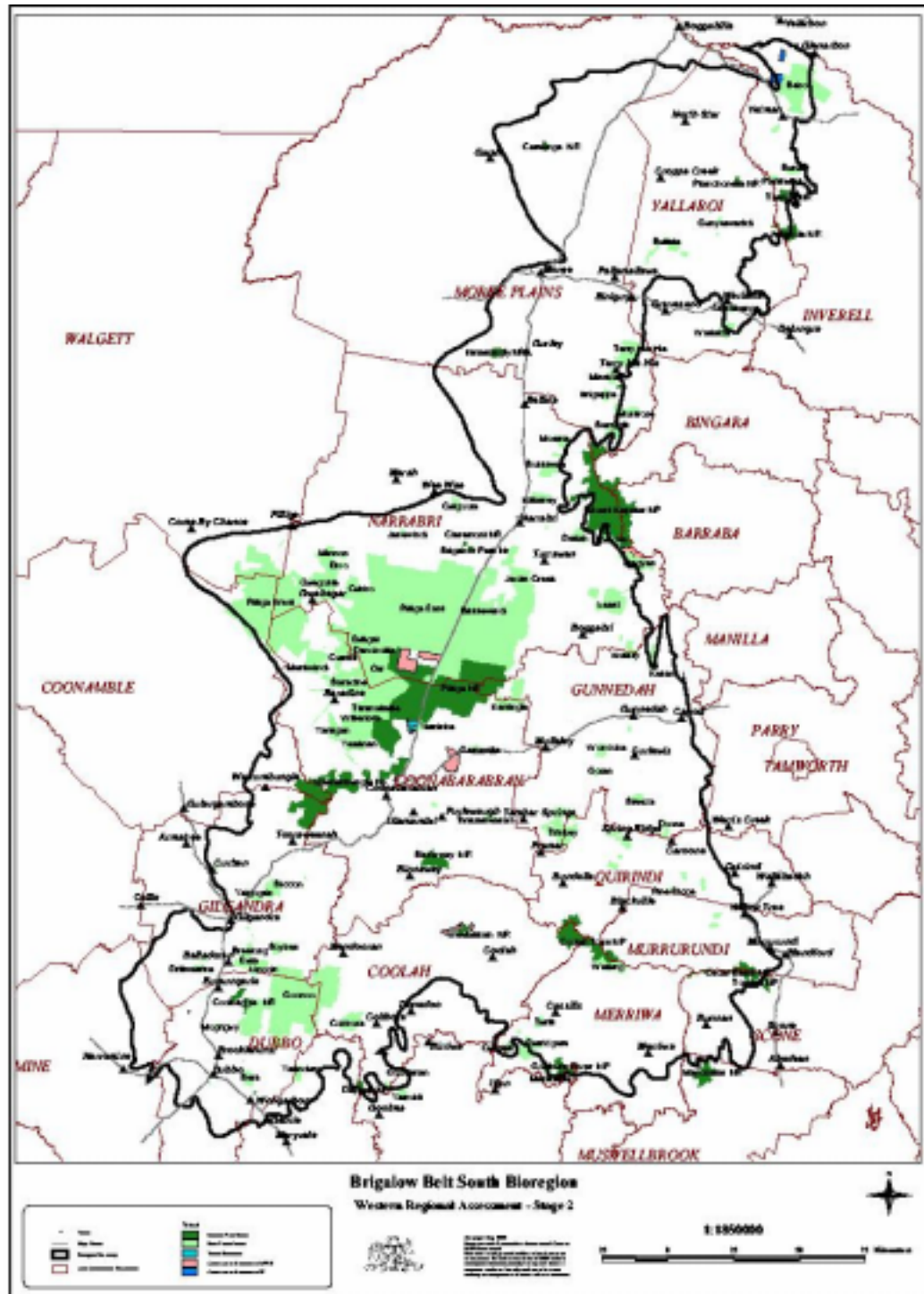
Dubbo  
Coolah  
Coonabarabran  
Gunnedah  
Gilgandra  
Merriwa  
Moree Plains\*  
Murrurundi\*  
Narrabri  
Quirindi  
Yallaro\*

This is the first resource assessment study of Western NSW, defined as catchments that flow to the west. However, the region does not generally extend to the eastern edge of the catchments. There is a physical geographic distinction of this region from those previously studied under RACAC and it will become apparent that there are major differences in the socioeconomic characteristics of the region. Most notable of those is the on-going decline in population in all but the major centre of the region (Dubbo). Those differences will be highlighted as they do suggest the need for some new approaches to natural resource assessment and policy. Further, as the first of the Western Regional Assessments, this assessment will have a defining role for subsequent assessments.

There are two general factors that are critical in their impact on the overall assessment. First, there is a considerable variety of land types and farming systems in the BBSB. This will be discussed in Chapter 4, but the systems range from 'high-country grazing' in the Liverpool ranges to intensive irrigation production in the plains. The region also includes

the Liverpool Plains that is recognised as a rich farming area but with significant environmental problems. The research, the community organisation and structure, and the management approaches being adopted in that region are leading-edge in NSW (and Australia) and provide important guidance to the more general approach to conservation in western NSW.

**FIGURE 1-1: THE BRIGALOW BELT SOUTH BIOREGION**



Second, land tenure issues are of considerable significance in the BBSB. This arises from the small share of land in public ownership (about 15 percent) with a further 11.48 percent of land under various types of leasehold. The widespread dispersion of this leased land has the implication that a large proportion of farms in the region has some leased land. Further, there is a range of tenure arrangements under those leases that has implications for

management. These conditions indicate that conservation measures undertaken on private land need to be considered alongside those measures undertaken on public land. Further, recognition should be given to the significant practical advances made by many farmers under the general heading of conservation farming aided by the support of Landcare and Natural Heritage Trust (NHT) project funding.

These factors represent a considerable variation on the range of issues to be considered and the regional economy characteristics encountered in previous studies.

There are three other NSW Government-initiated processes that are running parallel to the work of RACAC. These relate to the development of water sharing plans for the catchments of the region, the development of native vegetation management plans and the drafting of catchment management blueprints which are aimed at setting resource management targets for many issues including soil, water and vegetation. These plans are nearing finality with a high level of community consultation taking place through most of 2002 as the drafts of these plans are released for comment. (This does not complete the list of 'plans' relevant to resource management and economic development. Local Environment Plans of Councils and a range of economic development plans and strategies also exist, are being developed or are modified on a regular basis.)

This situation has two major implications. First, they represent a competitor for community input into various consultation processes. Given that many of the regional participants in the consultation processes are also in employment or operating businesses, the time available for consultation is limited.

The water, native vegetation, catchment blueprint and RACAC processes all relate in various ways to the management of natural resources. As a result, there are many interdependencies that are not well integrated and are a major source of confusion within the communities of the region. The various processes that are each operating on their own region boundaries do not assist the ready integration of these processes.

These tasks are also constrained by the availability and accuracy of both the scientific and economic data used in the analyses. This problem is not readily solved in completing this assessment process. However, it is expected that some initiatives to develop better data will result from this assessment.

These factors have impeded the development of some parts of this work in a number of ways. That includes the limited time available to key participants, an unwillingness to cooperate in the development of data and model development and an increased resistance to change. This is not a situation conducive to the formation of public- private partnerships to achieve common outcomes in resource management.

### **1.3 SOCIOECONOMIC ANALYSIS**

Socioeconomic impacts are an inevitable part of any change. A careful analysis of the socioeconomic impacts is essential for:

- Managing the inertia that impedes change,
- Minimising the various costs associated with change, and
- Securing equitable outcomes among those impacted and the community-wide benefits.

Socioeconomic assessments have been an integral part of the natural resource assessments undertaken by RACAC. The following comments involve an outline of the approach used in previous RACAC studies and some guidance on undertaking socioeconomic assessments that provide guidance on equity issues and the various ways in which structural change can be facilitated to achieve win-win type outcomes.



## **The Basics of Socioeconomic Assessments**

Socioeconomic assessments need to address the effects on those that are directly affected by the change. Once the effects are determined, the responses will generate flow-on effects to other entities. There are a number of elements in these linkages. Once the economic impacts are understood, then other social effects related to the impact on the welfare of households and communities can be assessed.

Socioeconomic assessments begin with an understanding of the microeconomics of the issue, ie, the way in which individual entities operate and respond to factors that affect their operation. Those entities might be businesses, households, community organisations and government agencies. Failure to understand the way entities respond cannot be corrected through subsequent aggregation or macroeconomic analysis.

The need for careful microeconomic analysis is why socioeconomic analysis is costly. With limited budgets, this is the part of the analysis that suffers from shortcuts. An inadequate analysis will be signaled when those impacted cannot relate their situation to what is presented in the analysis.

The task is complicated by the frequent observation that entities in the same industry will respond in different ways to a given change. That response will be influenced by factors such as (using businesses as an example):

- The financial position of the business;
- The nature and age of capital and technologies used in the business;
- The stage of the life cycle of the business owners; and
- The personal characteristics of the business owners.

As a result, not all businesses will respond in the same way as postulated by the microeconomic theory of the firm under perfect competition. The entities affected by the proposed change are most usefully categorised in terms of the characteristics that relate to their response. That too contrasts with the more common approach which stratifies on the basis of size.

Many analyses attribute little to the ingenuity of those in the affected entities to develop clever responses to change initiators. These managers tend to have a lengthy experience in operating their entity and responding to unexpected changes that leads to a capacity to develop innovative ways of responding to the change. This will be driven by the need to preserve the health of their entity. At the same time, this will lessen the overall impact of the change on the industry, region and nation.

Thus, socioeconomic analysis is likely to achieve two things.

- It will discover innovative ways of adapting to the changes that can be incorporated into the implementation program to encourage those initiatives. That will reduce the costs associated with structural change and enhance productivity.
- It will reduce the inertia to change by removing much of the uncertainty about the outcomes. In effect, the socioeconomic impact assessment is a credible desktop analysis of how the changes will work so that the various entities can plan their future with a high degree of confidence in the outcomes.

The socioeconomic analysis will need to be extended to assess the flow-on impacts as well as the direct impacts. The modern economy is characterised by extensive interindustry

transactions and dependencies. The linkages need to be identified so that those entities are better informed, can also plan their future with confidence and innovative actions to improve their performance can be encouraged.

There are five categories of economic transactions that may need to be assessed to understand the implications for associated entities through linkage effects. These are outlined below.

### **Change in input mix and use**

The initiative may change the level and mix of inputs used in production. This might arise from restrictions on use or changes in market prices for inputs. The extent of the change in use or input substitution will depend on the crop, technologies in use and geographic conditions. Those changes in the use of inputs will have backward linkage effects to the input supply industries. To the extent that there is a change in output mix and levels of production, there will also be downstream linkage effects (see below).

In the long-term, there is likely to be some dynamic effects associated with the development of new technologies. Those dynamic effects could be similar to the new technologies associated with the energy shocks of past decades. Those dynamic effects generally should be encouraged because they have the effect of minimising the negative impacts of the change.

### **Change in output level and mix**

A change in output will occur in most change situations and is often the only change that is analysed. Both the level of production and a restructuring of the product mix can occur. There will also be a set of dynamic effects that employ new technologies to obtain productivity gains, improve product quality or achieve higher product prices in specific markets. All of these developments will tend to offset any negative initial responses and should be encouraged.

These changes will involve linkage effects through change in product mix, production levels, input mix and input use levels. Both backward and forward or downstream linkage effects will change.

### **Market price effects**

Price effects may occur where there are departures from perfectly competitive markets. This could occur where the markets are local and changes in supply will impact on market prices. With a growing share of products destined for niche markets of some kind, then this is an ongoing possibility. Where the production is mainly of standardised commodities for an international market, price effects are unlikely to occur with the local changes being a small part of the overall market supply.

The linkage effects of price changes tend to be relatively small and accrue mainly to the affected producers. Where downstream activities operate on margins that are related to the product price rather than the product volume, then some of the price impact will spill over onto the operators of those activities.

### **Household income effects**

Households that are affected directly and indirectly will experience a change in their income. This could be significant in a short time frame but diminish in the longer term as they adopt a range of innovative responses to the change. In some circumstances, allowance might be required for social welfare payments to substitute for the loss of income from employment or business operation.

The number of households and the level of income together are the dominant factors in generating demand for household goods and services. Thus, there will be linkage effects associated with changes in household expenditure.

### **Capital expenditure effects**

Many of the adaptive processes described above are likely to require some adjustment to the capital stock of the entities. That capital expenditure will generate linkage effects to the suppliers of those capital items. Most of those impacts will be of a one-off nature compared with changes that may occur in annual operating expenditure.

In each of the above cases, there will be a range of natural, social and economic factors that will influence the level of those transactions. There is also an impact from risk arising from both natural and market sources that will impact on those transactions in a variety of ways.

### **Other Considerations**

#### **Regional context**

Change needs to be considered in the context of regional trends. Changes that have some negative adjustments to economic activity are much easier to accomplish in a situation where there is economic growth than where there is little or no economic growth. Thus that context needs to be identified. As a generalisation, an environment where there is little growth and where new opportunities for business activity are difficult to find will involve adjustments that occur slowly and involve high costs.

#### **Risk assessments**

The effect on risk associated with the economic structure of the region economy is one further issue that should be assessed. Rural regional economies have economic structures that have much higher levels of risk than those of urban economies. This arises because of the specialisation on primary commodities that are internationally traded. Thus, modifications to the way these industries are managed can impact on the level of risk to those industries and the regional economy. Not all of those changes to risk will be risk increasing with some of the conservation farming systems indicating that they will result in some risk reduction. The use of appropriate risk modelling methods does allow the impact on risk to be assessed at micro, industry and regional levels. However, that does require significant and specialised resources to undertake that work.

#### **Agglomeration and scale effects**

Few regional economies achieve agglomeration and scale economies that are an important source of competitive advantage in global economies. In the BBSB region, only Dubbo and the cotton industry seem to have secured these competitive advantages. With most of the region experiencing growth that is slower than the rate of growth in productivity, there is an on-going decline in employment and population. That process represents further erosion of existing scale and leads to further contraction in access to services and economic development opportunities. Limited access to easily applied analytical methods and data for areas smaller than LGAs is a major constraint to analysis of these issues.

## **1.4 GENERAL COMMENTS ON THE ANALYSIS OF SOCIOECONOMIC EFFECTS**

As a general rule, the more flexibility there is for businesses to adapt to the changed operating conditions, then the lower the economic impacts of those changes. Further, the longer the adjustment period, the greater the scope for adaptations without asset write-offs,

and the larger the opportunities to develop and apply new technologies that generate positive dynamic outcomes (higher outputs and higher productivity).

From a policy perspective, incentives to develop new technologies and actions that open up new market opportunities can be successful in generating better products and higher prices while reducing the use of natural resources. For example, new infrastructure to open up new markets for high value products coupled with assistance for on-farm changes to those products can shift from producing medium value commodities (eg. cotton) to high value products (eg. horticulture). The overall effect of the composite of changes can be increased output, employment and household income and reduced use of water. A whole of business approach is needed.

This suggests that consideration of new structures and ways of using natural resources should be undertaken in a context that extends beyond the use of the resource itself. The scope should also extend over the whole of the value chain for the products produced so that all of the possible compensating changes that can result in win-win outcomes can be considered.

There is a high level of diversity in the land, water and vegetation resources in any bioregion. This makes it very difficult to be prescriptive of the 'best' way of achieving production and conservation outcomes. The lowest cost of achieving specified outcomes will involve a considerable use of local knowledge and experience. As a result, processes that involve a parsimonious use of regulations, the development of widely agreed outcomes to be achieved and flexibility in the way those outcomes are met will provide most scope for win-win results. It is also likely to achieve the outcomes at least cost.

Within NSW, the Liverpool Plains Land Management Committee has demonstrated the basic requirements in terms of research, defining objectives and developing projects to achieve those objectives. The high level of understanding of the resource management issues and needs allows the targeting of conservation measures to areas where they will be most effective. The clever application of market/tender processes has been used to achieve the specified conservation outcomes at lowest cost.

Socioeconomic assessments can make a positive contribution to these issues. This economic assessment can contribute to the development of effective public and private collaborations to achieve shared outcomes and promote change as a positive process. Inadequate assessments will heighten concern about the impact of the reforms and entrench opposition to them.

## **1.5 ORGANISATION OF THE REPORT**

There are three major sections of this report. The next provides an overview of the BBSB economy and trends to develop the context for the study. That is followed by sections on the timber industry and agriculture describing the present situation and developing approaches to the analysis of change in those industries. Detailed local government area data are presented in an attachment along with other supporting information.

## 2. ECONOMIC PROFILE OF THE BBSB

### 2.1 SCOPE AND CONTENT

The economy of the BBSB is described in this section. This will provide a context for consideration of the forestry industry and other resource conservation issues. Special attention is given to information on the relative importance of the forestry industry and agriculture 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 release of key data from the 2001 Population Census has enabled most of the series to be updated to 2001. Some of the material in this chapter replicates material presented in Stage 1 with further detail added on each of the LGAs in the BBSB.

### 2.2 OVERVIEW OF THE ECONOMY

The analysis in this section is based on a number of input-output tables that indicate the economic structure of the region and subregions. The shift-share analysis provides some insights into industry and employment trends in the region.

The input-output tables were compiled using conventional procedures and data as outlined in Attachment 4. The industry/sector classification outlined in Attachment 5 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 5 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 2.

The input-output tables for the BBSB have been compiled using the most recent available data relating to 1996-97. By 1996-97, the NSW economy was well on the way to recovery from the early 1990s recession. The Gwydir table is based on 1993-94 data. Revised tables for 2000-01 are being prepared but are not yet available.

The base table in summary form is shown in Table 2-1. More detailed sectoral structure charts based on 52 sectors are used to describe the economic structure of the BBSB.

The rows of the input-output table (Table 2-1) 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 used 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.

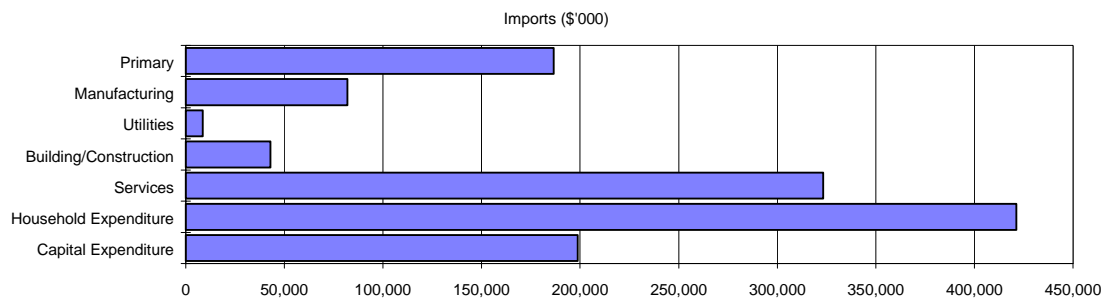
**Table 2-1: Aggregated Input-Output Table - BBSB 1996-97 (\$'000)**

	Ag Forestry	Manufacturing									
	Fishing	Mining		Utilities	Building	Services	TOTAL	H-hold Exp	O.F.D	Exports	Total
Ag/Forest/Fish	281078	66	39060	2	72	779	321056	2393	12062	728337	1063848
Mining	531	3662	6301	6104	1181	1998	19777	0	978	51878	72633
Manufacturing	6290	1532	54715	1072	20621	51910	136140	77433	18787	101127	333486
Utilities	13277	1085	2824	4610	467	35292	57554	25487	1344	5428	89813
Building	4364	193	55	70	91	43989	48763	0	108830	6666	164259
Services	122486	5782	39865	4442	19885	260405	452865	849560	331415	174491	1808332
TOTAL	428025	12319	142820	16300	42317	394373	1036155	954872	473417	1067926	3532371
H-hold Income	175086	16897	66436	15230	61148	590234	925030	0	0		925030
O.V.A.	286530	31032	42305	49652	17833	500458	927810	103547	23964		1055322
Imports	174207	12385	81926	8631	42961	323267	643376	421268	198728		1263371
TOTAL	1063848	72633	333486	89813	164259	1808332	3532371	1479687	696109	1067926	6776093
Employment	6862	305	2546	399	1974	22884	34970				

Gross Regional Product was \$1,980m that included \$925m paid to households as wages and salaries (including imputed payments to self-employed persons and employers). Employment totalled 34,970 people and the average wage and salary earned was \$26,452 per person. This is lower than the NSW average of \$30,868.

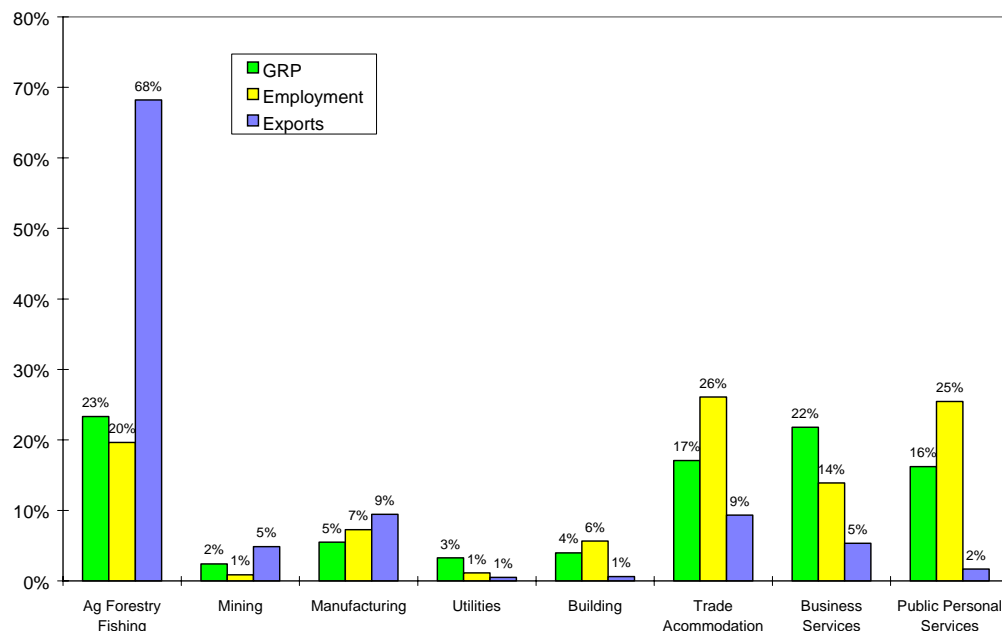
The trade in goods and services between the BBSB region and the rest of the world favoured imports. Imports totalled \$1,263m; that was 1.2 times the level of exports at \$1,068m. The destination of imports into the local region from all sources is shown by major category in Figure 2-1 and in detail by industry in Figure 2-12. In most regions the largest import items are goods for consumption by local households. This is also the case in the BBSB region where 33 percent of total imports to the local region were household consumables. Expenditure on capital items represented 16 percent of imports. This region is a relatively high importer of services that comprise 26 percent of all imports.

A further feature of the BBSB region is the high level of household expenditure estimated to be \$1,480m. This is a large part of the GRP of \$1,980m and considerably above the estimated level of wages and salaries earned by households of \$925m. Households have a number of other sources of income that can support expenditure. These include social welfare receipts, earnings from investments and retirement incomes. In addition, there may be some residents of the region that work outside the region.

**Figure 2-1: Distribution of Imports by Destination Sector: BBSB**

The Department of Social Security (DSS) has made estimates for 1996 of some of these variables (Bray and Mudd 1998). BBSB residents made income tax payments of \$192m and received DSS payments of \$181m. The relatively weak household income position of the BBSB is indicated by the income tax paid/DSS benefits ratio that is 1.1 and can be compared with 1.6 for NSW as a whole.

The economic structure of the BBSB may also be compared with that for NSW through a comparison of Figure 2-2 and Figure 2-3. This reveals that in the BBSB, the agriculture/forestry/fishing industry is much more important than in NSW highlighting the high dependence on primary industries. The share of the mining, utilities and building industries is similar to those prevailing in NSW. Both the manufacturing and service industries are less important than in NSW, especially in terms of the contribution to export earnings. The primary industries contribute over 70 percent to region exports in the BBSB. This is the case in a year of modest commodity prices but serves to highlight the sensitivity of the regional economy to world trends in commodity markets.

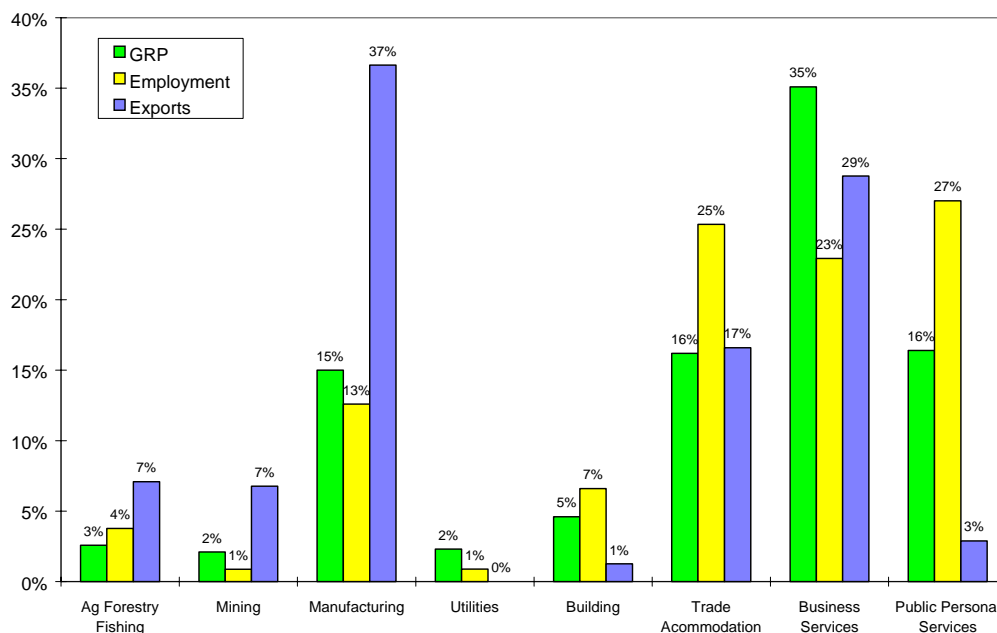
**Figure 2-2: Summary of Aggregated Sectors: BBSB 1996-97**

A further comparison is made between subregions within the BBSB. That can be made for Dubbo, the Gwydir Catchment (Moree Plains, Bingara and Yallaroi) and the rest of the BBSB (Narrabri, Gilgandra, Gunnedah, Coonabarabran, Coolah and Merriwa). This

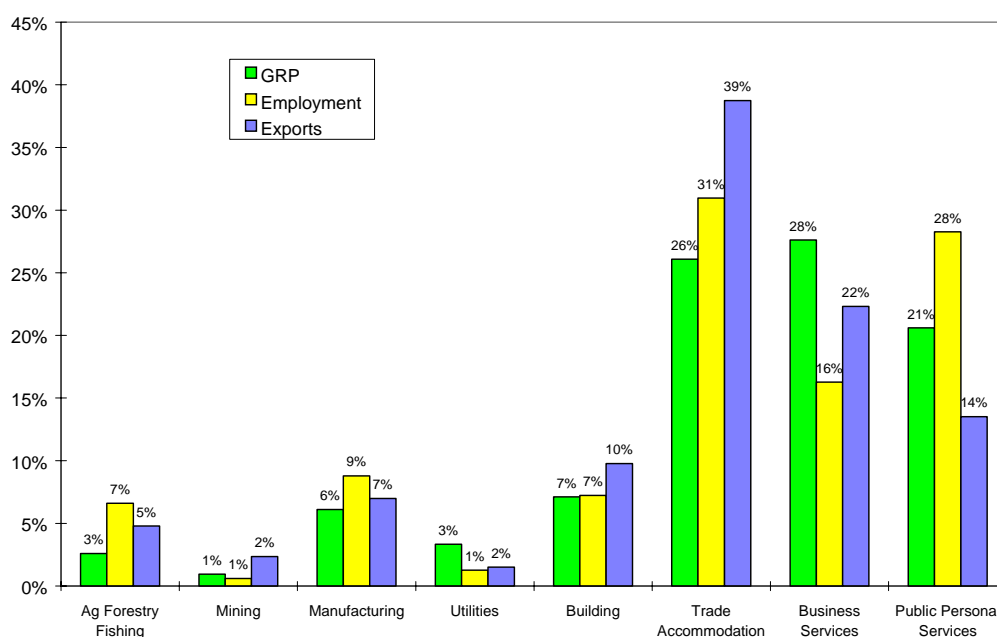
comparison shows some striking differences among regional components of the subregions.

Dubbo bears a closer resemblance to NSW than it does to the BBSB region by way of the size of its manufacturing and service industries. Some of those attributes relate to the important service centre role that it plays. That is also reflected in the building industry that supports its own growth and that of the surrounding area. There is a small share for agriculture, but it is notable that Dubbo has a high dependence on farm product manufacturing.

**Figure 2-3: Summary of Aggregated Sectors: NSW (1995-96)**



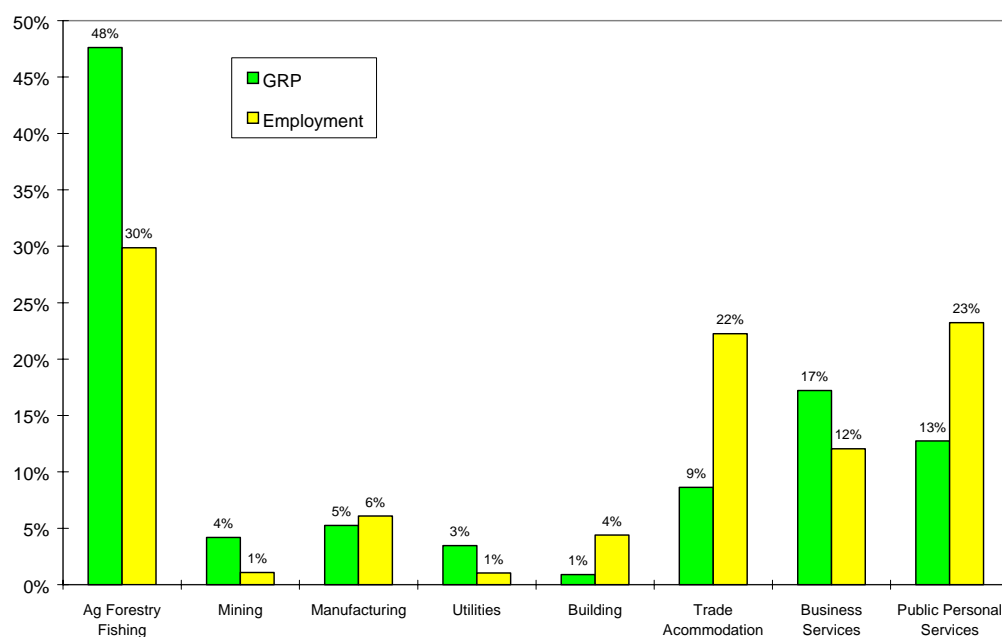
**Figure 2-4: Summary of Aggregated Sectors: Dubbo (1996-97)**

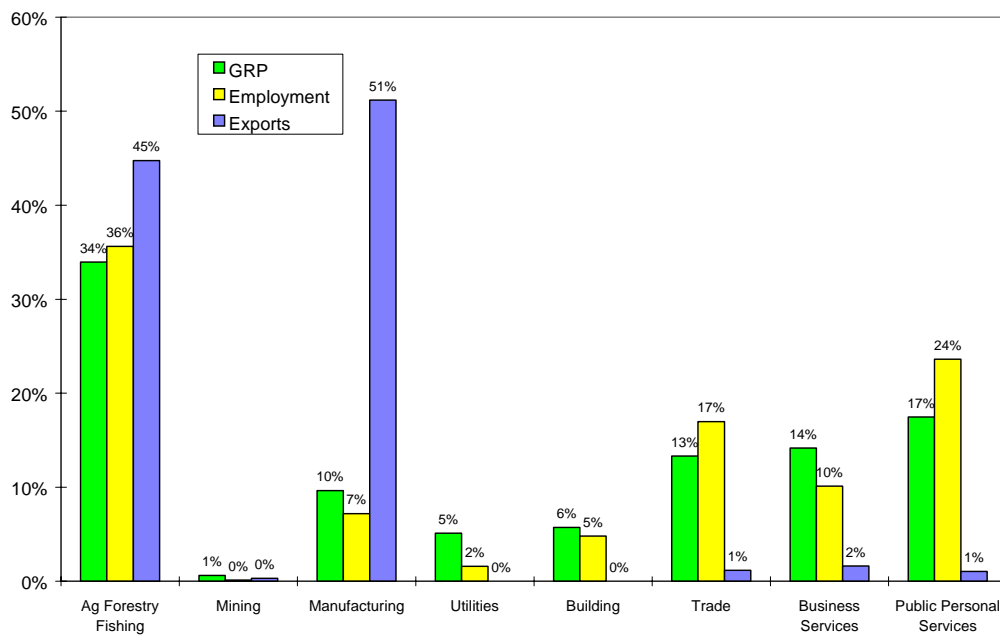




The 'Rural' Brigalow shown in Figure 2-5 and the Gwydir Catchment shown in Figure 2-6 indicated economic structures that are significantly different from that for NSW and Dubbo. (Note that in the Gwydir, manufacturing exports include the total value of cotton as at that stage ginning was considered to be a manufacturing activity. The effect of this will be to add substantially to agriculture's share of exports). These rural subregions show a high dependence on agriculture (34 percent to 48 percent of Gross Regional Product (GRP)) while the share of the services industries (trade, business, public and personal services) is around 40 percent, much lower than the 70 to 75 percent observed for Dubbo and NSW. That structure underpins the concern in the rural areas of the BBSB about any measures that erode the present and potential contribution of the core primary industries to the economy of those areas. Further, the contribution of the trade and accommodation services is markedly lower in the Rural Brigalow than in Dubbo indicating that they have been struggling to grow those activities that service residents and visitors.

**Figure 2-5: Summary of Aggregated Sectors: 'Rural' Brigalow (1996-97)**



**Figure 2-6: Summary of Aggregated Sectors: Gwydir Catchment (1993-94)**

The identification of key industries in the BBSB economy as a whole can be made with reference to Figure 2-7 through Figure 2-12. The structure in each of the LGAs measured in terms of employment is shown in Attachment 1. The importance does vary in terms of the measures used but the following sectors stand out as among the most important to the BBSB economy.

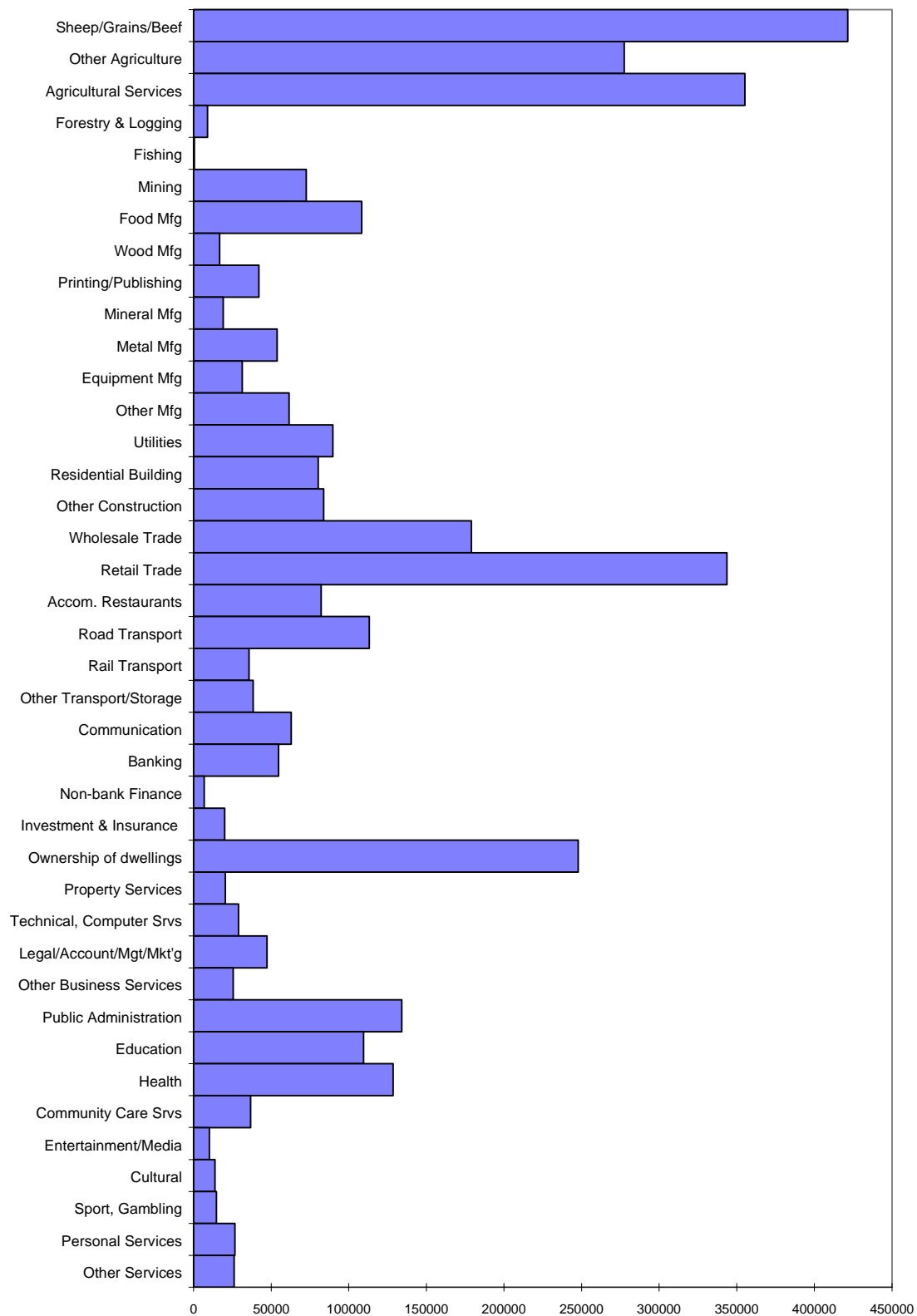
- Sheep, grains and beef
- Other agriculture
- Agricultural services
- Education
- Health
- Public administration
- Retail trade
- Wholesale trade

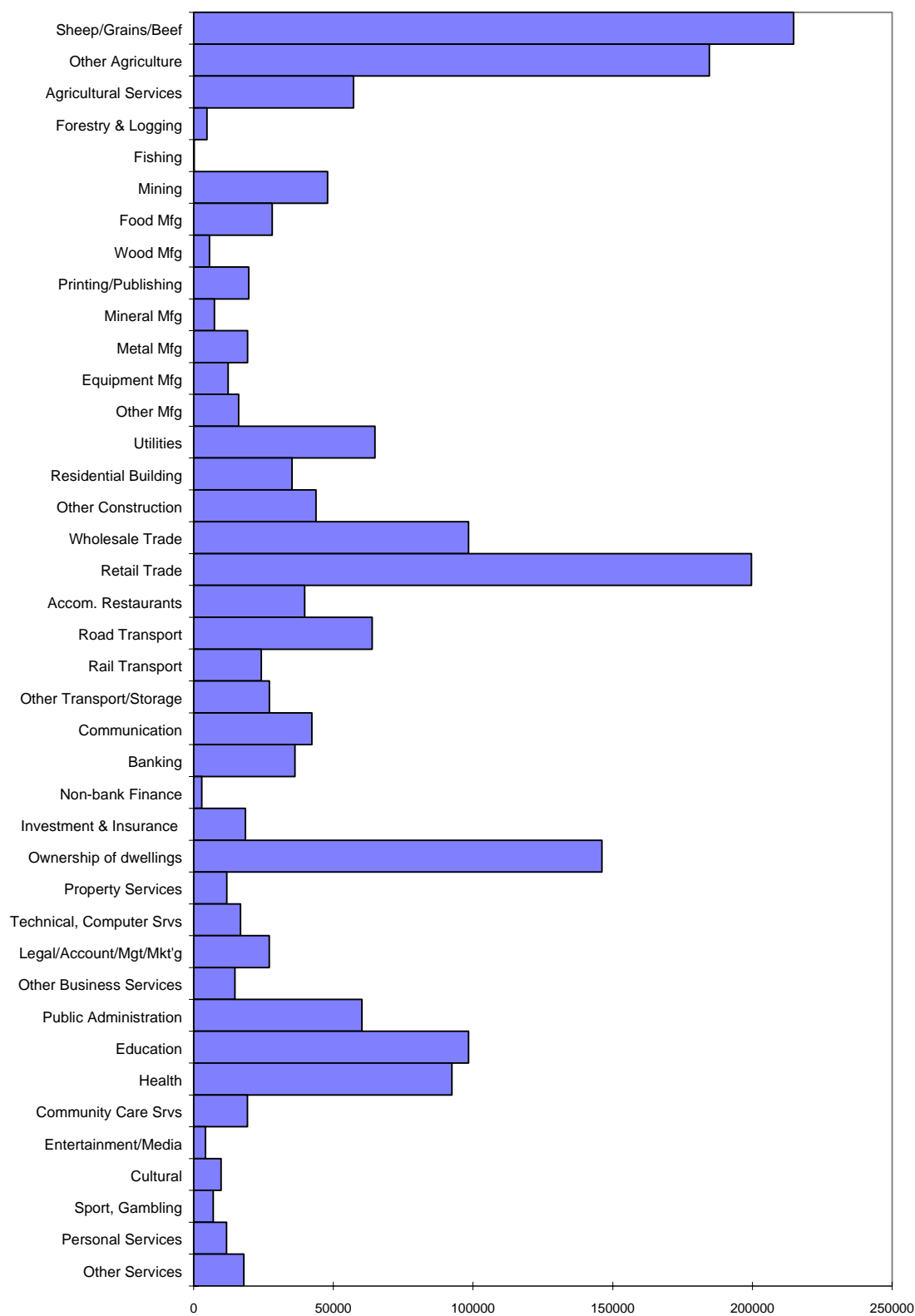
The 1996-97 data presented in these charts include the forest industry and wood processing. Those industries directly contributed \$10m (0.5 percent) to the value added of the region and generated 337 jobs (1.0 percent of regional employment). In the BBSB, forestry and related processing is a relatively small part of the economy but will be more important in some of the local areas. The current forestry operations are discussed in a later section.

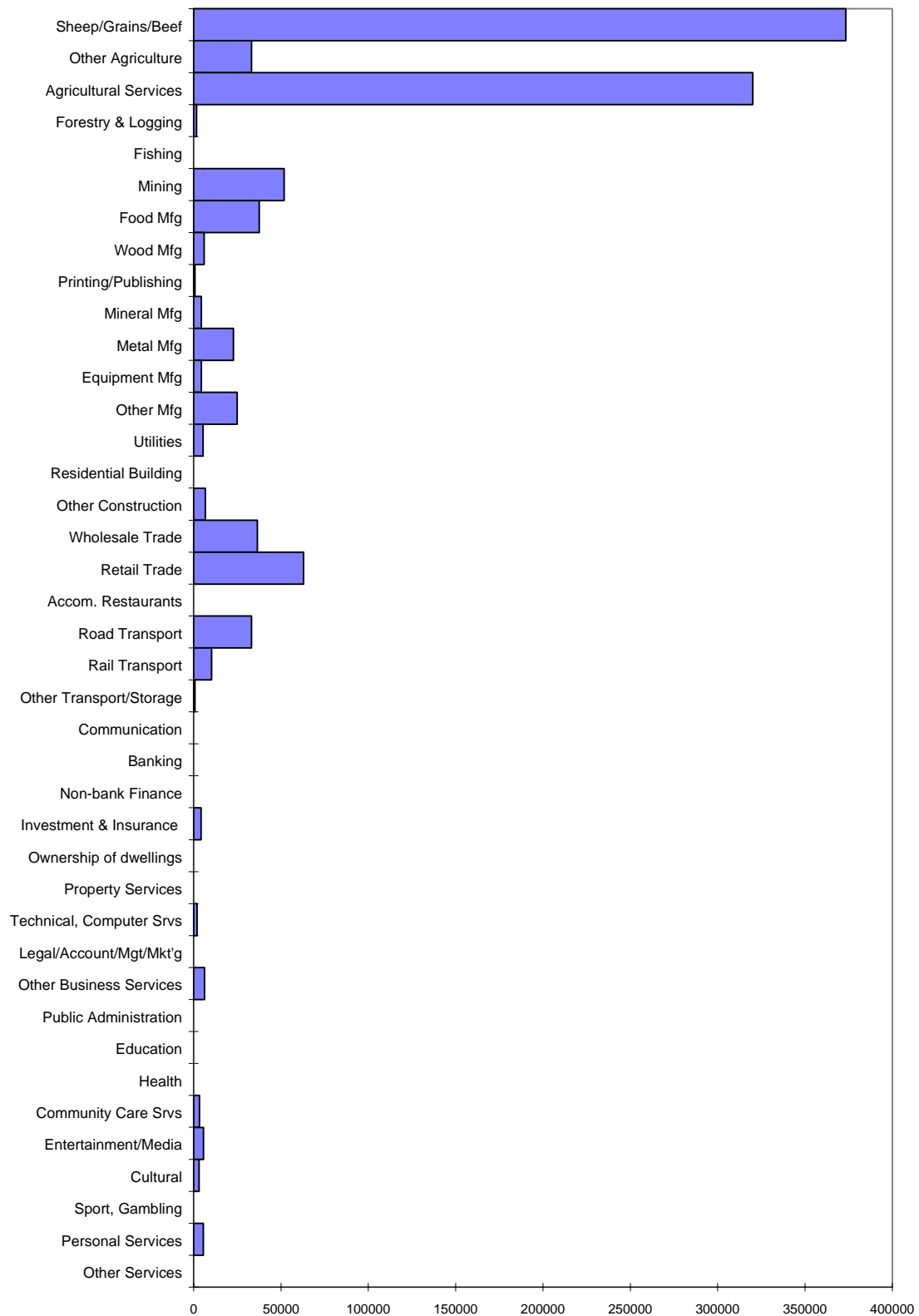
The information in these charts provides a context for the consideration of changes that may be proposed for industries in the region that are subject to policy deliberations. There is a capacity to estimate both the direct and indirect impacts on the economy that may be generated by those changes. Later in this report those linkages are examined for the timber industry and for agriculture. Those models can be used in to assist in the evaluation of options identified for the future development of the timber industry and any impacts that may arise from conservation measures in agriculture.

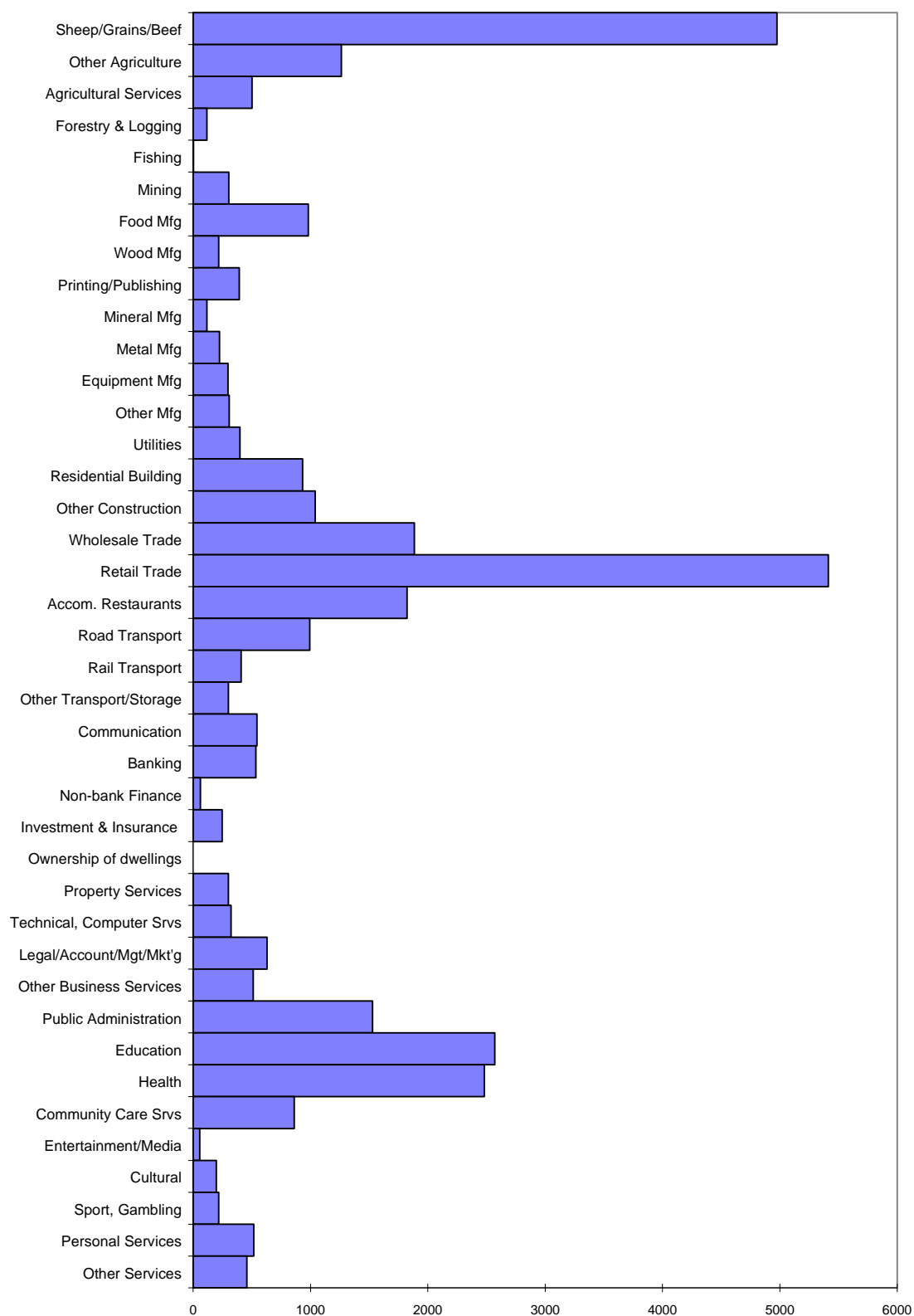
The next set of analyses involves consideration of other trends in the BBSB regional economy.

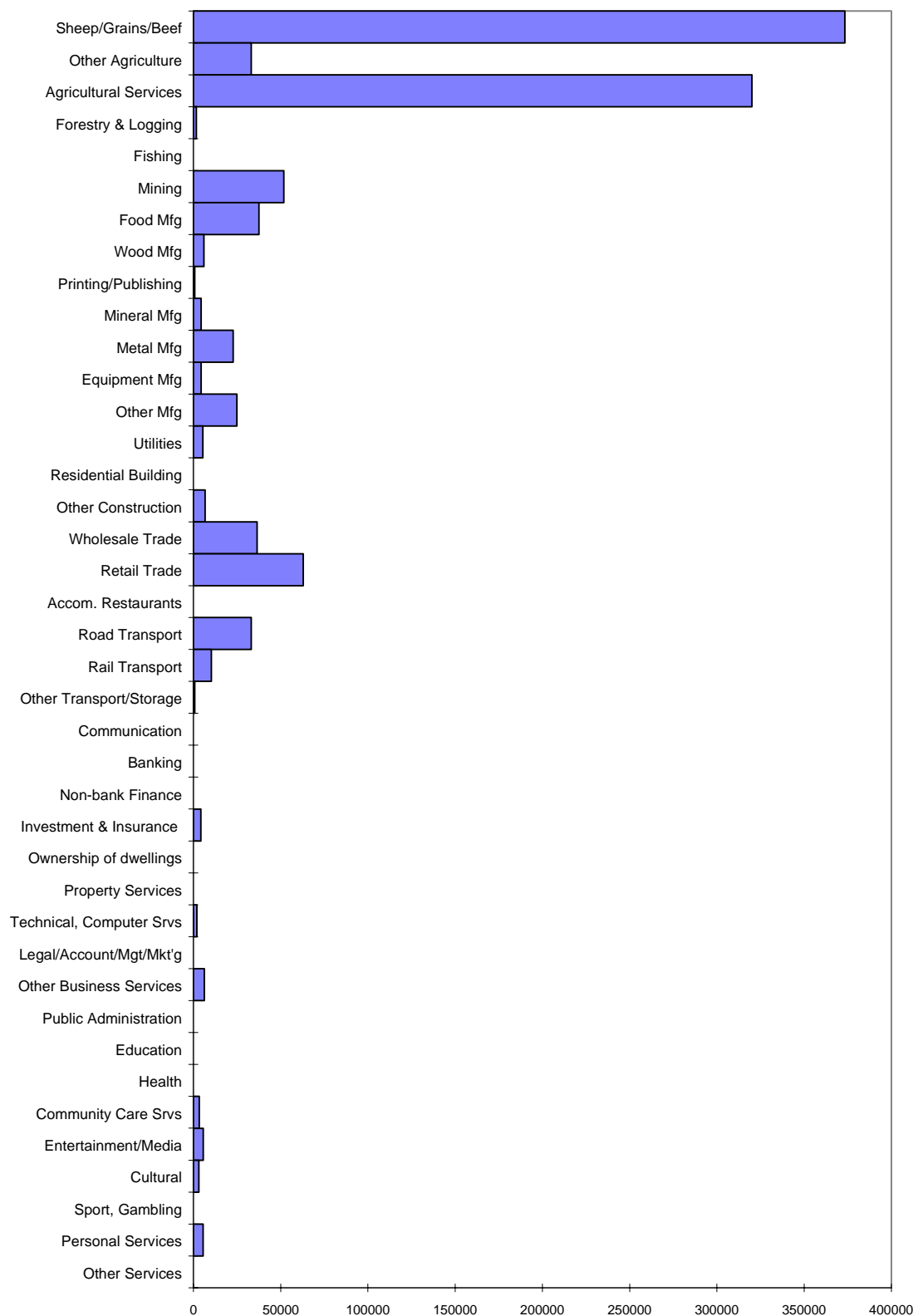
**Figure 2-7: Sectoral Distribution of Gross Output: BBSB 1996-97 (\$'000)**

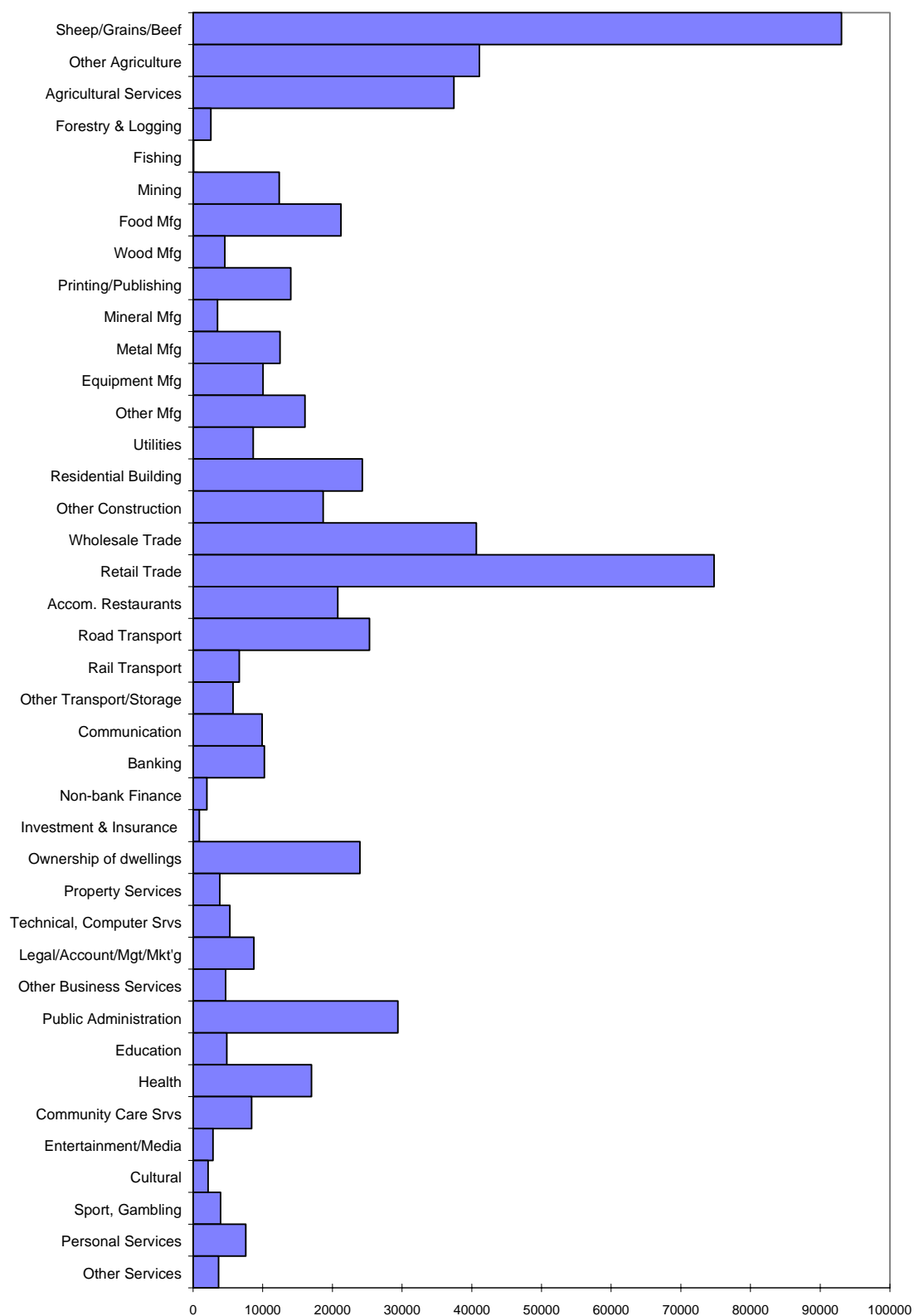


**Figure 2-8: Sectoral Distribution of GRP (Value-added): BBSB 1996-97 (\$'000)**

**Figure 2-9: Sectoral Distribution of Household Income: BBSB 1996-97 (\$'000)**

**Figure 2-10: Sectoral Distribution of Employment: BBSB 1996-97 (number)**

**Figure 2-11: Sectoral Distribution: Exports, BBSB 1996-97 (\$'000)**

**Figure 2-12: Sectoral Distribution: Imports, BBSB 1996-97 (\$'000)**



## 2.3 TRENDS IN THE REGIONAL ECONOMY

This section begins with data and comments on the population trends and employment trends in the BBSB region.

### Regional Population and Employment

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. The information from the various censuses have been compiled and manipulated so as to provide data that is consistent over time.

Data on population and employment levels from the census are shown in Table 2-2 with rates of change shown in Table 2-3. The population data are residence based while the employment data represent workplace based employment estimates. They are expressed as total employment with no adjustment for hours worked.

**Table 2-2 Population and Employment**

	Population						Employment				
	1976	1981	1986	1991	1996	2001	1981	1986	1991	1996	2001
Dubbo	23,950	28,900	30,840	33,860	36,533	37,261	12,109	12,199	14,027	15,389	16,490
Coolah	4,450	4,300	4,320	4,200	3,920	3,851	1,773	1,721	1,628	1,450	1,449
Coonabarabran	7,400	7,300	7,250	7,260	6,912	6,629	3,069	2,771	2,700	2,406	2,398
Gilgandra	4,950	5,050	5,080	5,030	4,897	4,642	2,067	1,920	1,885	1,781	1,874
Merriwa	2,400	2,400	2,440	2,470	2,352	2,336	1,089	958	970	907	890
Murrurundi	2,450	2,350	2,360	2,420	2,256	2,092	1,021	1,025	998	923	874
Gunnedah	13,150	13,250	13,550	13,540	13,085	12,089	5,482	5,437	5,279	5,051	4,704
Moree Plains	15,850	17,250	16,950	16,750	15,364	15,458	7,335	7,032	7,187	6,579	6,902
Narrabri	15,750	16,000	15,610	14,950	14,328	13,930	6,845	6,493	6,026	5,907	6,141
Quirindi	5,650	5,500	5,580	5,470	5,068	4,816	2,371	2,237	2,174	2,079	2,035
Yallaro	4,350	4,000	3,880	3,670	3,343	3,193	1,825	1,681	1,521	1,330	1,300
<b>Brigalow</b>	<b>100,350</b>	<b>106,300</b>	<b>107,860</b>	<b>109,620</b>	<b>108,058</b>	<b>106,297</b>	<b>44,986</b>	<b>43,474</b>	<b>44,395</b>	<b>43,802</b>	<b>45,057</b>

**Table 2-3 Average Annual Rates of Change Between Census Years**

	Population					Employment			
	1976 to 1981	1981 to 1986	1986 to 1991	1991 to 1996	1996 to 2001	1981 to 1986	1986 to 1991	1991 to 1996	1996 to 2001
	%	%	%	%	%	%	%	%	%
Dubbo	3.83	1.31	1.89	1.53	0.40	0.15	2.83	1.87	1.39
Coolah	-0.68	0.09	-0.56	-1.37	-0.35	-0.59	-1.10	-2.29	-0.01
Coonabarabran	-0.27	-0.14	0.03	-0.98	-0.83	-2.02	-0.52	-2.28	-0.07
Gilgandra	0.40	0.12	-0.20	-0.53	-1.06	-1.46	-0.37	-1.13	1.02
Merriwa	0.00	0.33	0.24	-0.97	-0.14	-2.53	0.25	-1.33	-0.38
Murrurundi	-0.83	0.08	0.50	-1.39	-1.50	0.08	-0.53	-1.55	-1.09
Gunnedah	0.15	0.45	-0.01	-0.68	-1.57	-0.16	-0.59	-0.88	-1.41
Moree Plains	1.71	-0.35	-0.24	-1.71	0.12	-0.84	0.44	-1.75	0.96
Narrabri	0.32	-0.49	-0.86	-0.85	-0.56	-1.05	-1.48	-0.40	0.78
Quirindi	-0.54	0.29	-0.40	-1.52	-1.01	-1.16	-0.57	-0.89	-0.43
Yallaro	-1.66	-0.61	-1.11	-1.85	-0.91	-1.63	-1.98	-2.65	-0.46
<b>Brigalow</b>	<b>1.16</b>	<b>0.29</b>	<b>0.32</b>	<b>-0.29</b>	<b>-0.33</b>	<b>-0.68</b>	<b>0.42</b>	<b>-0.27</b>	<b>0.57</b>
<b>NSW</b>	<b>1.09</b>	<b>1.11</b>	<b>1.29</b>	<b>1.02</b>	<b>0.39</b>	<b>-0.11</b>	<b>1.63</b>	<b>1.26</b>	<b>1.45</b>

The information on population and employment trends show that the BBSB has lagged behind the growth in NSW as a whole. The best periods for growth occurred in the second half of the 1970s, 1980s and 1990s. The growth has been uneven among the LGAs within the BBSB. In the early 1990s, only Dubbo managed an increase in

population and employment. The overall outcome for the region was population and employment decline.

The late 1990s were a better outcome for the BBSB, although there was still a decline in the population for the region. Dubbo was the main source of growth, but the rate of population growth in Dubbo has slowed considerably. There was a small growth in the population in Moree Plains that was part of the recovery from the significant decline in the early 1990s when drought was prolonged and severe. Over all, the late 1990s resulted in a growth in employment but at a rate well below that for NSW. Employment growth occurred in Dubbo, Gilgandra, Narrabri and Moree Plains. In the latter two LGAs the growth was related to a considerable improvement in agriculture while there has been increased manufacturing employment in all four LGAs.

The changes in employment are indicated in Table 2-4. Over 20 years, there has been little change in total employment with periods of growth and decline alternating each five years. Only Dubbo has grown over the whole period, while most of the smallest rural LGAs have declined over the whole period. The largest decline over 1991 to 1996 occurred in Moree Plains in response to the severe drought effects that peaked in 1994-95 and resulted in a decline in GRP in that LGA of around 45 percent (Powell and Chalmers 1995). That has been partly reversed in 1996 to 2001. Gunnedah has been a significant loser of employment throughout the 20 years as has Coonabarabran. The losses in Narrabri are also large but the trend has been reversed in the late 1990s.

**Table 2-4: Total Change in Employment**

	Employment Change				1981 to 2001 no.
	1981 to 1986 no.	1986 to 1991 no.	1991 to 1996 no.	1996 to 2001 no.	
Dubbo	90	1828	1362	1101	<b>4381</b>
Coolah	-52	-93	-178	-1	<b>-324</b>
Coonabarabran	-298	-71	-294	-8	<b>-671</b>
Gilgandra	-147	-35	-104	93	<b>-193</b>
Merriwa	-131	12	-63	-17	<b>-199</b>
Murrurundi	4	-27	-75	-49	<b>-147</b>
Gunnedah	-45	-158	-228	-347	<b>-778</b>
Moree Plains	-303	155	-608	323	<b>-433</b>
Narrabri	-352	-467	-119	234	<b>-704</b>
Quirindi	-134	-63	-95	-44	<b>-336</b>
Yallaroi	-144	-160	-191	-30	<b>-525</b>
<b>BBSB</b>	<b>-1512</b>	<b>921</b>	<b>-593</b>	<b>1255</b>	<b>71</b>

### Labour Force and Employment

The employment information from population censuses is summarised in Table 2-5. This indicates a little growth in employment, while population has declined over most of the 1990s. Recent growth in employment has been associated with a rise in the share of the population in employment to 42.4 percent. In 2001, that ratio is below the 44.0 percent level observed for NSW. Thus, the BBSB is a region where the most recent five years has seen population decline and employment increase on the basis that there is a higher proportion of the population in employment.

**Table 2-5: BBSB Population and Employment Summary**

Census Year	Total Employment	Total Population	Employment Share of Population	Average Annual Change Between Census Years	
				Employment	Population
			%	%	%
1976		100,350			
1981	44,986	106,300	42.3		1.16
1986	43,474	107,860	40.3	-0.68	0.29
1991	44,395	109,620	40.5	0.42	0.32
1996	43,802	108,058	40.5	-0.27	-0.29
2001	45,057	106,297	42.4	0.57	-0.33

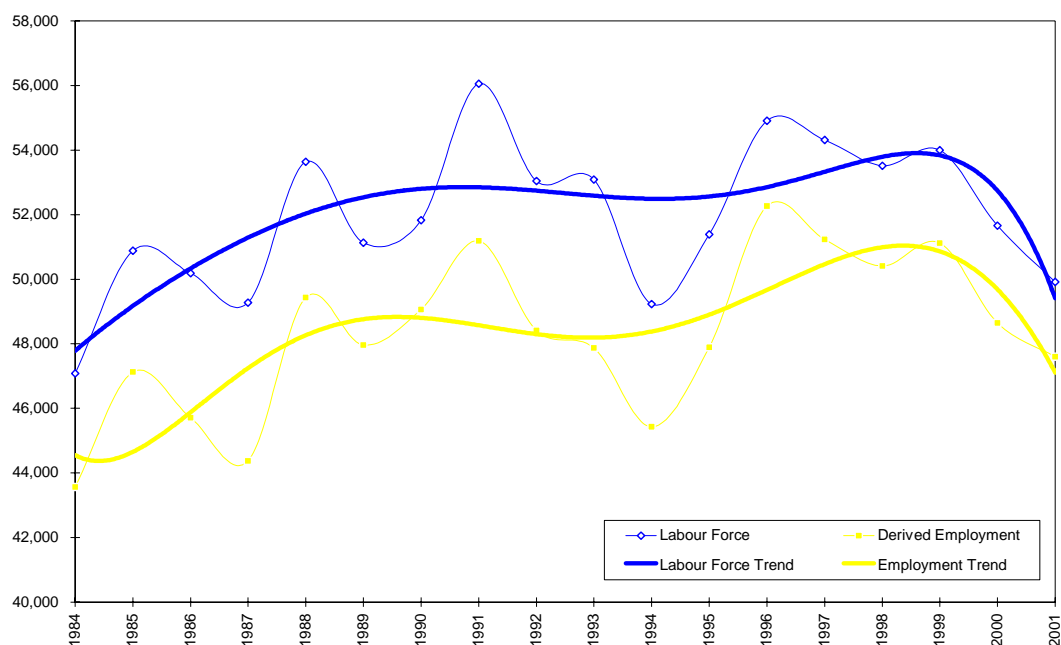
An additional source of data on the labour force (employed plus unemployed) and unemployment is the Department of Employment and Workplace Relations and its antecedent the Department of Education, Workplace Relations and Small Business (DEWRSB 1999). These data do not have the accuracy of the ABS population census data due to changes in definitions and the influence of various work programs. However, the quarterly data permits the development of annual movements in employment presented here through the use of the June quarter estimates. The resultant trends reflect a combination of macro-economic factors affecting Australia generally and local factors.

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 and the total labour force.

The information is presented in Table 2-6 and Figure 2-13. There are some clear trends of growth in employment from the early 1980s through to 1991 when economic policy induced a recession. Combined with poor seasons and commodity prices employment declined to 1994 and then recovered strongly to peak in 1996. Since then, employment has been in decline, especially since 1999. It is also notable that since the 1993 peak in the rate of unemployment, the unemployment rate has tended to decline through to the low point in 2001. Thus, the current situation is one of population decline, employment decline and a decline in unemployment. That would suggest that there is a steady loss of the labour force from the BBSB. (In the attachment relating to the LGAs, these general trends exist across the region but with variations in their intensity.)

The above is a little at variance with the data from the population census. The decline in population is consistent, but what appears to have occurred is the rise in the employment proportion of the population that has led to an increase in the labour force not identified in the Labour Force Survey data.

There is some complexity in understanding the reasons for these trends. Some of the change is likely to be due to statistical factors and some to changes in policy (eg. work for the dole arrangements). From an unemployment perspective, it looks healthy, but underneath, there is a current of workers and population leaving the region which has to reflect the limited work and career opportunities in most of the region. Even the data for Dubbo reflects a slowing in population and employment growth in recent years. A further factor is the strong growth nationally and in NSW that has driven the demand for employees up in the major cities such as Sydney. When this strong attractor of workers is combined with the underlying drift of people from the regions, there can be a rapid increase in people moving from the regions to the major cities. Thus, apart from economic structure issues, there is a very real concern in this region about its long-term sustainability and the cumulative effects of declining employment levels and limited potential growth in jobs.

**Figure 2-13: Labour Force Trends: BBSB**

Source: DEWRSB (2001)

**Table 2-6: Estimates of Employment and Unemployment**

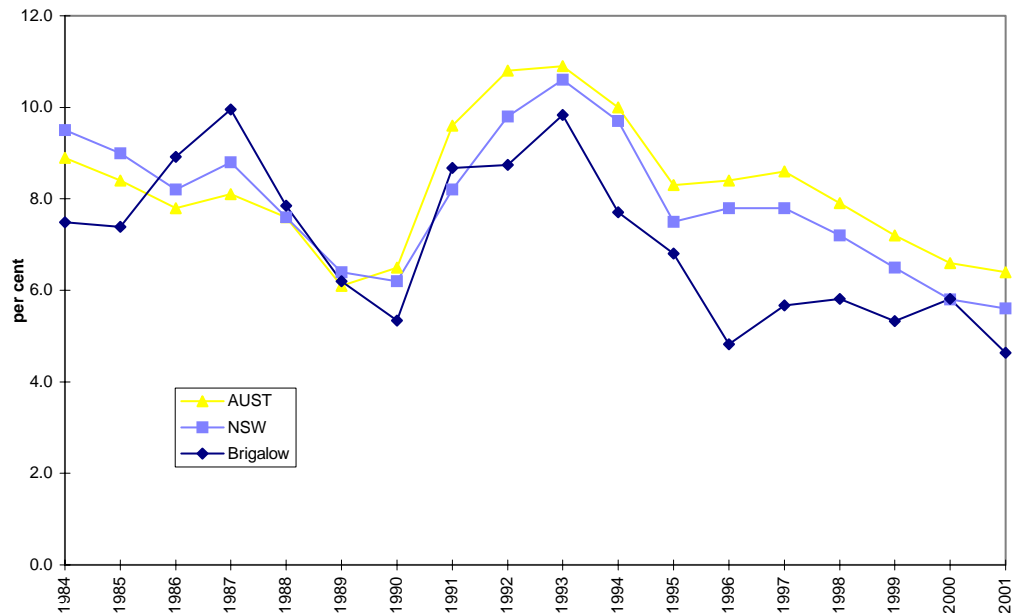
Year	Brigalow				Unemployment	
	Labour Force	Derived Employment	Unemployment		NSW	AUST
	no.	no.	no	%	%	%
1984	47,088	43,561	3,527	7.5	9.5	8.9
1985	50,882	47,126	3,756	7.4	9.0	8.4
1986	50,187	45,709	4,478	8.9	8.2	7.8
1987	49,276	44,374	4,902	9.9	8.8	8.1
1988	53,643	49,434	4,209	7.8	7.6	7.6
1989	51,135	47,963	3,172	6.2	6.4	6.1
1990	51,830	49,061	2,769	5.3	6.2	6.5
1991	56,052	51,187	4,865	8.7	8.2	9.6
1992	53,046	48,410	4,636	8.7	9.8	10.8
1993	53,085	47,869	5,216	9.8	10.6	10.9
1994	49,226	45,435	3,791	7.7	9.7	10.0
1995	51,391	47,892	3,499	6.8	7.5	8.3
1996	54,909	52,264	2,645	4.8	7.8	8.4
1997	54,309	51,230	3,079	5.7	7.8	8.6
1998	53,518	50,406	3,112	5.8	7.2	7.9
1999	53,995	51,118	2,877	5.3	6.5	7.2
2000	51,654	48,651	3,003	5.8	5.8	6.6
2001	49,917	47,605	2,312	4.6	5.6	6.4

Source: DEWRSB (2001)

A comparison of various unemployment rates is shown in Figure 2-14 and Figure 2-15. These charts indicate the relatively healthy situation of the BBSB in terms of unemployment. Given the other difficulties in the BBSB economy highlighted by other indicators, there is a clear conclusion that governments should approach the use of unemployment rates as an indicator for policy assistance very cautiously. (This was used in the past for labour market assistance and is part of the indicators proposed for zonal

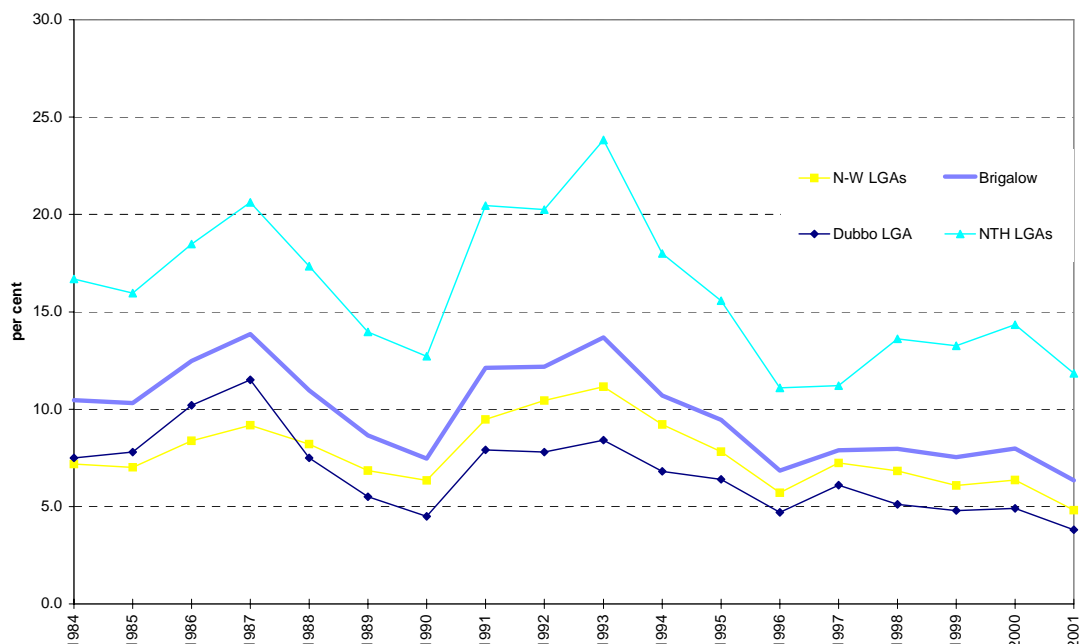
taxation arrangements.) There is also a notable regional variation within the subregions with the northern part of the region showing the highest levels of unemployment and Dubbo with the lowest levels. The unemployment rates for each of the LGAs are included in Attachment 1.

**Figure 2-14: National and State Unemployment Rate Comparisons**



Source: DEWRSB (2001)

**Figure 2-15: Unemployment Rates by Sub-Regions**



Source: DEWRSB (2001)

Overall, the picture emerges of falling population and unemployment in most of the region with some rise in employment in some areas. That will mean outmigration, particularly those that are most mobile, normally those in the 15 to 25 year age groups. Many in this group move to seek further education and training while others seek work and travel

opportunities. The higher incomes and growth-based employment opportunities in state capitals and to a lesser extent Dubbo provide incentives to move.

When translated into an age profile of the population, there is emerging a profile that has changed from a pyramidal shape with the most populous groups being the youngest age groups to one where there is a low population in the 15 to 25 year groups. This provides the basis for an aging of the population (who tend to be relatively less mobile) and a reduced potential for the younger groups to move into the main employment age groups. The implications of these trends for business in regional areas is not yet well understood. However, it would appear to be a potential constraint on future business opportunities in regional areas with a lesser number in the workforce.

## **2.4 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 5.

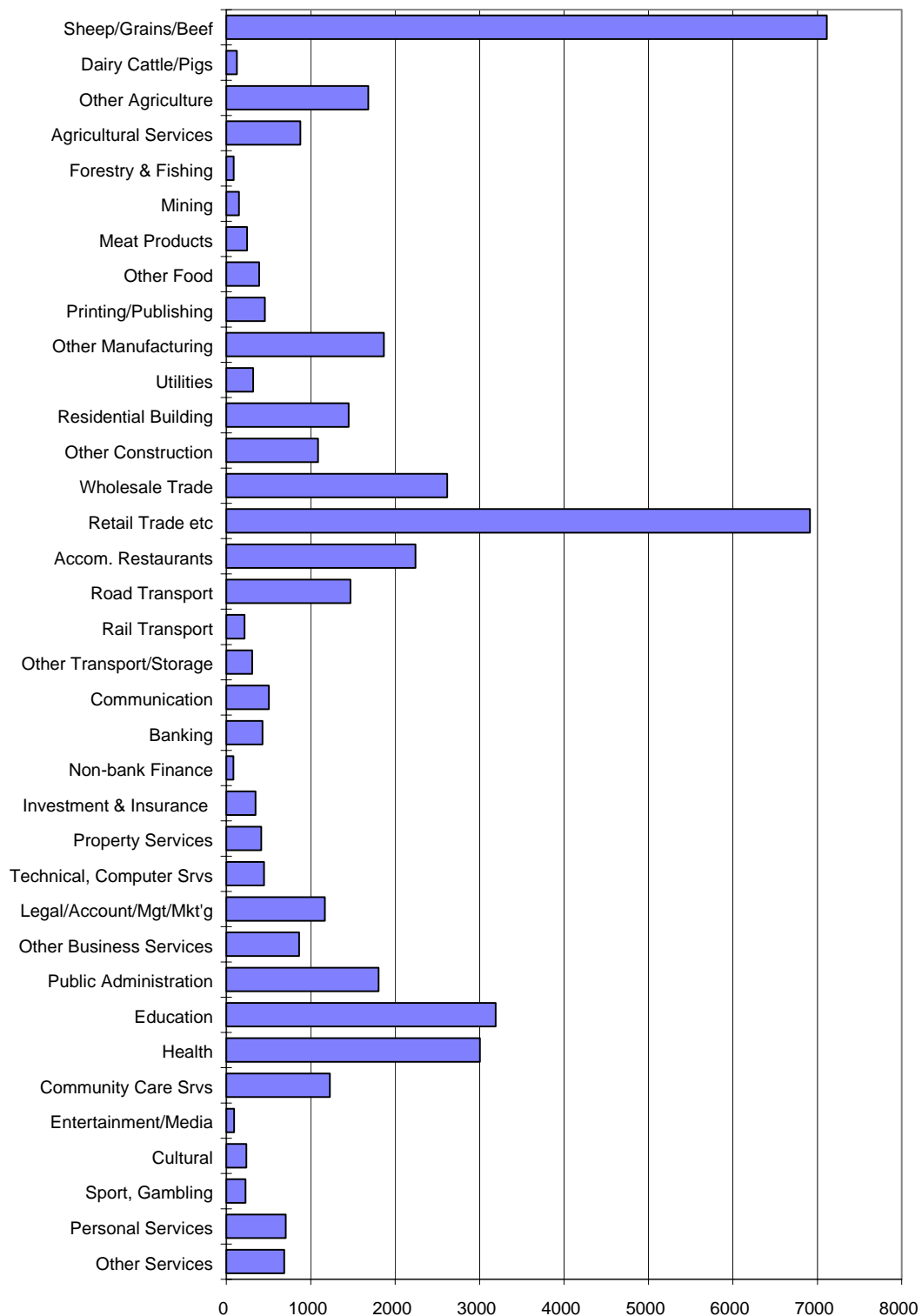
### **Sectoral Distribution of Employment**

The industry distribution of employment for 1996 is shown in Figure 2-10. Total employment was 43,805 persons and the main employing industries were (expressed in terms of the share of regional employment):

- The broadacre agriculture (sheep/beef cattle/grains) sector generated 15.8 percent of total employment.
- The retail trade sectors represented 12.1 percent of total employment and wholesale trade 5.3 percent.
- The accommodation/restaurants/cafes/pubs/clubs sector employed 5.0 percent.
- The education and health sectors each employed 7.1 and 6.7 percent, respectively.
- The total manufacturing sectors employed 6.6 percent.
- Other agriculture (mainly cotton) employed 4.0 percent
- The remaining sectors employed 37.4 percent.

The equivalent chart for 2001 is shown in Figure 2-16. This shows a similar pattern to that for 1996. The changes that have occurred will be analysed in the following pages. The essential characteristic of the regional economy is one where agriculture is important and it supports a significant agricultural processing industry. Otherwise service industries are important for the residents and to a lesser extent, tourists. The importance of Dubbo as a retail centre for much of the central west of NSW also helps to establish a high level of employment in retail trade.

The following analyses provide a range of comparative and benchmarking information on the BBSB economy.

**Figure 2-16: Employment Distribution by Sector, 2001: BBSB**

### Location Quotient Analysis

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

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

Where the local share is larger than the national share, the LQ is greater than 1 and where the local share is smaller, the value is less than 1. Where the value is high (greater than 2) it indicates that those industries are likely to be key strengths in the region and tend to be industries that are important to the regional economy.

LQs are presented in Table 2-7 for those industries that have a 2001 value greater than 1.0 and a selection of some of the essential service sectors. The LQs confirm that the BBSB is heavily concentrated on a number of agricultural and related industries and selected services, particularly transport. Two of those industries, oilseed processing industry and meat processing have notable declines in importance between 1996 and 2001. The forestry and timber processing industry, while small in employment terms, is more important to the BBSB than it is to Australia as a whole, but that significance is declining in the late 1990s.

**Table 2-7: Location Quotients, 1981 to 2001: BBSB**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Grains	7.3	12.4	11.7	12.2	<b>9.7</b>	4955
Beef cattle	9.3	5.3	8.5	7.0	<b>9.4</b>	1237
Services to agric.; hunting	8.7	9.2	9.8	7.4	<b>8.6</b>	877
Textile fibres, yarns etc	0.0	0.2	0.2	0.5	<b>5.5</b>	213
Leather and leather products	2.7	3.7	4.2	3.2	<b>5.0</b>	105
Pigs	4.6	5.4	7.1	6.3	<b>4.9</b>	99
Sheep	4.6	3.2	5.7	5.0	<b>4.2</b>	920
Oils and fats	10.1	6.8	8.0	10.7	<b>3.5</b>	35
Other agriculture	2.0	2.7	3.2	2.9	<b>3.0</b>	1604
Poultry	1.6	1.7	1.6	1.5	<b>2.0</b>	80
Concrete, cement, lime	0.6	0.6	0.8	0.9	<b>1.9</b>	82
Sawmill products	1.1	0.9	0.9	1.7	<b>1.5</b>	113
Road transport	3.2	1.2	1.3	1.3	<b>1.4</b>	1472
Mechanical repairs	1.3	1.3	1.3	1.4	<b>1.4</b>	1074
Flour and cereal foods	1.5	0.7	1.0	1.2	<b>1.4</b>	57
Forestry and logging	1.6	1.3	1.4	1.9	<b>1.3</b>	82
Rail & other transport	1.7	1.8	1.6	2.1	<b>1.2</b>	216
Other food products	0.4	0.4	0.5	0.7	<b>1.2</b>	176
Meat and meat products	1.5	1.5	2.7	2.2	<b>1.2</b>	245
Wholesale trade	0.9	0.9	0.9	0.9	<b>1.1</b>	2616
Community care services	1.1	1.3	1.0	1.0	<b>1.1</b>	1227
Other mining	1.1	0.8	1.1	1.0	<b>1.1</b>	45
Agricultural, mining etc machinery	0.5	0.9	1.5	0.9	<b>1.1</b>	147
Electricity	0.9	0.9	1.1	1.4	<b>1.1</b>	216
Prefabricated buildings	0.0	0.0	0.0	0.4	<b>1.1</b>	24
Public administration	1.0	1.0	0.9	1.1	<b>1.0</b>	1780
Other construction	0.7	0.7	0.7	0.8	<b>1.0</b>	1086
Publishing; recorded media etc	0.4	0.6	0.5	0.6	<b>1.0</b>	285
Accom. & restaurants	1.3	1.2	1.1	1.1	<b>1.0</b>	2241
Retail trade	1.0	1.0	1.0	1.0	<b>1.0</b>	5743
Education	0.9	0.9	0.9	1.0	<b>1.0</b>	3191
Health services	0.7	0.8	0.8	0.9	<b>0.9</b>	3004
Other property services	0.4	0.4	0.6	0.6	<b>0.6</b>	416
Legal, accounting srvs	0.7	0.5	0.5	0.5	<b>0.7</b>	1167
Scientific research etc	0.5	0.4	0.5	0.3	<b>0.3</b>	447

There is some manufacturing servicing primary production (machinery and repairs) or processing primary products. There has been growth in some areas of construction and printing. The LQs for most of the service sectors are about 1.0 indicating the region is



about on average for those services. The high dependence on road transport is a reflection of the high freight needs of industries in the region and it is growing while rail transport is declining. The LQs for many of the services that support business have been less than 1.0, eg, other business services, other property services, legal and accounting services and various technical and scientific services. However, in the most recent period there has been further employment that may represent a catch-up relative to business needs. Further growth would be possible as the levels remain below the NSW average. The accommodation etc sector is indicative of the role of tourism in the region and with a value of 1.0 indicates that it is as important in this region as it is in Australia as a whole.

### Service Delivery Levels

The servicing capacity of the BBSB economy is shown as Population-Employment Ratios (PER). Here, the servicing capacity is represented by the **number of residents serviced per employee** in a particular sector. This measures the levels of service in the BBSB 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 the service level perhaps indicating a higher quality of service. These ratios are only calculated for service sectors and are shown in Table 2-8.

**Table 2-8: Population:Employment Ratios by LGA, 2001**

Service Sectors	Dubbo	Coolah	Coonabarabran	Gilgandra	Marree	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yarrali	BBSB	NSW
Residential building	61	68	96	92	94	98	118	70	63	90	166	73	49
Other construction	77	145	251	102	75	89	106	99	122	120	119	98	97
Wholesale trade	30	94	58	70	112	56	52	42	40	49	51	41	41
Retail trade	14	30	24	25	38	34	19	20	19	23	38	19	18
Mechanical repairs	87	153	159	99	180	162	126	86	82	118	146	99	138
Other repairs	573	0	1747	0	0	0	792	2117	11070	1522	0	1110	779
Accom. & restaurants	42	67	36	44	44	59	62	50	45	68	93	47	43
Road transport	69	75	140	73	123	52	72	85	60	52	89	72	102
Rail & other transport	372	1256	589	1340	0	156	1436	1226	305	269	0	492	482
Water transport	0	0	0	0	0	0	0	0	0	0	0	0	1834
Air and space transport	759	0	0	0	0	0	3828	1124	2236	1567	0	1411	296
Transport svcs, storage	415	0	1076	696	628	624	0	299	200	0	0	460	214
Communication services	171	220	258	449	251	167	231	226	206	291	431	210	112
Banking	196	628	324	500	762	402	274	187	274	427	513	248	114
Non-bank finance	965	0	2158	0	0	0	1313	1117	909	1567	1027	1233	681
Financial asset investors	2125	0	0	0	0	0	0	5000	0	0	0	5154	1027
Insurance	288	0	2158	748	762	0	695	582	850	663	616	496	187
Services to finance etc	454	1233	0	0	0	0	1297	1875	3420	783	0	940	208
Ownership of dwellings	0	0	0	0	0	0	0	0	0	0	0	0	0
Other property services	174	1256	925	499	736	0	272	236	278	334	770	256	142
Scientific research etc	225	416	216	1489	0	335	469	448	82	1567	0	238	68
Legal, accounting svcs	71	250	269	166	374	335	87	70	105	97	146	91	53
Other business services	96	269	359	204	134	201	149	112	113	166	153	123	74
Public administration	57	64	62	52	53	100	68	50	83	60	50	60	71
Defence	3657	0	0	0	0	669	2953	0	4560	0	1027	4509	339
Education	30	32	31	35	43	61	35	33	39	36	35	33	33
Health services	25	48	36	39	63	39	46	52	45	38	53	35	32
Community care services	79	188	149	67	194	74	60	92	108	72	208	87	98
Motion picture, radio etc	653	0	0	1489	0	0	1313	880	4560	1567	0	1142	316
Libraries, museums, arts	225	0	324	0	762	223	1674	1250	977	772	0	445	327
Sport, gambling etc	331	1256	587	0	374	224	510	553	718	389	1027	464	209
Personal services	117	416	294	264	251	134	126	159	168	232	204	151	120
Other services	124	313	190	188	381	287	182	125	193	142	1027	155	130
<b>TOTAL SERVICES (excluding building &amp; construction)</b>	<b>2.9</b>	<b>5.7</b>	<b>4.7</b>	<b>4.5</b>	<b>6.1</b>	<b>4.9</b>	<b>4.1</b>	<b>3.8</b>	<b>3.8</b>	<b>4.2</b>	<b>5.7</b>	<b>3.6</b>	<b>3.0</b>

The information in Table 2-8 indicates that the BBSB has service levels better than NSW in only a few areas - road transport, public administration, mechanical repairs and community care (ie. a smaller PER). Retailing is about the NSW average because Dubbo and to a lesser extent other centres, service western NSW and travellers along the Newell Highway. The importance of road transport to the region is also highlighted while mechanical repairs support both transport and farming systems. In the key public-funded services of education, health and community care (community care includes those employed under the CDEP) the region shows similar levels to those of NSW. On the other hand, there are large differences in the level of many of those services that support business activity. It is also notable that the level of service in the key communications and banking sectors has been deteriorating while most other services have been improving over the 1981 to 1996 period.

The level of services provided within the region can also be expressed in the form of job opportunities as shown in Figure 2-17 (1996) and Figure 2-18 (2001). This indicates the change in employment that would occur in the BBSB if the PER were at the same level as for NSW as a whole. There are a few sectors that have service levels above the NSW average such as mechanical repairs, road transport, trade, public administration and community care sectors. However, those favourable sectors amount to only a few jobs relative to those sectors below the NSW level. An important concern is the large deficits that occur in business and personal services but scrutiny of the figures indicates that the deficits in a number of these key sectors have been reduced over the 1996 to 2001 period.

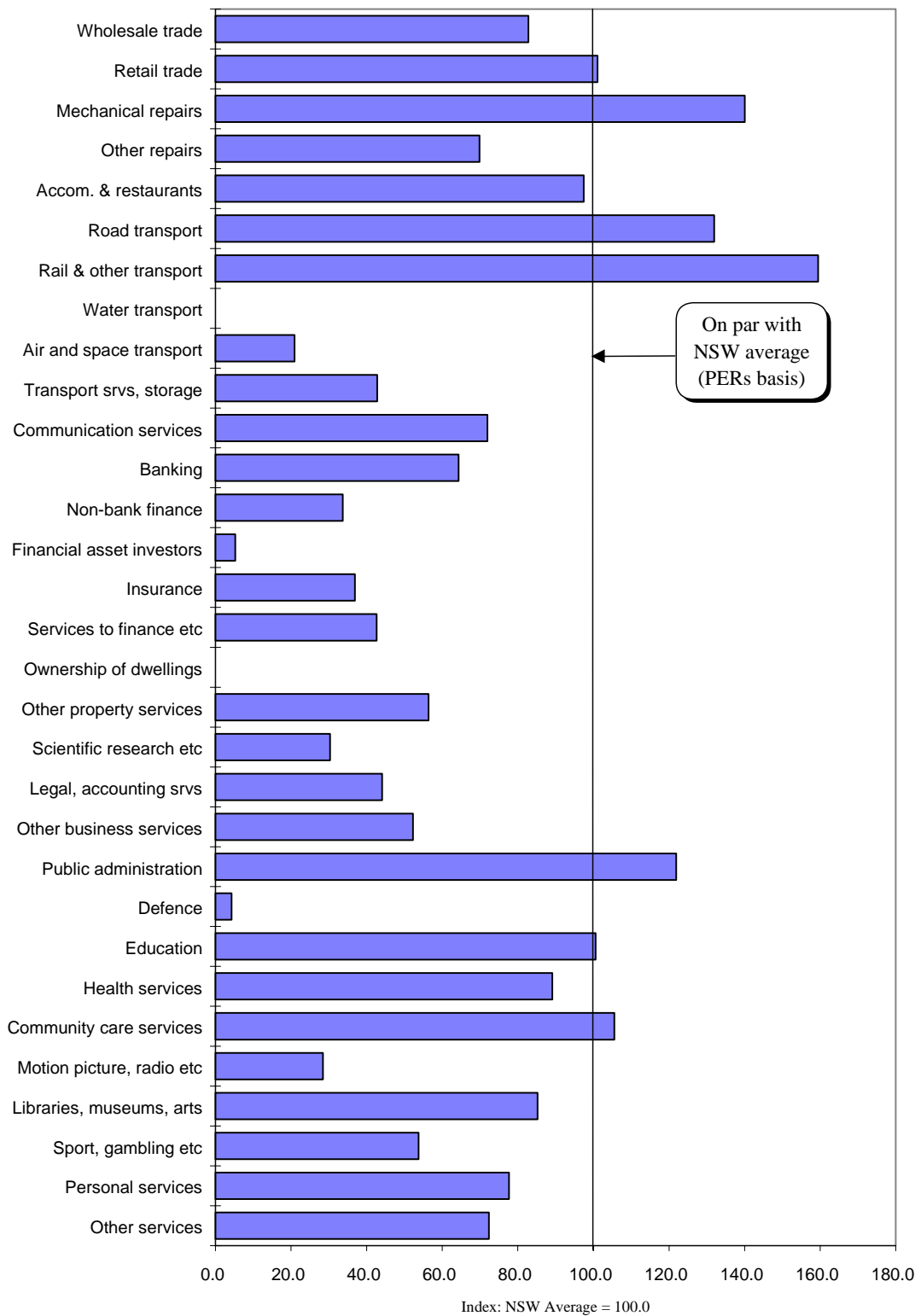
The BBSB region PER has fallen from 3.9 in 1996 to 3.6 in 2001 while over the same period the NSW value has declined from 3.2 to 3.0. This confirms that the gap between the BBSB and the NSW average has been reduced slightly. Within the region, service delivery has improved in all but four of the LGAs. They are also the areas with the lowest access to services and include Murrurundi, Yallaroi, Coolah and Merriwa. In most of the BBSB where population is declining, the prospect is for further withdrawal of services and a compounding of the disadvantage that this represents for business and households.

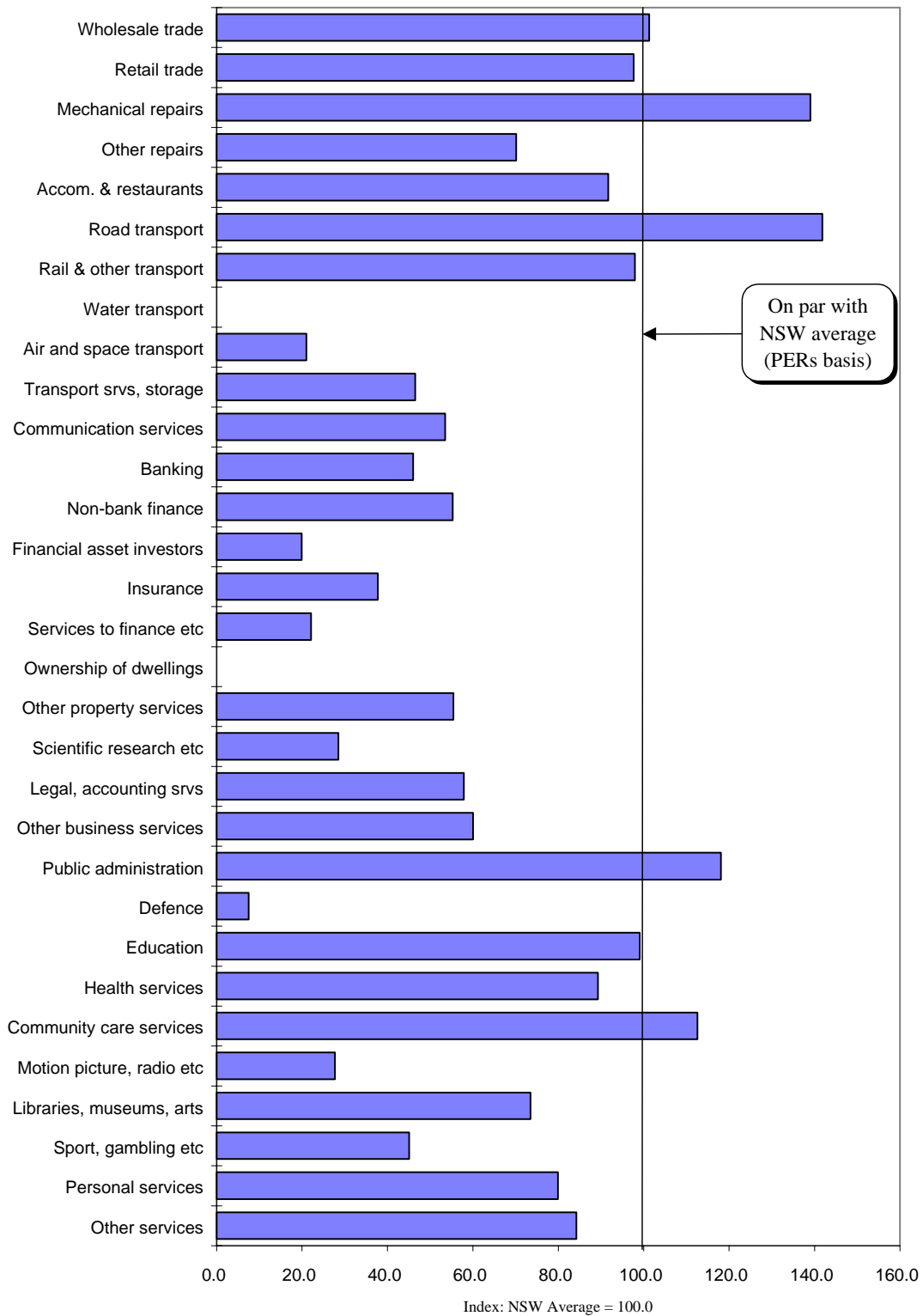
There is strong community concern about access to health services, but the situation for services that involve public funding is generally better than for the privately provided services. This arises from the application of a range of formulae in funding allocations within the public sector. However these services are being rationalised using many of the private sector principles so that those concerns are likely to be justified.

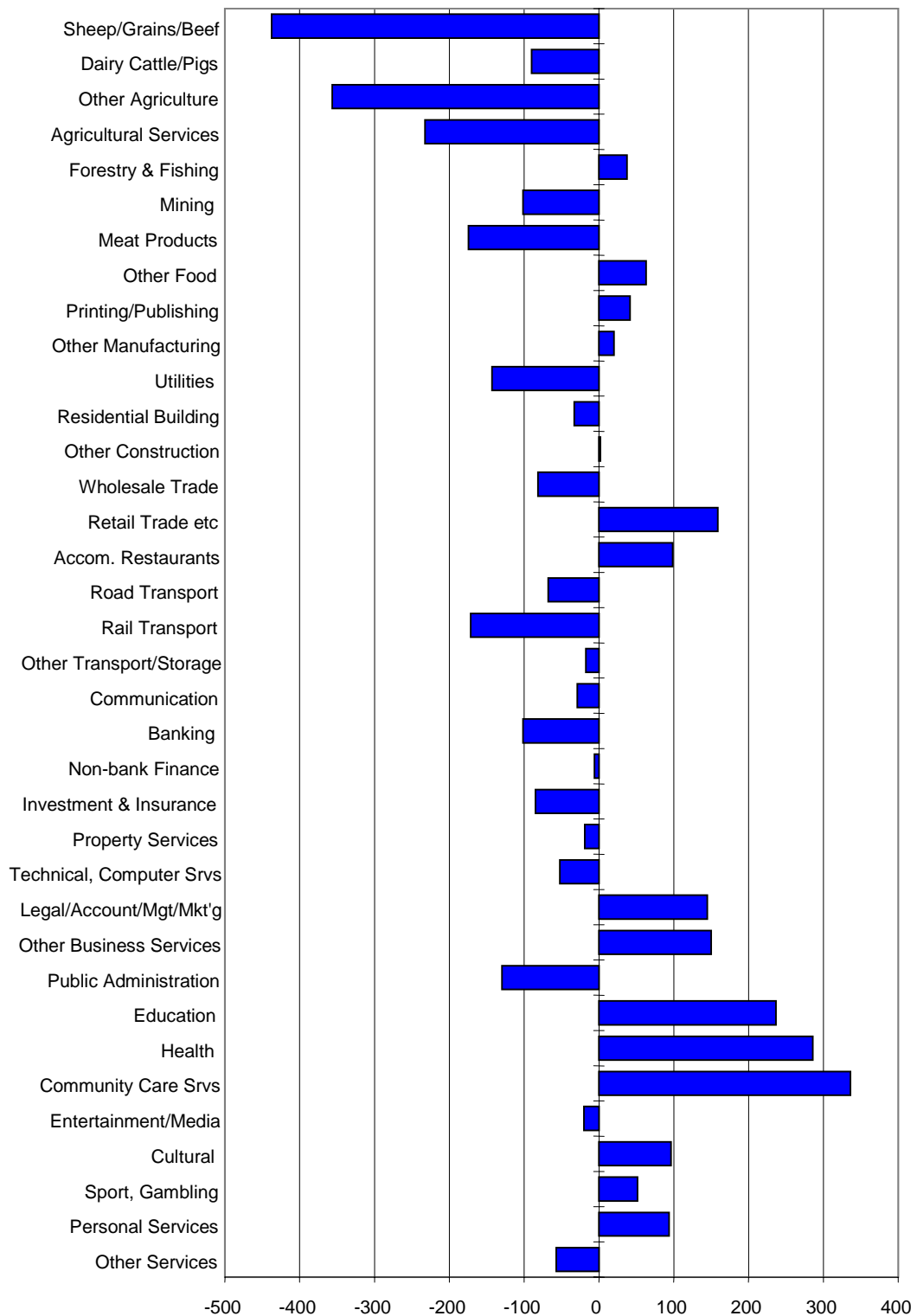
## Industry Performance

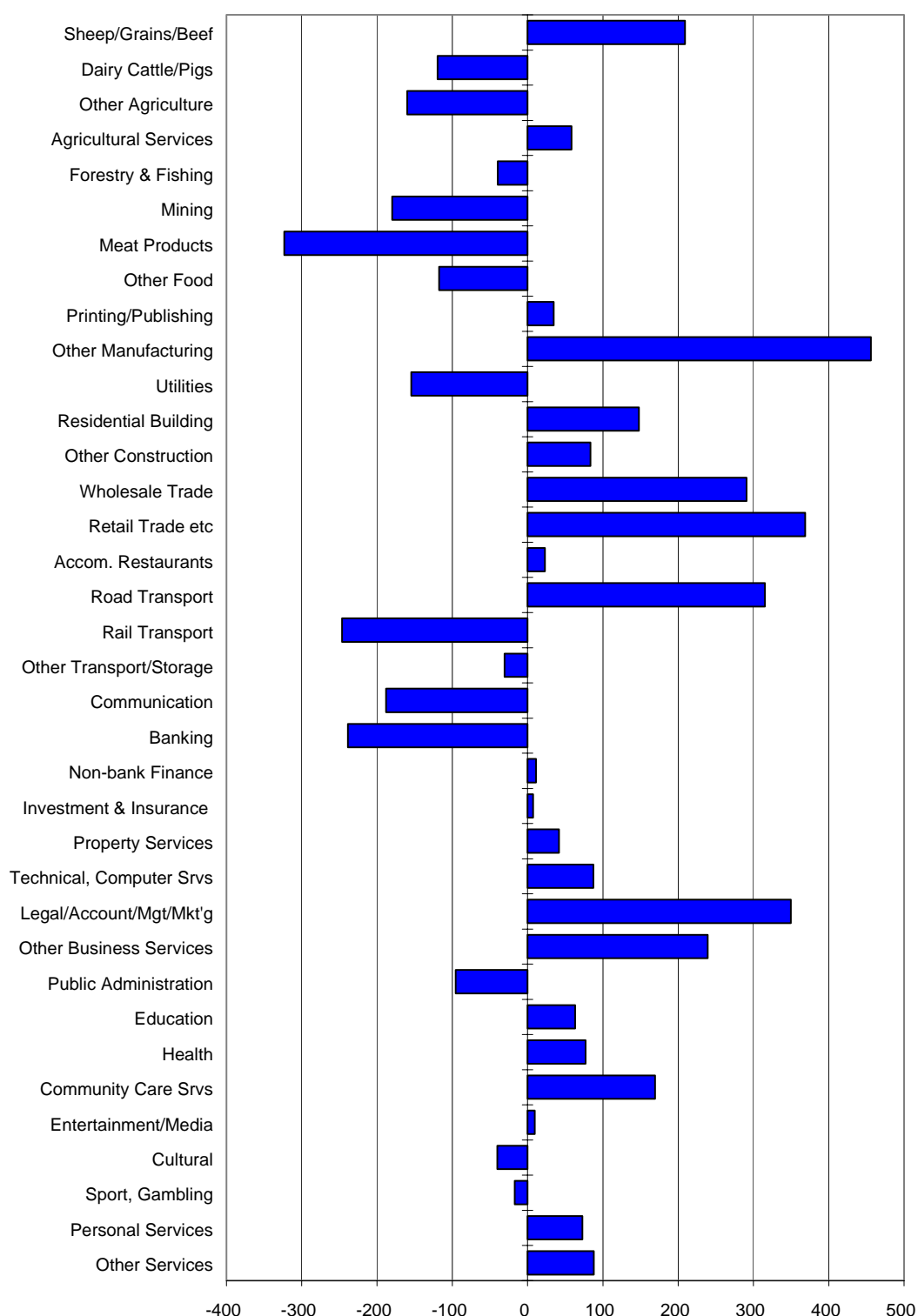
The remainder of this section is focused on identifying industry trends in the BBSB economy, and in comparing the BBSB with trends in NSW as a whole. The analysis is based on detailed employment data from ABS Population Censuses. Detailed information showing trends over the 1990s are included in this discussion. While it would be preferable to use output data, these are not available for many industries.

The change in total employment between 1991 and 1996 was distributed across the sectors as shown in Figure 2-19 and the change between 1996 and 2001 is shown in Figure 2-20. While the net position has not changed much, there is evidence of a substantial amount of structural change occurring contrary to many perceptions about rural areas. In both periods, many sectors have increased employment and others reduced employment. In the early 1990s, there were large losses in agriculture and related activities and strong growth in some services, especially those based on public funding. In the late 1990s, the main losses tended to concentrate in a few industries including meat processing, coal mining and the rationalisations that have occurred in utilities, rail transport, communications and banking. Growth was concentrated in some manufacturing, building and construction, trade, transport and business services that might be perceived to be emerging strengths.

**Figure 2-17: Service Delivery Index, 1996: BBSB**

**Figure 2-18: Service Delivery Index, 2001: BBSB**

**Figure 2-19: Total Change in Employment by Sector, 1991-1996: BBSB**

**Figure 2-20: Total Change in Employment by Sector, 1996-2001: BBSB**

It is possible to assess these changes in the BBSB 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 State growth, industry mix effects and local factors. The analysis can be used to identify the main industry strengths of the regional economies as indicated by an increase in the share of that regional industry of the total NSW industry.

In simple terms, the reasoning is that an industry increasing its share would be likely to have some form of competitive advantage that may be the basis for further growth.

The results for the BBSB region are shown in detail in Attachment 2 and summarised in Table 2-9 for the period 1991 to 1996. Subsequently, the results for the period from 1996 to 2001 will be discussed. This analysis is based on employment data as a proxy for output. Thus all data references refer to levels of employment.

If the BBSB economy performed as well as the NSW economy over 1991 to 1996, then employment would have grown by 2,879 jobs as shown under the State column. The industry mix effect (shown in the Industry column and a net positive value) indicates that the mix of industries in the region was slightly favourable for employment growth. That is, the BBSB had more than 50 percent of its employment in industries defined as high growth industries in NSW as growing faster than the average for all industries. The industry effect was equivalent to 1,125 jobs in the region.

**Table 2-9: Summarised Shift-Share Analysis 1991-96: BBSB**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	2,879	5,629	<b>8,508</b>	<b>882</b>	<b>9,391</b>
Negative Effects	-	(4,505)	<b>(4,505)</b>	<b>(5,476)</b>	<b>(9,981)</b>
<b>Total Effects</b>	<b>2,879</b>	<b>1,125</b>	<b>4,004</b>	<b>(4,594)</b>	<b>(590)</b>

This analysis establishes a benchmark that measures the performance of the BBSB against the overall trend in NSW and its industries. If the BBSB were on this benchmark, then employment would have increased by 4,004 (Table 2-9, Total State column). That benchmark for the BBSB would have resulted in employment changes for each industry as shown in Figure 2-21. The main growth areas statewide were in broadacre agriculture, some manufacturing, residential building, retail trade, accommodation, etc, many business and personal services and an expansion in the range of public-funded services. There was a reduction in other areas of agricultural employment and a rationalisation within many areas of manufacturing, utilities, transport and public administration. The changes reflect growth in tourism statewide and the increasing purchase of services relative to the products of agriculture and manufacturing.

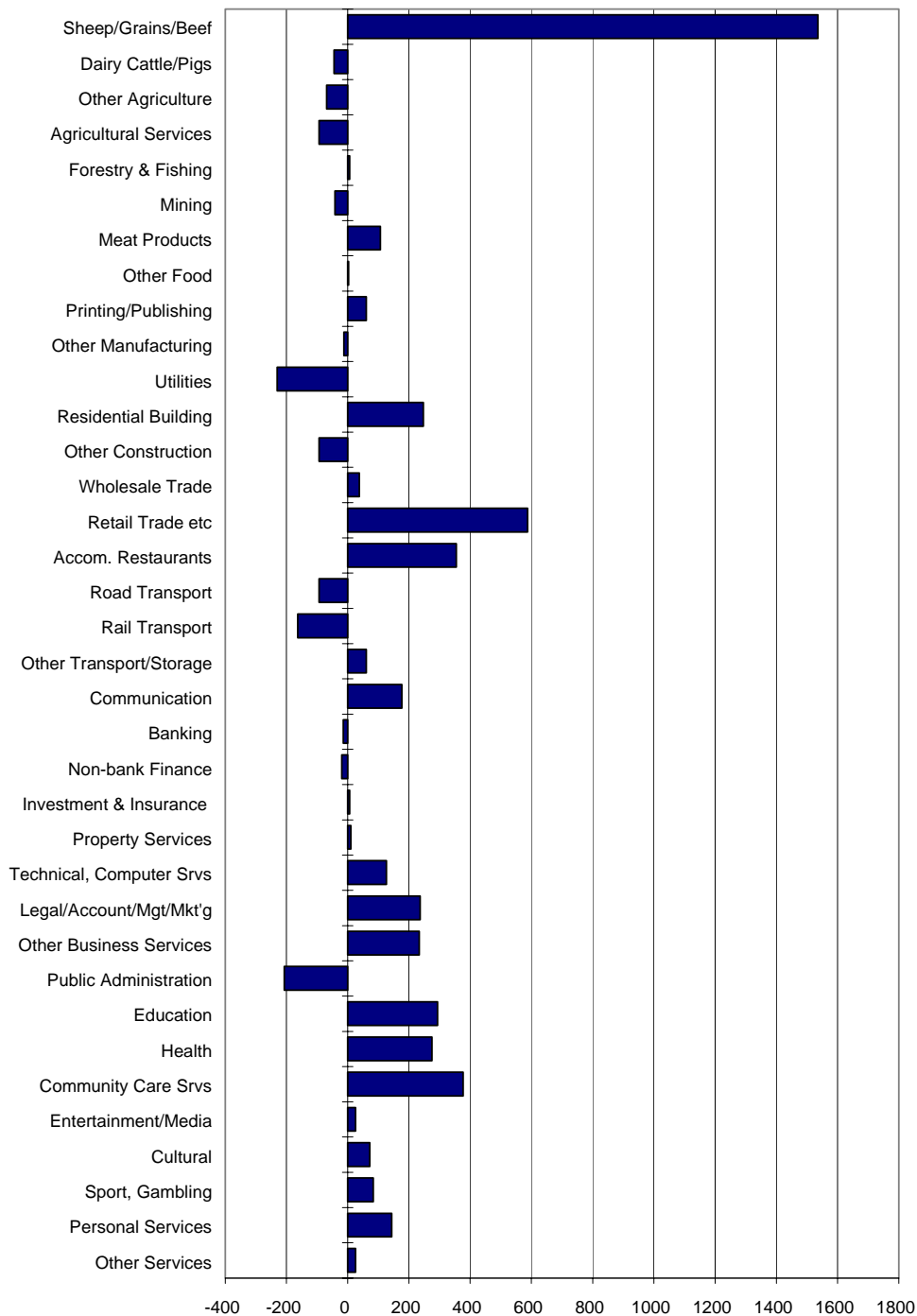
The combined state and industry effects provide a state benchmark of a 4,004 (2,879 + 1,125) job increase in the BBSB over 1991 to 1996. Since jobs actually fell in the local region by 590, the difference between the state benchmark suggests that local factors have been negative to the extent of a growth of 4,594 jobs (4,004 + 590). That means the BBSB did not share in the growth of the NSW economy. The local factors that may impede job growth could include localised seasonal and price conditions; loss of market share due to scale factors; low population growth; low infrastructure investments; 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 many industries did **not** perform as well at the local level as the state benchmark (Figure 2-22). The industries that lost some of their NSW market share included:

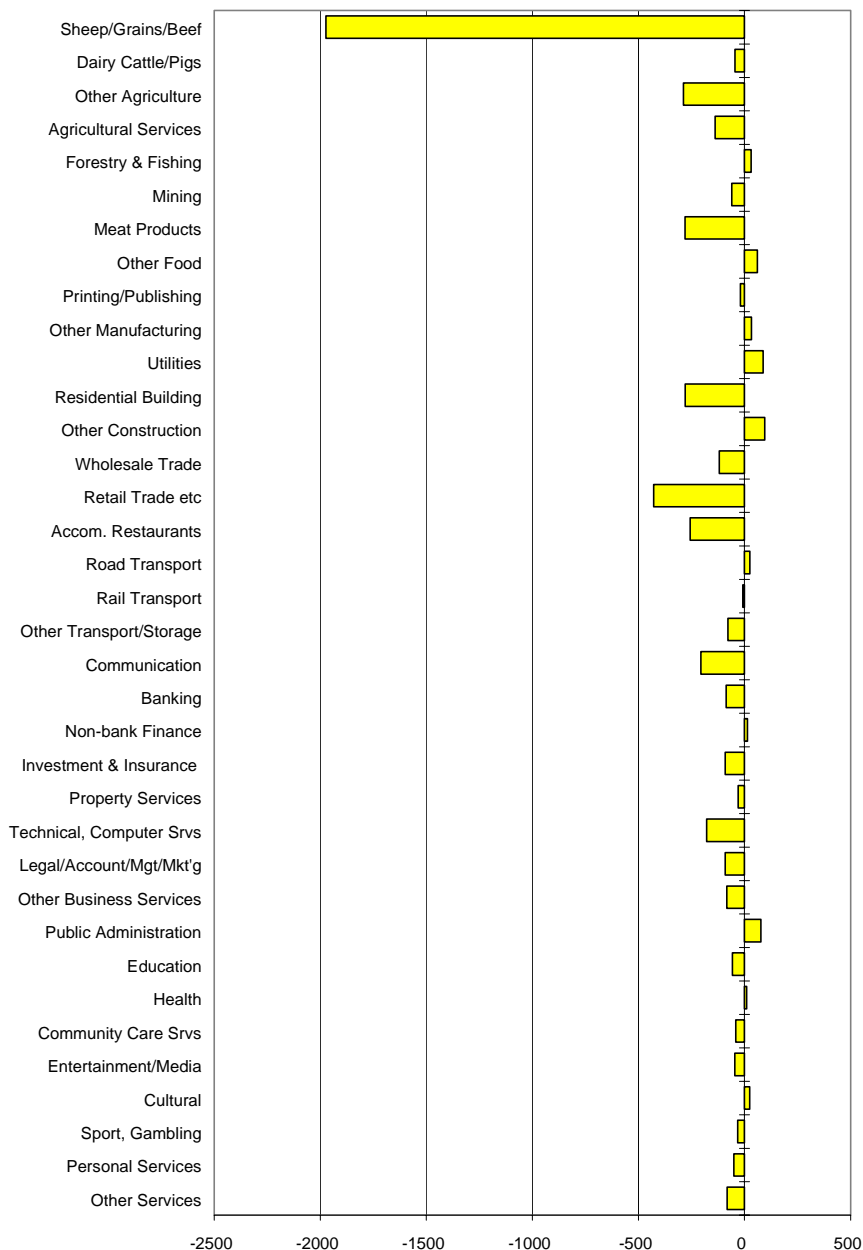
- Most of agriculture
- Some food manufacturing

- Residential building
- Retail trade
- Accommodation, restaurants, etc.
- Transport and communications
- Most business services
- Most personal services

**Figure 2-21: State Component of Change, 1991-1996: BBSB**





**Figure 2-22: Local Influences on Employment Change, 1991-1996: BBSB**

This list shows that demand trends in households has not been favourable for BBSB industries and the demands from local households and visitors to the BBSB has not been sufficient to generate much growth in local service industries.

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:

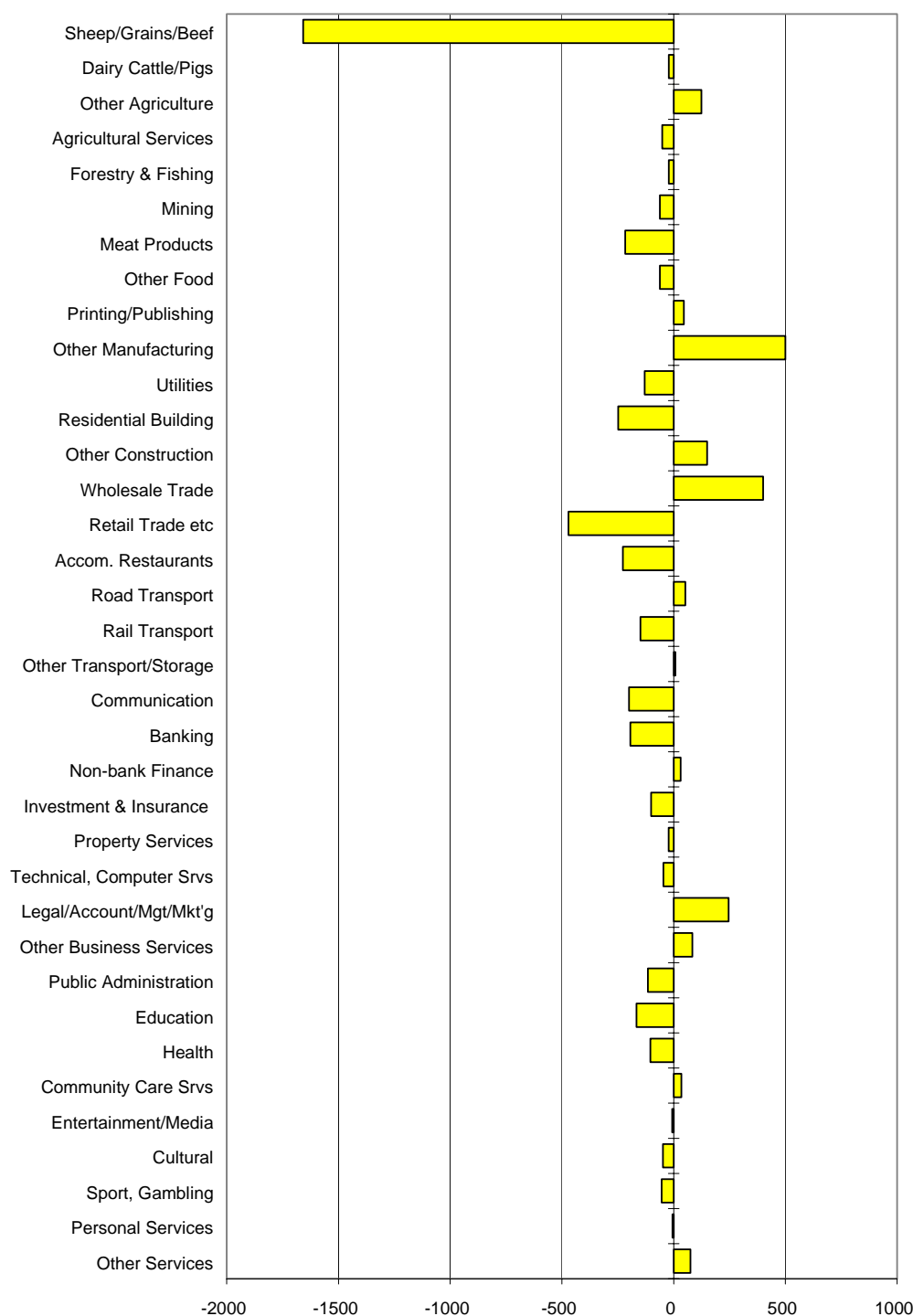
- Other food manufacturing
- Utilities
- Other construction
- Road transport
- Public administration

- Forestry and fishing and sawmilling (see detailed tables in the attachment)

In NSW, both the forestry and wood manufacturing sectors showed a small increase in employment. Within the BBSB, local factors were positive for forestry and logging and for wood manufacturing. This result reflects some growth in the harvesting and milling of cypress pine.

The analysis of employment change for the 1996 to 2001 period is summarised in Table 2-10 with the local effects shown in Figure 2-23. The main difference in this period is that there is a net positive change in employment, mostly associated with a smaller loss of employment from local factors.

**Figure 2-23: Local Influences on Employment Change, 1996-2001: BBSB**



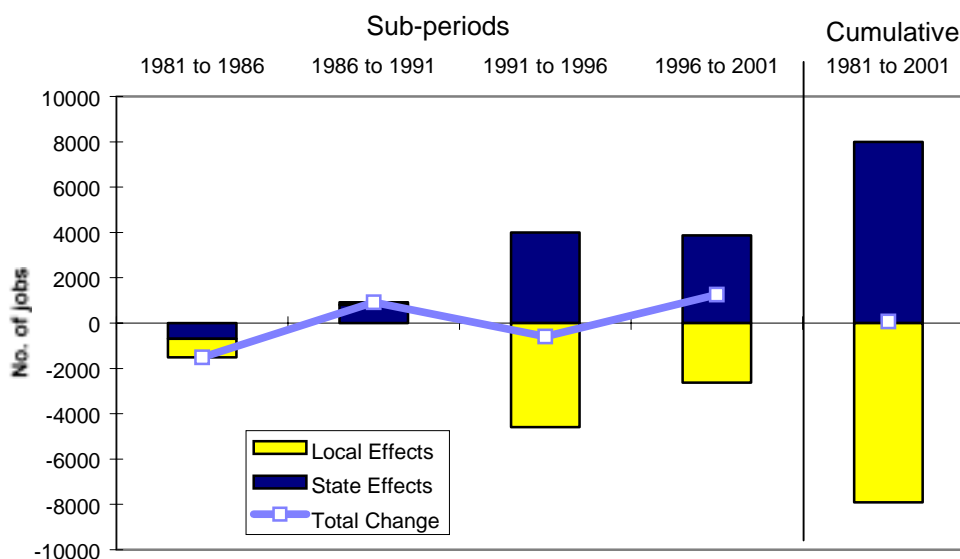
**Table 2-10: Summarised Shift-Share Analysis 1996-2001: BBSB**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	3,258	3,393	<b>6,651</b>	<b>2,213</b>	<b>8,864</b>
Negative Effects	-	(2,775)	<b>(2,775)</b>	<b>(4,837)</b>	<b>(7,612)</b>
<b>Total Effects</b>	<b>3,258</b>	<b>618</b>	<b>3,877</b>	<b>(2,625)</b>	<b>1,252</b>

There are only a small number of sectors that have positive local effects that indicated industries that are increasing their share of the market. The best results have occurred in wholesale trade, other manufacturing and some business services. That does not suggest the existence of many industries that are using their competitiveness to take a larger share of the NSW or other markets, although some of the growing sectors may be competing effectively against imported services.

Among the contracting employment sectors due to local factors is agriculture, meat processing, retail trade and accommodation etc. These are key sectors for the BBSB and if they lose market share for an extended period of time then it would not augur well for the future growth of the BBSB.

The shift share analysis for the 1981 to 2001 is shown in Figure 2-24. Between 1981 and 1986 there was a small decrease in employment in the BBSB. The dominant factor at that time appeared to be the weak growth in NSW as a whole that was under the influence of high inflation and interest rates. Over that period the BBSB lost employment faster than NSW as indicated by the negative local effects.

**Figure 2-24: Summarised Shift-Share Analysis: Brigalow Region: 1981- 1996**

In the 1986 to 1991 period growth in NSW was very strong. This was offset marginally in the BBSB where local factors were negative. Perhaps this was a period when the high growth in NSW made it possible for some people to leave the region and find employment elsewhere in the high growth industries and regions of NSW. In the period from 1991 to 1996, the potential for high growth in NSW was impacted by recession while at the local level, unfavourable seasonal conditions and commodity prices generated a negative

employment trend. The most recent period was not spectacular given the high growth in the NSW economy. Limited local capacity appeared to constrain regional growth to a level well below the NSW trend.

The analysis reported for the BBSB in total has been replicated in each of the LGAs of the region. That is reported in Attachment 1. What is evident there is the very different performance in Dubbo relative to the rest of the region. The smallest of the LGA economies, Merriwa, Coolah and Yallaroai present as economies that have a difficult future in the present economic environment.

## 2.5 REGIONAL INCOMES

Household income data are relatively difficult to obtain while the reliability is low for a number of reasons related to the way people respond to personal questions. Yet income is an important variable in market economies as it plays a role in the movement of population toward areas of relatively high incomes.

The ABS Population Census information on personal incomes provides the basis for comparing incomes across industries and among the LGAs. This information is provided in Table 2-11 and shown relative to NSW in Table 2-12. Incomes in the BBSB average 85 percent of the NSW level. This percentage is about average for regional NSW. The highest percentages occur in industries with statewide-determined employment conditions such as mining, utilities, education and community care. Dubbo has the highest income levels in the region followed by those areas with diversified cropping and cotton production (Moree Plains, Narrabri and Gunnedah). The LGAs where broadacre agriculture is the core industry have lower average incomes.

**Table 2-11: Average Incomes by Industry by LGA**

	Dubbo	Coolah	Coonabarabran	Gilgandra	Merriwa	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yallaroai	NSW
Agriculture, Forestry & Fishing	21,980	13,624	12,945	13,639	16,469	17,710	17,515	23,112	21,676	17,682	16,729	18,035
Mining	40,476	28,574	38,974	0	66,271	29,861	54,595	18,174	30,325	38,974	12,974	55,395
Manufacturing	23,840	17,580	19,220	18,174	20,105	23,374	23,494	22,859	24,268	21,502	21,352	27,288
Electricity, Gas & Water Supply	34,910	28,574	27,030	28,574	34,632	34,632	33,131	28,178	29,754	28,942	32,032	35,495
Construction	26,995	22,186	22,688	22,026	22,859	23,374	22,516	24,315	23,677	23,780	20,105	27,430
Wholesale Trade	25,413	20,233	21,563	22,891	22,516	15,226	23,809	27,014	26,461	27,084	21,830	28,612
Retail Trade	17,365	16,083	16,555	16,297	16,887	13,125	16,568	18,357	16,870	16,387	14,735	17,571
Accommodation, Cafes & Restaurants	15,617	12,182	13,739	14,100	13,442	11,588	15,303	16,724	15,743	15,886	11,944	18,014
Transport and Storage	26,776	21,031	24,232	22,978	29,003	23,160	26,066	22,872	25,047	27,666	26,858	30,257
Communication Services	32,002	34,632	26,858	28,574	16,432	33,774	28,145	24,983	24,018	25,305	30,290	32,965
Finance and Insurance	26,343	22,087	22,945	22,672	26,832	23,374	24,661	28,758	24,532	25,691	30,505	31,574
Property and Business Services	25,078	32,916	24,447	19,461	16,887	12,974	23,314	25,147	25,671	20,534	27,471	30,773
Government Administration & Defence	31,472	21,502	25,651	25,787	24,518	24,477	28,238	27,343	25,259	26,125	23,196	32,593
Education	34,223	28,942	28,574	30,505	26,644	25,433	27,609	27,920	30,583	28,970	26,735	32,286
Health and Community Services	24,837	22,230	23,494	19,783	18,174	21,873	19,570	23,251	22,087	21,926	23,223	24,636
Cultural & Recreational Services	23,488	24,822	26,489	13,858	24,579	16,432	15,180	26,297	18,174	12,974	23,374	25,485
Personal and Other Services	21,973	14,004	17,706	27,287	22,516	15,119	19,277	21,889	20,534	17,852	26,832	23,990
Non-classifiable economic units	19,821	11,232	11,258	12,272	13,832	18,174	18,689	15,815	20,352	14,905	1,040	23,374
Not stated	10,584	10,192	11,473	12,459	8,658	11,018	15,689	13,516	14,118	13,296	12,974	16,449
Total	23,849	17,404	18,589	18,454	18,818	18,804	21,402	22,864	22,287	21,024	19,583	26,078

The average income data combined with employment data allows estimates of the earnings of each industry for each LGA. These are shown in Table 2-13. This indicates a total income of \$971m, equivalent to 1.4 percent of NSW. Almost 40 percent accrue to residents in Dubbo where the earnings are widely spread over many industries. In the other major income earning LGAs of Moree Plains, Narrabri and Gunnedah, there is a dominance of earnings from agriculture.

**Table 2-12: Incomes Relative to NSW by Industry**

	Dubbo	Coolah	Coonabarabran	Gilgandra	Merriwa	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yallaro	NSW
	%	%	%	%	%	%	%	%	%	%	%	%
Agriculture, Forestry & Fishing	122	76	72	76	91	98	97	128	120	98	93	100
Mining	73	52	70	0	120	54	99	33	55	70	23	100
Manufacturing	87	64	70	67	74	86	86	84	89	79	78	100
Electricity, Gas & Water Supply	98	81	76	81	98	98	93	79	84	82	90	100
Construction	98	81	83	80	83	85	82	89	86	87	73	100
Wholesale Trade	89	71	75	80	79	53	83	94	92	95	76	100
Retail Trade	99	92	94	93	96	75	94	104	96	93	84	100
Accommodation, Cafes & Restaurants	87	68	76	78	75	64	85	93	87	88	66	100
Transport and Storage	88	70	80	76	96	77	86	76	83	91	89	100
Communication Services	97	105	81	87	50	102	85	76	73	77	92	100
Finance and Insurance	83	70	73	72	85	74	78	91	78	81	97	100
Property and Business Services	81	107	79	63	55	42	76	82	83	67	89	100
Government Administration & Defence	97	66	79	79	75	75	87	84	77	80	71	100
Education	106	90	89	94	83	79	86	86	95	90	83	100
Health and Community Services	101	90	95	80	74	89	79	94	90	89	94	100
Cultural & Recreational Services	92	97	104	54	96	64	60	103	71	51	92	100
Personal and Other Services	92	58	74	114	94	63	80	91	86	74	112	100
Non-classifiable economic units	85	48	48	53	59	78	80	68	87	64	4	100
Not stated	64	62	70	76	53	67	95	82	86	81	79	100
Total	91	67	71	71	72	72	82	88	85	81	75	100

**Table 2-13: Total Estimated Income by Industry by LGA**

	Dubbo	Coolah	Coonabarabran	Gilgandra	Merriwa	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yallaro	NSW
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Agriculture, Forestry & Fishing	21.5	8.4	9.0	8.2	6.2	5.8	17.6	44.7	35.2	11.9	11.2	1,666
Mining	3.6	0.0	0.2	0.0	1.4	0.5	9.0	0.1	0.3	0.3	0.0	1,196
Manufacturing	31.3	0.5	2.1	0.9	0.6	0.9	13.2	6.0	7.6	1.6	1.0	8,517
Electricity, Gas & Water Supply	6.7	0.3	0.4	0.1	0.2	0.3	1.3	1.5	2.9	0.7	0.3	782
Construction	29.1	1.2	1.8	1.9	0.8	1.1	4.1	6.2	6.7	2.6	0.3	4,488
Wholesale Trade	25.6	0.7	1.7	1.7	0.7	0.5	7.0	9.6	7.7	2.8	1.3	4,588
Retail Trade	48.9	2.1	4.8	3.9	1.1	1.1	11.0	16.4	12.5	3.7	1.3	6,007
Accommodation, Cafes & Restaurants	12.9	0.9	2.5	1.5	0.6	0.6	3.2	4.9	4.4	0.9	0.4	2,285
Transport and Storage	21.1	1.2	2.1	1.6	1.0	1.0	4.7	4.0	8.3	2.8	0.7	3,680
Communication Services	10.0	0.6	0.7	0.5	0.2	0.6	1.4	2.6	1.6	0.8	0.7	1,772
Finance and Insurance	12.9	0.3	1.0	0.5	0.4	0.4	2.4	5.6	2.6	1.1	0.5	3,860
Property and Business Services	21.5	0.9	2.3	0.9	0.3	0.4	5.8	8.4	8.9	1.6	0.7	8,379
Government Administration & Defence	21.1	0.9	2.7	2.0	1.5	1.0	6.0	6.4	6.1	2.1	1.9	3,597
Education	38.2	3.8	6.1	3.8	1.5	0.7	9.6	11.7	11.4	4.1	2.4	5,602
Health and Community Services	42.0	2.3	4.8	3.0	0.9	1.6	8.7	11.0	9.6	3.9	1.6	5,885
Cultural & Recreational Services	6.5	1.1	0.9	0.1	0.1	0.1	0.6	3.2	0.5	0.3	0.1	1,529
Personal and Other Services	11.0	0.3	1.0	1.0	0.2	0.4	2.6	4.6	2.8	1.0	0.2	2,190
Non-classifiable economic units	2.8	0.1	0.2	0.2	0.2	0.1	0.8	1.5	1.4	0.3	0.0	792
Not stated	2.6	0.4	0.8	0.7	0.2	0.3	2.1	2.2	1.9	0.7	0.6	737
<b>Total</b>	<b>369.3</b>	<b>25.9</b>	<b>45.1</b>	<b>32.5</b>	<b>18.1</b>	<b>17.4</b>	<b>111.1</b>	<b>150.7</b>	<b>132.4</b>	<b>43.2</b>	<b>25.3</b>	<b>67,551</b>

Additional information compiled by the Department of Social Security is indicative of the relative position of household income in the region. Bray and Mudd (1998) compiled estimates of household income from tax statistics and related those to the levels of income tax paid and (Federal government) social welfare benefits received in each LGA. For the BBSB the estimates were:

Gross Income	\$1,084m
Income tax paid	\$192m
Social welfare benefits	\$181m

Although the income estimates of Bray and Mudd are above those shown in Table 2-13, the differences are relatively small given the nature and quality of the data used for the estimates.

Some additional estimates relating to household income are shown in Table 2-14 to show the various sources of income and estimate household disposable income (post-tax

income). Welfare payments amounted to 17 percent of gross income compared with the NSW level of 12 percent. The ratio of tax paid to benefits received in the BBSB was 1.1 and is well below the ratio for NSW of 1.6. Total income tax paid is almost offset by the total of federal government welfare benefits received. Thus, this region is one where the household income situation appears to be well below the average for NSW. Only in Dubbo and Narrabri does the tax paid figure exceed the DSS benefits received. The overall results would reflect the poor seasonal and commodity market situation that applied in the mid 1990s. In any case, the household income situation in the BBSB is weak relative to NSW, particularly in those areas other than Dubbo.

**Table 2-14: Total Estimated Regional Income: Sources and Balances**

	Employed Persons Income	Non-employed Persons		Gross Income	Income Tax	Post Tax income	Calculated Tax:Benefi t Ratio
	\$m	Government Transfers	Investment Income				
		\$m	\$m	\$m	\$m	\$m	
Dubbo	369.3	69.7	57.0	496	92	404	1.3
Coolah	25.9	9.6	3.5	39	6	33	0.6
Coonabarabran	45.1	18.3	10.6	74	12	62	0.7
Gilgandra	32.5	11.5	7.0	51	8	43	0.7
Merriwa	18.1	5.1	3.8	27	4	23	0.8
Murrurundi	17.4	5.1	3.5	26	4	22	0.8
Gunnedah	111.1	28	15.9	155	27	128	1.0
Moree Plains	150.7	33.6	30.7	215	40	175	1.2
Narrabri	132.4	28.6	23.0	184	33	151	1.2
Quirindi	43.2	10.4	4.4	58	10	48	1.0
Yallaroi	25.3	7.9	3.8	37	6	31	0.8
<b>BRIGALOW</b>	<b>971.0</b>	<b>227.8</b>	<b>163.2</b>	<b>1362.0</b>	<b>242.0</b>	<b>1120.0</b>	<b>1.1</b>
<b>NSW</b>	<b>67551.0</b>	<b>11485.6</b>	<b>15199.4</b>	<b>94236</b>	<b>18602</b>	<b>75634</b>	<b>1.6</b>

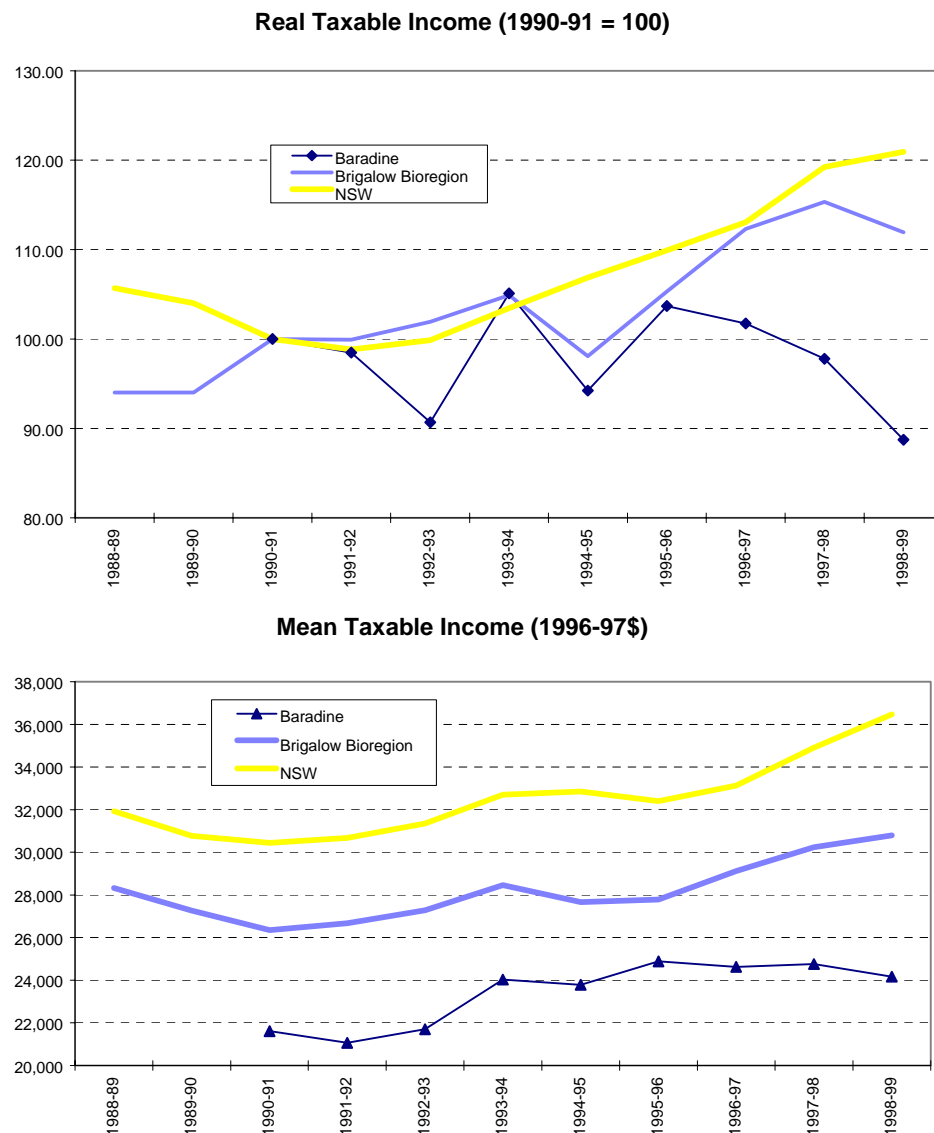
Source: ABS and DSS (1998)

At this stage, there are no plans to update the information compiled by Bray and Mudd. In the last two years, the situation may have improved due to higher earnings in agriculture. Income tax payments would have risen and welfare benefits receipts are likely to have declined along with lower levels of unemployment.

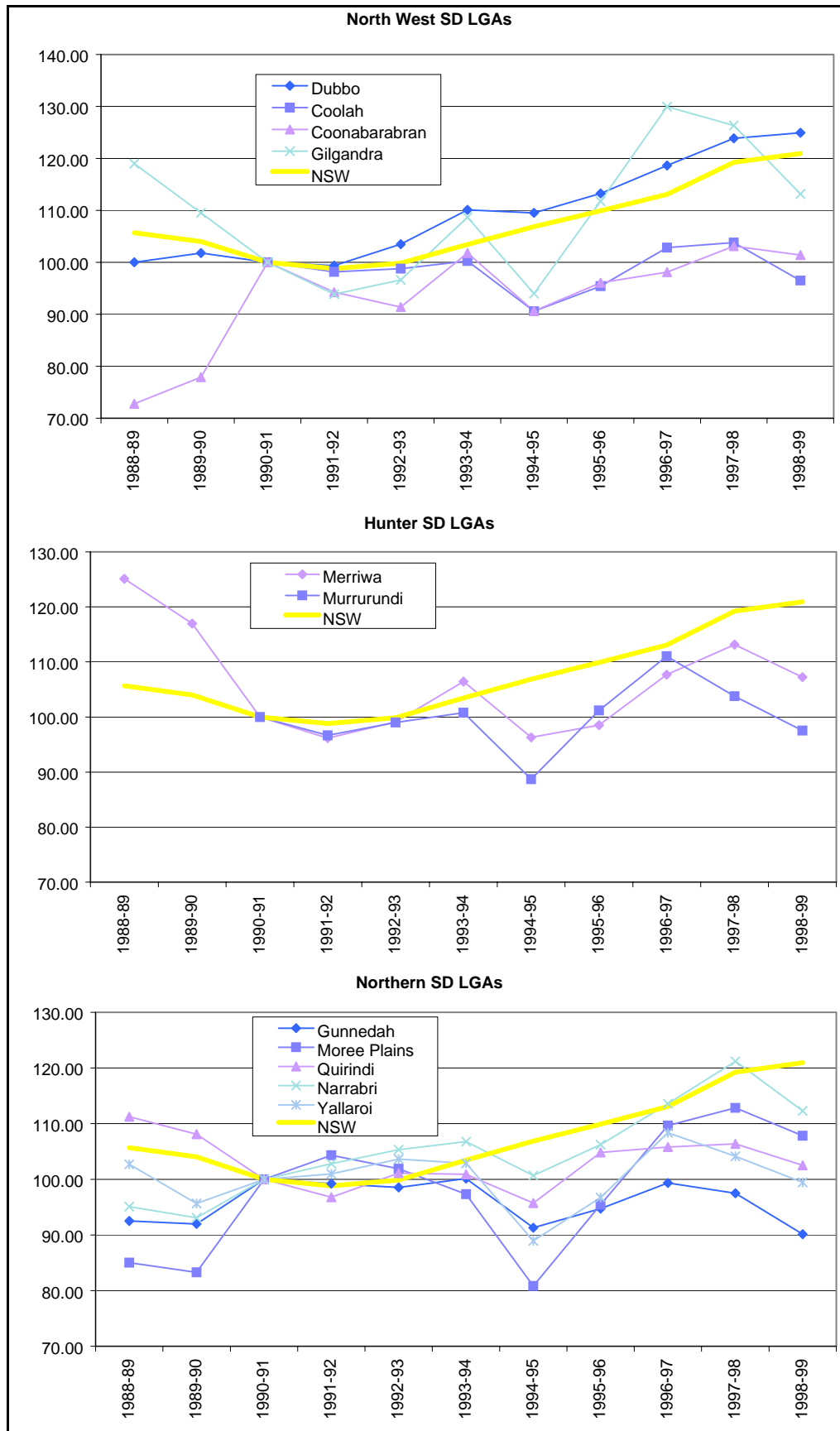
The trend in household income can be identified from taxation statistics relating to income tax payers. These data will not readily be compatible with the above income estimates based on population census data. However, it is likely that they may be consistent indicators over time after allowing for the various ways in which taxable income may be manipulated. These data are compiled on a postcode basis and related to LGAs.

A summary is provided in Figure 2-26 of the key trends. The first section is in index form to indicate the trend and includes a comparison of the BBSB with NSW and with Baradine as a sample local area. This chart highlights the large fluctuations in taxable income in the regions relative to NSW as a whole. It also suggests that the growth in taxable income is lower in the regions than in NSW as a whole.

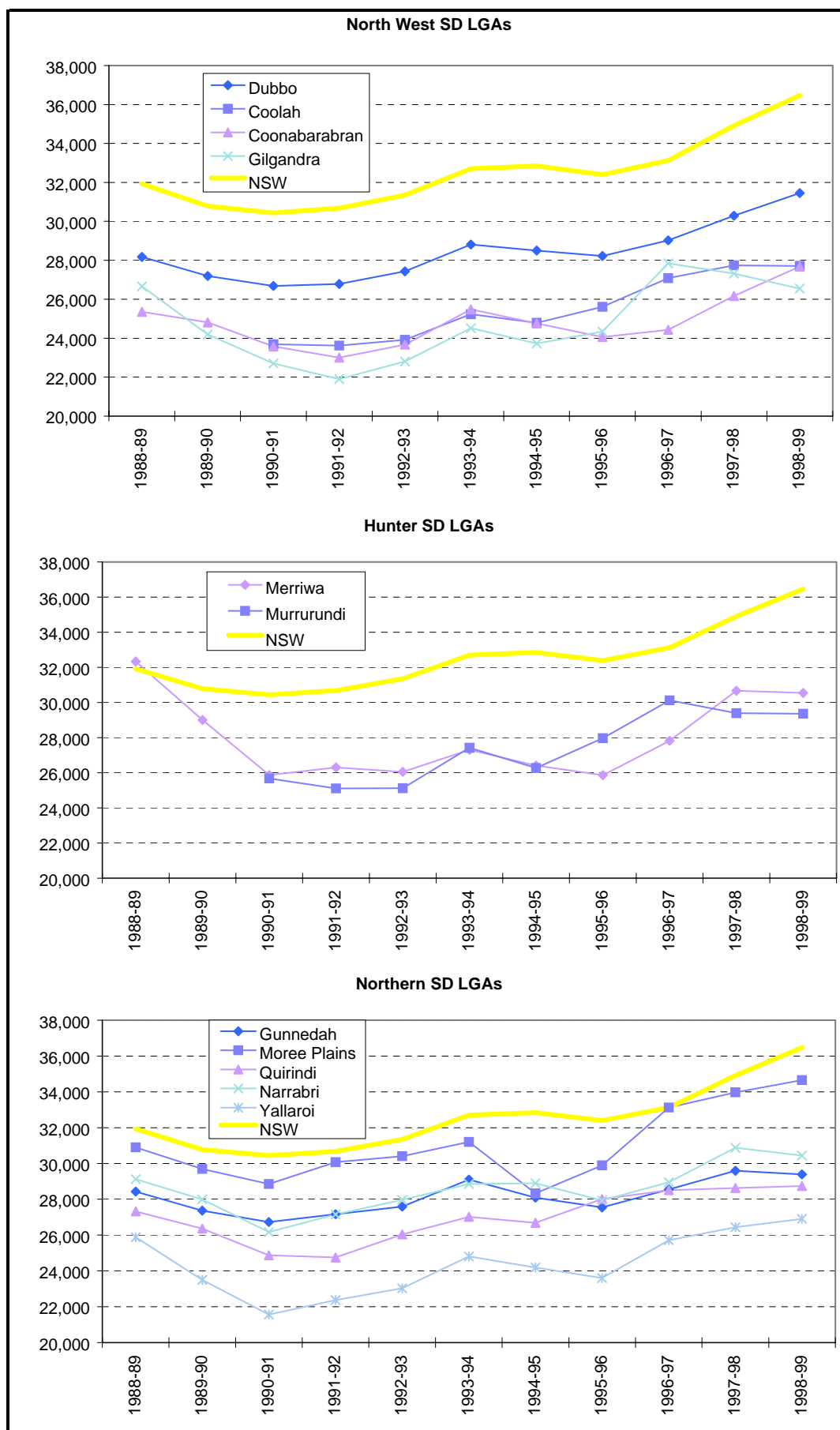
The second section of Figure 2-26 refers to mean taxable income. This shows the differences in the level of income. Mean taxable income in the BBSB is around 15 percent (\$5000) below that of NSW while Baradine is lower again by a similar amount relative to the BBSB average. These data confirm the earlier evidence of relatively low levels of household income in the BBSB along with the trend that the relative situation had deteriorated further up to 1998-99. Better agricultural conditions since then would have improved that situation, but that is now changing again under the influence of drought.

**Figure 2-25: Taxable Income in the BBSB**

The overview charts discussed above are shown for each of the LGAs in Figure 2-26 (real taxable income trends in index form) and in Figure 2-27 (mean taxable income adjusted for inflation using the CPI). It is notable that Dubbo has income levels rising faster than NSW, although the level of income is still some \$5000 below the NSW average. Moree Plains is the only LGA with income levels approaching the NSW average (note the impact of the drought in the mid-1990s). Otherwise, the other LGAs have income levels well below that of the NSW average. That situation is not conducive to retaining people who are mobile or attracting people with ambition to the region. It is a situation that will further enhance the position of Dubbo relative to its hinterland.

**Figure 2-26: Real Taxable Income (1990-91 = 100)**



**Figure 2-27: Mean Taxable Income (1996-97\$)**

## 2.6 OTHER ECONOMIC INDICATORS

In this section, some other indicators are discussed. These are more complex in a number of ways, but have been developed to highlight some of the characteristics of regions that are either favourable or unfavourable to their economic development. The measures are being refined and their significance in cross-sectional analysis of regional economy performance is yet to be established. The measures for 1991 to 1996 are shown in Table 2-15 and are discussed in turn. Subsequently, a similar set of results are presented for 1996 to 2001.

**Table 2-15: Other Selected Indicators, 1996, BBSB**

	Diversity Index (CS)		Industry Mix		Competitiveness		Service Delivery				Business Services	
	1991	1996	weighted	growth	weighted	growth	Surplus	Deficit	Net	PER	1991	1996
			%	%	%	%	%	%	%		%	%
Dubbo	15.8	16.5	49.7	1.1	57.9	1.9	11.5	-9.8	2.8	3.1	17.8	16.3
Coolah	46.2	48.0	55.1	-14.2	42.9	-5.4	4.9	-40.1	-38.9	5.5	10.4	8.0
Coonabarabran	32.7	34.5	55.9	-1.1	17.4	-18.4	3.3	-32.0	-33.6	4.7	12.3	10.8
Gilgandra	39.5	37.6	56.6	6.4	20.3	-19.1	3.4	-32.5	-32.5	4.9	8.4	9.1
Merriwa	49.4	48.9	36.5	-13.1	65.6	-0.8	4.6	-39.4	-38.2	5.7	7.6	9.0
Murrurundi	45.6	41.6	48.9	1.7	29.8	-16.9	4.7	-30.1	-26.9	4.8	14.9	11.7
Gunnedah	31.7	30.0	53.8	7.7	30.0	-19.0	2.3	-23.0	-24.2	4.3	11.6	11.8
Moree Plains	32.2	30.5	50.7	6.7	12.7	-23.0	2.6	-15.1	-14.8	3.9	12.2	12.8
Narrabri	32.5	31.7	46.6	0.3	36.9	-9.0	3.6	-20.1	-17.3	4.1	15.3	14.9
Quirindi	40.1	35.1	50.8	-0.9	49.3	-10.5	3.7	-24.1	-21.2	4.4	11.4	12.6
Yallaro	51.6	53.5	62.0	26.4	23.4	-48.2	2.8	-40.1	-43.3	6.2	7.9	7.1
<b>Brigalow</b>	<b>24.4</b>	<b>23.1</b>	<b>51.2</b>	<b>2.6</b>	<b>22.1</b>	<b>-10.5</b>	<b>2.8</b>	<b>-16.0</b>	<b>-14.5</b>	<b>3.9</b>	<b>13.9</b>	<b>13.5</b>
<b>NSW</b>	<b>5.3</b>	<b>4.6</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>3.2</b>	<b>21.5</b>	<b>22.9</b>

Notes: Diversity Index or CS - Coefficient of Specialisation range 0-100

Industry Mix (weighted): Proportion of total 1996 Nt in sectors with faster than average growth b/w 1991 & 1996

Industry Mix (growth): Industry Mix component of growth as proportion of total 1996 Nt

Industry Competitiveness (weighted): Proportion of total 1996 Nt in sectors with increasing competitiveness (market share)

Industry Competitiveness (growth): Local component of growth as proportion of total 1996 Nt b/w 1991 & 1996

Service Delivery: Jobs potential in the services sectors (from wholesale trade to other services) as % of total 1996 Nt

Service Delivery: Population employment ratio for the aggregate services sectors (wholesale trade to other services)

Business Services: Proportion of Total Nt in services to business (from road transport to other business services)

### Industry diversity

There is some tension in economic development between being specialised and competitive in a few industries and having a diversity of industries to provide some insulation from fluctuations in key industries. This issue involves applying some of the portfolio concepts from investment theory to the development of a more diverse economy. Many regional economies are heavily reliant on a small number of key industries. The response is to have diversification of the economy as a plank in the economic development strategy.

A measure of the industry diversity in the economy is the coefficient of specialisation (CS). The calculations are relatively complex. (The CS is calculated as the sum of the differences between the proportions of local and national employment in each sector). The resulting index relates to a scale that allocates a value of 0 to the Australian economy. At the other extreme, the maximum CS is 100 indicating that a region has only one industry.

This measure can be used to gauge the extent of specialisation in an economy and how the value changes over time. Most economies tend to become more diversified over time. However, the rate of diversification varies among regions. The values are shown for 1991 and 1996 for each of the LGAs in the BBSB in Table 2-15. Note that smaller values are preferred. The CS for the BBSB has declined slightly over 1991 to 1996. That trend has occurred in most areas of the region apart from Dubbo, Coolah and Coonabarabran. But the fall is slower than that for NSW as a whole. The levels vary considerably among the LGAs with Dubbo being most diversified at 16 to Yallaro at 50.

Overall, the limited diversification into industries that run on different business and seasonal cycles is a feature of this region apart from Dubbo. Building diversity is difficult

in these regions and it is important that they strive to retain the diversity that already exists, particularly in areas that are less sensitive to seasonal conditions and commodity price cycles.

### **Industry Mix**

Industry diversity is one aspect of economic structure and the composition of high and low growth industries is another. High and low growth industries can be readily established by considering past trends. The future may be different from the past as evidenced by the swing in roles played by the 'high-tech' industries over the last three years. There is on going commentary as well as past analyses of the growth levels and potential of various industries. For example, transport and logistics, media and communications are recognised as high growth areas while health expenditure, in all its forms, accounts for a rising share of our economy. Many areas of manufacturing and agriculture are perceived as low growth areas.

One way of assessing the industry mix factor is to use the NSW information to identify those industries that over a period of time grew faster / slower than average. This could be based on output but is limited by data. The employment by industry data from the population censuses can be used for this purpose. Regional economies can be assessed by comparing their mix of industries relative to the state mix.

The benchmark will have 50 percent of employment in each of high and slow growth industries (allocating those industries at the average level equally into the two categories). The regional assessment calculates the proportion of regional employment in the high growth industries as shown in Table 2-15 under industry mix. For the BBSB, 51.2 percent of employment in the region is in NSW industries that had high growth over 1991 to 1996. That is a favourable situation indicating that growth in the region was not associated with a poor mix of industries. The slightly negative mix in Dubbo is likely to be attributable to its importance in manufacturing that in NSW was not a high growth industry. The worst industry mix occurred in Merriwa and appeared to be important in its poor economic performance and situation. Yallaroi is indicated as being favoured in a significant way.

The value of this measure is that it indicates generally that the mix of industry does not seriously disadvantage the BBSB. Overall it is a small positive factor for the region and a negative in a few LGAs. While it helps to have a favourable industry mix, it is not the only factor in the economic health and growth in the region.

### **Industry Competitiveness**

Industry competitiveness is a major factor in the success of any industry. Competitive analysis is difficult to undertake, particularly in a dynamic environment where change is rapid. A simple assessment can be gained by identifying whether an industry in a region is increasing its share of that industry in NSW. Using employment by industry data, it is possible to calculate the share of the NSW industry taken by that industry in a region. A comparison of that measure in 1991 with the measure in 1996 will identify those industries that increase their share. The level of employment in those 'competitive' industries can then be expressed as a proportion of 1996 employment. It is expected that the best economies will have a large share of their employment in those competitive industries.

The resulting estimates are shown in Table 2-15 under the Competitiveness (weighted) heading. For the BBSB, industries that increased their share of the NSW industry accounted for 22.1 percent of all 1996 employment. That is a relatively low proportion and could indicate that there is an ongoing disadvantage to many industries in the region that is contributing to low economic growth. The extent of that disadvantage varies among the LGAs.

The Competitiveness (growth) column measures the local component of employment growth as a proportion of 1996 employment. This is the sum of the positive and negative growth in employment shown in Figure 2-22 expressed as a percentage of the 1996 employment. Thus, a negative measure indicates that the employment losses in industries losing competitiveness exceed the employment gains in industries gaining competitiveness. For the BBSB as a whole, this net loss of competitiveness contributed a reduction in employment of 10.5 percent of the 1996 employment level. Only in Dubbo did this factor have a positive impact on employment over the 1991 to 1996 period.

In summary, for much of the BBSB region, there is evidence that there is a net loss of competitiveness that is affecting growth in the region apart from Dubbo. If that is the case, then the factors that are reducing competitiveness overall need to be identified and acted on if the trends observed over 1991 to 1996 are to be changed.

### **Service Delivery**

The service delivery columns in Table 2-15, are summary numerical indicators of the issues discussed earlier. The surplus column show the number employed in services industries that exceed the NSW average while the deficit column show the number of employees in those service industries required to raise the level to the NSW average. Those numbers are then expressed as a percentage of the total employment in all industries in the respective regions. The net column is the net of the surplus and deficit expressed as a percentage of total employment. The final PER column is the single summary measure for all services and is compared with the NSW average.

These data consolidate the previous work and show that Dubbo is well serviced in many areas by way of its role as a regional centre. There are other areas where the service levels are below that of NSW, particularly in the area of business services. Away from Dubbo, access to services measured in this way is poor – the best is Moree Plains where the ratio overall is 28 percent higher than the NSW level and the worst is Yallaro at 94 percent higher than the NSW level.

### **Business Services Employment**

Business services have been defined to include transport, communications, banking, finance, insurance, property services, technology and research, legal, accounting and management, and other business services. The final column of Table 2-15 indicates the level of business services employment as a percentage of total employment.

This measure is used for two important reasons. First, the business services are primarily provided to other businesses and secondarily to households. Thus, the depth, breadth and ready availability of these services are important in facilitating business development. If they are not available locally, then businesses will incur additional costs to access them or may find ways to do without them. Either way, there will be an impact on business performance.

Second, these services tend to be activities with a high level of tertiary education and other training. These skills and related business experience are valuable skills for regional communities and the development projects that those communities undertake. There is an important community leadership role that is performed by these people along with other tertiary skilled people in community service activities. Where these skills are abundant, the community and business development needs are readily met. Where they are not, it is likely that development will languish, or there will be a heavy burden on a small number of people.

The information in Table 2-15, shows that in the BBSB the business services share of employment is 60 percent of the NSW level and that the share is declining while the NSW

level is rising. Dubbo is the best of the LGAs at 16.3 percent of employment in business services and some of that represents its role as a regional centre. There is a further group of LGAs that have about 12 percent of employment in business services. After that come the small LGAs where the share is less than 10 percent.

This is a situation that should be viewed with concern. It appears that within NSW, there is a trend to concentrate population, economic activity and skills into Sydney conurbation and the provincial cities. At the same time, the smaller communities are expected to cope with rapid change and new requirements without a commensurate increase in their personnel capacity to undertake that work. Those skills will need to be brought from outside and can be seen as a further development that impacts on their independence and pride.

The information discussed above has been replicated using the information from the 2001 population census and is shown in Table 2-16. This discussion is limited to a set of summary points that compare the developments in the late 1990s with the situation in the early 1990s.

**Table 2-16: Other Selected Indicators, 2001, BBSB**

	Diversity Index (CS)		Industry Mix		Competitiveness		Service Delivery				Business Services		
	1996	2001	weighted	growth	weighted	growth	Surplus	Deficit	Net	PER	1991	1996	2001
			%	%	%	%	%	%	%	%	%	%	%
Dubbo	16.5	15.9	50.8	-0.3	55.9	0.1	12.1	-9.7	2.3	2.9	17.8	16.3	16.6
Coolah	48.0	44.4	47.9	5.1	39.8	-12.6	1.6	-43.1	-44.0	5.7	10.4	8.0	8.5
Coonabarabran	34.5	33.7	47.1	2.1	29.2	-9.9	2.5	-33.5	-35.9	4.5	12.3	10.8	8.2
Gilgandra	37.6	38.1	54.2	6.6	35.9	-8.8	4.1	-31.9	-30.4	4.5	8.4	9.1	8.7
Merriwa	48.9	48.3	40.6	-1.8	42.9	-7.7	1.2	-45.3	-46.3	6.1	7.6	9.0	7.3
Murrurundi	41.6	44.1	49.5	-0.1	44.6	-13.4	4.4	-35.2	-32.8	4.9	14.9	11.7	11.2
Gunnedah	30.0	27.4	54.2	0.2	33.9	-15.6	3.0	-25.6	-26.3	4.1	11.6	11.8	12.8
Moree Plains	30.5	30.1	53.0	3.3	40.2	-5.7	3.0	-18.5	-17.3	3.8	12.2	12.8	13.3
Narrabri	31.7	30.0	52.0	0.3	50.1	-3.6	3.2	-18.5	-16.8	3.8	15.3	14.9	16.0
Quirindi	35.1	36.1	52.3	2.3	27.5	-12.1	4.4	-26.2	-24.7	4.2	11.4	12.6	12.5
Yallaroi	53.5	48.3	59.0	10.9	35.3	-20.8	1.7	-40.3	-42.9	5.7	7.9	7.1	8.0
<b>BBSB</b>	<b>23.1</b>	<b>22.0</b>	<b>52.2</b>	<b>1.4</b>	<b>31.8</b>	<b>-5.8</b>	<b>2.6</b>	<b>-16.2</b>	<b>-15.3</b>	<b>3.6</b>	<b>13.9</b>	<b>13.5</b>	<b>13.9</b>
<b>NSW</b>	<b>4.6</b>	<b>4.7</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>3.0</b>	<b>21.5</b>	<b>22.9</b>	<b>24.1</b>

Notes: Diversity Index or CS - Coefficient of Specialisation range 0-100

Industry Mix (weighted): Proportion of total 2001 Nt in sectors with faster than average growth b/w 1996 & 2001

Industry Mix (growth): Industry Mix component of growth as proportion of total 2001 Nt

Industry Competitiveness (weighted): Proportion of total 2001 Nt in sectors with increasing competitiveness (market sf

Industry Competitiveness (growth): Local component of growth as proportion of total 2001 Nt b/w 1996 & 2001

Service Delivery: Jobs potential in the services sectors (from wholesale trade to other services) as % of total 2001 Nt

Service Delivery: Population employment ratio for the aggregate services sectors (wholesale trade to other services)

Business Services: Proportion of Total Nt in services to business (from road transport to other business services)

- The BBSB region has increased the diversity of its economy by a small amount. This reflected improved diversity in all of the LGAs except Gilgandra, Murrurundi and Quirindi.
- The industry mix was slightly more favourable in terms of having 52 percent of employment in high growth industries.
- The favourable industry mix contributed less to overall employment growth than it did in the early 1990s.
- In the late 1990s, industries that were increasing their share of the market represented a smaller share of total employment than the competitive industries did in the early 1990s. However, this factor was of less overall importance in determining the trend in employment than in the early period of the decade.
- There was a better level of service delivery in 2001 than in 1996. The gap between the region level of service and the NSW average closed and service levels improved in all LGAs except Coolah, Merriwa, Murrurundi and Yallaroi.

- The proportion of employment in business services has increased between 1996 and 2001, but at a smaller rate than the proportion in NSW. A higher level occurred in all LGAs except Coonabarabran, Gilgandra, Merriwa and Murrurundi.

In total these comments do not suggest an overall strengthening of the BBSB economy. This may suggest that there is limited capacity within much of the region to operate businesses and industries in a way that achieves high economic growth. The region has not been able to a larger share of the NSW and other markets that have grown rapidly in the latter half of the 1990s.

## 2.7 OTHER INDUSTRIES

In this section, some comments are provided on manufacturing industry trends and the potential of mineral and energy production in the BBSB,

### Manufacturing Industry

Detailed manufacturing employment data are included in Attachment 3. Over the 1996 to 2001 period, employment in manufacturing increased by about two percent to 2824. That is a good outcome relative to the trends in manufacturing in NSW. The situation varied considerably among the LGAs with the largest relative increases occurring in Gilgandra (60%), Moree Plains (25%) and Narrabri (24%), while Dubbo increased manufacturing employment by the largest number, 109 (8%). A small increase occurred in Merriwa.

Small declines in manufacturing employment were recorded in Coolah, Coonabarabran, Murrurundi, and Quirindi, but the largest fall occurred in Gunnedah of 176 (31%). A constant level of employment occurred in Yallaroi.

Among the 200 manufacturing categories, there was significant expansion in the following industries:

- Prepared animal feedstuffs (Dubbo)
- Wine (Merriwa)
- Cotton textiles (Narrabri and Moree Plains)
- Periodical and book publication (Dubbo)
- Basic iron and steel (Dubbo and Moree Plains)
- Motor vehicles and bodies (Dubbo)
- Agricultural machinery (Dubbo, Gunnedah and Narrabri)

Manufacturing employment declines were significant in:

- Meat processing (Gunnedah and Dubbo)
- Oil and fat (Moree Plains and Narrabri)
- Bread and cake manufacturing (Dubbo)
- Printing (Dubbo)
- Fabricated metals (Moree Plains)
- Other machinery (Dubbo)

Within the timber-related activities of sawmilling and dressing, employment fell from 148 to 104 in the five years to 2001. The activities that use wood such as structural products and paper products, employment increased from 95 to 117.

The detailed information on manufacturing employment is a useful indicator of activities taking place in each of the LGAs. However, some care is needed in interpreting and using the information as it is based on the industry classifications indicated by census respondents. Thus, there may be difficulties in deciding which industry the respondents are in and the consistency with which respondents provide this information from census to census. Finally, there can be some issues relating to where the respondents were residing at census night, and the seasonal factors that may influence employment levels at census time. For example, August would be a period of low casual employment in many horticultural industries.

### **Minerals and Energy Products**

The Department of Mineral Resources (2002) have undertaken an analysis of mineral and petroleum resources in the BBSB. While the region counts a range of minerals as part of its resource base, most are relatively minor in a national sense. There are some operating mines and potential new operations such as the development of rare earths near Dubbo. Other mining provides the materials for a range of construction activities.

Most potential exists in energy products with most based around the extensive coal seams that underlie much of the region. That resource can support both coal mining and methane gas production in addition to the potential for natural gas production which has been the subject of considerable exploration effort over 20 years. There has been significant coal mining in the Gunnedah region although some mines closed in the late 1990s.

There is increasing recognition of the significance of the gas reserves and their potential to supply needs in the region and on the coast of NSW. Coastal markets will be needed to justify the investment in gas supply infrastructure. Dubbo, the largest regional centre is already connected to the natural gas network and proposals are well advanced to extend that supply to include Tamworth and Gunnedah and other places along the route. It is likely that development of gas in the BBSB will be driven by the capacity to secure a share of the major coastal markets. Those markets are also within the view of other potential suppliers from northern areas and beyond as the national pipeline network begins to take shape.

The development of the gas supply from the BBSB has some potential to be an attractor of industries that use large amounts of energy. Those industries tend to be capital intensive, require ready access to a range of specialist skills and services and have several location options. The competitiveness among alternate sources of natural and methane gas is likely to mean that the BBSB will not have any special competitive advantages as a location – rather it will be catching up to other areas by removing an energy cost disadvantage. Perhaps the most likely development will emerge from current discussions on the development of a gas-fired power generator in the region that disperses power supply and reduces transmission losses.

In summary, the potential gas supply from the region is an important resource and a preferred energy source. It is likely that most of the regional benefits in the next decade will arise from further exploration and some development of the resource to service coastal and other local markets. At best, there may be some electricity generation based on gas developed in the region.

The coal resource is also large with a number of mines developed in the Gunnedah area. The existing rail transport link to Newcastle has been an important disadvantage relative to the mines in the Hunter area. During the 1990s, some of the mines in the Gunnedah region

closed. The Population Censuses have indicated that employment in coal mining was 275 in 1991, 166 in 1996 and 51 in 2001.

It seems likely that further development of coal mining in the Gunnedah region (the most likely area in the BBSB) will not occur without development of the rail link and when the demand is unable to be met from supplies in the lower Hunter. The DMR suggests that this may be 20 years into the future. In the meantime, there will be further developments in relation to the greenhouse issues and energy technologies that will have a bearing on the development potential of the coal reserves in the BBSB.

Overall, the energy resources of the BBSB are an important resource with potential for development. However, there is little prospect that these developments will change the economic development trends in the region over the next ten years beyond the extension of natural gas supplies to further centres, some of which are already on the drawing board.

## **2.8 LOCAL GOVERNMENT ANALYSIS**

Further analysis of the LGAs that comprise the BBSB is included in Attachment 1. That analysis highlights the substantial variation in the structure, performance and opportunities among the LGAs. Those differences suggest that a common approach to development issues is likely to result in patchy outcomes.

The LGAs tend to fall into three groups. First, there is Dubbo located in the southern part of the region and servicing the LGAs of Gilgandra, Coolah and Coonabarabran among others as a regional centre. Dubbo is the strongest of the LGA economies and the only one to exhibit strong and sustained growth.

Second, there is a group of northern LGAs that have a more diverse set of agricultural product opportunities and access to irrigation water. These include Moree Plains, Narrabri, Gunnedah and Quirindi and embrace the Liverpool plains, the Namoi and the Gwydir. The characteristics of these economies indicate some competitive advantages, some scale economies and more diversity than the remaining LGAs. The development of non-farm businesses in some of these LGAs would have been constrained by the development of Tamworth as a regional centre (which is outside the BBSB).

The third group of economies has broadacre grazing and cereals as their agricultural base. They are also smaller in population and economic activity and many of their non-farm businesses will be vulnerable to the continued erosion of population and employment. Those on the Newell Highway are likely to develop opportunities associated with increased traffic on that route (the Gilgandra and Coonabarabran economies already include some of those activities relating to transport and tourism). The other LGAs, Yallaroi, Coolah, Merriwa and Murrurundi, are small economies and, in some cases, face a problematic future. Murrurundi is likely to be best placed as it can gain from location on the New England Highway and developments in the Upper Hunter region.

## **2.9 SUMMARY AND IMPLICATIONS**

The BBSB resource assessment is taking place at a critical time for the inland regions of NSW. For some years, there has been a rising tension between the inland regions of NSW and the metropolitan (mainly) and coastal areas of NSW. The analysis has provided evidence of some worrying trends that suggest many parts of the BBSB are falling behind in the economic stakes and not sharing in the considerable economic growth that has occurred in NSW in the past decade. The heavy reliance on international and national markets will not spare them from the need for further adjustment. The premiums that can be obtained from creative responses to changes in the operating environment could be



missed with the drift of population and skills to Sydney and the coast, to a few provincial cities such as Dubbo and into retirement.

The macroeconomic environment has not been benign with respect to the inland regions of NSW in the 1990s. The decade began with a recession triggered by overheating in the metropolitan and coastal economies (unlike in earlier decades where rural booms were often the cause). The rural effects of the recession were extended by the impact of drought that culminated in very poor results in 1994-95. By then, rapid growth in the rest of NSW was under way. A program to attract international business to NSW (predominantly Sydney) further stimulated growth, as did the Olympics and major infrastructure spending in Sydney and parts of the coast. Sluggish rural commodity markets continued until 2000. Hopes were raised with significant livestock price rises in 2001-02 only to be dashed by drought conditions that have appeared with a speed and intensity that is rare. Meanwhile, the national and NSW economies continue to achieve one of the longest periods of high and uninterrupted growth in a century.

The macroeconomic environment described appears to be impacting on inland regions and the BBSB in particular, in a variety of ways. These trends have been elaborated on in the previous pages. The important effects include the following:

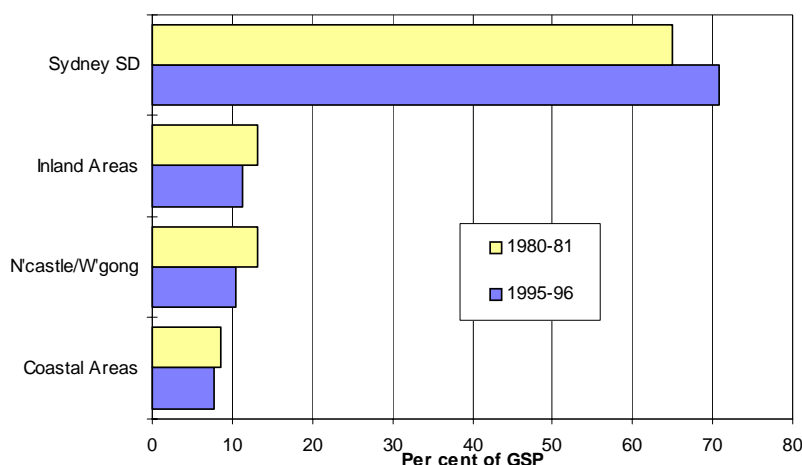
Signs that there is a rapid loss of population from the region with employment growth from a higher participation rate and declining unemployment. The potent force behind this acceleration is the strength of the economy in Sydney (mainly) and the coast. For most of the past decades, there has been a drift from the country in response to structural change, income differentials, the pursuit of education and training and so on. The ready availability of employment in metropolitan areas is what is different in the past couple of years. In the post WW II period, this only occurred at the end of the 1960s when many thousands left country towns and farms to take up jobs in the cities.

In the 1996 to 2001 period, the BBSB did manage to share in some of the growth in the NSW economy. However, there were a range of negative factors that appear to have offset those gains. The negative factors are difficult to identify and will vary from place to place, but the result is economic growth, measured as employment growth, that is well below the NSW average. It is likely that some key economic drivers are absent from the BBSB and there is a need to develop a better understanding of those factors.

The consequences of the above is that the demographic structure of the BBSB region is taking on an hour-glass character with relatively small numbers in the 15 to 25 year age groups. At the same time the baby-boom cohort is nearing retirement which will be sufficient to continue a decline in employment in future years without a turnaround in migration patterns.

Previous work at CARE has documented the increased concentration of NSW economic activity in Sydney (and noted that similar patterns of concentration exist in all other Australian states, Powell 2001) as summarised in Figure 2-28. An issue that is presently unexplored, is the possibility that a similar concentration of education and training skills is also occurring to the disadvantage of the BBSB and other regions.

Strong economies generally secure scale economies and/or derive growth from their creative skills and knowledge. Economies with a loss of employment and population are at a disadvantage and the BBSB economy does seem to be losing its competitiveness. That flows through into a widening income gap relative to the average for NSW. Other business measures indicate low diversity in the economy, a low share of business services employment in total employment and lower access to services generally than in 'average' NSW. Reversing these trends while there is high growth in Sydney and coastal NSW appears unlikely under current market-determined conditions.

**Figure 2-28: Regional Share of Gross State Product (GSP), 1980-81 and 1995-96**

Source: Powell and Chalmers 1998

Dubbo is a regional centre servicing part of the BBSB and a large hinterland other than the BBSB. Dubbo has achieved the status of a high growth regional centre. It has achieved some scale economies and steady population and employment growth – until recently. There are signs that employment and population growth is slowing. A continuing drought will send it into reverse given its high reliance on food processing and retail activities. Signs that Dubbo is struggling will serve to highlight just how difficult conditions are in the predominantly rural areas of the BBSB.

The dependence on agriculture in the BBSB is high and in the irrigation areas of the Namoi and Gwydir there is an aggregation of activities that achieve some scale and diversification economies. The northern areas also have added opportunities through both summer and winter cereal and oilseed production. The strongest economies after Dubbo include the Moree Plains, Narrabri and Gunnedah, although Gunnedah has suffered from the closure of coalmines and the abattoir.

New opportunities appear to be limited and there is little evidence that this has occurred outside of Dubbo in the last decade. The development of the Newell Highway corridor has the potential to stimulate new activities in an incremental way (as seems to have occurred in recent times in Gilgandra). The BBSB has gained a share of the tourism market, particularly Dubbo.

The manufacturing sector has been developing greater diversity and has increased employment despite some major plant closures. There would appear to be further potential for development of manufacturing. Perhaps the BBSB's most important resource is the coal and petroleum resources that seem to be abundant in the region. Natural and methane gas reserves are considerable but their development will be dependent on the development of markets in major cities or with major users such as power generation.

In summary, the regional economy of the BBSB is under considerable stress attributed to the confluence of on-going adjustment pressures with the people attracting strength of the main growth centres of NSW, particularly Sydney. The drought is now exacerbating those trends and raises some important questions about the future level of employment and population in the BBSB. This will be important to the future of businesses and investment in the region. Such a situation is not one where there is ready acceptance of the need for further change while the capacity to manage change has probably been eroded.

# 3. THE TIMBER INDUSTRY

## 3.1 INTRODUCTION

The main focus of this section is on the forestry and timber processing activities. There is a description of current activity levels and their economic contribution to the BBSB economy. This section of the work also includes the development of timber industry response models that are linked to the regional economy models. Those models can be used to assess the economic impact of possible changes to the industry on the industry and the region.

The work to date is mainly focused on the timber industry based on public lands. There is a low level of activity based on wood from private property. However, options related to the development of private property forestry are included in the farm models discussed in section 5. This report has only included a summary of the grazing and apiary activities that operate in state forests based on the material in the Stage 1 report.

The native timber industry in the BBSB is based on Narrowleaf Ironbark, which dominate the forest areas in the East Pilliga State forests and the White Cypress, which dominate the forest areas in the West Pilliga and Goonoo State Forests. State Forests NSW (SFNSW) operations managed from the Dubbo regional office cover three forest management areas that are located totally inside the region ie, Pilliga, Gunnedah and Dubbo/Gilgandra management areas and one management area that is partially inside the region and partially outside the region ie, Inverell Management Area.

## 3.2 CURRENT OPERATIONS

### The Regions Mills

There are currently 13 fixed sawmills that source logs from Crown lands within or partially within the BBSB. Two of these, Lowes and Appalachian Log Homes, receive a very small quantity of timber and are located in Queensland and Sydney, respectively. These mills are largely excluded from the analysis due to their location.

Of the remaining 11 mills, 10 are located within the BBSB, while one mill, Bingara Cypress, is located just outside the BBSB. For the purpose of the analysis this mill has been treated as if it were located within the region. Ten of the mills process cypress logs and one processes ironbark. These are listed in Table 3-1.

The region mills range in size from small mills taking 400 m<sup>3</sup> to large mills taking up to 21,600 m<sup>3</sup>. Table 3-2 provides an overview of the number of mills classified as small, medium and large utilising crown resource and operating in the assessment region. The majority of mills are of medium size processing between 5,000 m<sup>3</sup> and 9,999 m<sup>3</sup>.

**Table 3-1: Mills Sourcing Logs from the BBSB**

<b>Iron Bark Mills Located Inside Region</b>	<b>Town/Location</b>
Gallagher Insultimbers	Baradine
<b>Cypress Mills Located Inside Region</b>	
Browns Sawmilling	Narrabri
Gunnedah Timbers	Gunnedah
Baradine Sawmilling	Baradine
Lidoframe Pty Ltd	Narrabri West
Gwabegar Sawmill	Gwabegar
Ramien Timber Co. Pty Ltd	Dubbo
J. Burns	Baradine
Gulargambone Cypres	Gulargambone
R. Austin Pty Ltd	Quirindi
Bingara Timbers	Bingara
<b>Cypress Mills Located Outside the Region</b>	
Lowes	Cecil Plains (Queensland)
Appalachian Log Homes	Emu Plains (Sydney)

**Table 3-2: Number of Fixed Mills by Mill Size Operating in the Region**

Mill Classification	Throughput (m <sup>3</sup> )	Number of Mills
Small	0 - 4,999	3
Medium	5,000 – 9,999	5
Large	10,000 & above	3

### Log Supplies

The logs from the region's forests is committed to the timber industry under a mix of annual quota, term agreements and short term parcel sales usually allocated by a tendering process in the open market.

SFNSW logs commitments from the BBSB region for 2002 total 79,560 m<sup>3</sup>, comprising 72,560 m<sup>3</sup> of cypress and 7,000 m<sup>3</sup> of ironbark. Not all this timber is processed by mills located in the region. A small quantity, 420m<sup>3</sup> from that part of Inverell MA located with in the BBSB is exported from the region. Similarly, the mills located in the region process 6,840 m<sup>3</sup> of cypress timber from that part of the Inverell MA that is located outside the BBSB. The source and destination of log commitments by management area for 2002 is summarised in Table 3-3.

**Table 3-3: Log Supply by BBSB Management Area**

Management Area	Volume (m <sup>3</sup> )
<b><i>Iron Bark Mills Located Inside Region</i></b>	
Pilliga Management Area	7,000
<b><i>Sub-total</i></b>	<b><i>7,000</i></b>
<b><i>Cypress Mills Located Inside Region</i></b>	
Pilliga Management Area	51,600
Inverell Management Area	10,260
Gunnedah Management Area	7,200
Gilgandra/Dubbo Management Area	3,080
<b><i>Sub-total</i></b>	<b><i>72,140</i></b>
<b><i>Cypress Mills Located Outside the Region</i></b>	
Inverell Management Area	420
<b><i>Sub-total</i></b>	<b><i>420</i></b>
<b>Total Cypress</b>	<b>72,560</b>
<b>TOTAL IRON BARK AND CYPRESS</b>	<b>79,560</b>

Discussion with mill owners and managers indicated that there was little if any use of private property logs supplies.

### **Wood Products Produced and End Markets**

Iron-bark processed within the region is primarily processed into electric fence posts and fence droppers with about 50 percent exported overseas via Sydney or Melbourne and the remainder is supplied to the domestic markets.

Final products produced from cypress are primarily kiln dried products such as flooring and boards supplemented by weather boards, decking, panelling, pickets and greensawn framing and structural products. Residuals include sawdust/shavings and chips with some of this being used landscaping, sale to Oberon for particle board, use in horse stables, power generation, etc. while some is burnt as waste.

The end markets for cypress products include regional areas such as Dubbo and Moree, all States and Territories in Australia, Melbourne, NSW East Coast, Japan and the USA. Japan is an increasingly attractive market because of the recognised structural properties of cypress timber.

### **Investment Trends**

Since 1995 a number of cypress mills in the region have upgraded their facilities. Upgrades have included installation of kilns to increase drying capabilities and assist in the production of higher value end products, the establishment of new distribution facilities to assist in broadening markets for the products produced and mill equipment upgrades to improve the efficiency of resource utilisation (RACD et al 2000).

Mills consulted as part of this study indicated intentions for considerable future investment (over \$2m) subject to a guarantee of maintenance or increase in log supplies. The proposed investments included chippers and plants to process residuals, increased automation, additional kilns, new saws, moulders, planers and increased storage. Production and investment is increasingly focused on the Japanese market for structural timbers.

### **Direct Economic Effects**

The financial simulation models developed for each mill in the region can be used to report in aggregate some of the economic dimensions of the timber industry in the BBSB in 2002. The 2002 allocation of 85,980 m<sup>3</sup> to mills located in the BBSB (comprising 72,140 m<sup>3</sup> of cypress from the BBSB, 6,840 m<sup>3</sup> of cypress from outside the BBSB and 7,000 m<sup>3</sup> of iron bark logs) is estimated to result in the sawn timber production shown in Table 3-4.

The gross output value of this production within the region, at mill door, is estimated at \$22.3m. An additional \$0.1m in mill door sawn timber value is estimated for mills located outside the region that source logs from inside the region.

In 2002 it is estimated that there are 214 people (188 full time and 26 casual/part-time) directly employed by mills utilising the regions logs resources. Of this total, 209 people (184 full time and 25 casual/part-time) were directly employed by mills located within the region while 5 (4 full time and 1 casual/part-time) were estimated to be directly employed by mills located outside the region.

Total employment in harvesting operations was estimated at 32 jobs with all of these being associated with mills located within the BBSB. In some instances, SFNSW is responsible

for engaging contract harvesters while in other instances these contractors are directly engaged by the mills. One mill employed people directly to undertake harvesting operations. The employment estimates are shown in Table 3-5.

**Table 3-4: Estimated Sawn Timber Production 2002 from Mills Located within BBSB**

<b>Sawn Timber Product</b>	<b>Volume (m<sup>3</sup>)</b>
Scantling/boards green	200
Scantling/boards air dried	0
Green sawn dressed (structural/framing)	2,004
KD boards	0
KD flooring	1,716
Fencing	1,400
Pallets	0
Stakes	0
Other	0
Combined	27,032
<b>Total Sawn Timber Production</b>	<b>32,352</b>
<b>Sawdust/Wood chip</b>	<b>46,584</b>

**Table 3-5: Employment Associated with the Timber Industry Located within the BBSB**

<b>Employment</b>	<b>Associated with Mills Located Inside Region</b>	<b>Associated with Mills Located Outside Region</b>	<b>Total</b>
<b>Mill</b>			
Full time	184	5	188
Casuals	25	1	26
<b>Sub-total</b>	<b>209</b>	<b>5</b>	<b>214</b>
<b>Forest</b>			
Fall/snig/load	20	0	20
Log haulage	12	0	12
<b>Sub-total</b>	<b>32</b>	<b>0</b>	<b>32</b>
<b>Total Employment</b>	<b>241</b>	<b>5</b>	<b>246</b>

### Changes Since 1999

There have been a number of changes since the analysis included in the Stage 1 report. These are summarised in Table 3-6. The assembled data are not always fully consistent between the two sets but some of the main trends in the activities can be identified.

From 1999 to 2002 the log supplies from the forests of the region have expanded from 69,400 m<sup>3</sup> to 79,560 m<sup>3</sup>, although the hardwood component has declined from 9,000 m<sup>3</sup> to 7,000 m<sup>3</sup>. Logs processed within the region have increased from 68,900 m<sup>3</sup> to 85,980 m<sup>3</sup>, while exports to mills outside the region have decreased from 1,500 m<sup>3</sup> to 420 m<sup>3</sup>.

The number of mills in the region processing crown resource has increased from 10 to 11, while the number of cypress mills located outside the region that is processing logs from inside the region has increased from 1 to 2. Mobile mills appear to be no longer operational while private property resources available to mills appears to be close to zero.

Mill gate output value has increased considerably due to a number of factors including an increased volume of log supply, increased prices and increased value adding. Productivity of mills also seems to have improved since the increased volume of logs being processed and increased output value is being achieved with a similar level of employment.

**Table 3-6: Changes in the Timber Industry Between 1999 and 2002**

1999	2002
<b><i>Total Log Supply From Region</i></b>	
61,400 m <sup>3</sup> of cypress	72,560 m <sup>3</sup> of cypress
9,000 m <sup>3</sup> hardwood	7,000 m <sup>3</sup> of hardwood
<b><i>Log Exports</i></b>	
1,500 m <sup>3</sup> of cypress	420 m <sup>3</sup> of cypress
No hardwood	No hardwood
<b><i>Logs Processed Inside Region</i></b>	
59,900 m <sup>3</sup> of cypress	78,980 m <sup>3</sup> of cypress (72,140m <sup>3</sup> from the BBSB and 6,840 m <sup>3</sup> from outside the BBSB)
9,000 m <sup>3</sup> of hardwood	7,000 m <sup>3</sup> of hardwood
68,900 m <sup>3</sup> total	85,980 m <sup>3</sup> in total
<b><i>Mills Using the Regions Resource</i></b>	
12 fixed mills in total using the regions resource	13 fixed mills in total using the regions resource
9 cypress and 1 hardwood mill located inside the region	10 cypress and 1 hardwood mill located inside the region
1 cypress and 1 hardwood mill located outside the region	2 cypress mills located outside the region
1 mill reliant on private property logs	Zero private property mills
5 mobile mills operating	Zero mobile mills operating
<b><i>Mill Gate Output Value (Mills inside region only)</i></b>	
\$13.28M	\$22.3M
<b><i>Employment</i></b>	
Mill employment associated with total logs from region - 201	Mill employment associated with total logs from region - 214
Mill employment associated with mills inside the region - 173	Mill employment associated with mills inside the region - 209
35 people engaged in logging/haulage	32 people engaged in logging/haulage

This comparison is complicated by a different regional definition in 2002 compared to 1999 (the 2002 region includes the Tenterfield Management Area) as well as absence of documentation in 1999 as to which mills were included in the regional analysis.

### 3.3 LOCAL AND REGIONAL SIGNIFICANCE

The significance of the timber industry to the BBSB is compiled on the basis of the activities that occur within the region. In practical terms, that means inclusion of all of the harvesting of logs in the region, but only those mills that operate in the region. The operation of the SFNSW regional office in Dubbo is included even though it is managing areas beyond the BBSB boundaries. The Inverell office is located outside the region and is not included.

The regional impacts include the direct effects discussed above and the flow-on effects that are estimated using multipliers from the BBSB input-output table described in Section 2. The impacts that accrue within the region as a whole are shown in Table 3-7. The multipliers that are used to estimate the impacts are shown in Table 3-9.

**Table 3-7: Estimated Timber Industry Impacts, BBSB 2002**

IMPACTS	Direct Effect	Flow-on Effects			TOTAL IMPACT
		Production Induced	Consumption Induced	Total Flow-on	
GROSS OUTPUT (\$'000)					
Local Milling:					
Cypress Forestry	3,446	86	389	475	3,921
Ironbark Forestry	165	18	66	84	249
Logging/Haulage	3,284	888	1,493	2,381	5,665
Milling (net)	15,407	2,003	8,723	10,726	26,133
TOTAL (mill gate)	22,301	2,995	10,671	13,667	35,968
Downstream Freight	1,142	303	432	735	1,877
TOTAL MILLING	23,443	3,298	11,104	14,402	37,844
Logging/Haulage to external mills	17	5	8	12	29
Forestry (Other Expenditure)	1,956	674	957	1,631	3,588
Forestry (External Royalties)	18	0	2	3	21
TOTAL GROSS OUTPUT	25,434	3,977	12,070	16,048	41,482
VALUE ADDED (\$'000)					
Local Milling:					
Cypress Forestry	3,304	49	220	269	3,573
Ironbark Forestry	137	10	38	48	185
Logging/Haulage	2,090	507	844	1,351	3,442
Milling (net)	11,989	1,201	4,933	6,133	18,122
TOTAL (mill gate)	17,520	1,767	6,034	7,801	25,321
Downstream Freight	644	181	244	426	1,070
TOTAL MILLING	18,164	1,948	6,279	8,227	26,391
Logging/Haulage to external mills	11	3	4	7	18
Forestry (Other Expenditure)	1,219	379	541	920	2,140
Forestry (External Royalties)	18	0	1	1	19
TOTAL VALUE ADDED	19,412	2,330	6,826	9,156	28,567
HOUSEHOLD INCOME (\$'000)					
Local Milling:					
Cypress Forestry	324	23	106	129	453
Ironbark Forestry	54	5	18	23	77
Logging/Haulage	1,022	265	406	671	1,693
Milling (net)	4,054	581	2,374	2,955	7,009
TOTAL (mill gate)	5,454	874	2,904	3,778	9,232
Downstream Freight	294	91	118	208	503
TOTAL MILLING	5,748	965	3,022	3,987	9,735
Logging/Haulage to external mills	5	1	2	3	9
Forestry (Other Expenditure)	659	197	261	458	1,117
Forestry (External Royalties)	2	0	1	1	2
TOTAL HOUSEHOLD INCOME	6,415	1,164	3,285	4,449	10,864
EMPLOYMENT (no.)					
Local Milling:					
Cypress Forestry	10	1	4	5	15
Ironbark Forestry	2	0	1	1	3
Logging/Haulage	32	10	17	26	58
Milling (net)	209	19	97	116	325
TOTAL (mill gate)	253	30	119	149	402
Downstream Freight	10	3	5	8	18
TOTAL MILLING	263	33	124	157	420
Logging/Haulage to external mills	0	0	0	0	0
Forestry (Other Expenditure)	34	7	11	18	52
Forestry (External Royalties)	0	0	0	0	0
TOTAL EMPLOYMENT	297	40	134	175	472

Rounding Errors may occur

Forestry - Other expenditure includes State Forest operations not directly attributable to log sales



The impacts shown indicate the various components and have eliminated double counting of outputs. This can be illustrated by taking the value of output from the mills estimated to be \$22.301m. That value is comprised of payments for royalties, logging and hauling and the value that is added by milling. Thus, logs cost \$6.894m at the milling added \$11.989m in value. They then paid for the transport of the product to markets estimated at \$1.142m. In addition to those activities, there are the royalties, logging and haulage to mills located outside the region, and the other administrative operations of SFNSW in the region.

The estimated direct effects of \$25.434m generated flow-on effects of \$16.048m so that the total impact was estimated to be \$41.482m. That implies a multiplier overall of 1.63. That is a relatively low value and reflects a rapid leakage of input and consumption goods purchases out of the region to other suppliers.

The estimated economic impacts are also measured as value added (approximates gross domestic product used in the national accounts), household income and employment. Those estimates indicate value added at \$28.567m out of which \$10.864m are paid to households as wages and salaries. A total of 472 people are directly and indirectly employed in the timber industry although not all of them will be full-time. That represents average earnings of \$23,005.

A summary of the economic impacts is shown in Table 3-8. This indicates that the timber industry contributes about 1.2 percent of the economic activity in the BBSB. The milling activities represent about 91 percent of the economic impacts. If 70 percent of milling impacts accrue in the Narrabri and Coonabarabran LGAs (about 20 percent of employment in the BBSB), then the timber industry would be contributing about 4.2 percent to those economies (calculated as  $1.2 / 0.2 * 0.7 = 4.2$ ). For those areas, the timber industry is a significant contributor.

**Table 3-8: Summary of Economic Significance**

	South Brigalow Bio-region	Total Impact	Share of Region %
Gross Output (\$'000)	3,532,371	41,482	1.17
Value-Added (GRP - \$'000)	1,980,351	28,567	1.44
Household Income (\$'000)	925,030	10,864	1.17
Employment (no.)	34,970	472	1.35

The distribution of these impacts among the LGAs is not undertaken formally in this study although the direct effects are shown geographically in an accompanying study. Most of the impacts from logging and milling will accrue in the Pilliga area (Narrabri and Coonabarabran LGAs) but noting that milling also occurs in Quirindi, Gunned, Dubbo and Gulargombone). Many of the SFNSW functions are based in Dubbo. Most of the economic impacts from the timber industry will accrue within the Narrabri and Coonabarabran LGAs while logging is concentrated on the Pilliga forest.

**Table 3-9: Timber Industry Multipliers, BBSB**

		Flow-on Effects				
	Direct	Production	Consumption	Total	TOTAL	Type II
	Effect	Induced	Induced	Flow-on	IMPACT	Ratio
MULTIPLIERS						
GROSS OUTPUT (\$)						
Local Milling:						
Cypress Forestry	1.000	0.025	0.113	0.138	1.138	1.138
Ironbark Forestry	1.000	0.109	0.404	0.513	1.513	1.513
Logging/Haulage	1.000	0.271	0.455	0.725	1.725	1.725
Milling (net)	1.000	0.130	0.566	0.696	1.696	1.696
TOTAL (mill gate)	1.000	0.134	0.479	0.613	1.613	1.613
Downstream Freight	1.000	0.265	0.379	0.644	1.644	1.644
TOTAL MILLING	1.000	0.141	0.474	0.614	1.614	1.614
Logging/Haulage to external mills	1.000	0.271	0.455	0.725	1.725	1.725
Forestry (Other Expenditure)	1.000	0.345	0.489	0.834	1.834	1.834
Forestry (External Royalties)	1.000	0.025	0.113	0.138	1.138	1.138
TOTAL GROSS OUTPUT	1.000	0.156	0.475	0.631	1.631	1.631
VALUE ADDED (\$)						
Local Milling:						
Cypress Forestry	0.959	0.014	0.064	0.078	1.037	1.081
Ironbark Forestry	0.831	0.062	0.228	0.290	1.122	1.349
Logging/Haulage	0.637	0.154	0.257	0.412	1.048	1.647
Milling (net)	0.778	0.078	0.320	0.398	1.176	1.512
TOTAL (mill gate)	0.786	0.079	0.271	0.350	1.135	1.445
Downstream Freight	0.564	0.159	0.214	0.373	0.937	1.661
TOTAL MILLING	0.775	0.083	0.268	0.351	1.126	1.453
Logging/Haulage to external mills	0.637	0.154	0.257	0.412	1.048	1.647
Forestry (Other Expenditure)	0.623	0.194	0.277	0.471	1.094	1.755
Forestry (External Royalties)	0.959	0.014	0.064	0.078	1.037	1.081
TOTAL VALUE ADDED	0.763	0.092	0.268	0.360	1.123	1.472
HOUSEHOLD INCOME (\$)						
Local Milling:						
Cypress Forestry	0.094	0.007	0.031	0.037	0.131	1.398
Ironbark Forestry	0.331	0.029	0.110	0.139	0.470	1.420
Logging/Haulage	0.311	0.081	0.124	0.204	0.516	1.657
Milling (net)	0.263	0.038	0.154	0.192	0.455	1.729
TOTAL (mill gate)	0.245	0.039	0.130	0.169	0.414	1.693
Downstream Freight	0.258	0.080	0.103	0.183	0.441	1.708
TOTAL MILLING	0.245	0.041	0.129	0.170	0.415	1.694
Logging/Haulage to external mills	0.311	0.081	0.124	0.204	0.516	1.657
Forestry (Other Expenditure)	0.337	0.101	0.133	0.234	0.571	1.694
Forestry (External Royalties)	0.094	0.007	0.031	0.037	0.131	1.398
TOTAL HOUSEHOLD INCOME	0.252	0.046	0.129	0.175	0.427	1.694
EMPLOYMENT (no./\$'000)						
Local Milling:						
Cypress Forestry	0.003	0.000	0.001	0.001	0.004	1.510
Ironbark Forestry	0.012	0.001	0.004	0.006	0.017	1.475
Logging/Haulage	0.010	0.003	0.005	0.008	0.018	1.828
Milling (net)	0.014	0.001	0.006	0.008	0.021	1.557
TOTAL (mill gate)	0.011	0.001	0.005	0.007	0.018	1.588
Downstream Freight	0.009	0.003	0.004	0.007	0.016	1.800
TOTAL MILLING	0.011	0.001	0.005	0.007	0.018	1.596
Logging/Haulage to external mills	0.010	0.003	0.005	0.008	0.018	1.828
Forestry (Other Expenditure)	0.017	0.004	0.005	0.009	0.027	1.526
Forestry (External Royalties)	0.003	0.000	0.001	0.001	0.004	1.510
TOTAL EMPLOYMENT	0.012	0.002	0.005	0.007	0.019	1.589

### 3.4 OTHER FOREST-BASED ACTIVITIES

The forest areas are used by the apiary industry on a regular basis under a licensing system. For the Stage 1 report, the value of apiary activities undertaken in the forest areas was estimated at \$10m. In addition, the forest areas are subject of periodic grazing under a license system that was estimated to have a value of between \$50,000 and \$75,000 per year.

The forests are also a source for other timber products such as firewood, and various types of posts and stays. Surveys have provided information on the number of people involved in these activities but the value of production has not been estimated.

### **3.5 INDUSTRY RESPONSE MODELLING**

#### **Introduction**

Industry response models have been developed as part of the regional assessment for the BBSB. The main objectives of the modelling were to:

- develop a quantitative framework for analysing different timber supply scenarios in the BBSB;
- assess the direct regional economic impacts of different timber supply scenarios for the BBSB as part of the negotiation process; and
- provide economic data that facilitates the assessment of the total regional economic impacts of timber supply scenarios for the BBSB.

To meet these requirements, the study involved the collation of mill data and the development from this data of a number of financial simulation models. The financial simulation models were used to describe the direct economic dimensions of the 2002 BBSB timber industry in section 3.2.5. These models will also be used to estimate the direct employment and output effects of the different timber supply scenarios for the BBSB during the negotiation phase of the assessment.

#### **Method**

Mill data were obtained from four sources:

- A mill financial survey undertaken in 2000 by Allan Stewart for the FPA;
- SFNSW data on 2002 timber allocations;
- Mill consultations undertaken in March 2002;
- Consultations with SFNSW.

Mill data collected included:

- SFNSW log supply volume, including supply arrangement and Management Area;
- Private property timber supply volume;
- Royalty payments;
- Fall, snig and haul arrangements;
- Mill employment;
- Residence of mill employment;
- Products produced;
- Price information;
- Markets;
- Recovery rates;
- Contractor information;
- Mill capacity;
- Impact of decreased or increased log supplies;
- Industry development opportunities; and
- Cost of production information.

This information was then used to develop a financial model for each mill located within the BBSB region. These financial models are based on a number of broad physical and financial relationships as follows:

Physical data relationships

- Log supply able to be varied depending on different timber supply availability and likely allocation by SFNSW;
- Reported recovery rates for each mill area assumed to remain constant but can be varied if quality of timber reduces or improves;
- Sawn timber volumes dependent on unsawn timber supply and assumed mill recovery rate;
- Employment levels per mill based on identified employment ratios per mill and unsawn timber volumes provided to each mill.

Revenue estimates are based on:

- Estimates of sawn timber volumes per mill; and
- Assumed sawn timber prices per mill (average across product range or per product depending on the availability of information).

Costs estimates

Royalty and harvesting cost estimates are based on:

- Unsawn timber volumes per mill; and
- Reported average royalty and harvesting costs per mill.

Employment costs such as wages, payroll tax/super and workers compensation are based on:

- Estimated employment levels from a survey and consultations with mills and SFNSW; and
- Average wages and other costs per mill.

Non labour costs such as repairs and maintenance, materials, lights and power are based on:

- Sawn timber volumes; and
- Average non-labour costs per mill.

A number of costs such as depreciation and interest payments were assumed to be fixed and would not vary with changes in timber supply or employment.

These relationships were built into a number of linear spreadsheet model, that are able to estimate the indicative final product mix<sup>1</sup>, the volume of sawn timber output, the value of output and the regional expenditure profile, associated with the processing of logs on a mill by mill and aggregate basis.

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<sup>1</sup> Product mix categories were those used in the FPA survey included: scantling/boards green, scantling/boards air dried, green sawn dressed, KD boards, KD flooring, fencing, pallet, stakes, sawdust/woodchip, other, combined.

### **3.6 SUMMARY AND IMPLICATIONS**

The timber industry in the BBSB is based on logs drawn from the Pilliga forest. The harvest of logs from the BBSB amounted to 72,560 m<sup>3</sup> of cypress and 7,000m<sup>3</sup> of iron bark. This was supplied to 13 mills, 11 of which were in the region. Mills within the region also obtained 6,840 m<sup>3</sup> of cypress timber from outside the region. The estimated value of timber products produced by mills within the BBSB was \$22.3m. The total direct regional employment related to the forestry activities in the BBSB was 241 people. When the flow on effects were taken into account, the industry generated \$41.5m of gross output, \$28.6m of value added, generated 472 jobs with \$10.9m of wages and salaries accruing to households in the region. That amounted to about 1.2 percent of the regional economy. Most of these activities occurred in the LGAs of Narrabri and Coonabarabran.

The forest areas also generated about \$10m of products from apiary activities and a small amount of grazing.

The work also involved building a capacity to assess how changes proposed for the timber industry would impact on the industry and the region. The industry response model is outlined and linked to the regional input-output model described in Section 2.



# 4. THE FARMING INDUSTRIES

## 4.1 INTRODUCTION

Agriculture is a major industry in the BBSB. Detailed annual data has been available on a range of physical and value measures for each LGA until 1996-97. Since then, only some measures have been provided at the Statistical Division level. The BBSB region includes LGAs in the Northern, Hunter and North West Statistical Divisions that are substantially within the BBSB. Detailed information will be available every five years following an agricultural census. A census was taken for the 2000-01 year but the results will not be available until the end of 2002.

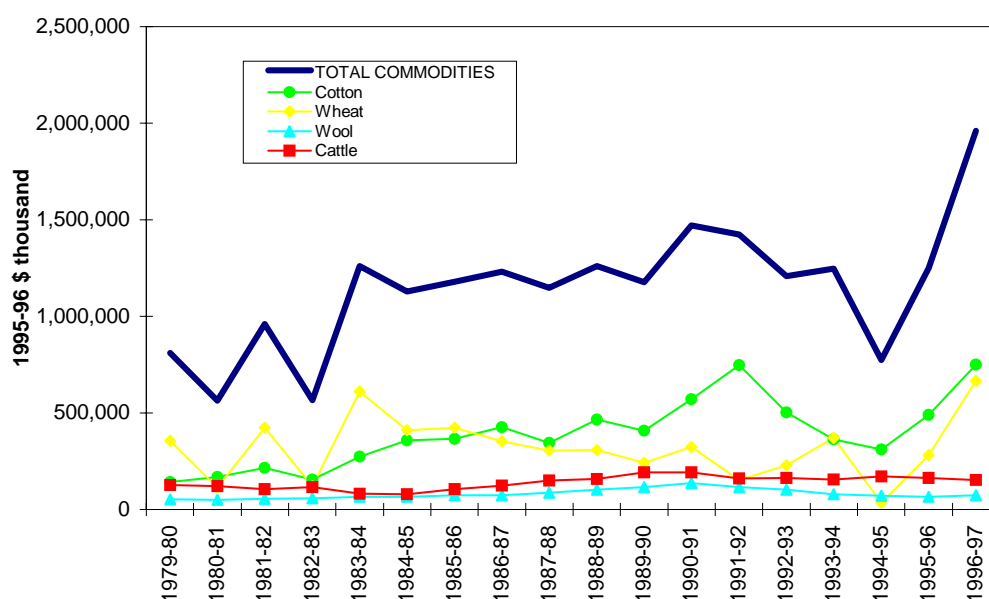
This overview of agriculture is structured to provide information on agricultural production in 1996-97 and to update that with selected indicators to provide an overview of trends since then. The significance of agriculture to each of the LGAs is also estimated using the 1996-97 value of production data. Some summary comments complete the section.

## 4.2 INDUSTRY STRUCTURE AND PERFORMANCE

Agricultural production has been steadily increasing due to the development of new technologies and management systems. Some developments have involved changing land use, such as clearing that have brought more land into production or increased the productivity of the land. The trend in agricultural production since 1979-80 in constant prices is shown in Figure 4-1. There are two periods of notable instability and below trend production levels associated with drought. They occurred around 1980 and in the middle of the 1990s. Production has increased rapidly since 1994-95 after the early 1990s drought was broken.

The composition of production in the BBSB is made up of relatively constant levels of production from sheep (mostly wool) and cattle (beef). The wheat and cotton crops are more important contributors to production, but with significant variation from year to year. Wheat production is the most vulnerable while cotton, as an irrigated crop is less variable. However, in the mid-1990s after a prolonged period of low rainfall, water allocations were slashed and production fell sharply.

Cotton was an important factor in the growth in agriculture since the 1970s. The growth was associated with the development of irrigation until the potential water was fully allocated. The possibility of reduced irrigation water allocations in the future will tend to reverse some of the previous growth. There is some growth in the production of dryland cotton, but that would normally be a substitute for cereal production. The conclusion is that further growth in agricultural production will come from improvements in productivity and actions that will secure higher prices from the market place.

**Figure 4-1: Value of Agricultural Production**

Source: ABS Agstats (various issues)

In the information about the LGAs, there is a chart that shows the composition of agricultural production in each case. Most of the region is categorised as broadacre grazing and cereal production with irrigation activities concentrated in the Namoi and Gwydir valleys. In 1996-97, the value of agricultural production was \$1,961m of which 38 percent was cotton. With little production of horticultural products or intensive livestock products, most of the balance is from the broadacre grazing and cereal activities. That production was from 4,301 establishments that had an average area of 1,239 ha.

A guide to trends since 1996-97 can be found in two sources. First, reference is made to the farm surveys reports prepared by ABARE. A set of summary statistics is included in Table 4-1. This shows the rate of return on capital excluding capital appreciation and on the basis of full equity. Using the all broadacre industry group, there has been little improvement in the rate of return since 1996-97, itself a relatively good year. Among the industry subcategories, there have been some better years for cereal producers, but the returns to livestock have continued to be meagre. The conclusion from these indicators is that the value of production in the BBSB region has not changed much up to 2000-01 and up till then, the level was likely to be below that of 1996-97.

**Table 4-1: Rate of Return on Capital for NSW Broadacre Farms (%)**

Farm category	Return on capital (full equity, no capital appreciation)				
	1996-97	1997-98	1998-99	1999-00	2000-01
All broadacre industries	1.2	0.9	0.8	0.7	1.6
Wheat and other crops	7.0	5.6	7.2	2.8	3.3
Mixed livestock and crops	1.8	1.5	0.9	1.3	2.4
Sheep	-1.1	-0.9	-1.6	-0.1	1.6
Beef	-2.2	-2.4	-1.9	-0.6	-0.3
Sheep and beef	-0.9	-1.9	-1.5	-1.6	0.2

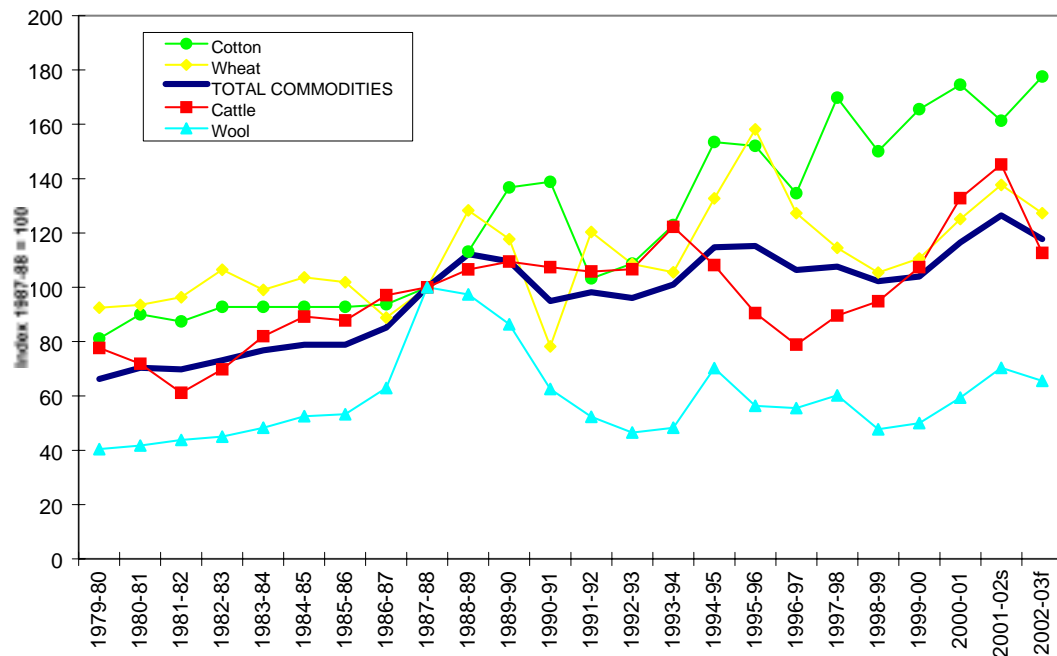
ABARE (2002) *Australian Farm Surveys Report*, Canberra.

The second indicator is the trend in prices received by producers as indicated by the ABARE indexes. These are shown in Figure 4-2 for the main commodities and include estimates



through to 2002-03. These data indicate prices reaching a peak in 2001-02 and then declining. There is a significant increase in the prices for wheat, cattle and wool from 1998-99 and that has been of benefit to the broadacre farmers in the BBSB.

**Figure 4-2: Indexes of Prices Received for Commodities**



Source: ABARE, Indexes of prices received and paid.

The conclusion from these data is that the agricultural industry experienced a growth in the gross and net value of production from 1999 to the first half of 2002. That would have allowed farmers to improve their net capital position. However, the dry conditions that began with a lower rainfall summer have continued into a full-blown *el Nino* of considerable severity. Only a small portion of the BBSB area planned for winter cereals was planted and much of that will fail due to lack of rain. The possibility of compensating through a large planting of summer crops still exists but the probability of good crops is decreased in *el Nino* events. Meanwhile, graziers have had to reduce stock and engage in a substantial feeding program. Heavy numbers at stock sales, cattle in particular, have depressed prices to around 50 percent of the peak earlier in the year. At this stage, the outlook for the agricultural year 2002-03 is dismal with sharply declining gross and net value of farm production.

#### 4.3 INDUSTRY SIGNIFICANCE

The primary industries (agriculture and forestry / logging) are an important part of most of the LGAs that comprise the BBSB. An indicator of significance is to estimate the direct and flow-on effects of agriculture and forestry in each of the LGAs and the BBSB in total. The estimates are shown in Table 4-2. Because of the ready availability of employment data on a consistent basis, the estimates are made on that variable. For each of the LGAs the flow-on effects are estimated through the use of an input-output table that applies to that LGA or would approximate that LGA. As indicated in the table, use has been made of tables for Dubbo, Coolah, Coonabarabran, Namoi and the Gwydir.

The top section of the table shows employment by primary industry for each of the LGAs and the share of total employment in 1996. For the BBSB as a whole agriculture accounted for almost 23 percent of all employment. The range in the share was from 6.6 percent in Dubbo to 53.2 percent in Yallaro.

**Table 4-2: Direct and Indirect Share of Agriculture in the Economy**

	Dubbo	Coolah	Coonabarabran	Gulgandra	Merriwa	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yallaro	Total
<b>Employment 1996 (no.)</b>												
Sheep	210	184	110	127	84	19	27	58	61	31	30	<b>942</b>
Grains	257	300	330	400	105	148	667	939	656	346	513	<b>4662</b>
Beef cattle	246	104	145	38	147	69	105	81	103	186	76	<b>1300</b>
Dairy cattle	43	0	9	7	0	0	5	0	5	0	0	<b>69</b>
Pigs	8	16	25	5	5	18	26	6	43	11	13	<b>177</b>
Poultry	9	0	4	5	0	5	15	0	0	46	5	<b>89</b>
Other agriculture	121	25	52	10	44	66	119	659	580	39	40	<b>1755</b>
Ag services	90	15	22	31	11	13	72	277	223	37	28	<b>819</b>
Forestry/logging	32	0	33	7	3	3	13	0	23	6	3	<b>124</b>
<b>Total</b>	<b>1017</b>	<b>644</b>	<b>731</b>	<b>631</b>	<b>398</b>	<b>341</b>	<b>1049</b>	<b>2020</b>	<b>1694</b>	<b>702</b>	<b>708</b>	<b>9936</b>
Share of Total Employment (%)	6.6	44.4	30.4	35.4	43.9	37.0	20.8	30.7	28.7	33.8	53.2	22.7
<b>Multipliers (Type II Ratios)</b>												
Sheep	1.755	1.396	1.499	1.499	1.396	1.396	1.499	1.294	1.490	1.499	1.294	<b>1.660</b>
Grains	1.744	1.415	1.461	1.461	1.415	1.415	1.461	1.420	1.681	1.461	1.420	<b>1.710</b>
Beef cattle	1.751	1.402	1.456	1.456	1.402	1.402	1.456	1.366	1.490	1.456	1.366	<b>1.658</b>
Dairy cattle	1.891	1.510	0.000	0.000	1.510	1.510	0.000	1.406	1.490	0.000	1.406	<b>1.652</b>
Pigs	2.381	1.281	1.706	1.706	1.281	1.281	1.706	1.406	1.490	1.706	1.406	<b>1.733</b>
Poultry	1.534	0.000	1.268	1.268	0.000	0.000	1.268	1.731	1.490	1.268	1.731	<b>1.397</b>
Other agriculture	1.597	1.354	1.320	1.320	1.354	1.354	1.320	2.163	2.943	1.320	2.163	<b>1.942</b>
Ag services	1.701	1.288	3.129	3.129	1.288	1.288	3.129	1.289	1.647	3.129	1.289	<b>5.899</b>
Forestry/logging	1.931	0.000	1.330	1.330	0.000	0.000	1.330	1.643	1.867	1.330	1.643	<b>1.618</b>
<b>Total Employment Impacts (no.)</b>												
Sheep	369	257	166	190	117	27	41	76	91	47	38	<b>1417</b>
Grains	449	425	482	585	148	210	975	1334	1103	506	729	<b>6945</b>
Beef cattle	431	146	211	56	205	97	154	111	153	271	104	<b>1937</b>
Dairy cattle	81	0	0	0	0	0	0	0	7	0	0	<b>88</b>
Pigs	19	21	43	9	6	24	44	9	64	19	18	<b>275</b>
Poultry	13	0	5	7	0	0	19	0	0	58	8	<b>111</b>
Other agriculture	193	33	69	14	60	89	157	1425	1707	51	87	<b>3886</b>
Ag services	153	19	69	97	14	16	227	357	368	115	36	<b>1471</b>
Forestry/logging	62	0	45	10	0	0	17	0	43	8	5	<b>189</b>
<b>Total</b>	<b>1771</b>	<b>901</b>	<b>1089</b>	<b>966</b>	<b>551</b>	<b>462</b>	<b>1632</b>	<b>3311</b>	<b>3536</b>	<b>1075</b>	<b>1026</b>	<b>16320</b>
Share of Total Employment (%)	11.5	62.1	45.3	54.2	60.7	50.1	32.3	50.3	59.9	51.7	77.1	37.3
Total LGA Employment	15389	1450	2406	1781	907	923	5051	6579	5907	2079	1330	43802

The relevant multipliers have been applied to those employment data to estimate the total impact of these primary industries. The details are shown in the middle and lower sections of the table. For the BBSB as a whole, the total employment effect amounts to 16,320 jobs or 37 percent of all employment. The range of values is from 11.5 percent in Dubbo to 77 percent in Yallaro. In the area excluding Dubbo, the total for primary industry is 14,549 in a total of 28,413 that is equivalent to 51 percent. Gunnedah is notable with only 32 percent, but these data refer to a time prior to the closure of coalmines and the abattoir.

The above estimates only take account of the backward linkages from farms so that the flow-on effect through the purchase of inputs is included. The downstream impacts associated with marketing and processing of the products is not included. The inclusion of downstream impacts would further boost the importance of agriculture to these regional economies.

#### **4.4 DEVELOPMENTS IN CONSERVATION ON PRIVATE LAND**

The development of conservation farming systems is part of the continuous evolution of farming technologies. That is the product of accumulated knowledge from research and experience. It is the application of a flow of new knowledge and information that involves continuous improvement with occasional major advances. There is a close link to technological change.

This process is partly a response to the ongoing need to improve productivity and minimise costs. The outcome of these developments is an improvement in net farm returns, thereby providing the incentive for adoption.

The inclusion of conservation measures into farming systems reflects a change in the ranking of conservation outcomes in the set of farming objectives. Better assessment of the state of the environment and factors impacting on it has led to a broad-based recognition that greater emphasis is needed on achieving better environmental outcomes from all types of activities. In a national context, that has led to higher levels of funding for research on environmental issues and for programs to improve the state of the environment. Research programs now include environmental issues in the research.

Farmers generally do recognise the need to be much more aware of the environmental impact of their farming systems. Most of the material relating to farm operations in all forms of the media has an underlying 'conservation farming' focus. Further, by recognising what are known as 'environmental services' farming practices can be improved along with environmental outcomes and higher net returns.

The adoption of conservation farming methods is similar to adopting other new technologies into agriculture. There are lags associated with a range of socioeconomic factors that include access to information, complexity of the technology, the innovativeness of the farmers and their access to capital. The self-interest incentives are the basis for the adoption of technologies that will increase net returns to the farmers.

That leaves some other technologies that are not readily adopted. These may be associated with factors generally regarded as 'market failure'. These situations include developments where the benefits accrue in part to other farmers or natural resource users in a way that precludes the development of markets where those benefiting have to pay the developer. If this is the case, then investment in those developments will be less than 'optimal'. That situation can be rectified by creating some equivalent of a market process that restores a financial incentive for those investments.

The under investment in projects that generate public benefits to the community is readily and widely recognised. This can lead to a general claim that farmers are not investing enough in conservation farming systems. That appears to be an inappropriate claim that stems from a poor documentation of the implementation of conservation farming systems and the benefits that ensue. Farmers have responded to the array of incentives that are available. These incentives favour those developments generating additional farm returns relative to general community or 'public' benefits. Among the opportunities considered within this project are initiatives that will involve the rigorous documentation of the implementation of conservation farming systems and the associated environmental outcomes.

Information provided by farmers on changes in their practices over the past decades indicates a growing interest in holistic approaches to farm management. This is significant as it represents the development of a management approach that is consistent with the development of environmental management systems for agriculture. Those approaches seek to assess environmental effects in addition to social and economic returns.

Within the conservation-oriented approach, farmers identified the following operational developments. (This is not an exhaustive list but does indicate the scope of the initiatives.)

- The use of rotational grazing instead of set stocking.
- Improved fencing related to the needs of land and soil types and to facilitate grazing management
- Minimum tillage soil preparation for crops and stubble retention.
- Regular soil testing to calibrate fertiliser applications to requirements.
- Use of reticulated water and dams to limit stock access to streams and the rehabilitation of stream banks.
- Use of improved pastures to restrict invasive weeds such as St Johns Wort.
- The maintenance of ground cover to restrict weeds and reduce soil loss.
- Feral animal control to prevent land degradation.
- Earthworks to repair damage from feral animals and previous adverse grazing practices.
- Earthworks to manage flows of water run-off to restrict soil loss and erosion.
- Use of livestock to assist the control of invasive weeds, eg. goats (blackberry, sweet briar and thistles), cattle (St Johns Wort) and sheep (Patterson's curse).
- Strategic use of chemicals and drenches to reduce usage.
- Selection of livestock types that are better suited to the local environment.

There has been a high level of interest in the 'holistic' management approach of Savory, particularly in the grazing and rangeland areas of Australia. The ideas have been debated and questioned by both traditional agronomists and ecologists, but adoption appears to be increasing. Suzuki and Dressel (2002 p106) said this about the approach.

What's even more significant is that ranchers aren't following his management indicators religiously. Instead, they're adapting his precepts to the special needs of the area's particular biodiversity, land tenure and size. The result is just what the word "holistic" implies: practices that are open to reality, constantly trying to perceive the whole that they are working within and, because the whole is alive and changing, being extraordinarily flexible and humble in response.

While the particular approach of Savory may not appeal to all and is only one of several new directions being developed, most have some common elements. They include dimensions of holism, the need to be flexible and adaptive to locations, to changes in the systems and in knowledge of the systems – a point well made by Suzuki and Dressel.

It is notable that many of the proposals for environmental management systems centre about comprehensive recording systems and the analysis and interpretation of the information that is gathered. That will sit alongside the findings of researchers. Not only will this be important in developing a better understanding of the way the systems work, but it will also provide a set of data about management that is presently very sparse. Better information should enable the debate to be better focused on key issues rather than on the extent and nature of current management practices.

## 4.5 THE DEVELOPMENT OF FARM MODELS

### Farm Modelling

The purpose of this section of the work is to develop some capacity to analyse the economic impact of changes in resource management practices on operating farms. At this stage, there is no specification of the practices to be investigated. Thus, the task is seen as one where suitable generic farm models are developed that have the capability to be readily adapted to analyse a wide range of changes in the way farm operate. This is the practical aspect of the principles advanced in section 1 that competent socioeconomic assessments begin with competent analysis at the micro level. Once the farm impacts are known, then an aggregation to regional economic impacts can be made.

The changes in farm management practices may arise from:

- Changes in legislation;
- Farmer initiatives; or
- Responses to commercial opportunities.

These sources of change reflect farmers taking up conservation opportunities that provide benefits to them in terms of improving the sustainability and / or the commercial outcomes of the farm, or conservation requirements that arise from research or are embodied in legislation or recommended to achieve particular outcomes.

Analytic modelling can be an important part in the voluntary uptake of conservation opportunities by demonstrating the potential value of the change to the landowner. If it can be demonstrated that there are worthwhile private benefits in the conservation measure, then this can be used in an 'extension' context to encourage the uptake of the measure.

In some cases, the private conservation benefits might be uncertain or not be available for some time into the future. For example, farmers adopting the Environmental Management Systems (EMS) approach will be incurring costs to plan and implement the system. The expectation is that sometime in the future, there will be a market advantage for products from accredited, environmentally sound producers. Conceptually, this is a reasonable expectation, but there is little agricultural evidence about the size and timing of the premiums. To encourage the uptake of EMS, public policy could involve the community taking up some of the uncertainty by subsidising costs. There might also be some subsidy associated with the public benefits associated with EMS that is not recouped from market operations. Indeed, this is in line with what has happened in agriculture overseas, where subsidies for environmental activities have to varying degrees replaced price support activities.

Within these issues is the way in which regulations, incentives and the motivations and objectives of farmers interact to achieve outcomes that achieve both farmer and community objectives, ie, 'a win-win outcome'. The intensity of debate on these issues signals the importance of the issues, the lack of maturity in the present structures and the on-going need for research and development (trials) to develop better structures for policy and incentives as well and the need to understand the issues better.

The achievement of good outcomes will involve reaching agreement about the balance between supportive regulation and the commitment of farmers to a strategy of on-going improvement in farming systems that achieve conservation outcomes as well as financial

outcomes. The notion of an on-going commitment to improvement is especially important because:

- We operate in a learning context where new understanding, ideas and approaches appear as a stream. They need to be considered in relation to any particular piece of land and, where appropriate, integrated into a modified farming system. A structure such as the EMS is designed to assist that process. That process is continuous and promises to provide ongoing improvement that is difficult to achieve under regulation.
- There is a need to document the changes made and the improvement in outcomes. While there is good documentation of production and financial outcomes, those related to conservation are not. Further, the actions taken and changes made to management systems have to be recorded if there is to be due recognition for actions and the possibility that linkages between actions and conservation outcomes can be identified and measured.

The focus is on better understanding the system so as to achieve a balanced set of outcomes (triple bottom line). That contrasts with actions that will achieve the minimum requirements of a regulation at minimum cost, or worse, expending resources on attempting to avoid the regulation or meet the requirement via some deviant path. The attitude of taxpayers to various tax regulations is a case in point.

### **The System for Farm Modelling**

Each farm has a distinctive resource base in terms of land characteristics, soil types and condition, vegetation type and condition, rainfall and access to water, and land use. Further, there will be a variety of land, soil, vegetation and land uses occurring on most properties. The mix of these characteristics will ensure that there will be unique opportunities for conservation on each property and a related set of opportunity costs that will be unique for each property. Those factors suggest that management plans for production and conservation need to be customised to a particular property. This is difficult to achieve in administrative systems and have been tried in the past in NSW.

Geographical attributes do generate aggregations of properties where there is a relatively high degree of similarity in terms of land, vegetation, soil and land use. This provides an opportunity to model those farming systems and properties with a similar resource base and land use opportunities. Those models need to be structured in a way that enables the land types and uses to be combined in various proportions. In that way a generic model can be used to 'represent' a number of farms, with that number being determined by the geographic spread of common characteristics.

The quality of this approach is related to the capacity to use information on the natural resource base and land use to define areas that are relatively homogenous. GIS provides a capacity to do this, but the data are not always available for the various attributes.

The data for the modelling would need to include both planning and financial information such as the following.

- Land area and land types: There will be a need to allow property size to vary and to allow the mix of land types to vary.
- Land use: This will include both actual use and potential use(s)
- Gross margins: This will be for actual and potential uses.
- Overhead costs: These are business costs not associated with the enterprises on the farm

For effective farm analysis, a range of other operational information will be required. Here, the task is to develop an understanding of the way key management decisions are made and the links between those decisions and the performance outcomes of the farm business. Thus, there is a need for close collaboration with farm operators to develop that understanding.

Ideally, the approach is best applied with a few selected case studies. Dealing with one manager or management group is a major advantage in determining the basis for key decisions and following through the implications for the business. However, individual case studies are problematic in terms of being representative of some defined categories of farming. The extrapolation of a case to large numbers of other farms is problematic.

One solution that seeks to combine a more representative structure with some of the advantages of the case study involves the use of a small focus group of around six farm managers. The focus group is used to develop a set of management decision rules that are generally applied in that farming region. These are then implemented in a hypothetical property that reflects the farm characteristics of the region. Greater breadth of coverage can be obtained through using a range of values for key farm characteristics. It is also possible to allow some variations in farm management strategies such as the way farmers' approach the selling and/or feeding of livestock in periods of drought.

There will be issues related to the suitability of the hypothetical farm as representative of farming in that area. The paucity of data on farms makes it difficult to define the hypothetical farm in the first place and then to demonstrate how representative it is. It is expected that in future, the development of GIS databases will make this easier in respect of the physical attributes of the property. It will be even more difficult to develop assurances that the members of the focus group will be representative of farmers in general. The use of the focus group is seen as an advance beyond using a single case study, but it will still be difficult to claim some level of representativeness of farmers generally.

There is also the issue of the modelling timeframe to be considered. Modelling just an 'average' year is not suitable for the analysis of farm management changes that may have cumulative financial and environmental impacts over several years.

In the past, it has been necessary to run the farm business models over time-periods ranging from 5 to 60 years, depending on the issue under consideration. For example, the financial effects of consecutive drought years can readily be captured within a five-year period. In contrast, the addition of a cypress pine forestry management system to the business may require an analysis period of 70-100 years as that is the typical rotation length between harvests for cypress.

In addition, if stochastic (ie. uncertain) variables are added to the model, their impacts will also be cumulative and typically several years of modelled information are needed to capture these effects and show the possible range of outcomes.

While considerable experience has been built learning about the timeframes needed to capture the financial effects of management changes, it is uncertain whether or not these timeframes will coincide with measurable environmental change. At the very least however, farm business models run over several years will provide useful insights into the financial feasibility of the management changes and incentives on offer and hence their likelihood of adoption.

This analytical approach has its deficiencies, as do most approaches. The purpose is to develop insights into the way in which farm managers respond to changes in the conditions in which they are operating. This knowledge becomes useful in considering policy initiatives and allows the responses to be simulated through modelling before committing

to policy implementation. In a structured approach a number of options can be considered and modelled in ways that include the use of the focus groups to determine the way in which the managers are likely to respond to the proposed change. The capacity to do this will be available to analyse options for conservation on private land in the BBSB.

### **Farm Model Structure**

Farm level modelling is an important tool for performing a 'reality check' on the likelihood of alternative farm management systems being adopted by farmers. A number of recent conservation initiatives (eg rate rebates for conservation) would benefit significantly from a reality check within a whole-farm financial model to reveal the true significance of rebates in relation to the whole farm financial situation. Capturing the financial nature of such incentives will provide important information on likely uptake rates and a means of comparing alternative conservation mechanisms.

In building these models, it is not necessary to start from basics. CARE has been involved in a range of modelling research and analysis tasks. That experience has led to a set of structures and approaches that the models are based upon. The configuration and operational details of the models are tailored to the circumstances and the objectives of the analysis.

Over the past ten years, CARE has developed a number of farm business (microeconomic) models for a range of purposes including;

- Assessment of alternative farm management options, including those specifically aimed at improved resource management (eg opportunity cropping to manage water tables);
- Adoption of new farm enterprises (eg farm forestry, both from plantations and existing native forests);
- Assessing the performance of alternative drought management strategies; and
- Estimating the impacts of taxation reform.

The process of developing these models has normally involved input from individual landholders or farmer focus groups. This has the advantage of accessing actual farm data and allows for personal interaction with farm managers to gain insights into farm management options and likely responses to changes in the operating environment, including policy initiatives. Inevitably we find that the farming systems described and the information collected is significantly different from the 'average' data collected and published by various government agencies.

Personal interaction with landholders, provides scope for model validation and to improve the models iteratively while providing feedback to landholders about the financial implications of the issues being examined. There is an element of 'giving something back' to those who provide data for the models.

The models developed in the past have varied considerably in structure and content highlighting their flexibility and the range of issues analysed. The major point to note is that these are whole-farm models that capture a greater number of financial performance variables than standard gross margin analysis.

The models are usually run on an annual time step over a number of years so the cumulative impact of farm management changes on both physical and financial parameters can be estimated. This is important because some changes (eg a single year of drought) will have a relatively minor impact on performance while three consecutive drought years can be business threatening. Similarly, investments such as farm forestry require perhaps 30-40 years of analysis to gauge the impacts over a rotation cycle.



Because of the capacity to track cumulative effects over time, the models contain a range of financial measures of interest to decision-makers and more fully illustrate financial outcomes. These have included;

- Annual business cash flows;
- Net farm income;
- Taxable income (and in some cases, estimates of tax payable)
- Net worth;
- Farm equity levels;
- Balance sheets;
- Debt levels;
- Stock numbers;
- Physical inventories (eg grain stored);
- Internal rates of return, net present values and annuity equivalents for new investments (eg farm forestry).

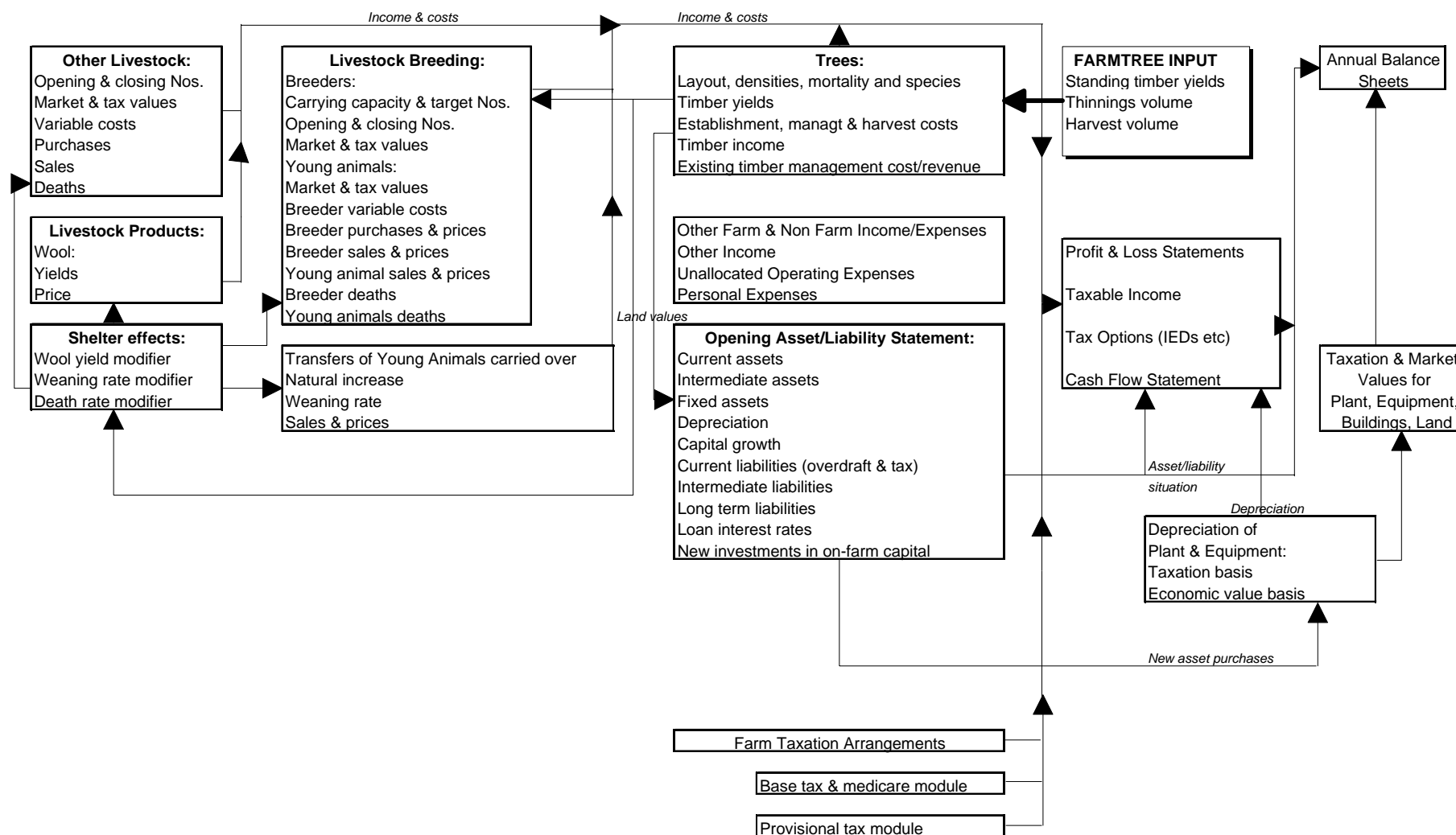
The structure of one of these models is illustrated in Figure 4-3. Because a range of models has already been developed, these can be adapted to suit the purposes of the current project. The models have been developed using standard spreadsheet software (usually Excel<sup>TM</sup>), though recently, systems modelling software (Vensim<sup>TM</sup>) was used to examine the financial-environmental trade-offs associated with management options in cotton production systems.

An important feature of the models that is often ignored in most financial analyses of farming systems is the capacity to examine risk. Most models are developed using 'average' data and assume that average environmental conditions prevail, and so discount the role of uncertainty in farming systems.

Where warranted, we have overcome this deficiency through the use of the @Risk<sup>TM</sup> software (when working in Excel<sup>TM</sup>) and via Vensim<sup>TM</sup>. Both these approaches provide the capacity to set up key model variables as probability distributions, so capturing the inherent uncertainty in farming systems. This uncertainty can be applied to a range of model variables including:

- Climatic conditions (eg rainfall);
- Production rates (eg crop yields, livestock weaning rates, wool cuts);
- Product prices;
- Interest rates.

**Figure 4-3: Structure of a Whole-farm Model to Examine Farm Forestry Investment**



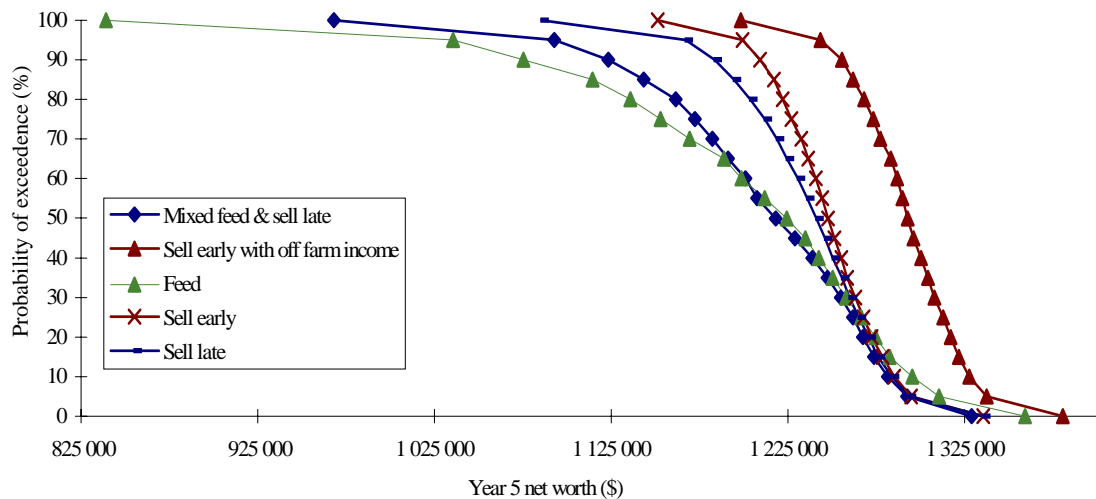
In many cases there are correlations between modelled variables and it has been necessary to examine historical data to build both positive and negative correlations into the models. For example, livestock prices may be negatively correlated with drought because during prolonged drought, significant de-stocking can occur causing market over-supply. Estimating these correlations quantitatively can be challenging and again, information from farmer focus groups can be useful in making a sensible estimate of those responses based on their experience and local knowledge.

The outcome of using a stochastic (uncertain) approach to farm modelling is a far richer source of descriptive data on system performance. Not only are average (or expected) results generated, but also with well-designed experiments, it is possible to determine which risky variables are having the strongest impact on outcomes. Moreover, statistics are generated which provide an overview of the range of likely outcomes (eg minimums, maximums, standard deviations and the probability of reaching a particular performance level).

An example of the type of output which can be generated using an @Risk™ analysis is provided in Figure 4-4. In this case, several alternative drought management strategies were analysed over a five-year period. The graph shows the probability of exceeding specified farm net worth levels after operating each strategy for five years. In this case, the five modelled years were simulated 600 times to capture system variability and the probability of drought years including sequences of drought years.

Recent applications of whole-farm models have ventured into the area of bio-economic modelling. Bio-economic modelling goes beyond straight financial analysis to include components of the biological system within which the farm system operates. Interactions between the farm biological and financial sub-systems can be catered for with this approach.

**Figure 4-4: Drought Management Strategies for a Hunter Valley Beef Property**



Current work on ecosystem services on cotton farms links a standard whole-farm financial model to biophysical models that include water balance, pest control and irrigation supply models. Alternative 'ecosystem friendly' management systems can be simulated. Because the biophysical components are stochastic in nature and will fluctuate over time, by running simulations over a number of years, the financial and biophysical outcomes are simulated. In addition, it is possible to incorporate farm management responses to uncertainty into the model (eg under conditions of limited irrigation supply, smaller areas of cotton will be planted).

Of particular relevance to the current project is our work on native farm forestry on case study farms in the New England Region (Thompson 1998). This analysis involved the use of actual farm financial data and developing annual models that ran over 60-100 year time periods. The models were used to compare financial performance under the current farm structure with the situation where existing native forests (both eucalypt and cypress pine) were managed and harvested for timber production. Interactions between the native forestry enterprise and livestock carrying capacity were catered for. By estimating the difference in farm cash flows with and without forestry situation, it was possible to calculate the net present value and internal rates of return from the new forestry enterprise.

The farm models in the Pilliga and Goonoo areas could focus on the options for areas that carry native vegetation. In general terms, the options could include:

- Continuation with the existing low level of management;
- Management of areas under a sustainable farm forestry plan: and

The analysis of these options will provide guidance on the financial returns from the options and the possible need to provide incentives for some of developments. The incentives may be considered for options that are desirable on social grounds but do not generate an economic return to the landowner that is sufficient to justify the investment.

### **The Selection of Farm Areas**

Ideally, the farms would be based on data on physical land, soil and vegetation characteristics and characteristics of farms. This has not proved possible at this time given the limited amount of data available on farms and the parallel development of suitable GIS systems. The modelling has been based on a subjective judgement basis that has involved reference to:

- The Brigalow Belt South Provinces as reported in the RACD Project on Soil Landscapes.
- Areas which relate to a range of conservation issues and interest.
- Areas where a focus group of farmers could be established.

Six farm models have been developed as follows:

- The Northern Basalt areas where there are cropping and grazing activities (Warialda district).
- The Basalt and Northern Liverpool Plains areas where there are grazing and cropping opportunities along with substantial areas on native forest (Narrabri-Kaputar area).
- The Liverpool Range area (east) where the main activity is grazing and cropping is limited to small areas in the valley floors (Scone).
- The Liverpool Ranges area (west) where there are land development opportunities focused on improved pastures to manage invasive weeds (St Johns Wort). (Coolah)
- The farming areas surrounding the Goonoo forests in the Pilliga province. These adjacent areas have well established cropping and grazing activities along with substantial areas of native forest. There is potential for commercial forestry operations on these areas.
- The farming areas to the north and west of the Pilliga forest. These properties include areas of mainly cypress forest that can be managed for forestry or developed for farming. The farming systems in these areas have been developed relatively recently and are now reaching maturity.

While these farms cannot be representative of all of the farming systems in the region, they do represent a set that are relevant to a number of conservation and farming issues in the

BBSB. In all cases a basic set of farm data has been assembled, a model built and an informal group of farmers established. These models and groups can form the basis for ongoing consideration of on-farm conservation issues.

As indicated earlier, the more important part is the focus group approach that provides insights into the decision-making processes in operating the farm. Further, the group can provide responses to conservation options that might be proposed. That task can be most effective where the members of the focus group have also provided information for building the base model. The development of a level of trust with the participants and an understanding of the purpose of the analyses is an important part of this work. As farmers become more involved in some form of environmental management system, the need for analytical capacity to support those systems will become apparent.

#### **4.6 SUMMARY AND IMPLICATIONS**

Agriculture is a core industry in the BBSB and outside of Dubbo accounts for around one-half of all jobs directly and indirectly. In 1996, the gross value of production was \$1,916m from 4,301 establishments. The available data indicates that there has been little improvement in the values until the last two years. That improvement will be short-lived given the severe drought conditions. The industry has been adjusting continuously to financial pressures given that most of the markets are international. A strengthening of the \$A also poses a threat to the financial position of BBSB farmers.

Over the BBSB, broadacre grazing and cereal production is the main industry and these generate relatively weak linkages to other industries. In the northern areas, there is more diversity in the array of grain crops produced along with irrigation that provides a strong base for those economies and supporting industries.

From the region perspective, it is imperative that the agriculture base be retained and strengthened where possible. There is little evidence for optimism about the growth of other industries that will revitalise these economies. The agricultural industries need support now as much as ever along with a good drenching from drought-breaking rains.

Agricultural land use is closely linked to a range of environmental issues and there has been a substantial cultural change toward 'conservation farming' methods. Some examples of the more important of these changes have been noted. The extent and significance of those changes is poorly documented, while their application in farming appears to have been curtailed because of the modest financial situation of many farmers through the 1990s.

The work has involved the development of a set of farm models to provide a basis for understanding how conservation measures impact on farm performance. These models relate to a range of farming and land types and represent a capacity to analyse conservation (and other) issues as they might arise from time to time. Good microanalysis of how those measures will be incorporated into the farming systems is important for assessing their impacts and in guiding the way those measures might be adopted.



# 5. OVERVIEW

This project is one of three in the general area of socioeconomic assessment of the Brigalow Belt South Bioregion (BBSB). The work in this project has two broad functions:

- To provide descriptive and analytic information on the BBSB that offers a context in which discussion about conservation and natural resource management can take place.
- To develop a set of analytical tools that can be used to assess proposed changes in land management in the region. Three specific tools have been developed. They are:
  - Models of timber processing operations to examine the impact of proposed changes in timber milling and log supply on the industry.
  - Models of farming systems to analyse changes to land management on private land.
  - An input-output model with supporting data on Local Government Areas (LGAs) to undertake regional economic impact assessments of proposed changes that will affect business activity in the region.

This overview is structured along the above lines.

## 5.1 THE ECONOMIC CONTEXT

There is an extensive overview of the BBSB economy. The economy in total has experienced patchy economic conditions through out the 1990s. There is little doubt that the BBSB has not been sharing in the growth in NSW that has been high and sustained since 1994. That growth has been concentrated in Sydney, the surrounding areas and parts of the coast. In recent times, there is evidence of an accelerated out-migration from the inland in spite of better economic circumstances in agriculture. It appears that the competitive strength of the high growth areas is impacting on inland regions through simultaneous reductions in population, employment and unemployment in many localities.

The implications of the demographic and employment change are a faster loss of people from the 15 to 25 years age group. With an impending rise in 'baby boom' retirements, further employment and population loss is likely in the coming years. There is also the possibility that regions will suffer a net loss of skills as they concentrate into the major growth areas along with economic activity. The inland regions will fall further behind in terms of capturing scale economies and the income differentials relative to the NSW average level widens.

These outcomes are occurring in spite of rapid restructuring and change in the regions. Coping with change in a situation of economic stagnation or decline is more difficult than in a growth situation. When the focus is on survival and asset preservation, there is not so much capacity to seek new opportunities and little willingness to accept more change.

The BBSB economy did make some gains in the second half of the 1990s but local factors held down the rate of growth of employment to levels that were much lower than NSW as a

whole. A positive sign was the growth in manufacturing employment between 1996 and 2001 despite some significant plant closures. There are also important coal and gas resources in the region with the potential for development when significant markets are secured. However, projects of that type tend to have long development periods and even longer periods before they begin to attract new industries to the region.

Within the region, there is great variation among the LGAs. The strongest is Dubbo that gains from the large hinterland it serves and the role as a regional centre. That strength has some benefits for the southern area of the BBSB. At the other extreme, the small LGAs of Coolah, Merriwa and Yallaroi have a high dependence on broadacre agriculture and are not located on major traffic corridors that provide other business opportunities. Their capacity to reverse the negative trends is limited.

The remaining LGAs have some prospects associated with their highway location and/or the diversity of the agriculture they service or other factors. Most have been declining in recent times, but there is a basis for a return to growth with appropriate support and strategy. In the meantime, further erosion of the present economic base should be avoided. The present drought conditions are likely to do that and actions to ameliorate damage to those economies should be considered.

It is notable that the region has low levels of employment in business services relative to NSW. A good sign is that these activities are growing rapidly in a number of LGAs. This has two important implications. First, these sectors employ a large number of people with a range of skills relative to business and regional development. If they are in limited number, that represents a serious limitation to the capacity of the regions to develop their economy.

Second, in regional areas, community members have to play an important role in developing the capacity, infrastructure and services of their community. Often, these tasks are not required of the community in the cities. As a result many of the critical people with important skills are expected to undertake too much community work and operate in their business. It would be useful if more support could be provided to support their efforts in the community so as to enhance the prospects for economic development in the regions.

The data have been used to provide the perspective on the regional economy and to build analytic models. There is an array of input-output models that can be used to assess the regional economic impacts of proposed changes on the economy. Detailed analysis of population census data up to 2001 has been used to profile the BBSB and the LGA economies. Those profiles are designed to form an analytical basis for the consideration of economic development strategies and plans.

## **5.2 THE TIMBER INDUSTRY**

The information on the timber industry has been updated to current levels. Since 1999, there has been an increase in the amount of cypress milled and a decrease in the ironbark. The amount planned to be logged in 2002 is 85,980 m<sup>3</sup> and is used in 13 mills, 11 of which are located in the BBSB. The estimated value of production from the BBSB mills is \$22.3m and employment in milling in the region is 209 and other supporting activities in the region bring total direct employment to 263.

The total impacts including flow-on effects amount to \$41.5m of gross output, 472 jobs and \$10.9 m in wages and salaries. This represents 1.2 percent of the BBSB economy and around four percent of the Coonabarabran economy where much of the activity is concentrated.



The forest areas are also used for grazing and apiary activities that have been estimated to have a value of around \$10m. The firewood and other timber producing activities that operate in the forest have not been valued at this time.

A microeconomic model of the timber industry has also been developed so that proposed changes to the industry can be assessed. That model is linked to the regional economic models to assess regional impacts of proposed changes.

### 5.3 AGRICULTURE

Agriculture is a core industry in the BBSB and outside of Dubbo accounts for around one-half of all jobs directly and indirectly. In 1996, the gross value of production was \$1,916m from 4,301 establishments. The available data indicates that there has been little improvement in the values until the last two years. That improvement will be short-lived given the severe drought conditions.

Over the BBSB, broadacre grazing and cereal production is the main industry and these generate relatively weak linkages to other industries. In the northern areas, there is considerable diversity in the array of grain crops produced along with irrigation that provides a strong base for those economies and supporting industries.

Agricultural land use is closely linked to a range of environmental issues and there has been a substantial cultural change toward 'conservation farming' methods. The extent and significance of those changes is poorly documented, while their application in farming appears to have been curtailed because of the modest financial situation of many farmers through the 1990s.

The work has involved the development of a set of farm models to provide a basis for understanding how conservation measures impact on farm performance. These were to represent:

- The Northern Basalt areas where there are cropping and grazing activities (Warialda district).
- The Basalt and Northern Liverpool Plains areas where there are grazing and cropping opportunities along with substantial areas of native forest (Narrabri-Kaputar area).
- The Liverpool Range area (east) where the main activity is grazing and cropping is limited to small areas in the valley floors (Scone).
- The Liverpool Ranges area (west) where there are land development opportunities focused on improved pastures to manage invasive weeds (St Johns Wort). (Coolah)
- The farming areas surrounding the Goonoo forests in the Pilliga province. These adjacent areas have well established cropping and grazing activities along with substantial areas of native forest. There is potential for commercial forestry operations on these areas.
- The farming areas to the north and west of the Pilliga forest. These properties include areas of mainly cypress forest that can be managed for forestry or developed for farming. The farming systems in these areas have been developed relatively recently and are now reaching maturity.

These models are at an operational level and will be used to support the analysis of a range of conservation issues that are considered in the region. It is expected that farmers will move toward the formal use of some type of environmental management system as part of their farm management structure. In that context, the farm models will provide some supporting analytical capacity to those developments.

#### **5.4 ANALYSIS OF LOCAL GOVERNMENT AREAS**

A common set of data and comments has been compiled for each of the LGAs in the BBSB. This recognises that there is considerable variation among the LGA in terms of their economic structure, performance and potential. It is an important step towards refined approaches to economic development that tailor the actions to the needs and potential of each area.

# ATTACHMENT 1:

## REGIONAL DATA AND COMMENT

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It is apparent that there is considerable diversity among the LGAs that comprise the BBSB. Some of that diversity has been captured in the discussion in Section 2. However, some further data, analyses and comment on each of the LGAs is valuable for them in their own development planning and to those considering the implementation of policy changes that will impact on these LGAs.

The information is derived from the 1996 population census and that provides the basis of the information provided here. Information from the 2001 census has become available so the analysis has been added to this report. Time constraints have precluded it from being well integrated and the implications fully discussed. However, the information has been interpreted so as to be able to compare trends in the first half of the 1990s with those in the 1996 to 2001 period.

In broad contextual terms, the first half of the 1990s was one characterised by an economic recession and relatively poor seasonal conditions that extended the rural recession in the BBSB beyond that of the rest of NSW. Better agricultural conditions have prevailed up to 2001 and the NSW economy has grown rapidly since the end of the recession around 1994. The impact of the worsening drought conditions of 2002 has not impacted on these data.

Some of the information presented in the tables supports charts included in Section 2. In other cases, there is a cross-reference to an earlier table or chart. In addition, information on building activity and accommodation is included. The following attachments include data used in the shift-share analysis for the region as a whole, (the analysis for each LGA has not been included for space reasons). The numbers employed in 1996 and 2001 in manufacturing industries (detailed at the 4-digit level) in each LGA is included in Attachment 3. The structure of the information and discussion that follows is the same for each of the LGAs.

At the outset, there is a loose grouping of the LGAs that seem to fit similar characteristics. Those groups are:

**Dubbo:** Dubbo is the only LGA that has a sizeable economy able to gain some scale economies and functions as a regional centre (for part of this region and for other areas to the west and south). The result is that Dubbo looks more like an urban economy than a rural one, even though it has a high dependence on its rural hinterland – a weak hinterland economy will impact on business in Dubbo. It has the strongest features in terms of employment trend and earnings. The size and geographic location of Dubbo suggest that it must be near to a stage where there is self-sustaining growth.

**Moree Plains, Narrabri and Gunnedah:** These LGAs include a medium-sized centre and a set of economic activities that have generated growth or give the economy some diversity relative to the essentially rural areas. The growth of the cotton industry has been significant and it brings with it other industries associated with its marketing and processing, oil seed processing, the manufacture of plant and equipment and research.

These economies exhibit some depth in their economic activity although Gunnedah has lost some of these key industries with the abattoir and coal mine closures. These areas do have some economic resilience, but there is ample evidence that the failure of key industries due to drought or other reasons will threaten their on-going economic structure and growth. An erosion of core agricultural activities without significant new industries could result in these

economies becoming marginal with negative growth, an increased dependence on welfare assistance and a steady withdrawal of services. The further development of the “Newell Transport and Services Corridor” could assist in their economic development.

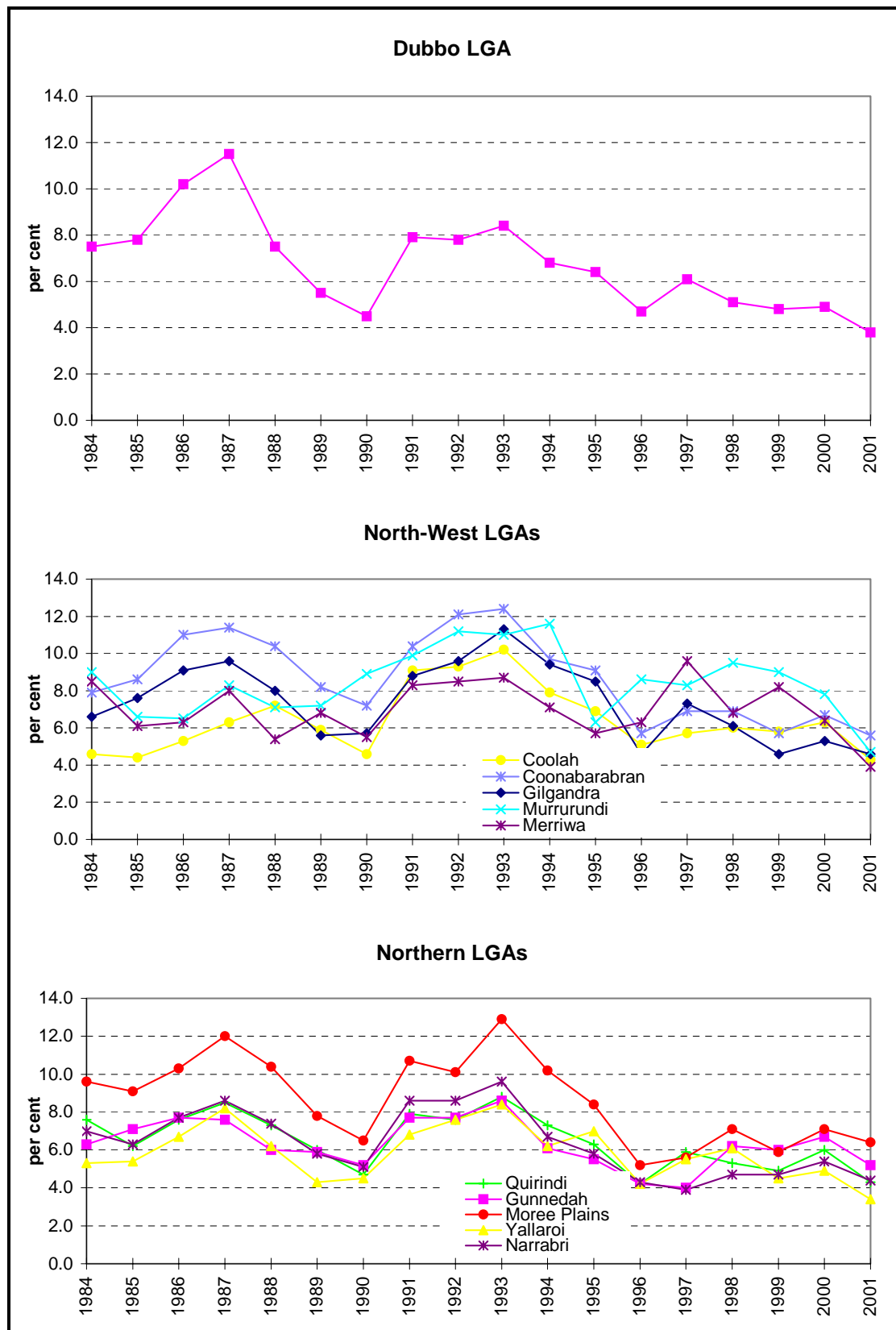
**Gilgandra, Coonabarabran, Quirindi and Murrurundi:** These LGAs essentially exhibit the characteristics of rural economies with a mid-level town centre and access to a range of essential services. However, further development will be a real challenge and the natural resource base offers limited scope for further agricultural development along the lines of recent decades in the above group. The economy is heavily dependent on agriculture, there is a steady loss of employment and population, and incomes are tending to be relatively low.

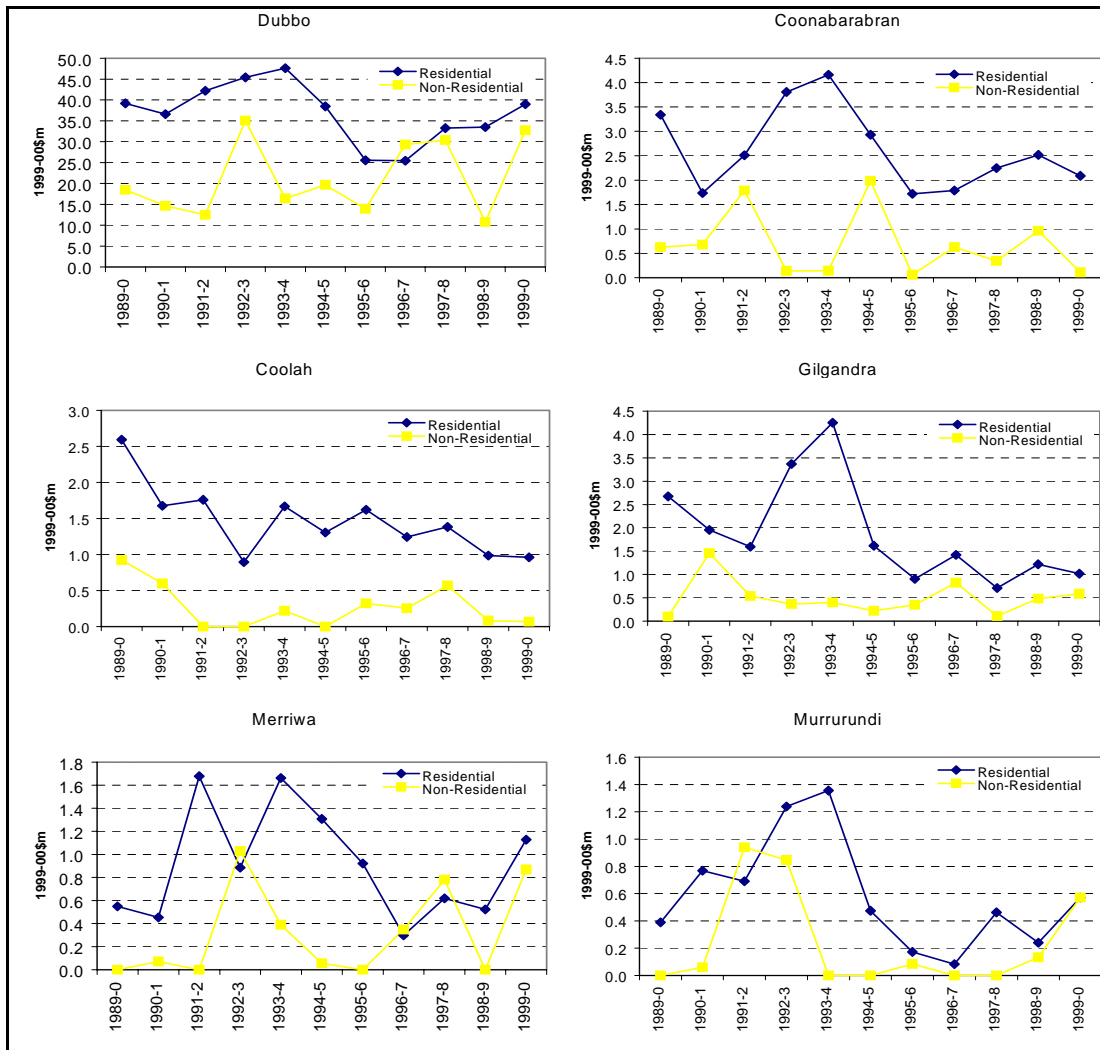
These economies are sustainable providing the agricultural base is retained and new opportunities that exist for most of them can be developed. Gilgandra and Coonabarabran can potentially benefit from the Newell Corridor developments and already gain some advantage from that traffic. Quirindi and Murrurundi are located where they can gain some advantage from proximity to the Upper Hunter along with investments in wine production and the horse industry. Relative to the other LGAs in this group, Quirindi has a more diverse economy and may gain further with the proposed development of a softwood timber milling facility.

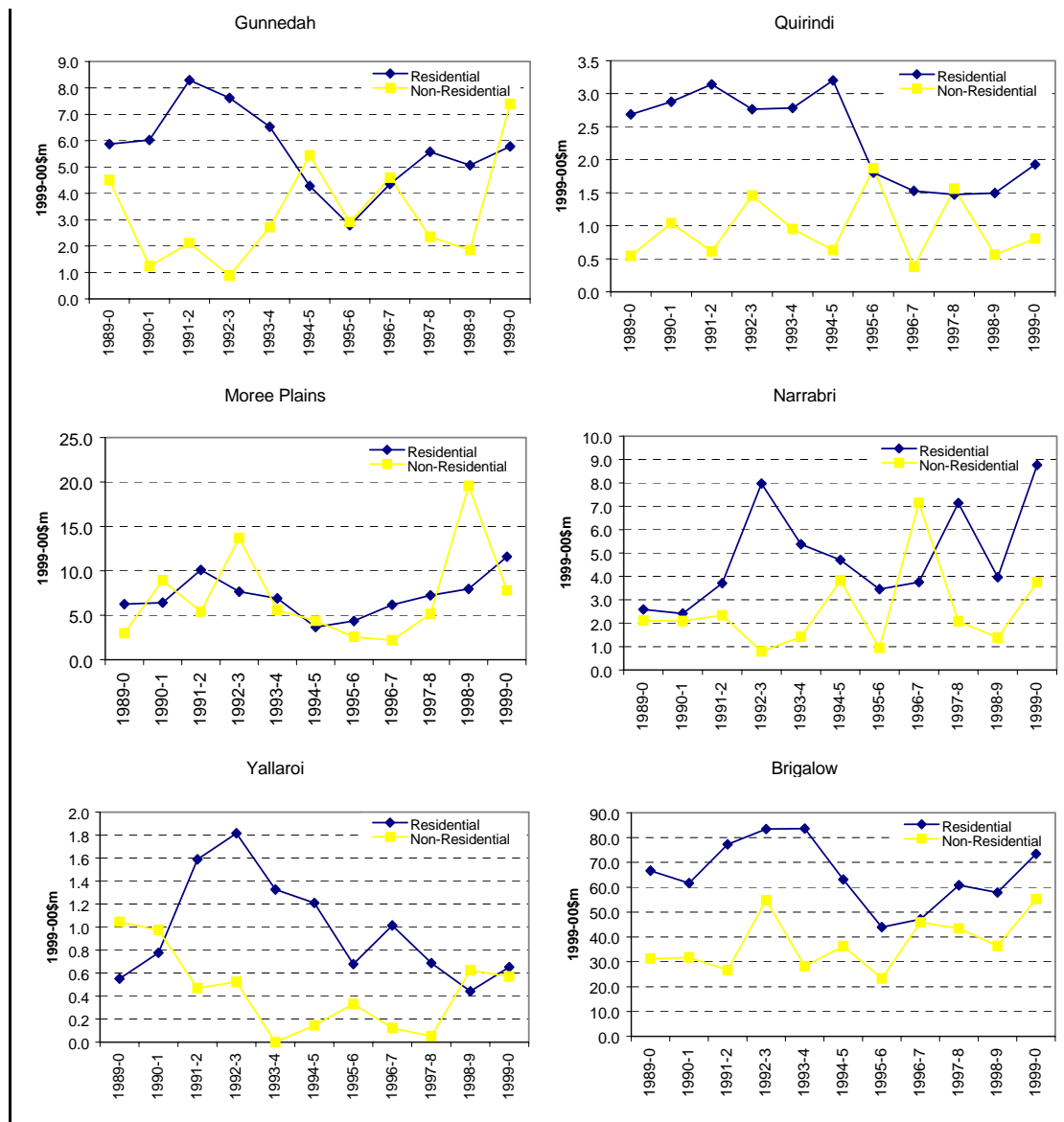
**Coolah, Merriwa and Yallaroi:** These LGAs are small and very much agricultural. There is an out-migration of population and decline in employment driven mainly by the structural adjustments occurring in agriculture. There is little opportunity to offset those adjustments by growth in other industry activities. The level of services provided is being eroded, including those in the private sector such as bank closures.

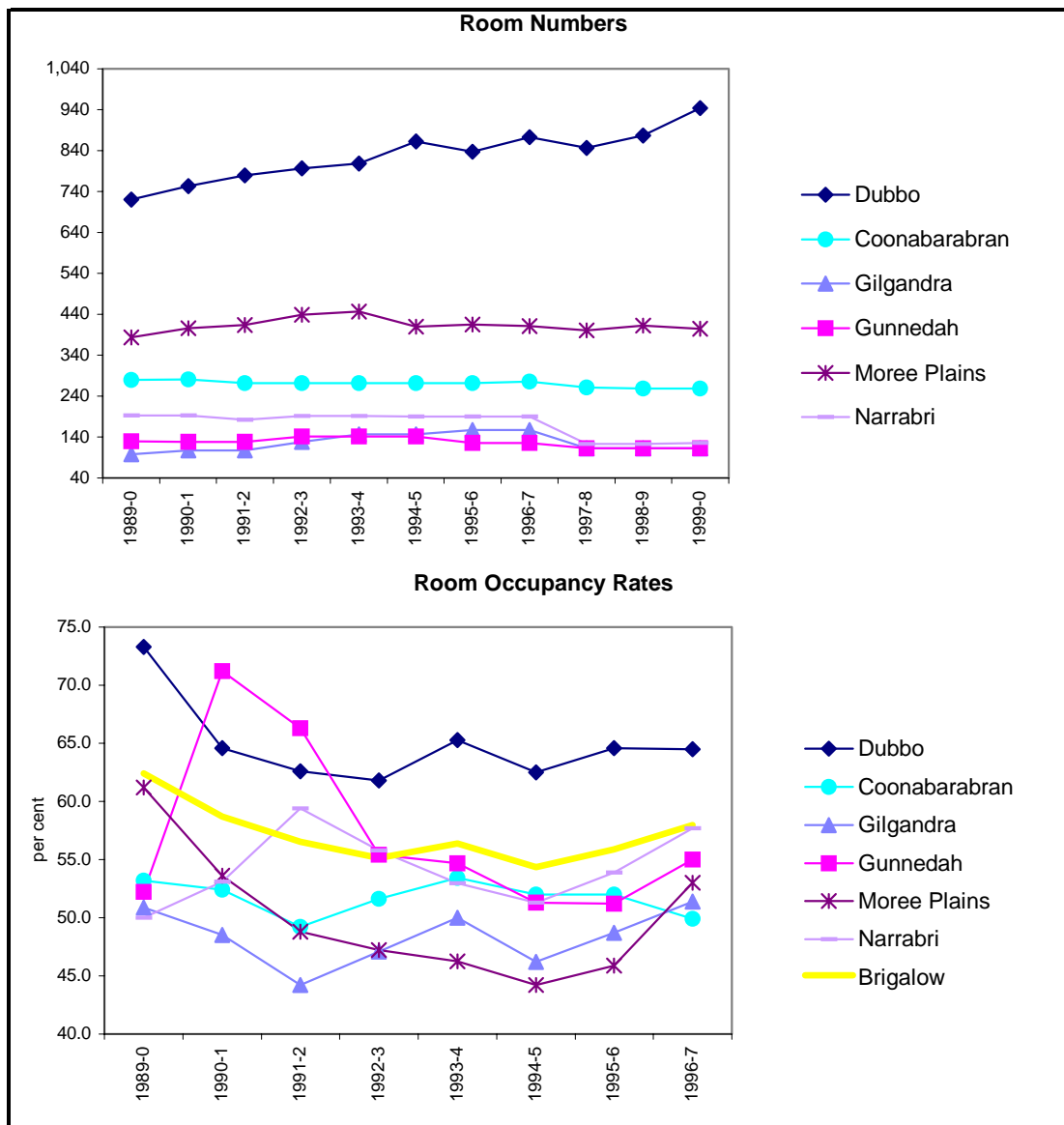
These economies will gain little from the Newell Corridor, as they are not located on it. Merriwa may make some gains from its proximity to The Hunter and not being so far from the Sydney region.

Overall, apart from Dubbo, all of these LGAs have much to fear from any further erosion of their core primary activities. Agriculture will remain the dominant determinant of the health of their economy. The development of new economic activities is no easy task and will take years rather than months to achieve a significant diversification of the economies.

**Figure 1: Unemployment Rates by LGA**

**Figure 2: Building Approvals by LGA**



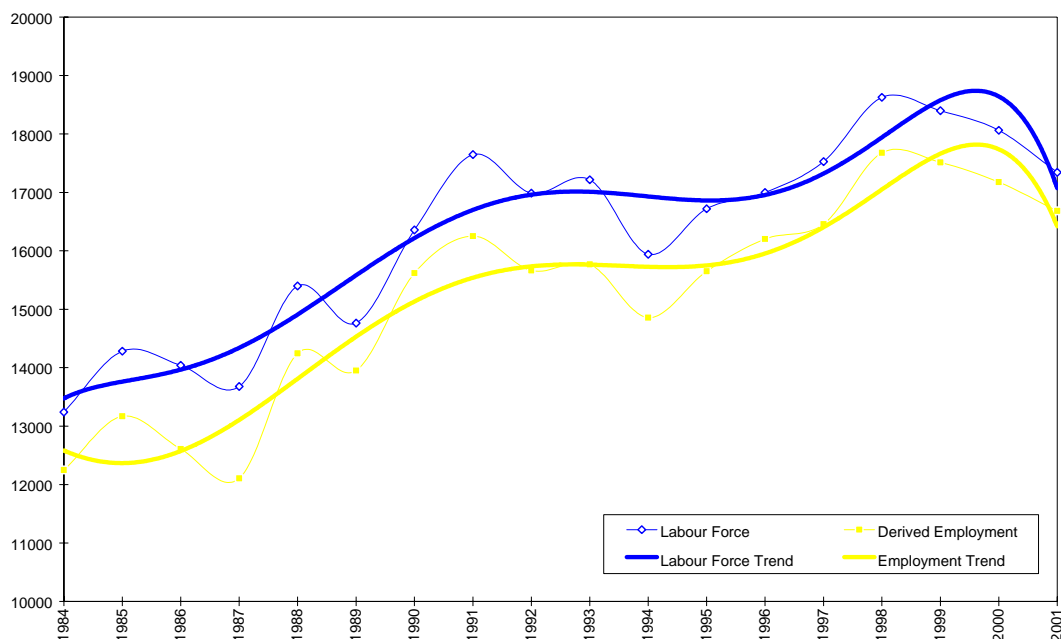
**Figure 3: Accommodation: Hotels, Motels with Facilities**



## 5.5 DUBBO

Dubbo is the stand out economy in the region. It has scale and diversity in its structure, and its dependence on agriculture within the Dubbo LGA is low. It is the only area to generate a strong growth in employment over several decades. However, there is evidence that employment growth is slowing with the information in Figure 4 indicating a loss of jobs since 1998. That is salutary in that a loss of employment in Dubbo would be a very important indicator that the inland economy is not healthy. The 2001 census data on employment indicates that employment increased from 1996 to 2001 but at a slower rate while the population growth has slowed considerably. There are clear signs that there has been a slowdown in growth in Dubbo although perhaps not to the extent of a decline in employment.

**Figure 4: Labour Force and Employment, Dubbo.**



The number of location quotients (LQs) that are greater than one is an indicator of the diversity of the Dubbo economy. Those values indicate that the industry is more important to the Dubbo economy than it is to the national economy. Where this exists in many industries, it is an indicator of strength in the economy. They lie in agricultural product processing, building and construction and transport. It is particularly notable that the retail sector is very important reflecting the role of Dubbo as a regional retail centre (ie a value of 1.2 suggests that retailing is about 20 percent larger than it would be on the basis of the population in Dubbo itself). Otherwise, Dubbo has strengths in public administration, education and health due to the role it plays as a regional centre.

A notable feature is the low LQ values for the various business service sectors. Even in this strong regional centre, business services are relatively weak and would represent a constraint on business performance. However, there has been some notable increases in these values in the 1996 to 2001 period. A comparison of the values over 1996 and 2001 suggest an increased importance for publishing, some food processing and wholesale trade. Printing and rail transport are among the sectors that are of less importance.

Agriculture in Dubbo is primarily broadacre grazing and cereal production with only a small amount of intensive production. Most of the irrigation in the Macquarie Valley lies further west, although some of those activities will impact on Dubbo. In all, the direct and indirect impact of agriculture on Dubbo amounts to 11 percent that is very low compared with other LGAs in the BBSB. The composition of agricultural production in Dubbo is shown in Figure 5.

**Table 1: Location Quotients, 1981 to 2001: Dubbo**

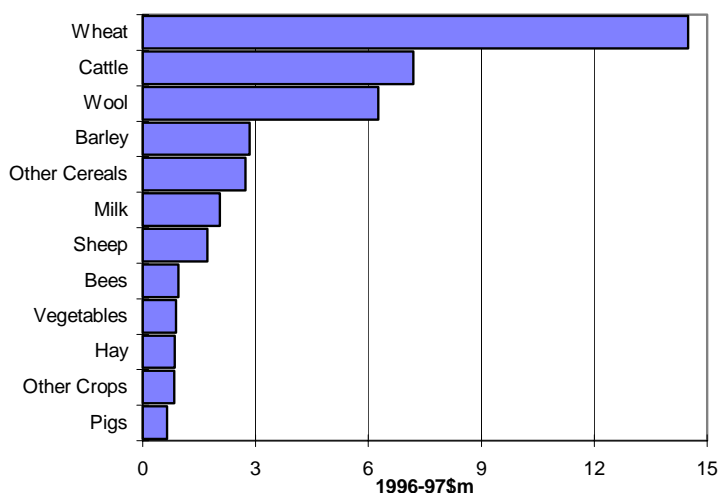
Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Concrete, cement, lime	0.7	0.8	1.4	0.7	<b>3.9</b>	63
Services to agric.; hunting	3.0	2.8	3.5	2.3	<b>3.1</b>	115
Beef cattle	1.8	1.1	1.4	3.8	<b>3.0</b>	143
Meat and meat products	2.6	0.1	3.2	2.5	<b>2.3</b>	174
Grains	1.6	2.4	1.3	1.9	<b>2.2</b>	405
Prefabricated buildings	0.0	0.0	0.0	1.2	<b>2.0</b>	17
Sheep	1.8	1.4	2.1	3.2	<b>2.0</b>	159
Publishing; recorded media etc	0.7	0.9	0.6	1.1	<b>1.9</b>	205
Other food products	0.8	1.1	1.1	0.9	<b>1.8</b>	96
Rail & other transport	1.8	2.1	1.8	2.8	<b>1.6</b>	100
Flour and cereal foods	0.9	0.4	1.5	1.1	<b>1.5</b>	23
Mechanical repairs	1.5	1.5	1.6	1.4	<b>1.5</b>	427
Libraries, museums, arts	0.7	1.0	1.6	1.3	<b>1.5</b>	166
Other repairs	1.3	1.1	1.2	1.2	<b>1.5</b>	65
Leather and leather products	2.1	3.8	1.0	1.0	<b>1.5</b>	11
Other mining	1.9	1.9	1.9	1.7	<b>1.4</b>	22
Road transport	3.5	1.3	1.4	1.5	<b>1.4</b>	538
Wholesale trade	1.3	1.2	1.2	1.1	<b>1.4</b>	1228
Electricity	1.0	1.0	1.2	1.5	<b>1.4</b>	104
Retail trade	1.4	1.4	1.3	1.3	<b>1.2</b>	2629
Health services	1.0	1.1	1.1	1.2	<b>1.2</b>	1474
Other construction	0.9	0.9	0.7	1.1	<b>1.2</b>	482
Water, sewerage & drainage	0.8	0.9	0.6	2.2	<b>1.2</b>	48
Printing; services to printing	0.5	2.0	1.9	1.6	<b>1.1</b>	128
Other wood products	0.5	0.7	0.8	1.0	<b>1.1</b>	84
Community care services	2.8	2.3	1.2	1.1	<b>1.1</b>	472
Accom. & restaurants	1.6	1.5	1.3	1.1	<b>1.1</b>	891
Public administration	1.0	1.0	1.0	1.1	<b>1.1</b>	658
Other services	0.5	0.6	0.8	0.8	<b>1.0</b>	302
Plaster; other concrete products	2.3	1.9	1.3	1.4	<b>1.0</b>	20
Education	0.9	0.9	1.0	1.0	<b>1.0</b>	1239
Fabricated metal products	0.3	0.4	0.4	0.6	<b>1.0</b>	70
Personal services	1.1	1.0	1.1	1.0	<b>1.0</b>	319
Non-bank finance	1.0	0.9	0.6	0.6	<b>1.0</b>	39
Structural metal products	0.9	0.6	1.1	0.4	<b>1.0</b>	46
Other property services	0.8	0.7	1.0	0.8	<b>0.9</b>	214
Legal, accounting srvs	1.0	0.7	0.8	0.6	<b>0.9</b>	524

Other measures of the Dubbo economy indicate that:

- Dubbo has the most diverse economy in the BBSB;
- The industry mix of high and low growth sectors is about the same as for NSW as a whole;
- The high growth sectors were an important component of overall growth; and

- The level of services was approximately at the NSW level although there were some areas below the NSW level.
- The share of business services in employment has declined during the 1990s and at 16.6 percent in 2001 is only two-thirds of the level for NSW as a whole.

**Figure 5: Composition of Agricultural Production Dubbo 1996-97**



The shift-share analysis provides insights into the development of Dubbo. This was the only LGA in the BBSB over 1991 to 1996 where the rate of growth was faster than the NSW average as indicated by the positive local industry component shown in Table 2. The information in that table also confirms the favourable industry mix with the positive changes under industry exceeding the negative changes. In all, the results for 1991 to 1996 were good as it covered a period of recession and a run of relatively poor seasons for agriculture. Dubbo has been sharing in the overall growth of NSW.

**Table 2: Summarised Shift-Share Analysis 1991-96: Dubbo**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	910	1,121	2,031	1,260	3,292
Negative Effects	-	(957)	(957)	(969)	(1,927)
<b>Total Effects</b>	<b>910</b>	<b>164</b>	<b>1,074</b>	<b>291</b>	<b>1,365</b>

The same analysis for the 1996 to 2001 period is shown in Table 3. During this period, almost all of the growth was sharing in the growth of NSW as a whole. Local factors were negligible in building growth while the industry composition effects were slightly negative, ie, for this period the industry mix for Dubbo tended to have slightly more industries that were growing slower than the NSW average.

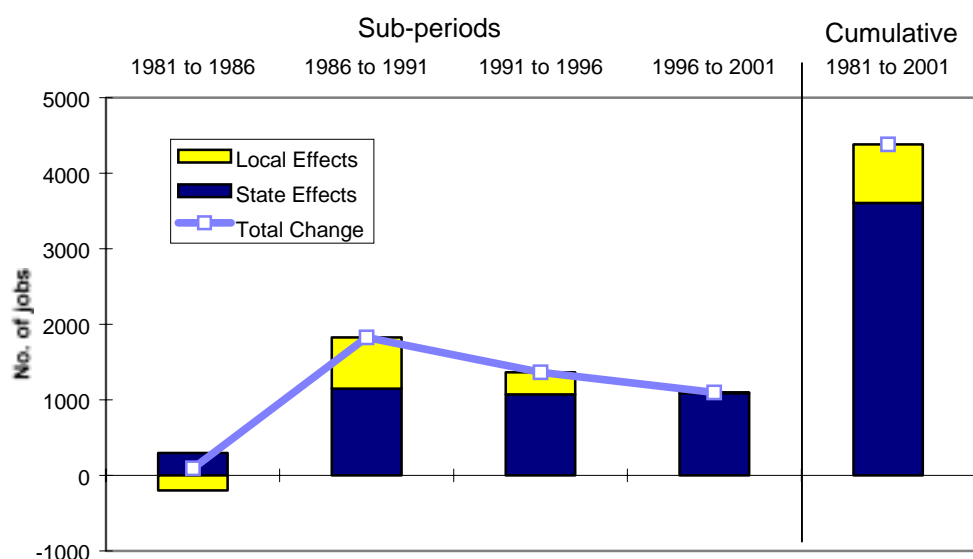
The analysis of growth over the period 1981 to 2001 confirms a good growth record. The performance of Dubbo was best between 1986 and 1991 as shown in Figure 6. In that period, growth was higher and the local factors were relatively more important. Over time, the importance of local factors in the growth of Dubbo has been diminishing but growth remains

strong. This may mean that the trend for some activities to concentrate in regional centres at the expense of its hinterland may have run its course.

**Table 3: Summarised Shift-Share Analysis 1996-2001: Dubbo**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	1,145	824	1,968	1,279	3,248
Negative Effects	-	(881)	(881)	(1,269)	(2,150)
<b>Total Effects</b>	<b>1,145</b>	<b>(57)</b>	<b>1,088</b>	<b>10</b>	<b>1,098</b>

**Figure 6: Summarised Shift-Share Analysis: Dubbo: 1981- 2001**



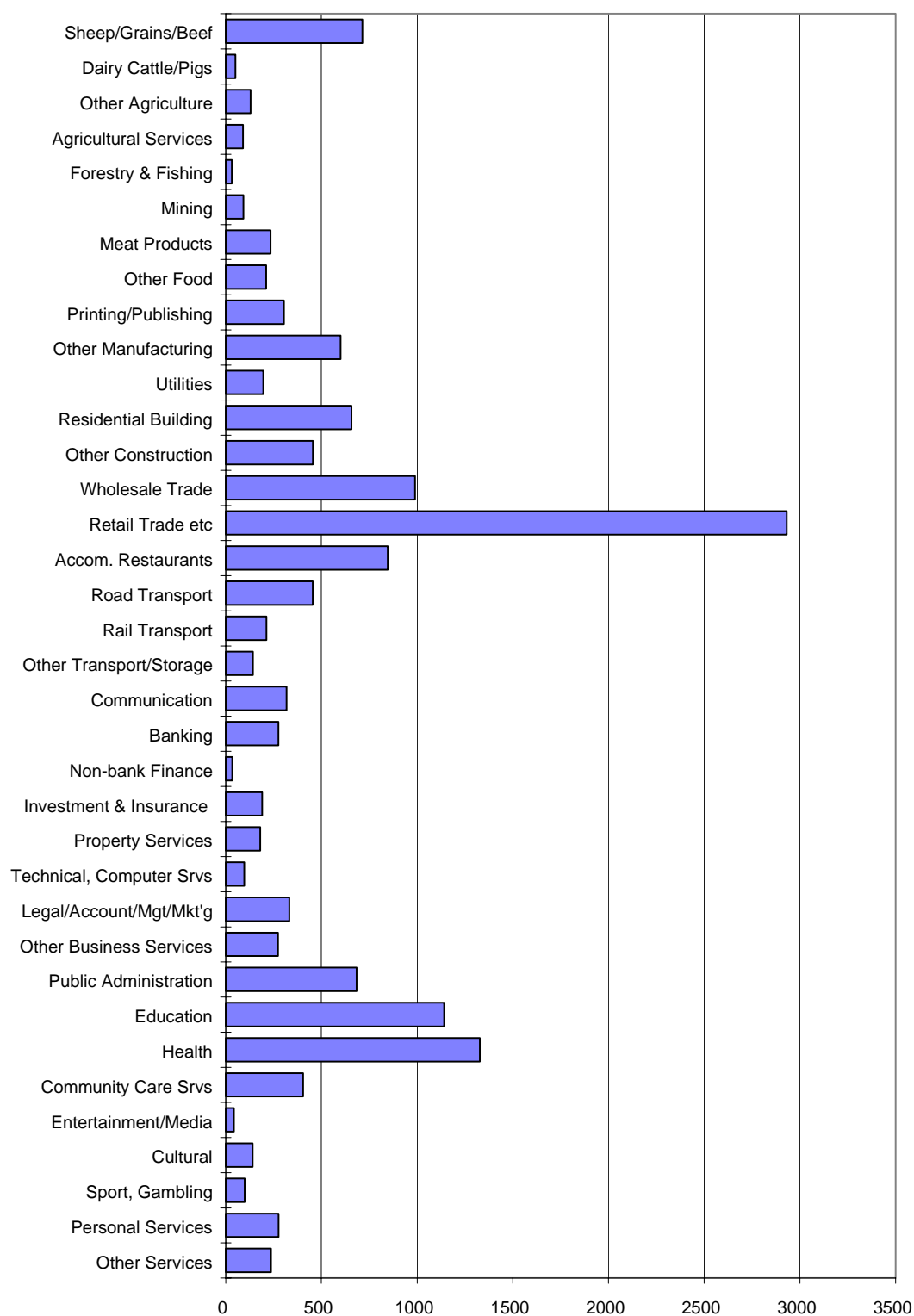
The sectoral information on employment and employment change 1991 to 1996 is shown in Figure 7 through Figure 9. These figures show that employment is widely spread over the various sectors (note the dominance of retail employment!). There is growth in employment in most sectors but note the declines in some of the business services sectors. Finally, the strong influence of the strengths of Dubbo is apparent and highlights retail, construction and public-funded services as important growth areas.

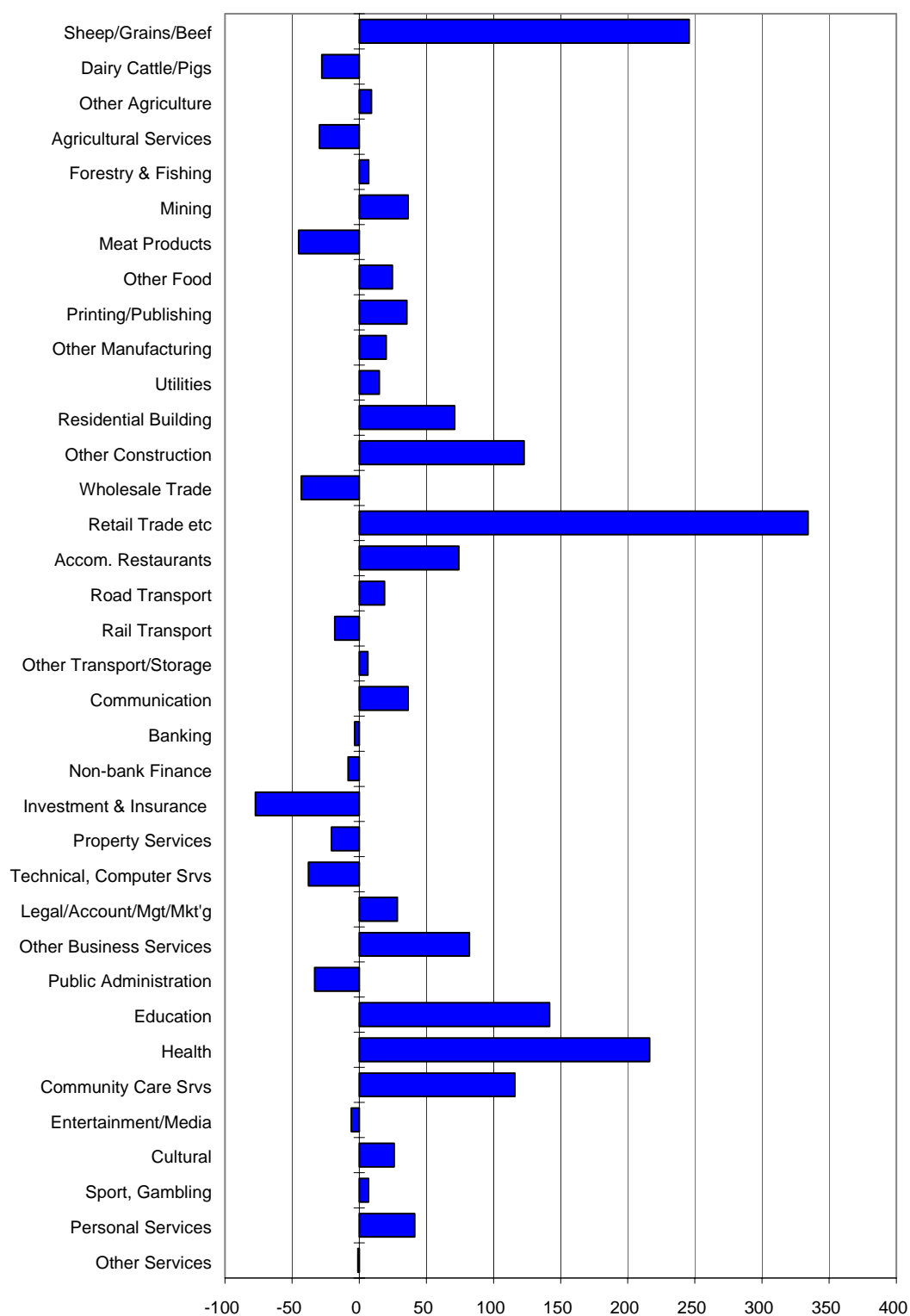
The same set of data relating to the 1996 to 2001 period is shown in Figure 10 through Figure 12. These charts suggest that there has been greater disparity in employment change among industries than there was in the 1991 to 1996 period. Employment growth was concentrated in some manufacturing, trade, accommodation and road transport and most other service sectors. Notable declines occurred in rail transport, communications and banking reflecting national trends to change in those industries. The local strengths apparent in Figure 12 highlight growing strengths and increasing market shares in other manufacturing, wholesale trade and legal, accounting and other business services, the latter being an area noted as lagging relative to NSW trends. There is some evidence that Dubbo has lost some of its market share of retail

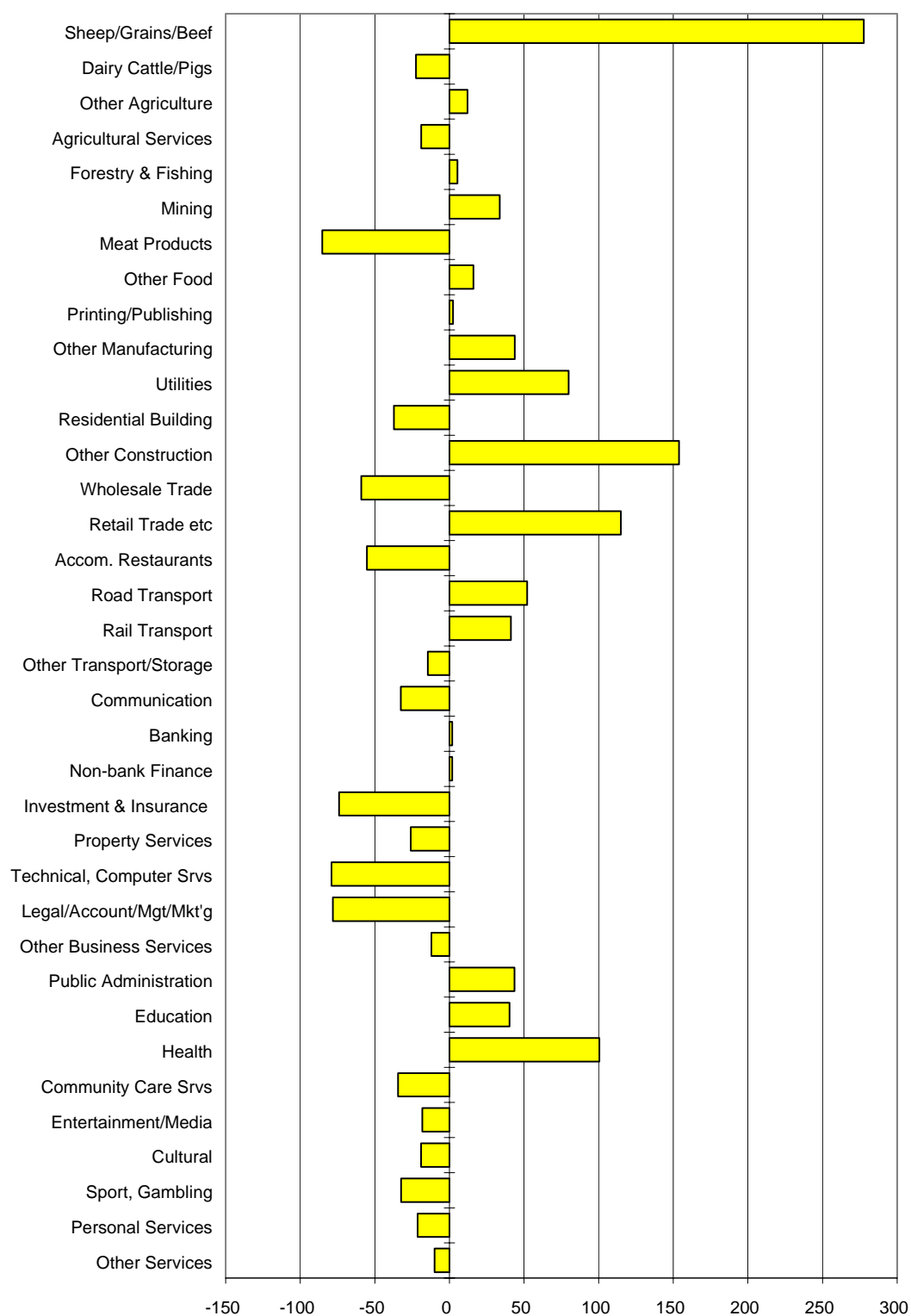
trade while the slowing in residential construction may reflect the slowing in the rate of population growth.

Other data indicates that average incomes in Dubbo are closest to the NSW average and above those earned in the remainder of the BBSB. Dubbo accounts for over half of the building activity in the BBSB and dominates the provision of visitor accommodation.

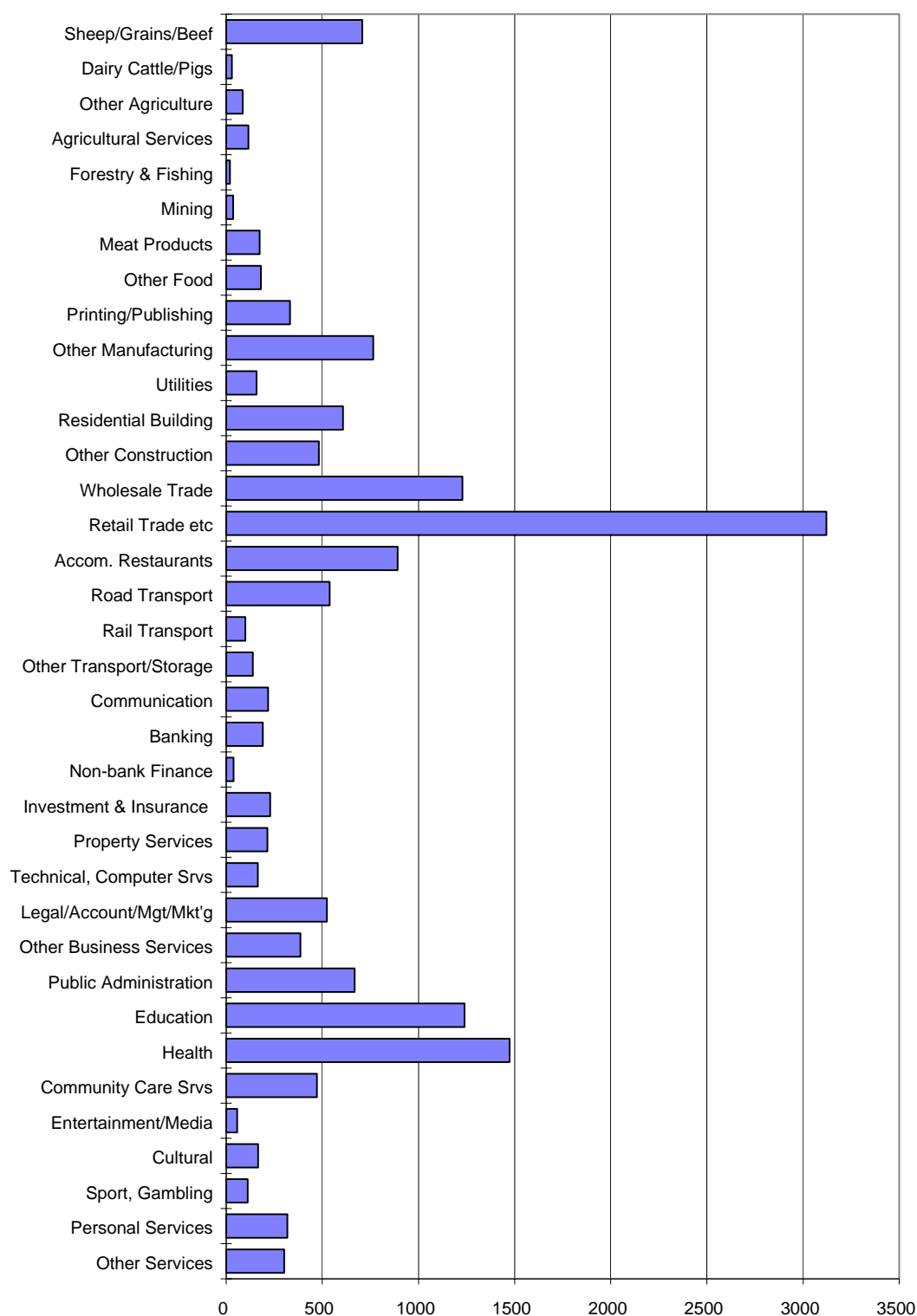
In conclusion, Dubbo is a strong economy that is performing well. However, it is slowing compared to the past and that may reflect the considerable competitive strength of the Sydney area within the NSW economy. That advantage is likely to have strengthened with the long period of uninterrupted and high economic growth that began in 1994. Dubbo will incur only small direct impacts from changes in the management of natural resources in the BBSB and other growth opportunities exist to maintain a high rate of economic growth.

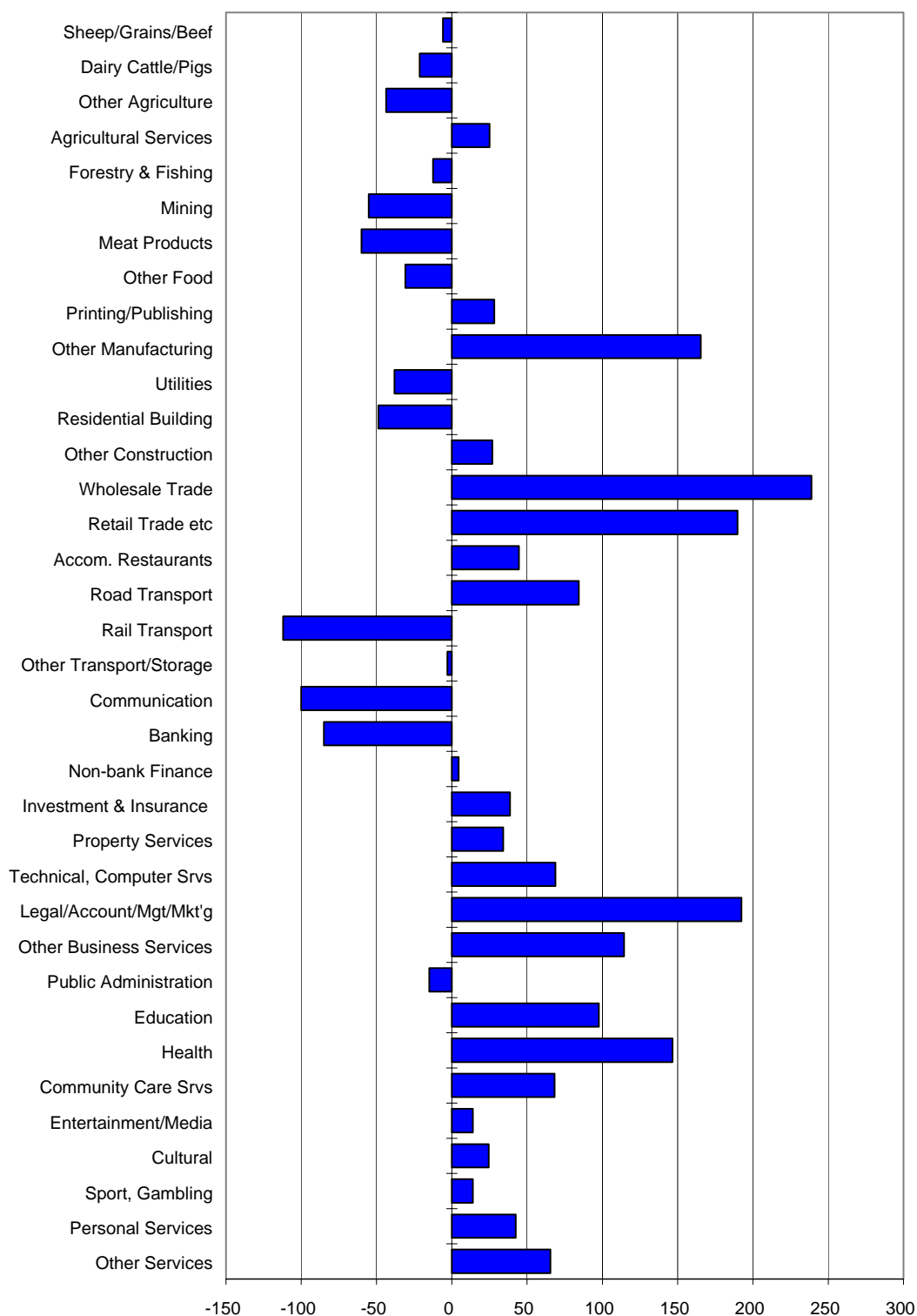
**Figure 7: Employment Distribution by Sector, 1996: Dubbo**

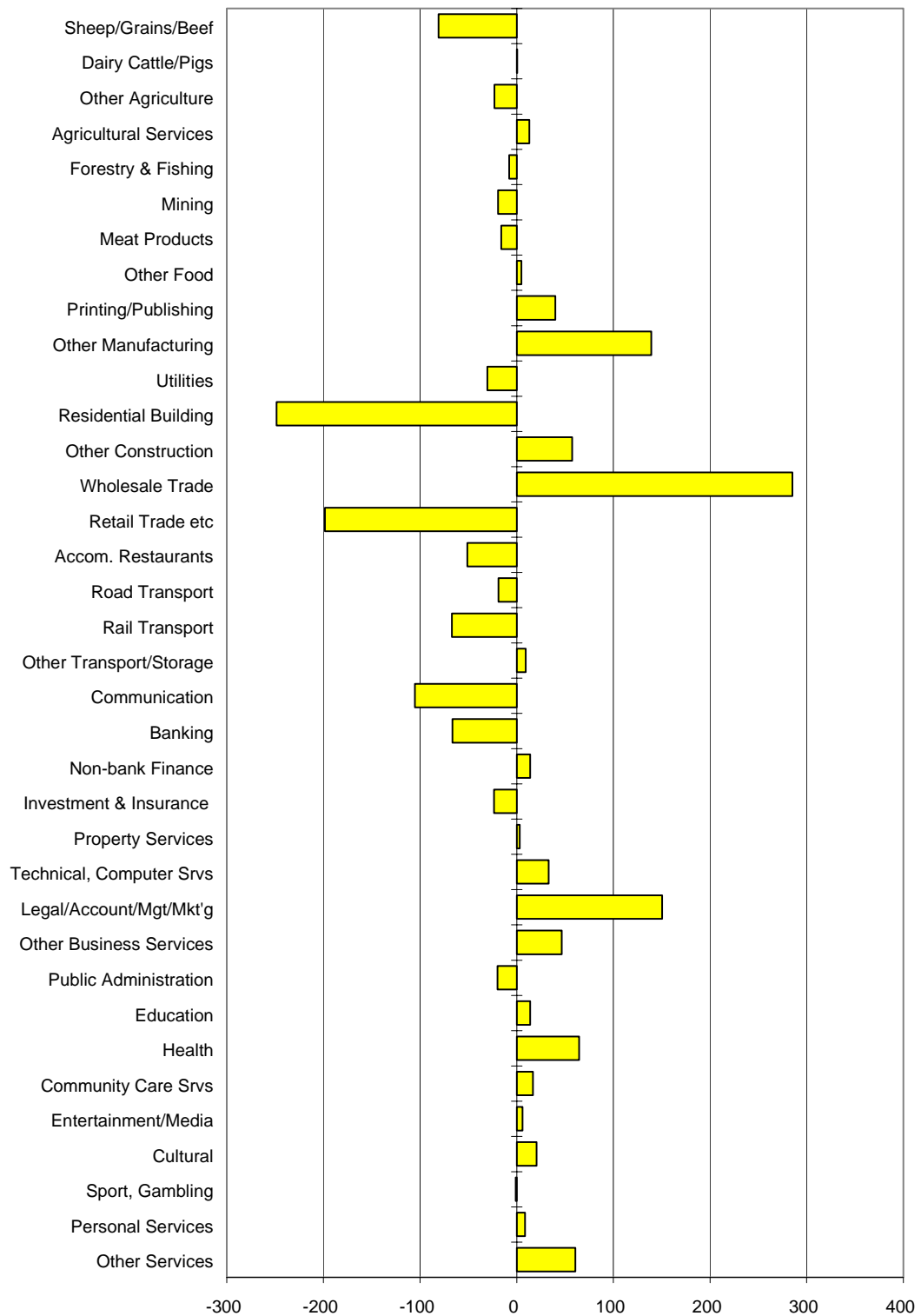
**Figure 8: Total Change in Employment by Sector, 1991-1996: Dubbo**

**Figure 9: Local Influences on Employment Change, 1991-1996: Dubbo**



**Figure 10: Employment Distribution by Sector, 2001: Dubbo**

**Figure 11: Total Change in Employment by Sector, 1996-2001: Dubbo**

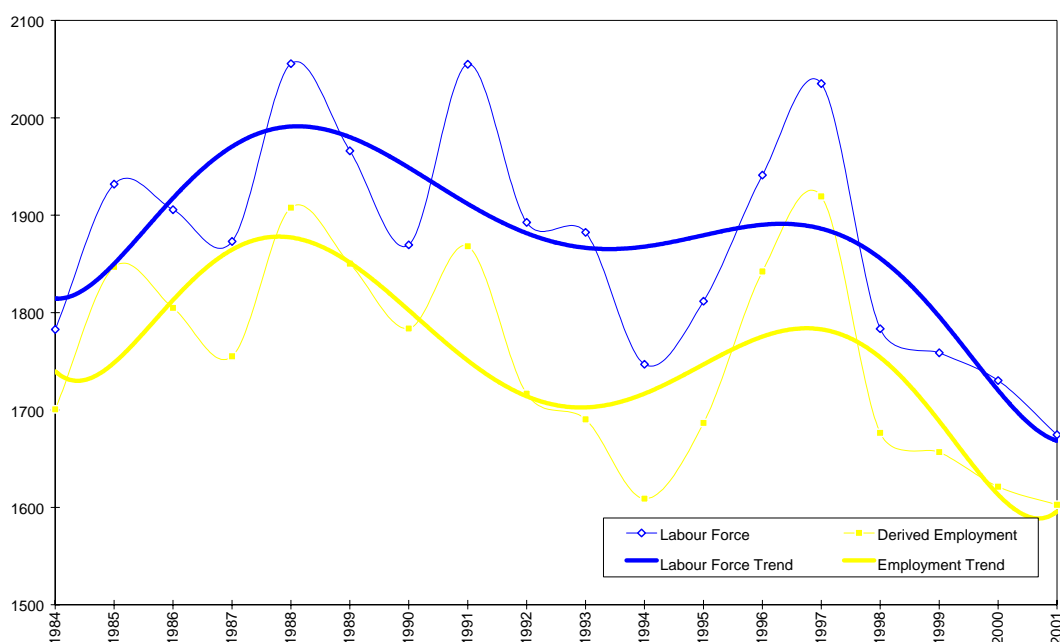
**Figure 12: Local Influences on Employment Change, 1996-2001: Dubbo**

## 5.6 COOLAH

Coolah sits at the other end of the spectrum to Dubbo. This is a small economy with a high reliance on agriculture. Other towns that compete for local business surround it.

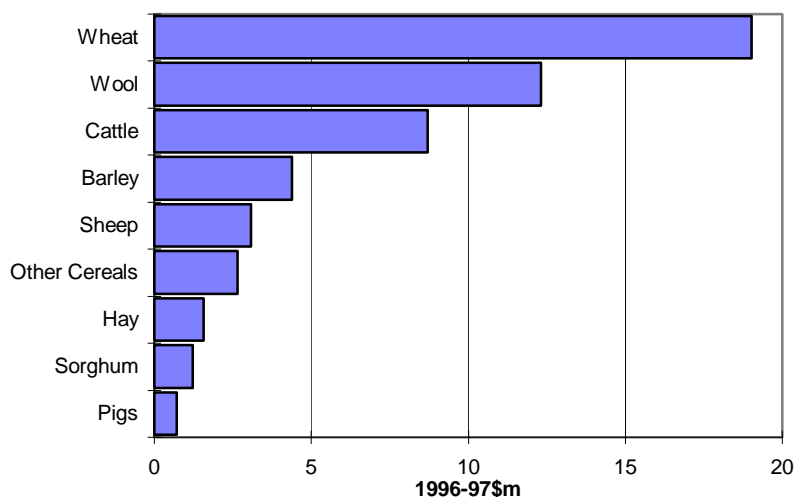
Employment in Coolah is strongly related to events in agriculture. There have been fluctuations in employment during the 1990s, but the trend is downward, particularly since 1998 as shown in Figure 13.

**Figure 13: Labour Force and Employment, Coolah**



There is a high dependence on agriculture. Directly and indirectly, agriculture was estimated to account for 62 percent of the economy in 1996-97. The composition of agricultural production is primarily cereals and grazing products with little intensive agriculture (Figure 14). While these activities represent the core of the economy, they are not going to generate new growth in the economy.

**Figure 14: Composition of Agricultural Production, Coolah 1996-97**



**Table 4: Location Quotients, 1981 to 2001: Coolah**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Sheep	16.1	16.7	28.4	29.3	<b>25.9</b>	182
Beef cattle	24.8	13.5	20.9	16.9	<b>24.5</b>	103
Grains	5.2	16.2	9.3	23.8	<b>18.1</b>	298
Pigs	9.8	6.6	8.4	17.6	<b>13.0</b>	8
Services to agric.; hunting	6.1	6.3	7.4	4.1	<b>8.5</b>	28
Other mining	1.6	0.0	1.5	0.0	<b>2.8</b>	4
Glass and glass products	0.0	0.0	0.0	0.0	<b>1.8</b>	3
Coal; oil and gas	0.0	0.0	0.0	0.0	<b>1.7</b>	8
Road transport	2.9	1.2	0.8	1.7	<b>1.6</b>	52
Forestry and logging	2.3	2.0	1.4	0.0	<b>1.5</b>	3
Other agriculture	0.8	0.8	1.2	1.2	<b>1.4</b>	24
Education	1.0	1.1	1.0	1.2	<b>1.1</b>	121
Public administration	1.0	1.0	0.8	0.7	<b>1.1</b>	60
Electricity	0.7	0.7	0.8	0.6	<b>1.1</b>	7
Mechanical repairs	0.9	0.7	1.2	1.3	<b>1.0</b>	25
Residential building	1.0	0.8	0.6	0.7	<b>0.9</b>	57
Water, sewerage & drainage	0.0	0.6	0.9	0.8	<b>0.9</b>	3
Non-ferrous metal ores	0.0	0.0	0.0	0.0	<b>0.8</b>	4
Accom. & restaurants	0.8	0.9	0.9	1.1	<b>0.8</b>	58
Other construction	0.3	0.4	0.2	0.4	<b>0.8</b>	27
Health services	0.6	0.5	0.7	0.8	<b>0.7</b>	80
Retail trade	0.6	0.6	0.6	0.6	<b>0.7</b>	127
Communication services	1.5	1.2	0.9	0.6	<b>0.7</b>	18
Community care services	0.0	0.2	0.1	0.6	<b>0.6</b>	20
Rail & other transport	1.4	2.8	3.2	1.0	<b>0.5</b>	3
Wholesale trade	0.5	0.6	0.5	0.4	<b>0.5</b>	41
Fabricated metal products	0.1	0.3	0.4	0.4	<b>0.5</b>	3
Other services	0.3	0.4	0.5	0.3	<b>0.5</b>	12
Other wood products	0.5	0.5	0.8	0.0	<b>0.5</b>	3
Personal services	0.4	0.4	0.4	0.5	<b>0.3</b>	9
Other business services	0.5	0.6	0.2	0.3	<b>0.3</b>	14
Printing; services to printing	0.0	0.0	0.0	0.0	<b>0.3</b>	3
Other property services	0.0	0.0	0.6	0.1	<b>0.1</b>	3
Legal, accounting svcs	0.3	0.1	0.3	0.2	<b>0.3</b>	15
Scientific research etc	0.0	0.1	0.0	0.1	<b>0.2</b>	9

The LQs for Coolah shown in Table 4 confirm the dominance of agriculture and indicate that there is a limited level of diversity in the economy – many sectors have very small levels of employment. There has been a small increase in many of the LQs that is probably reflecting the improving economic conditions in agriculture which is flowing through to other non-farm sectors.

The analysis of employment change from 1991 to 1996 summarised in Table 5 highlights the unfavourable industry composition of the economy with a large negative effect. Coolah has economic activity concentrated in industries that are slow growing in NSW. That makes it very difficult to share in the growth of the NSW economy. Overall, employment fell significantly over 1991 to 1996. That represented a continuation of trends that were established in the mid 1980s as shown in Figure 15.

The summary for 1996 to 2001 shown in Table 6 reflects a better situation. In this period, the industry structure of Coolah was better able to share in NSW-wide trends as shown by the

positive state component. However, the negative local effects offset that advantage so that employment in 2001 remained at about the same level as in 1996. However, the overall result is a significant reversal of the decline in employment that has been evident since 1981 (Figure 15). Coolah remains a small and vulnerable economy, heavily dependent on the performance of its agricultural industries. Access to services is poor while the level of business service employment in Coolah is low.

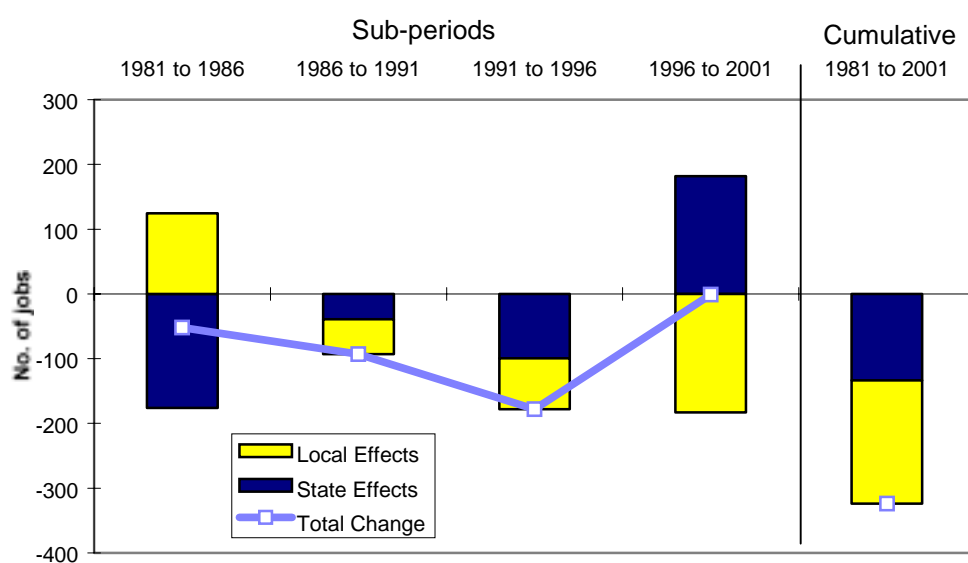
**Table 5: Summarised Shift-Share Analysis 1991-96: Coolah**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	106	146	252	257	508
Negative Effects	-	(351)	(351)	(335)	(686)
<b>Total Effects</b>	<b>106</b>	<b>(205)</b>	<b>(100)</b>	<b>(78)</b>	<b>(178)</b>

**Table 6: Summarised Shift-Share Analysis 1996-2001: Coolah**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	108	150	257	134	392
Negative Effects	-	(76)	(76)	(317)	(393)
<b>Total Effects</b>	<b>108</b>	<b>74</b>	<b>182</b>	<b>(183)</b>	<b>(1)</b>

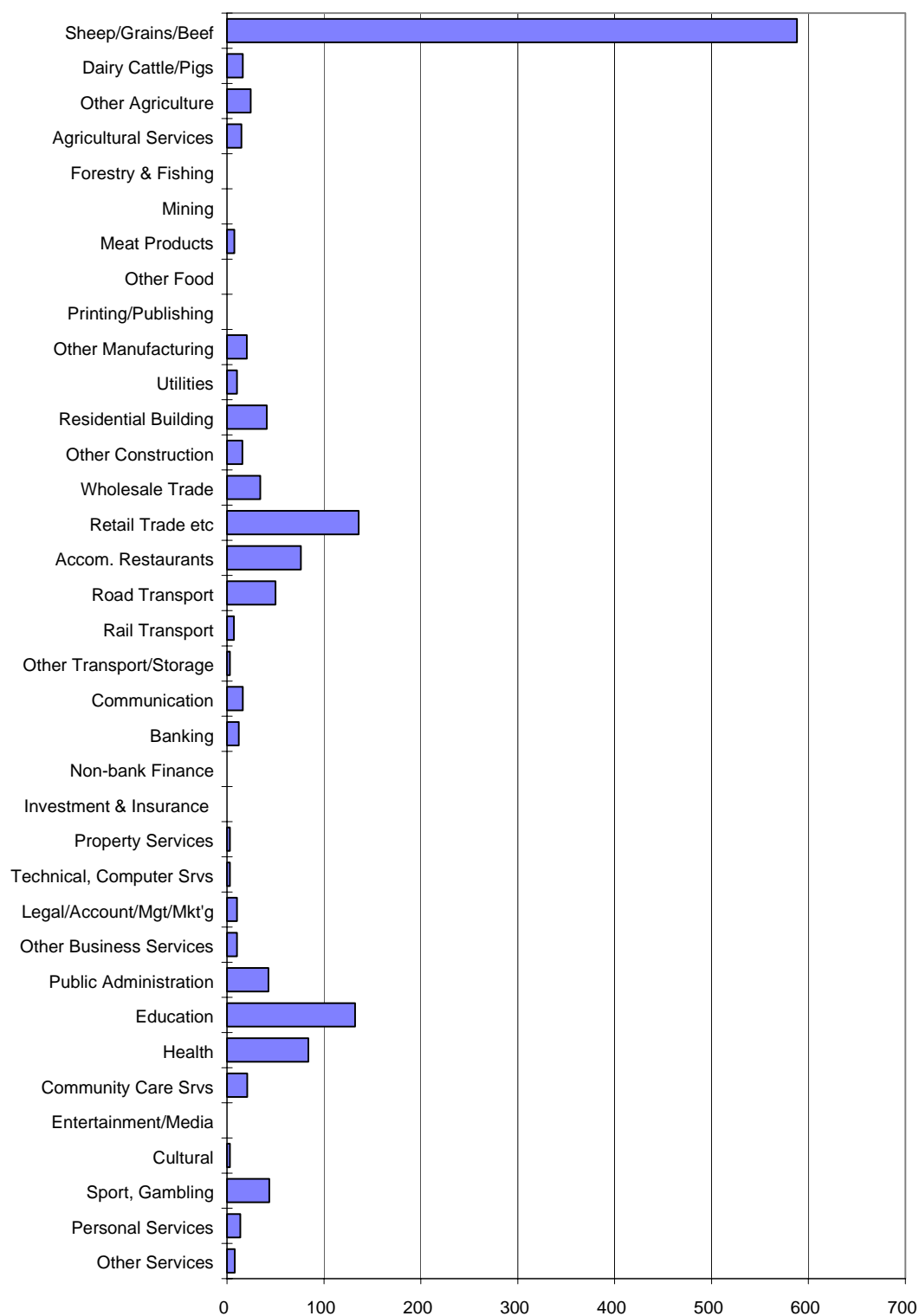
**Figure 15: Summarised Shift-Share Analysis: Coolah: 1981- 2001**



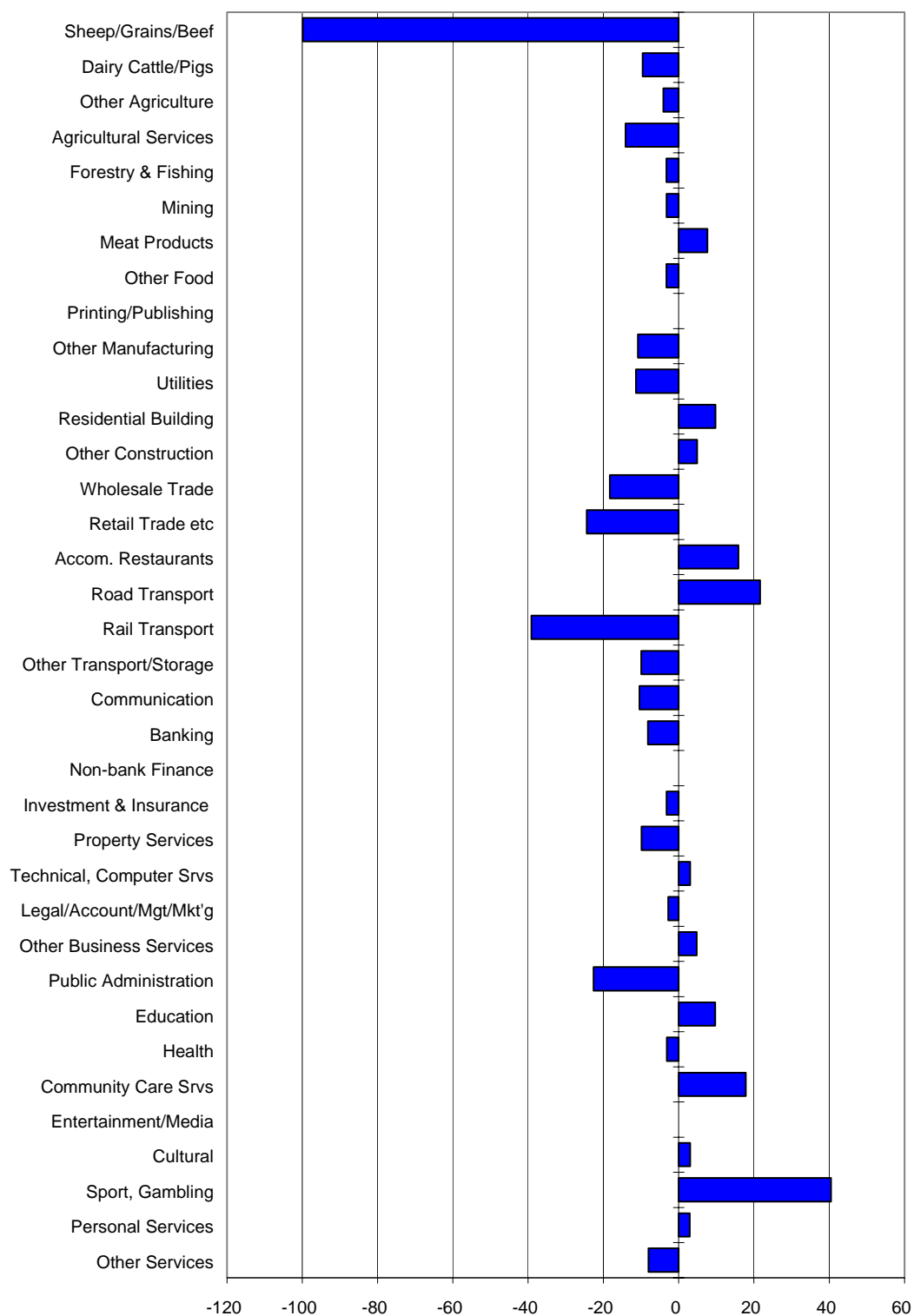
Further information on employment trends in Coolah over 1991 to 1996 is presented in Figure 16 through Figure 18. This highlights the concentration of employment in agriculture and a small number of service sectors. There was a mixture of employment change between 1991 and 1996, but with only a few sectors showing growth, the most notable being sport and gambling activities. Only a few industries increased their share of total industry employment as shown in Figure 18. Sport and gambling and transport were notable along with agriculture. (Although agriculture employment declined, Coolah increased its share indicating that the decline in Coolah was slower than the average for NSW. That likely reflects the limited alternative agricultural opportunities in Coolah.)

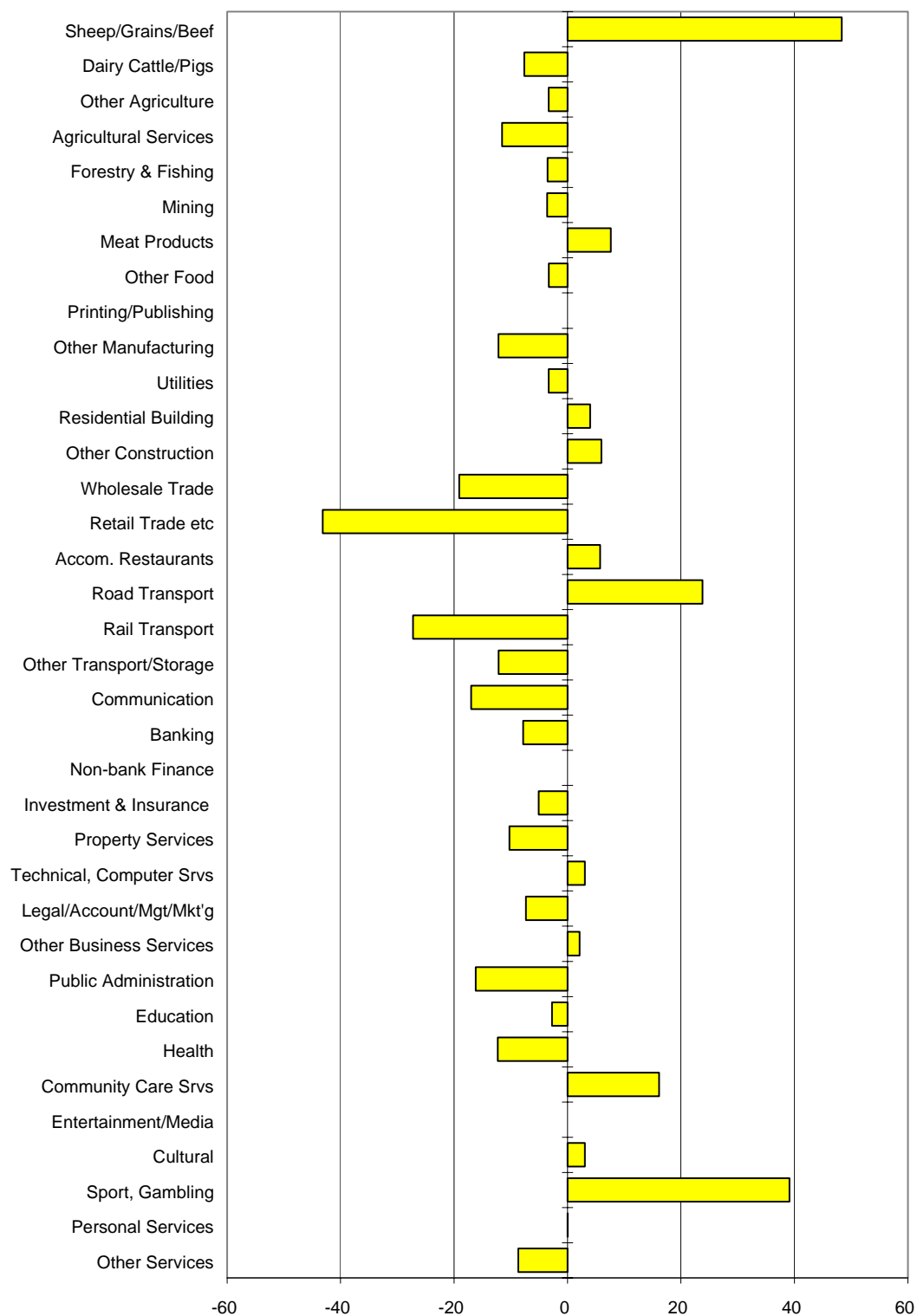
The trends over 1996 to 2001 are shown in Figure 19 through Figure 21. The pattern is similar to those for the 1991 to 1996 period, but with some significant positive growth in the trade and building industries and some other services. On the other hand the sport gambling and accommodation activities have lost many of the gains from the previous period. (That suggests the possibility of some statistical anomalies.) Since 1996, Coolah has seen the closure of the sawmilling activities with the formation of the Coolah Tops National Park.

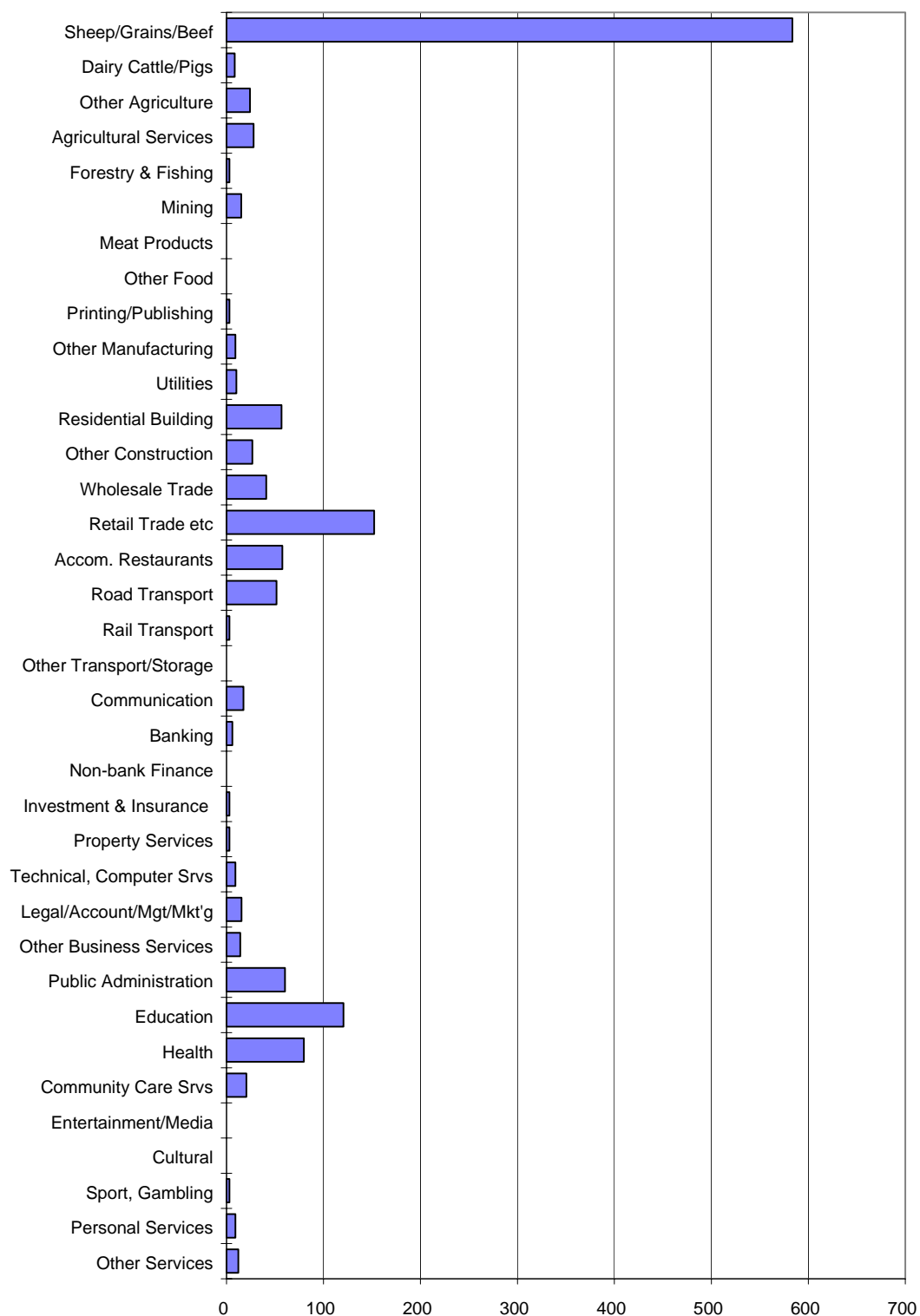
Coolah has only a small amount of tourist activity, low levels of building activity, relatively low incomes and poor access to services. This is a community that is struggling to maintain itself and its viability would be threatened by further restrictions on its primary industries.

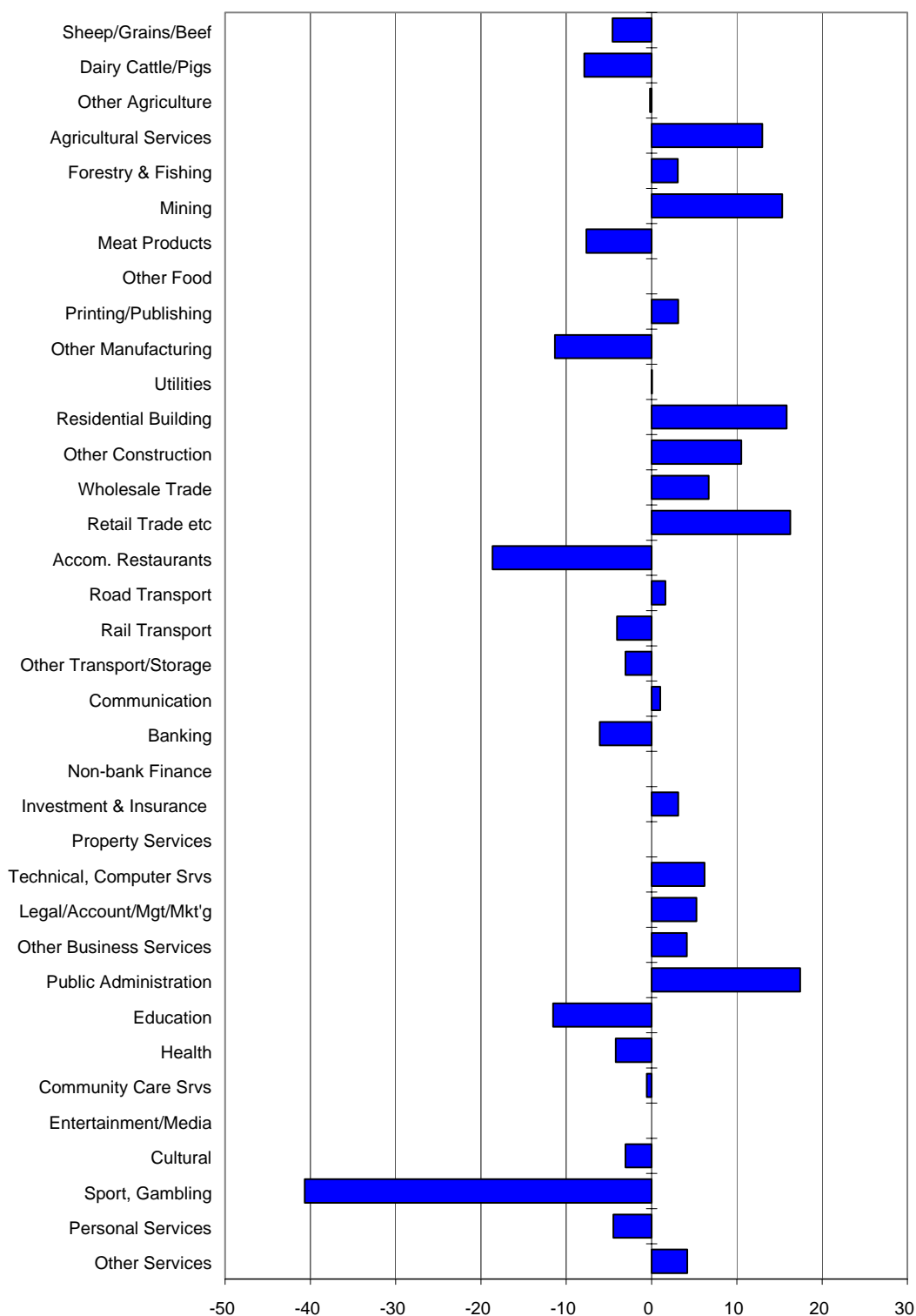
**Figure 16: Employment Distribution by Sector, 1996: Coolah**

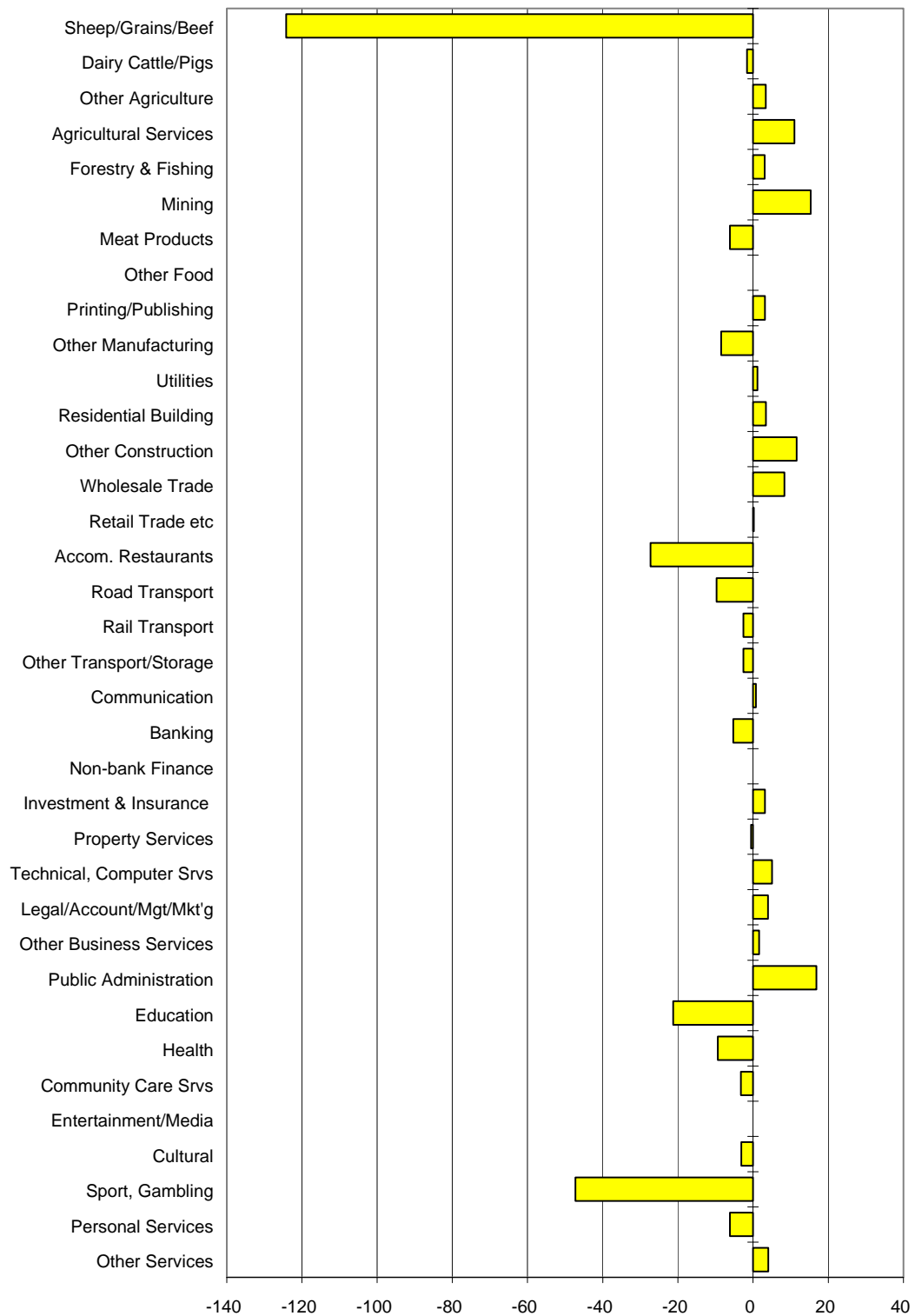


**Figure 17: Total Change in Employment by Sector, 1991-1996: Coolah**

**Figure 18: Local Influences on Employment Change, 1991-1996: Coolah**

**Figure 19: Employment Distribution by Sector, 2001: Coolah**

**Figure 20: Total Change in Employment by Sector, 1996-2001: Coolah**

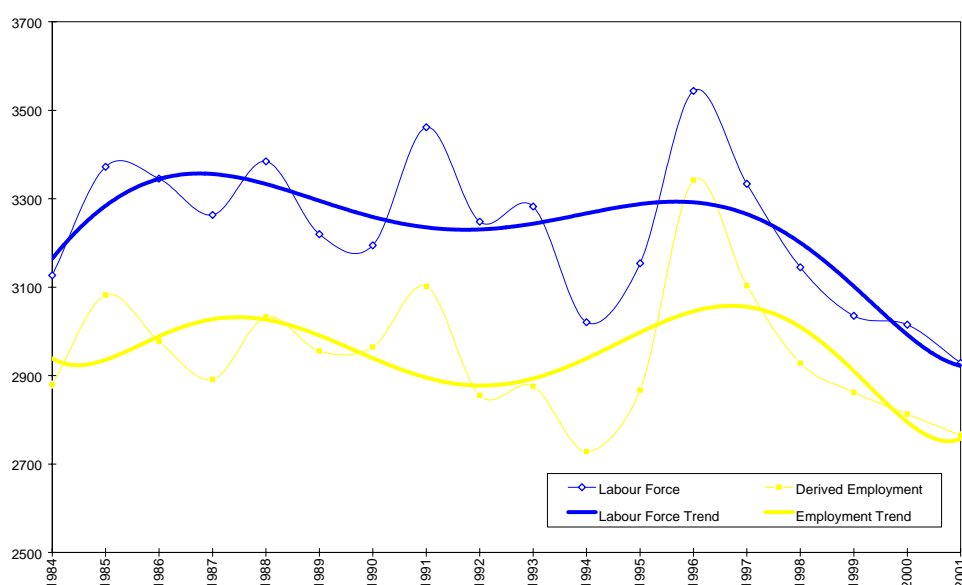
**Figure 21: Local Influences on Employment Change, 1996-2001: Coolah**

## 5.7 COONABARABRAN

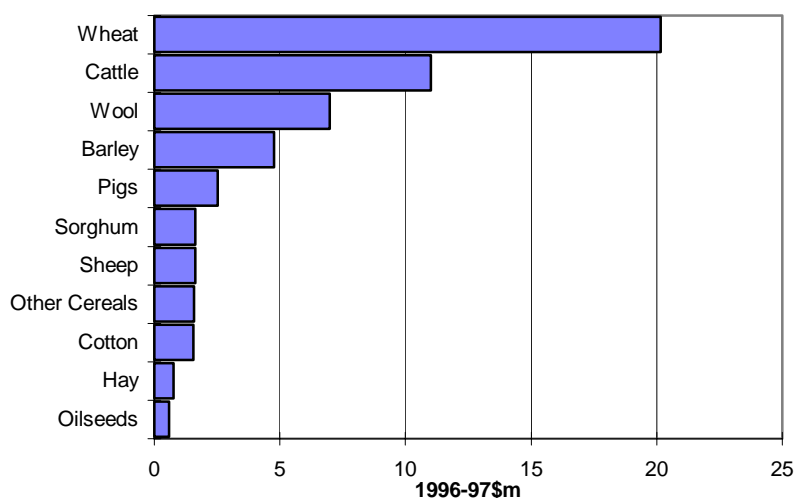
Coonabarabran is one of the middle-ranked LGAs that have a high dependence on agriculture yet gains some advantage from being a secondary regional centre located on the Newell Highway and adjacent to the Warrumbungle National Park.

The trend in employment is shown in Figure 22 with employment being relatively stable until recent times when it appears to have a downward trend. It would appear that for most of the period covered, the loss of employment in agriculture has been offset by other gains related to traffic and visitation associated with the Newell Highway. Agriculture is concentrated in grazing and cereals with little intensive activity (Figure 23) that might offset the trend to less employment.

**Figure 22: Labour Force and Employment, Coonabarabran**



**Figure 23: Composition of Agricultural Production, Coonabarabran, 1996-97**



The LQs shown in Table 7, provide some insights into the diversity that exists in the Coonabarabran economy. That indicates a significant role for timber-based activities and a significant role for accommodation and restaurants related to visitor activity. The education, repairs and public administration activities are also notable. Thus, there is some useful diversity within this economy but only a limited amount of industries that generate high earnings for the economy outside of agriculture.

**Table 7: Location Quotients, 1981 to 2001: Coonabarabran**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Beef cattle	12.6	9.9	15.1	14.2	<b>22.1</b>	155
Grains	9.8	14.6	11.7	15.8	<b>13.0</b>	353
Sheep	7.1	5.4	12.3	10.6	<b>10.1</b>	118
Pigs	5.1	5.3	7.2	16.4	<b>9.6</b>	10
Forestry and logging	10.2	7.4	9.8	9.4	<b>8.9</b>	29
Sawmill products	5.5	5.1	1.7	7.8	<b>7.0</b>	29
Services to agric.; hunting	6.0	4.3	3.8	3.6	<b>4.2</b>	23
Ceramic products	0.3	0.7	0.0	2.1	<b>3.1</b>	8
Meat and meat products	0.5	0.7	1.2	0.4	<b>1.6</b>	18
Accom. & restaurants	1.6	1.7	1.6	1.6	<b>1.5</b>	186
Poultry	1.5	0.0	3.2	1.3	<b>1.5</b>	3
Other mining	0.9	0.0	0.0	0.0	<b>1.4</b>	3
Non-metallic min. products nec	0.0	0.0	0.0	0.0	<b>1.3</b>	3
Libraries, museums, arts	1.8	1.9	1.9	1.2	<b>1.3</b>	20
Education	0.9	1.0	1.1	1.2	<b>1.2</b>	214
Rail & other transport	2.2	2.2	1.4	1.9	<b>1.2</b>	11
Public administration	1.0	1.0	0.8	1.1	<b>1.2</b>	108
Structural metal products	0.3	0.0	0.3	0.0	<b>1.1</b>	8
Other agriculture	0.7	1.1	1.4	1.6	<b>1.1</b>	31
Health services	0.7	0.9	0.8	1.0	<b>1.0</b>	183
Mechanical repairs	0.8	0.9	0.8	1.2	<b>1.0</b>	42
Retail trade	0.8	0.9	0.8	0.9	<b>0.9</b>	280
Other services	0.5	0.4	0.6	0.6	<b>0.8</b>	35
Community care services	0.4	0.5	0.7	0.6	<b>0.7</b>	44
Other property services	0.2	0.1	0.3	0.1	<b>0.2</b>	7
Legal, accounting svcs	0.4	0.3	0.4	0.2	<b>0.3</b>	25
Scientific research etc	1.3	0.8	1.0	0.7	<b>0.4</b>	31

The industry structure noted above means that the industry mix is not a major disadvantage as shown by the industry effects in Table . However, the local effects shown in Table 8 swamp the state and industry trend effects to give a significant decline in employment between 1991 and 1996. When compared to the 1986 to 1991 period, this was a poor result. The late 1980s were a period when Coonabarabran shared in the growth of NSW

**Table 8: Summarised Shift-Share Analysis 1991-96: Coonabarabran**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	175	331	<b>506</b>	<b>126</b>	<b>632</b>
Negative Effects	-	(358)	<b>(358)</b>	<b>(568)</b>	<b>(926)</b>
<b>Total Effects</b>	<b>175</b>	<b>(27)</b>	<b>148</b>	<b>(442)</b>	<b>(294)</b>

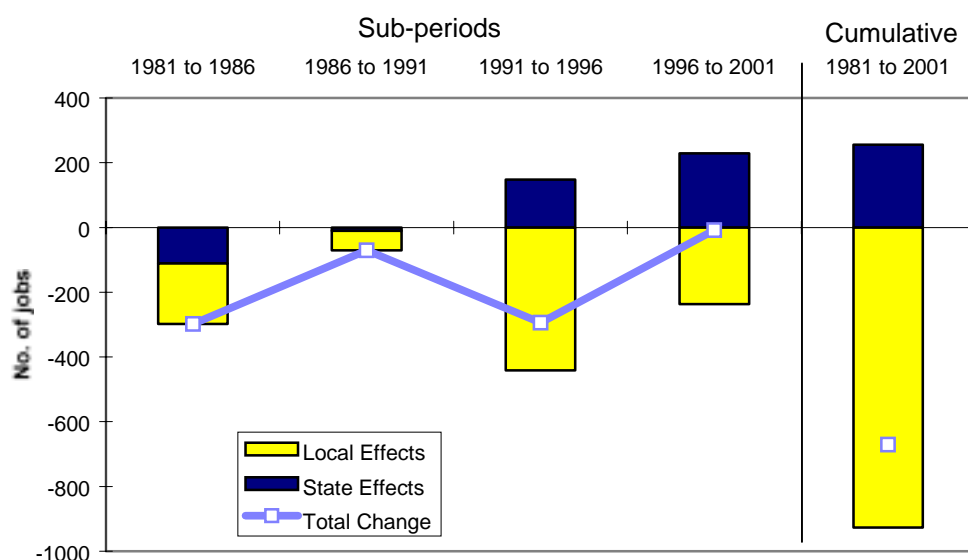
The period from 1996 to 2001 was similar to the previous five years in that the industry structure would support region growth by sharing in the state growth. However, the negative local effects continued but not as strong as in the early 1990s. As a result the overall effect on employment is a small decline. This is a vastly improved outcome over the early 1990s and is similar to the result in the second half of the 1980s as shown in Figure 24.

Further details of the change in employment 1991 to 1996 are shown in Figure 25 through Figure 27. The sectoral distribution of employment indicates employment across many sectors even if at a low level. The change from 1991 to 1996 shows widespread reductions in almost all sectors (especially agriculture). The information shown in Figure 27 is particularly disturbing because there is hardly a sector where Coonabarabran has increased its share of NSW employment. This could mean that few industries have a level of competitiveness that would enable the employment levels to increase.

**Table 9: Summarised Shift-Share Analysis 1996-2001: Coonabarabran**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	179	198	377	179	556
Negative Effects	-	(148)	(148)	(415)	(564)
<b>Total Effects</b>	<b>179</b>	<b>50</b>	<b>229</b>	<b>(237)</b>	<b>(8)</b>

**Figure 24: Summarised Shift-Share Analysis: Coonabarabran: 1981- 2001**

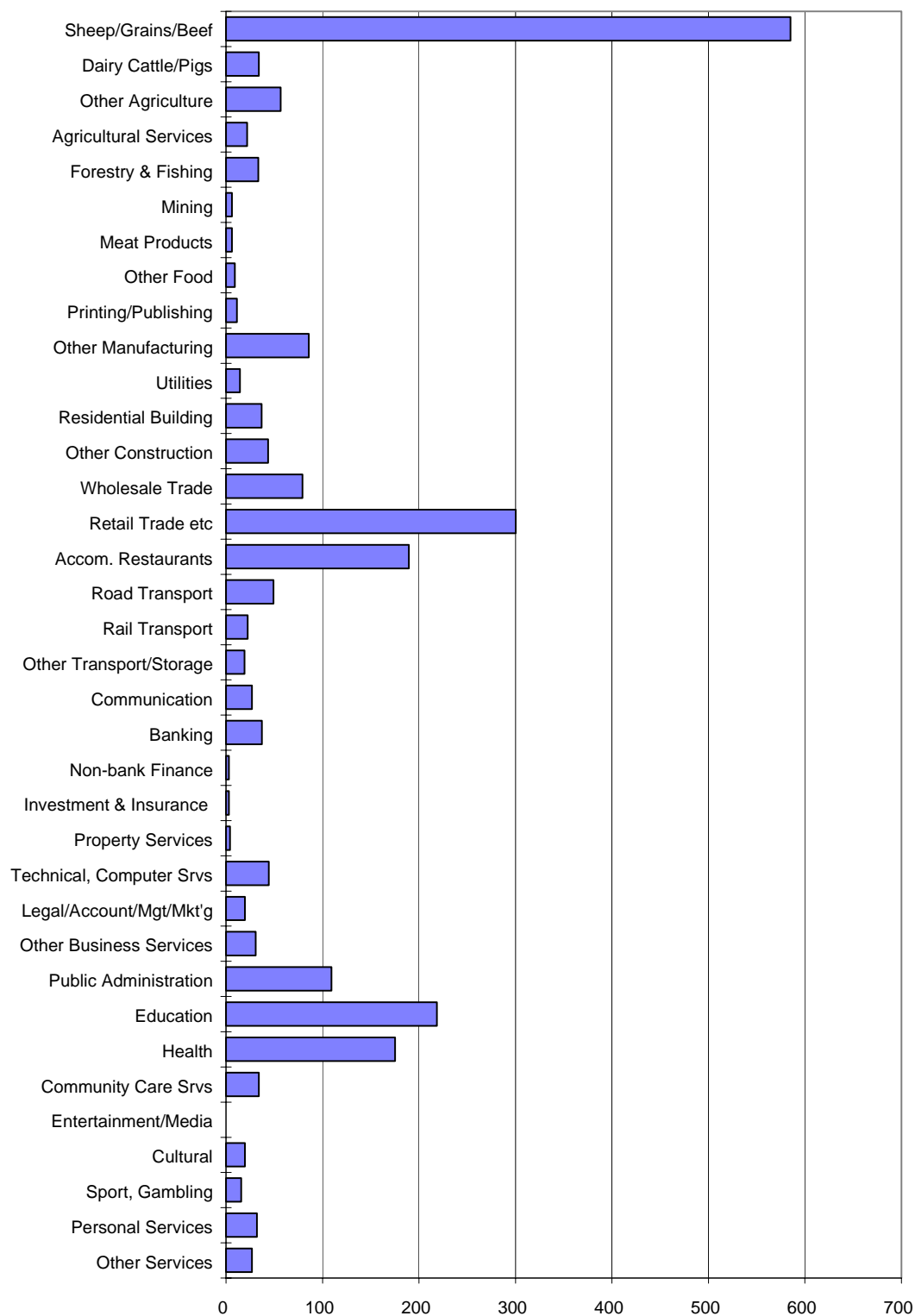


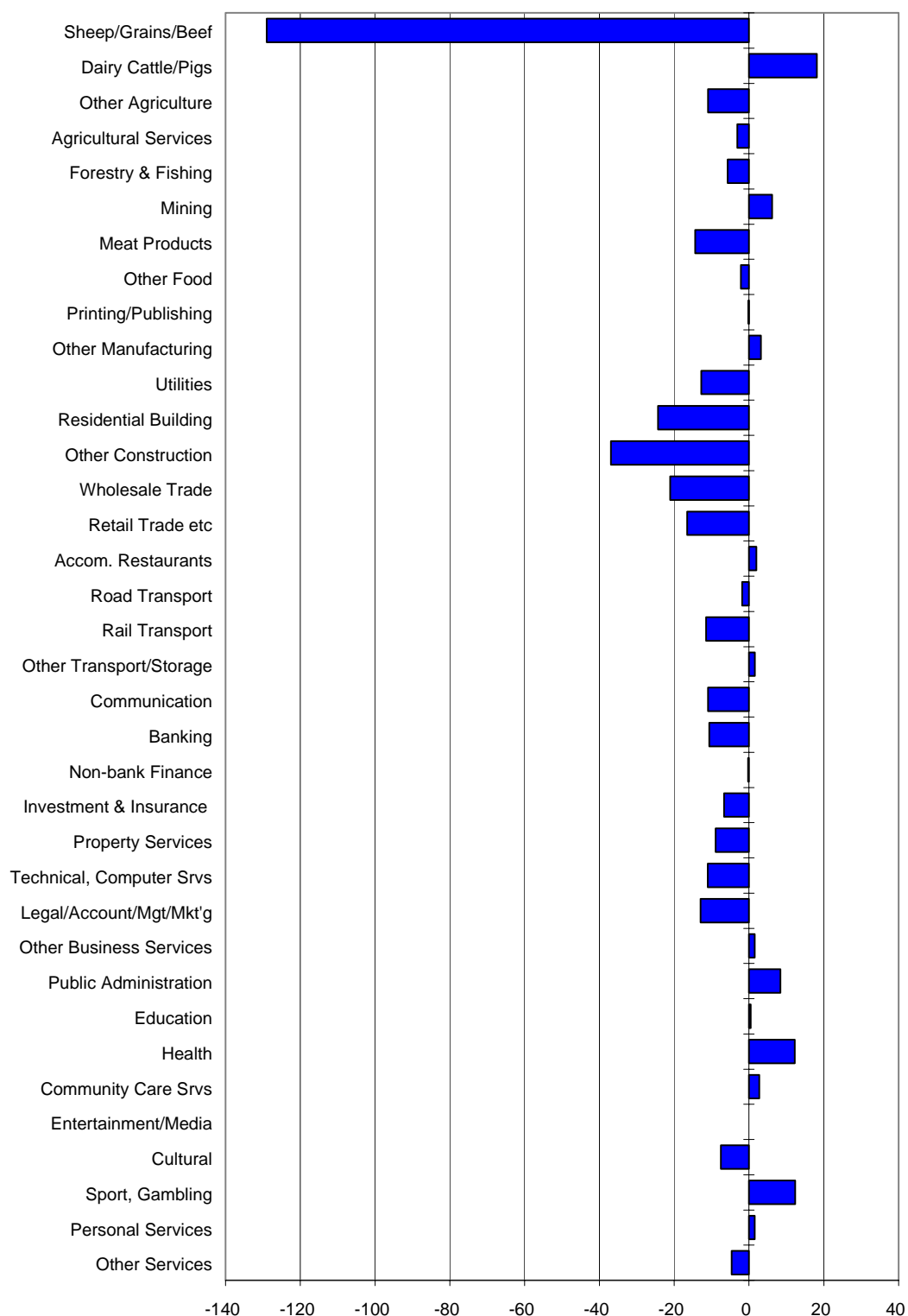
The results of the analysis for 1996 to 2001 are shown in Figure 28 through Figure 30. During this period there has been some large swings in employment among the various industries. There has been significant employment growth in some construction and trade sectors and some of the services supported by public funds. There is little that is encouraging about the results for the second half of the 1990s. The local effects on industries does not indicated that there are industries that are expanding market share and leading the economic development of the area.

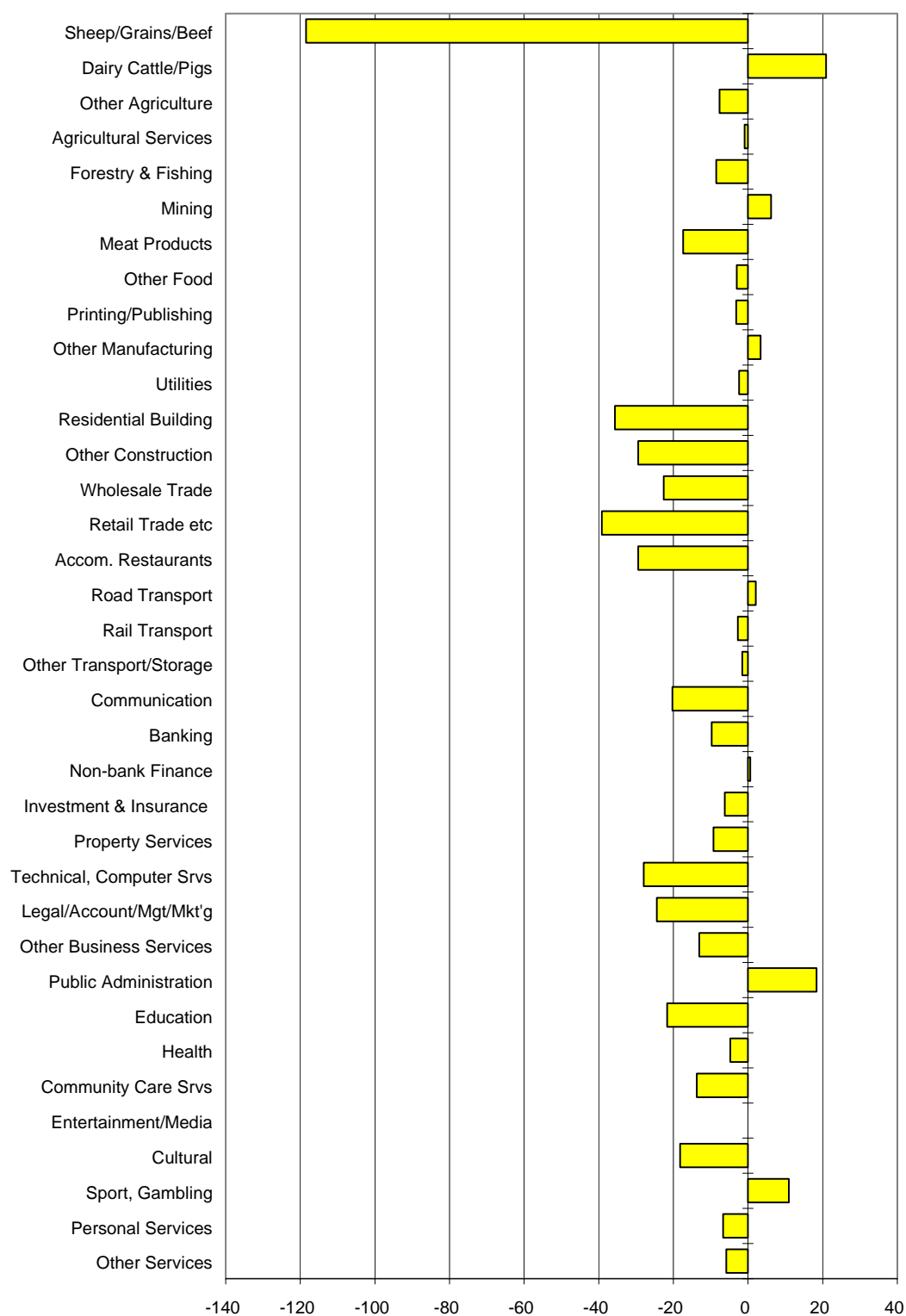


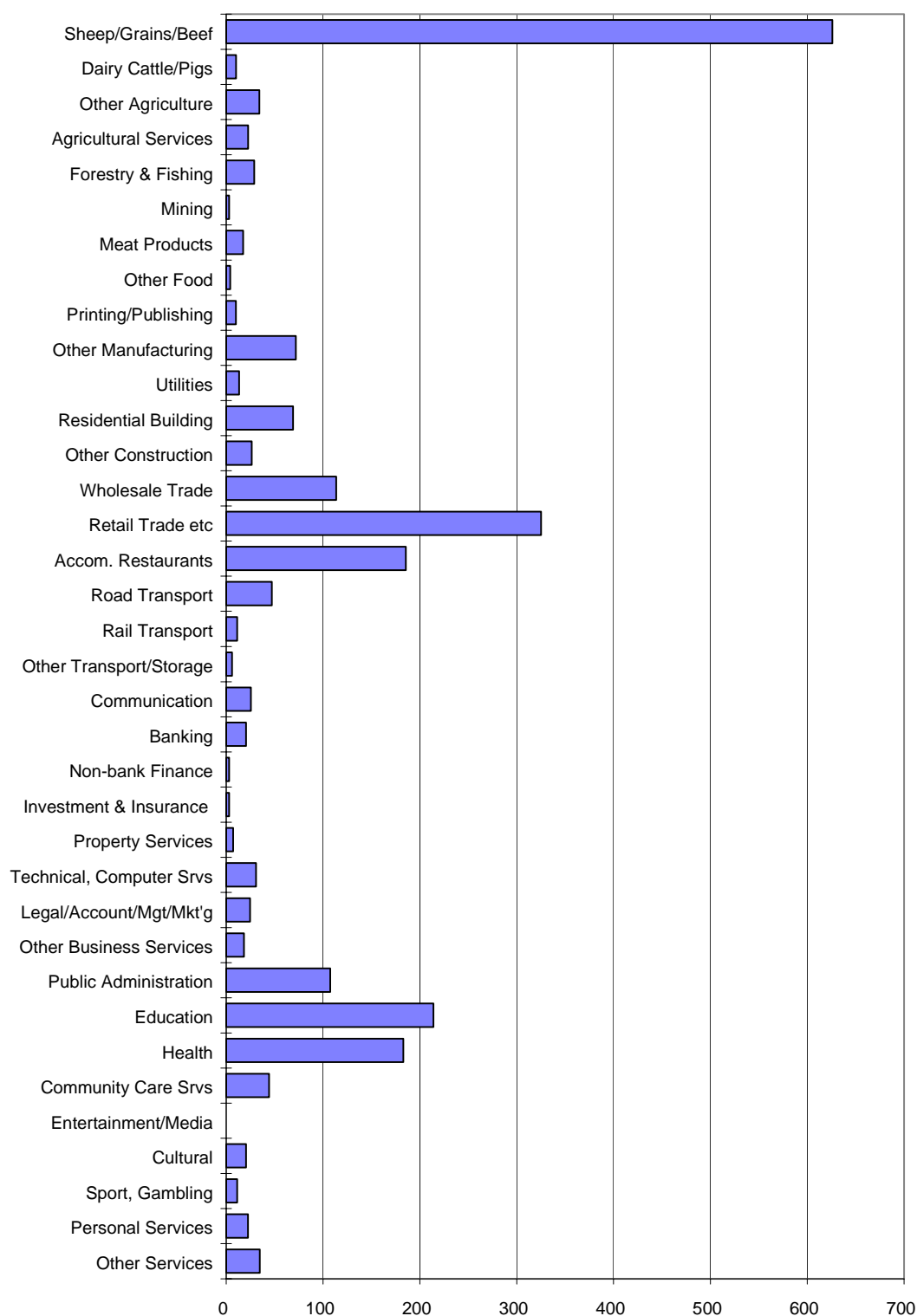
It seems likely that Coonabarabran developed businesses to service demands from Newell travellers during the 1980s. These developments have not been a source of growth in the 1990s as evidenced by the small growth in the number of accommodation rooms and the level of building and construction activity. Thus Coonabarabran is on the edge of moving forward with some new initiatives, or moving backwards under the structural changes taking place in agriculture. The recent data on employment suggests that the area is headed for a decline in employment and population that would not be helped by further changes associated with forest policy. The 1990s do not suggest that there is growth in visitor servicing activities that will provide more than holding existing employment levels despite the proximity to some significant natural attractions.

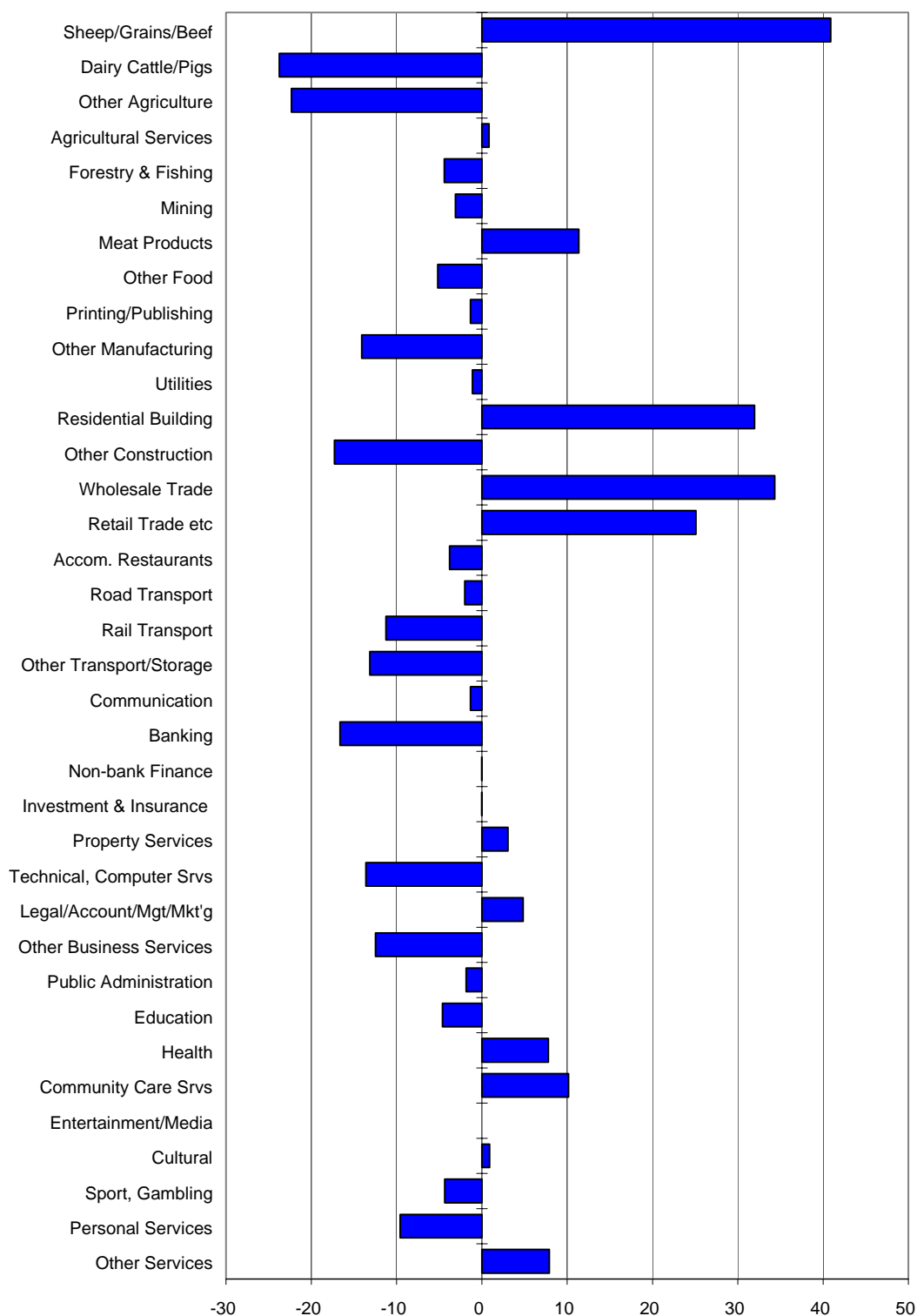
Coonabarabran is a lower middle ranked economy in terms of its diversity and service delivery levels as it acts as a mini regional centre to a large district. There would appear to be scope for further economic development as is evidenced by a low and declining share of employment in business services activities.

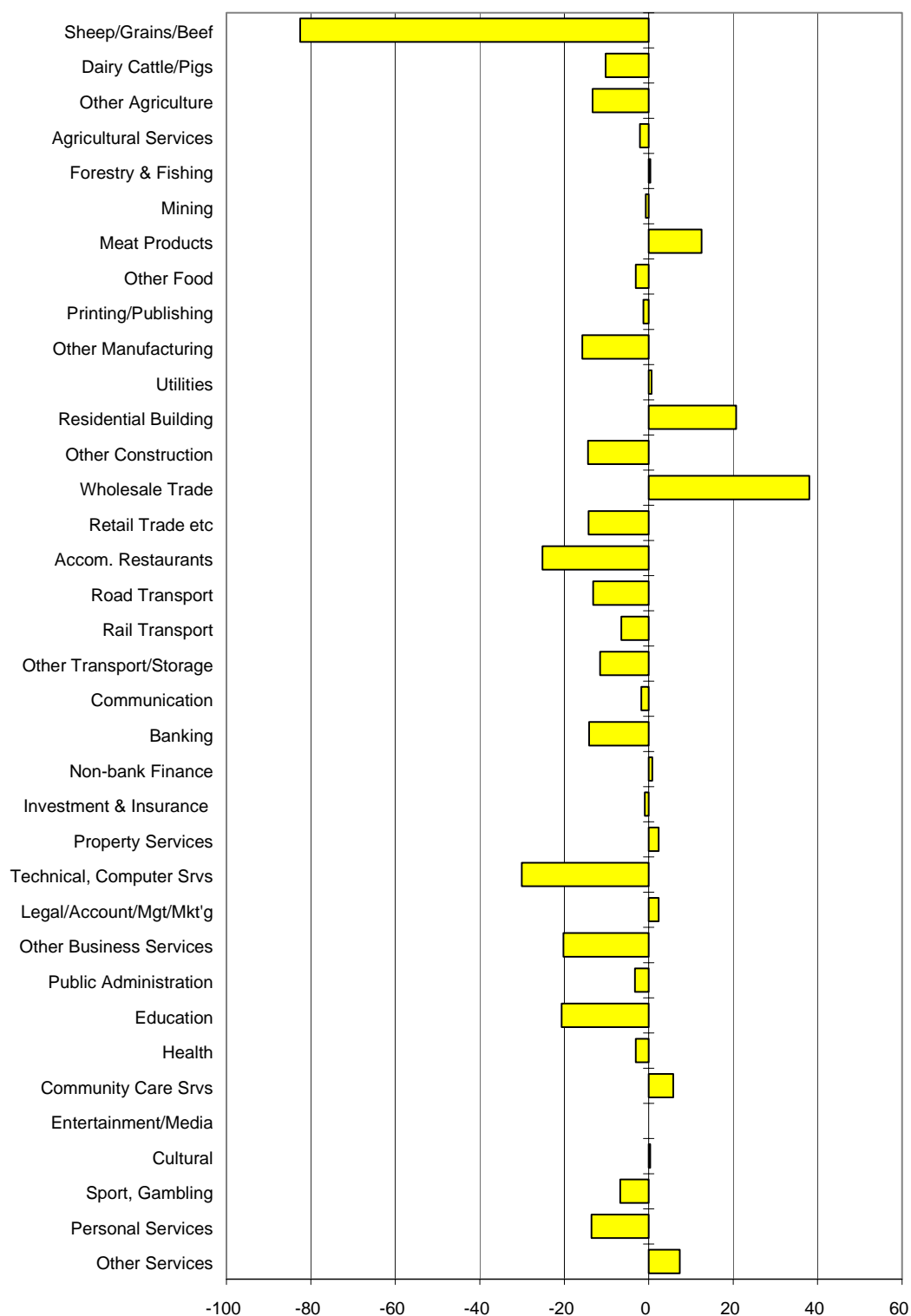
**Figure 25: Employment Distribution by Sector, 1996: Coonabarabran**

**Figure 26: Total Change in Employment by Sector, 1991-1996: Coonabarabran**

**Figure 27: Local Influences on Employment Change, 1991-1996: Coonabarabran**

**Figure 28: Employment Distribution by Sector, 2001: Coonabarabran**

**Figure 29: Total Change in Employment by Sector, 1996-2001: Coonabarabran**

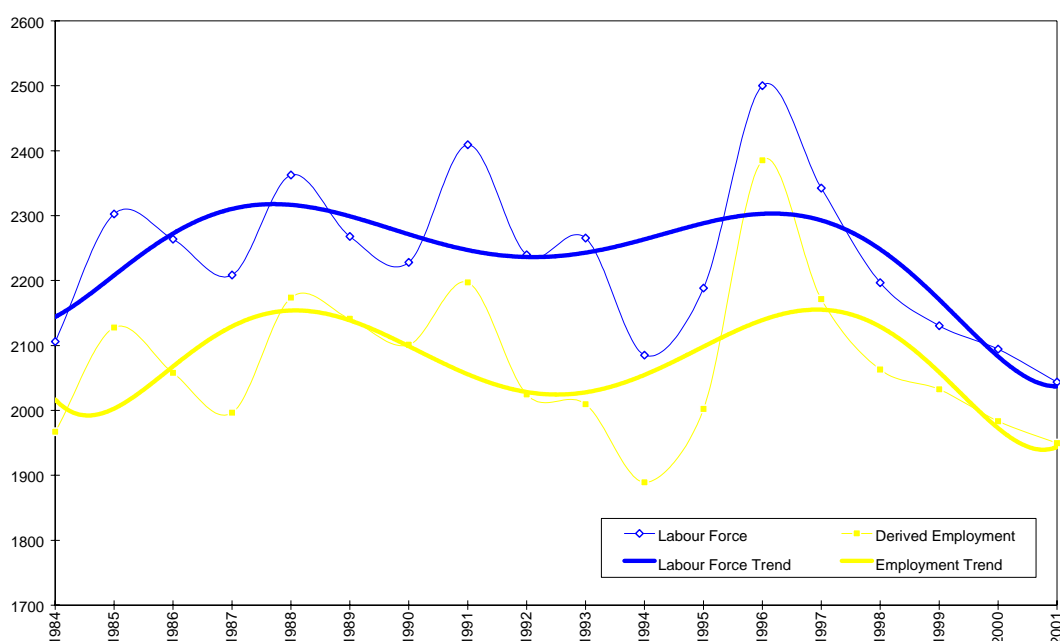
**Figure 30: Local Influences on Employment Change, 1996-2001: Coonabarabran**

## 5.8 GILGANDRA

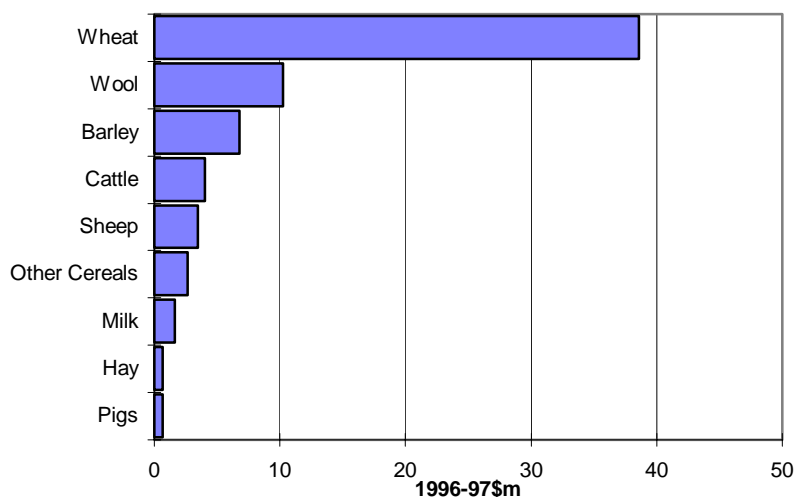
Gilgandra is an area that has many similarities to Coonabarabran with a heavy dependence on agriculture and a location on the Newell highway. However, it is a smaller economy by way of less development of non-agricultural activities. While there is a significant level of activities servicing visitors, it is not as well developed as in Coonabarabran.

The trend in employment shown in Figure 31 is similar to Coonabarabran with a peak in 1996 and a decline since then. This trend is at variance with employment information from the 2001 population census which shows a small increase in employment. The dependence on grazing and cereal cropping (Figure 32) without intensive agriculture, exposes Gilgandra to the trend to less employment in agriculture and to the region generally. About one-half of the employment in Gilgandra is directly or indirectly dependent on primary production.

**Figure 31: Labour Force and Employment, Gilgandra**



**Figure 32: Composition of Agricultural Production, Gilgandra 1996-97**





The LQ data shown in Table 9 reveal the concentration in agriculture and a lesser role to accommodation and restaurants. The road transport and mechanical repairs are notable activities. Community care also shows up as significant although this may include some indigenous people working under the CDEP (included in this sector by the ABS). Gilgandra does not appear to have the secondary regional centre role that is apparent in Coonabarabran.

**Table 9: Location Quotients, 1981 to 2001: Gilgandra**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Grains	15.4	21.6	26.4	25.8	<b>20.6</b>	437
Sheep	13.9	10.9	21.2	16.4	<b>15.2</b>	138
Beef cattle	5.9	3.5	7.4	5.1	<b>7.6</b>	42
Services to agric.; hunting	7.5	8.2	8.1	6.9	<b>5.9</b>	25
Leather and leather products	0.6	2.1	0.0	0.0	<b>5.4</b>	5
Poultry	0.4	1.6	4.5	2.2	<b>3.9</b>	6
Forestry and logging	1.7	3.1	1.5	2.8	<b>3.2</b>	8
Sawmill products	0.2	0.0	0.0	2.8	<b>2.1</b>	7
Paints	0.0	0.0	0.0	0.0	<b>1.9</b>	3
Petroleum and coal products	0.0	0.0	0.0	0.0	<b>1.8</b>	3
Road transport	2.3	1.1	0.9	1.7	<b>1.5</b>	63
Mechanical repairs	1.6	1.6	1.7	1.6	<b>1.5</b>	47
Community care services	1.0	1.4	1.6	1.3	<b>1.5</b>	70
Public administration	0.8	0.9	1.0	1.1	<b>1.3</b>	90
Services to mining	0.0	0.0	0.0	0.0	<b>1.3</b>	3
Fabricated metal products	0.2	0.5	0.3	0.3	<b>1.2</b>	10
Meat and meat products	0.0	0.0	0.7	0.6	<b>1.2</b>	10
Accom. & restaurants	1.4	1.2	1.1	1.3	<b>1.1</b>	104
Electricity	0.5	0.6	0.8	0.6	<b>1.1</b>	9
Other construction	0.6	0.6	0.4	0.9	<b>1.0</b>	46
Education	0.9	0.9	1.0	1.0	<b>1.0</b>	134
Health services	0.4	0.6	0.7	0.8	<b>0.9</b>	119
Retail trade	0.8	0.9	0.8	0.9	<b>0.8</b>	185
Other services	0.4	0.7	0.7	0.5	<b>0.7</b>	25
Legal, accounting srvs	0.4	0.5	0.2	0.3	<b>0.4</b>	28
Other property services	0.2	0.3	0.3	0.2	<b>0.3</b>	9
Scientific research etc	0.1	0.1	0.0	0.1	<b>0.1</b>	3

The shift-share analysis shown in Table 10 indicates that Gilgandra has an industry structure that favours sharing in the growth of NSW but local factors are generating a net loss of jobs. Gilgandra appears to be gaining a good share road transport and associated services. It is difficult for a small economy such as Gilgandra to develop some diversity in its economic structure and industries that are able to increase their share of the NSW industry. Developments in the Newell Corridor are likely to assist Gilgandra to build on some of its existing strengths.

**Table 10: Summarised Shift-Share Analysis 1991-96: Gilgandra**

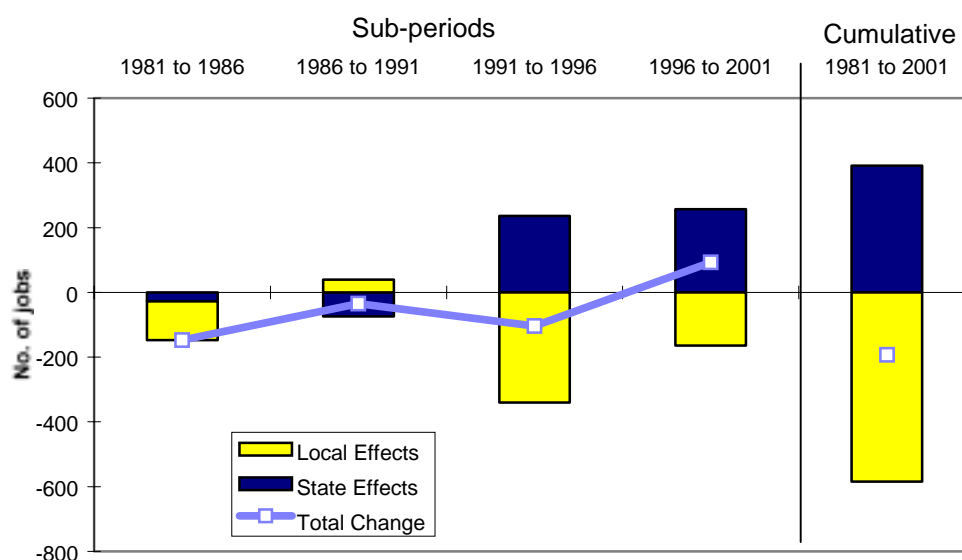
	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	122	392	<b>514</b>	<b>107</b>	<b>621</b>
Negative Effects	-	(278)	<b>(278)</b>	<b>(448)</b>	<b>(725)</b>
<b>Total Effects</b>	<b>122</b>	<b>114</b>	<b>236</b>	<b>(340)</b>	<b>(104)</b>

The information from the 1996 to 2001 period shown in Table 11 suggests that is beginning to happen. There has been a reduced negative impact of local factors on employment and a strengthening of the capacity to share in the growth in NSW. The longer-term trends shown in Figure 33 are an encouraging sign for the development of Gilgandra.

**Table 11: Summarised Shift-Share Analysis 1996-2001: Gilgandra**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	132	201	334	147	481
Negative Effects	-	(77)	(77)	(311)	(388)
<b>Total Effects</b>	<b>132</b>	<b>125</b>	<b>257</b>	<b>(164)</b>	<b>93</b>

**Figure 33: Summarised Shift-Share Analysis: Gilgandra: 1981- 2001**

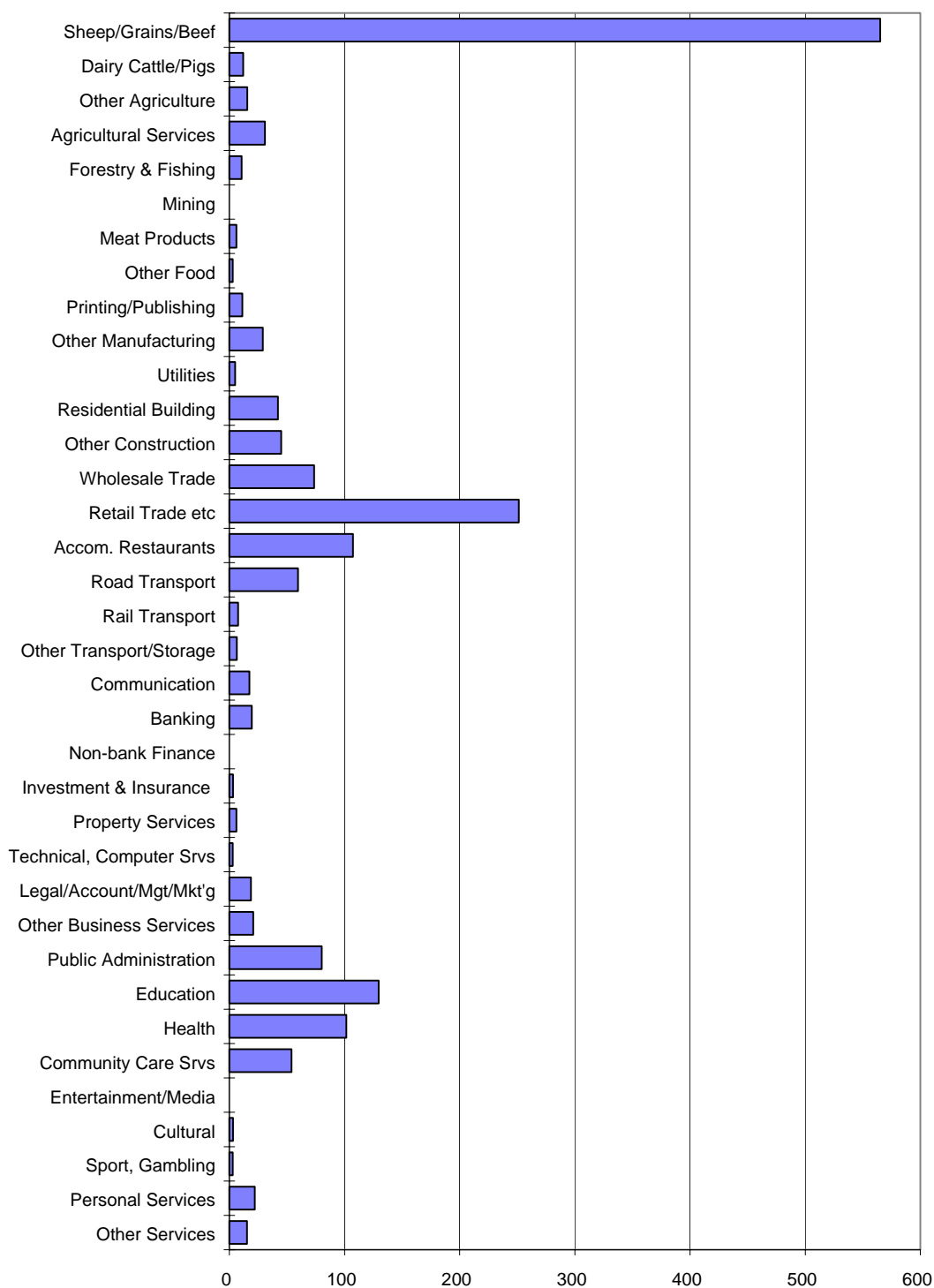


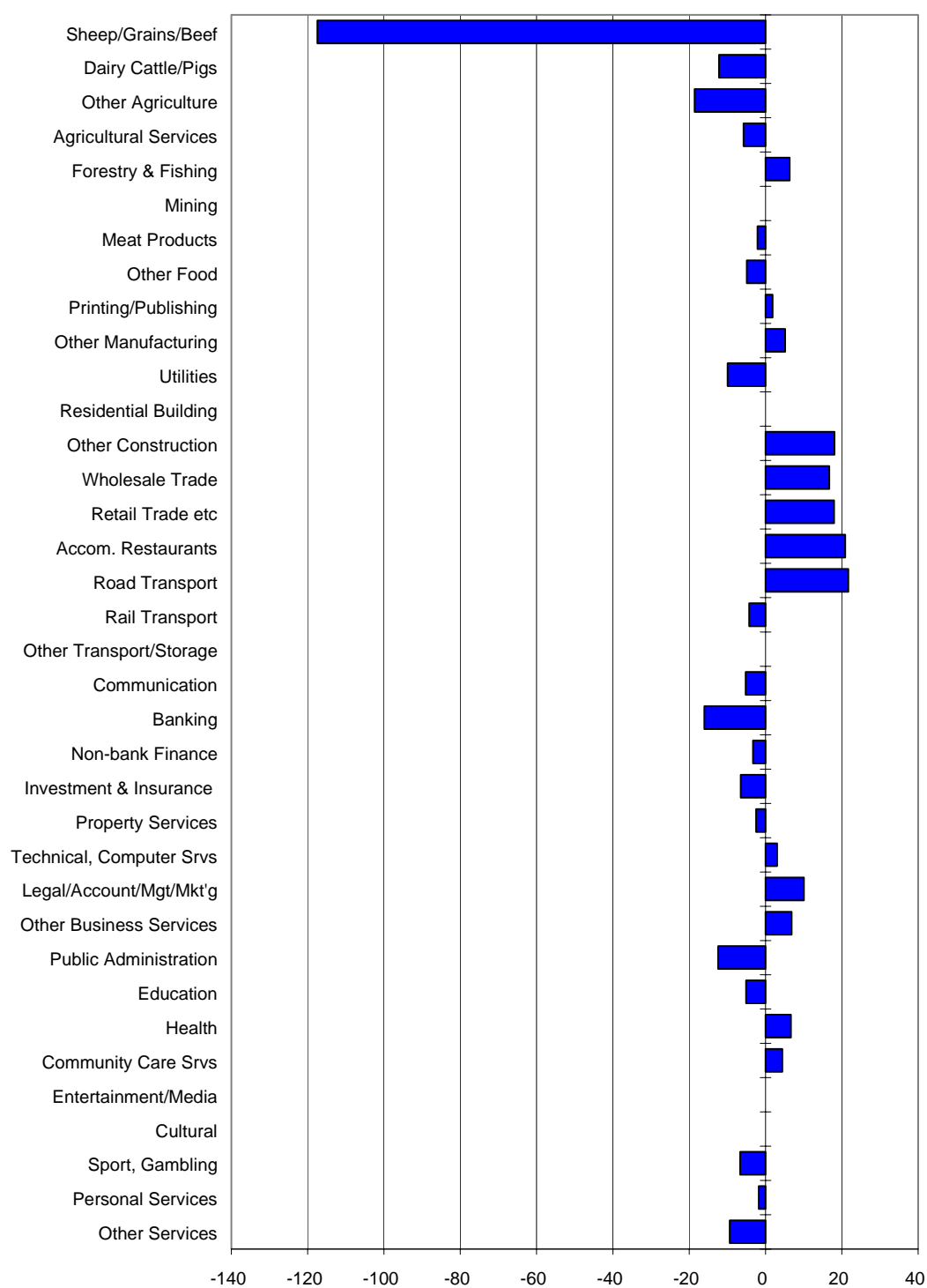
Further information on these trends for 1991 to 1996 is provided in Figure 34 through Figure 35. The high reliance on agriculture is noted. There has been significant job growth in the trade, accommodation and repairs sectors over 1991 to 1996 (Figure 34) that has translated through into increased employment shares in those sectors as shown in Figure 36. It would appear that Gilgandra has developed some new activities in these areas in the 1990s whereas Coonabarabran developed those capacities in an earlier decade. Such patterns are also evident in the data on accommodation and building activity which show some growth in Gilgandra in the early 1990s.

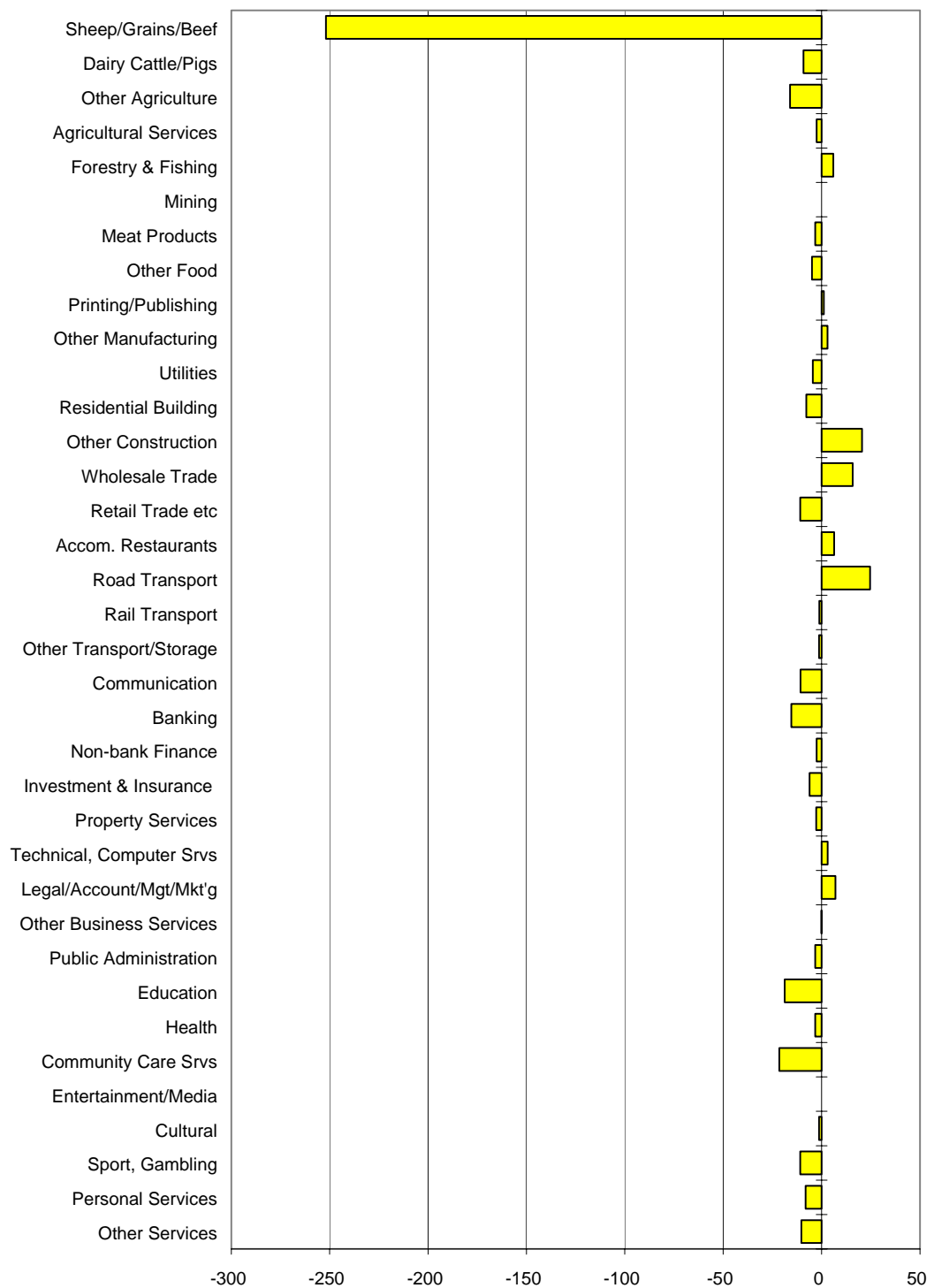
Similar charts for the 1996 to 2001 period are shown in Figure 37 through Figure 39. There has been employment growth in many manufacturing and service sectors that form the basis for growth. The local factors shown in Figure 39 should be interpreted as favourable. Gilgandra is one of the few middle ranked centres with a range of industries that have achieved an increase in market share, although the positive growth is swamped by large negative changes in agriculture.

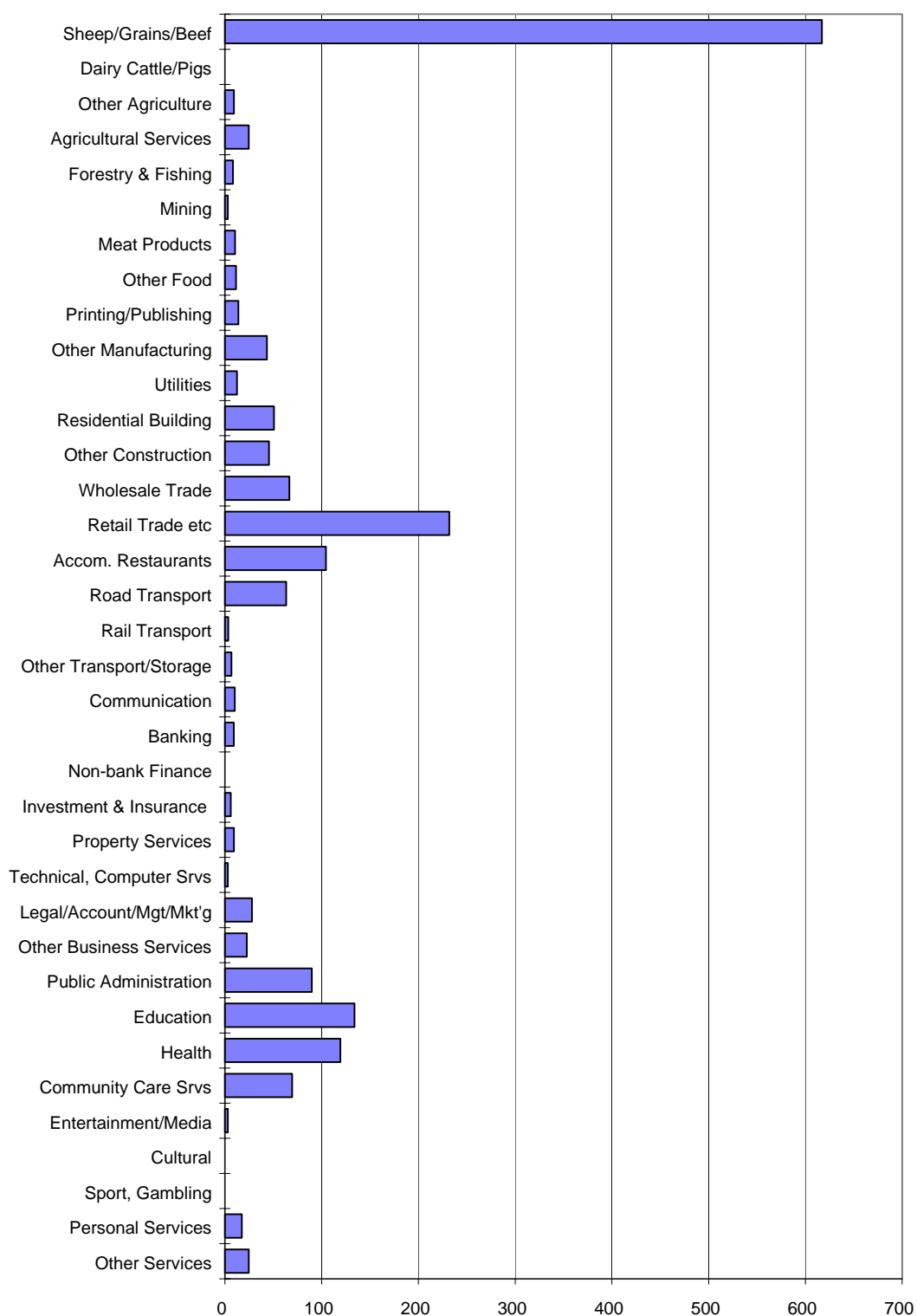
Gilgandra has a significant level of employment in forestry and related activities. The economy seems to be building some economic development momentum. The level of service delivery and the role of business services in the economy are still at a low level, but they will likely improve with further growth in business activity. It is an economy that will be sensitive to policy changes that impact on agriculture and forestry.

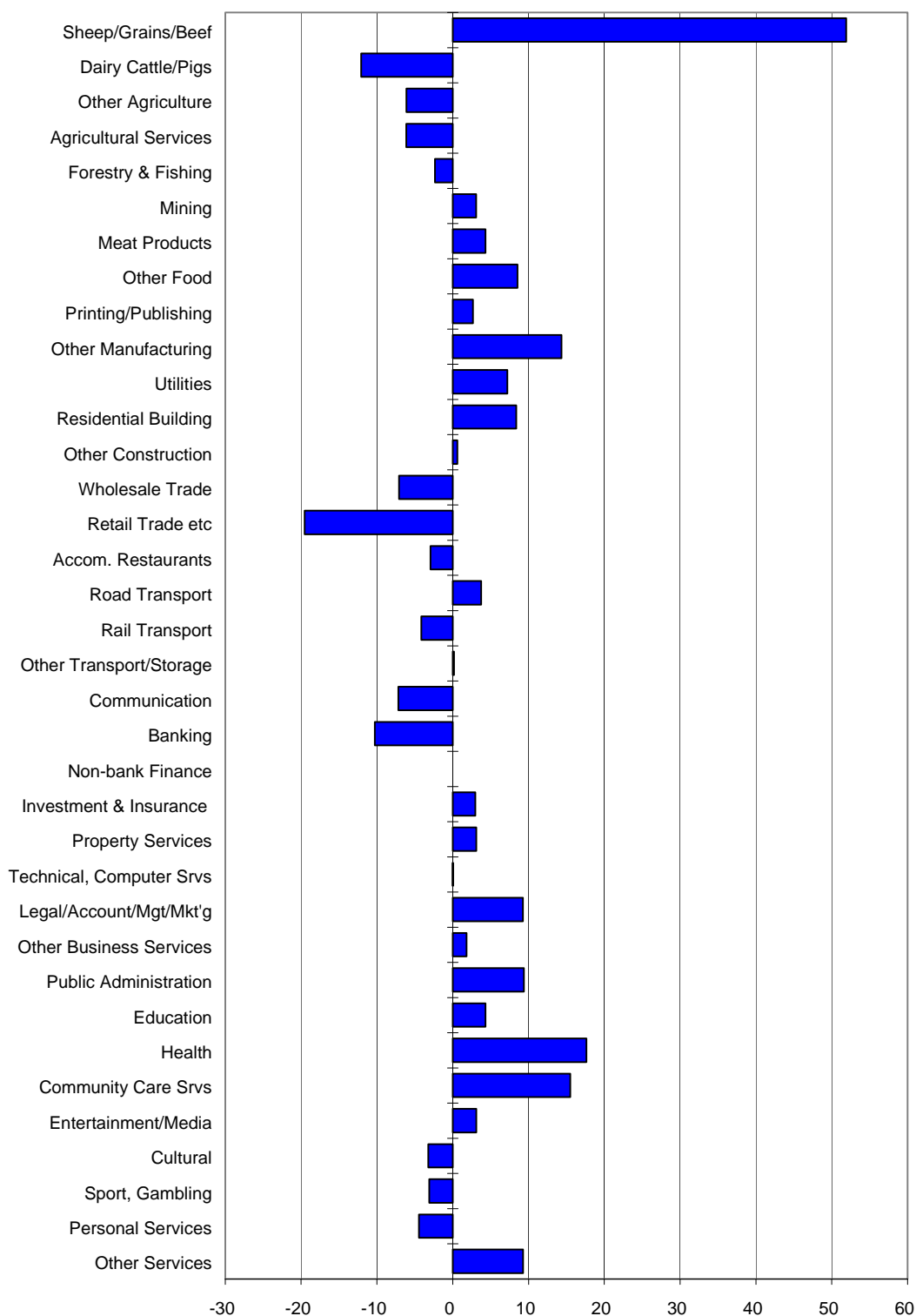
**Figure 34: Employment Distribution by Sector, 1996: Gilgandra**

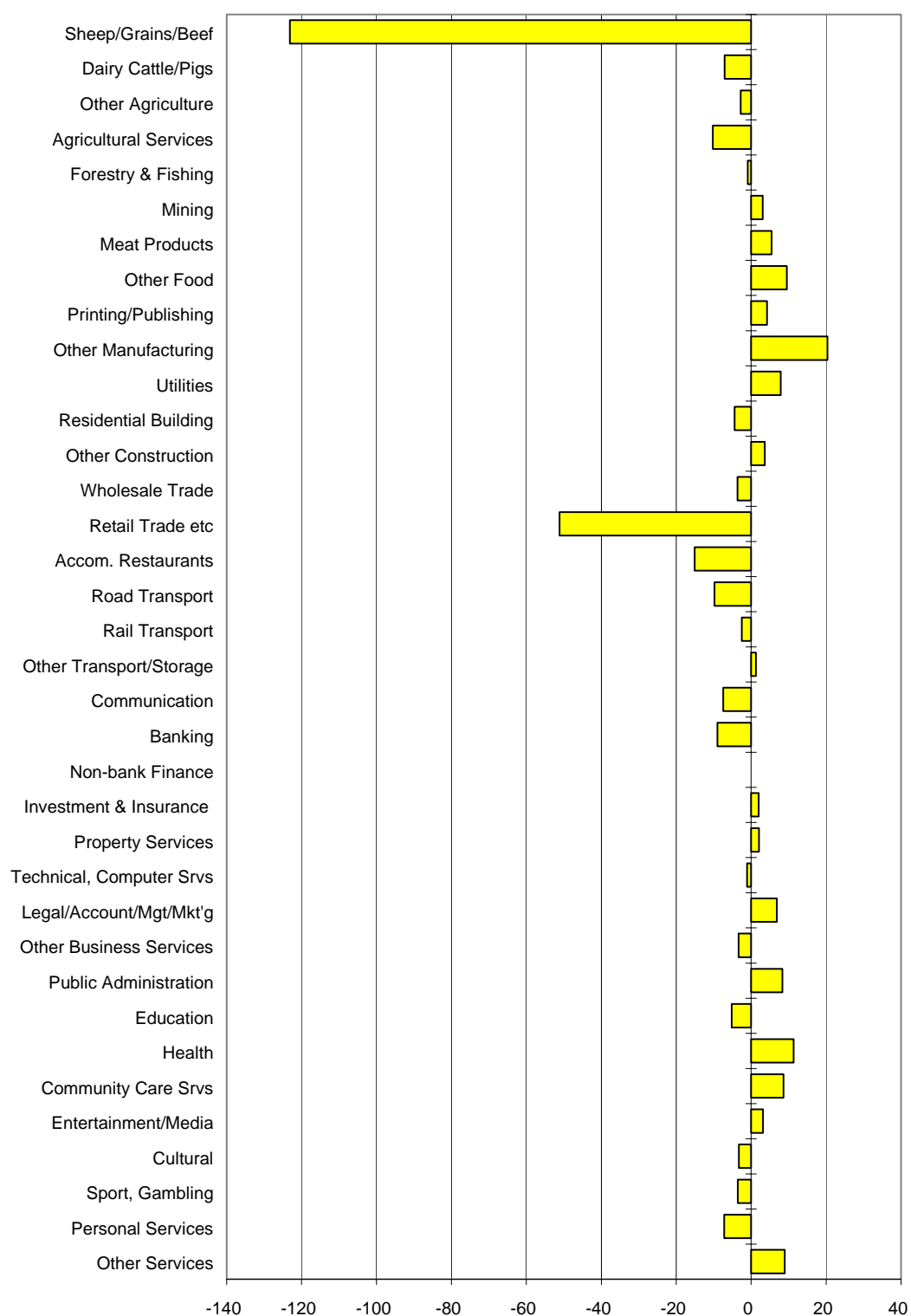


**Figure 35: Total Change in Employment by Sector, 1991-1996: Gilgandra**

**Figure 36: Local Influences on Employment Change, 1991-1996: Gilgandra**

**Figure 37: Employment Distribution by Sector, 2001: Gilgandra**

**Figure 38: Total Change in Employment by Sector, 1996-2001: Gilgandra**

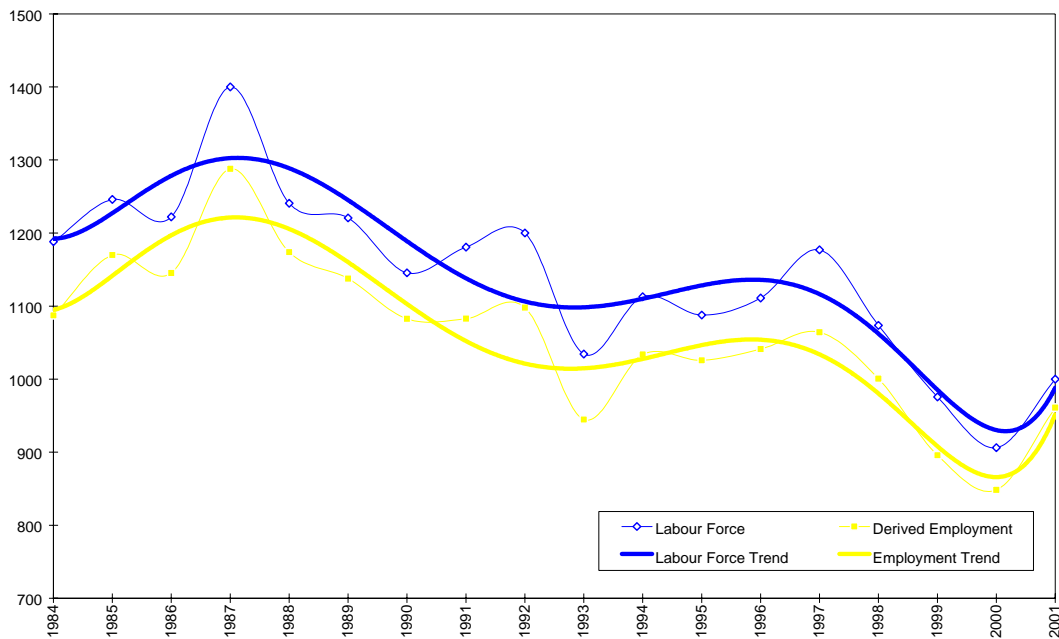
**Figure 39: Local Influences on Employment Change, 1996-2001: Gilgandra**



## 5.9 MERRIWA

Merriwa is among the smallest of the LGAs in the BBSB. It is an area heavily dependent on agriculture for up to 60 percent of employment directly and indirectly. With little development of new industries, employment has been trending downward for most of the past two decades as shown in Figure 40. Merriwa did not gain significant employment in either the late 1980s or late 1990s as in most other localities. There are signs of an upturn beginning in 2001. This is a small, agriculturally dependent economy that will struggle without the benefit of scale advantages or being recognised as a locality with special characteristics.

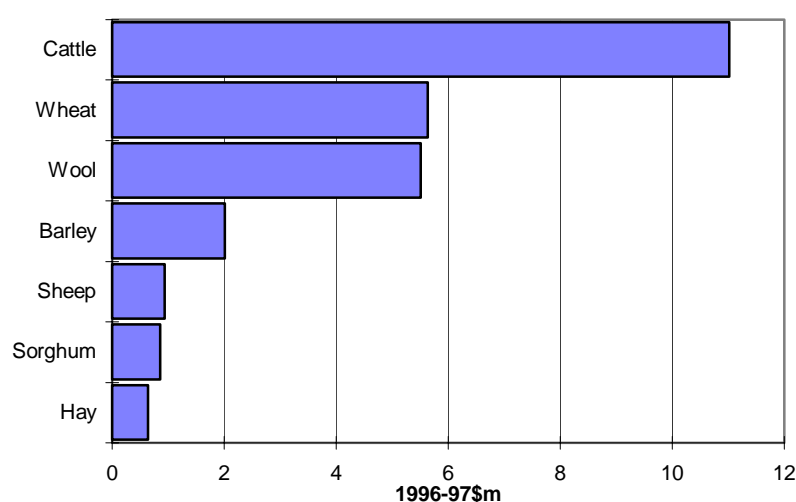
**Figure 40: Labour force and Employment, Merriwa**



Merriwa is dependent on the traditional broadacre grazing and cereal production as shown in Figure 41. It is these industries that have seen a large rationalisation of employment. The same dominance of agriculture is shown in the LQs (Table 12), but it is notable that some of the influence of the Hunter shows employment in the wine industry and coal mining. While this may reflect commuting to employment in the Hunter, it is likely to have further growth potential.

The analysis of employment change over 1991 to 1996 shown in Table 13 indicates that Merriwa has an industry mix that is concentrated on low growth industries –shown by the large negative under Industry and the large negative state component in Table 13.

The situation improved in the 1996 to 2001 period shown in Table 14. The net result of more favourable conditions is that there was only a small decline in employment. The industry mix was more favourable to growth while the local factors were much more encouraging. Although there is still a considerable amount of restructuring going on among industries, there are some positive signs of new development that could continue to generate employment growth. The summary of these trends shown in Figure 42 indicates that situation.

**Figure 41: Composition of Agricultural Production, Merriwa 1996-97****Table 12: Location Quotients, 1981 and 2001: Merriwa**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Beef cattle	26.7	21.6	29.5	38.0	<b>57.2</b>	149
Sheep	11.5	11.8	17.4	21.3	<b>19.6</b>	85
Wine and spirits	0.0	4.1	4.7	9.8	<b>14.0</b>	27
Services to agric.; hunting	16.5	9.3	25.5	4.8	<b>11.2</b>	23
Grains	1.8	12.2	6.5	13.3	<b>10.5</b>	106
Coal; oil and gas	5.9	5.3	7.0	5.9	<b>4.4</b>	12
Other food products	0.0	0.0	0.0	1.1	<b>4.3</b>	12
Other agriculture	1.4	1.5	1.7	3.5	<b>2.5</b>	26
Other construction	0.8	0.4	0.1	0.7	<b>1.4</b>	31
Public administration	1.4	1.4	1.2	1.7	<b>1.3</b>	44
Accom. & restaurants	1.3	1.0	1.0	1.1	<b>1.2</b>	53
Electricity	0.6	0.9	1.4	1.5	<b>1.0</b>	4
Bakery products	0.9	1.4	0.8	2.2	<b>1.0</b>	3
Education	0.8	0.9	0.9	0.9	<b>0.8</b>	54
Other business services	0.5	0.0	0.5	0.7	<b>0.7</b>	17
Health services	0.7	0.6	0.6	0.6	<b>0.6</b>	37
Personal services	0.2	0.5	0.6	0.4	<b>0.5</b>	9
Community care services	0.0	0.6	0.2	0.4	<b>0.5</b>	12
Retail trade	0.6	0.7	0.6	0.6	<b>0.5</b>	61
Other services	0.4	0.4	0.6	0.2	<b>0.4</b>	6
Insurance	0.0	0.0	0.0	0.0	<b>0.4</b>	3
Other property services	0.0	0.0	0.0	0.2	<b>0.2</b>	3
Banking	0.9	0.8	0.7	0.6	<b>0.2</b>	3
Legal, accounting srvs	0.1	0.1	0.2	0.0	<b>0.2</b>	6

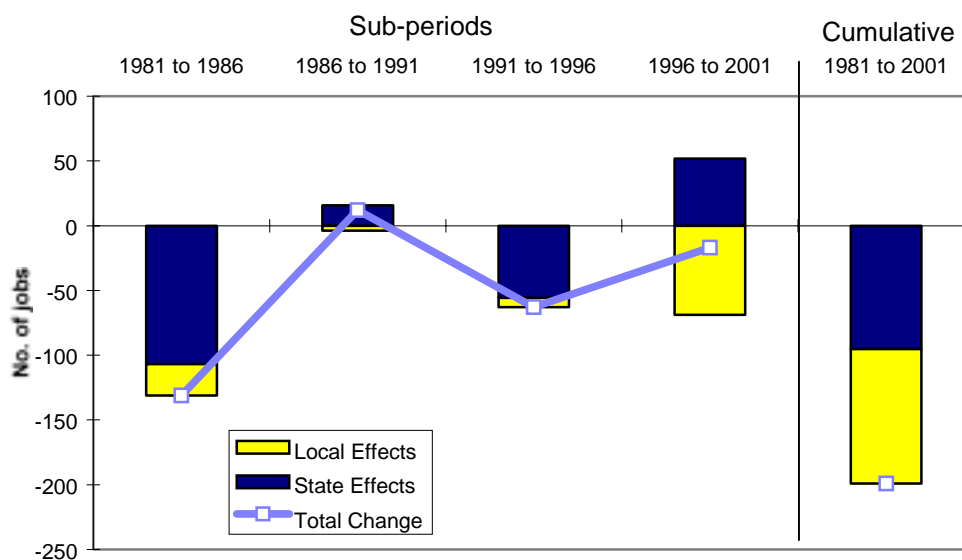
Detailed charts on industry employment in Merriwa over 1991 to 1996 are shown in Figure 43 through Figure 45. This shows the heavy dependence on agriculture and a selection of essential services. The changes in employment from 1991 to 1996 show a good deal of restructuring among industries. There is notable growth in other agriculture (wine) other food, building and wholesale trade. There does not appear to be any significant effects on employment from tourist activities and there are no data to show that there is significant visitor accommodation in the area.

**Table 13: Summarised Shift-Share Analysis 1991-96: Merriwa**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	63	74	137	163	300
Negative Effects	-	(193)	(193)	(170)	(363)
<b>Total Effects</b>	<b>63</b>	<b>(119)</b>	<b>(56)</b>	<b>(7)</b>	<b>(63)</b>

**Table 14: Summarised Shift-Share Analysis 1996-2001: Merriwa**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	67	70	138	101	239
Negative Effects	-	(86)	(86)	(170)	(256)
<b>Total Effects</b>	<b>67</b>	<b>(16)</b>	<b>52</b>	<b>(69)</b>	<b>(17)</b>

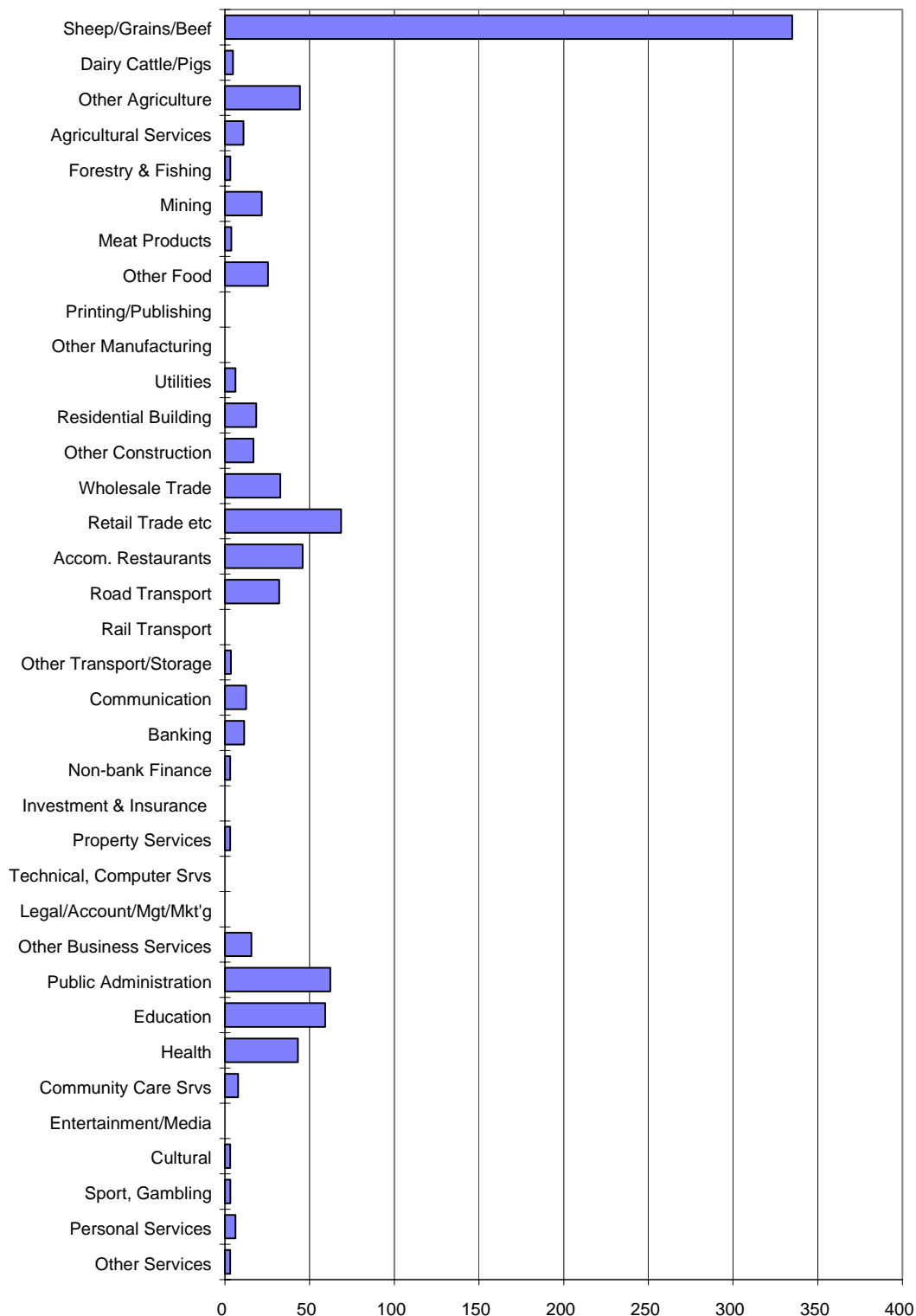
**Figure 42: Summarised Shift-Share Analysis: Merriwa: 1981- 2001**

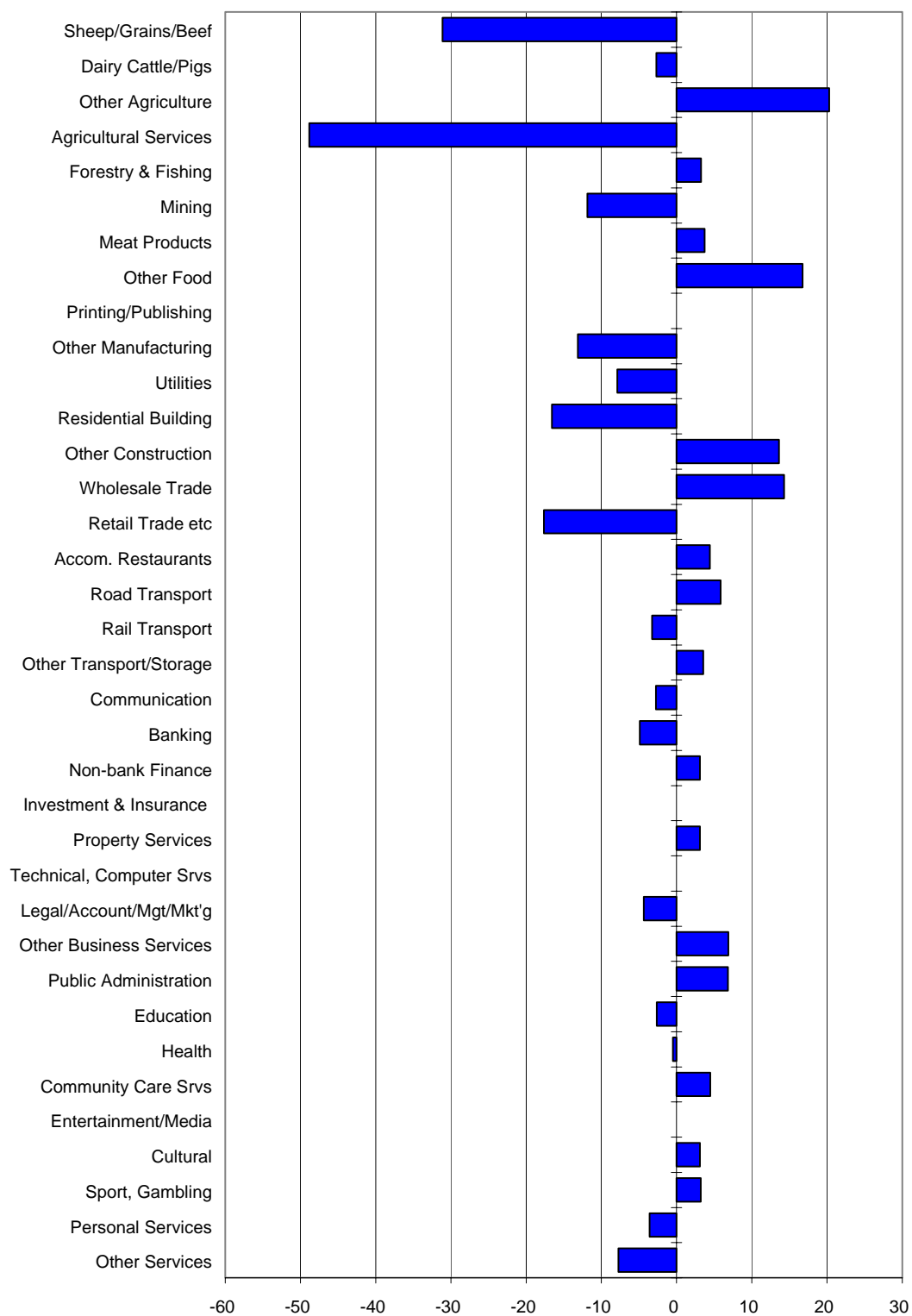
Similar charts for the 1996 to 2001 period are shown in Figure 46 through Figure 48. While it is apparent that the restructuring among industries continues, the developments in agricultural services, other food manufacturing, other construction and legal, accounting and other business services could be pointers to a new direction for economic development.

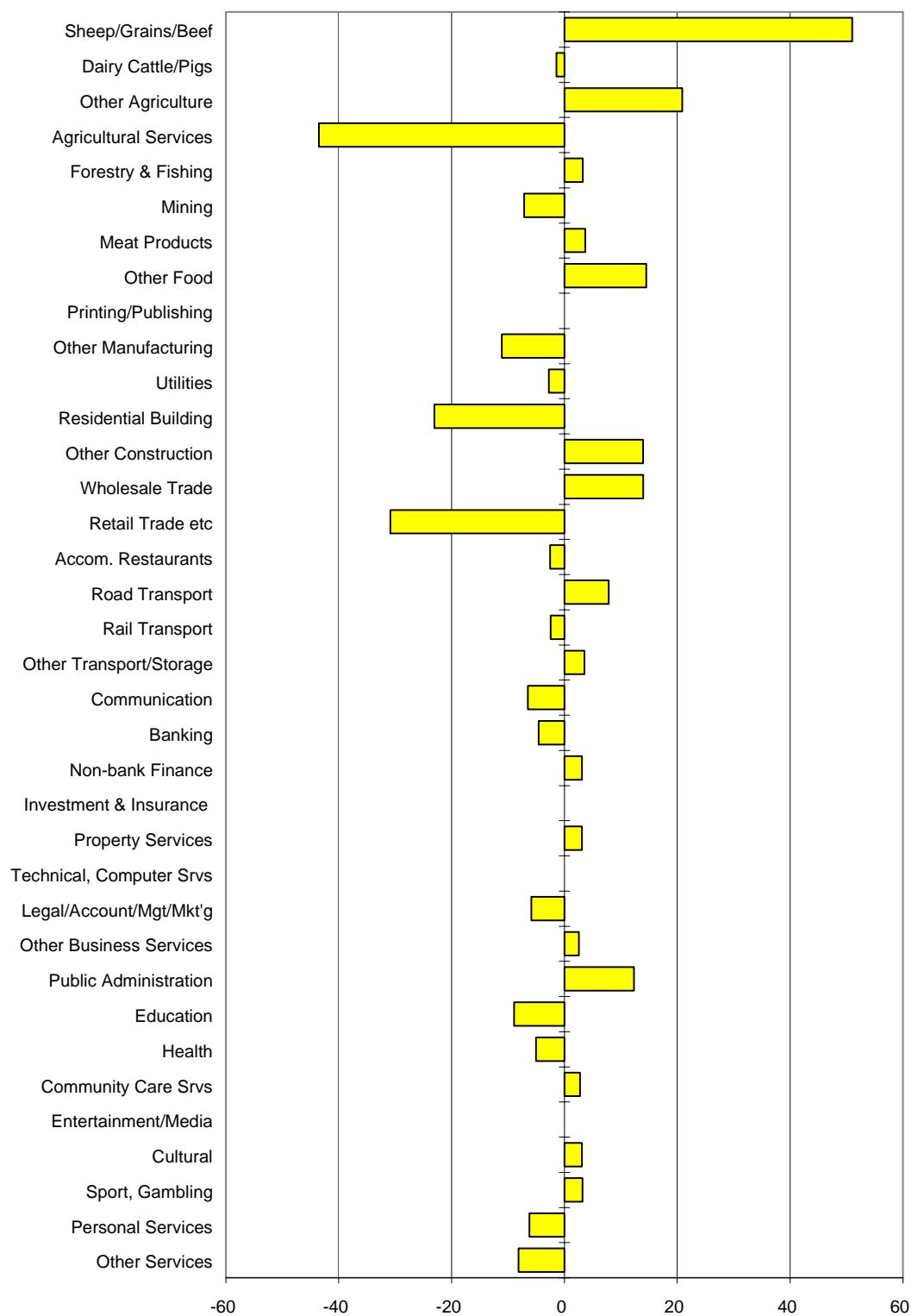
Merriwa is a small economy heavily dependent on agriculture with many challenges in building economic growth. Future growth appears likely to come from it becoming an area of residence

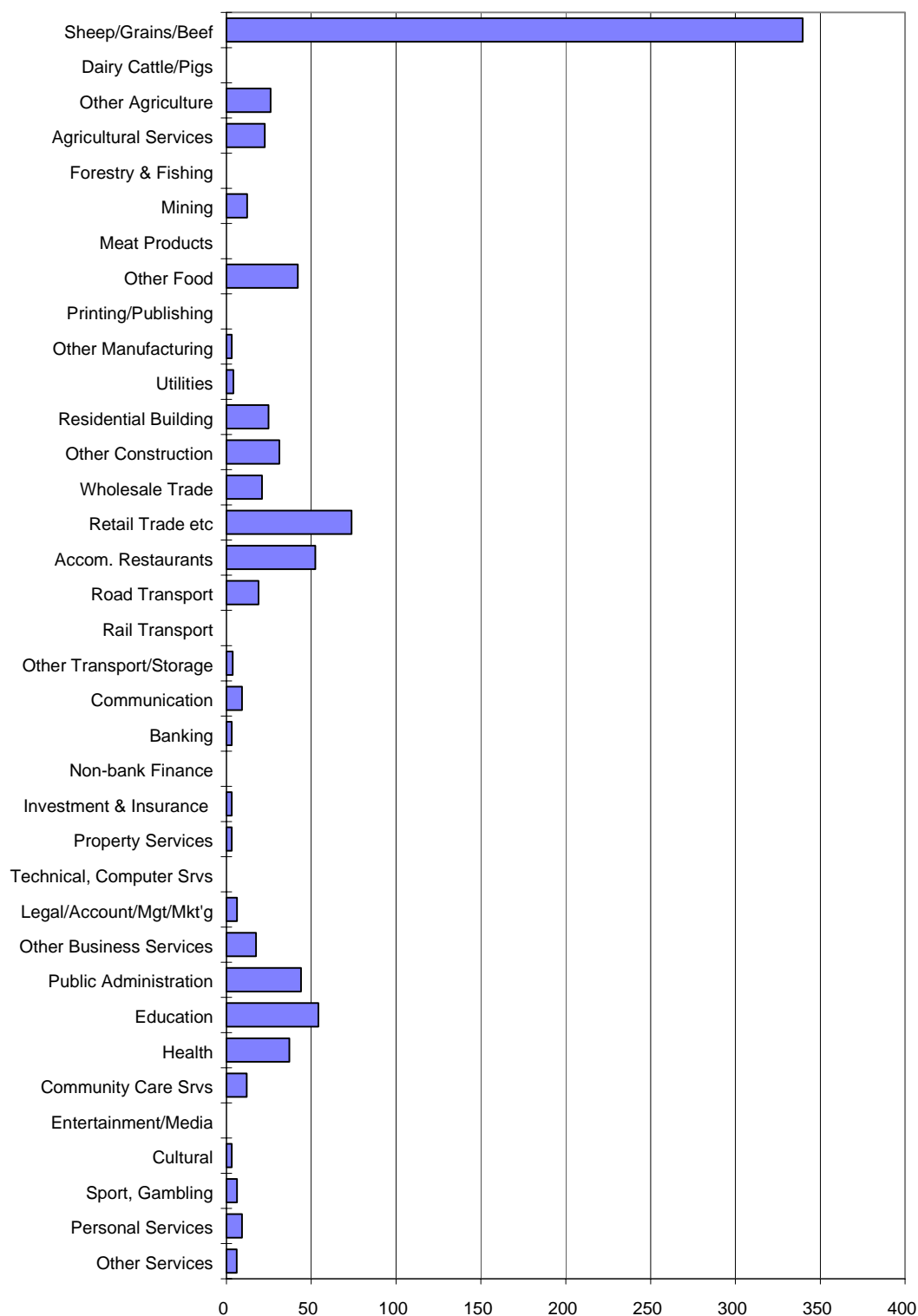
for commuters to the hunter and from expansion of the wine and other niche activities. Until population and employment growth begins, Merriwa will continue to suffer low levels of service delivery and a low level of business service employment.

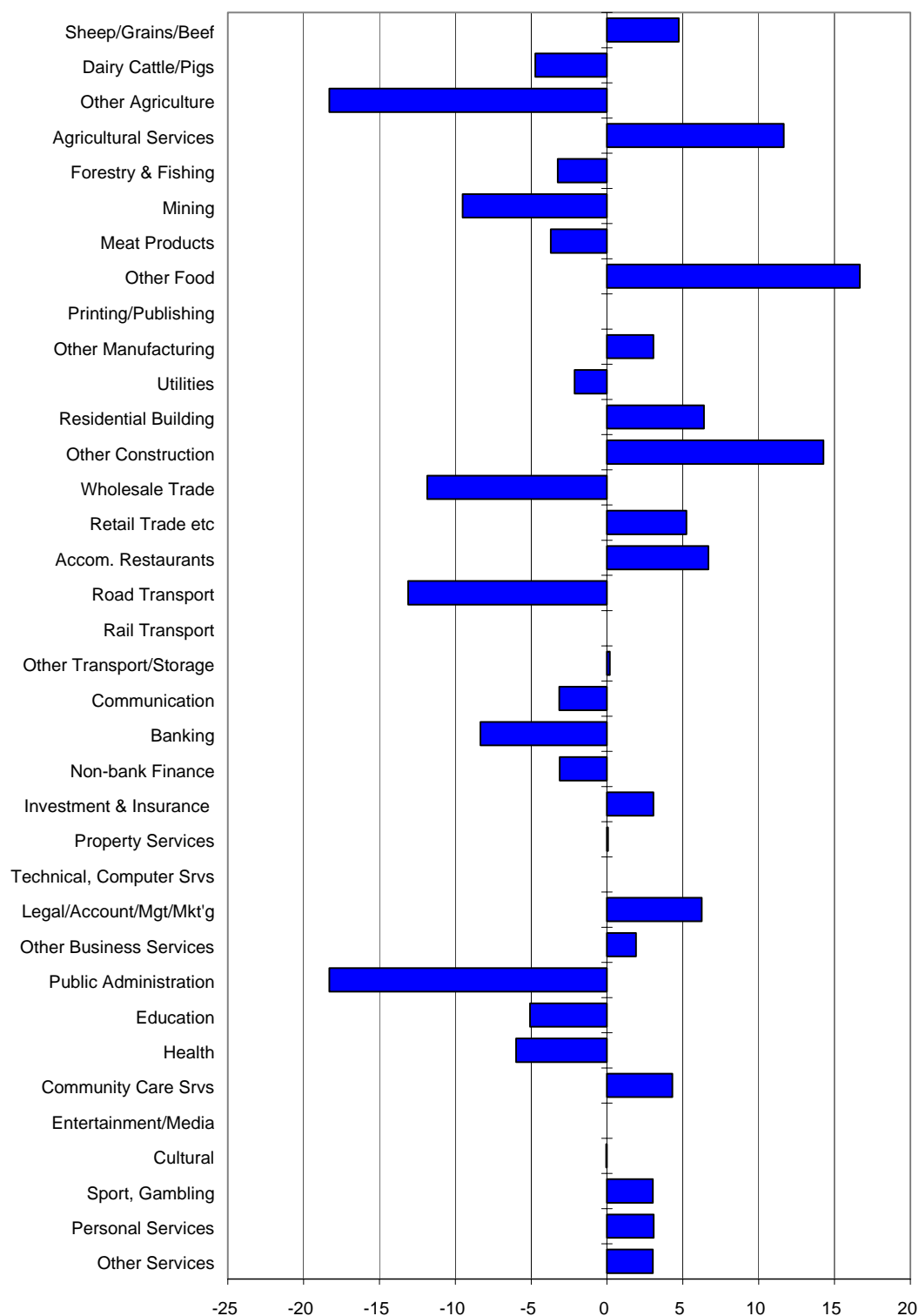
**Figure 43: Employment Distribution by Sector, 1996: Merriwa**



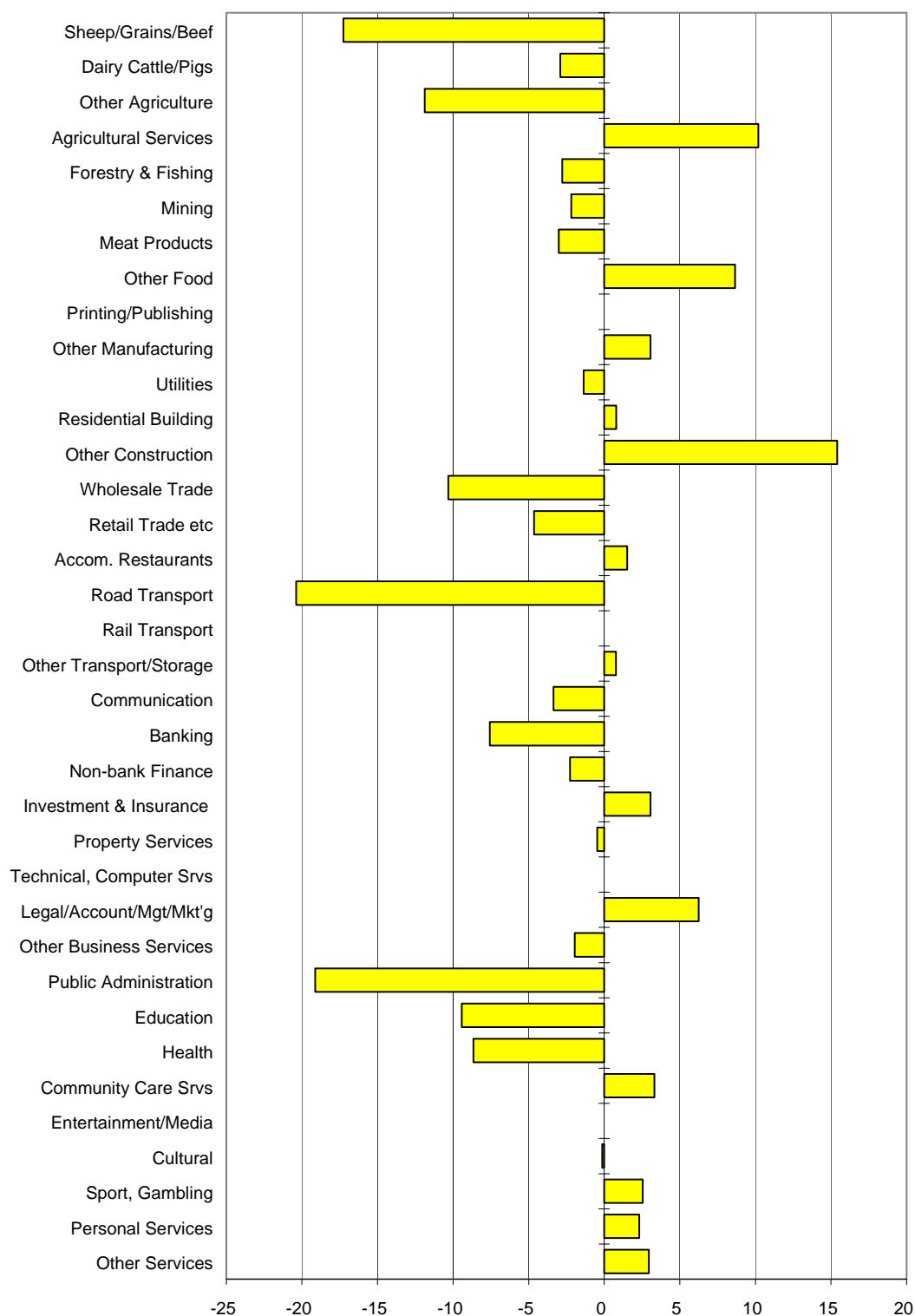
**Figure 44: Total Change in Employment by Sector, 1991-1996: Merriwa**

**Figure 45: Local Influences on Employment Change, 1991-1996: Merriwa**

**Figure 46: Employment Distribution by Sector, 2001: Merriwa**

**Figure 47: Total Change in Employment by Sector, 1996-2001: Merriwa**

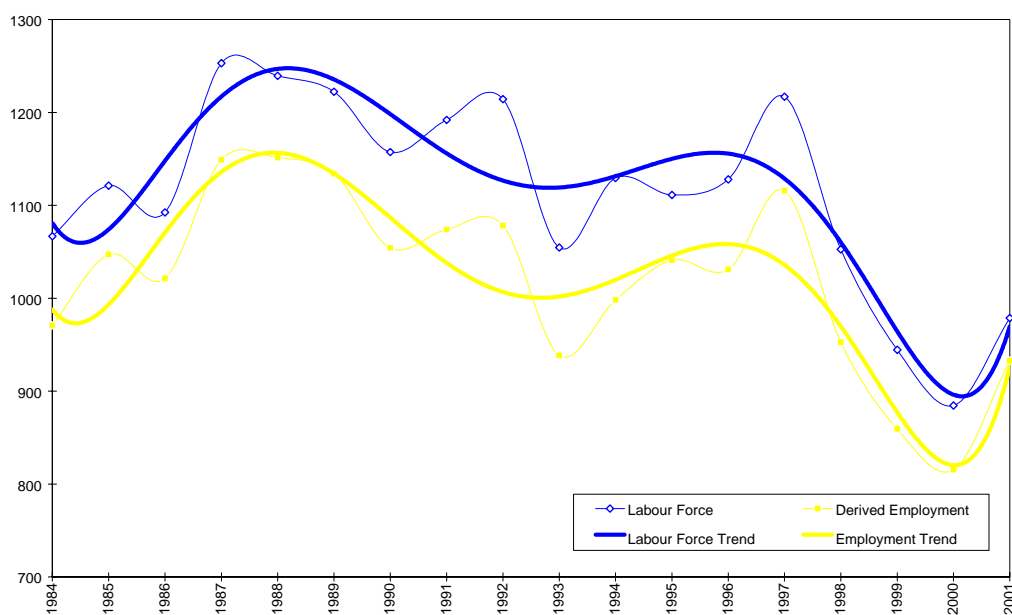


**Figure 48: Local Influences on Employment Change, 1996-2001: Merriwa**

## 5.10 MURRURUNDI

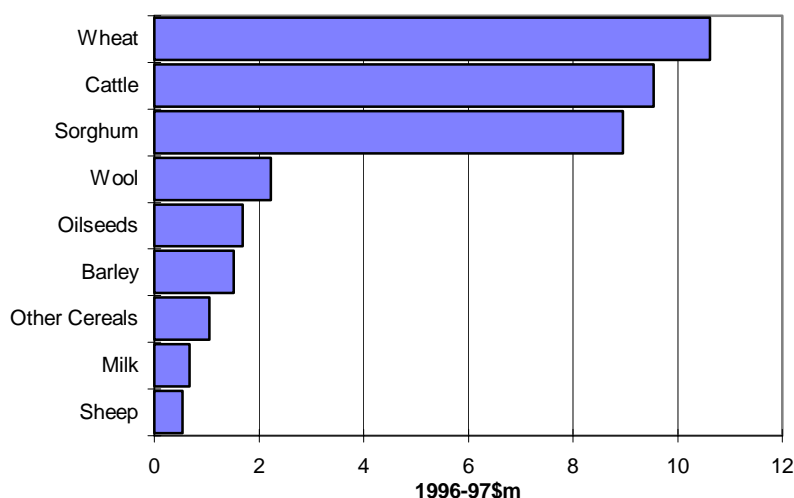
Murrurundi is also a small LGA but has an advantage of location on the New England Highway at the upper end of the Hunter Valley. However, the employment trend reflects the high dependence on broadacre agriculture and some intensive livestock that appears to have some growth potential. The trend in employment has been to decline (along with population) with a more dramatic decline commencing in 1997. (Figure 49). There are signs that employment is beginning to grow in 2001.

**Figure 49: Labour Force and Employment, Murrurundi**



Agriculture is predominantly grazing on the hill country and cereals on the Liverpool Plains as shown in Figure 50. There is a range of cereals produced that offer some diversity. The area is also adjacent to a concentration of horse studs that will likely spill over to benefit Murrurundi either directly or in supplying inputs.

**Figure 50: Composition of Agricultural Production, Murrurundi, 1996-97**



The LQs shown in Table 15 include a relatively large number greater than 1.0. That is an indicator of diversity in the economy with a number reflecting the location on the New England Highway such as transport. They are signs that there is potential for growth in the further expansion of those activities. The fact remains that agricultural activities are the core of the economy that accounts for around one-half of employment directly and indirectly.

**Table 15: Location Quotients, 1981 and 2001: Murrurundi**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Beef cattle	20.7	14.8	20.8	17.6	<b>31.4</b>	80
Grains	9.6	19.3	18.2	18.4	<b>17.4</b>	172
Services to agric.; hunting	5.2	2.2	7.2	5.4	<b>13.3</b>	26
Poultry	0.0	2.5	0.0	3.9	<b>9.9</b>	7
Pigs	13.5	19.9	14.2	31.1	<b>8.1</b>	3
Sheep	5.5	4.3	7.8	4.9	<b>5.3</b>	23
Other agriculture	2.6	4.2	4.0	5.2	<b>4.5</b>	47
Rail & other transport	4.2	4.5	3.6	4.1	<b>3.9</b>	13
Other mining	11.1	3.1	6.4	10.2	<b>3.8</b>	3
Coal; oil and gas	0.4	0.0	0.0	1.4	<b>2.7</b>	7
Forestry and logging	0.0	0.0	0.0	2.3	<b>2.7</b>	3
Commercial fishing	0.0	0.0	0.0	0.0	<b>2.4</b>	3
Sawmill products	0.0	0.0	0.0	3.3	<b>2.1</b>	3
Road transport	4.5	2.2	1.9	1.3	<b>2.0</b>	40
Libraries, museums, arts	0.0	0.0	0.0	0.0	<b>1.6</b>	9
Water, sewerage & drainage	0.0	0.0	0.8	0.0	<b>1.4</b>	3
Electricity	0.7	1.3	1.8	1.9	<b>1.3</b>	5
Community care services	0.0	0.5	0.2	1.0	<b>1.3</b>	28
Other construction	1.0	0.8	0.9	0.7	<b>1.1</b>	23
Personal services	0.7	0.2	0.2	0.8	<b>0.9</b>	16
Health services	0.8	0.7	0.9	0.8	<b>0.8</b>	54
Accom. & restaurants	1.1	1.0	1.2	1.2	<b>0.8</b>	35
Legal, accounting svcs	0.4	0.1	0.3	0.3	<b>0.2</b>	6

The analysis of employment change from 1991 to 1996 shown in Table 16 indicates that Murrurundi has an industry mix that is favourable to growth. Most of the decline in employment has been attributed to local adjustments in agriculture and a number of other service industries such as rail and road transport and retail trade. Some employment growth occurred in wholesale trade, community care and other agriculture among a number of other small changes.

**Table 16: Summarised Shift-Share Analysis 1991-96: Murrurundi**

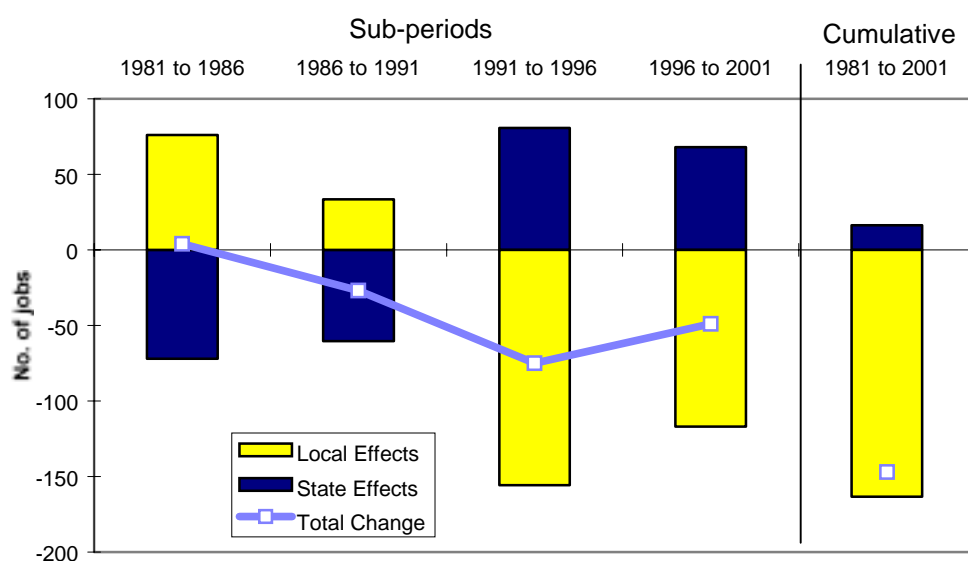
	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	65	157	<b>221</b>	<b>128</b>	<b>349</b>
Negative Effects	-	(141)	<b>(141)</b>	<b>(283)</b>	<b>(424)</b>
<b>Total Effects</b>	<b>65</b>	<b>16</b>	<b>81</b>	<b>(156)</b>	<b>(75)</b>

The analysis for 1996 to 2001 is shown in Table 17. These results similar to the early 1990s and show that local factors have been dominant so that there is a small fall in overall employment. The net result is better than in the early 1990s as shown in Figure 51. This indicates that the employment situation in Murrurundi has been weak for the past two decades and at no stage has shown significant growth. It appears that Murrurundi is struggling because of the lack of scale and the competition provided from surrounding towns. The small scale has not allowed further diversification of the economy and service levels continue to decline. There appear to be major challenges in economic development even though it is located on the main transport route from the Hunter to the northern inland areas of NSW.

**Table 17: Summarised Shift-Share Analysis 1996-2001: Murrurundi**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	69	82	151	121	272
Negative Effects	-	(83)	(83)	(238)	(321)
<b>Total Effects</b>	<b>69</b>	<b>(1)</b>	<b>68</b>	<b>(117)</b>	<b>(49)</b>

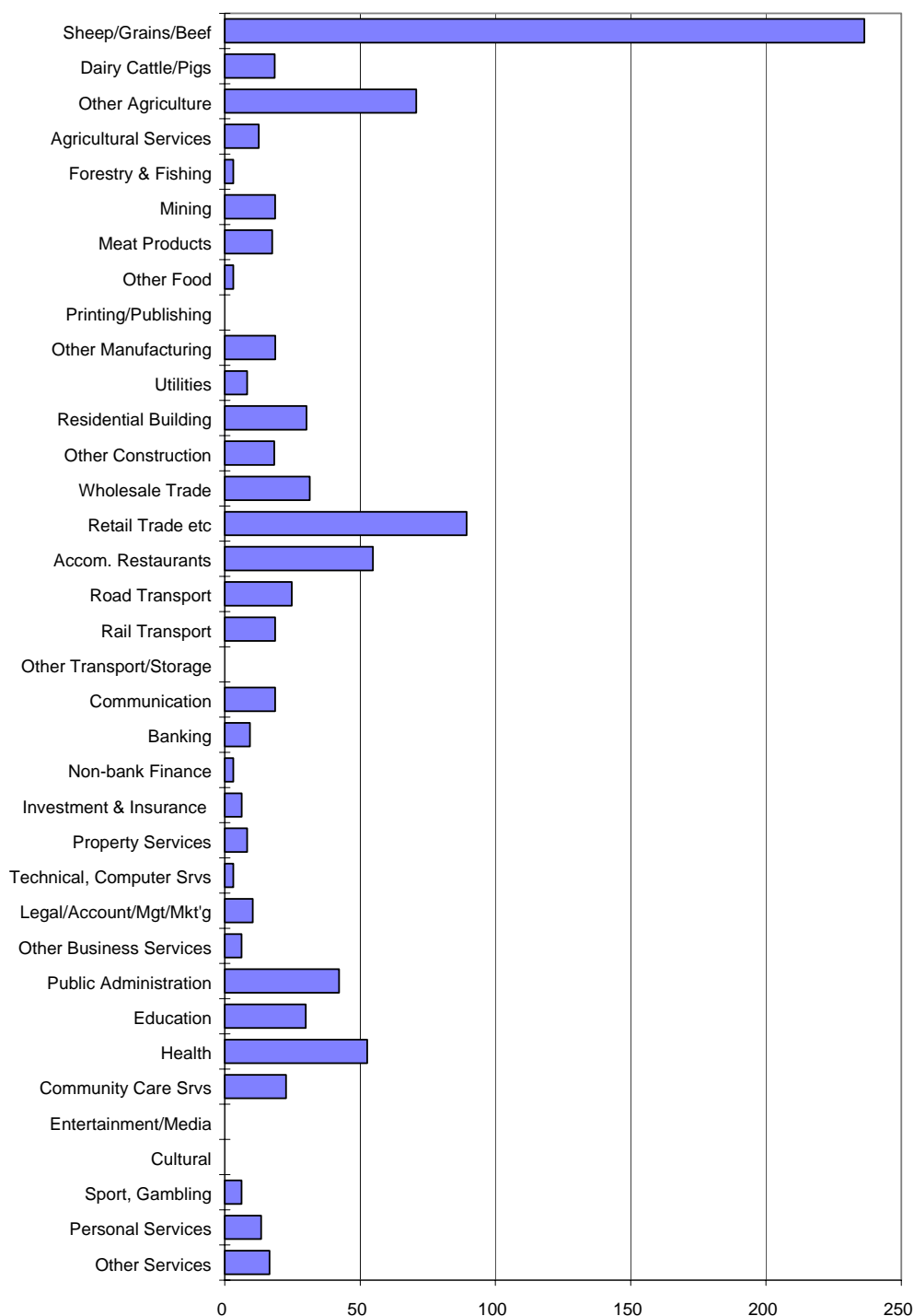
**Figure 51: Summarised Shift-Share Analysis: Murrurundi: 1981- 2001**

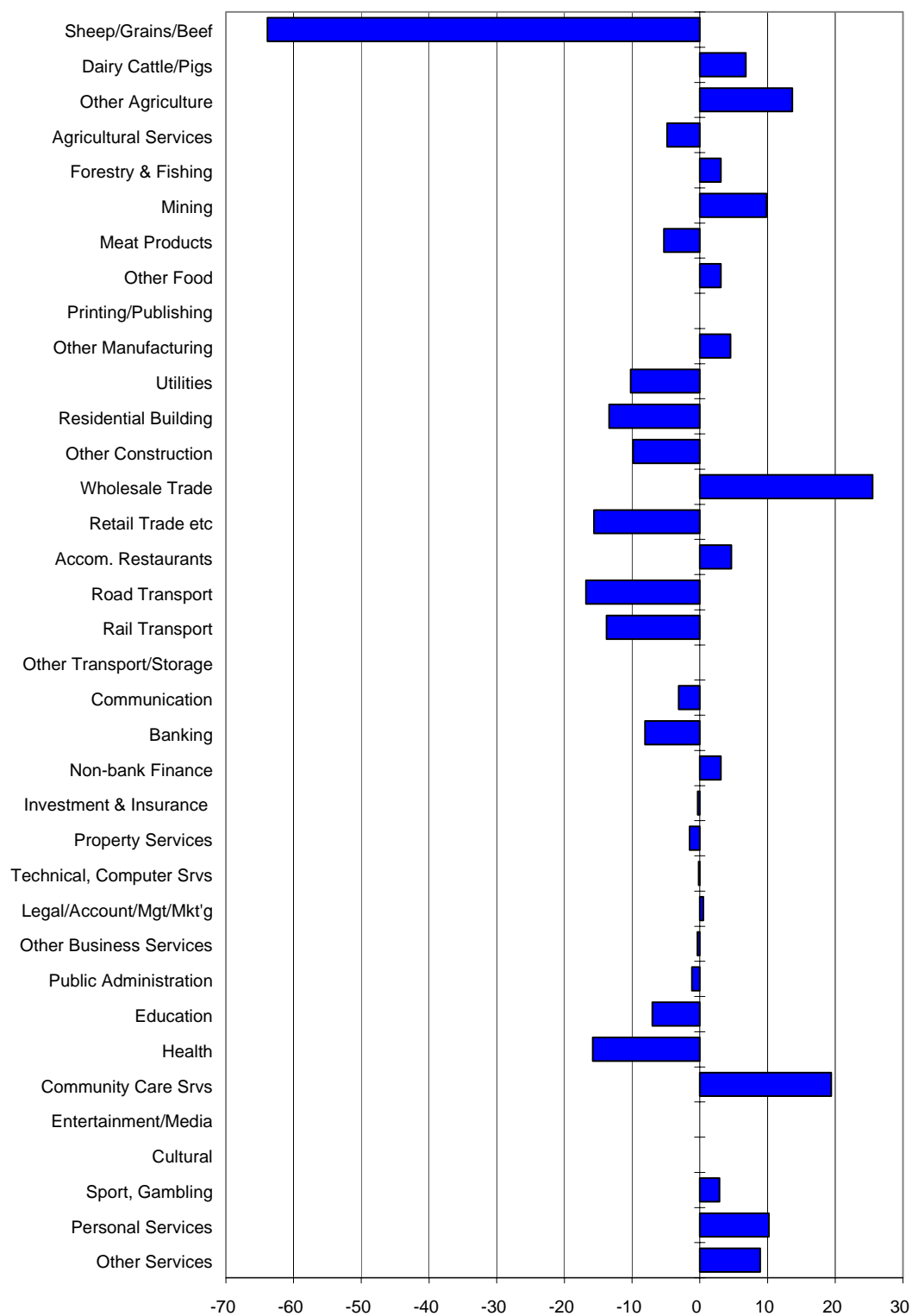


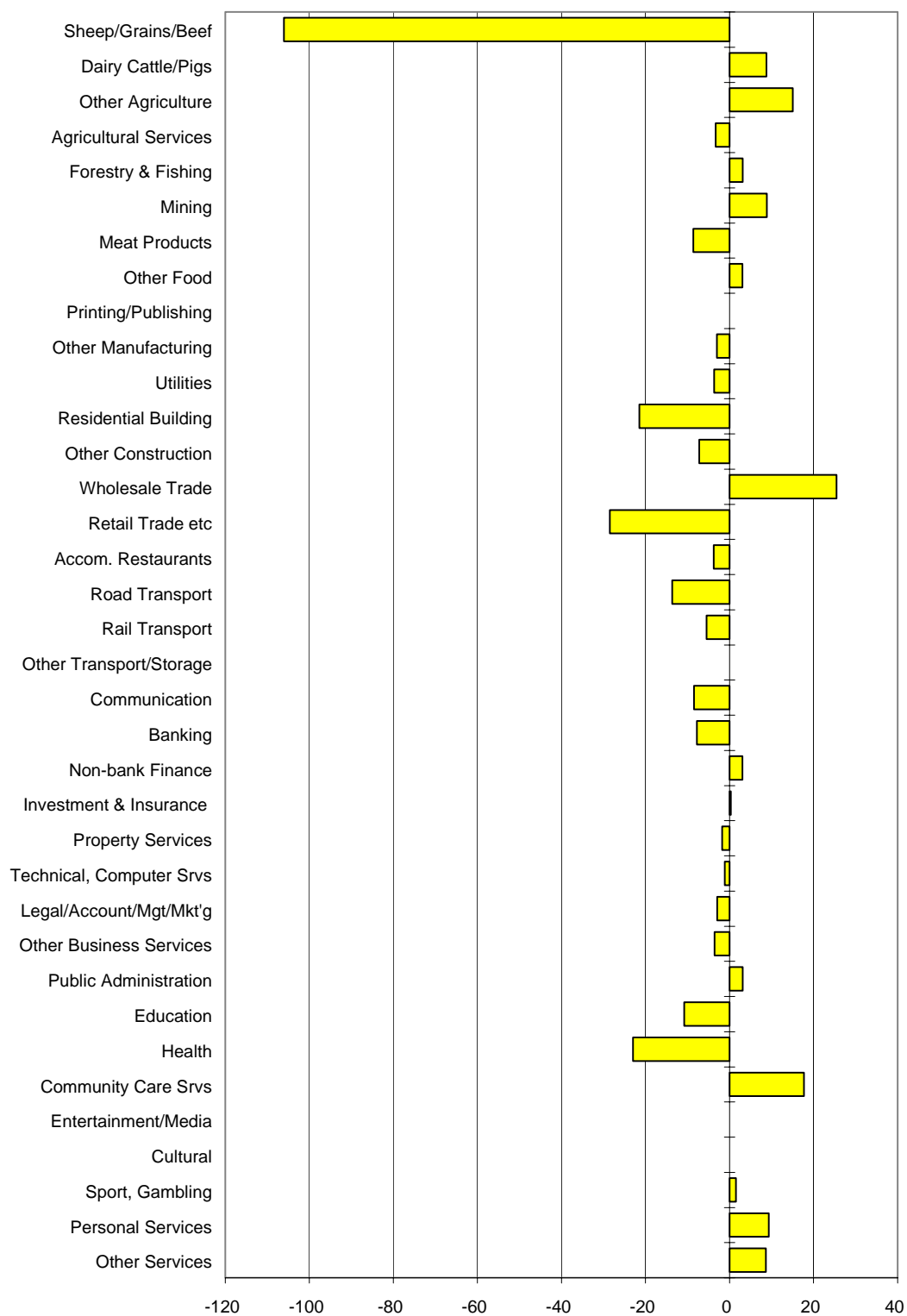
The detailed industry distribution of employment and employment change over 1991 to 1996 are indicated in Figure 52 through Figure 54. While this was a period of rapid loss of employment, there are signs of the development of a more diversified agriculture into other livestock production. The situation appears to be negative in respect of many services where it seems there is strong competition from other nearby centres. However, growth in highway traffic and the further spread of activities toward the upper Hunter may benefit Murrurundi in future growth in employment.

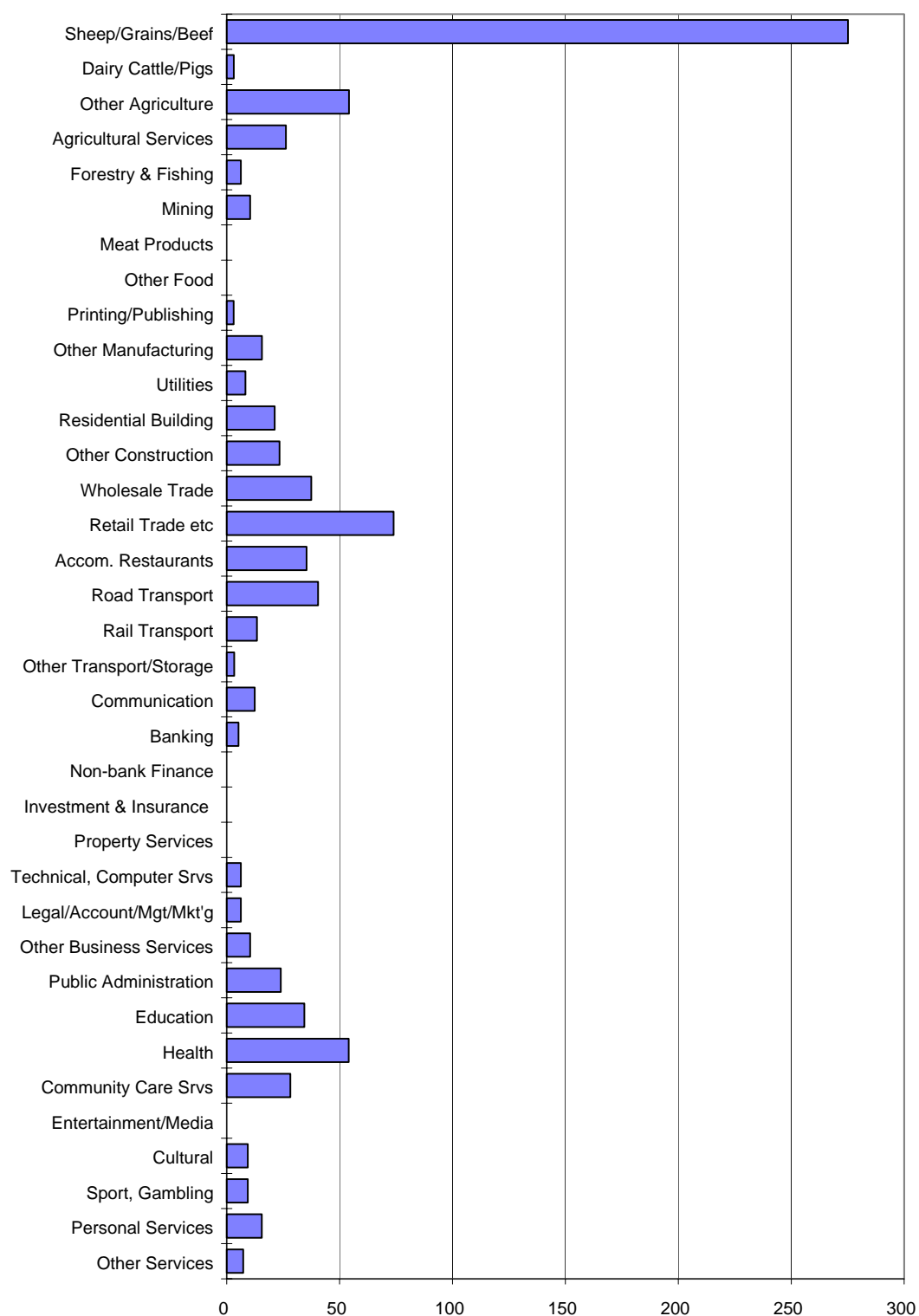
The data for 1996 to 2001 shown in Figure 55 through Figure 57 still indicates a good deal of industry restructuring and loss of employment. There are a number of sectors that have been increasing their share shown in Figure 57 including agricultural services, construction, wholesale trade, road transport and cultural activities. That is sitting alongside some considerable losses in residential building, retail trade, accommodation etc, and public administration. It appears that the nature of the future Murrurundi economy is yet to appear which will likely be a prerequisite for a return to population and employment growth.

**Figure 52: Employment Distribution by Sector, 1996: Murrurundi**

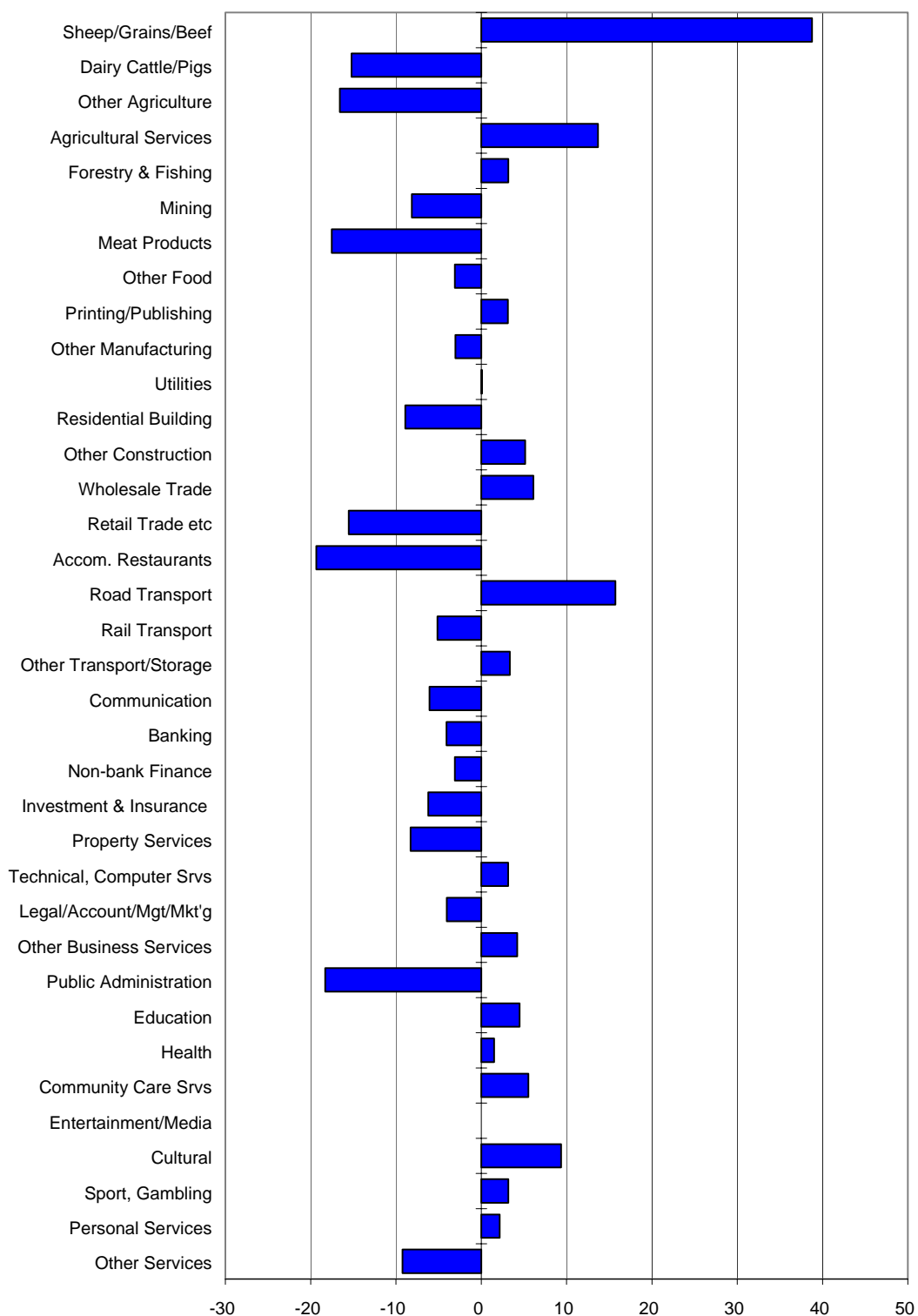


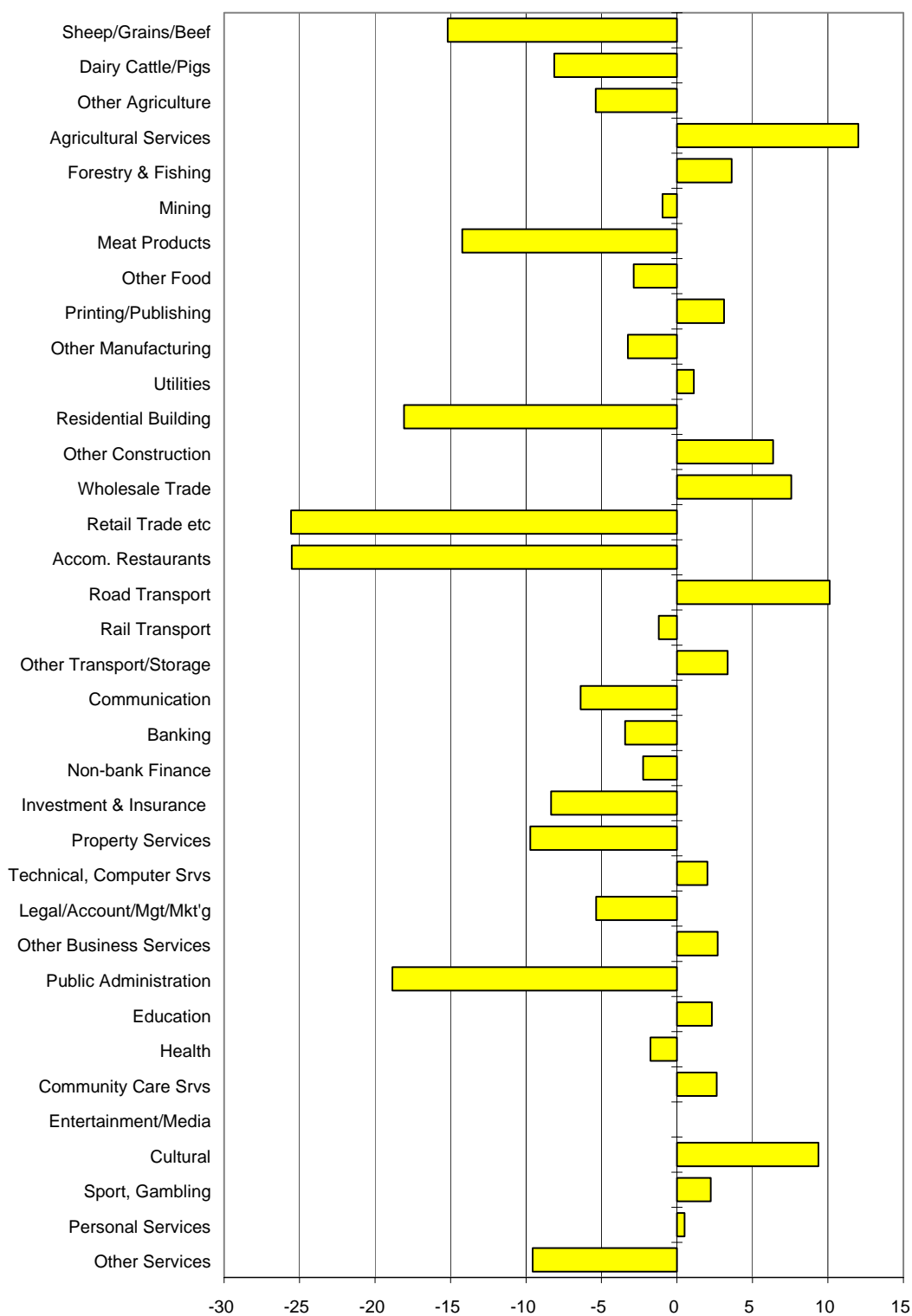
**Figure 53: Total Change in Employment by Sector, 1991-1996: Murrurundi**

**Figure 54: Local Influences on Employment Change, 1991-1996: Murrurundi**

**Figure 55: Employment Distribution by Sector, 2001: Murrurundi**



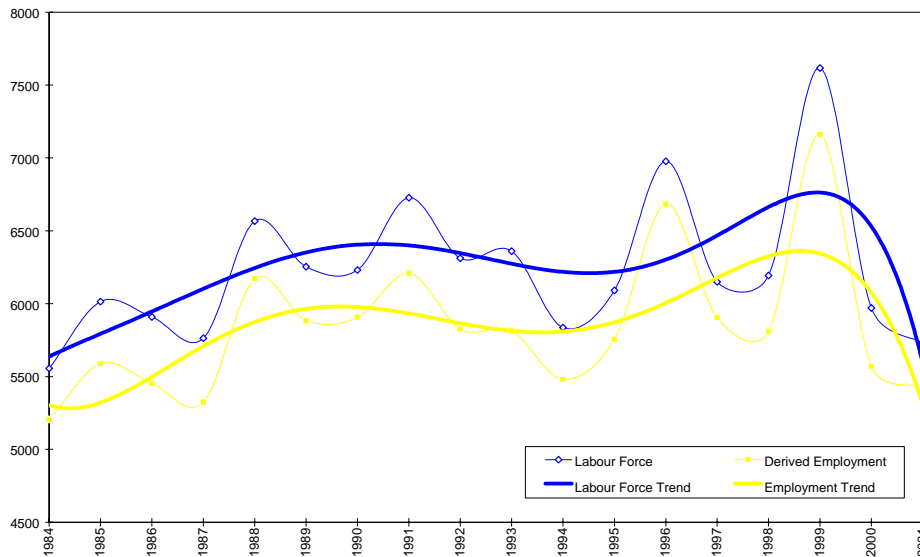
**Figure 56: Total Change in Employment by Sector, 1996-2001: Murrurundi**

**Figure 57: Local Influences on Employment Change, 1996-2001: Murrurundi**

### 5.11 GUNNEDAH

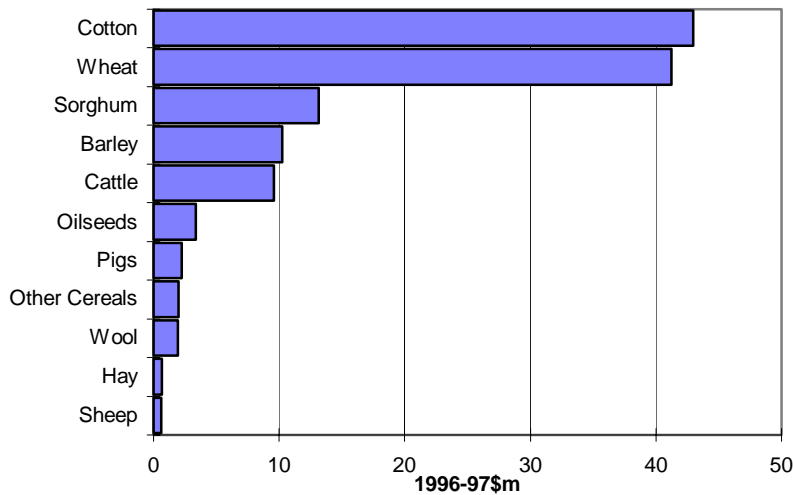
Gunnedah has been a growth area in the BBSB based on a hinterland of rich farming country, irrigation development, coal mining and food processing. It has a size that enables it to reap some scale economies. Employment grew steadily until the late 1990s as shown in Figure 58. The closure of coal mining and the abattoir then put Gunnedah into a severe decline in employment. Those two industries employed over 400 people in 1996. Finding alternative employment for those retrenched is not possible in a short period of time and so employment and population declines. Over the 1996 to 2001 intercensal period, the population and employment decline was the largest in the BBSB.

**Figure 58: Labour Force and Employment, Gunnedah**



Agriculture is heavily concentrated on cropping of cotton and cereals as shown in Figure 59. The relatively low ranking of grazed livestock is notable and there is some intensive animal production with pigs. Gunnedah is a rich and diversified agricultural area underpinned by the development of irrigation over recent decades.

**Figure 59: Composition of Agricultural Production, Gunnedah 1996-97**



The diversity of the Gunnedah economy is also shown by the LQs in Table 18. The diversity of the Gunnedah economy is reflected in the large number of LQs that are greater than 1.0. There are a considerable number of agriculture and related activities including intensive livestock production that are important to the area. Despite the demise of the meatworks, there is a significant manufacturing presence in Gunnedah along with a wide range of service industries that support the economy. There are a number of administrative agencies in Gunnedah. The proximity of Tamworth as a major competitor and regional centre will constrain the growth of some activities such as retailing and other regional functions.

**Table 18: Location Quotients, 1981 and 2001: Gunnedah**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Leather and leather products	15.1	18.4	29.0	22.4	<b>37.8</b>	83
Grains	10.6	14.4	17.5	15.2	<b>12.0</b>	639
Pigs	4.2	6.0	8.6	7.9	<b>11.3</b>	24
Poultry	1.5	0.5	3.1	2.3	<b>9.2</b>	37
Services to agric.; hunting	4.8	7.1	4.7	5.7	<b>8.2</b>	87
Flour and cereal foods	2.4	2.8	4.3	6.5	<b>8.1</b>	34
Beef cattle	7.6	4.5	8.6	4.9	<b>7.4</b>	101
Ceramic products	1.5	2.1	2.6	3.8	<b>3.7</b>	19
Coal; oil and gas	9.6	11.5	10.5	8.1	<b>3.5</b>	51
Sawmill products	0.4	0.0	0.0	1.9	<b>3.5</b>	28
Textile fibres, yarns etc	0.0	0.2	0.0	0.0	<b>3.2</b>	13
Other agriculture	0.2	0.6	1.1	1.7	<b>2.4</b>	135
Other food products	0.0	0.6	0.8	1.9	<b>2.1</b>	32
Agricultural, mining etc machinery	0.0	1.3	1.4	0.2	<b>1.9</b>	28
Community care services	0.6	0.8	1.2	1.3	<b>1.7</b>	200
Road transport	3.3	1.6	1.4	1.2	<b>1.6</b>	169
Forestry and logging	1.0	0.7	0.7	1.7	<b>1.4</b>	9
Other repairs	1.3	1.1	1.2	0.8	<b>1.2</b>	15
Mechanical repairs	1.4	1.2	1.2	1.4	<b>1.2</b>	96
Plaster; other concrete products	0.9	0.5	0.9	0.5	<b>1.2</b>	6
Sheep	2.1	0.8	2.0	1.3	<b>1.2</b>	26
Meat and meat products	5.2	9.4	9.8	8.6	<b>1.1</b>	25
Personal services	1.1	0.9	0.7	0.8	<b>1.1</b>	96
Education	0.9	0.9	0.8	1.0	<b>1.0</b>	348
Retail trade	1.1	0.9	1.0	0.9	<b>1.0</b>	620
Public administration	1.1	0.9	1.0	1.1	<b>1.0</b>	177
Other construction	0.5	0.5	0.4	0.7	<b>1.0</b>	114
Accom. & restaurants	1.3	1.1	0.9	0.9	<b>0.8</b>	194
Other services	0.7	0.5	0.6	0.7	<b>0.8</b>	67
Legal, accounting srvs	0.6	0.6	0.5	0.6	<b>0.8</b>	139
Other property services	0.2	0.3	0.5	0.7	<b>0.6</b>	44

The analysis of employment change over 1991 to 1996 shown in Table 19 indicates that the industry structure is favourable. The decline in employment was the result of a very large amount of industry adjustment as shown in Figure 62. This is an example of very large changes occurring within a few years that spanned the census. This meant that local factors exceeded the growth attributable to State factors and led to a significant employment decline. That has set in train a series of adjustments that have extended over the rest of the 1990s.

A similar change in employment has occurred in the period from 1996 to 2001 as shown in Table 20. With a lesser gain from state effects, this has resulted in a high rate of employment decline to 2001. All of those changes have resulted in a steadily worsening employment

position over two decades as shown in Figure 60. There is little doubt that these pressures for change have had a considerable impact on Gunnedah.

The economy appears to be changing from some of its traditional strengths of broadacre farming, mining and retail into intensive agriculture and construction as well as some areas of business services and public sector funded services. Changes in those directions would generally be regarded as favourable for the economy but are yet to bear fruit in employment growth.

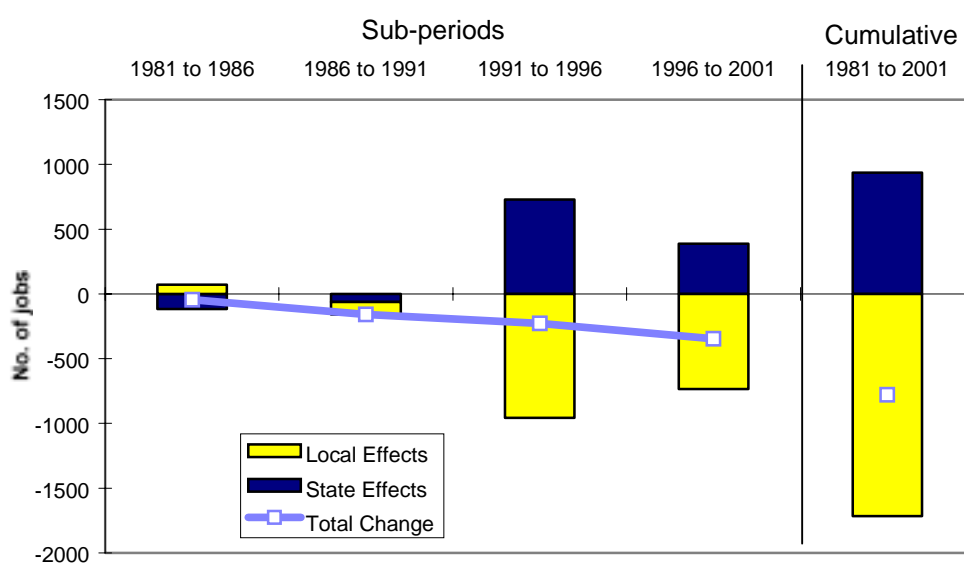
**Table 19: Summarised Shift-Share Analysis 1991-96: Gunnedah**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	342	854	1,197	295	1,492
Negative Effects	-	(467)	(467)	(1,252)	(1,720)
<b>Total Effects</b>	<b>342</b>	<b>387</b>	<b>730</b>	<b>(958)</b>	<b>(228)</b>

**Table 20: Summarised Shift-Share Analysis 1996-2001: Gunnedah**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	376	408	784	335	1,119
Negative Effects	-	(397)	(397)	(1,068)	(1,466)
<b>Total Effects</b>	<b>376</b>	<b>11</b>	<b>387</b>	<b>(734)</b>	<b>(347)</b>

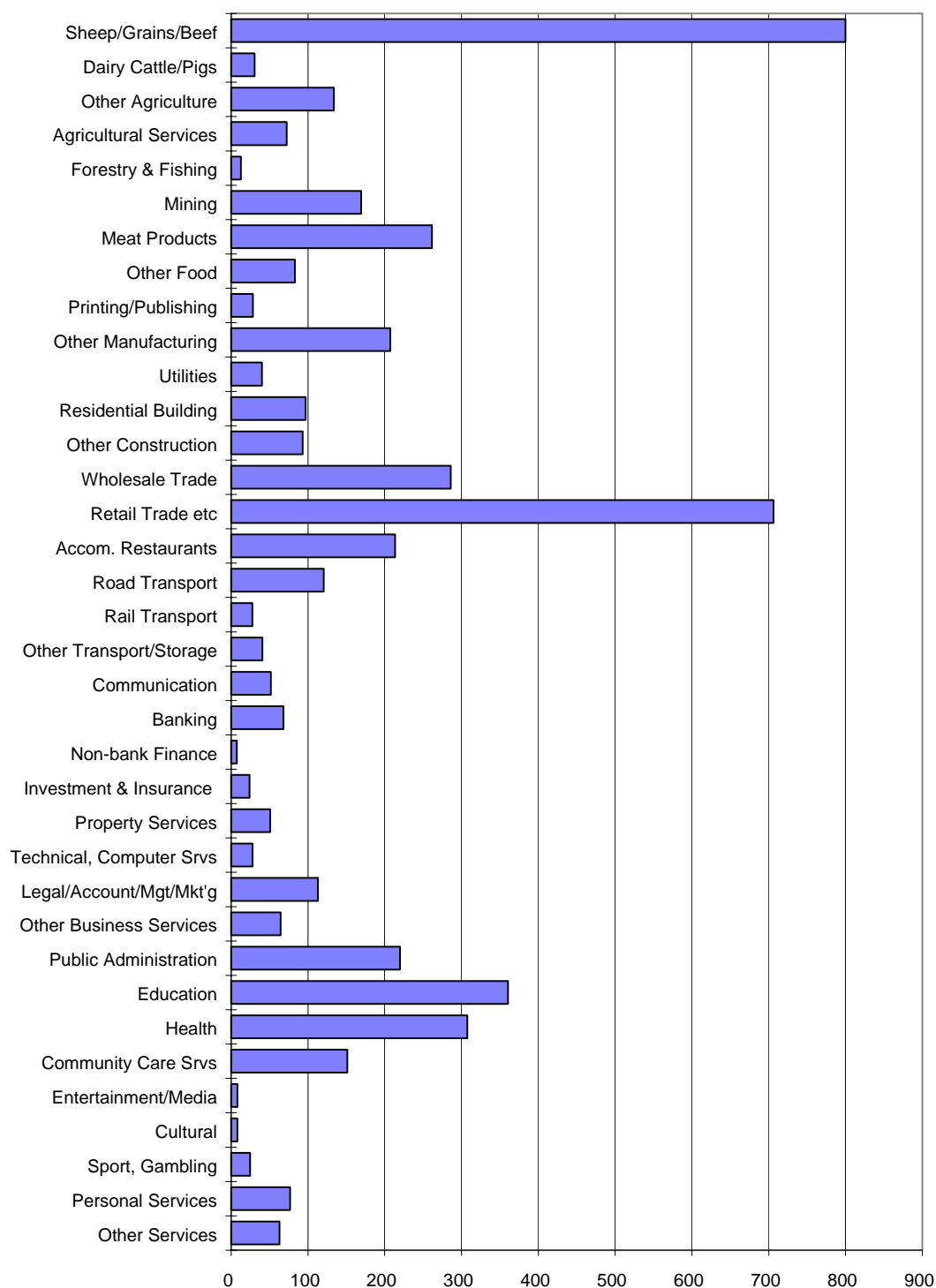
**Figure 60: Summarised Shift-Share Analysis: Gunnedah: 1981- 2001**

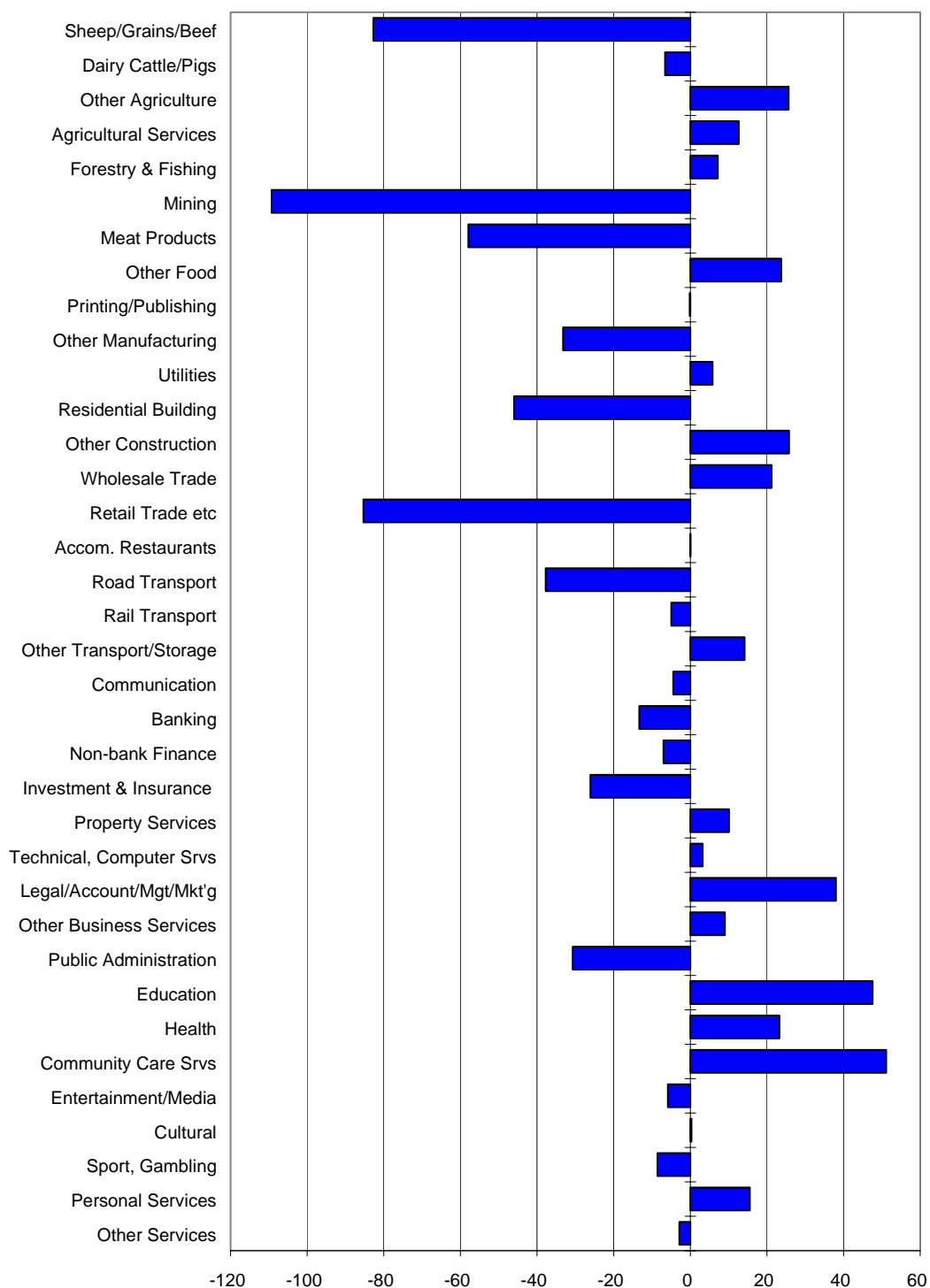


The detailed industry structure of the employment changes in Gunnedah over 1991 to 1996 is shown in Figure 61 through Figure 63. There have been some dramatic structural changes among industries as shown in Figure 62. At the same time there are many sectors that have increased employment and their share of the NSW economy by a small amount. These are pointers toward future growth opportunities.

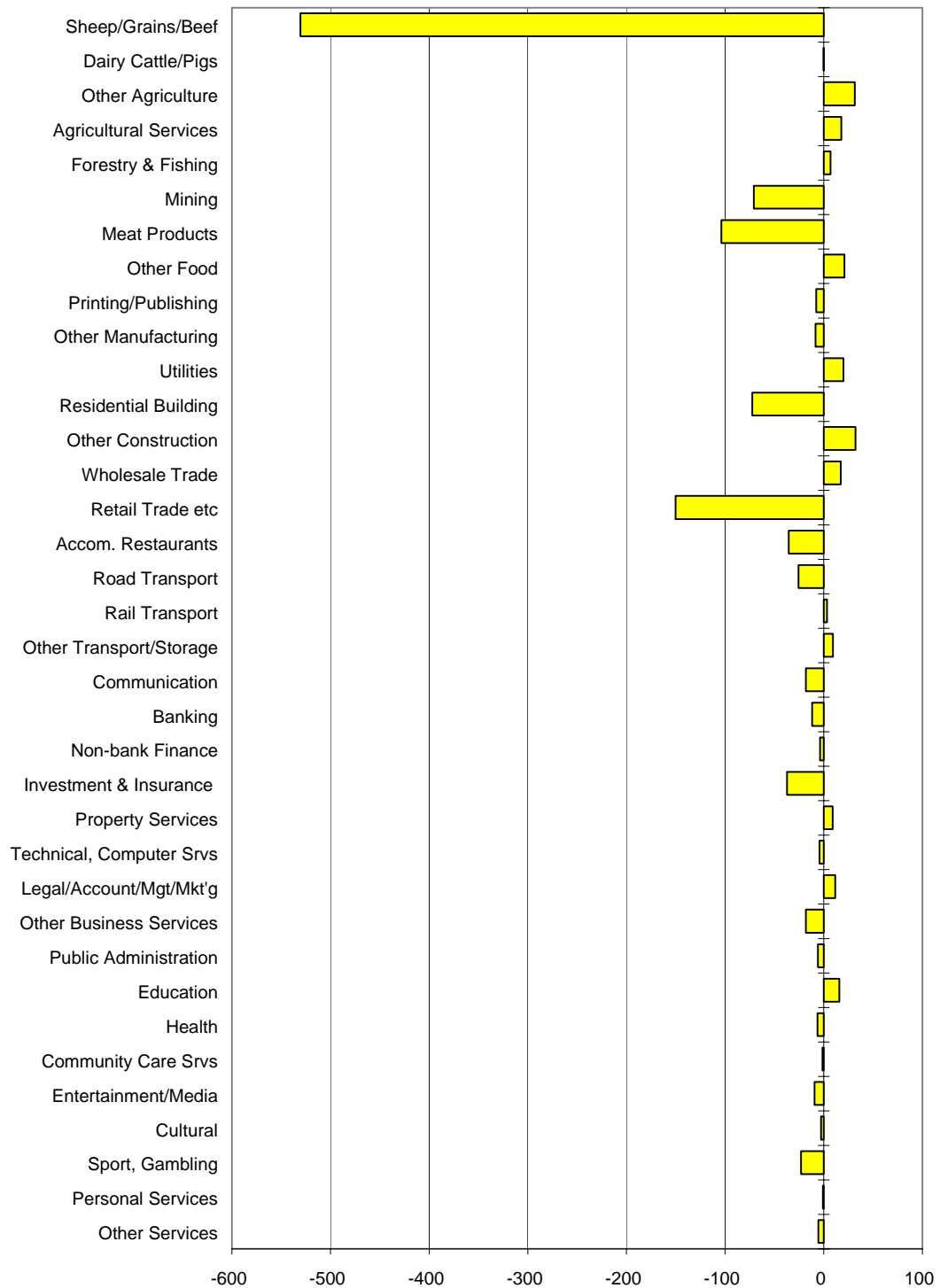
A similar set of information for the 1996 to 2001 period is shown in Figure 64 through Figure 66. These charts show that Gunnedah is a relatively diversified economy and that the dramatic restructuring of industry was mostly completed by 1996. Since then, the main changes have been employment losses from meat processing and coal mining. But there are some significant gains in other agriculture, other manufacturing, construction and road transport. It is likely that the future will build further on the developing industries, although some further adjustments may be triggered by the water reforms that are presently be considered.

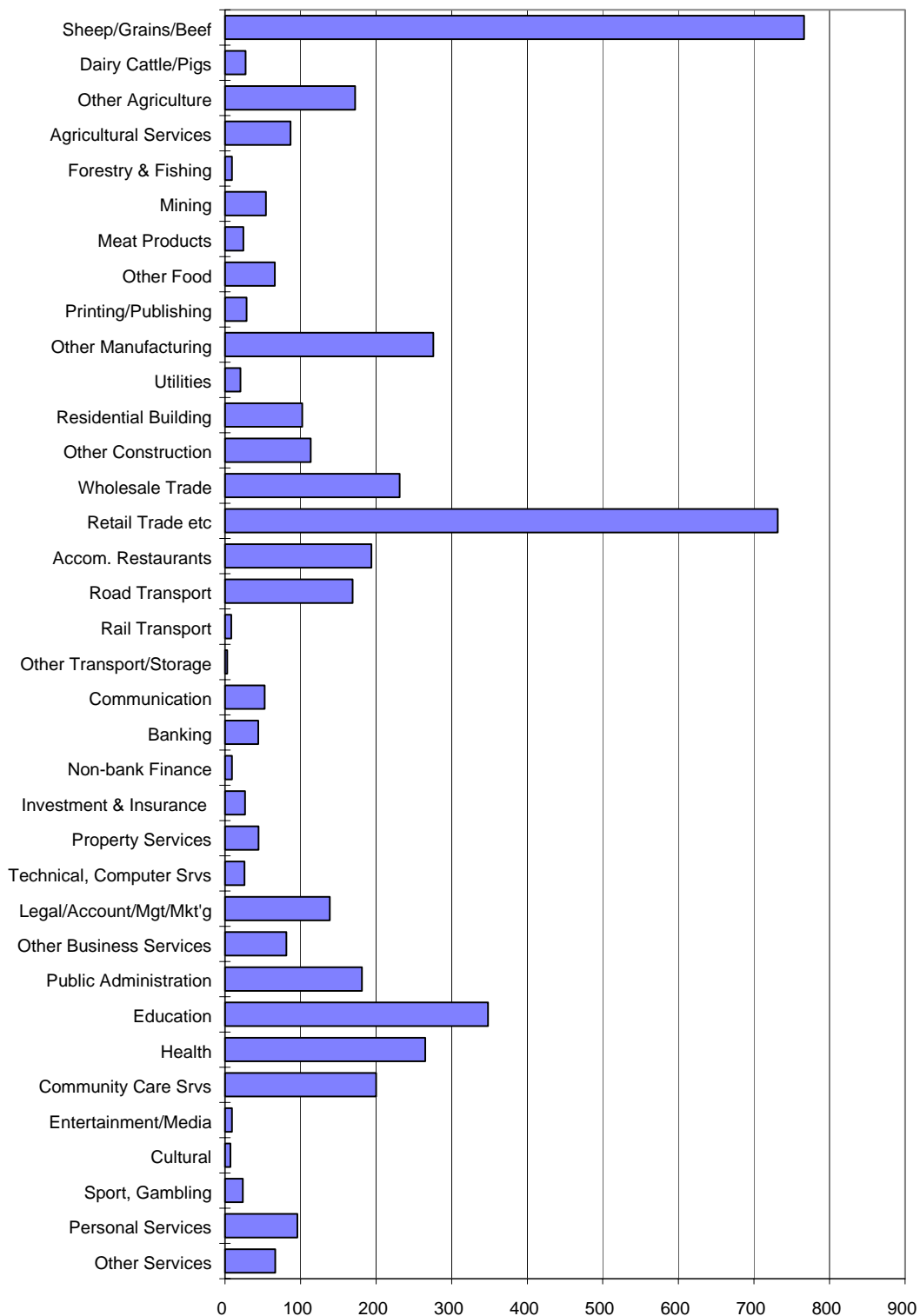
Although Gunnedah itself is not located on the Newell Highway, it will gain benefits from its further development through opening up new market opportunities and bringing more visitors to the town. Other information indicates a positive level of building activity in recent years and the 'koala' factor is a novel promotion idea. They will also benefit from the already well-developed level of service provision and industry diversity, which are among the highest in the region.

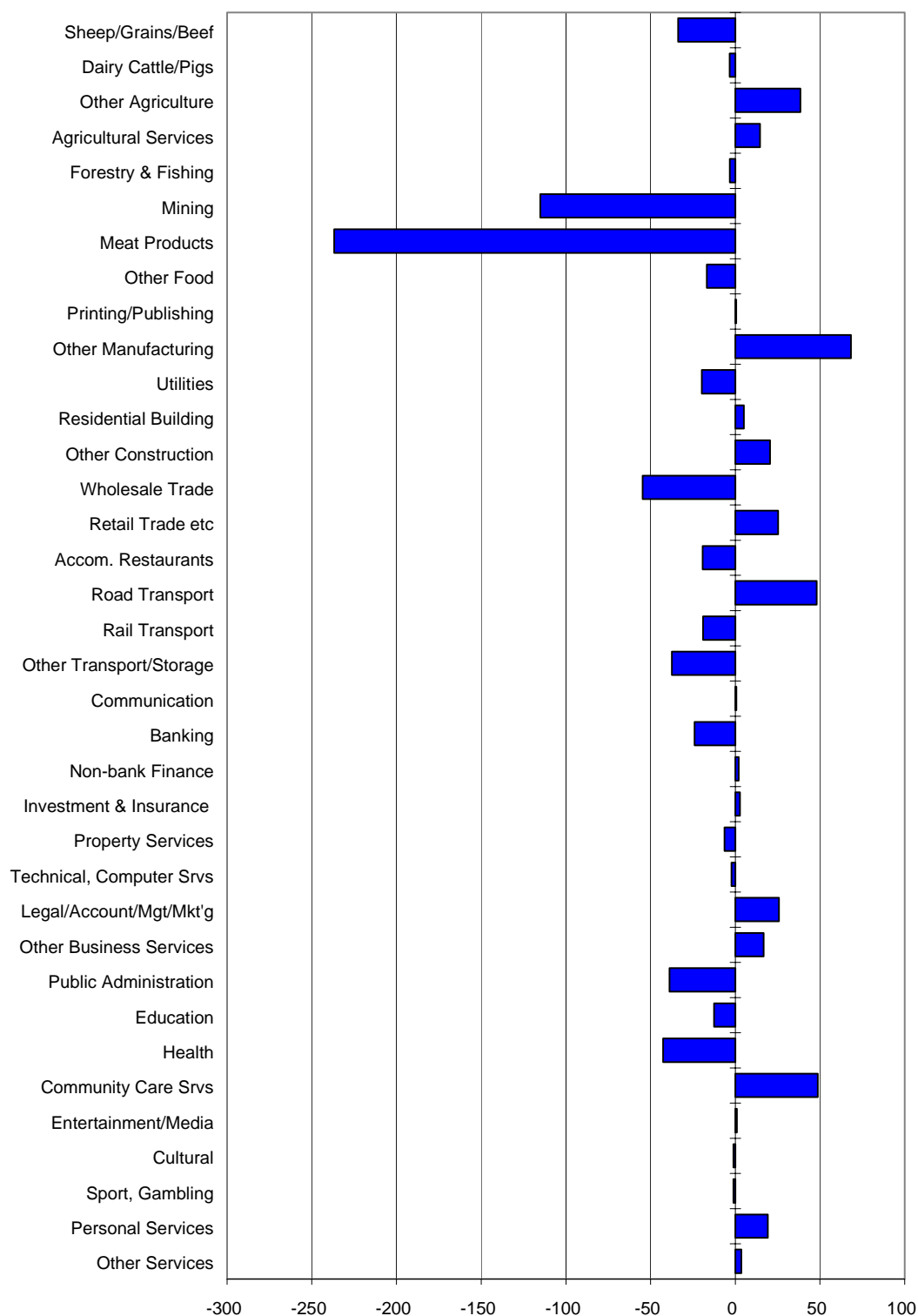
**Figure 61: Employment Distribution by Sector, 1996: Gunnedah**

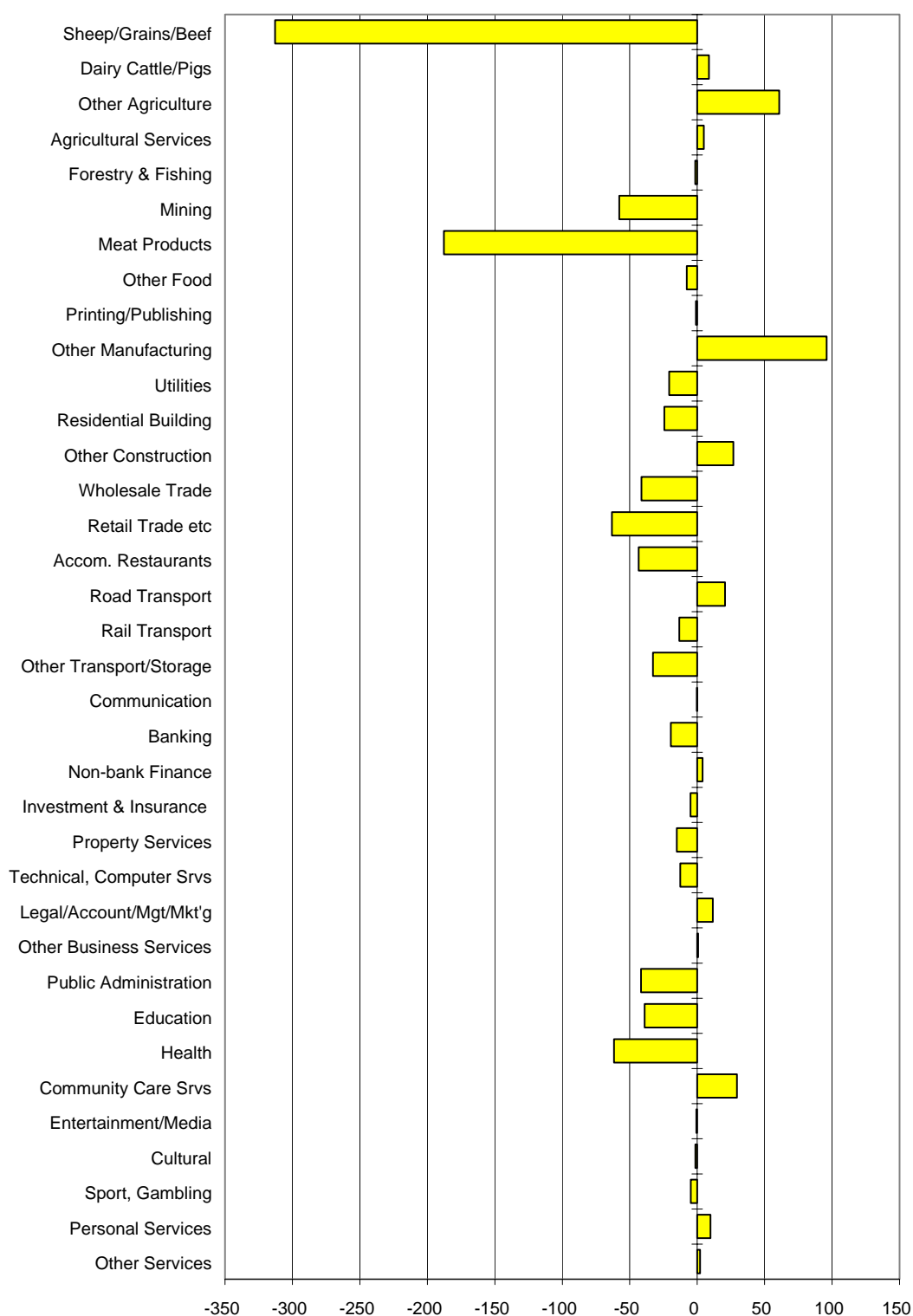
**Figure 62: Total Change in Employment by Sector, 1991-1996: Gunnedah**



**Figure 63: Local Influences on Employment Change, 1991-1996: Gunnedah**

**Figure 64: Employment Distribution by Sector, 2001:Gunnedah**

**Figure 65: Total Change in Employment by Sector, 1996-2001: Gunnedah**

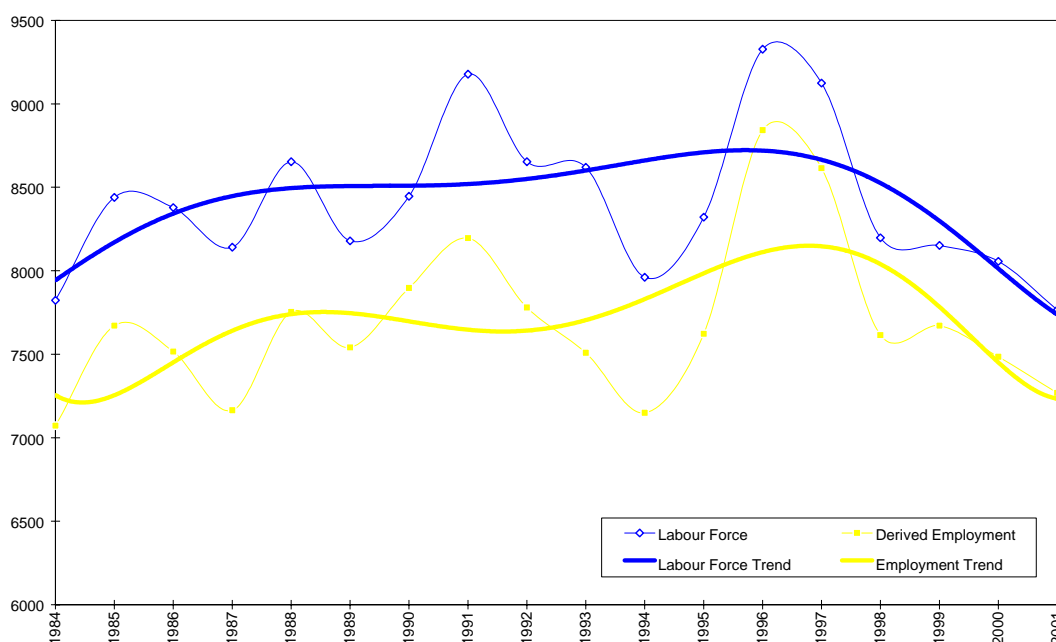
**Figure 66: Local Influences on Employment Change, 1996-2001: Gunnedah**

## 5.12 MOREE PLAINS

Moree Plains shire is one of the few LGAs to have an increase in population between the 1996 and 2001 population censuses. One of the reasons for that was the large losses in employment in the early 1990s as the drought led to reductions in water allocations and cotton production. For much of the 1980s there had been increasing employment built around agricultural development. This is among the most productive shires in Australia in terms of agricultural built around cotton and cereal production and the advantages of being able to grow winter and summer grain crops.

After the recovery in employment following the drought, Moree Plains has experienced loss of jobs as shown in Figure 67 in common with many areas in the BBSB. However, the real levels of employment in Moree Plains as revealed in the population census for 2001 is not as low as shown.

**Figure 67: Labour Force and Employment, Moree Plains**

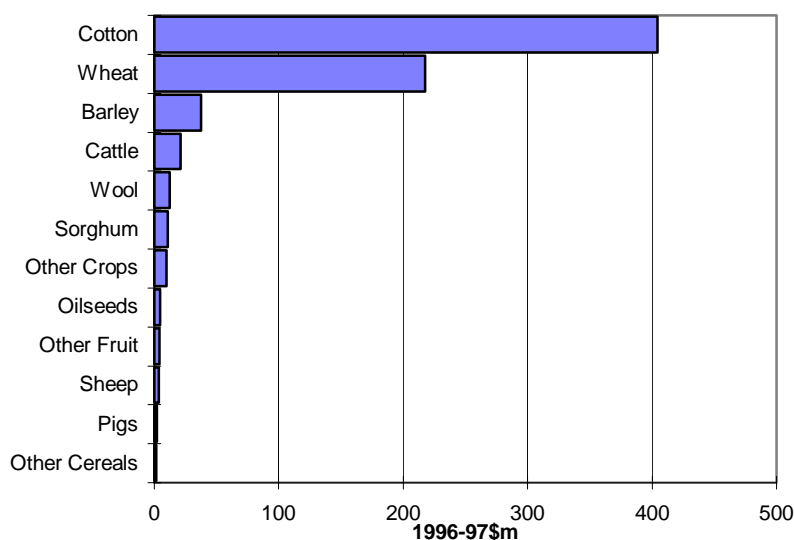


The composition of agricultural production is shown in Figure 68. In that year, cotton and wheat dominated production and the grazing contribution has fallen to a low level. Directly and indirectly, agriculture contributed 50 percent of employment. The concentration on wheat is likely to vary from year to year depending on soil moisture conditions, which is the most important factor in decisions to plant summer and winter cereal crops. The area of cotton is mostly dependent on the amount of irrigation water available to irrigators. However, the adoption of continuous water accounting systems does allow irrigators to carry forward unused allocations. This does allow actions that have an averaging impact over time and so reduces some of the instability arising from irrigation activities.

The LQs shown in Table 21 confirm the agricultural structure noted above, but also highlight the important agricultural services, mechanical repairs and fabrication industries that support cotton production in the main but also cereal production. Apart from those industries, there is little other diversification of industry. There is an unusually high level of employment in the arts, while the community care sector would include some in the CDEP. The level of business

service employment is a little above that for the rest of the BBSB region. It should be noted that the employment shown for cotton textiles is in the statistics but not in reality. This may reflect some misclassification. Note also the loss of employment from oil processing in recent years.

**Figure 68: Composition of Agricultural Production, Moree Plains 1996-97**



**Table 21: Location Quotients, 1981 and 2001: Moree Plains**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Services to agric.; hunting	13.9	9.3	17.8	16.8	<b>17.3</b>	269
Grains	7.1	15.5	16.8	16.4	<b>12.7</b>	995
Textile fibres, yarns etc	0.1	0.3	0.3	0.3	<b>12.3</b>	72
Other agriculture	3.8	6.6	9.3	7.2	<b>8.2</b>	672
Beef cattle	10.3	3.1	3.7	2.9	<b>4.3</b>	86
Oils and fats	24.1	22.4	22.1	19.0	<b>2.2</b>	3
Sheep	5.1	2.1	4.2	2.1	<b>1.8</b>	62
Soft drinks, cordials, syrups	1.9	1.0	1.3	1.7	<b>1.6</b>	8
Mechanical repairs	1.2	1.4	1.3	1.5	<b>1.5</b>	180
Concrete, cement, lime	0.8	1.1	0.6	2.6	<b>1.5</b>	10
Agricultural, mining etc machinery	0.1	0.6	0.4	0.6	<b>1.2</b>	25
Public administration	1.1	1.1	0.9	0.9	<b>1.2</b>	310
Road transport	3.0	1.0	1.0	0.9	<b>1.2</b>	181
Paper bags and products	0.0	0.0	0.0	0.0	<b>1.1</b>	10
Textile products	0.1	0.0	0.9	0.0	<b>1.0</b>	16
Other services	0.7	0.6	1.1	0.9	<b>1.0</b>	124
Wholesale trade	0.9	1.0	1.0	0.9	<b>1.0</b>	368
Community care services	1.0	1.2	1.2	1.1	<b>1.0</b>	169
Other mining	0.3	0.3	0.3	0.0	<b>1.0</b>	6
Gas	0.0	0.0	0.4	0.0	<b>1.0</b>	3
Education	0.9	0.8	0.8	0.9	<b>0.9</b>	463
Accom. & restaurants	1.3	1.2	1.1	1.0	<b>0.9</b>	307
Legal, accounting srvs	0.6	0.6	0.6	0.7	<b>0.9</b>	220
Retail trade	1.0	1.0	0.9	1.0	<b>0.8</b>	766
Personal services	0.8	0.7	0.7	0.8	<b>0.7</b>	97
Banking	0.9	0.8	0.7	0.8	<b>0.7</b>	82
Other property services	0.5	0.5	0.5	0.5	<b>0.6</b>	65

The analysis of employment trends 1991 to 1996 has to be viewed in the light of the drought effects on 1996 employment. That is evident in the very large local component shown in Table 22. The local drought impacts are the most important effect given that the state and industry mix factors are positive. There has been a large loss of jobs in total despite the potential to share in some of the NSW growth.

The analysis of the trends over 1996 to 2001 is summarised in Table 23. In this period, the state effects are still positive although not to the same extent as in the previous period. The local factors are negative but at a modest level so that there is a significant growth in employment indicated for this period.

**Table 22: Summarised Shift-Share Analysis 1991-96: Moree Plains**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	466	1,089	1,555	276	1,830
Negative Effects	-	(647)	(647)	(1,791)	(2,438)
<b>Total Effects</b>	<b>466</b>	<b>441</b>	<b>907</b>	<b>(1,515)</b>	<b>(608)</b>

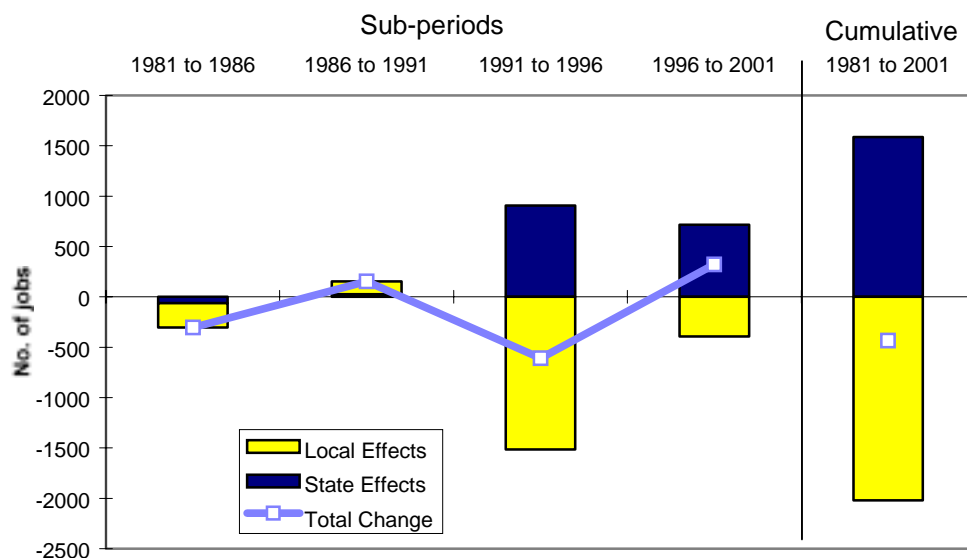
**Table 23: Summarised Shift-Share Analysis 1996-2001: Moree Plains**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	489	590	1,079	663	1,742
Negative Effects	-	(362)	(362)	(1,057)	(1,419)
<b>Total Effects</b>	<b>489</b>	<b>228</b>	<b>717</b>	<b>(394)</b>	<b>323</b>

The unusual nature of 1996 is also evident from Figure 69 where the large negative in the early 1990s contrast markedly with the previous periods of development. This chart presents a positive image for Moree Plains that is generally on an increasing employment path that was interrupted in a dramatic way in the mid-1990s.

Further detail of employment change in the 1991 to 1996 period is given in Figure 70 through Figure 72. The employment composition highlights the importance of agriculture and the retail sector. Moree is a significant retail sector by way of the western areas that it serves and the relatively long distances to other centres. There is also more employment in business services (transport to other business services) compared with other LGAs in the region.

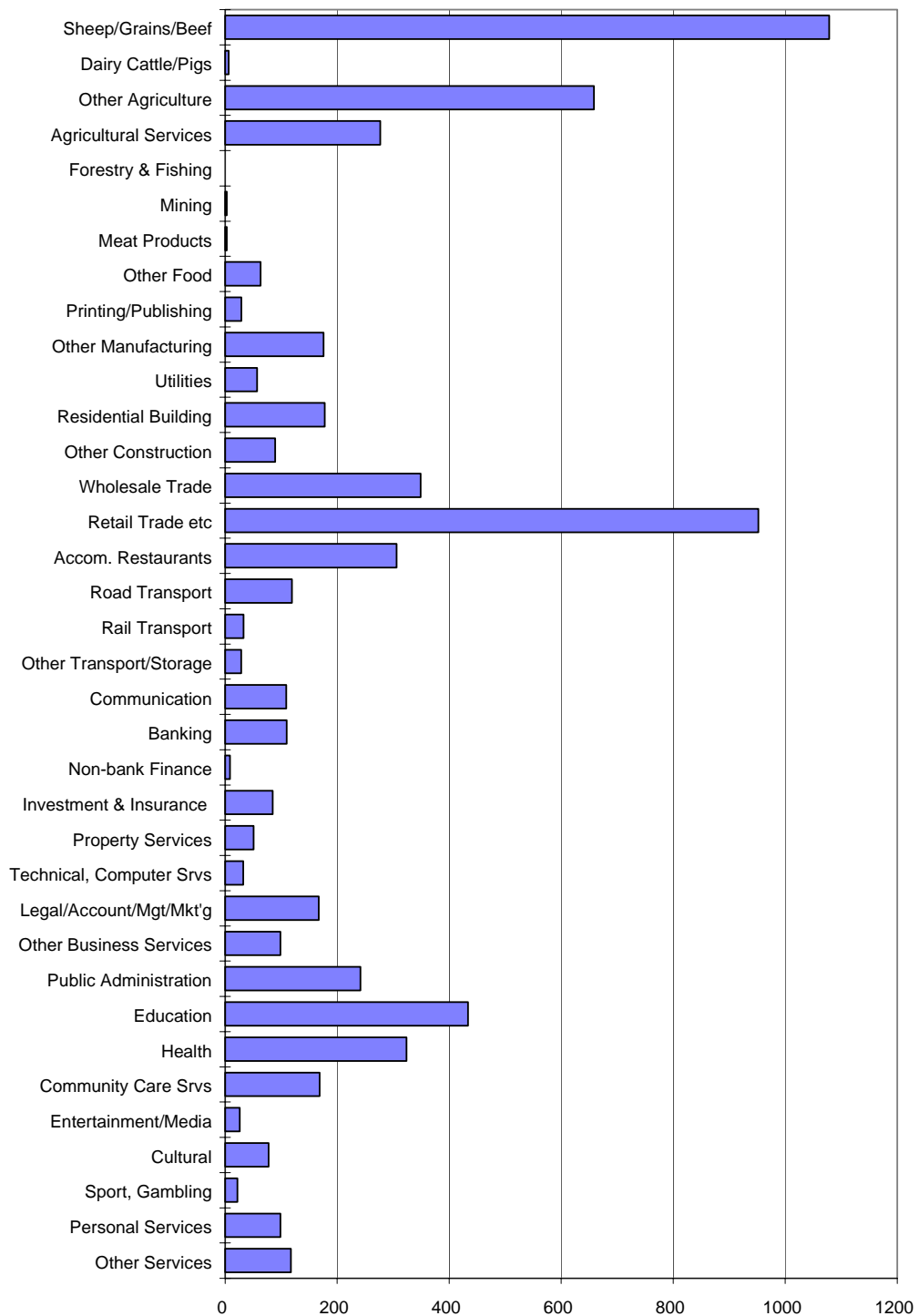
The change in employment 1991 to 1996 shown in Figure 71 shows widespread losses and some services growth, mostly in services that have little direct links to agriculture. That would be consistent with widespread reductions in business and household expenditure associated with the drought. When those changes are related to the trends in NSW as a whole in Figure 72, there are not many areas of growth. There are large losses in agriculture and in construction, wholesale trade (includes agricultural marketing activities) retail trade, accommodation, transport and communications. All of those declines would have been consistent with a decline in agriculture because of drought.

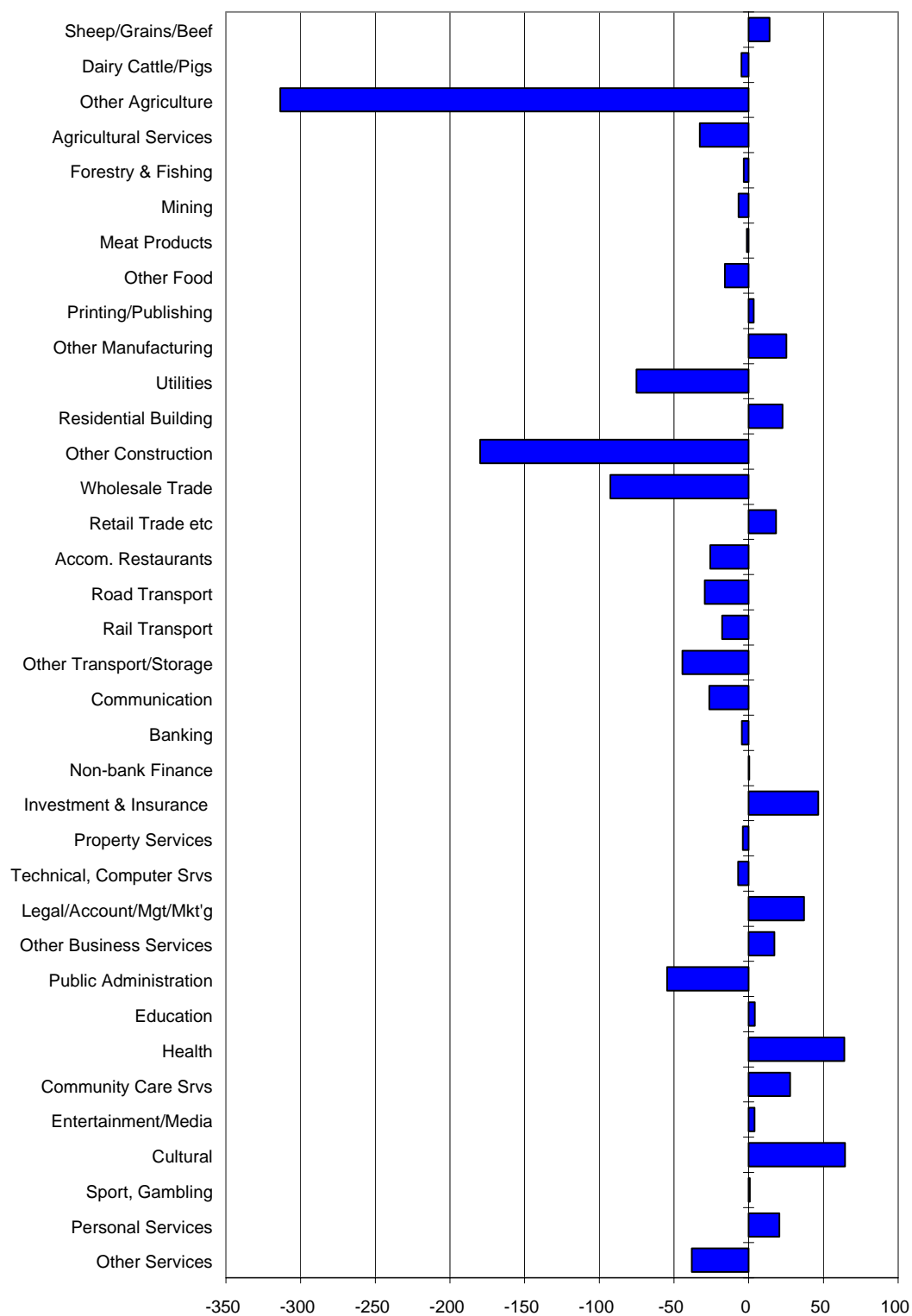
**Figure 69: Summarised Shift-Share Analysis: Moree Plains: 1981- 2001**

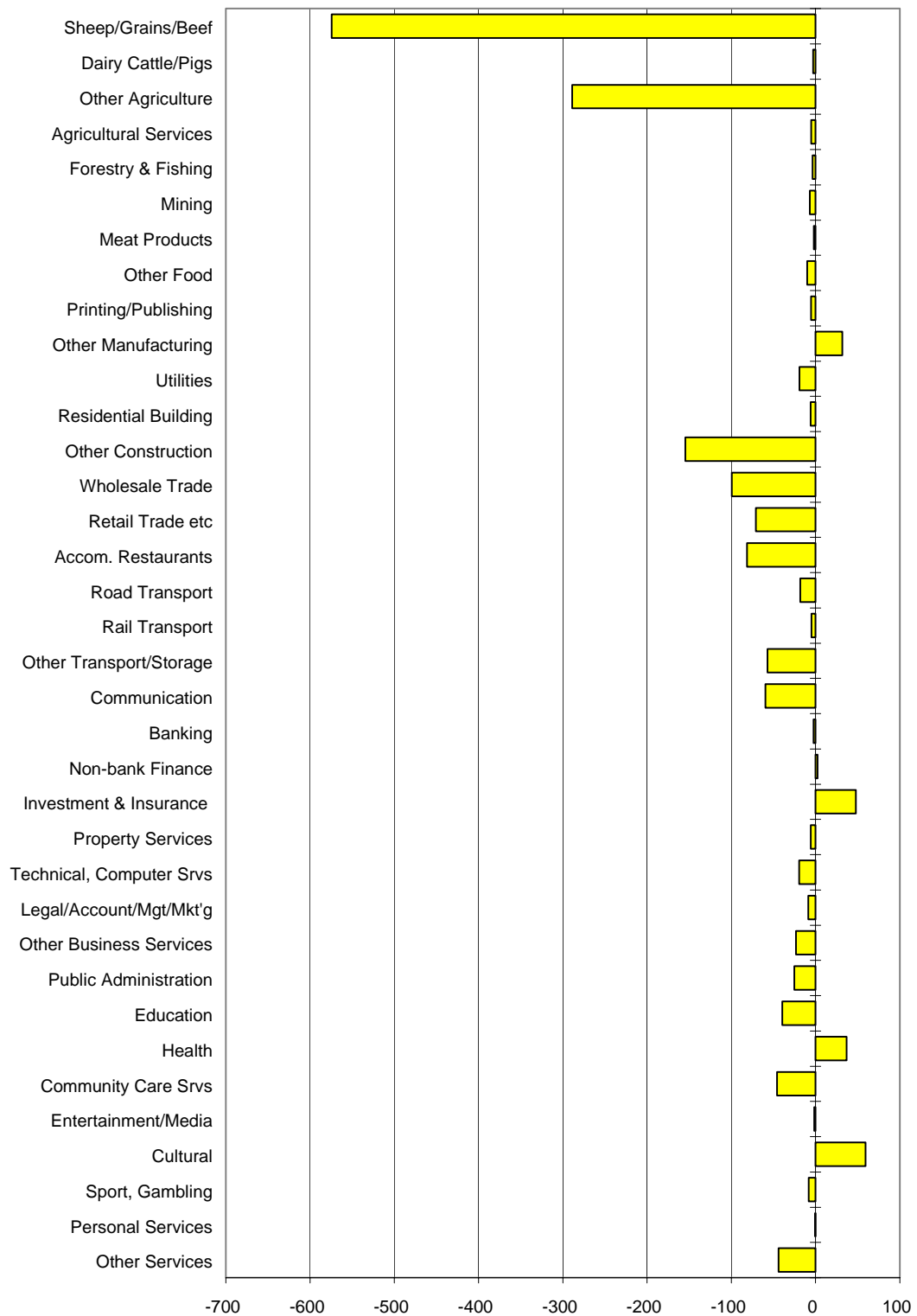
Over the 1996 to 2001 period a very different pattern emerges as indicated by Figure 73 through Figure 75. As indicated in Figure 74, there are widespread and substantial increases in employment. These include manufacturing (but probably less than shown because of the non-existence of cotton textile production) building and construction, transport and business services. Many of these represent a growth in market share and point to further development potential.

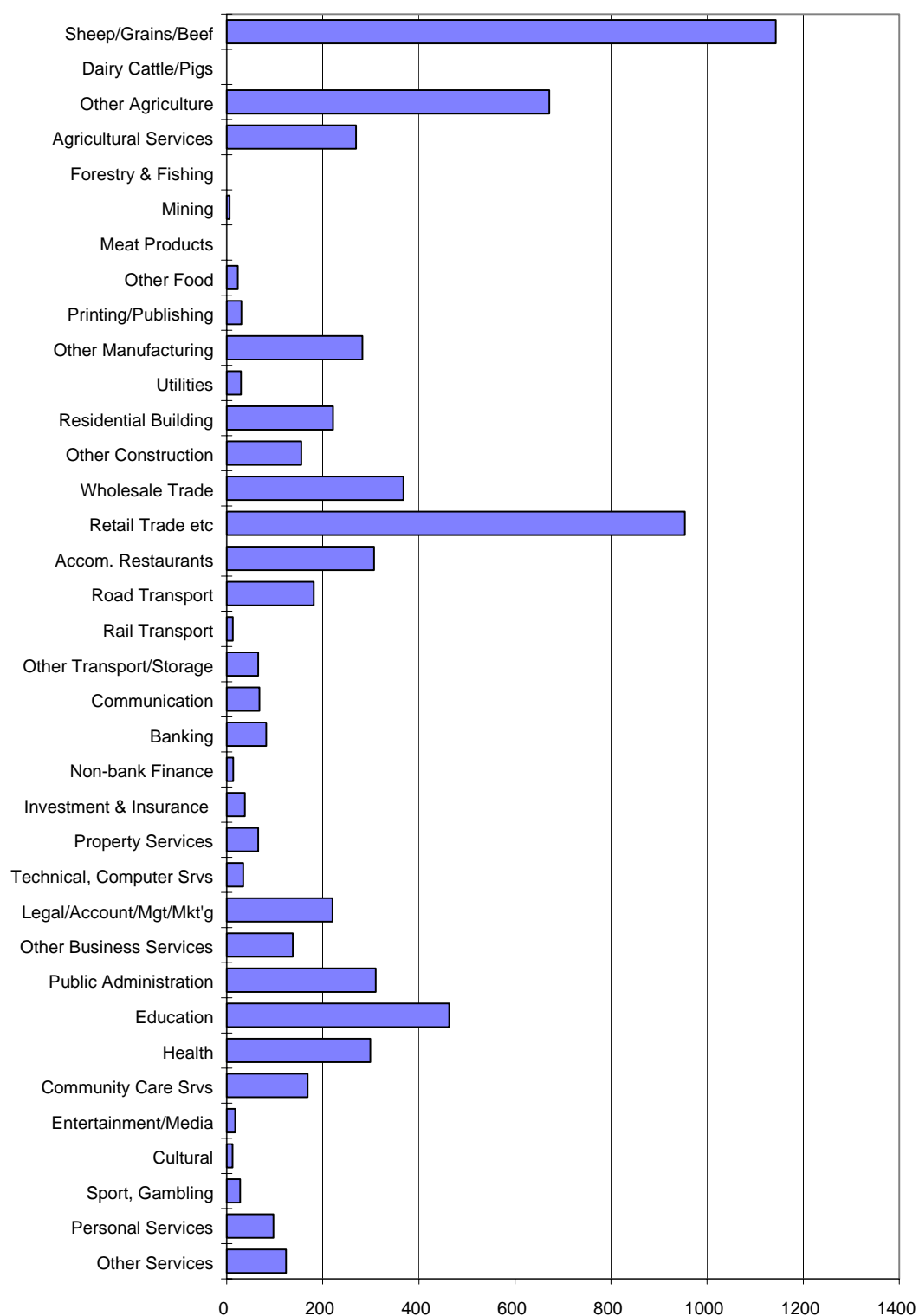
Moree lies on the Newell corridor and will benefit from those developments. There are initiatives already in place to improve the transport linkages to Brisbane. That will nurture further development of the already considerable trade in that direction. Moree Plains has one of the highest levels of income in the BBSB. Investment in building and construction has been increasing at the end of the 1990s and the level of visitation has probably increased relative to 1996 to raise the importance of the accommodation and restaurant activity in the LGA. The level of service delivery and the proportion of employment in business services are among the highest in the BBSB.

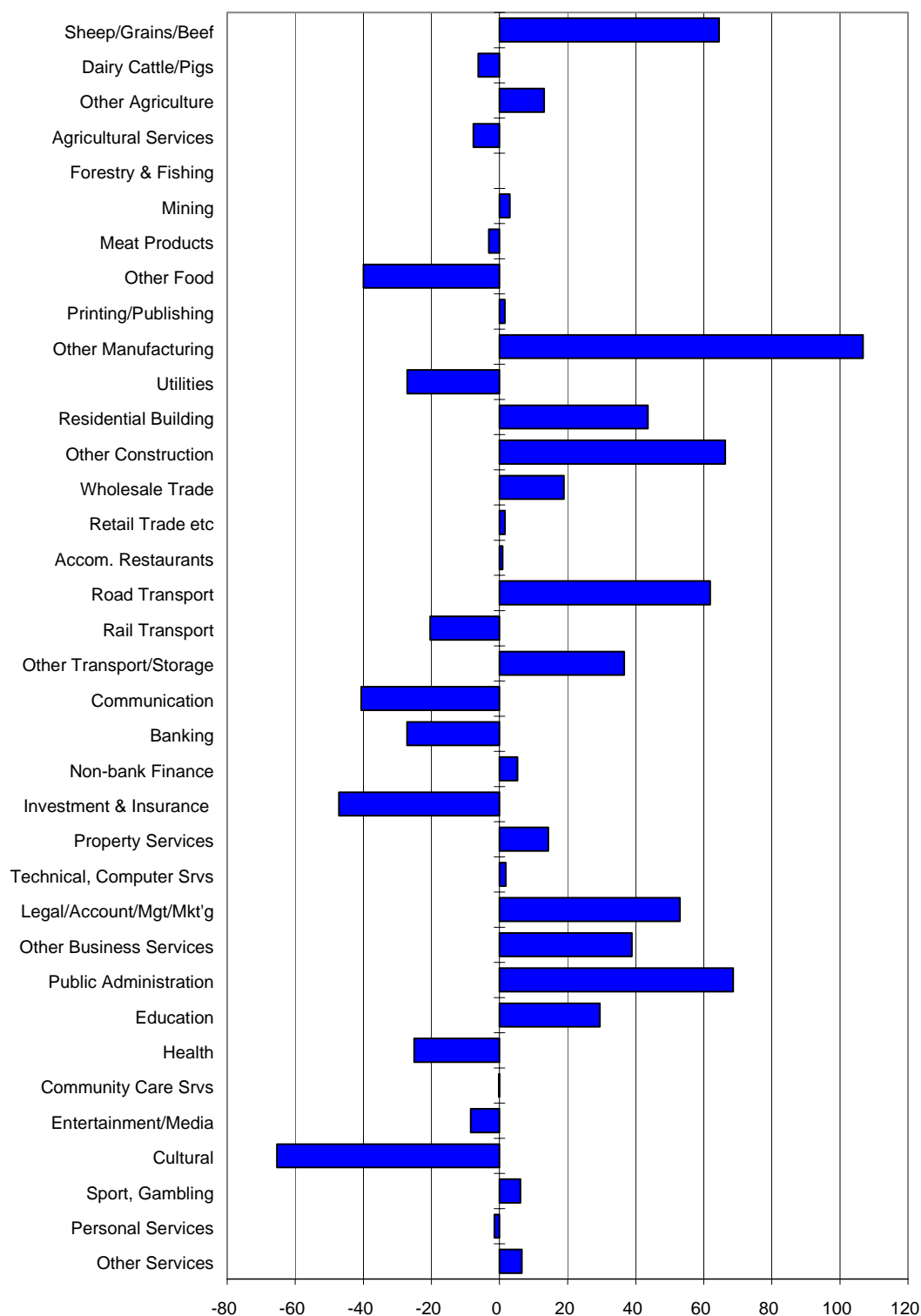


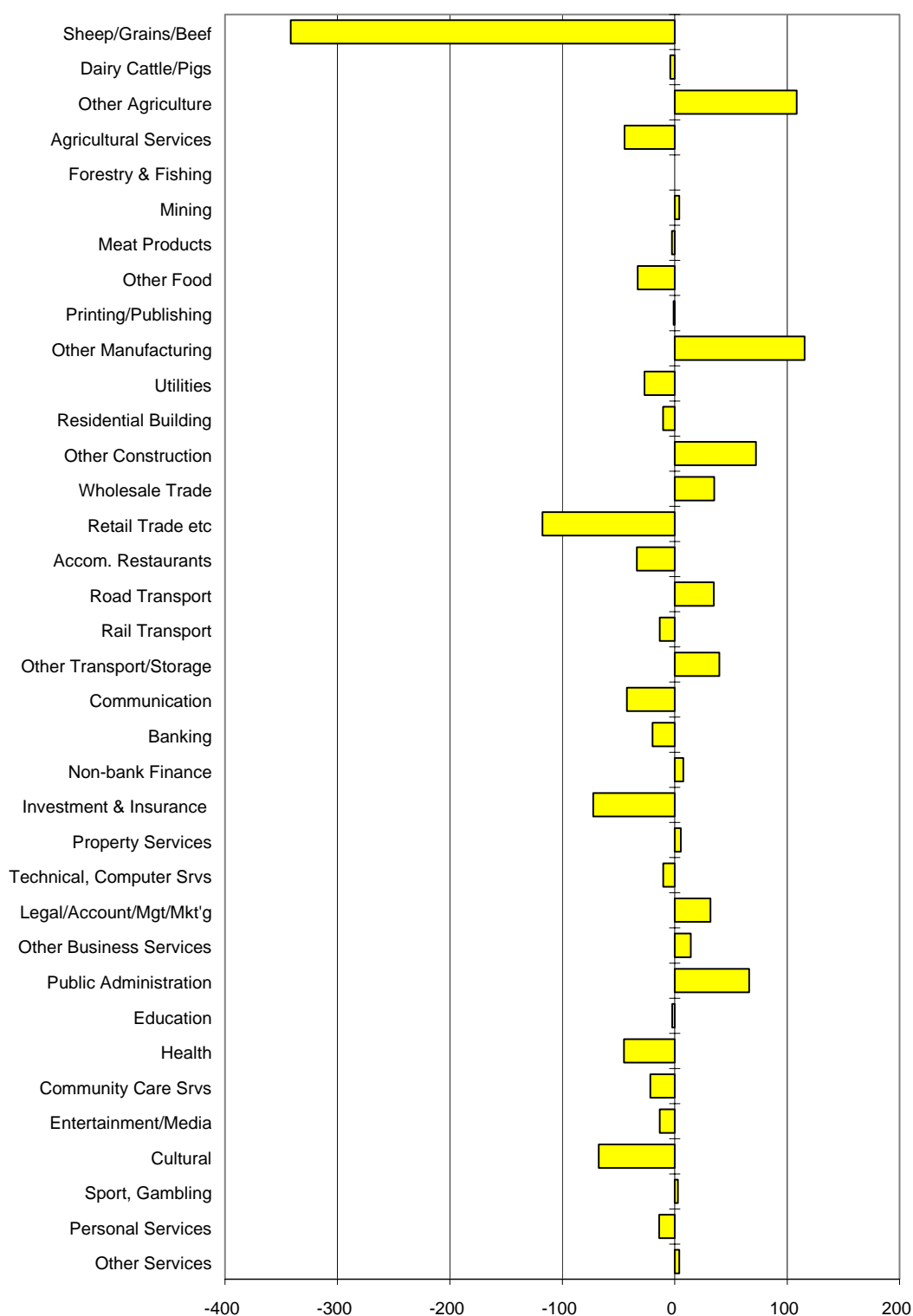
**Figure 70: Employment Distribution by Sector, 1996: Moree Plains**

**Figure 71: Total Change in Employment by Sector, 1991-1996: Moree Plains**

**Figure 72: Local Influences on Employment Change, 1991-1996: Moree Plains**

**Figure 73: Employment Distribution by Sector, 2001: Moree Plains**

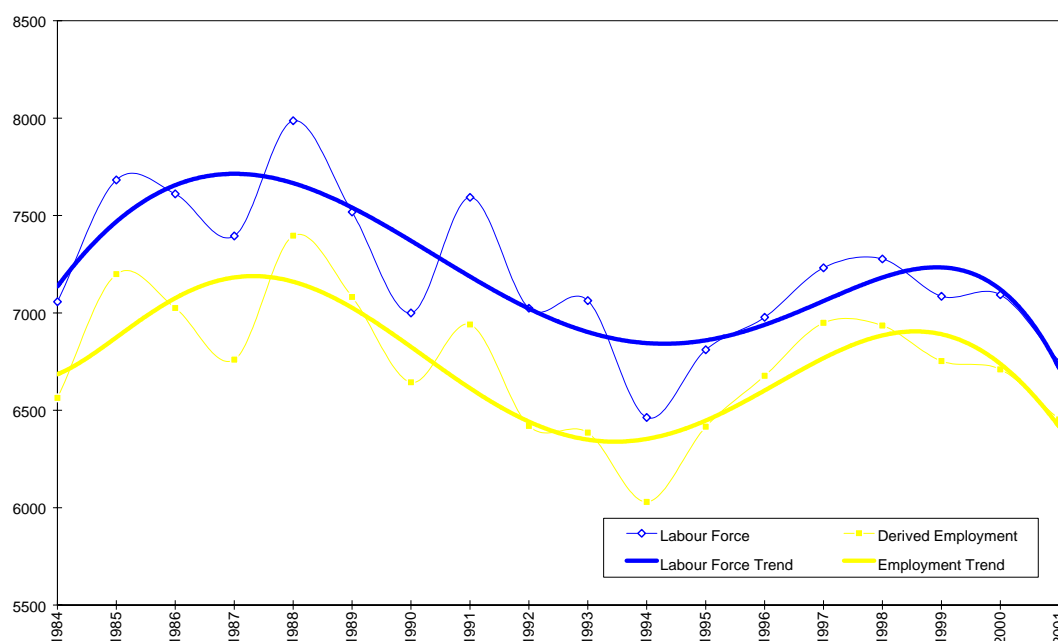
**Figure 74: Total Change in Employment by Sector, 1996-2001: Moree Plains**

**Figure 75: Local Influences on Employment Change, 1996-2001: Moree Plains**

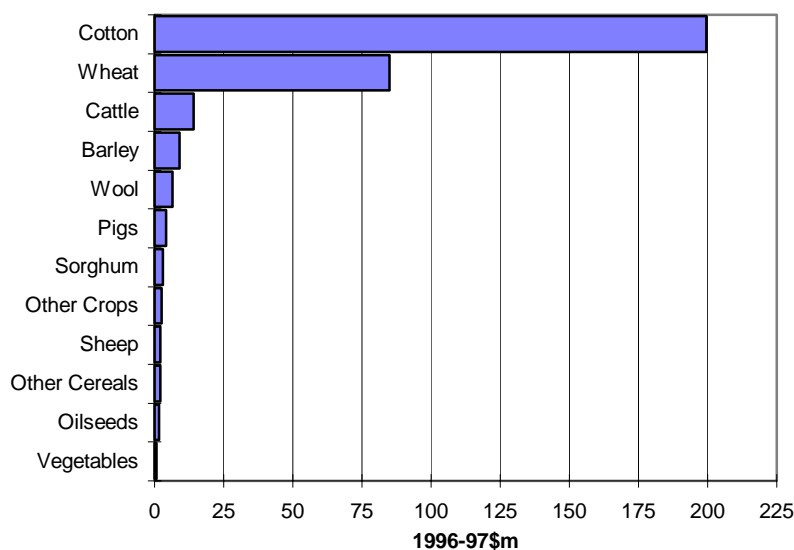
### 5.13 NARRABRI

Narrabri has some similarities to Moree Plains, as it is also an area of major irrigated agriculture and one of the largest LGAs in terms of agricultural production. However, it reached maturity in terms of irrigation development earlier than Moree Plains. The employment trend shown in Figure 76 has been downward since the mid 1980s while the post-drought growth in employment was not as pronounced as in Moree. The most recent trend shows declining employment and a reduction in the level of unemployment. However, the 2001 population census indicates that employment increased between 1996 and 2001.

**Figure 76: Labour Force and Employment, Narrabri**



**Figure 77: Composition of Agricultural Production, Narrabri**



The composition of agricultural production is similar to that of Moree Plains with cotton and wheat being the most important. This is illustrated in Figure 77, although a large array of activities is possible. Both summer and winter cereal production is possible depending on the level of soil moisture at sowing time. There is a small level of intensive livestock operations that add value to the cereals produced and diversifies the economy. Agriculture directly and indirectly accounted for almost 60 percent of employment in Narrabri.

The industry structure of Narrabri shown by the LQs in Table 24 indicates many industries that have values greater than 1.0. Narrabri also includes a significant part of the forestry and timber industry of the BBSB. Other notable activities are the processing of oils, road and rail transport, mechanical repairs and electricity (distribution), although some have declined in recent years.. Like Moree, transport, mechanical repairs and metal products support the large agriculture industries. The main national research facilities for cotton in Australia are located in Narrabri shire and boost the importance of the technical and research sector. Narrabri is also located on the Newell corridor and has activities related to servicing traffic along that route. As a result, the accommodation sector is relatively important.

**Table 24: Location Quotients, 1981 and 2001: Narrabri**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Oils and fats	39.6	18.4	28.7	53.7	<b>23.6</b>	32
Textile fibres, yarns etc	0.0	0.3	0.2	2.7	<b>22.4</b>	118
Services to agric.; hunting	19.4	27.7	21.5	15.1	<b>15.3</b>	211
Pigs	8.3	10.0	13.5	11.3	<b>11.1</b>	31
Grains	7.3	11.9	8.9	12.8	<b>10.1</b>	705
Other agriculture	6.4	6.3	7.2	7.1	<b>7.3</b>	532
Beef cattle	7.4	3.6	10.7	4.1	<b>6.2</b>	111
Sawmill products	2.6	1.5	2.5	3.0	<b>2.9</b>	30
Sheet metal products	0.4	0.8	1.1	1.8	<b>2.4</b>	18
Sheep	3.7	1.8	2.7	2.4	<b>2.2</b>	66
Rail & other transport	1.9	2.1	2.7	3.2	<b>1.9</b>	46
Road transport	3.6	1.3	1.4	1.4	<b>1.7</b>	233
Mechanical repairs	1.2	1.3	1.5	1.6	<b>1.6</b>	169
Electricity	1.6	1.9	2.0	3.0	<b>1.2</b>	33
Agricultural, mining etc machinery	0.1	0.7	2.4	0.6	<b>1.1</b>	22
Leather and leather products	0.7	0.0	0.8	0.8	<b>1.1</b>	3
Soap and detergents	0.0	0.0	0.0	0.0	<b>1.1</b>	3
Transport srvs, storage	0.3	1.3	0.9	1.0	<b>1.1</b>	70
Forestry and logging	2.3	1.1	1.1	2.6	<b>1.1</b>	9
Wholesale trade	0.8	0.9	0.8	0.8	<b>1.1</b>	348
Non-bank finance	0.1	0.3	0.2	0.4	<b>1.0</b>	15
Prefabricated buildings	0.0	0.0	0.0	0.0	<b>1.0</b>	3
Accom. & restaurants	1.2	1.2	1.0	1.0	<b>1.0</b>	309
Retail trade	0.8	0.8	0.9	0.8	<b>0.9</b>	724
Scientific research etc	1.2	1.3	1.2	1.0	<b>0.9</b>	169
Community care services	0.5	1.1	0.8	0.9	<b>0.8</b>	129
Education	0.8	0.8	0.8	0.9	<b>0.8</b>	360
Other property services	0.3	0.4	0.4	0.5	<b>0.5</b>	50
Legal, accounting srvs	0.5	0.4	0.4	0.4	<b>0.6</b>	132

The analysis of employment trends shown in Table 25 indicates a different pattern from that of Moree plains. The employment losses over 1991 to 1996 were not significant. This would appear to have been due to less severe drought effects, some of which would be attributable to



the higher level of reliability of water supply from ground water. In other respects, the irrigation development was mature and the influence of agricultural trends toward less employment was already apparent in the latter years of the 1980s. The net result was a smaller loss of employment in the early 1990s than in the late 1980s.

The results of the 1996 to 2001 analysis of employment change shown in Table 26 reveals a similar pattern to the earlier period. Like Moree, the influence of negative local effects are considerably less so as to leave a net increase in employment in this period.

**Table 25: Summarised Shift-Share Analysis 1991-96: Narrabri**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	391	657	1,048	352	1,400
Negative Effects	-	(637)	(637)	(882)	(1,519)
<b>Total Effects</b>	<b>391</b>	<b>20</b>	<b>411</b>	<b>(530)</b>	<b>(119)</b>

**Table 26: Summarised Shift-Share Analysis 1996-2001: Narrabri**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	439	459	898	581	1,480
Negative Effects	-	(443)	(443)	(803)	(1,246)
<b>Total Effects</b>	<b>439</b>	<b>16</b>	<b>455</b>	<b>(221)</b>	<b>234</b>

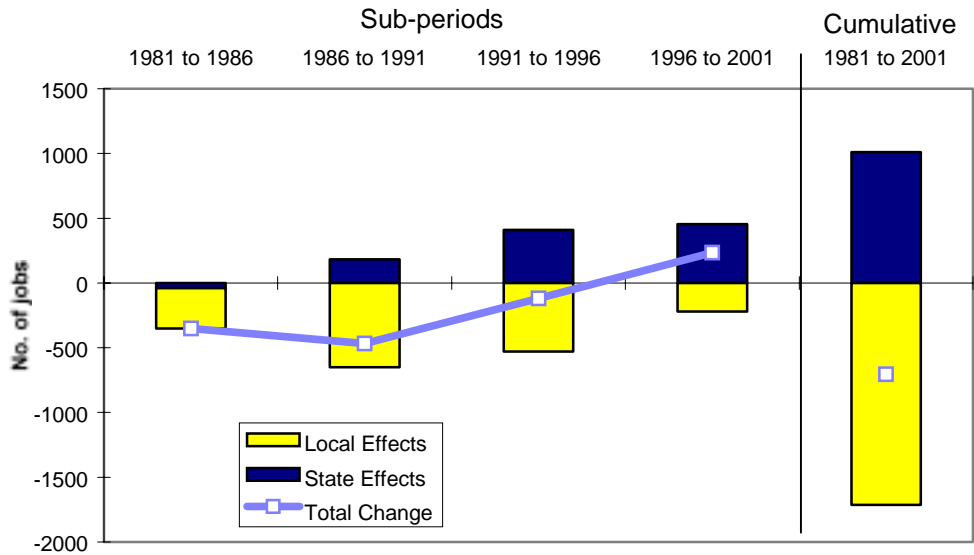
The analysis of employment change over the past 20 years is shown in Figure 78. In this case, the worst period was the second half of the 1980s, which was a period of strong growth in NSW. Since then, there has been an improving trend in the level of employment resulting in an increase in employment in recent years.

Further analysis of the employment trends from 1991 to 1996 is provided in Figure 79 through Figure 81. The employment distribution indicates the presence of most industry categories similar to Moree Plains but with a little more importance to utilities and other construction. Personal services are notably weak. The dominance of agriculture and its linked activities and retail trade is apparent. There has been a substantial amount of industry restructuring as shown in Figure 80. There is significant growth in some business services, other construction, other food, accommodation and restaurants and community care (may included CDEP employment). There were also some large losses outside of agriculture including rail transport, utilities, residential building and banking and finance. Further losses continued in utilities under the rationalisation of the electricity distribution system in NSW.

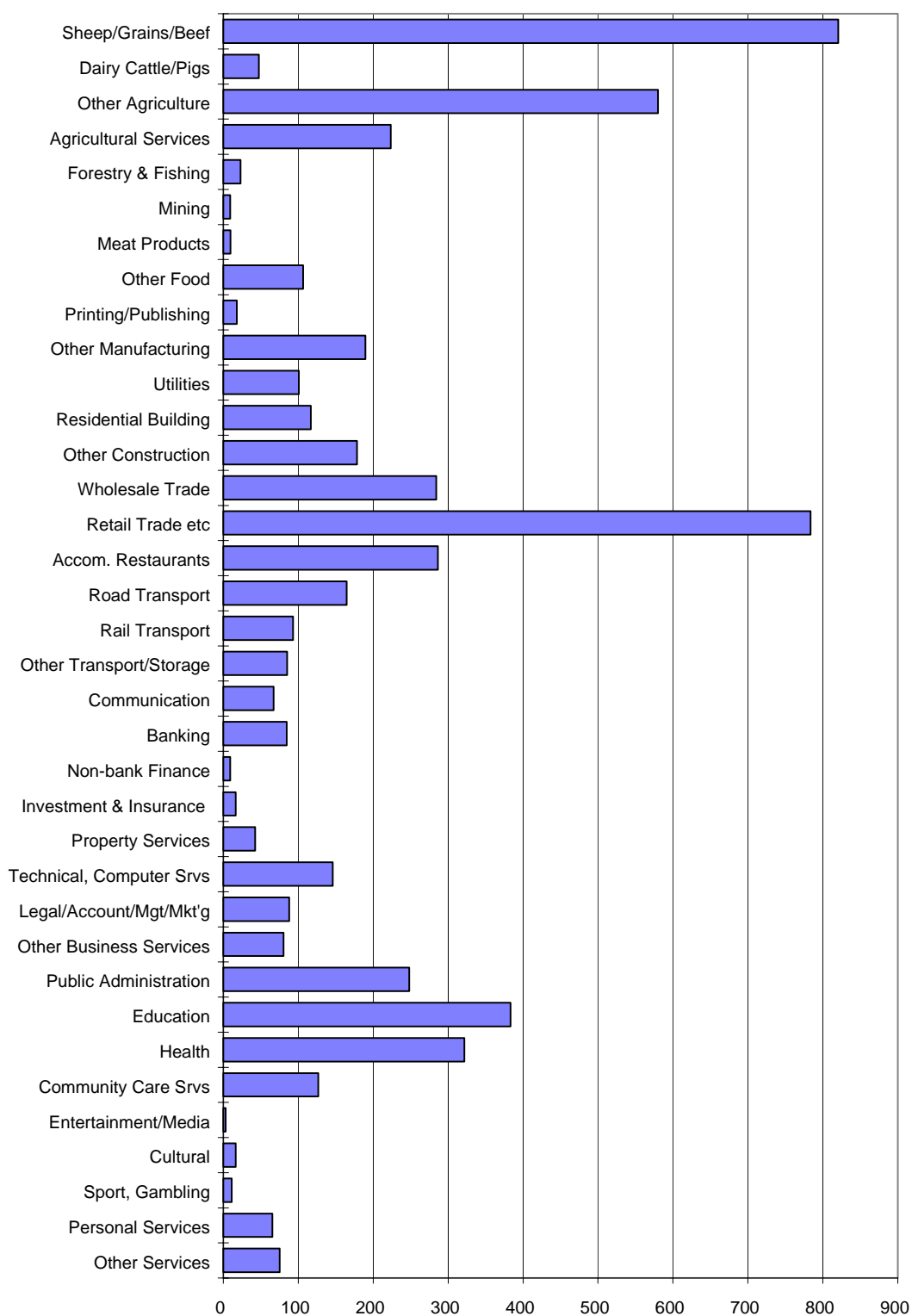
A similar set of results for the 1996 to 2001 period is shown in Figure 82 through Figure 84. This indicates that the industry restructuring has been continuing with significant growth in the residential building trade, accommodation and transport sectors as well as some areas of business services (discounting the cotton textile manufacturing within other manufacturing). A number of these growth areas have translated through to an increase in market share and

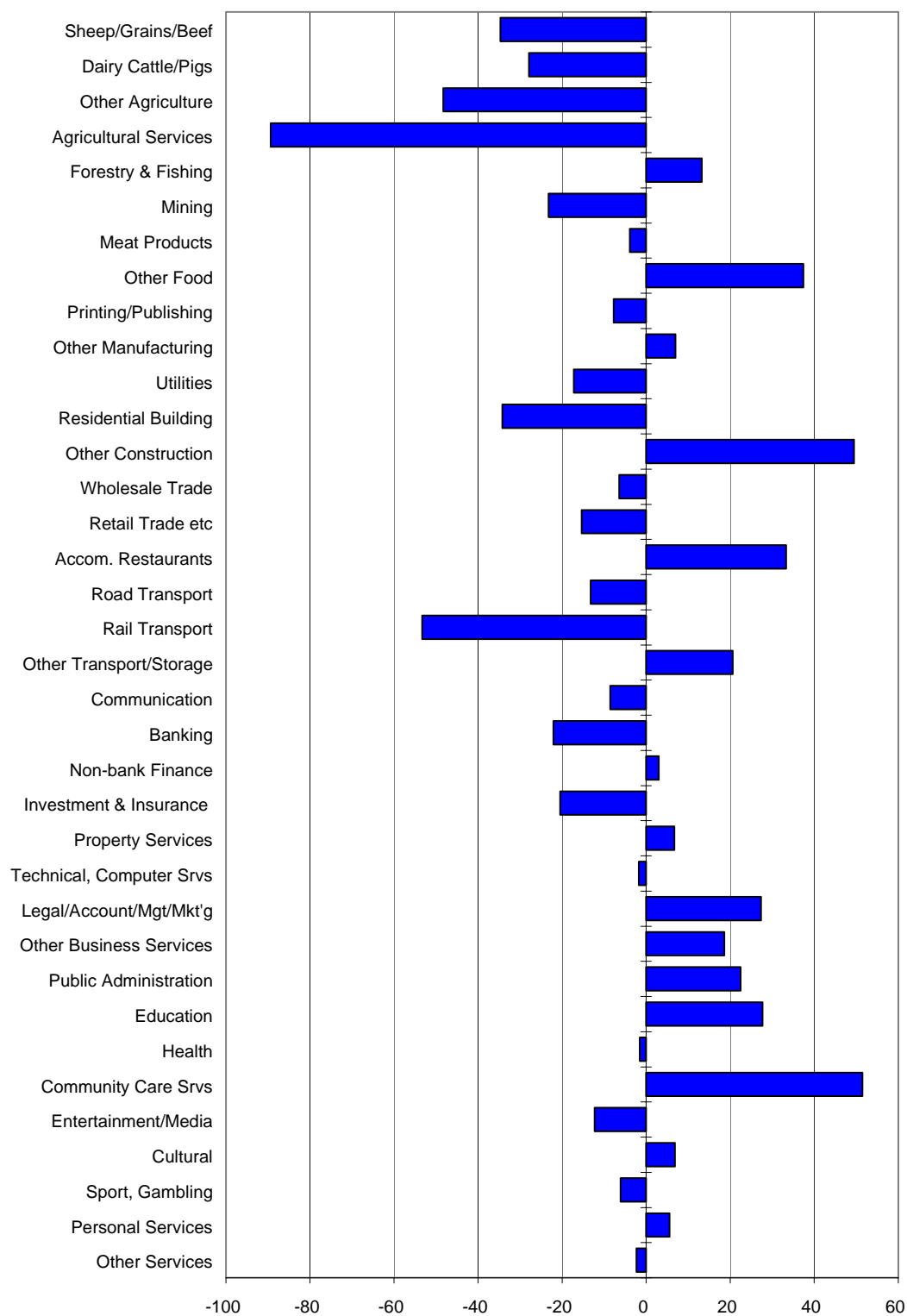
suggests that there is a platform for further growth. Narrabri is one of the areas in the BBSB that can claim to have diverse economy, good service delivery levels and among the highest level of business service employment.

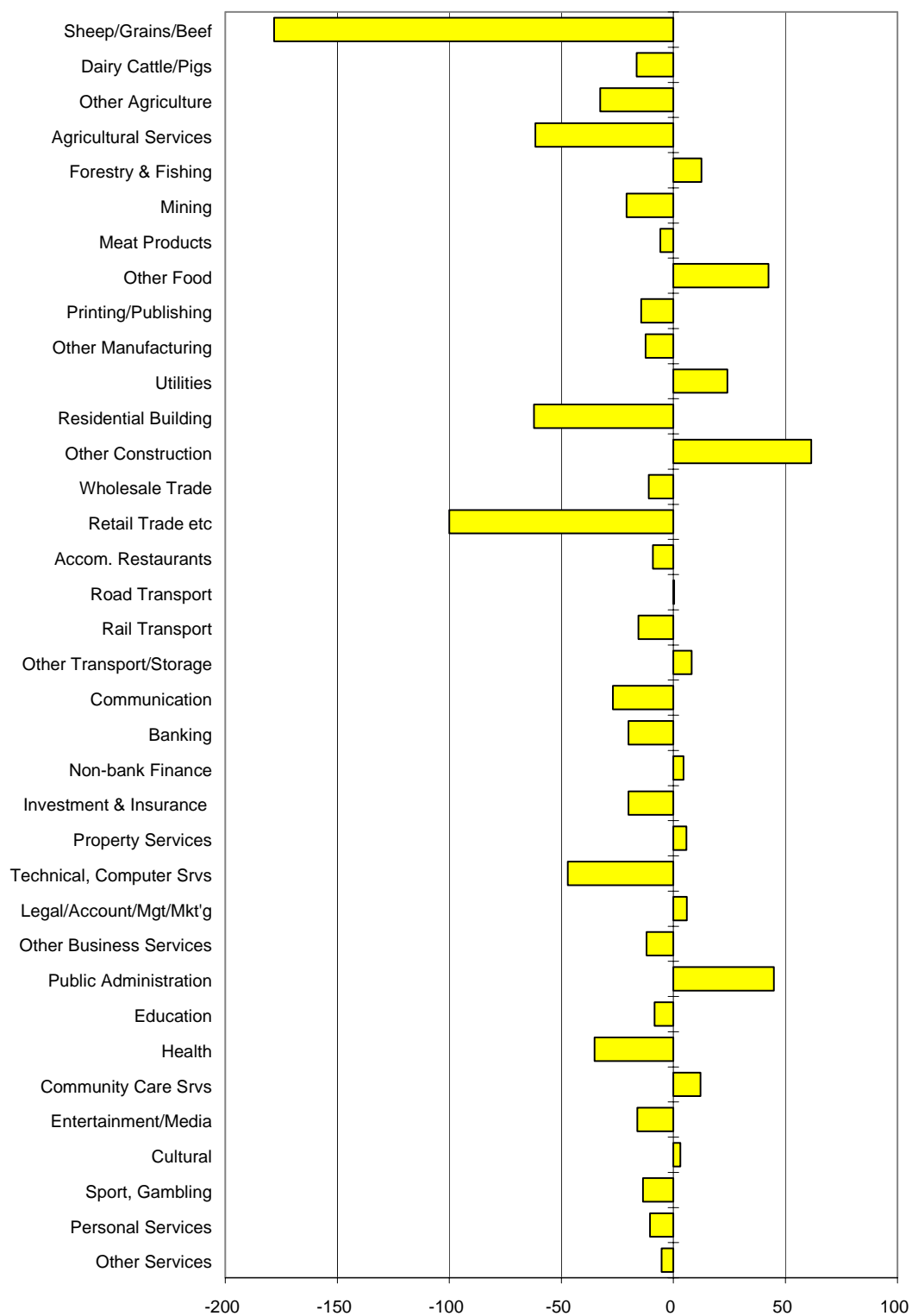
**Figure 78: Summarised Shift-Share Analysis: Narrabri: 1981- 2001**

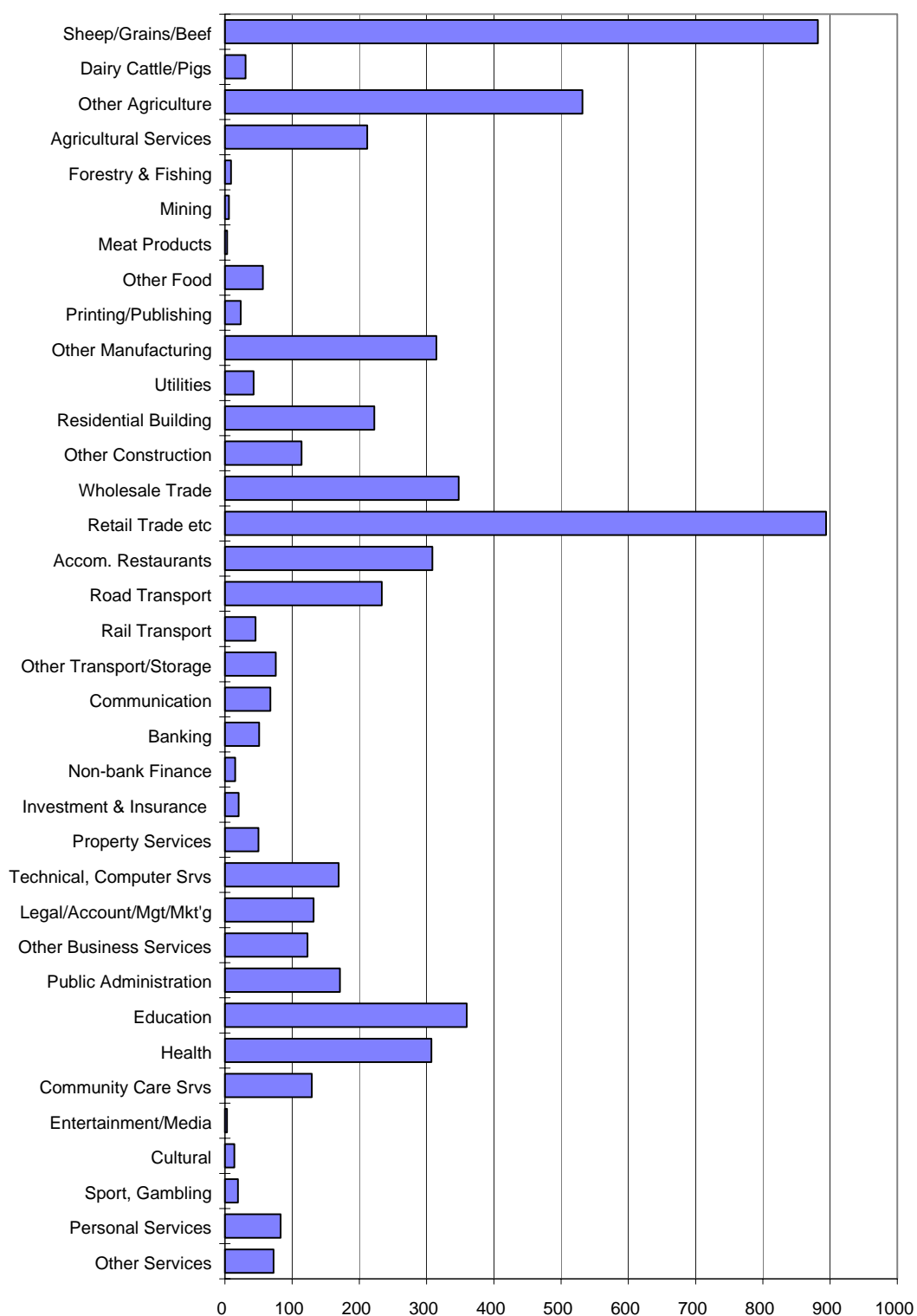


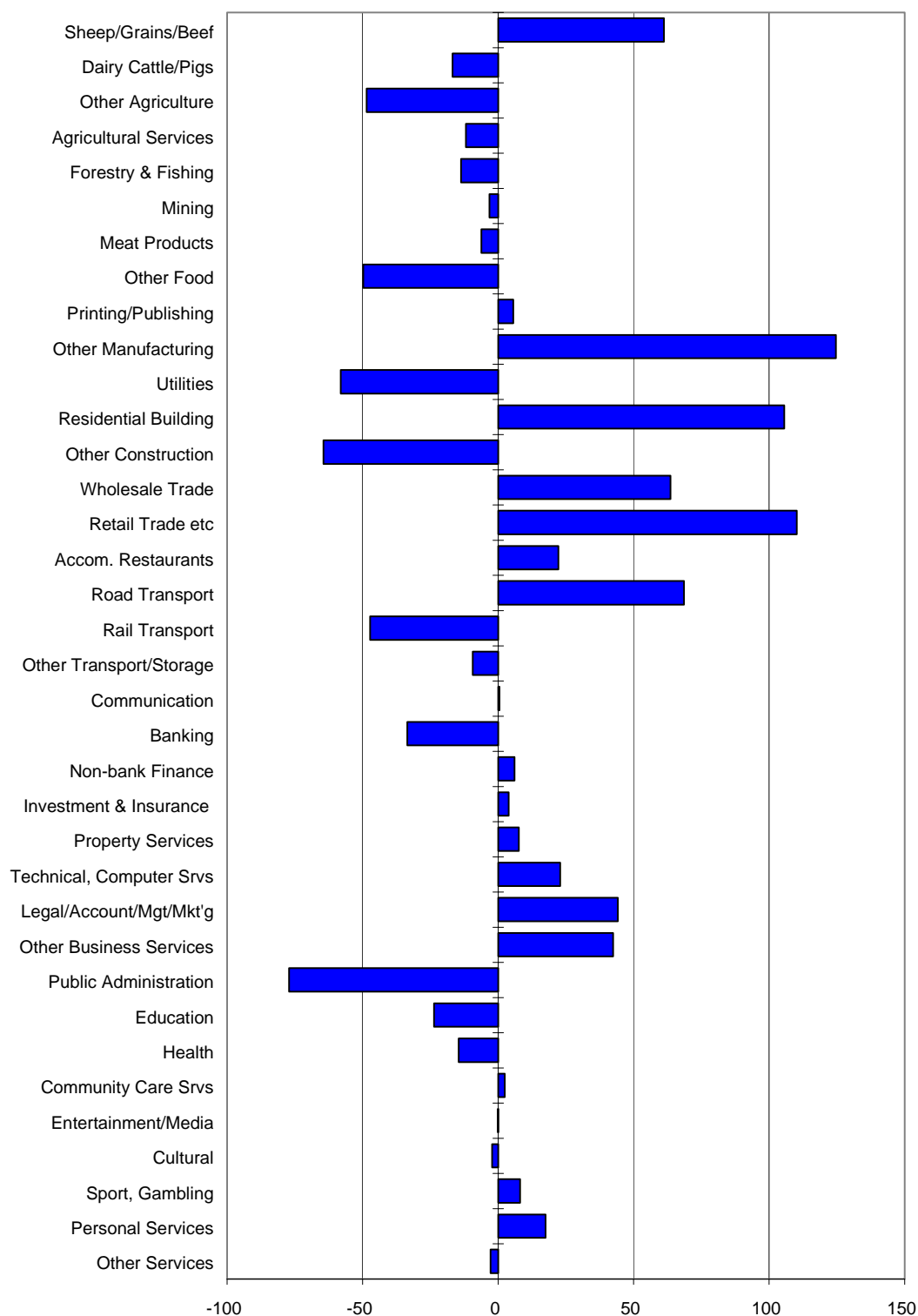
Within this context, Narrabri could gain from developments in the Newell corridor. In the case of adjustments to the timber industry, there could be losses in the small communities adjacent to the Pilliga forest and to the activities of the sawmills located in Narrabri.

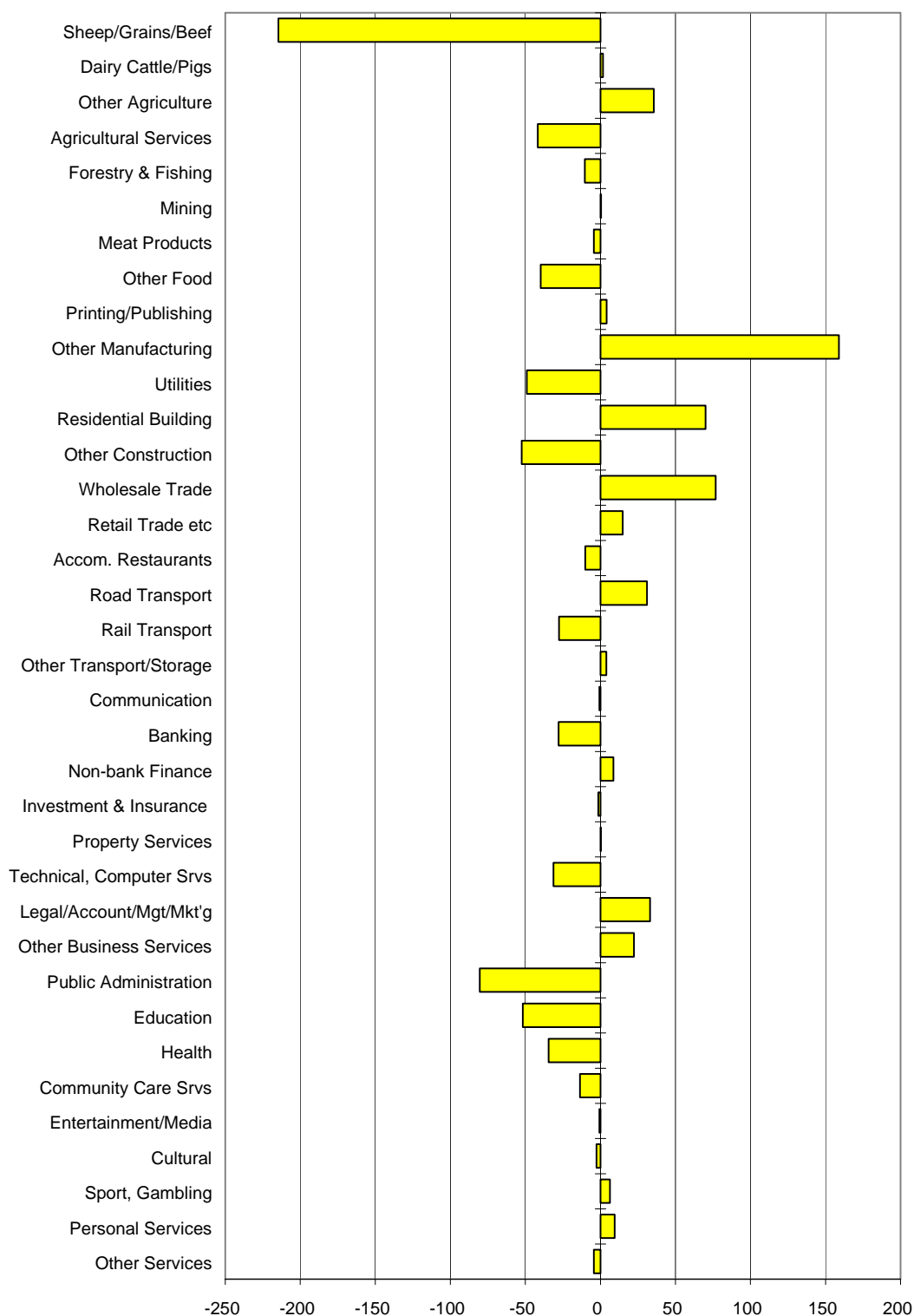
**Figure 79: Employment Distribution by Sector, 1996: Narrabri**

**Figure 80: Total Change in Employment by Sector, 1991-1996: Narrabri**

**Figure 81: Local Influences on Employment Change, 1991-1996: Narrabri**

**Figure 82: Employment Distribution by Sector, 2001: Narrabri**

**Figure 83: Total Change in Employment by Sector, 1996-2001: Narrabri**

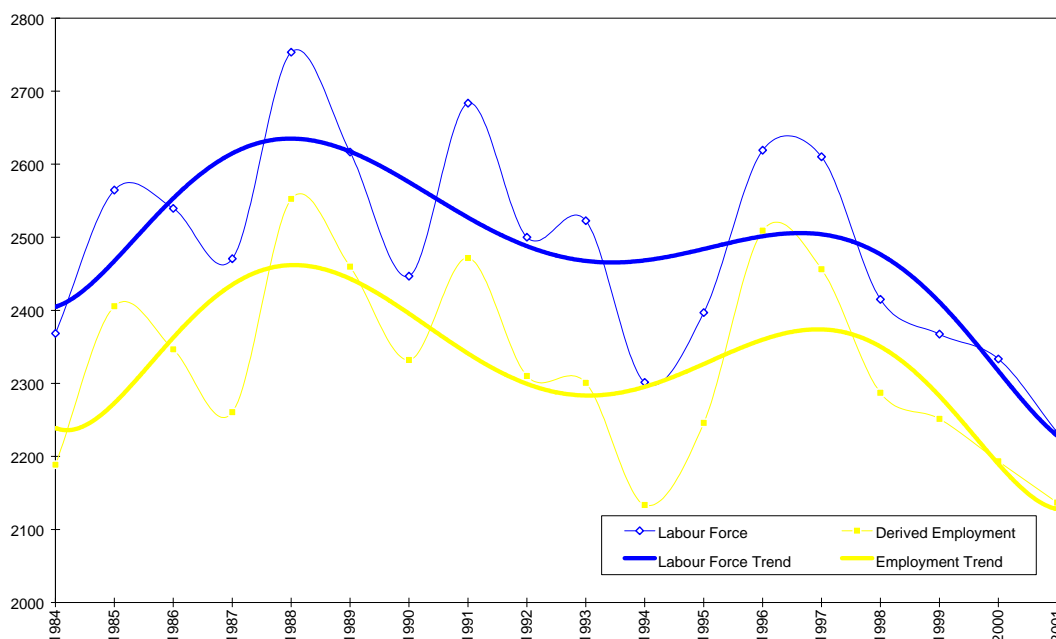
**Figure 84: Local Influences on Employment Change, 1996-2001: Narrabri**



### 5.14 QUIRINDI

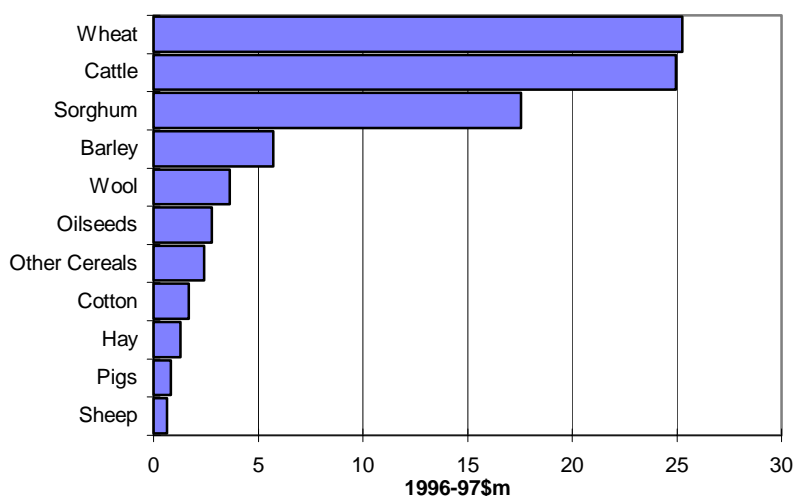
Quirindi is a smallish LGA in terms of area, but it has some favourable characteristics that provide more opportunities than are evident in other small LGAs in the BBSB. Those opportunities would seem to be associated with a relatively diverse agricultural sector. Employment in Quirindi reflects an underlying trend driven by the rationalisation of agriculture, which is mostly downward as shown in Figure 85. The population census data for 2001 show a smaller decline in employment than shown here.

**Figure 85: Labour Force and Employment , Quirindi**



Directly and indirectly agriculture contributed 52 percent to employment in Quirindi. Agriculture is mainly based on broadacre grazing and cereal production with some irrigation on parts of the Liverpool Plains as shown in Figure 86. There is more diversity than in many other LGAs in the BBSB including some intensive livestock industries and beef cattle feed lotting.

**Figure 86: Composition of Agricultural Production, Quirindi 1996-97**



The LQs shown in Table 27 reflect that diversity in agriculture and the industries that support agriculture. They include services to agriculture, agricultural machinery and road transport. There is a small amount of employment in forestry and saw milling. The significant community service employment includes some CDEP programs that operate in Quirindi shire. Apart from those mentioned, there is limited employment in manufacturing and business services although retail trade is notable. However, the growth in retail trade will be inhibited by the relative proximity of Tamworth. There is little evidence of a large number of visitors to Quirindi, perhaps due to its location off the New England highway.

**Table 27: Location Quotients, 1991 and 1996: Quirindi**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Beef cattle	23.3	17.3	26.2	21.0	<b>33.3</b>	198
Grains	7.4	15.9	13.8	19.1	<b>15.9</b>	368
Poultry	20.1	21.5	15.7	16.4	<b>14.4</b>	25
Pigs	10.9	6.6	20.9	8.5	<b>10.5</b>	10
Services to agric.; hunting	4.5	7.6	9.7	7.1	<b>7.7</b>	35
Leather and leather products	0.0	1.8	4.3	0.0	<b>3.9</b>	4
Prefabricated buildings	0.0	0.0	0.0	0.0	<b>3.6</b>	4
Agricultural, mining etc machinery	0.3	0.0	2.7	4.1	<b>3.6</b>	22
Sheep	1.6	2.0	3.5	3.5	<b>3.4</b>	33
Rail & other transport	2.6	2.6	2.0	4.0	<b>2.3</b>	18
Road transport	2.8	1.1	1.7	1.5	<b>2.0</b>	93
Concrete, cement, lime	0.0	0.0	0.0	0.0	<b>1.7</b>	3
Other mining	0.0	0.0	1.1	1.0	<b>1.6</b>	3
Community care services	0.2	0.5	0.6	1.3	<b>1.3</b>	67
Water, sewerage & drainage	0.0	0.2	0.3	0.6	<b>1.2</b>	6
Mechanical repairs	1.3	1.2	1.1	1.0	<b>1.2</b>	41
Other agriculture	0.6	1.0	1.4	1.4	<b>1.1</b>	28
Public administration	0.8	0.9	1.0	1.0	<b>1.1</b>	81
Commercial fishing	0.0	0.0	0.0	0.0	<b>1.0</b>	3
Sawmill products	1.9	1.1	0.0	1.5	<b>1.0</b>	3
Other services	0.3	0.4	0.5	0.8	<b>0.9</b>	34
Education	0.9	0.9	0.7	1.0	<b>0.9</b>	133
Retail trade	0.8	0.8	0.8	0.8	<b>0.8</b>	207
Legal, accounting srvs	0.8	0.7	0.4	0.6	<b>0.7</b>	50
Legal, accounting srvs	0.8	0.7	0.4	0.6	<b>0.7</b>	50
Other property services	0.2	0.4	0.3	0.4	<b>0.5</b>	14

The analysis of employment trends for 1991 to 1996 shown in Table 28 indicates that there has been a steady decline over the 1991 to 1996 period. Quirindi has benefited to a small degree from NSW trends. The employment change is due mainly to local factors associated with the adjustment in agriculture and the industries that support it. This has given a net result of slow loss of employment in this period.

The situation in the 1996 to 2001 period is summarised in Table 29. The result is similar to that for the previous five years. The benefits from NSW growth have been offset by local factors to give a small net loss in employment.

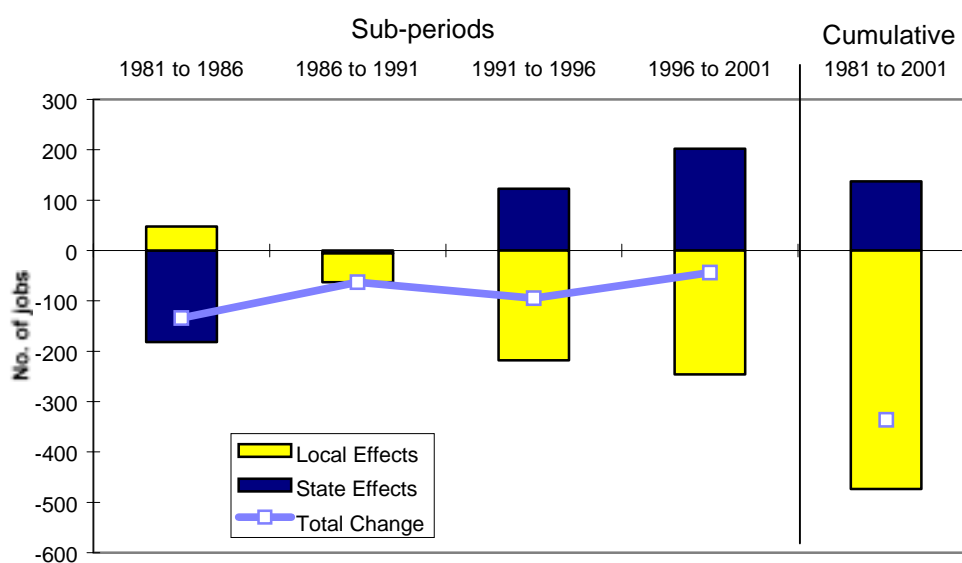
**Table 28: Summarised Shift-Share Analysis 1991-96: Quirindi**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	141	279	420	168	588
Negative Effects	-	(297)	(297)	(386)	(683)
<b>Total Effects</b>	<b>141</b>	<b>(18)</b>	<b>123</b>	<b>(218)</b>	<b>(95)</b>

**Table 29: Summarised Shift-Share Analysis 1996-2001: Quirindi**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	155	199	353	122	475
Negative Effects	-	(151)	(151)	(368)	(519)
<b>Total Effects</b>	<b>155</b>	<b>48</b>	<b>202</b>	<b>(246)</b>	<b>(44)</b>

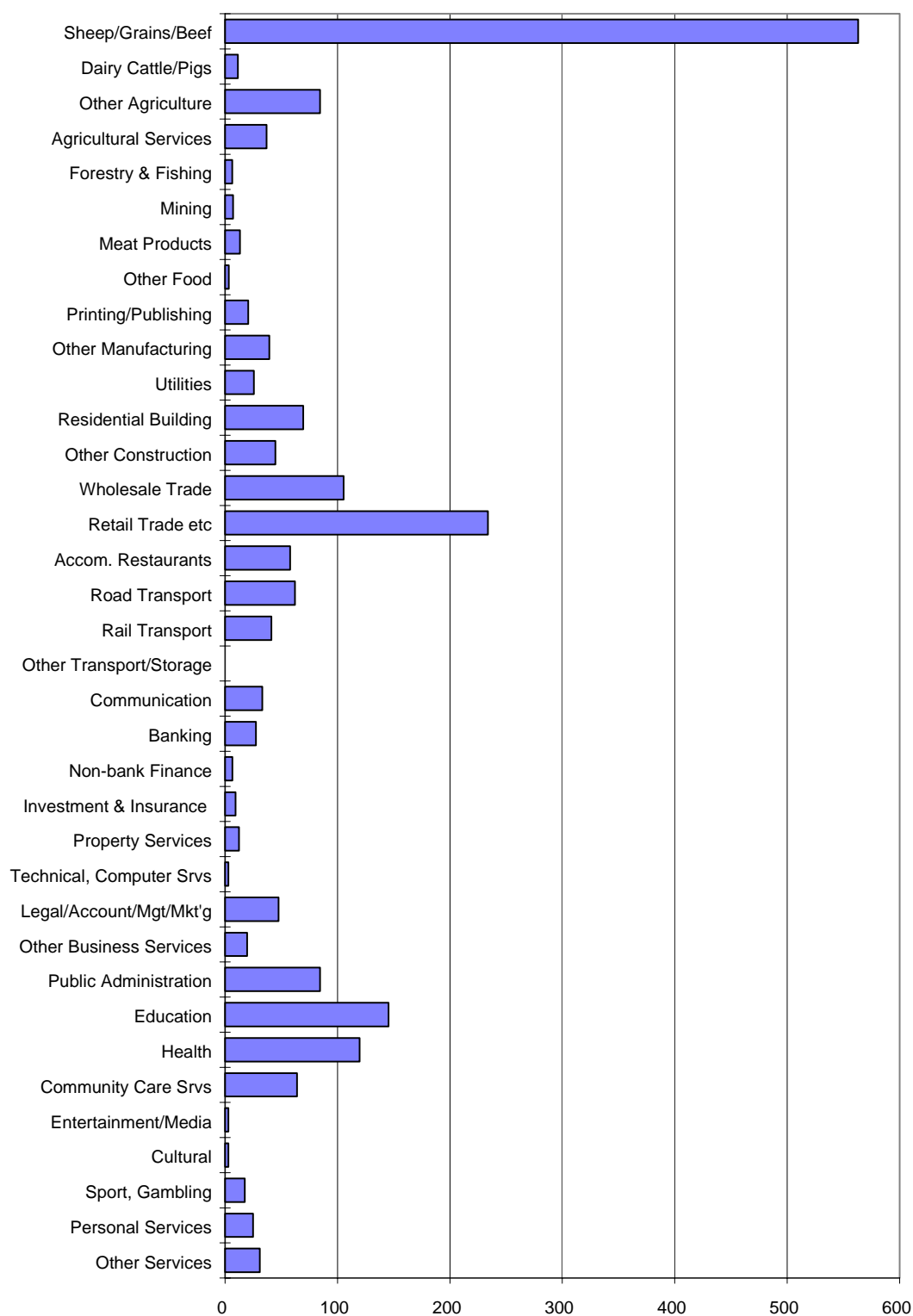
The summary of trends over 20 years to 2001 is shown in Figure 87. There is a consistency in development where the underlying rationalisation in agriculture leads to less employment and there have not been enough positive initiatives to offset that trend. As a result, there has been a steady but small loss of jobs throughout the period. In the early 1980s, local factors generated employment growth but were swamped by a poorly performing state economy. That is likely to have been associated with an intensification of agriculture including the development of intensive livestock production.

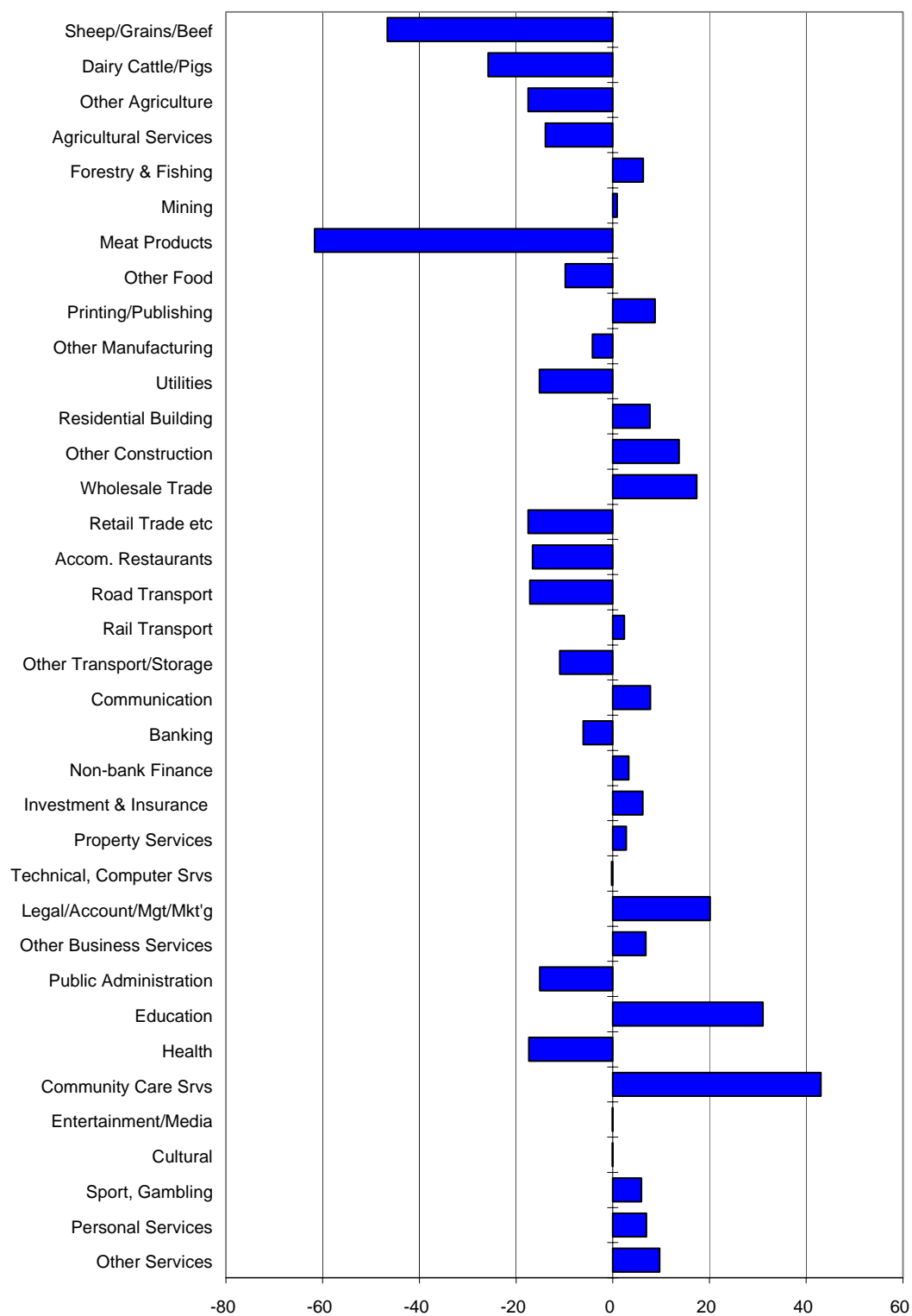
**Figure 87: Summarised Shift-Share Analysis: Quirindi: 1981- 2001**

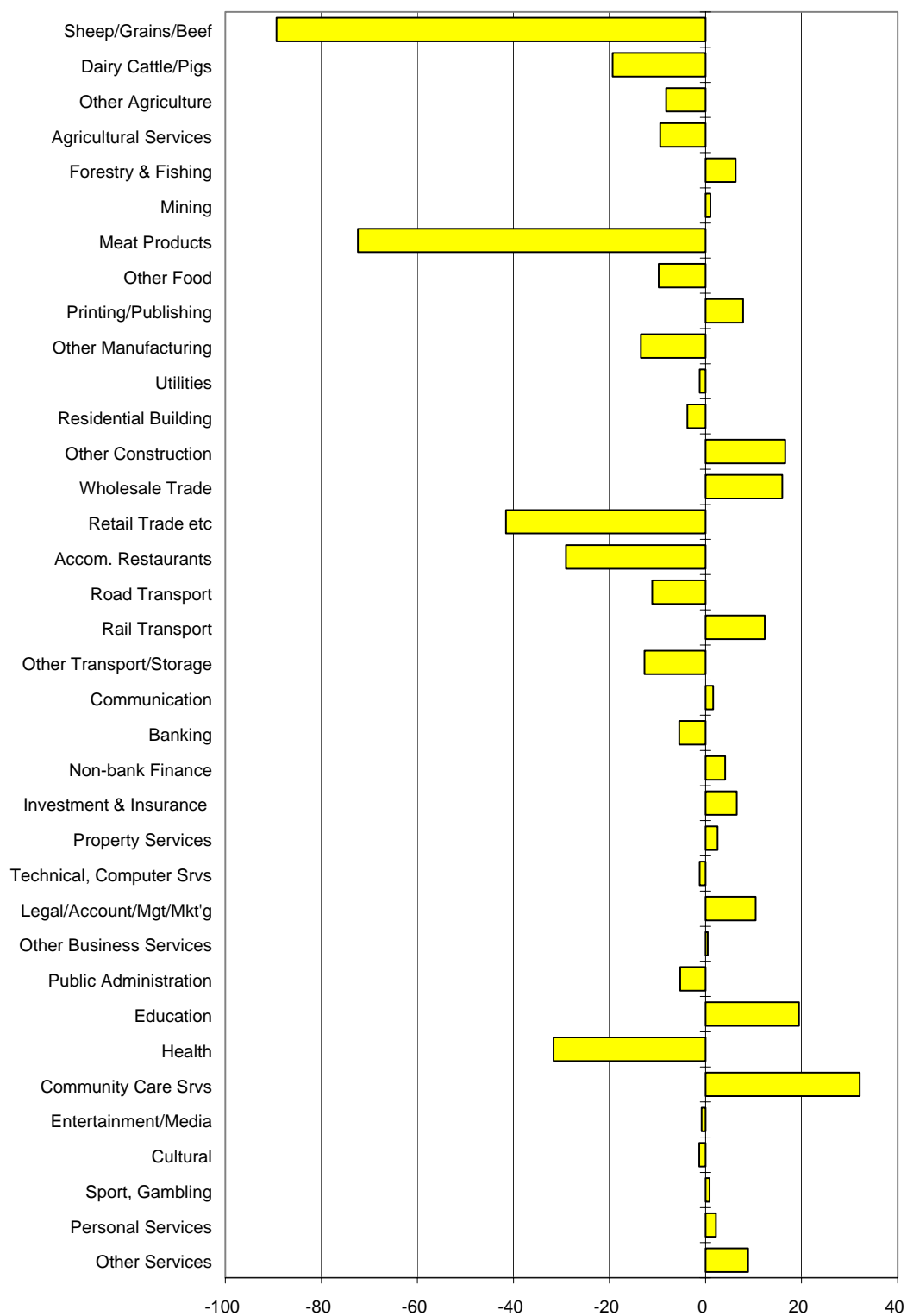
Further details of employment in Quirindi are shown in Figure 88 through Figure 90. The employment distribution in 1996 has little that is notable apart from the dominance of the broadacre grazing and cereals production. Otherwise, the pattern is similar to most small rural LGAs. The change in employment from 1991 to 1996 (Figure 89) also shows a common pattern of losses from many industries and a few sectors where there are increases. There is a notable loss of employment from meat product processing associated with Quirindi residents losing jobs in Aberdeen when that abattoir closed. The increases in employment included building activities, wholesale trade (including agricultural marketing that is strong in Quirindi) education and legal and accounting services. The growth in community services is likely to be associated with the CDEP. Analysis of the local factors highlight the loss of jobs in meat processing and the slow growth in retailing and other services that support visitors. There are few significant growth opportunities apart from construction and some business services that will have to compete with Tamworth.

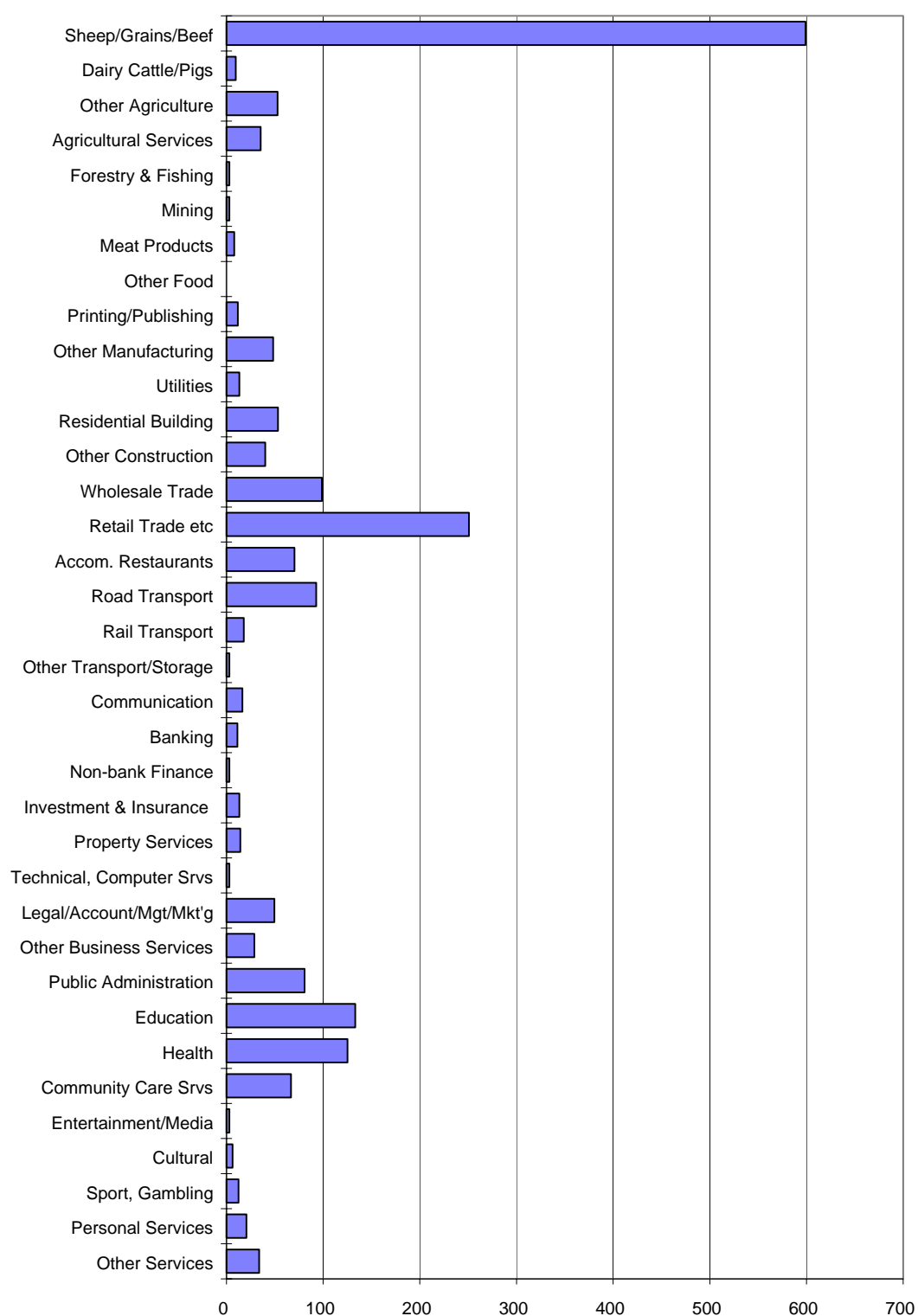
The situation for the 1996 to 2001 period is shown in Figure 91 through Figure 93. In this period there were widespread losses in employment while few sectors gained. Apart from agriculture, the best gains were in retail, accommodation and road transport, some of which reversed declines in the previous period. There was also some growth in businesses and selected other services.

Although the outlook and trends for Quirindi appear to be unfavourable, some of the performance measures are relatively good. The economy has more strength than the smaller LGAs in the BBSB and has some of the characteristics of the larger LGAs in respect of the quality of its agriculture and support activities. There is also the possibility of some spill overs from the Hunter Valley benefiting Quirindi. The proposed sawmill processing softwood from the plantations in Nundle – Walcha will strengthen the economy.

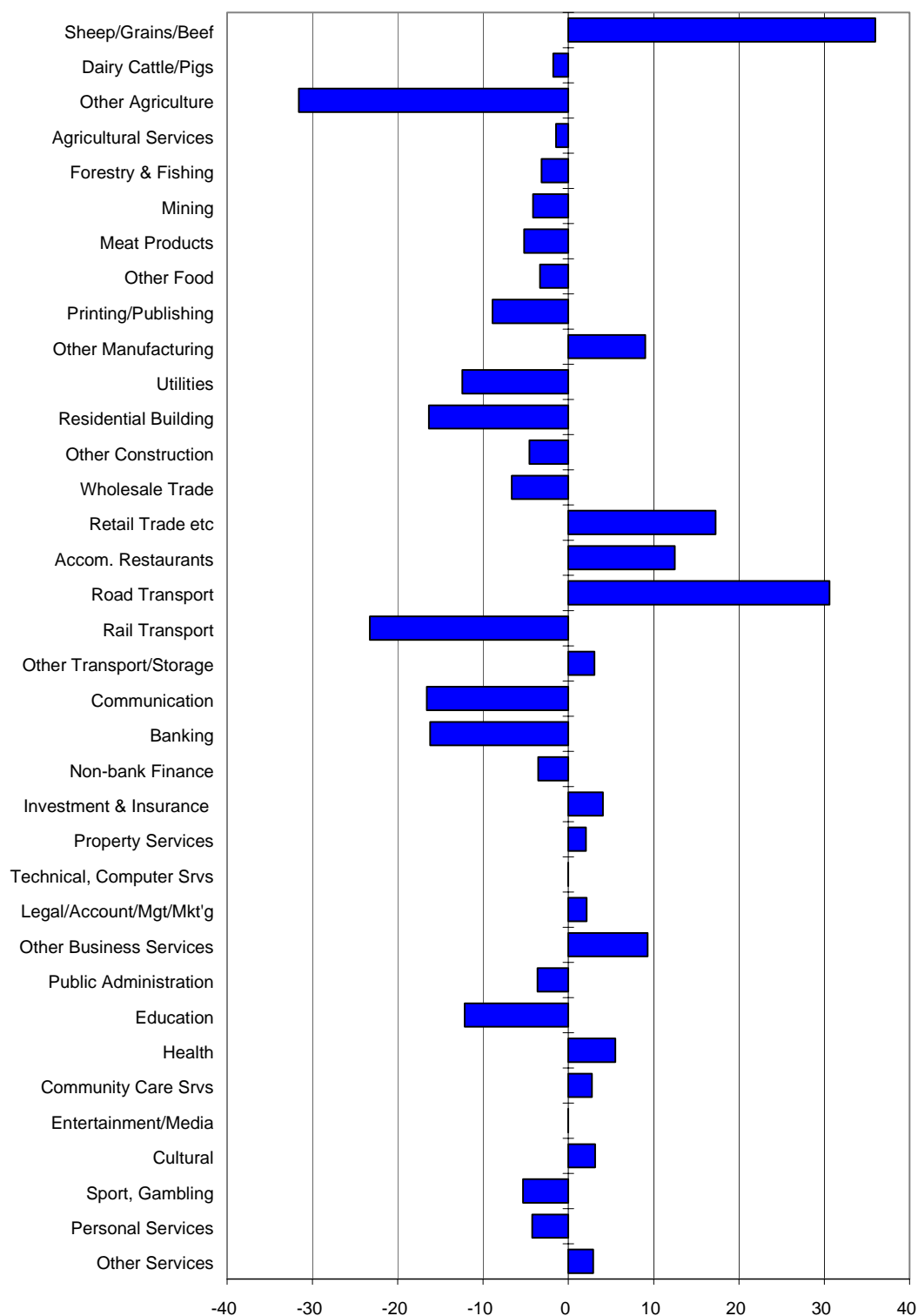
**Figure 88: Employment Distribution by Sector, 1996: Quirindi**

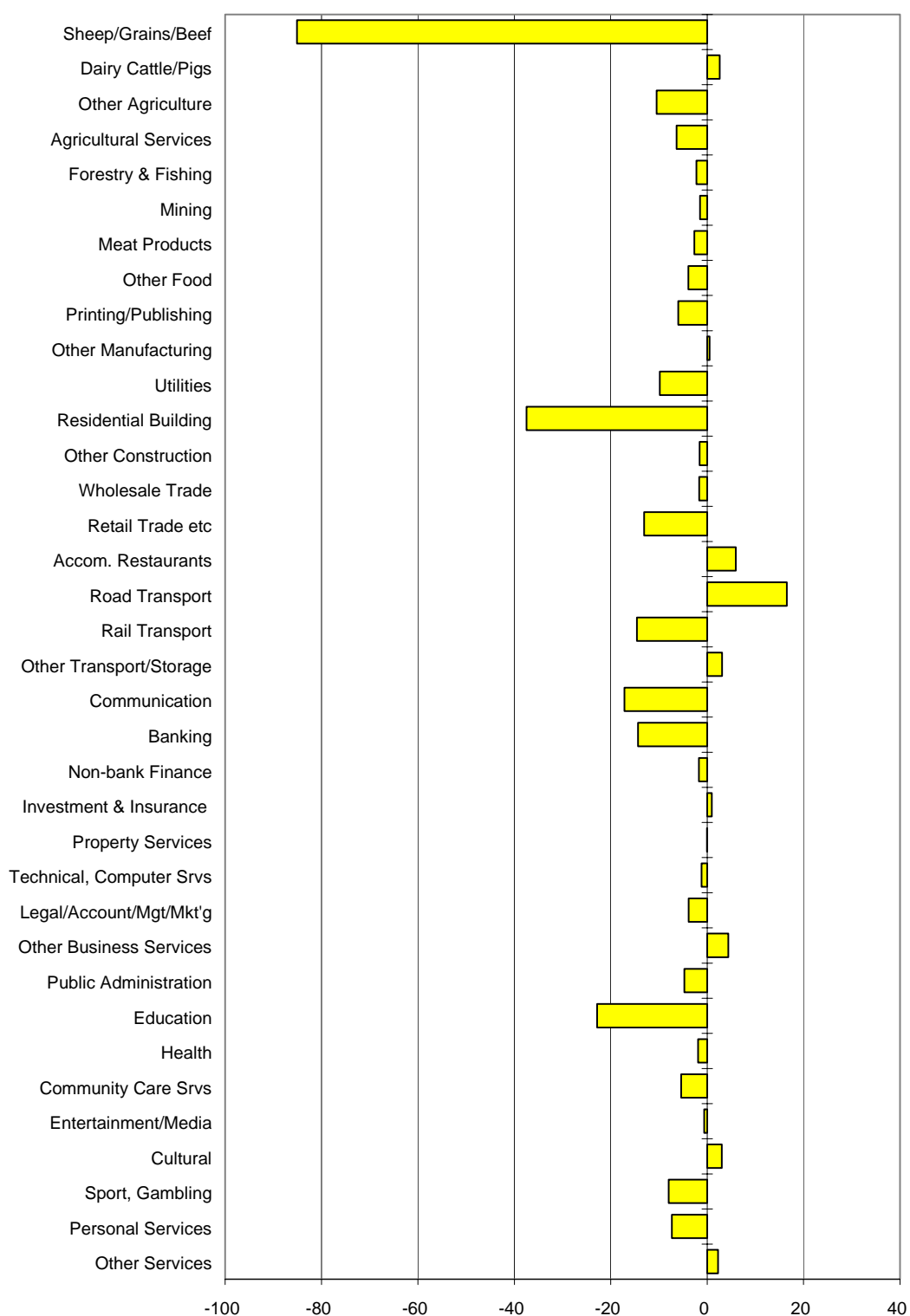
**Figure 89: Total Change in Employment by Sector, 1991-1996: Quirindi**

**Figure 90: Local Influences on Employment Change, 1991-1996: Quirindi**

**Figure 91: Employment Distribution by Sector, 2001: Quirindi**



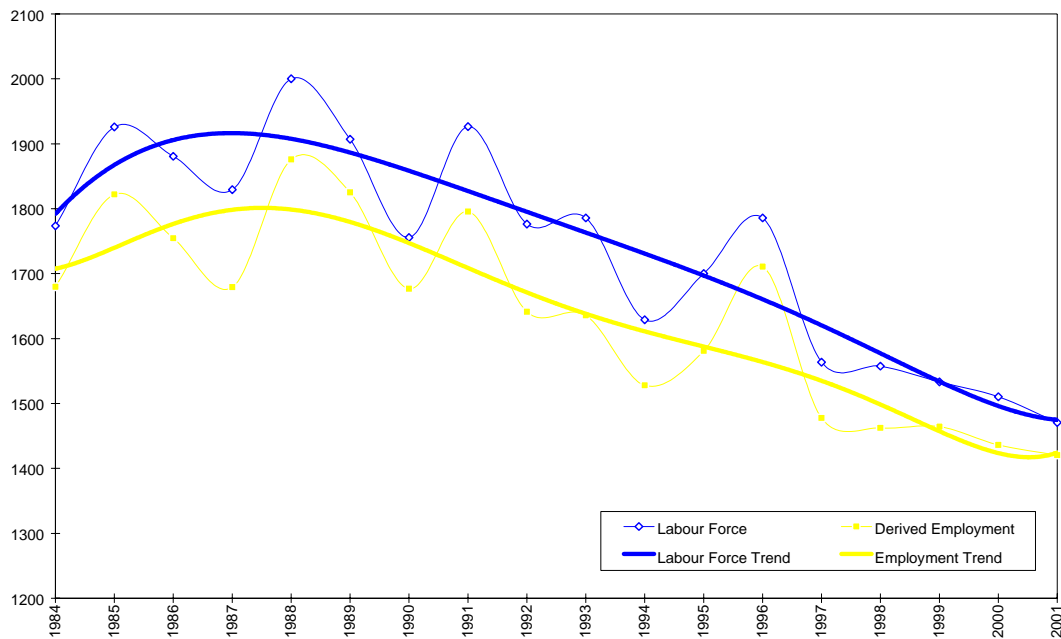
**Figure 92: Total Change in Employment by Sector, 1996-2001: Quirindi**

**Figure 93: Local Influences on Employment Change, 1996-2001: Quirindi**

### 5.15 YALLAROI

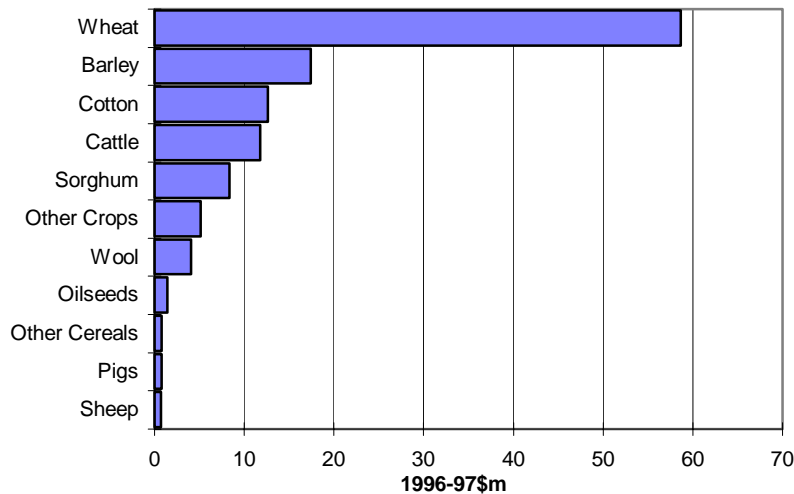
Yallaroi is the most rural dependent LGA in the BBSB. The main industry is broadacre grazing and cropping with a little cotton. Its geography limits the range of business activities in Warialda that has to compete with larger centres of Inverell, Moree and Goondiwindi. As a result, employment in Yallaroi reflects the trends in agricultural employment as shown in Figure 94. That shows a steady decline in employment since the mid 1980s. Up until then the change from predominantly grazing to predominantly cropping was still occurring and generating some additional employment. Like the other LGAs the level of unemployment is now small. Both population and employment has declined in all of the census periods since 1976.

**Figure 94: Labour force and Employment, Yallaroi**



The composition of agricultural production in Yallaroi is shown in Figure 95 and reflects the dominance of wheat production. The composition of cereal crops and the possibilities of dry land cotton is dependent on soil moisture at critical planting times.

**Figure 95: Composition of Agricultural Production, Yallaroi, 1996-97**



The LQs shown in Table 30 confirms the dominance of agriculture and its supporting activities including road transport. Like other small centres, there are very limited services available within the LGA and they are under threat from decreases in the population and the amount of spending within the LGA. The activities that service visitors are of limited importance to the Yallaroi economy.

**Table 30: Location Quotients, 1991 and 1996: Yallaroi**

Ranked Sectors by 2001	LQs					Employment
	1981	1986	1991	1996	2001	2001
Grains	26.8	41.1	53.6	44.3	<b>32.3</b>	476
Beef cattle	15.1	7.9	16.7	13.4	<b>18.5</b>	70
Services to agric.; hunting	8.3	9.1	8.4	8.5	<b>11.8</b>	35
Pigs	0.0	4.2	8.3	15.2	<b>11.3</b>	7
Petroleum and coal products	0.0	0.0	0.0	0.0	<b>4.6</b>	6
Sheep	5.9	2.9	8.9	5.2	<b>4.4</b>	28
Soft drinks, cordials, syrups	1.7	0.0	2.3	0.0	<b>3.5</b>	3
Sawmill products	1.9	3.1	5.6	7.1	<b>2.8</b>	6
Plaster; other concrete products	0.0	0.0	0.0	0.0	<b>2.1</b>	3
Paper bags and products	0.0	0.0	0.0	0.0	<b>1.9</b>	3
Other agriculture	1.0	2.8	2.6	2.2	<b>1.3</b>	21
Public administration	1.0	0.9	1.1	1.6	<b>1.3</b>	63
Road transport	2.6	1.1	1.2	0.8	<b>1.2</b>	36
Meat and meat products	0.6	0.4	0.0	0.8	<b>1.2</b>	7
Electricity	0.3	0.4	1.1	1.5	<b>1.1</b>	6
Non-bank finance	0.0	0.0	0.0	0.0	<b>1.0</b>	3
Mechanical repairs	0.7	0.9	0.5	0.9	<b>1.0</b>	22
Education	0.8	0.9	1.0	1.0	<b>0.9</b>	90
Accom. & restaurants	0.6	0.7	0.7	0.5	<b>0.5</b>	34
Community care services	0.1	0.3	0.2	0.1	<b>0.5</b>	15
Legal, accounting srvs	0.3	0.2	0.2	0.2	<b>0.5</b>	22
Other property services	0.0	0.2	0.3	0.6	<b>0.2</b>	4

The analysis of employment trends over 1991 to 1996 shown in Table 31 is interesting in that the decline in employment is not connected with an unfavourable industry mix. However, the local effects were large and negative and associated with structural change in agriculture. The limited scale effects within Warialda and the competition from nearby larger centres will constrain growth. The performance of the economy will depend almost exclusively on agriculture.

**Table 31: Summarised Shift-Share Analysis 1991-96: Yallaroi**

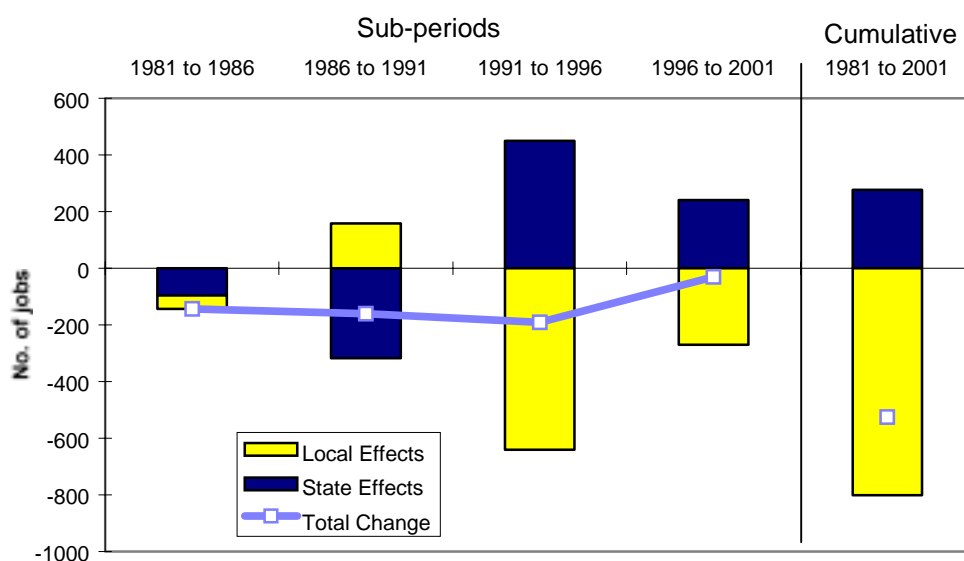
	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	99	529	<b>628</b>	<b>74</b>	<b>702</b>
Negative Effects	-	(178)	<b>(178)</b>	<b>(715)</b>	<b>(893)</b>
<b>Total Effects</b>	<b>99</b>	<b>351</b>	<b>450</b>	<b>(641)</b>	<b>(191)</b>

The trends for the 1996 to 2001 period shown in Table 32 is almost a replica of the results for the previous period. A favourable industry structure is overrun by local factors to result in a net decline in employment although the decline is smaller than previously. The longer-term summary is contained in Figure 96 and confirms the persistent trend to losses in employment. The main driver of that trend is the adjustments in agriculture as farmers seek to raise productivity. It is reasonable to suggest that whatever happens to growth in NSW, it will be unlikely that Yallaroi will be able to share in that growth. This small and specialised economy will prosper so long as agriculture is in good health.

**Table 32: Summarised Shift-Share Analysis 1996-2001: Yallaroi**

	Component				Total
	State	Industry	Total State	Local	Change
	No.	No.	No.	No.	No.
Positive Effects	99	212	311	153	463
Negative Effects	-	(70)	(70)	(423)	(493)
<b>Total Effects</b>	<b>99</b>	<b>141</b>	<b>240</b>	<b>(270)</b>	<b>(30)</b>

**Figure 96: Summarised Shift-Share Analysis: Yallaroi: 1981- 2001**



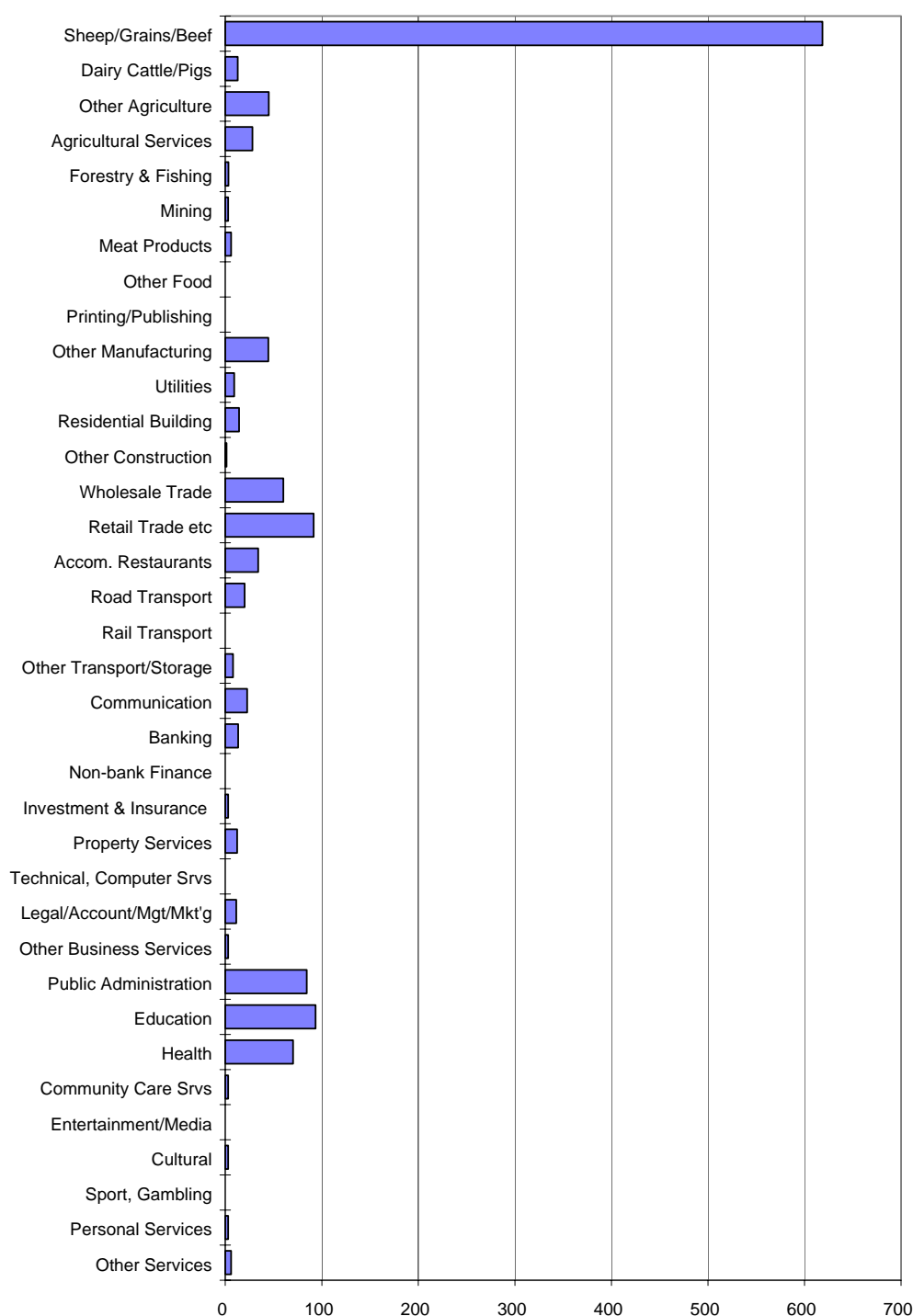
Further information on employment change in Yallaroi between 1991 and 1996 is indicated in Figure 97 through Figure 99. Employment in Yallaroi is dominated by agriculture, some trade activities and a variety of publicly funded activities. The only manufacturing of note is the saw milling included in other manufacturing (now closed). The change in employment from 1991 to 1996 is shown in Figure 99 and indicates overall losses in employment. The only significant increase was in the saw milling included in other manufacturing. The calculation of local influences is not significant given the small numbers involved.

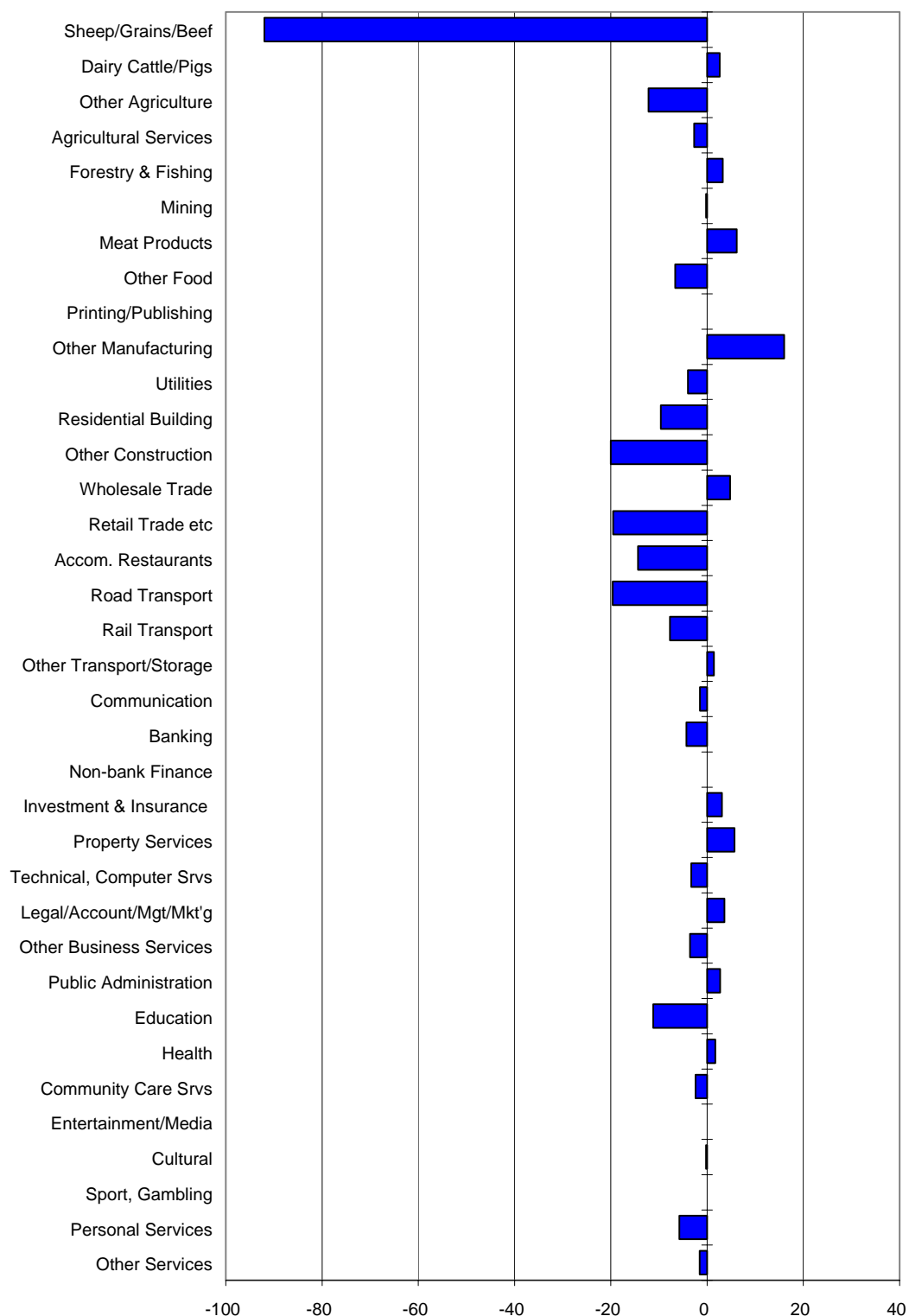
The change in the 1996 to 2001 is shown in Figure 100 through Figure 102. There is a noticeable increase in industry restructuring in this period with some significant gains made in construction, trade road transport, business services and some personal services. In some cases,

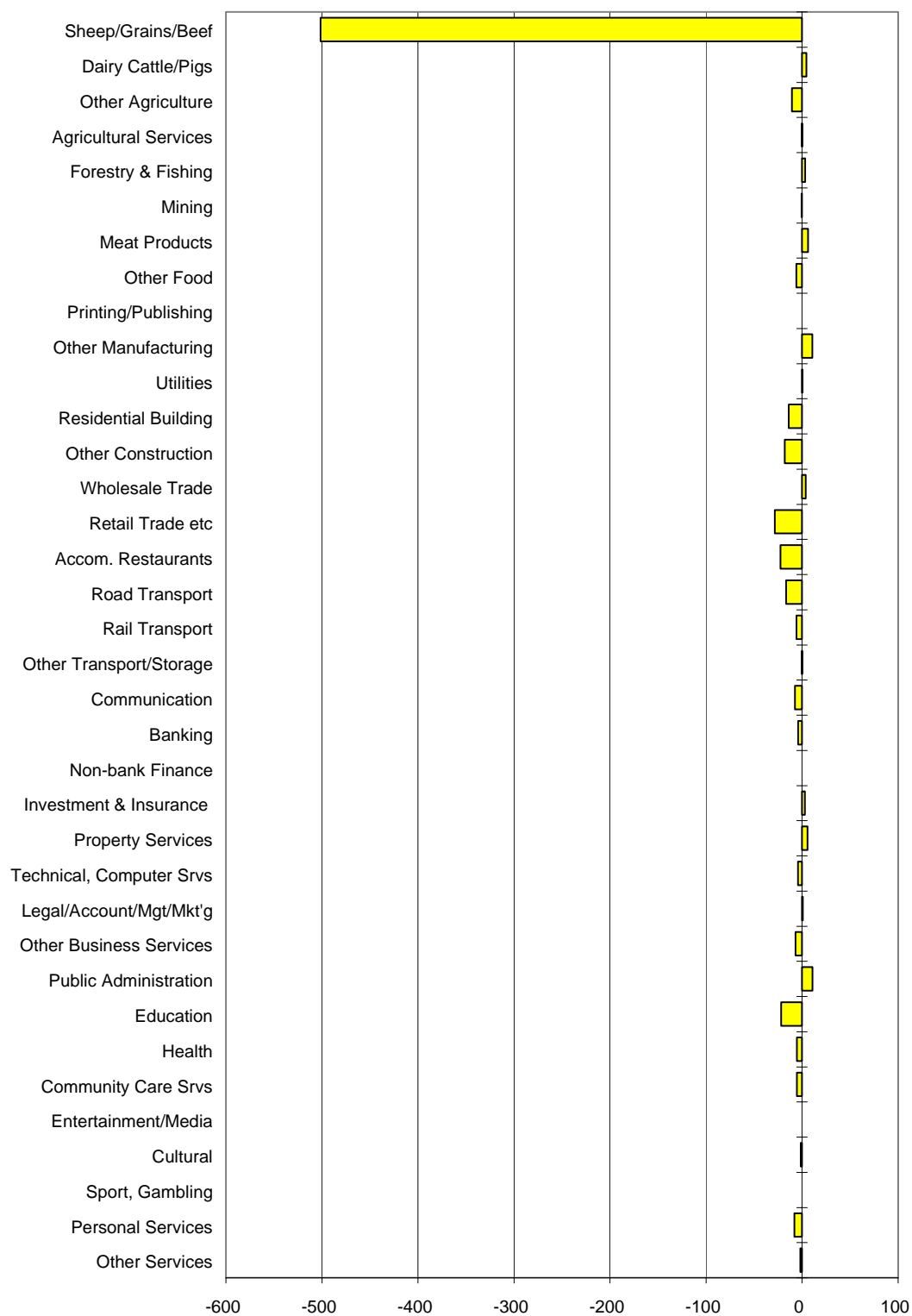
these changes have shown through to represent an increase in market share. Some of those initiatives may contain the seeds for further business and employment growth.

Yallaroi is the smallest economy in the BBSB and has least diversity and among the lowest levels of access to services. The overwhelming importance of agriculture to the level of economic activity in Yallaroi is apparent. Actions that diminish agriculture or curtail its growth will add to the on-going decline in population and the economy in Yallaroi.

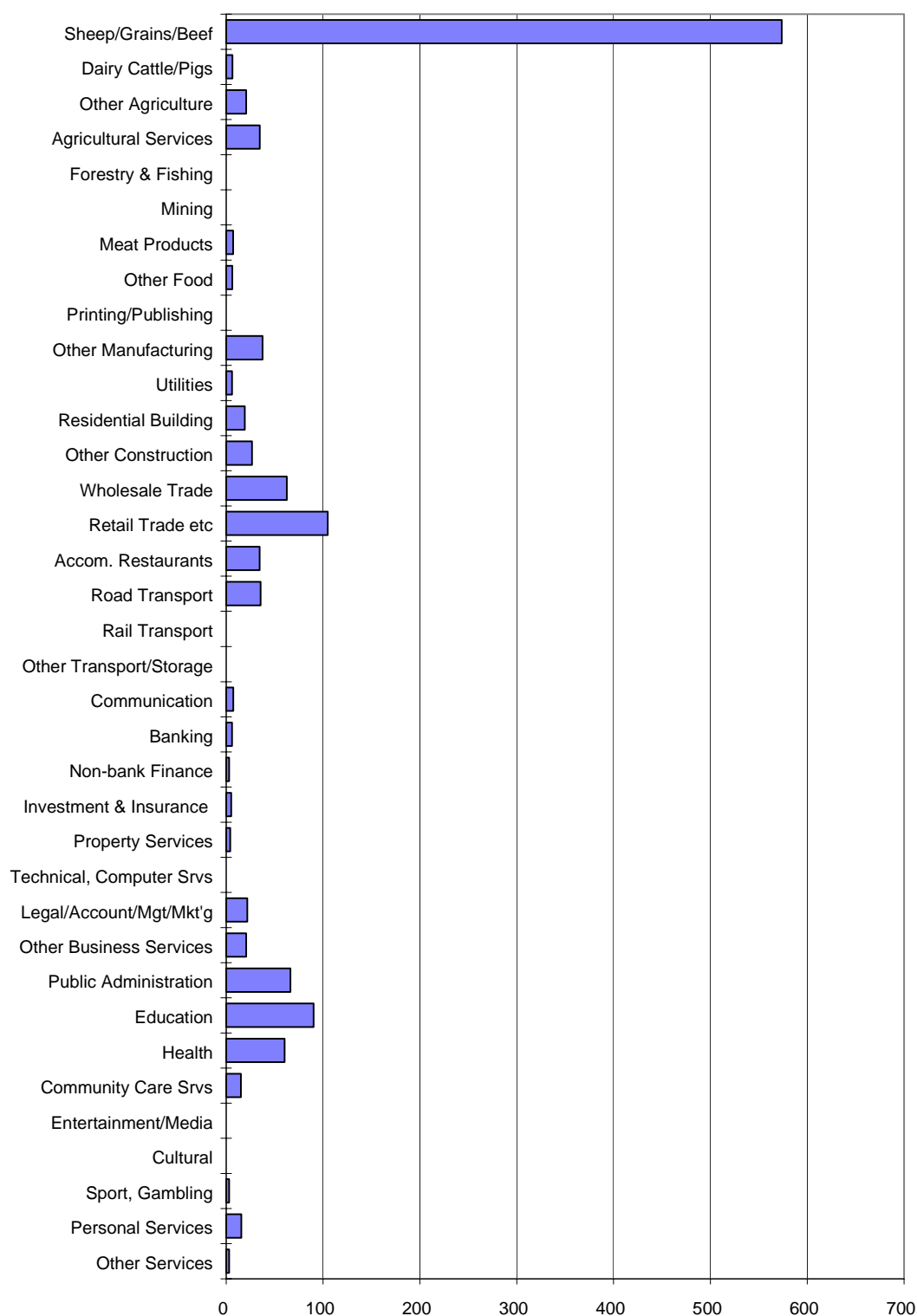
**Figure 97: Employment Distribution by Sector, 1996: Yallaroi**

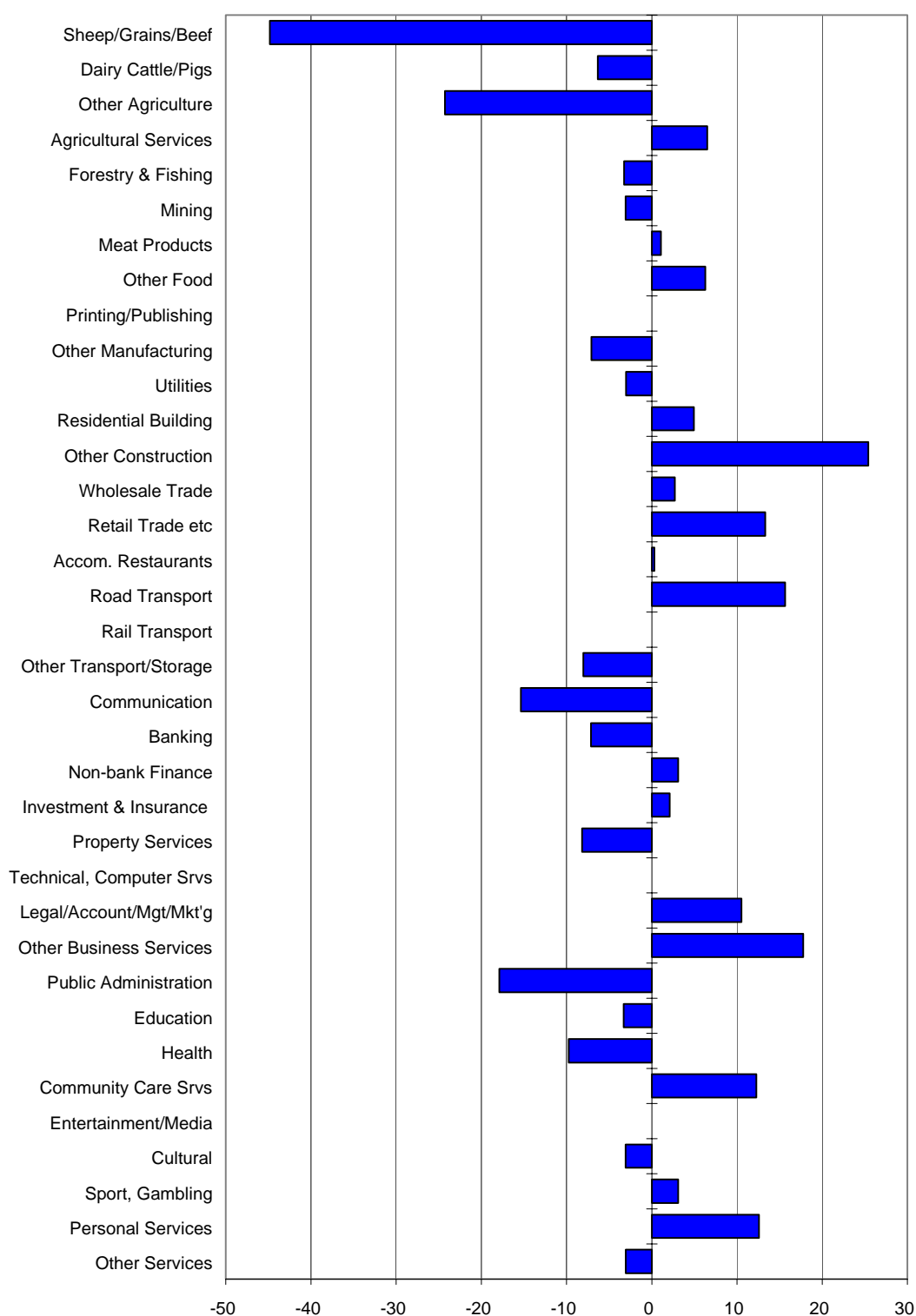


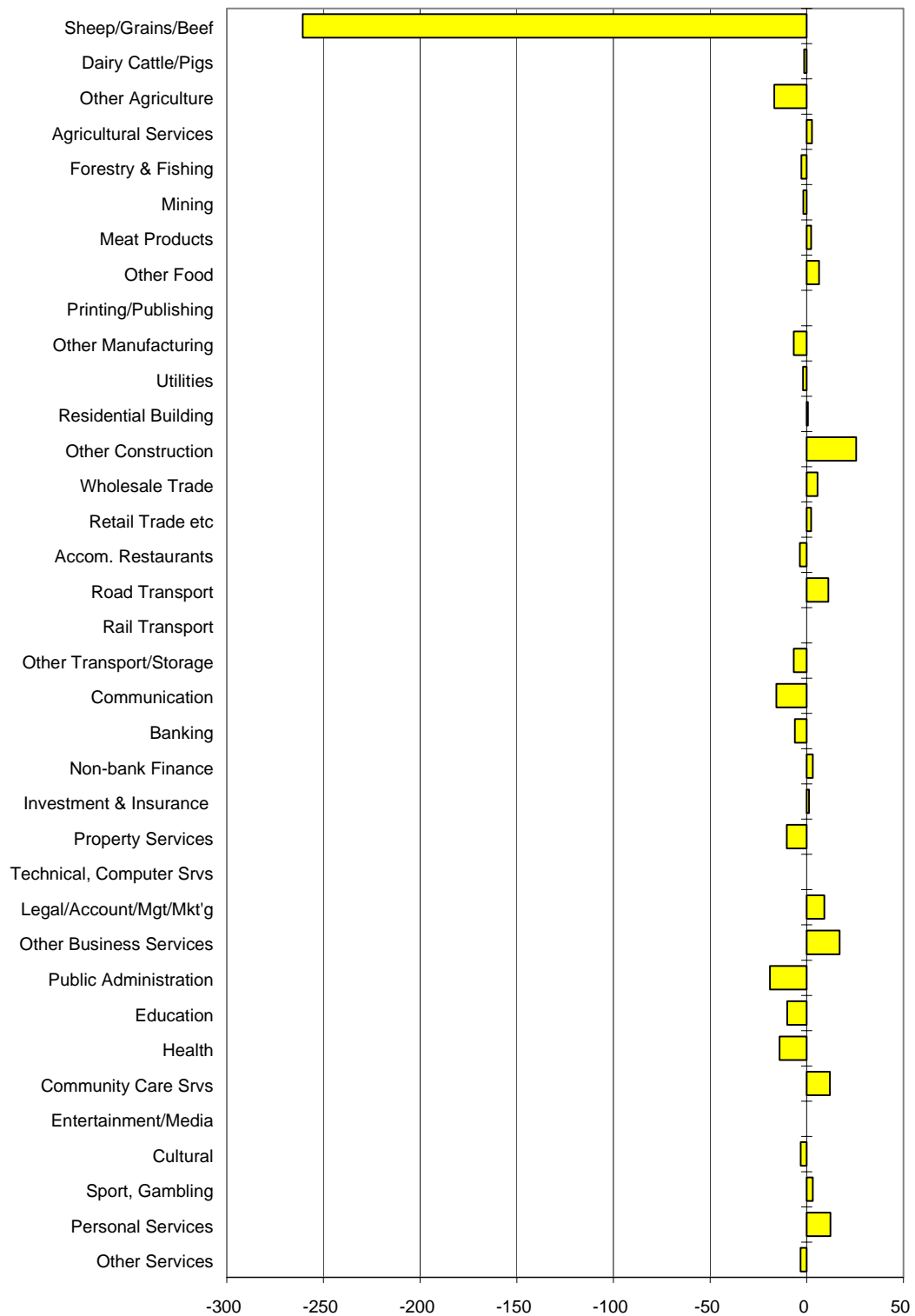
**Figure 98: Total Change in Employment by Sector, 1991-1996: Yallaro**

**Figure 99: Local Influences on Employment Change, 1991-1996: Yallaro**



**Figure 100: Employment Distribution by Sector, 2001: Yallaroi**

**Figure 101: Total Change in Employment by Sector, 1996-2001: Yallaro**

**Figure 102: Local Influences on Employment Change, 1996-2001: Yallaro**

**ATTACHMENT 2a: 107 SECTOR SHIFT-SHARE EMPLOYMENT ANALYSIS 1996**

Sector	Employment		Growth		Component				Total Change
	1996	1991	NSW Gni	Local Gri	State	Industry	Total State	Local	
Sheep	942	2052	0.54	0.46	133	-1079	<b>-946</b>	-164	<b>-1110</b>
Grains	4662	2717	2.20	1.72	176	3077	<b>3253</b>	-1307	<b>1945</b>
Beef cattle	1300	2573	0.70	0.51	167	-939	<b>-772</b>	-501	<b>-1273</b>
Dairy cattle	69	79	1.00	0.87	5	-5	<b>0</b>	-10	<b>-11</b>
Pigs	177	256	0.83	0.69	17	-61	<b>-44</b>	-35	<b>-79</b>
Poultry	89	118	0.86	0.75	8	-24	<b>-17</b>	-12	<b>-29</b>
Other agriculture	1755	2082	0.98	0.84	135	-187	<b>-52</b>	-276	<b>-327</b>
Services to agric.; hunting	819	1052	0.91	0.78	68	-162	<b>-93</b>	-139	<b>-232</b>
Forestry and logging	124	90	1.07	1.38	6	1	<b>6</b>	28	<b>34</b>
Commercial fishing	3	0	1.00	0.00	0	0	<b>0</b>	3	<b>3</b>
Coal; oil and gas	208	338	0.86	0.62	22	-70	<b>-48</b>	-83	<b>-130</b>
Iron ores	0	0	0.00	0.00	0	0	<b>0</b>	0	<b>0</b>
Non-ferrous metal ores	7	7	0.74	0.95	0	-2	<b>-2</b>	2	<b>0</b>
Other mining	60	67	1.11	0.90	4	3	<b>8</b>	-15	<b>-7</b>
Services to mining	55	19	1.03	2.89	1	-1	<b>1</b>	36	<b>36</b>
Meat and meat products	569	743	1.14	0.77	48	59	<b>107</b>	-281	<b>-174</b>
Dairy products	25	25	0.94	0.98	2	-3	<b>-2</b>	1	<b>0</b>
Fruit and vegetable products	5	10	1.04	0.54	1	0	<b>0</b>	-5	<b>-5</b>
Oils and fats	109	103	0.88	1.06	7	-19	<b>-12</b>	19	<b>7</b>
Flour and cereal foods	59	51	1.02	1.16	3	-2	<b>1</b>	7	<b>8</b>
Bakery products	173	160	1.00	1.08	10	-10	<b>0</b>	13	<b>13</b>
Confectionery	0	0	0.96	0.00	0	0	<b>0</b>	0	<b>0</b>
Other food products	105	73	1.18	1.43	5	9	<b>13</b>	18	<b>32</b>
Soft drinks, cordials, syrups	13	20	0.94	0.62	1	-3	<b>-1</b>	-6	<b>-8</b>
Beer and malt	3	0	0.67	0.00	0	0	<b>0</b>	3	<b>3</b>
Wine and spirits	14	4	1.52	3.29	0	2	<b>2</b>	8	<b>10</b>
Tobacco products	3	0	0.69	0.00	0	0	<b>0</b>	3	<b>3</b>
Textile fibres, yarns etc	34	18	0.92	1.90	1	-3	<b>-1</b>	17	<b>16</b>
Textile products	24	27	0.74	0.91	2	-9	<b>-7</b>	5	<b>-2</b>
Knitting mill products	0	0	0.56	0.00	0	0	<b>0</b>	0	<b>0</b>
Clothing	23	17	1.04	1.36	1	0	<b>1</b>	5	<b>6</b>
Footwear	11	13	0.68	0.81	1	-5	<b>-4</b>	2	<b>-2</b>
Leather and leather products	101	132	0.80	0.77	9	-34	<b>-26</b>	-5	<b>-31</b>
Sawmill products	156	55	1.38	2.83	4	17	<b>21</b>	80	<b>101</b>
Other wood products	101	132	0.87	0.77	9	-26	<b>-18</b>	-13	<b>-31</b>
Pulp, paper and paperboard	0	0	0.81	0.00	0	0	<b>0</b>	0	<b>0</b>
Paper bags and products	0	0	1.16	0.00	0	0	<b>0</b>	0	<b>0</b>
Printing; services to printing	256	263	1.08	0.97	17	3	<b>20</b>	-28	<b>-8</b>
Publishing; recorded media etc	167	118	1.34	1.42	8	33	<b>40</b>	9	<b>49</b>
Petroleum and coal products	4	7	0.84	0.54	0	-1	<b>-1</b>	-2	<b>-3</b>
Basic chemicals	23	33	0.74	0.68	2	-11	<b>-9</b>	-2	<b>-11</b>
Paints	5	3	0.92	1.40	0	0	<b>0</b>	2	<b>1</b>
Pharmaceuticals etc	14	24	1.08	0.60	2	0	<b>2</b>	-12	<b>-10</b>
Soap and detergents	4	3	0.58	1.03	0	-2	<b>-1</b>	2	<b>0</b>
Cosmetics and toiletries	0	3	0.98	0.00	0	0	<b>0</b>	-3	<b>-3</b>
Other chemical products	4	0	0.79	0.00	0	0	<b>0</b>	4	<b>4</b>
Rubber products	9	8	1.22	1.22	1	1	<b>2</b>	0	<b>2</b>
Plastic products	7	19	0.84	0.36	1	-4	<b>-3</b>	-9	<b>-12</b>
Glass and glass products	7	4	0.89	1.67	0	-1	<b>0</b>	3	<b>3</b>
Ceramic products	44	31	0.78	1.45	2	-9	<b>-7</b>	20	<b>14</b>
Cement, lime and concrete slurry	36	54	0.66	0.66	4	-22	<b>-18</b>	0	<b>-18</b>
Plaster; other concrete products	47	56	0.77	0.84	4	-16	<b>-13</b>	4	<b>-9</b>
Non-metallic min. products nec	9	8	0.98	1.16	0	-1	<b>0</b>	1	<b>1</b>
Iron and steel	39	37	0.86	1.04	2	-8	<b>-5</b>	7	<b>2</b>
Basic non-ferrous metals etc	3	0	0.81	0.00	0	0	<b>0</b>	3	<b>3</b>
Structural metal products	62	153	0.93	0.40	10	-20	<b>-10</b>	-81	<b>-91</b>
Sheet metal products	47	31	0.98	1.50	2	-3	<b>-1</b>	16	<b>16</b>
Fabricated metal products	157	68	1.03	2.31	4	-2	<b>2</b>	87	<b>89</b>
Motor vehicles and parts etc	102	67	0.92	1.52	4	-10	<b>-6</b>	40	<b>35</b>
Ships and boats	0	0	0.68	0.00	0	0	<b>0</b>	0	<b>0</b>

Sector	Employment		Growth		Component				Total
	1996	1991	NSW Gni	Local Gri	State	Industry	Total State	Local	Change
Railway equipment	3	10	0.56	0.33	1	-5	-4	-2	-6
Aircraft	19	30	1.35	0.63	2	8	10	-21	-11
Scientific etc equipment	8	18	1.12	0.44	1	1	2	-13	-10
Electronic equipment	10	12	0.95	0.81	1	-1	-1	-2	-2
Household appliances	0	13	0.77	0.00	1	-4	-3	-10	-13
Other electrical equipment	15	26	0.69	0.57	2	-10	-8	-3	-11
Agricultural, mining etc machinery	105	98	2.26	1.07	6	117	123	-116	7
Other machinery and equipment	90	88	0.66	1.02	6	-35	-29	31	2
Prefabricated buildings	8	0	0.00	0.00	0	0	0	8	8
Furniture	58	50	1.23	1.17	3	8	11	-3	8
Other manufacturing	28	46	0.76	0.60	3	-14	-11	-7	-18
Electricity	296	405	0.67	0.73	26	-160	-134	25	-109
Gas	3	23	0.68	0.14	1	-9	-7	-12	-19
Water, sewerage & drainage	175	189	0.53	0.92	12	-101	-89	75	-14
Residential building	1301	1334	1.18	0.98	87	160	247	-280	-33
Other construction	1002	1000	0.91	1.00	65	-158	-93	95	2
Wholesale trade	2325	2407	1.02	0.97	156	-119	38	-119	-82
Retail trade	5325	5612	1.02	0.95	364	-259	105	-392	-287
Mechanical repairs	1113	652	1.71	1.71	42	421	463	-2	461
Other repairs	106	122	1.16	0.87	8	12	19	-35	-15
Accom. & restaurants	2218	2119	1.17	1.05	137	218	355	-256	99
Road transport	1157	1225	0.92	0.94	79	-173	-93	26	-68
Rail & other transport	463	634	0.74	0.73	41	-204	-163	-8	-172
Water transport	0	3	1.01	0.00	0	0	0	-3	-3
Air and space transport	72	76	1.08	0.95	5	1	6	-10	-4
Transport srvs, storage	265	275	1.20	0.96	18	37	55	-65	-10
Communication services	694	723	1.24	0.96	47	130	177	-206	-29
Banking	668	769	0.98	0.87	50	-64	-15	-87	-101
Non-bank finance	75	81	0.76	0.93	5	-25	-19	14	-6
Financial asset investors	4	36	1.58	0.12	2	18	21	-52	-31
Insurance	162	243	0.90	0.66	16	-40	-24	-58	-82
Services to finance etc	175	147	1.07	1.19	10	0	10	19	28
Ownership of dwellings	0	0	0.00	0.00	0	0	0	0	0
Other property services	374	393	1.03	0.95	25	-15	10	-29	-19
Scientific research etc	360	412	1.31	0.87	27	100	126	-178	-52
Legal, accounting srvs	818	673	1.35	1.22	44	193	236	-91	145
Other business services	623	473	1.49	1.32	31	203	234	-84	150
Public administration	1881	1965	0.90	0.96	127	-322	-195	110	-85
Defence	19	63	0.81	0.29	4	-16	-12	-33	-45
Education	3128	2891	1.10	1.08	188	106	293	-57	236
Health services	2927	2641	1.10	1.11	171	104	275	10	286
Community services	1057	722	1.52	1.47	47	330	377	-41	336
Motion picture, radio etc	83	104	1.25	0.81	7	19	26	-46	-20
Libraries, museums, arts	279	183	1.39	1.53	12	60	72	24	96
Sport, gambling etc	246	195	1.43	1.26	13	71	84	-32	51
Personal services	633	539	1.27	1.17	35	109	144	-50	94
Other services	599	656	1.04	0.91	43	-17	25	-82	-57
<b>TOTAL</b>	<b>43805</b>	<b>44395</b>	<b>1.06</b>	<b>0.99</b>	<b>2879</b>	<b>1125</b>	<b>4004</b>	<b>-4594</b>	<b>-590</b>

**ATTACHMENT 2b: 107 SECTOR SHIFT-SHARE EMPLOYMENT ANALYSIS 2001**

Sector	Employment		Growth		Component				Total Change
	1996	1991	NSW Gni	Local Gri	State	Industry	Total State	Local	
Sheep	920	942	1.03	0.98	70	-46	24	-46	-22
Grains	4955	4662	1.45	1.06	347	1735	2082	-1789	293
Beef cattle	1237	1300	0.82	0.95	97	-336	-240	177	-62
Dairy cattle	27	69	0.57	0.39	5	-35	-30	-12	-42
Pigs	99	177	0.62	0.56	13	-81	-68	-10	-78
Poultry	80	89	0.66	0.90	7	-37	-30	21	-9
Other agriculture	1604	1755	0.85	0.91	131	-385	-255	104	-151
Services to agric.; hunting	877	819	1.13	1.07	61	48	109	-51	58
Forestry and logging	82	124	0.86	0.66	9	-27	-18	-25	-43
Commercial fishing	6	3	0.89	1.97	0	-1	0	3	3
Coal; oil and gas	78	208	0.66	0.38	15	-86	-70	-59	-130
Iron ores	0	0	0.00	0.00	0	0	0	0	0
Non-ferrous metal ores	10	7	1.05	1.55	0	0	0	3	4
Other mining	45	60	0.59	0.74	4	-29	-25	9	-16
Services to mining	17	55	0.56	0.31	4	-29	-24	-14	-38
Meat and meat products	245	569	0.81	0.43	42	-149	-107	-216	-323
Dairy products	3	25	1.18	0.13	2	3	4	-26	-21
Fruit and vegetable products	0	5	1.36	0.00	0	2	2	-7	-5
Oils and fats	35	109	0.92	0.32	8	-16	-8	-65	-74
Flour and cereal foods	57	59	0.81	0.96	4	-16	-12	9	-2
Bakery products	73	173	0.70	0.42	13	-65	-53	-47	-100
Confectionery	0	0	1.13	0.00	0	0	0	0	0
Other food products	176	105	0.93	1.68	8	-15	-8	79	71
Soft drinks, cordials, syrups	16	13	1.14	1.31	1	1	2	2	4
Beer and malt	0	3	1.19	0.00	0	0	1	-4	-3
Wine and spirits	30	14	2.04	2.11	1	14	15	1	16
Tobacco products	0	3	1.01	0.00	0	0	0	-3	-3
Textile fibres, yarns etc	213	34	0.54	6.32	3	-18	-16	195	179
Textile products	47	24	1.18	1.93	2	3	4	18	23
Knitting mill products	0	0	0.92	0.00	0	0	0	0	0
Clothing	15	23	0.70	0.64	2	-8	-7	-1	-8
Footwear	8	11	0.63	0.77	1	-5	-4	1	-2
Leather and leather products	105	101	0.68	1.04	8	-40	-32	37	4
Sawmill products	113	156	0.89	0.73	12	-29	-17	-25	-42
Other wood products	111	101	1.16	1.09	8	9	16	-7	10
Pulp, paper and paperboard	3	0	1.24	0.00	0	0	0	3	3
Paper bags and products	13	0	1.07	0.00	0	0	0	13	13
Printing; services to printing	173	256	0.86	0.67	19	-55	-36	-48	-83
Publishing; recorded media etc	285	167	1.15	1.70	12	12	25	93	118
Petroleum and coal products	22	4	1.56	6.11	0	2	2	16	18
Basic chemicals	24	23	0.91	1.06	2	-4	-2	3	1
Paints	18	5	1.52	3.93	0	2	2	11	14
Pharmaceuticals etc	34	14	1.22	2.32	1	2	3	16	19
Soap and detergents	3	4	1.32	0.91	0	1	1	-1	0
Cosmetics and toiletries	0	0	1.20	0.00	0	0	0	0	0
Other chemical products	0	4	1.11	0.00	0	0	0	-4	-4
Rubber products	7	9	0.80	0.71	1	-3	-2	-1	-3
Plastic products	13	7	1.01	2.01	0	0	0	7	7
Glass and glass products	11	7	1.17	1.64	0	1	1	3	4
Ceramic products	41	44	0.94	0.94	3	-6	-3	0	-3
Cement, lime and concrete slurry	82	36	1.17	2.28	3	4	6	40	46
Plaster; other concrete products	35	47	0.99	0.76	3	-4	-1	-10	-11
Non-metallic min. products nec	11	9	1.60	1.21	1	5	5	-3	2
Iron and steel	126	39	1.08	3.23	3	0	3	84	87
Basic non-ferrous metals etc	20	3	1.56	6.23	0	2	2	15	17
Structural metal products	66	62	0.73	1.07	5	-21	-16	21	4
Sheet metal products	35	47	0.56	0.75	3	-24	-21	9	-12
Fabricated metal products	125	157	0.75	0.79	12	-51	-39	7	-32
Motor vehicles and parts etc	125	102	1.32	1.23	8	25	33	-10	23
Ships and boats	14	0	1.21	0.00	0	0	0	14	14

Sector	Employment		Growth		Component				Total
	1996	1991	NSW Gni	Local Gri	State	Industry	Total State	Local	Change
Railway equipment	3	3	0.74	1.04	0	-1	-1	1	0
Aircraft	15	19	0.91	0.80	1	-3	-2	-2	-4
Scientific etc equipment	20	8	1.46	2.49	1	3	4	8	12
Electronic equipment	25	10	1.45	2.56	1	4	4	11	15
Household appliances	3	0	1.05	0.00	0	0	0	3	3
Other electrical equipment	20	15	0.99	1.39	1	-1	0	6	6
Agricultural, mining etc machinery	147	105	1.26	1.40	8	19	27	15	42
Other machinery and equipment	71	90	0.95	0.79	7	-11	-5	-14	-19
Prefabricated buildings	24	8	0.98	3.03	1	-1	0	16	16
Furniture	85	58	1.11	1.47	4	2	6	21	27
Other manufacturing	14	28	1.06	0.51	2	0	2	-15	-13
Electricity	216	296	0.88	0.73	22	-59	-37	-43	-80
Gas	9	3	0.74	3.08	0	-1	-1	7	6
Water, sewerage & drainage	94	175	1.07	0.54	13	0	13	-93	-81
Residential building	1449	1301	1.30	1.11	97	298	395	-248	148
Other construction	1086	1002	0.93	1.08	75	-142	-67	150	83
Wholesale trade	2616	2325	0.95	1.13	173	-282	-109	400	291
Retail trade	5743	5325	1.16	1.08	396	442	838	-420	418
Mechanical repairs	1074	1113	1.01	0.97	83	-74	9	-47	-39
Other repairs	96	106	0.93	0.90	8	-15	-8	-3	-11
Accom. & restaurants	2241	2218	1.11	1.01	165	86	251	-227	23
Road transport	1472	1157	1.23	1.27	86	177	263	52	315
Rail & other transport	216	463	0.79	0.47	34	-132	-98	-148	-246
Water transport	0	0	1.10	0.00	0	0	0	0	0
Air and space transport	75	72	1.08	1.04	5	0	6	-3	3
Transport srvs, storage	231	265	0.83	0.87	20	-64	-44	10	-34
Communication services	506	694	1.02	0.73	52	-40	12	-200	-188
Banking	429	668	0.93	0.64	50	-95	-45	-194	-239
Non-bank finance	86	75	0.73	1.15	6	-26	-21	32	11
Financial asset investors	21	4	1.31	4.83	0	1	1	15	16
Insurance	215	162	1.34	1.33	12	44	56	-3	53
Services to finance etc	113	175	1.29	0.65	13	38	51	-113	-62
Ownership of dwellings	0	0	0.00	0.00	0	0	0	0	0
Other property services	416	374	1.17	1.11	28	36	64	-23	42
Scientific research etc	447	360	1.37	1.24	27	107	134	-46	87
Legal, accounting srvs	1167	818	1.13	1.43	61	42	103	246	349
Other business services	862	623	1.25	1.38	46	109	155	84	239
Public administration	1780	1881	1.01	0.95	140	-115	24	-125	-101
Defence	24	19	0.75	1.27	1	-6	-5	10	5
Education	3191	3128	1.07	1.02	233	-3	229	-166	63
Health services	3004	2927	1.06	1.03	218	-37	181	-104	77
Community services	1227	1057	1.13	1.16	79	56	135	34	169
Motion picture, radio etc	93	83	1.19	1.12	6	9	16	-6	10
Libraries, museums, arts	239	279	1.03	0.86	21	-13	8	-48	-40
Sport, gambling etc	229	246	1.15	0.93	18	19	37	-54	-17
Personal services	706	633	1.12	1.11	47	31	78	-5	73
Other services	687	599	1.02	1.15	45	-32	12	75	88
<b>TOTAL</b>	<b>45057</b>	<b>43805</b>	<b>1.07</b>	<b>1.03</b>	<b>3258</b>	<b>618</b>	<b>3877</b>	<b>-2625</b>	<b>1252</b>

**ATTACHMENT 3a: MANUFACTURING INDUSTRY EMPLOYMENT 1996**

Manufacturing Industry Class - 1996	Dubbo	Coolah	Coonabarabran	Gilgandra	Merriwa	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yallaro	Brigalow Region
2100 Food, Bevrg & Tabcco Mfg, undef	3	0	0	0	4	0	3	0	0	0	0	10
2110 Meat & Meat Products Mfg, undef	3	0	0	0	0	0	3	0	0	3	0	9
2111 Meat Processing	211	6	3	3	0	17	244	3	9	5	6	507
2112 Poultry Processing	6	0	3	3	0	0	0	0	0	4	0	16
2113 Bacon, Ham & Smallgood Mfg	0	0	0	0	3	0	0	0	0	0	0	3
2120 Dairy Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2121 Milk & Cream Processing	17	0	0	0	0	0	0	0	0	0	0	17
2122 Ice Cream Manufacturing	3	0	0	0	0	0	0	0	0	3	0	6
2129 Dairy Product Manufacturing, nec	0	0	0	0	0	0	0	0	0	0	0	0
2130 Fruit & Vegetable Processing	0	0	0	0	0	0	5	0	0	0	0	5
2140 Oil & Fat Manufacturing	3	0	0	0	0	0	3	28	70	0	0	104
2150 Flour Mill & Cereal Fd Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2151 Flour Mill Product Manufacturing	18	0	0	0	0	0	35	0	3	0	0	56
2152 Cereal Food & Baking Mix Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2160 Bakery Product Mfg, undef	10	0	3	0	3	0	0	4	0	0	0	20
2161 Bread Manufacturing	80	0	3	0	6	0	3	7	6	0	0	105
2162 Cake & Pastry Manufacturing	12	0	0	3	0	0	0	7	15	0	0	37
2163 Biscuit Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2170 Other Food Manufacturing, undef	0	0	0	0	0	0	0	0	0	0	0	0
2171 Sugar Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2172 Confectionery Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2173 Seafood Processing	0	0	0	0	0	0	0	0	0	0	0	0
2174 Prepared Animal & Bird Feed Mfg	44	0	3	0	3	3	32	6	0	0	0	91
2179 Food Manufacturing, nec	3	0	0	0	0	0	0	0	4	0	0	7
2180 Beverage & Malt Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2181 Soft Drink, Cordial & Syrup Mfg	3	0	0	0	0	0	0	9	0	0	0	12
2182 Beer & Malt Manufacturing	3	0	0	0	0	0	0	0	0	0	0	3
2183 Wine Manufacturing	0	0	0	0	9	0	0	0	3	0	0	12
2184 Spirit Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2190 Tobacco Product Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2200 Txl Clthg Ftwr Lthr Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2210 Txl Fbre Yrn Wvn Fab Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2211 Wool Scouring	5	0	0	0	0	0	0	0	0	0	0	5
2212 Synthetic Fibre Textile Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2213 Cotton Textile Manufacturing	0	0	0	0	0	0	0	3	24	0	0	27
2214 Wool Textile Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2215 Textile Finishing	0	0	0	0	0	0	0	0	0	0	0	0
2220 Textile Product Mfg, undef	0	0	0	0	0	3	0	0	0	0	0	3
2221 Made-Up Textile Product Mfg	11	0	0	0	0	0	4	0	0	0	0	15
2222 Textile Floor Covering Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2223 Rope, Cordage & Twine Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2229 Textile Product Mfg, nec	0	0	0	0	0	0	0	0	5	0	0	5
2230 Knitting Mills, undef	0	0	0	0	0	0	0	0	0	0	0	0
2231 Hosiery Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2232 Cardigan & Pullover Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2239 Knitting Mill Prod Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0
2240 Clothing Manufacturing, undef	0	0	0	3	0	0	3	0	3	0	0	9
2241 Men's & Boys' Wear Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2242 Women's & Girls' Wear Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2243 Sleepwr Undwr & Infant Clthg	0	0	0	0	0	0	0	0	0	0	0	0
2249 Clothing Manufacturing, nec	3	0	0	3	0	0	0	0	0	0	0	6
2250 Footwear Manufacturing	10	0	0	0	0	0	0	0	0	0	0	10
2260 Leather & Lthr Prod Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2261 Leather Tanning & Fur Dressing	3	0	0	0	0	0	77	0	3	0	0	83
2262 Leather & Lthr Substit Prod Mfg	7	0	3	0	0	0	0	3	0	0	0	13
2300 Wood & Paper Prod Mfg, undef	0	0	0	0	0	3	0	0	0	0	0	3
2310 Log Sawmilling & Tmbr Drssng	0	3	3	0	0	0	16	0	9	3	0	34
2311 Log Sawmilling	3	6	28	3	0	3	3	0	26	3	19	94
2312 Wood Chipping	0	0	0	0	0	0	0	0	0	0	0	0
2313 Timber Resawing & Dressing	3	0	7	7	0	0	0	0	0	0	0	17
2320 Other Wood Product Mfg, undef	0	0	0	0	0	0	0	0	3	0	0	3
2321 Plywood & Veneer Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2322 Fabricated Wood Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2323 Wooden Structural Component Mfg	44	0	6	0	0	0	4	9	0	3	0	66
2329 Wood Product Manufacturing, nec	13	0	4	0	0	0	6	3	0	0	0	26
2330 Paper & Paper Prods Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2331 Pulp, Paper & Paperboard Mfg	0	0	0	0	0	0	0	0	0	0	0	0



	Dubbo	Coolah	Coonabarabran	Gilgandra	Murrumbidgee	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yallalori	Brigalow Region
Manufacturing Industry Class - 1996												
2332 Solid Paperboard Container Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2333 Corrugated Paperboard Container Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2334 Paper Bag & Sack Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2339 Paper Product Manufacturing, excl	0	0	0	0	0	0	0	0	0	0	0	0
2400 Prnt Publish Recorded Media undef	0	0	0	0	0	0	0	0	0	0	0	0
2410 Printing & Serv to Printing udf	0	0	0	0	0	0	0	0	0	0	0	0
2411 Paper Stationery Manufacturing	0	0	3	3	0	0	0	0	0	0	0	6
2412 Printing	187	0	3	8	0	0	9	6	4	16	0	233
2413 Services to Printing	0	0	0	0	0	0	0	0	0	3	0	3
2420 Publishing, undef	4	0	0	0	0	0	0	0	0	0	0	4
2421 Newspaper Printing or Publishing	94	0	5	0	0	0	18	22	13	0	0	152
2422 Other Periodical Publishing	3	0	0	0	0	0	0	0	0	0	0	3
2423 Book & Other Publishing	0	0	0	0	0	0	0	0	0	0	0	0
2430 Recorded Media Mfg & Publishing	0	0	0	0	0	0	0	0	0	0	0	0
2500 Petr'l Coal Chmcl Ass Prd Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2510 Petroleum Refining	0	0	0	0	0	0	0	0	0	0	0	0
2520 Petroleum, Coal Product Mfg, excl	3	0	0	0	0	0	0	0	0	0	0	3
2530 Basic Chemical Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2531 Fertiliser Manufacturing	0	0	0	0	0	0	3	5	7	0	0	15
2532 Industrial Gas Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2533 Synthetic Resin Manufacturing	3	0	0	0	0	0	0	0	0	0	0	3
2534 Organic Indust Chemical Mfg nec	3	0	0	0	0	0	0	0	0	0	0	3
2535 Inorganic Industl Cheml Mfg nec	0	0	0	0	0	0	0	0	0	0	0	0
2540 Other Chemical Product Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2541 Explosive Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2542 Paint Manufacturing	4	0	0	0	0	0	0	0	0	0	0	4
2543 Medicinal, Pharmactl Prodt Mfg	4	0	0	0	0	0	0	0	0	0	0	4
2544 Pesticide Manufacturing	3	0	0	0	0	0	3	3	0	0	0	9
2545 Soap & Other Detergent Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2546 Cosmetic, Toiletry Prep Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2547 Ink Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2549 Chemical Product Mfg, nec	3	0	0	0	0	0	0	0	0	0	0	3
2550 Rubber Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2551 Rubber Tyre Manufacturing	0	3	0	6	0	0	0	0	0	0	0	9
2559 Rubber Product Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0
2560 Plastic Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2561 Plastic Blow Moulded Product	0	0	0	0	0	0	0	0	0	0	0	0
2562 Plastic Extruded Prdct Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2563 Plastic Bag & Film Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2564 Plastic Prd Rigid Fbr Reinfrd	0	0	0	0	0	0	0	0	0	0	0	0
2565 Plastic Foam Product Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2566 Plastic Injctn Moulded Prod Mfg	3	0	0	0	0	0	0	3	0	0	0	6
2600 Non-Metalic Minl Prod Mfg undef	3	0	0	0	0	0	3	0	0	0	0	6
2610 Glass, Glass Product Mfg	6	0	0	0	0	0	0	0	0	0	0	6
2620 Ceramic Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2621 Clay Brick Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2622 Ceramic Product Manufacturing	0	3	0	0	0	0	20	0	0	0	0	23
2623 Ceramic Tile & Pipe Mfg	0	0	0	0	0	0	0	3	0	0	0	3
2629 Ceramic Product Mfg, nec	7	0	6	0	0	0	0	0	0	0	0	13
2630 Cmnt Lme Plstr Cncrt Prd Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2631 Cement & Lime Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2632 Plaster Product Manufacturing	3	0	0	0	0	0	0	0	0	0	0	3
2633 Concrete Slurry Manufacturing	8	0	3	0	0	0	0	15	5	0	3	34
2634 Concrete Pipe, Box Culvert Mfg	12	0	0	0	0	0	0	0	9	0	0	21
2635 Concrete Product Mfg, nec	12	0	0	0	0	0	3	0	3	0	0	18
2640 Non-Metalic Minl Prod Mfg, nec	5	0	0	0	0	0	0	3	0	0	0	8
2700 Metal Product Mfg, undef	16	0	3	0	0	0	6	12	8	0	3	48
2710 Iron & Steel Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2711 Basic Iron & Steel Mfg	27	0	3	0	0	0	0	0	0	0	0	30
2712 Iron, Steel Casting, Forging	0	0	0	0	0	0	0	0	0	0	0	0
2713 Steel Pipe, Tube Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2720 Basic Non-Ferous Mtl Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2721 Alumina Production	0	0	0	0	0	0	0	0	0	0	0	0
2722 Aluminium Smelting	0	0	0	0	0	0	0	0	0	0	0	0
2723 Copr Slvr Lead Zinc Smltg Refng	0	0	0	0	0	0	0	0	0	0	0	0
2729 Basic Non-Ferous Metal Mfg, nec	0	0	0	0	0	0	0	0	0	3	0	3
2730 Non-Frs Basic Mtl Prd Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0

Manufacturing Industry Class - 1996	Dubbo	Coolah	Coonabarabran	Gilgandra	Merriwa	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yallaro	Brigalow Region
2731 Aluminium Rllng, Drwng, Extrudng	0	0	0	0	0	0	0	0	0	0	0	0
2732 Non-Frs Mtl Rllng Drw Extrdng	0	0	0	0	0	0	0	0	0	0	0	0
2733 Non-Ferrous Metal Casting	0	0	0	0	0	0	0	0	0	0	0	0
2740 Structural Mtl Prod Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2741 Structural Steel Fabricating	19	0	0	0	0	0	3	3	9	0	0	34
2742 Archtectral Aluminium Prod Mfg	3	0	0	0	0	0	0	9	0	0	0	12
2749 Structural Metal Prod Mfg, nec	0	0	0	0	0	0	4	0	0	0	0	4
2750 Sheet Metal Product Mfg, undef	3	0	0	0	0	0	0	3	3	0	0	9
2751 Metal Container Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2759 Sheet Metal Product Mfg, nec	11	0	0	0	0	0	0	0	19	0	0	30
2760 Fabricated Mtl Prod Mfg, undef	0	0	0	0	0	0	0	3	0	0	0	3
2761 Hand Tool, General Hardware Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2762 Spring & Wire Product Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2763 Nut, Bolt, Screw, Rivet Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2764 Metal Coating & Finishing	8	0	0	0	0	0	0	0	0	0	0	8
2765 Non-Ferrous Pipe Fitting Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2769 Fabricated Metal Prods Mfg, nec	35	3	0	3	0	3	8	41	15	0	3	111
2800 Machinery, Equipmnt Mfg, undef	10	0	0	0	0	0	0	0	0	0	0	10
2810 Motor Vehicle, Part Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2811 Motor Vehicle Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2812 Motor Vehicle Body Manufacturing	41	0	8	0	0	0	6	3	0	3	0	61
2813 Automotive Elctrcl, Instrmnt Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2819 Automotive Component Mfg, nec	11	0	3	0	0	0	3	9	0	0	3	29
2820 Other Transport Equip Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2821 Shipbuilding	0	0	0	0	0	0	0	0	0	0	0	0
2822 Boatbuilding	0	0	0	0	0	0	0	0	0	0	0	0
2823 Railway Equipment Manufacturing	0	0	0	0	0	0	0	3	0	0	0	3
2824 Aircraft Manufacturing	6	0	0	0	0	0	3	3	5	0	0	17
2829 Transport Equipment Mfg, nec	3	0	0	0	0	0	0	0	0	0	0	3
2830 Phtgphc Scientfc Eqp Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2831 Photographic, Optical Good Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2832 Medical, Surgical Equip Mfg	4	0	0	0	0	0	3	0	0	0	0	7
2839 Profsnl, Scientfc Equip Mfg nec	0	0	0	0	0	0	0	0	0	0	0	0
2840 Electronic Equip Mfg undef	3	0	0	0	0	0	0	0	0	0	0	3
2841 Computer, Business Machine Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2842 Telecmn Brdcstng Trnscvg Eqp	3	0	0	0	0	0	0	0	0	0	0	3
2849 Electronic Equipment Mfg nec	0	0	0	0	0	0	0	0	0	0	3	3
2850 Electrl Equip Aplnce Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2851 Household Appliance Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2852 Electric Cable & Wire Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2853 Battery Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2854 Electric Light & Sign Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2859 Electrical Equipment Mfg nec	13	0	0	0	0	0	0	0	0	0	0	13
2860 Indstl Machnry Equip Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2861 Agricultural Machinery Mfg	44	0	3	0	0	3	3	10	9	21	0	93
2862 Mining, Constrtn Machinery Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2863 Food Processing Machinery Mfg	9	0	0	0	0	0	0	0	3	0	0	12
2864 Machine Tool & Part Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2865 Lftng, Matral Hndlng Equip Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2866 Pump & Compressor Mfg	0	0	0	0	0	0	0	0	5	0	0	5
2867 Comcl Spce Htng Colng Equip Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2869 Industl Machnry, Equip Mfg nec	42	0	0	0	0	0	5	8	7	0	3	65
2900 Other Manufacturing, undef	3	0	0	0	0	0	0	0	0	0	0	3
2910 Prefabrctd Building Mfg undef	3	0	0	0	0	0	0	0	0	0	0	3
2911 Prefabricated Metal Building Mfg	4	0	0	0	0	0	0	0	0	0	0	4
2919 Prefabricated Building Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0
2920 Furniture Manufacturing, undef	3	0	0	0	0	0	0	0	0	0	0	3
2921 Wdn Frntre, Upholstrd Seat Mfg	26	0	0	0	0	3	6	6	0	0	3	44
2922 Sheet Metal Furniture Mfg	0	0	0	0	0	0	0	0	0	0	3	3
2923 Mattress Mfg (Except Rubber)	0	0	0	0	0	0	0	3	0	0	0	3
2929 Furniture Manufacturing, nec	0	0	0	0	0	0	0	0	0	0	0	0
2940 Other Manufacturing, undef	0	0	0	0	0	0	0	0	0	0	0	0
2941 Jewellery & Silverware Mfg	3	0	3	0	0	0	0	0	0	0	0	6
2942 Toy & Sporting Good Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2949 Manufacturing, nec	16	0	0	0	0	0	0	3	0	0	0	19
C000 Manufacturing, undef	43	3	0	3	0	0	11	0	7	4	0	71
<b>Total Manufacturing</b>	<b>1315</b>	<b>27</b>	<b>109</b>	<b>48</b>	<b>28</b>	<b>38</b>	<b>561</b>	<b>261</b>	<b>314</b>	<b>74</b>	<b>49</b>	<b>2824</b>

## ATTACHMENT 3b: MANUFACTURING INDUSTRY EMPLOYMENT 2001

Manufacturing Industry Class - 2001	Dubbo	Coolah	Coonabarabran	Gulgandra	Merriwa	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quindri	Yallandi	Brungle	Region
2100 Food, Bevrg & Tabcco Mfg, undef	8	0	3	0	0	0	0	0	0	0	0	0	11
2110 Meat & Meat Products Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2111 Meat Processing	157	0	13	6	0	0	19	0	3	3	7	0	208
2112 Poultry Processing	0	0	0	3	0	0	4	0	0	4	0	0	11
2113 Bacon, Ham & Smallgood Mfg	3	0	0	0	0	0	0	0	0	0	0	0	3
2120 Dairy Product Mfg, undef	3	0	0	0	0	0	0	0	0	0	0	0	3
2121 Milk & Cream Processing	0	0	0	0	0	0	0	0	0	0	0	0	0
2122 Ice Cream Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2129 Dairy Product Manufacturing, undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2130 Fruit & Vegetable Processing	0	0	0	0	0	0	0	0	0	0	0	0	0
2140 Oil & Fat Manufacturing	0	0	0	0	0	0	0	3	30	0	0	0	33
2150 Flour Mill & Cereal Fd Mfg, undef	13	0	0	0	0	0	18	0	0	0	0	0	31
2151 Flour Mill Product Manufacturing	8	0	0	0	0	0	14	0	0	0	0	0	22
2152 Cereal Food & Baking Mix Mfg	0	0	0	0	0	0	0	0	0	0	0	0	0
2160 Bakery Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2161 Bread Manufacturing	46	0	0	3	3	0	0	3	6	0	0	0	61
2162 Cake & Pastry Manufacturing	3	0	0	0	0	0	0	0	3	0	0	0	6
2163 Biscuit Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2170 Other Food Manufacturing, undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2171 Sugar Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2172 Confectionery Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2173 Seafood Processing	0	0	0	0	0	0	0	0	0	0	0	0	0
2174 Prepared Animal & Bird Feed Mfg	82	0	3	4	3	0	27	5	8	0	0	0	132
2179 Food Manufacturing, nec	6	0	0	0	9	0	3	3	6	0	3	0	30
2180 Beverage & Malt Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2181 Soft Drink, Cordial & Syrup Mfg	5	0	0	0	0	0	0	7	0	0	3	0	15
2182 Beer & Malt Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2183 Wine Manufacturing	0	0	0	3	26	0	0	0	0	0	0	0	29
2184 Spirit Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2190 Tobacco Product Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2200 Txl Clthg Ftwr Lthr Mfg undef	3	0	0	3	0	0	0	0	0	0	0	0	6
2210 Txl Fbre Yrn Wvn Fab Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2211 Wool Scouring	3	0	0	0	0	0	0	0	3	0	0	0	6
2212 Synthetic Fibre Textile Mfg	0	0	0	0	0	0	0	0	0	0	0	0	0
2213 Cotton Textile Manufacturing	0	0	0	0	0	0	12	65	107	0	0	0	184
2214 Wool Textile Manufacturing	3	0	0	0	0	0	0	0	0	0	0	0	3
2215 Textile Finishing	3	0	0	0	0	0	0	0	0	0	0	0	3
2220 Textile Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2221 Made-Up Textile Product Mfg	18	0	0	0	0	0	3	14	3	0	0	0	38
2222 Textile Floor Covering Mfg	3	0	0	0	0	0	0	0	0	0	0	0	3
2223 Rope, Cordage & Twine Mfg	0	0	0	0	0	0	0	0	0	0	0	0	0
2229 Textile Product Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0	0
2230 Knitting Mills, undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2231 Hosiery Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2232 Cardigan & Pullover Mfg	0	0	0	0	0	0	0	0	0	0	0	0	0
2239 Knitting Mill Prod Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0	0
2240 Clothing Manufacturing, undef	3	0	3	0	0	0	0	0	0	0	0	0	6
2241 Men's & Boys' Wear Mfg	0	0	0	0	0	0	0	0	0	0	0	0	0
2242 Women's & Girls' Wear Mfg	0	0	0	0	0	0	0	0	0	0	0	0	0
2243 Sleepwr Undwr & Infant Clthg	0	0	0	3	0	0	0	0	0	0	0	0	3
2249 Clothing Manufacturing, nec	0	0	0	0	0	0	0	0	0	0	3	0	3
2250 Footwear Manufacturing	7	0	0	0	0	0	0	0	0	0	0	0	7
2260 Leather & Lthr Prod Mfg, undef	0	0	0	0	0	0	3	0	0	0	0	0	3
2261 Leather Tanning & Fur Dressing	3	0	0	0	0	0	61	0	3	0	0	0	67
2262 Leather & Lthr Substit Prod Mfg	7	0	0	3	0	0	13	0	0	3	0	0	26
2300 Wood & Paper Prod Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0	0
2310 Log Sawmilling & Tmbr Drssng	0	0	0	0	0	3	3	0	0	0	0	0	6
2311 Log Sawmilling	7	0	22	3	0	0	23	0	28	3	6	0	92
2312 Wood Chipping	0	0	0	0	0	0	0	0	0	0	0	0	0
2313 Timber Resawing & Dressing	0	0	3	3	0	0	0	0	0	0	0	0	6
2320 Other Wood Product Mfg, undef	3	0	0	0	0	0	3	0	0	0	0	0	6
2321 Plywood & Veneer Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2322 Fabricated Wood Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
2323 Wooden Structural Component Mfg	63	3	0	0	0	0	6	6	0	3	0	0	81
2329 Wood Product Manufacturing, nec	12	0	0	0	0	0	0	0	3	0	0	0	15
2330 Paper & Paper Prods Mfg, undef	0	0	0	0	0	0	0	9	0	0	3	0	12
2331 Pulp, Paper & Paperboard Mfg	0	0	0	0	0	0	3	0	0	0	0	0	3

	Dubbo	Coolah	Coonabarabran	Gilgandra	Merriwa	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yarraloi	Brigalow Region
Manufacturing Industry Class - 2001												
2332 Solid Paperboard Container Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2333 Corrugated Paperboard Container Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2334 Paper Bag & Sack Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2339 Paper Product Manufacturing, undef	0	0	0	0	0	0	0	0	0	0	0	0
2400 Prnt Publsh Recorded Media undef	0	0	0	0	0	0	0	0	0	0	0	0
2410 Printing & Serv to Printing udf	0	0	0	0	0	0	0	0	0	0	0	0
2411 Paper Stationery Manufacturing	3	0	3	0	0	0	3	0	0	0	0	9
2412 Printing	111	3	0	3	0	0	7	6	3	6	0	139
2413 Services to Printing	6	0	0	3	0	0	0	0	3	0	0	12
2420 Publishing, undef	0	0	3	0	0	0	0	0	0	0	0	3
2421 Newspaper Printing or Publishing	88	0	3	6	0	0	17	21	16	4	0	155
2422 Other Periodical Publishing	91	0	0	0	0	3	0	0	0	0	0	94
2423 Book & Other Publishing	14	0	0	0	0	0	0	0	0	0	0	14
2430 Recorded Media Mfg & Publishing	0	0	0	0	0	0	0	0	0	0	0	0
2500 Petr Coal Chmcl Ass Prd Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2510 Petroleum Refining	0	0	0	0	0	0	0	3	0	0	3	6
2520 Petroleum, Coal Product Mfg,	5	0	0	3	0	0	0	0	3	0	3	14
2530 Basic Chemical Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2531 Fertiliser Manufacturing	0	0	0	0	0	0	0	8	8	0	0	16
2532 Industrial Gas Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2533 Synthetic Resin Manufacturing	0	0	0	0	0	0	3	0	0	0	0	3
2534 Organic Indust Chemical Mfg nec	0	0	0	0	0	0	3	0	0	0	0	3
2535 Inorganic Industl Cheml Mfg nec	0	0	0	0	0	0	0	0	0	0	0	0
2540 Other Chemical Product Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2541 Explosive Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2542 Paint Manufacturing	14	0	0	3	0	0	0	0	0	0	0	17
2543 Medicinal, Pharmactl Prodt Mfg	3	0	0	0	0	0	0	0	3	0	0	6
2544 Pesticide Manufacturing	6	0	3	0	0	0	3	4	9	0	0	25
2545 Soap & Other Detergent Mfg	0	0	0	0	0	0	0	0	3	0	0	3
2546 Cosmetic, Toiletry Prep Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2547 Ink Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2549 Chemical Product Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0
2550 Rubber Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2551 Rubber Tyre Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2559 Rubber Product Mfg, nec	3	0	0	0	0	0	0	3	0	0	0	6
2560 Plastic Product Mfg, undef	0	0	0	0	0	3	0	0	0	0	0	3
2561 Plastic Blow Moulded Product	0	0	0	0	0	0	0	0	0	0	0	0
2562 Plastic Extruded Prdct Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2563 Plastic Bag & Film Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2564 Plastic Prd Rigid Fbr Reinfrd	3	0	0	0	0	0	0	3	0	0	0	6
2565 Plastic Foam Product Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2566 Plastic Injctn Moulded Prod Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2600 Non-Metalic Minl Prod Mfg undef	3	0	0	0	0	0	0	3	0	0	0	6
2610 Glass, Glass Product Mfg	3	3	0	0	0	0	0	3	0	0	0	9
2620 Ceramic Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2621 Clay Brick Manufacturing	6	0	0	0	0	0	13	0	0	0	0	19
2622 Ceramic Product Manufacturing	0	0	0	0	0	0	5	0	0	0	0	5
2623 Ceramic Tile & Pipe Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2629 Ceramic Product Mfg, nec	3	0	7	0	0	0	0	0	0	0	0	10
2630 Cmmt Lme Plstr Cnrt Prd Mfg	12	0	3	0	0	0	3	0	0	0	0	18
2631 Cement & Lime Manufacturing	35	0	0	0	0	0	0	0	0	0	0	35
2632 Plaster Product Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2633 Concrete Slurry Manufacturing	14	0	0	0	0	0	0	7	5	3	0	29
2634 Concrete Pipe, Box Culvert Mfg	7	0	0	0	0	0	0	0	3	0	0	10
2635 Concrete Product Mfg, nec	8	0	0	0	0	0	3	0	3	0	3	17
2640 Non-Metalic Minl Prod Mfg, nec	6	0	0	0	0	0	0	0	0	0	0	6
2700 Metal Product Mfg, undef	3	0	0	0	0	0	3	3	3	0	0	12
2710 Iron & Steel Mfg, undef	3	0	0	0	0	0	0	0	0	0	0	3
2711 Basic Iron & Steel Mfg	44	0	0	0	3	3	7	20	8	4	3	92
2712 Iron, Steel Casting, Forging	3	0	0	0	0	0	0	0	0	0	0	3
2713 Steel Pipe, Tube Manufacturing	0	0	0	0	0	0	0	6	5	0	0	11
2720 Basic Non-Ferous Mtl Mfg, undef	0	0	0	0	0	0	0	3	0	0	0	3
2721 Alumina Production	0	0	0	0	0	0	0	0	0	0	0	0
2722 Aluminium Smelting	3	0	0	0	0	0	0	0	0	0	0	3
2723 Copr Slvr Lead Zinc Smltg Refng	0	0	0	0	0	0	0	0	0	0	0	0
2729 Basic Non-Ferous Metal Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0
2730 Non-Frs Basic Mtl Prd Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0

	Dubbo	Coolah	Coonabarabran	Gulgandra	Merinda	Murrumbidgee	Gunnedah	Moree Plains	Narrabri	Quirindi	Yarraloi	Brigalow Region
Manufacturing Industry Class - 2001												
2731 Aluminium Ring, Drwg, Extrudng	3	0	0	0	0	0	3	0	0	0	0	6
2732 Non-Frs Mtl Ring Drw Extrdng	3	0	0	0	0	0	0	0	3	0	0	6
2733 Non-Ferrous Metal Casting	0	0	0	0	0	0	0	0	0	0	0	0
2740 Structural Mtl Prod Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2741 Structural Steel Fabricating	25	0	3	0	0	0	3	0	0	0	0	31
2742 Architectral Aluminium Prod Mfg	9	0	0	0	0	0	3	5	0	0	0	17
2749 Structural Metal Prod Mfg, nec	8	0	3	0	0	0	0	0	0	0	0	11
2750 Sheet Metal Product Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2751 Metal Container Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2759 Sheet Metal Product Mfg, nec	13	0	0	0	0	0	3	0	15	0	0	31
2760 Fabricated Mtl Prod Mfg, undef	3	0	0	0	0	0	0	0	0	0	0	3
2761 Hand Tool, General Hardware Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2762 Spring & Wire Product Mfg	9	0	0	3	0	0	0	0	0	0	0	12
2763 Nut, Bolt, Screw, Rivet Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2764 Metal Coating & Finishing	7	3	3	0	0	0	0	0	0	0	0	13
2765 Non-Ferrous Pipe Fitting Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2769 Fabricated Metal Prods Mfg, nec	45	0	6	0	0	0	4	20	10	0	0	85
2800 Machinery, Equipmnt Mfg, undef	7	0	0	0	0	0	0	5	3	0	0	15
2810 Motor Vehicle, Part Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2811 Motor Vehicle Manufacturing	10	0	3	0	0	0	3	3	0	0	3	22
2812 Motor Vehicle Body Manufacturing	60	0	0	0	0	6	3	0	0	0	0	69
2813 Automotive Elctrcl, Instrmnt Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2819 Automotive Component Mfg, nec	10	0	0	3	0	0	3	3	3	0	0	22
2820 Other Transport Equip Mfg, undef	0	0	0	0	0	0	0	0	0	0	0	0
2821 Shipbuilding	6	0	0	0	0	0	0	0	3	0	0	9
2822 Boatbuilding	0	0	0	0	0	0	0	0	3	0	0	3
2823 Railway Equipment Manufacturing	3	0	0	0	0	0	0	0	0	0	0	3
2824 Aircraft Manufacturing	3	0	0	0	0	0	0	3	7	0	0	13
2829 Transport Equipment Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0
2830 Phtgphc Scientfc Eqp Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2831 Photographic, Optical Good Mfg	3	0	0	0	0	0	0	0	3	0	0	6
2832 Medical, Surgical Equip Mfg	0	0	0	0	0	0	6	0	0	0	0	6
2839 Profsnl, Scientfc Equip Mfg nec	3	0	0	0	0	0	0	3	0	0	0	6
2840 Electronic Equip Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2841 Computer, Business Machine Mfg	3	0	0	0	0	0	3	0	3	0	0	9
2842 Telecmn Brdcastng Trnscvg Eqp	10	0	0	0	0	0	0	0	0	0	0	10
2849 Electronic Equipment Mfg nec	4	0	0	0	0	0	0	0	0	0	0	4
2850 Electrcl Equip Aplnce Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2851 Household Appliance Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2852 Electric Cable & Wire Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2853 Battery Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
2854 Electric Light & Sign Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2859 Electrical Equipment Mfg nec	9	0	0	0	0	0	3	0	3	0	0	15
2860 Indstl Machnry Equip Mfg undef	0	0	0	0	0	0	0	0	0	0	0	0
2861 Agricultural Machinery Mfg	33	0	0	0	0	0	23	14	16	19	3	108
2862 Mining, Constrtn Machinery Mfg	0	0	0	0	0	0	3	3	0	0	0	6
2863 Food Processing Machinery Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2864 Machine Tool & Part Mfg	0	0	0	0	0	0	3	0	0	0	0	3
2865 Lftng, Matral Hndlng Equip Mfg	3	0	3	3	0	0	0	3	3	0	0	15
2866 Pump & Compressor Mfg	3	0	0	0	0	0	6	4	6	0	0	19
2867 Comcl Spce Htng Colng Equip Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2869 Indstl Machnry, Equip Mfg nec	18	0	3	0	0	0	3	10	0	0	3	37
2900 Other Manufacturing, undef	0	0	0	0	0	0	0	0	0	0	0	0
2910 Prefabrcted Building Mfg undef	9	0	0	0	0	0	0	0	0	3	0	12
2911 Prefabrcted Metal Building Mfg	7	0	0	0	0	0	0	0	3	0	0	10
2919 Prefabricated Building Mfg, nec	0	0	0	0	0	0	0	0	0	0	0	0
2920 Furniture Manufacturing, undef	3	0	0	0	0	0	0	0	0	0	0	3
2921 Wdn Frntre, Upholstrd Seat Mfg	24	0	0	4	0	0	3	10	9	3	0	53
2922 Sheet Metal Furniture Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2923 Mattress Mfg (Except Rubber)	0	0	0	0	0	0	0	0	0	0	0	0
2929 Furniture Manufacturing, nec	5	0	3	0	0	0	7	3	0	0	3	21
2940 Other Manufacturing, undef	0	0	0	0	0	0	0	0	0	0	0	0
2941 Jewellery & Silverware Mfg	3	0	0	0	0	0	0	0	0	0	0	3
2942 Toy & Sporting Good Mfg	0	0	0	0	0	0	0	0	0	0	0	0
2949 Manufacturing, nec	10	0	0	0	0	0	0	0	0	0	0	10
C000 Manufacturing, undef	63	0	11	6	0	0	15	29	19	8	0	151
<b>Total Manufacturing</b>	<b>1424</b>	<b>12</b>	<b>101</b>	<b>77</b>	<b>44</b>	<b>18</b>	<b>385</b>	<b>326</b>	<b>390</b>	<b>66</b>	<b>49</b>	<b>2892</b>

## ATTACHMENT 4: 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 purpose of the study.

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

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

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

**TABLE 1: Input-Output Table Quadrants**

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

Once a transaction table has been developed for a particular region, simple mathematical procedures can be applied to derive multipliers for each sector of the economy. The main function of input-output tables is to analyse problems involving the inter-sectoral 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 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 an overview of the GRIT method based on 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 this method should be used by an analyst who is familiar with the economy being modelled, or at least someone with that familiarity should be consulted.

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

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

**Table 2: The GRIT Method**

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

Source: Table 2 in Bayne and West (1988)



## Methods Used

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

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

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

### *Employment*

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

### *Gross Output*

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

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

where:  $i = 1...109$

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

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

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

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

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

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

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

### ***Household Income***

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

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

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

### ***Household Expenditure***

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

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

$${}^aC_{bread} = {}^aNSW_{bread} * {}^AC_{Food} / {}^ANSW_{Food}$$

where:

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

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

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

where:

<i>i</i>	=	sector 1....109
<i>R</i>	=	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 percent may be purchased locally but at least 40 percent 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 adjusted by using location quotients.

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).

Exports from NSW (or any regional input-output model) also include sales to other states/regions of Australia (ie 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 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 national 1993-94 input-output table which has 107 sectors based on the ANZSIC. While the input-output tables are available at the 107 sector level, equivalent with the 1995-96 national input-output table based on ASIC, the sector aggregation is shown in Attachment 5 with the corresponding sector description.

**ATTACHMENT 5: SECTOR CLASSIFICATION**

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

Sector Aggregation	107 IO Sectors
	Ships and boats 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

## References

- ABARE (2002), *Australian Farm Surveys Report*, Canberra.
- 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 (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.
- ABS (1997a), *Agstats, Small Area Agricultural Commodity Data, 1995-96*, Australian Government Publishing Service, Canberra. Catalogue No. 7119.0
- 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.
- Bray, J. and W. Mudd (1998), *The Contribution of DSS Payments to Regional Income*, Technical Series No.2, Department of Social Security, Canberra.
- Department of Employment and Workplace Relations (2001), *Small Area Labour Markets*, 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. 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.
- Jensen, R.C., Mandeville, T.D. and Karunaratne, N.D. (1979), *Regional Economic Planning: Generation of Regional Input-Output Analysis*, Croom Helm London.
- 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.

- Powell, Roy and Chalmers, Linden (1995), *Gwydir Valley Cotton and Drought Impact Study*, a report prepared for the Gwydir Valley Cotton Growers' Association by the Centre for Agricultural and Resource Economics, University of New England, Armidale.
- Powell, Roy and Linden Chalmers, (1998), 'New tables and new insights: The 1995-96 NSW input-output tables', paper presented to the ANZRSI Annual Conference, Tanunda, September.
- Powell, Roy, (2001) 'Globalisation And Business Development In Regional Australia', paper to the Who Dares Conference, Mandura, WA.
- Suzuki, D and Dressel, H. (2002), *Good News for a Change*, Allen and Unwin Sydney.
- Thompson, D. (1998), *Agroforestry From Existing Timber Resources on the Northern Tablelands*, a report prepared for the Rural Industries Research and Development Corporation, Canberra.
- West, G.R. (1992), *Input-Output Analysis for Practitioners: Version 7 User's Guide*, Department of Economics, University of Queensland, Brisbane.

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