Socio-Economic Profile of the

Goulburn Broken Catchment

including all of the Shepparton Irrigation Region

2006

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GOULBURN BROKEN
CATCHMENT MANAGEMENT AUTHORITY

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Note:

The report was last published as 'An Economic Profile of the Goulburn Broken Catchment (including the whole of the Shepparton Irrigation Region)' in 2001.

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Glossary of Terms

Gross Value of Production (GVP) – is the gross market value of the total number of units of output from an industry or sector, without any deductions for inputs.

Farm Gate Gross Value of Production – is the value of the total output from all farm enterprises without any deductions for inputs – eg. total litres of milk produced X gross price per litre (no deductions for levies, transport or other costs of production).

The **Gross Value of Production of the Dairy Processing Sector** – is the value of the total number of units of output from the factories. Part of this figure is the value of the milk used to produce the factory output. Therefore it is inappropriate to add the **Farm Gate GVP to the Processing Sector GVP** to get a total dairy industry GVP as that would involve double counting the value of milk used to produce the factory output. This principle applies to all sectors where value adding of primary products occurs.

Gross Domestic Product (GDP) - is the net value of the enterprise or industry output after input costs have been deducted. At a dairy industry level, the dairy processing GDP is the gross value of the units of factory output, less the cost of inputs (including raw milk) to the highest level of processing output. There is no double counting of milk.

Gross Regional Domestic Product – is the sum of the GDP's of all sectors in the regional economy.

Value adding – increasing the value of a product eg. milk, by changing its characteristics through a manufacturing process and/or packaging that increases its demand in the market place. Value adding can be as simple as segregating a bulk commodity, such as wheat grain, into different quality grades, using a seed cleaning facility that sorts on size and weight of the individual grains. Raw milk can end up in many final forms, including butter, many types of cheeses, yoghurts, whey proteins and low lactose milk, suitable for lactose intolerant consumers.

Prime Development Zones – areas recognised as being suitable for new irrigation development because of their suitable soil types, accessibility to water, potential drainage outfall and existence of essential infrastructure and services – roads, rail, product storage, power, telephone (including mobile phones) and value-adding potential.

Aquaculture – fish farming

Salmonoids are introduced cold-water fish of the trout and salmon family.

Eco-tourism – is a type of tourism based on **an appreciation of** the interrelationship between natural features of the environment

Natural Resource-based tourism – tourism that **makes use of** the region's natural resources of land, water, forests and alpine areas for a whole range of sporting and recreational purposes.

Softwood Timber – are principally pine trees (*Pinus radiata*) grown in plantations.

Hardwood Timber – are principally *Eucalyptus spp.* – plantations and old growth.

Old Growth Hardwood – original indigenous forest species, principally *Eucalyptus spp.*

Viticulture – grape growing

List of Acronyms and abbreviations

ABARE	Australian Bureau of Agriculture and Resource Economics
ABS	Australian Bureau of Statistics
ASGC	Australian Standard Geographical Classification
AQIS	Australian Quarantine and Inspection Service
CMA	Catchment Management Authority
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
FGGVP	Farm Gate Gross Value of Production
GBC	Goulburn Broken Catchment
GBCMA	Goulburn Broken Catchment Management Authority
GDP	Gross Domestic Product
G-MW	Goulburn-Murray Water
GRDP	Gross Regional Domestic Product
GVP	Gross Value of Production
GVW	Goulburn Valley Water
ha	hectares
km	kilometre
LGA/LGAs	Local Government Area(s)
m	meter
M	million
no.	number
NRP	National Regional Profile
NSW	New South Wales
NVFA	Northern Victoria Fruitgrowers Association
SIR	Shepparton Irrigation Region
SLA/SLAs	Statistical Local Area(s)
SPC-Ardmona	Shepparton Preserving Company-Ardmona
t	tonnes
TWE	Transferable Water Entitlement
VOBIS	Victorian Ordinary Breeds Incentive Scheme

A Socio-Economic Profile of the Goulburn Broken Catchment

1. Introduction

The Goulburn Broken Catchment (GBC) management area represents a prime example where success in meeting regional challenges has been achieved through a high level of cooperation, coordination and integration of a number of key regional initiatives that have achieved significant environmental, social and economic outcomes.

The GBC in Northern Victoria, covers an area of 2.5 million ha of which:

520,000 ha	is the Shepparton Irrigation Region of which approximately 280,000 ha is irrigated
1,100,000 ha	is dryland riverine plains and hill country
47,000 ha	is water bodies
414,300 ha	is State Forests, including Barmah, the largest Red Gum Forest in the world, that is also a RAMSAR Convention Wetland
95,827 ha	is urban
4,228 ha	is alpine resort

Source: Mike Young, Goulburn Broken Catchment Profile, 2000

Figure 1 shows the map of the GBC including the whole of the Shepparton Irrigation Region (SIR)[1].

The GBC has an estimated population of 203,000 in 2005 (Table 1). The 2001 ABS Population Census shows that about 88% of the catchment population are in inner regional areas and the rest are in outer regional areas.

The catchment covers all or part of these municipalities:

- Irrigation sub-catchment:
  Greater Shepparton City Council
  Shire Councils of Campaspe and Moira

- Dryland sub-catchment:
  Benalla Rural City Council
  Shire Councils of Mansfield, Mitchell, Murrindindi and Strathbogie

- Other (small parts of these municipalities are in the catchment):
  City Council of Greater Bendigo and Whittlesea
  Wangaratta Rural City
  Shire Councils of Macedon Ranges, Yarra Ranges and Nillumbik

Limitation of this report

Availability of data that refers wholly to GBC which is the major challenge in preparing this report.

The local government areas (LGA) referred to in this report are combined to form the "**Goulburn**" Statistical Division as defined by the ABS. Within this Statistical Division, there are Statistical Local Areas (SLA) that fall physically outside the catchment. There are also some parts of other SLAs that are inside the catchment but are relatively small and thus excluded in the report.

[1] The Shepparton Irrigation Region is within the GBC management area, which include some parts of the Campaspe Shire that are in the North Central Catchment.

Appendix A is a list of the local government areas in the Goulburn Statistical Division and corresponding SLAs.

As shown in Figure 2, most of the area in the Campaspe Shire Council (Rochester, Echuca and some parts of Campaspe South) physically fall outside the GBC. These SLAs are however, mostly within the geographical region under the influence of the GBC Regional Catchment Strategy and associated land and water management plans and initiatives **and are therefore included in the catchment statistics**.

Table 1 Population and principal towns and cities in the Goulburn Broken Catchment including the whole of the Shepparton Irrigation Region

Local Government Area		Population (DSE 2005)	Principal Towns	
Campaspe Shire Council	I	37,580	• Colbinabbin • Echuca • Girgarre • Kyabram	• Rochester • Rushworth • Stanhope • Tongala
Greater Shepparton City Council	I	61,213	• Dookie • Merrigum • Mooroopna • Murchison	• Shepparton • Tallygaroopna • Tatura
Moira Shire Council	I	27,634	• Barmah • Cobram • Katamatite • Katunga • Nathalia	• Numurkah • Strathmerton • Tungamah • Yarrawonga
Benalla Rural City Council	D	14,208	• Benalla • Glenrowan • Goorambat • Swanpool • Taminick	• Tatong • Thoona • Warrenbayne • Winton
Mansfield Shire Council	D	7,178	• Boonie Doon • Jamieson • Kevington • Mansfield	• Merrijig • Mt Buller Alpine Village • Tolmie • Woods Point
Mitchell Shire Council	D	31,822	• Broadford • Kilmore • Puckapunyal	• Seymour • Wallan • Wandong
Murrindindi Shire Council	D	14,601	• Alexandra • Eildon • Kinglake • Lake Mountain	• Marysville • Snobb's Creek • Taggerty • Thornton • Yea
Strathbogie Shire Council	D	9,748	• Euroa • Avenel • Mangalore	• Nagambie • Violet Town
Total estimated residential population for the Goulburn Broken Catchment			**187,504 (2001 ABS Census)**	**203,444 (2005 DSE)**

Notes:
- I = Irrigation sub-catchment; D = Dryland sub-catchment
- Includes data of areas outside of the Goulburn Broken Catchment

Sources:
- Department of Sustainability and Environment (DSE), *Victoria in Future 2004*
- Australian Bureau of Statistics (ABS) 2001 Census of Population and Housing, "Usual Residents Profile" Catalogue No. 2004.0

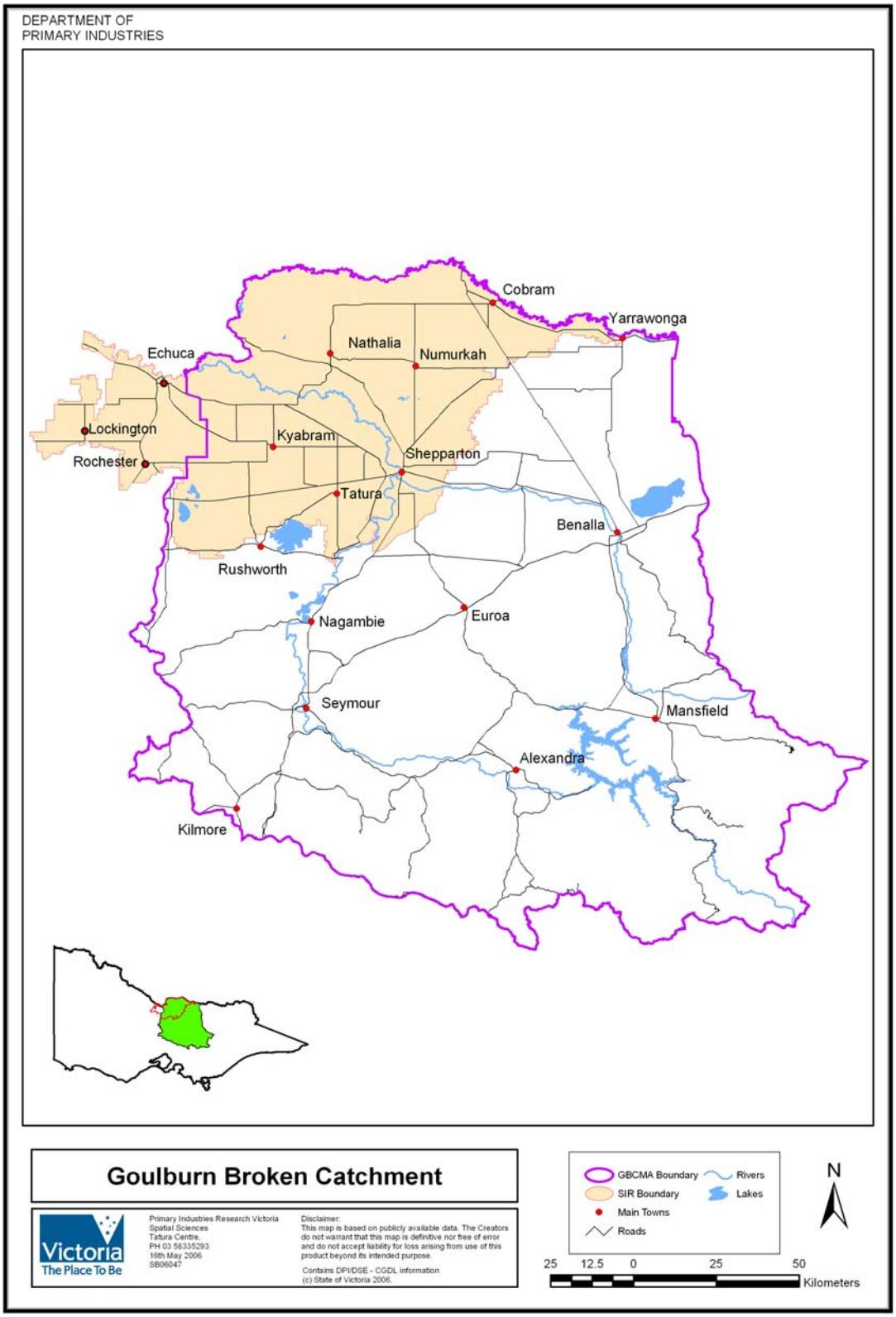

Figure 1 **Map of the Goulburn Broken Catchment including the whole of the Shepparton Irrigation Region**

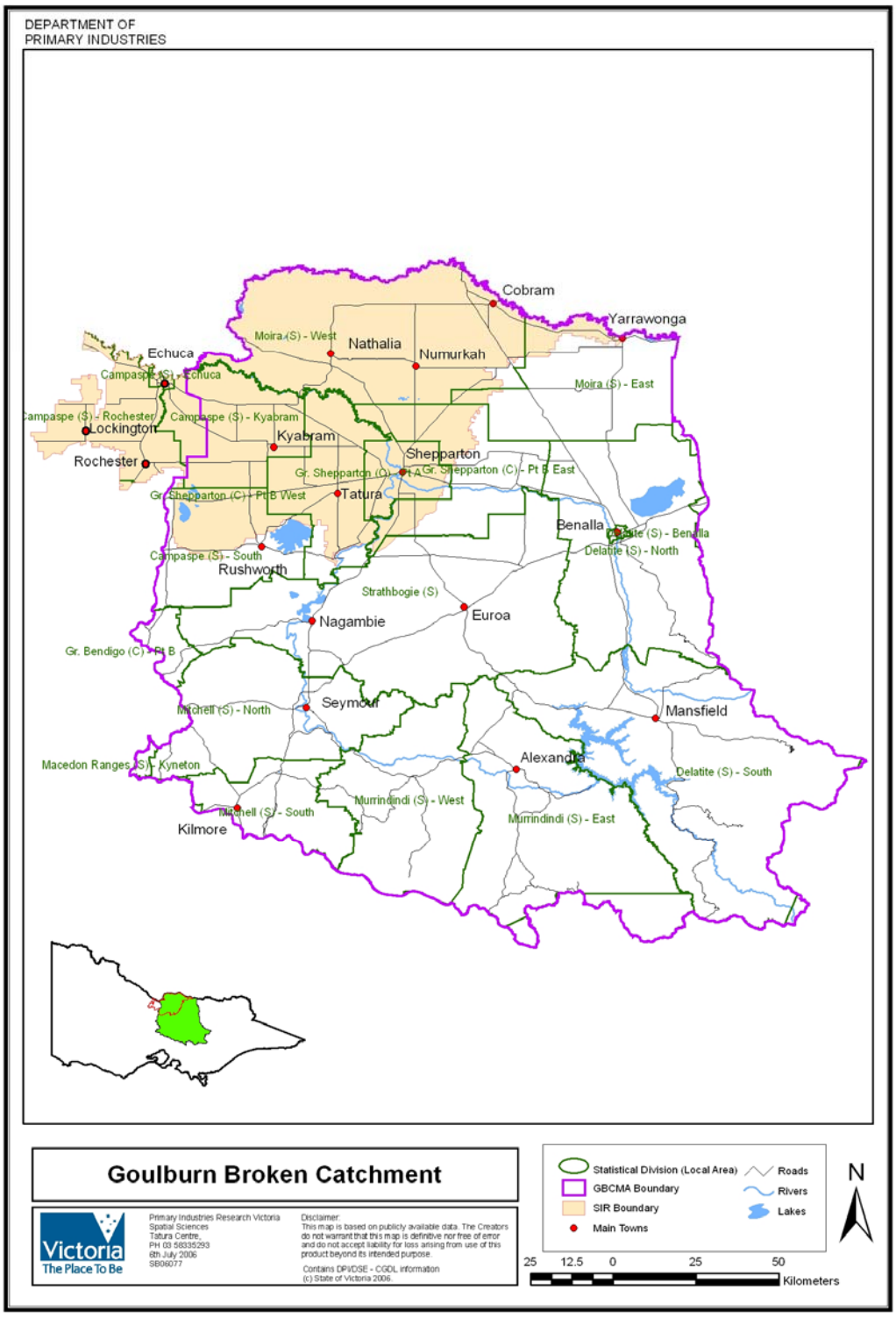

Figure 2 **Map of the Goulburn Broken Catchment and the Goulburn Statistical Division**

2. The Economy of the Goulburn Broken Catchment

The strength of the GBC is its natural resource-based farm, forestry and fisheries industries. These primary industries provide the raw materials to the processing/manufacturing sector mostly in the catchment, including food processing, feed milling, timber product manufacturing and fibre processing. In addition, the natural resource-based tourism industry attracts a high level of investment and contributes to regional wealth.

The food processing industries, based principally on dairy and horticultural processing, are concentrated in the SIR. The timber industry and aquaculture are more significant in the dryland shires of the catchment.

The SIR is referred to as the "Food Bowl" of Australia with an estimated Farm Gate Value of Agricultural Production (FGVAP) of $1.24 billion in 2003-4. The economic output from the Region was calculated at $6.2 billion and it produced 25% of Victoria's export earnings (Young, 2000).

The dryland areas have traditionally large wool and beef industries but some properties are relatively small, creating an interest in higher value farm enterprises to make them more viable. Many dryland farming families have off-farm income to supplement their farm income.

The gross regional product in 2001 reached $8,709 million (Table 2). It is estimated that the gross regional product will increase to $9,500 million in 2005 and $11,300 million in 2010.

Table 2 Value of economic activity, Goulburn Broken Catchment ($M)

	2001 (note 1)	2005 (note 2)	2010 (note 3)
Dairy production and dairy processing	$2,058.3	$2,066.6	
Livestock production and meat processing	$404.3	$396.8	
Fruit production and processing	$696.9	$697.9	
Grape production and wine making	$36.9	$37.2	
Vegetable production and processing	$245.3	$247.7	
Other agricultural production	$439.6	$425.2	
Forestry, wood and paper manufacturing	$248.8	$260.6	
Mining	$14.8	$14.8	
Other food manufacturing	$12.4	$12.5	
Other manufacturing	$12.4	$14.2	
Utilities	$388.6	$388.4	
Building, construction and trade	$1,232.6	$1,562.4	
Transport & communications	$892.5	$1,073.2	
Finance	$743.2	$834.7	
Community services	$940.9	$1,126.2	
Tourism & other services	$341.6	$379.5	
Total	**$8,709.0**	**$9,537.9**	**$11,262.5**

Notes:
1 Abel, *et al.* 2003

2 Estimated using Australia's rate of growth. ABS *National Income, Expenditure and Product* catalogue no. 5206.0 Canberra (Table 45)

3 Estimated using Australia's projected rate of economic growth. Australian Bureau of Agriculture and Resource Economics (ABARE) *Australian Commodities*, volume 12 number 1, March 2005 page 16

2.1. Agriculture, forestry and fishery

The value of agriculture, forestry and fishery produced in the GBC reached $1.58 million in 2003-4, an increase of 9.4% from the 2002-3 level and 7% less than value of agricultural commodities produced in 2001-2 (Table 3). The impact of the 2002-3 drought is evident in the decrease in the value of livestock, grains, oilseeds and legumes. On the other hand, the value of hay produced increased by 79%.

The cropping sector (pasture and grasses, crops for hay, cereals for grain, oilseeds, legumes and other crops) had shown a strong recovery with the value of production increasing from $141.9 million in 2002-3 to $322.7 million in 2003-4. The value of the livestock industry is still below the 2001-2 level.

Table 3 Farm gate gross value of production (agriculture, forestry and fishery) Goulburn Broken Catchment, 2002 to 2005 (in $M)

	2001-2	2002-3	2003-4	2004-5 estimate (note 2)
Pasture and grasses	$71.9	$68.3	$123.3	$111.7
Crops cut for hay	$6.8	$12.3	$68.3	$61.9
Cereals for grain	$106.0	$47.4	$104.3	$94.5
Oilseeds and legumes	$21.8	$9.9	$23.2	$21.0
Other crops	$2.5	$4.0	$3.7	$3.4
Nurseries, flowers and turf	$40.0	$49.6	$48.0	$43.5
Vegetables	$72.2	$85.8	$89.6	$81.2
Fruit excluding grapes	$227.8	$276.7	$280.2	$253.9
Grapes	$9.5	$9.4	$14.4	$13.0
Sheep and lambs slaughtered	$74.2	$76.8	$85.2	
Cattle and calves slaughtered	$258.6	$219.5	$200.2	
Pigs slaughtered	$28.1	$22.7	$19.3	
Poultry slaughtered	$1.1	$1.5	$1.4	
Other livestock slaughtered	$1.3	$1.1	$1.9	
Livestock slaughtering	**$363.0**	**$321.6**	**$307.9**	**$334.1**
Eggs for human consumption	$14.3	$13.7	$16.8	
Wool	$56.8	$71.0	$49.4	
Milk	$649.7	$411.6	$388.6	
Livestock products	**$720.8**	**$496.3**	**$454.8**	**$493.5**
Total value of agriculture (note 1)	**$1,642.5**	**$1,381.3**	**$1,517.7**	**$1,511.7**
Forestry **(note 3)**	$47.8	$54.1	$52.7	
Fishery **(note 4)**	$10.0	$9.8	$10.1	$10.4
TOTAL, Agriculture, Forestry and Fishery	**$1,700.3**	**$1,445.2**	**$1,580.5**	

Notes:
1. Statistical Local Area data are only available on census years eg 2000-1 and 2005-6. Source: ABS 2001 Census of Agriculture; 2003 and 2004 Survey of Agriculture for Goulburn Statistical Division

2. 2004-5 estimates based on Australia's rate of change (Source: *ABARE Australian Commodities*, September 2005 page 459)
3. Estimates based on Australia's rate of change (Source: ABARE *Australian Forest and Wood Product Statistics* March–June quarters 2005)
4. Source: Anon (2004) Fisheries Victoria *"Commercial Fish Production Information Bulletin"*

Appendix B shows the farm value of agriculture, forestry and fishery in the catchment in 2001 by LGA. Appendix C shows an estimate of the gross value of agricultural production in the dryland and irrigation areas of the Goulburn Statistical Division in 2001-2, 2002-3 and 2003-4.

Figure 3 shows the contribution of each LGA to the catchment's agricultural production in 2001. About 83% of the $1.49 billion Farm Gate Value of Agricultural Production (excludes forestry and fishery) came from the SIR comprising of the shires of City of Greater Shepparton, Campaspe and Moira. This reflects the intensity and diversity of agricultural production that irrigation permits in a relatively low rainfall area. It also explains why 20 or more major food processing companies have plants located in the SIR. They have ready access to large volumes of reliably produced raw materials for their production lines and a concentration of infrastructure and services that support their businesses.

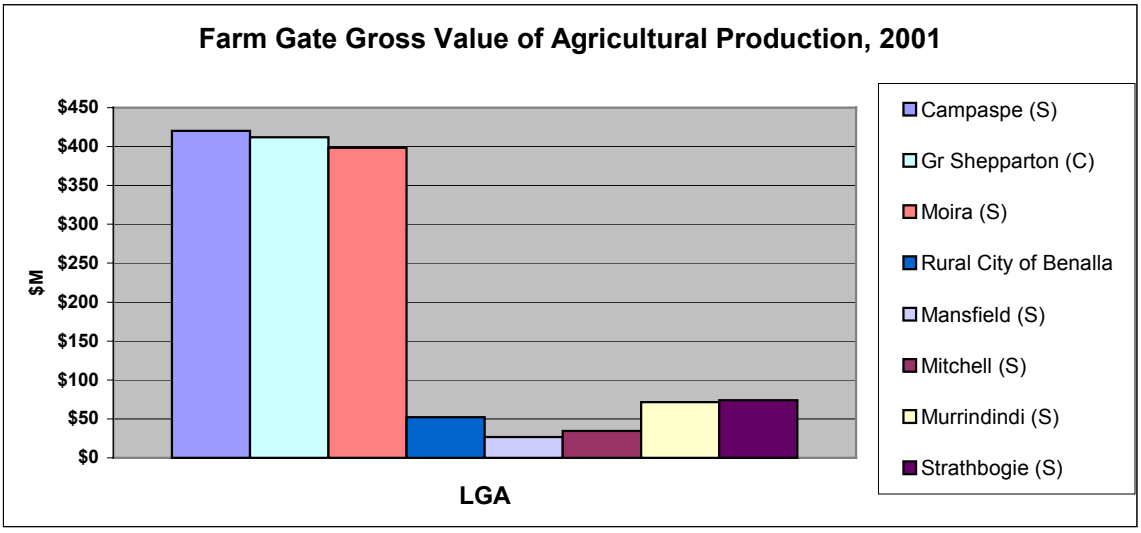

Figure 3 Farm gate gross value of production, Goulburn Broken Catchment, 2001 (excluding forestry & aquaculture)

Sources: Refer to list of sources in Table 4.

Table 4 shows the 2001farm-gate value of primary industries in the catchment.

Table 4 Farm gate gross value of production, Goulburn Statistical Division, 2001 (in $000)

	Crops	Horti-culture	Livestock	Total Agriculture	Forestry	Fishery	**Total FGVP**
Campaspe (Shire)	$54,425	$38,169	$327,873	$420,468	$800		
Gr Shepparton (City)	$34,353	$172,611	$204,978	$411,943			
Moira (Shire)	$76,412	$80,508	$241,285	$398,205			
Benalla (Rural City)	$15,078	$1,484	$35,452	$52,015	$26,200		
Mansfield (Shire)	$10,029	$329	$16,393	$26,751			
Mitchell (Shire)	$5,584	$948	$27,919	$34,451	$2,600	$10,000	
Murrindindi (Shire)	$24,425	$8,039	$38,993	$71,456	$21,000		
Strathbogie (Shire)	$18,465	$11,041	$44,492	$73,998			
TOTAL	**$238,771**	**$313,130**	**$937,387**	**$1,489,287**	**$50,600**	**$10,000**	**$1,549,887**

Sources: Agriculture data: ABS 2001 Census of Agriculture

Forestry data: calculated value based on the total value of processed wood and timber.

- Plantations North East Inc, *"The Timber Industry in North East Victoria - A Socio-Economic Assessment, May 2002*
- Bernard Young, personal communication, October 2005
- Murrindindi Shire "*Economic Development Strategy for Agriculture, Forestry and Tourism Sectors 2003-8*"

Fishery data:

- Source: Anon (2004) Fisheries Victoria *"Commercial Fish Production Information Bulletin"*
- Edward Meggitt, Victorian Trout and Salmon Farmers Association, personal communication

Dairying and grazing contributed more than half of the gross value of production with 34.5% and 21.5% of the total value in 2001 (Table 5).

Table 5 Contribution of major primary industries to the farm gate gross value of production, Goulburn Broken Catchment, 2001

Milk production	34.5%
Livestock slaughtering	21.5%
Fruit excluding grapes	14.3%
Cereals for grain	5.9%
Pastures and grasses	5.2%
Vegetables	5.1%
Wool	3.6%
Forestry	3.3%
Other primary industries (grapes, aquaculture and other smaller industries)	6.7%

Sources:

- ABS 2001 Census of Agriculture
- Plantations North East Inc, *"The Timber Industry in North East Victoria - A Socio-Economic Assessment, May 2002*
- Anon (2004) Fisheries Victoria *"Commercial Fish Production Information Bulletin"*

2.2. Manufacturing, processing and value adding

Manufacturing in the GBC is concentrated in the SIR and mainly value adding of agricultural produce with a strong emphasis on food processing. The processing of dairy, fruit and vegetable products occurs in the irrigation region and timber processing and winemaking are features of the dryland areas. There are also meat-processing facilities in all shires across the catchment.

The estimated value of the processing sector is $2.7 billion in 2005 (Table 6).

Table 6 Estimated value of the processing sector, Goulburn Broken Catchment, ($M)

	2001 (note 1)	2005 (note 2)
Dairy Processing	$1,590.6	$1,611.2
Fruit Processing	$502.8	$509.3
Meat Processing	$128.8	$130.5
Vegetable Processing	$218.2	$221.1
Wine	$31.8	$32.2
Other Food Manufacturing	$12.2	$12.4
Wood & Paper Manufacturing	$169.0	$174.1
Other Manufacturing	$14.1	$14.5
Total manufacturing	**$2,667.5**	**$2,705.3**

Notes:
1 Abel, *et al* 2003.

2 Estimated using Australia's rate of growth. ABARE. *Australian Commodities*, volume 12 number 4, December 2005 page 722

2.2.1. Dairy processing

Dairy farmers in the GBC supply their milk to local milk factories, including the two large farmer cooperatives - Fonterra Foods in Stanhope (formerly Bonlac) and Murray Goulburn (Cobram and Rochester). Farmers also supply Tatura Milk Industries, a smaller cooperative. Murray Goulburn supplies milk to Kraft (USA) in Strathmerton. Milk factories also supply Nestlé (Swiss) in Tongala and Echuca gets for further processing. Dairy Farmers Cooperative has a presence in the region as milk product packagers and distributors.

The Murray Goulburn Cooperative has formed a joint venture with Meiji-Mitsubishi (Japanese) to form Meiji- MGC Dairy Company Pty Ltd - Cobram to process and package infant milk formula for exporting to Asian markets. Similarly, Tatura Milk Industries (TMI) and Snow Brand Tatura Dairies Pty Ltd (Japanese) have developed a contractual arrangement for the processing and production of infant milk formula for marketing to Asia. In both cases, the infant milk formula packaging plants have been constructed adjacent to the respective factories, making integration of the processes very efficient. The arrangements have provided their milk suppliers with high value-added market outlets for their products and have enabled the cooperatives to expand their processing capacity. TMI also works closely with Nestlé, providing them with pre-processed raw materials for additional value adding, worldwide.

All milk-processing factories in the GBC have expanded their processing capacity significantly since 1995. This is in response to an annual growth in milk production

of between 5% and 7.5% per annum as well as a long-term positive outlook for dairy product exports. Competition between factories for suppliers is becoming more noticeable.

2.2.2. Horticultural processing

The major horticultural processors in the GBC include:

- Shepparton Preserving Company – Ardmona Ltd in Shepparton (SPC-Ardmona), now owned by Coca-cola Amatil;
- Henry Jones Foods Pty Ltd (USA) – Kyabram;
- Campbell's Soups (USA) - Shepparton/Lemnos;
- Girgarre Country Foods - a division of H.J. Heinz Co. Aust. Ltd – Girgarre;
- Heinz Wattie - Australasian Infant Feeding Centre of Excellence – Echuca;
- Unifoods - a division of Unilever (Australia) - Rosella – Tatura;
- Cedenco Australia (joint partnership Cedenco NZ and Cerebos (Aust) Ltd) – Echuca;
- Simplot (USA) - Echuca

SPC -Ardmona is principally a stone and pome fruit cannery but also handles tomatoes, other vegetables and various mixes. The company produces more than 75% of Australia's canned fruit.

Henry Jones Foods Pty Ltd produces IXL, AJC, State, Balgay and Taylors brands of conserves, jams, sauces and toppings.

Campbell's Soups processes tomato and vegetable products into soups and sauces as well as fruit and vegetable juices, meals and stocks. It also produces Kettle brand snack foods.

Girgarre Country Foods, Unifoods, Cedenco and Simplot all focus on various tomato-based products. The Echuca Cedenco facility claims to be the largest tomato processing plant in Australia. Cedenco provides tomato products to Simplot for further value adding. Whilst Cedenco and Simplot are outside the GBC, the economic flow-on from their presence impacts on businesses in the catchment.

The Heinz Wattie Australasian Infant Feeding Centre of Excellence in Echuca produces pureed vegetable and fruit products for infants.

The tomato-based product market has grown substantially over the last three years, requiring the companies to source up to 30% of their tomatoes from New South Wales (NSW). In the North Central Catchment, new planting around Boort have added to increased Victorian planting's in a reliable tomato-growing region.

2.2.3. Winemaking

Winemaking capacity has increased in the catchment, in response to the rapid increase in winegrape planting's. Long established wineries have increased processing and storage capacity in recent years to meet their own future requirements and a growing number of new crushing, winemaking, bottling and storage facilities are being developed across the catchment.

The total value of investment by one winemaker is about $30 million in 2005 (Winemaker, personal communication, August 2005). The company invested a total of $5.5 million on buildings, plant and equipment, replanting of vines and oak barrels in 2001-5. It plans to invest $5 million in 2006-10 and $10 million between 2010 and 2015. The company's executive commented that the industry is currently

experiencing a significant oversupply of wine that will continue until 2010 and creating discounting by major wineries. This will result in a reduction in margins for small to medium sized producers (wineries and growers) in the next five years.

In the medium term (2010-2015), there will be some upward adjustments in the supply and demand situation and wine sales and profit will improve. To take advantage of this development, this company plans to increase investment as it expands its business. The success of this company will depend on the flexibility of its business model and its ability to compete especially against larger producers, and to consolidate customers with significant purchasing power.

2.2.4. Livestock processing

Livestock production in the GBC is second only to milk production in terms of gross value of production. This reflects the large number of mixed farms in both the irrigation and dryland areas of the catchment, running beef cattle, sheep for wool and lambs, goats, pigs and poultry as well as the dairy cull stock (veal and chopper cows).

There are a number of abattoirs in the catchment such as:

- Vodusek – Cobram
- Benalla Meat Packers - Benalla
- HW Greenhams – Tongala
- Riverside Meats - Echuca
- Ryans Wholesale Meat - Nathalia
- Auld's Knackery – Stanhope
- Numurkah Knackery - Numurkah

Vodusek and Greenhams each employ in excess of 200 staff. Riverside Meats employ 140 staff. New marketing opportunities, such as pre-packaging retail meat cuts at the abattoir for the supermarket trade, are constantly under evaluation.

There are also some relatively large poultry farms and processing plants in the catchment. Marven Poultry has facilities in Strathmerton, Mooroopna (fertile eggs) and Katunga (hatchery).

The Strathbogie Shire is attracting interest for the relocation of poultry operations from the Mornington Peninsular as population pressures and urban development force farming enterprises from that region.

2.2.5. Crop processing

Riverina Oilseeds Processors Pty Ltd in Numurkah does local crushing of soybeans, canola and sunflowers. The company produces oils and meals for re-selling to other processors including Unilever, Bunge and Ridley Agriproducts, who refine the oils for human consumption and protein meals for livestock consumption.

Coprice Feeds at Tongala produce a range of rice-based stockfeeds. They are a division of the NSW Ricegrowers' Cooperative Ltd. There is also a small but rapidly expanding rice-growing industry in Northern Victoria located in pockets on the heavy soil floodplains of the Murray River, between Nathalia and Murrabit (North Central Catchment).

A purpose-built plant was built in Melbourne in late 1990s to process soybeans for human consumption, thus making soybeans more profitable as an irrigated crop.

2.3. Employment

Total employment in the GBC was 80,528 (ABS, Basic Community Profile catalogue no. 2001.0) distributed across all sectors in the regional economy (Figure 4). The breakdown of employment across industries and LGAs in the catchment is shown in Appendix D.

The importance of primary production and manufacturing (mostly food processing) as an employer is highlighted above. Retailing, as a single sector, is almost as important as manufacturing and reflects the discretionary expenditure that flows on from the other sectors.

The SIR provides 63% of total employment and 73% of farm jobs in the catchment (Figure 4 and Table 7).

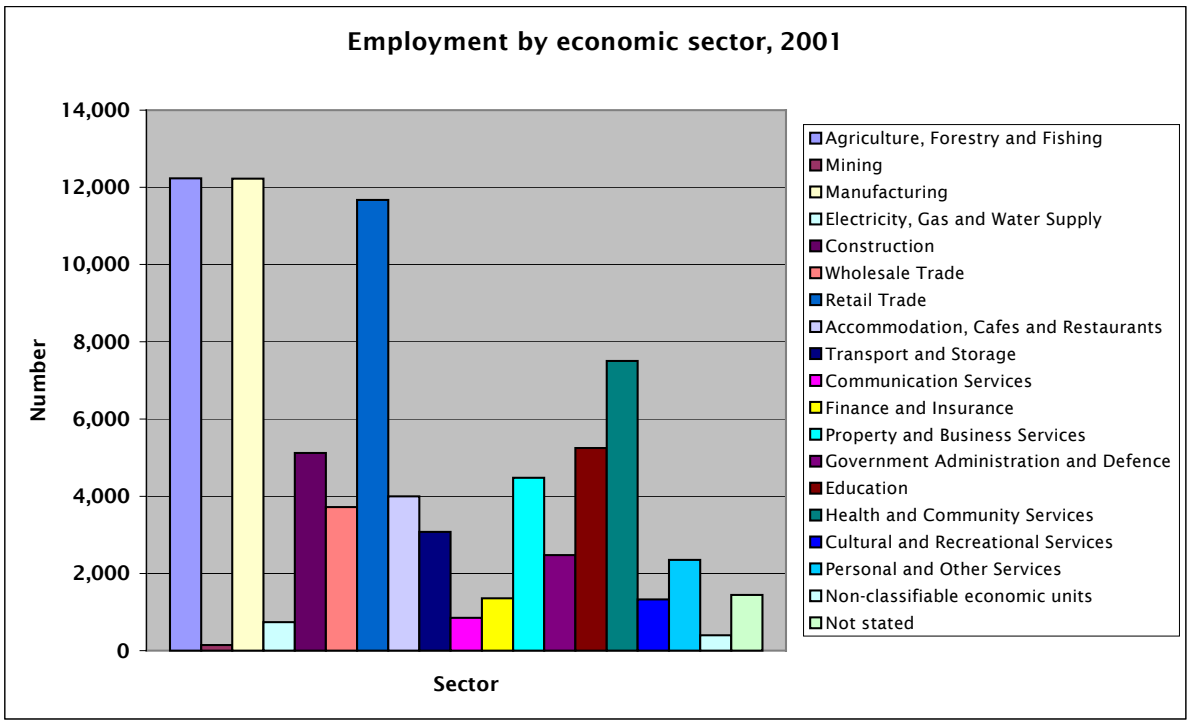

Figure 4 Employment by economic sector, Goulburn Broken Catchment, 2001

Source: ABS 2001 Census of Population and Housing "Usual Residents Profile", Catalogue no. 2004.0

Table 7 Employment in primary industries by local government area, Goulburn Broken Catchment, 2001

LGA	Agri-culture	Services to Agriculture; Hunting and Trapping	Forestry and Logging	Commercial Fishing	Other	**Sub-Total primary Industries**	**Total Employ-ment**
Campaspe (I)	2,828	90	12	3	12	**2,945**	**14,970**
Gr Shepparton (I)	2,816	101	13	3	9	**2,942**	**24,318**
Moira (I)	2,413	81	13	3	8	**2,518**	**10,749**
Benalla (RC) (D)	575	27	25	0	0	**627**	**5,487**
Mansfield (D)	264	9	16	0	3	**292**	**3,836**
Mitchell (D)	589	36	20	3	3	**651**	**11,748**
Murrindindi (D)	665	12	45	49	3	**774**	**5,661**
Strathbogie (D)	739	24	0	3	0	**766**	**3,759**
TOTAL	**10,889**	**380**	**144**	**64**	**38**	**11,515**	**80,528**

Sources:
1. Employment in primary industries – ABS 2001 Census of Population and Housing, Working Population Profile (Catalogue No. 2006.0)
2. Total employment – ABS 2001 Census of Population and Housing, Basic Community Profile (Catalogue No. 2001.0)

Whilst agriculture and horticulture are the most important farm employers in the catchment, the timber industry plays an important role (production and processing) in the dryland municipalities.

Education and Health Services are significant regional employers. Shepparton, as a regional centre, has TAFE, Universities and major teaching hospital facilities and has the greatest number of employees in these categories. Education and Health and Community Services employment levels tend to reflect the population in the LGAs and the relative size of individual towns.

Defence related industries in Mitchell Shire (Puckapunyal Army Base) and, to a lesser extent, in Benalla (Australian Defence Industries Pty Ltd), are important employers in the respective shires.

The combined retail and wholesale trade sectors are the biggest employers in the catchment, indicating the flow-on effects from primary production and manufacturing. The retail sector also benefits in areas where towns are located adjacent to the Hume Freeway.

Tourism related employment (Accommodation, Cafes, Restaurants and Cultural and Recreational Services) is important in the following areas:
- along the Murray River (Campaspe - Echuca and Moira - Cobram and Yarrawonga)
- in the snowfields and lakes (Mansfield, Benalla - Mt Buller and Lake Eildon), and,
- in Shepparton because of its importance as a business centre.

All of the major towns in Strathbogie, Murrindindi and Mitchell Shires have developed tourist attractions, often in association with wineries. These shires have also historical association with the early development of Northern Victoria, including the gold rush days of the late 1800's. There are some active gold mining and fossicking activities around Nagambie, Bailieston, Graytown, Whroo and Rushworth and there are many historic relics relating to that era.

Table 8 is a summary table of economic indicators for the catchment.

Table 8 Summary of economic performance, Goulburn Broken Catchment

	2001	2005 (estimate)	2010 (predicted)
Farm Gate Gross Value of Production ($M)	$1,550 (1)	$1,580.5(3)	
Gross Regional Product ($M)	$8,709 (2)	$9,537.9 (4))	$11,262.5
Employment - Direct Farm	12,111		
Employment - Manufacturing	12,076		
Employment – Utilities and Services	56,259		
Total Employment	80,528 (5)	86,809 (6)	
New Infrastructure Investment	Investment in agriculture in the last five years (2000-05) was less than the previous five years (1996-2000) due to the severe drought in 2002-3 and continuing dry conditions up to 2005. The reduction in investment was estimated to be between 20% and 35%, approximately $65 million to $80 million per year compared to about $100 million per year in 1996-2000.		

Sources:
(1) ABS, 2001 Census of Agriculture
(2) Abel, *et al*. 2003. Input-Output Transaction Table developed as part of the Natural Values Project
(3) See Table 3 for source of data
(4) See Table 2 for source of data
(5) ABS, Basic Community Profile, catalogue no 2001.0
(6) 2005 employment based on growth in employment in Victoria

3. Population

3.1. Population by birthplace

About 15% of the catchment's population in 2001 were born overseas compared to 12% in 1996 (Table 9). Whist Europe is still the dominant birthplace, the percentage of the population born in Europe decreased by 4% in 2001. The details of the birthplace (countries) are in Appendix E.

The 1996 and 2001 Censuses of Population and Housing show that the estimated resident Aboriginal and Torres Strait Islander population are 2,301 and 2,825, respectively. This is an increase of 23% over five years.

Table 9 Population by birthplace (continent), Goulburn Broken Catchment, 1996 and 2001

Continent/Region	1996	2001	%change
Europe	12,102	11,650	-4%
Africa	252	360	43%
Middle east	374	929	148%
Asia	1,191	1,388	17%
Americas and the Caribbean	368	408	11%
Other	1,308	1,799	38%
Sub-total	**15,595**	**16,534**	**6%**
Australia	156,417	160,310	3%
Not stated	5,964	10,656	
Overseas visitor	629		
TOTAL	**178,605**	**187,500**	**5%**

Sources: ABS 1996 Census of Population and Housing, "Basic Community Profile"
ABS 2001 Census of Population and Housing, "Usual Residents Profile" Catalogue No. 2004.0

3.2. Population projection

The population in the catchment is expected to grow at an average rate of 1% for the period 2006 to 2031 (Table 10). It is estimated to reach 261,000 in 2031, more than 15% of the projected population in Regional Victoria (Table 11).

Table 10 Average annual rate of population growth, Goulburn Broken Catchment, 2001to 2031

Year	Victoria	Regional Victoria	Goulburn Broken Catchment
Between 2001 and 2006	0.9%	0.8%	1.2 per cent
Between 2006 and 2011	1.1%	0.9%	1.1 per cent
between 2011 and 2016	1.0%	0.9%	1.0 per cent
between 2016 and 2021	0.9%	0.8%	1.0 per cent
between 2021 and 2026	0.8%	0.8%	0.9 per cent
between 2026 and 2031	0.7%	0.7%	0.8 per cent

Source: DSE, *Victoria in Future*, 2004.

Mitchell Shire (second) and Greater Shepparton (tenth) are in the top ten fastest growing shires in Regional Victoria (Bass Coast is highest). The availability of excellent road infrastructure in Mitchell Shire making it within commuting distance from Melbourne contributes to its strong population growth. The role of Greater Shepparton as one of the major regional centres in Victoria is reflected in its expected population increase of 1.33% annually.

Table 11 Population projection by local government area, Goulburn Broken Catchment, 2001 to 2031

LGA Name	2001	2006	2011	2021	2031	Increase 2001-2031 %	Average annual increase %
Gr Shepparton (C)	58,150	62,026	66,023	73,947	81,378	39.94%	1.33%
Moira (S)	26,810	27,880	29,039	31,222	33,263	24.07%	0.80%
Campaspe (S)	36,349	37,901	39,412	42,230	44,827	23.32%	0.78%
Benalla (RC)	14,017	14,276	14,569	15,093	15,679	11.86%	0.40%
Mansfield (S)	6,979	7,263	7,663	8,405	9,281	32.98%	1.10%
Mitchell (S)	28,406	32,473	35,766	42,517	48,835	71.92%	2.40%
Murrindindi (S)	13,640	14,175	14,712	15,725	16,653	22.09%	0.74%
Strathbogie (S)	9,648	9,798	10,018	10,420	10,877	12.74%	0.42%
CATCHMENT TOTAL	**193,999**	**205,792**	**217,202**	**239,559**	**260,793**	34.43%	1.15%
Regional Victoria	1,332,519				1,686,507	26.57%	0.89%
VICTORIA	**4,804,726**				**6,225,477**	**29.57%**	**0.99%**

Source: DSE, *Victoria in Future 2004*

Notes:
- There is a slight difference in the population data provided ABS and DSE.
- Average annual increase was calculated by deducting the 2001 population from 2031 population divided by 30 years. DSE's calculation was based on a five-year block.

The following are projections from *Victoria in Future 2004*:

- The steady growth rate in Campaspe is in line with the average for Regional Victoria and would be in and around Echuca and rural residential areas along the Murray River

- Moira's growth is slightly less than the state average and population growth will come from older persons migrating to the area

- The Rural City of Benalla's population growth is projected to be well below the Victorian average due to migration of young adults to larger cities

- The population of Mansfield is projected to increase strongly, at or above the Victorian average. The loss of many young adults will be offset by large increases in the 55 years and over age groups

- Murrindindi will experience steady population growth over the next 25 years, but at a rate lower than the state average

- Strathbogie has of late become more popular as a lifestyle and retirement destination for people leaving Melbourne. Over the next 30 years, the population will continue to grow though at a slower rate than the rest of Regional Victoria. Population will be increasingly comprised of older age groups, and Strathbogie will have very few children and young adults

4. Regional infrastructure and property values

The GBC has excellent infrastructure on which to develop existing and new industries, with the Hume Freeway connecting Melbourne to Sydney, the Goulburn Valley

Highway connecting Shepparton to Melbourne and Brisbane and the Midland Highway connecting the catchment from east to west, through Shepparton. Shepparton is one of Australia's major road transport centres.

The GBC is also well served with electricity, natural gas and water that has created many new opportunities for improving the efficiency of operations in the catchment's value adding industries.

4.1. Rail network

The GBC is well served by rail, with Sydney, Melbourne and Geelong being accessible via the standard gauge rail. Additional broad gauge rail links key regional centres to Melbourne and Geelong, with Seymour being a major rail hub, directing rice from southern NSW, dairy and fruit products from Shepparton and timber from the dryland areas to markets and ports in the south. A container handling facility has been developed in Mooroopna to provide an unbroken rail container link into Melbourne wharves for fruit and dairy products.

The Echuca-Toolamba and the Echuca-Bendigo railway lines are being upgraded (2006) to improve railway services. A transport hub is also being developed in Mooroopna.

4.2. Road network

The road network is one of the best in the country and regional roads are well developed to serve the agricultural and timber industries. There is a ring road around Melbourne that joins the catchment to the Melbourne-Geelong Road and the Port of Geelong.

The following road infrastructure projects have and/or will further improve the transport of goods and services in and out of the catchment:

- Upgrade of Goulburn Valley Highway between Hume Freeway and Nagambie completed in 2001covering 16km with a total cost of $53 million. A four-lane divided road replaced the previous two-lane, two-way roads (VicRoads Annual Report 2000-1)

- Murchison East Deviation Project commenced in April 2001 and was completed in February 2003 at a cost of $88.9 million. It reduces travel distance to and from Shepparton by almost 4km. The project has a total length of 18km dual highway, 13km of which follows a new alignment close to the main irrigation channels. It includes three bridges over the channel (VicRoads Annual Report 2002-3 and John Harvey, VicRoads, personal communication)

- The 17 km Craigieburn Bypass (Hume to Western Ring Road) is still under construction and expected to cost about $306 million (VicRoads Annual Report 2002-3)

Proposed works (VicRoads Annual Report 2003-4):

- The Arcadia duplication section of the Goulburn Valley Highway (11 km) costs approximately $4 million per kilometre, including planning and pre-construction costs (John Harvey, personal communication October 2005)

- Shepparton Bypass will cost approx $12 million per kilometre due to the need to build two carriageways and the increase in the land values. The cost includes planning and pre construction costs (John Harvey, personal communication October 2005)

- Upgrade of the bridges over Murray River (Echuca-Moama and Corowa) to provide better access to the catchment's major food processing plants for rural producers in southern NSW, especially for tomatoes, vegetables and grain

There are about 20,000 km of local road network in the catchment and 661 bridges (Table 12).

The municipalities in the catchment manage about 2,200 km of local roads and 146 bridges. In 2003-4, the councils spent more than $45million on road and bridge construction and maintenance.

Table 12 Length of and expenditure on local roads and bridges, Goulburn Broken Catchment, as of 30 June 2001

Municipality	Total Local Road Lengths (km)				No. of Bridges on local roads	2003-4 Expenditure	
	Sealed	Formed & Surfaced	Natural Surface	Total Length		Roads ($000)	Bridge ($000)
Campaspe (S)	1,730	2,655	717	5,102	66	$12,797	$421
Gr Shepparton(C)	1,378	1,292	298	2,968	33	$8,305	$310
Moira (S)	1,470	1,951	552	3,973	58	$4,587	$565
Benalla (RC)	727	833	94	1,654	88	$1,643	$378
Mansfield(S)	184	855	19	1,058	42	$2,092	$84
Mitchell (S)	697	564	215	1,476	118	$3,845	$945
Murrindindi (S)	451	729	16	1,196	126	$3,191	$762
Strathbogie (S)	1,012	1,400	28	2,440	130	$3,526	$1,880
Total	**7,649**	**10,279**	**1,939**	**19,867**	**661**	$39,986	$5,345

Source: Graeme Bales, personal communication, October 2005

4.3. Urban and agriculture water supply

4.3.1. Urban water supply

Goulburn Valley Water manages the urban water supply and wastewater treatment in the catchment. Its assets are valued at about $473 million in 2005 (Table 13).

Table 13 Value of assets, Goulburn Valley Water, 2005 ($000)

	Value ($000)
Buildings	$10,469
Land	$22,149
Sewer Treatment (note 1)	$109,391
Water Treatment (note 2)	$83,894
Sewer Main	$110,526
Sewer Manhole	$12,790
Water Mains	$111,827
Sewer Miscellaneous	$108
Water Miscellaneous	$377
Vehicles / Computer / Corp etc	$11,458
TOTAL	$472,989

Source: Chris Murdoch, personal communication, August 2005
Notes:
1 includes Waste management treatment facilities
2 includes Water treatment facilities

4.3.2. Agricultural water supply

The SIR has around 280,000 ha of irrigated land and associated supply and drainage infrastructure and includes the junctions of the Campaspe, Goulburn and Broken Rivers with the Murray River. Goulburn-Murray Water (G-MW) manages irrigation and drainage infrastructure in the catchment. The SIR uses around 1.5 million megalitres of water annually depending on seasonal allocations.

District Services is one of four G-MW's business units. This unit provides irrigation and drainage services in Irrigation Districts and Domestic and Stock supplies in Water Districts (Table 14). In 2000, the renewals replacement cost of the assets in the GBC was $816.5 million and the reproduction replacement cost is $884.1 million (Victor Zurawski, personal communication October 2005).

Table 14 Value of District Services assets, Goulburn-Murray Water, 2000

Asset Type	Length / No	Replacement Cost ($000)	
		Reproduction	Renewals
Water Supply Channels (km)	4,148	$346,036	$395,460
Supply Pipelines (m)	82,953	$10,772	$10,772
Channel Structures (No.)	11,809	$355,430	$352,885
Meter Outlets (No.)	14,175	$38,006	$51,096
Irrigation Pump Stations (No.)	10	$7,479	$8,758
Irrigation Major Structures (No.)	14	$7,624	$9,101
Surface Drains (km)	2,157	$138,335	$6,782
Pipe Drains (m)	14,291	$2,282	$2,072
Drain Structures (No.)	4,646	$139,970	$122,605
Drainage Inlets (No.)	5,866	$6,640	$6,640
Drainage Pump Stations (No.)	2	$6,640	$6,640
Drainage Major Structures (No.)	4	$568	$619
Groundwater Pumps (No.)	93	$6,220	$5,057
TOTAL		**$1,066,001**	**$978,487**

Source: Victor Zurawski personal communication, October 2005

Note: These assets are located in Waranga Western Channel (East), East Goulburn Main Channel, Tungamah D & S, and the Irrigation Areas of Murray Valley, Rochester, Campaspe, Shepparton and Central Goulburn.

4.4. Electricity and gas infrastructure

4.4.1. Electricity

One of the providers of electricity in the catchment valued its infrastructure at about $170 million in 2005. The value of electricity distribution assets at cost is $120 million and the transmission assets at replacement cost is $50 million (Phillip Bryant, personal communication, August 2005)

4.4.2. Gas

One supplier of gas in the catchment valued its infrastructure at $94.8 million in 2005 (Table 15).

Table 15 Value of gas infrastructure, Victoria Northern Zone, 2005

VIC Northern Zone assets (at 2005 prices)				
	Quantity	**Units**	**$/unit**	**$M value**
Mains - all types	923258	m	41	$37.9
(Pressure) Regulator stations	37	number	400000	$14.8
Meters - commercial	1382	number	1701	$2.4
Meters - domestic	38654	number	181	$7.0
Meters - large industrial	30	number	7000	$0.2
Inlets - commercial	1382	number	1130	$1.6
Inlets - domestic	38654	number	790	$30.5
Inlets - large industrial	30	number	17000	$0.5
TOTAL				**$94.8**

Source: Brian Fitzgerald, personal communication October 2005

This network of infrastructure is an excellent and essential framework for the growth of all industries in the catchment.

4.5. Property values

The capital improved value of properties in the catchment improved from $7,400 million in 1991 to $13,300 million in 2000 and to $16,000 million in 2003 (Table 16). The highest increase was in 2000-1 and 2001-2 with 12.5%, almost half of the rate of increase in Victoria. In 2003, whilst the value of the all properties in Victoria decreased by over 1%, the value of properties in the catchment increased by 4.2%.

Table 16 Capital improved value of all properties, Goulburn Broken Catchment, 1991, 2000 to 2003 ($M)

Year	GBC ($M)	% change	Victoria ($M)	% change
1991	$7,408			
2000	$13,285		$428,868.0	
2001	$13,647	2.7%	$446,435.8	4.1%
2002	$15,359	12.5%	$562,556.3	26.0%
2003	$16,002	4.2%	$556,232.6	-1.1%

Sources:

- 1991: Annual Reports of Shires in the catchment
- 2000 to 2003: Graeme Bales personal communication, August 2003. Victoria Grants Commission annual questionnaire to councils.

The shires in the irrigation area accounted for about 60% of the total capital improved value (Table 17). The value of residential properties constitutes more than half of the total value of properties and rural properties accounted for about 37%.

Table 17 Capital improved value of properties by local government area and type of properties, Goulburn Broken Catchment, 2003 ($M)

Municipality	Residential	Commercial	Industrial	Rural	Other	**Total**
Campaspe (S)	$1,558.4	$229.9	$180.4	$988.8		$2,957.6
Gr Shepparton(C)	$2,616.8	$475.2	$230.9	$1,079.1	$15.1	$4,417.2
Moira (S)	$989.6	$130.5	$145.8	$942.1	$0.3	$2,208.3
Benalla (RC)	$445.2	$81.1	$52.4	$486.6	$5.3	$1,070.6
Mansfield (S)	$546.4	$52.5	$3.0	$246.5	$0.5	$848.9
Mitchell (S)	$1,178.7	$86.9	$27.3	$723.4		$2,016.3
Murrindindi (S)	$562.2	$101.7		$811.9		$1,475.8
Strathbogie (S)	$373.6	$50.0		$583.6		$1,007.2
TOTAL	$8,271.0	$1,207.9	$639.9	$5,861.9	$21.2	$16,001.9
	51.7%	7.5%	4.0%	36.6%	0.1%	100%

Source: Graeme Bales personal communication, August 2003. Victoria Grants Commission's annual questionnaire to councils

Note: Valuations data for 2003 is not edited

5. Primary Industries in the Catchment - Farms, Forests and Fisheries

Dairying, horticulture, livestock production (beef, sheep, goats, pigs, poultry), cropping, timber and aquaculture are the major primary industries in the catchment. There are also a large number of smaller specialist enterprises (including mushrooms, nursery, turf and cut-flowers, peppermint, wasabi, green tea and herbs) and importantly, the thoroughbred horse stud breeding and horse riding industry.

Agricultural statistics in the catchment is shown in the following tables (Table 18 to Table 22):

Table 18 Land use, area, volume and farm gate value of crop production, Goulburn Statistical Division, 2003 and 2004

	2002-3		2003-4	
	area (ha)	Production (t)	area (ha)	Production (t)
Pastures cut for hay	57,724	231,792	96,944	471,284
Crops cut for hay	18,237	51,890	32,423	312,933
Pasture seed	2,926	1,201	4,235	2,210
Cereals for grain	188,899	166,020	184,213	555,431
Oilseeds	33,704	19,545	34,354	59,775
Legumes for grain	10,463	2,729	9,256	11,666
All other crops	2,858		9,364	
TOTAL	**314,811**		**370,788**	
Land use - grazing land (including pastures and rangelands)	1,120,406		no data	
Land use - land under crop (including vegetables, fruit and nuts, broad-acre crops)	325,806		no data	

Source: ABS Survey of Agriculture 2003, 2004

Table 19 Area, volume and farm gate value of horticultural production and number of trees, Goulburn Statistical Division, 2003

	Area (ha)	Production (t)	Number of trees (000)
Citrus		3,435	50
Pome fruit		No data	2,392
Stone fruit		168,931	3,346
Other fruit for sale		2,110	
Nuts			<1
Total number of trees			5,788
Vegetables	3,804	202,936	
Vegetable seed	26	413	
All fruit (excluding grapes)	9,362		
Grapes	3,936		
Nurseries cut flowers and cultivated turf	734		
Horticultural crops	**17,861**		

Source: ABS Survey of Agriculture 2003

Note: Rounding off errors.

Table 20 Area, volume and farm gate value of horticultural production and number of trees, Goulburn Statistical Division, 2004

	Area (ha)	Production (t)	Number of trees ('000)
Citrus		1,971	46.3
Pome fruit		135,519	2,959.5
Stone fruit		66,576	3,350.2
Other fruit for sale		1,003	77.2
Nuts			<1
Total number of trees		**205,069**	**6,433.3**
Vegetables	3,482	229,293	
Vegetable seed	55		
All fruit (excluding grapes)	15,438	205,069	
Grapes	3,692		
Nurseries cut flowers and cultivated turf	610		
Horticultural crops	**23,276**		

Source: ABS Survey of Agriculture 2004

Note: Rounding off errors

Table 21 Livestock statistics, Goulburn Statistical Division, 2003 and 2004

Livestock	2003	2004
Sheep and lambs	2,268,012	2,139,304
Milk cattle (excludes house cows)	461,307	424,492
Meat cattle	335,215	379,271
Sub-total Cattle (milk and meat cattle)	**796,522**	803,763
Pigs	121,276	100,492
All other livestock - on holding	16,511	14,436
Poultry slaughtered	321,600	340,600
Eggs for human (000 dozen)	8,766	9,229
Wool	no data	
Milk		
Honey and beeswax		

Source: ABS Survey of Agriculture 2003, 2004

Table 22 Number of registered dairy farms, number of dairy cows, volume and farm gate value of milk production in Victoria and Goulburn Murray Region, 1979-80, 1989-90 and 1994 to 2004

	Number of registered dairy farms		Number of dairy cows (000 heads)		Milk production (M litres)
	VICTORIA **(note 1)**	Goulburn Murray **(note 2)**	VICTORIA **(note 1)**	Goulburn Murray **(note 2)**	Goulburn Murray **(note 3)**
At March 31					
1979/80	11,467		1,047		
1989/90	8,840		968		
1994/95	8,379	2,599	1,113	441	1,855
1995/96	8,275	2,571	1,161	423	1,956
1996/97	8,203	2,593	1,229	420	1,921
1997/98	8,084	2,618	1,268	454	2,149
1998/99	7,926	2,687	1,340	489	2,377
1999/2000	7,806	2,709	1,377	508	2,704
At June 30					
2000/01	7,559	2,487	1,377	450	2,744
2001/02	7,079	2,329	1,363	446	3,005
2002/03	6,801	2,238	(r) 1,303	426	2,527
2003/04	(p) 6,242	2,054	(e) 1,308	428	2,511

r – revised data e – estimated data p – provisional data

Notes

1 Source: Dairy Australia, *Australian Dairy Industry InFocus 2004*

2 The dairy-producing region as defined by Dairy Australia covers Northern Victoria and Riverina in New South Wales.

Sources of data

- Data from 1994-95 to 1999-2000 are from ABARE *Australian Dairy Industry Survey*.
- Data from 2000-1 to 2003-4 are calculated. Assumes that 32.9% of number of registered farms and 32.7% of number of dairy cows in Victoria are in the GM Region, the average proportion from 1994-95 to 1999-2000.

3 Data from 1994-95 to 1999-2000 are from ABARE *Australian Dairy Industry Survey* Data from 2000-1 to 2003-4 are from Dairy Australia, *Australian Dairy Industry InFocus 2004*

5.1. Dairying

The dairy industry in the GBC is largely concentrated in the SIR. It takes full advantage of the low cost, high quality and reliable supply of irrigated pasture as the major feed input to milk production.

Relatively low cost of production, ready access to markets and product value adding capacity makes the dairy industry in the GBC amongst the most efficient in Australia and highly competitive internationally.

Productivity grew at a rate of around 5.6% annually (1995 to 2004) from a relatively stable total herd size. Individual herds are getting larger on average and there are

fewer smaller farms. The dairy farming industry has a substantial scope for improved production and resource use efficiency under high quality management.

The drought in 2002 to 2004 significantly impacted on the dairy industry in terms of decreased income through loss of production and increased feed costs (Dairy Australia, 2004). A study commissioned by Dairy Australia found that 97% of the farmers were affected and milk production decreased by an average of 21% per farm. Farm profitability and equity were significantly reduced. A drop of 18% in average farm gate price in 2002-3 season compounded the drought situation.

The total dairy herd size has changed only slightly since 2000-1, staying around the 420,000 to 450,000 cows. Productivity per cow and per herd has increased although the actual number of dairy farmers is slowly declining due to on-going structural adjustment in the industry. Dairy deregulation in 2000 had provided opportunities for some of the smaller producers to leave the industry, resulting in a lift in average herd size and increased efficiencies in resource use.

Dairy farmers in the catchment are dependent on irrigated pasture as the basis for feeding the herds. The main type of pasture is summer pasture (white clover, perennial ryegrass and paspalum in varying proportions) and a smaller proportion of winter annual pastures (sub-clover, annual ryegrasses, oats and a variety of other legumes). The climate is conducive to August/September calving and drying off the herd in June/July.

A smaller number of dairy farmers split calving between spring and autumn and milk through the winter to achieve winter production milk price bonuses. The effect of wet winters on pastures can make this difficult and is generally most suited to properties with well-drained soils. Many producers rely on grain or concentrates to fill seasonal pasture feed gaps. Higher levels of grain feeding for production require careful evaluation of the cost of the grain versus the value of the additional milk produced, relative to the cost of milk production from pasture.

An alternative to feeding grain on properties where the limiting input is available irrigation water, is to purchase more water through permanent or temporary transfer of water entitlement. The alternative feeding strategies require careful economic and technical evaluation on a property by property basis. These evaluations will be affected by the ability of individual dairy factories to access a greater share of the whole milk market for their suppliers.

5.2. Horticulture

The GBC is one of Australia's premier fruitgrowing areas. There are approximately 600 horticultural properties in the catchment, with an area covering almost 16,000 ha. The SIR is the centre of orchard production and processing activity.

The horticulture industry in the catchment is centred in the irrigation region because of reliable water supply, suitable soils and good climate.

The industry represents a significant portion of the economy in the irrigation region of the catchment, accounting for 23.4% of its FGVAP. This high level of production is occurring from less than 4% of the total irrigated land area and demonstrates the catchment's potential to expand into high-value horticulture, using under-utilised land and water, provided major new markets emerge.

The drought also affected the industry in terms of reduced yield and high cost of water. The severe frost in September 2003 wiped out almost half of stone fruit production in the irrigation region.

5.2.1. Perennial horticulture

The principal orchard crops are pears, apples, peaches, nectarines, apricots, plums, nashi, kiwi fruit and cherries. These are grown for both the fresh market and for processing through the major canneries. In recent years, these crops have undergone major growth in production quantities. The impact of the global market has forced the industry to develop intensive, high density planting systems in an effort to produce early yielding, quality, price-competitive fruit and the resulting additional tonnages are available for the export market.

The region grows:

- 90% of the national deciduous canned fruit production
- 85% of the national pear crop
- 45% of the national stone fruit crop
- 14% of the national fresh stone fruit crop
- 16% of the national apple crop
- 90% of the national kiwi fruit crop and
- 80% of the national nashi fruit crop

The total average annual production of fruit exceeds 350,000 tonnes (Table 23).

Table 23 Fruit type by area and volume of production, Goulburn Valley, 2003

Fruit Type	No. Trees	Planting Density	Area Planted (ha)			Estimated production (t)		
			Processing	Fresh	Total	Processing	Fresh	Total
Apple	1,939,321	933	398	1,681	2,079	24,000	56,000	80,000
Apricot	421,229	710	431	162	593	7,500	2,400	9,900
Cherry	143,366	1,147		125	125		1,800	1,800
Citrus	35,291	304		116	116		5,800	5,800
Kiwifruit	58,310	655		89	89		1,800	1,800
Nectarine	438,869	871		504	504		15,000	15,000
Peach	1,461,450	667	1,904	288	2,192	56,000	12,640	68,640
Pear	1,767,796	452	1,654	2,259	3,913	87,000	98,000	185,000
Plum	654,337	1,144	91	481	572	1,200	10,200	11,400
Pluot	33,194	1,747		19	19		400	400
Other	19,714	680		29	29		600	600
Total	6,972,877		4,478	5,753	10,231	175,700	204,640	380,340

Source: Simon Mills, SPC-Ardmona, Goulburn Valley Orchard Census 2003, personal communication, October 2005

About 46% of produce is sold in the fresh market and approximately 54% is processed at the SPC-Ardmona plants in Shepparton and Mooroopna.

The 2003 orchard census indicated a total area of slightly over 10,000 ha in the Goulburn Valley, an increase of 14% from the 1997 census. It is estimated that between 1997 and 2002, new development (excluding grapes) is about 450 ha per year. At a cost of between $20,000 to $35,000 per ha depending on trellis and irrigation system installed, the value of the investment is $9 million to $15.75 million annually.

The area planted to stone fruit increased by 47% from 2,723 ha in 1997 to 4,005 ha in 2003 and production increased by 66%. There was a moderate increase (6%) in area with pome fruit but production increased by 46% during the same period.

Replanting of established orchards occurs at the rate of about 5% annually or 440 ha based on the 1997 orchard census data.

To adapt to the international marketplace, many growers have pursued vertical integration and export fruit through their own packing sheds. There are approximately 50 orchardists with packing sheds licensed by the Australian Quarantine and Inspection Service (AQIS) to pack fresh fruit for export and at least 12 well-known companies that export fresh fruit. It can be expected that the percentage of fresh fruit exported will rise in the near future as the large, new planting's come into full production.

The abnormal dry conditions in 2001 culminating to drought conditions in 2002 to 2003 restricted new investments and deferred replanting programs as growers redirected expenditure to buying Temporary Water Entitlements (TWE). With an allocation of only 57% in 2001-2, one never before experienced in the Goulburn Irrigation System, TWEs sold for about $500 per ML.

5.2.2. Tomatoes

Tomatoes are grown for the fresh market and for processing. The 2003-4 season crop of processing tomatoes was 168,187 tonnes grown from 1,948 ha mainly in the SIR - Corop, Colbinabbin and Rochester (ABS, 2004).

The industry is also experiencing continuous structural adjustment. In the early 1990s, there were more than 40 growers and in 2005 there were 16 growers. Farm productivity of processing tomatoes increased from 76 tonnes per hectare in 2000-1 (224,000 t from 2,937 ha) to 86 tonnes per hectare in 2003-4 (168,187 t from 1,949 ha).

The fresh market has normal supply and demand forces driving the price on a daily basis. About ten large fresh growers can influence the market on any one day and there are about twice that number of small growers who also supply the markets. The growing market popularity of trellis (gourmet) tomatoes and their associated high growing costs and premium prices is putting pressure on the smaller growers who don't have the resources to establish these varieties.

The total area of fresh tomatoes in 2000-1 was 711 ha producing about 30,400 tonnes and 624 ha producing 36,258 tonnes in 2003-4. Productivity increased from 43 tonnes per hectare in 2000-1 to 58 tonnes per hectare in 2003-4.

5.2.3. Winegrapes

The area of wine grape planting grew rapidly in the late 1990s up to 2002 with nearly one third of the total area yet to reach commercial production. The farm gate value from grape production is not likely to increase significantly as a proportion of the catchment's FGVAP.

In 2003, the area of wine grapes in the GBC reached 3,936 ha, an increase of 52% from the 2001 level of 2,582 ha (ABS 2003). The wine growing areas are mainly in the Strathbogie Shire.

5.3. Cropping - fodder and grains

The large dryland and irrigated mixed farming and grazing sector is focusing more and more on finding alternatives to predominantly livestock enterprises, due to low wool prices and fluctuating meat prices.

In the arable areas, there is a growing area of winter cereals, pulse and oilseed crops in the dryland and growing interest in the potential of summer irrigated grain and fodder crops in the irrigation areas. Irrigated fodder-cropping plays a major role in supporting the growing dairy industry needs through the provision of hay and silage. It is also an important national drought fodder reserve. There is also a specialty export market for hay.

The hay, pasture, grain, oilseed and legume industries contribute 12.8% and 13.9% of FGVAP as part of the mixed farming sector in the irrigated and dryland areas, respectively. These industries provide fodder for the mixed grazing sector as well as being increasingly more important sources of supplementary feed for the dairy industry as it gradually intensifies. The Victorian Irrigated Cropping Council is strongly promoting the potential for higher value irrigated crops for human consumption as an alternative to traditional grazing of irrigated pastures by sheep and beef cattle. In the dryland areas, higher value cropping is also being promoted as an alternative to or to supplement dryland-grazing enterprises where soils are suitable.

5.4. Grazing/animal industry

Livestock slaughtering represents 19% of FGVAP in the irrigation area and 32% of FGVAP in the dryland shires, highlighting the importance of broad-acre grazing enterprises in the dryland. With falling commodity prices for wool, there is considerable incentive for graziers in both the irrigation and dryland areas to seek alternative, higher value farm enterprises. A steady move towards larger dairy farms and more cropping both irrigated and dryland, is occurring where that is possible.

Wool production contributes 3.6% of the FGVAP in the GBC. It is an important sector in the dryland, contributing 12.1% to the FGVAP and reflects the large areas in the upper catchment that have limited alternatives to sheep grazing. Wool production will continue to be a significant enterprise in the catchment as sheep production plays a major management role in maintaining crop rotations and utilising large areas of non-arable land. Wool is also an important by-product from the prime lamb industry in the climatically more favourable mixed farming areas in both the irrigation and dryland areas.

5.5. Forestry

Timber production, principally softwood plantation timber contributes 15.6% of FGVAP in the dryland shires and 3.3% of FGVAP of the GBC. The indicative value of goods produced in the catchment is about $115 million (Plantation North East, Inc.). The higher rainfall in the upper catchment provides ideal conditions for large-scale plantation timber production. Forest management and subsequent milling and value adding of timber products is a major employer in the dryland shires. Some graziers are being persuaded that plantation timber production is more profitable in the long term, than wool production and are converting all or some of their dryland grazing land into plantation timber.

In 2001, the area of plantations was recorded at more than 26,000 ha and there were more than 760,000 ha of native forest (Table 24). A list of timber processing plants is shown in Table 25.

Table 24 Area of plantations and native forest, Goulburn Broken Catchment, 2001

Municipality	Plantations (ha)		Native Forest (ha)	
	Softwood	Hardwood	Public land	Private land
Campaspe			24,700	10,000
Delatite	12,757	656	284,200	40,600
Gr Shepparton	4	129	8,300	8,200
Mitchell	2,162	917	47,800	30,000
Moira		43	39,100	7,700
Murrindindi	7,615	749	162,100	46,400
Strathbogie	1,005	67	25,900	26,800
Total	**23,543**	**2,561**	**592,100**	**169,700**

Source: Plantations North East, Inc. "The Timber Industry in North East Victoria: A Socio-Economic Assessment, May 2002 p62.

Table 25 Timber processing plants, Goulburn Broken Catchment, 2001

Companies	Municipality	Type of industry
Murray River Sawmills	Campaspe	Hardwood sawmilling
Risstrom Bros	Campaspe	Hardwood sawmilling
Ryan & McNulty P/L	Delatite	Hardwood sawmilling
DSM Sawmills	Delatite	Hardwood sawmilling
The Stakeman	Delatite	Hardwood sawmilling
McCormack Timbers	Mitchell	Hardwood sawmilling
J L Gould Sawmills	Murrindindi	Hardwood sawmilling
Alex Demby Timber	Murrindindi	Hardwood sawmilling
Neville Smith Timber Industries	Murrindindi	Hardwood sawmilling
D & R Henderson P/L	Delatite	Softwood saw milling
GB Sawmills	Murrindindi	Softwood saw milling
Benalla Timber Products	Delatite	Roundwood preservation
Hume Timbers	Strathbogie	Roundwood preservation
Monsbent P/L	Delatite	Panel products

Source: Plantations North East, Inc. *"The Timber Industry in North East Victoria: A Socio-Economic Assessment*", May 2002 p63.

More information about the forest industry in the North East of Victoria is available at http://www.plantationsnortheast.com.au.

5.5.1. Hardwood forestry

Hardwood forestry is based on native forests and is centred on the Murrindindi Shire, which produces 15% of Victoria's sawn hardwood, with smaller volumes coming from the Mitchell Shire.

There is a long established processing industry in the catchment based on harvesting native eucalypt (hardwood) forest on public land. A number of hardwood sawmills operate throughout the catchment.

It is unlikely that the hardwood industry based on native forests will expand. Expansion is only likely if the area of hardwood plantations increases substantially and technologies to mill plantation grown eucalypts improve.

5.5.2. Softwood plantation forestry

The majority of forest industries based on plantations, use radiata pine as their prime resource. There are approximately 20,000 ha of plantation softwood forests in the dryland area of GBC.

The softwood plantation industry is targeting the higher rainfall, traditional grazing areas in the dryland, which are close to the existing value adding facilities or close to a rail head, for potential expansion of softwood plantations. There are some landholders and local government resistance to large-scale plantation development because of perceived adverse impacts on population numbers and loss of services, especially rural schools, regional aesthetics and damage to road infrastructure by logging trucks. Some landowners and local governments have expressed a preference for the development of more intensive industries that will maintain the population base and generate a more regular cash flow, compared to plantation forestry. With a planned approach to plantation forestry development, these perceptions may be overcome.

5.6. Aquaculture

The aquaculture industry in the catchment, mainly salmonoids hatchery and grow out is centred in Murrindindi Shire. Fish farms are located adjacent to the Goulburn River and/or its tributaries, between Eildon and Nagambie. These trout and salmon fisheries are dependent on the cold water that flows from the bottom of the Eildon Dam and from the surrounding alpine areas. Hugh Meggitt's Trout Farm has built a fish smoking plant at Thornton, providing additional marketing opportunities for other producers in the area.

In 2004-5, salmonoids production in the catchment was valued at about $10.4 million (Table 26). It is estimated that the catchment accounts for 80% of the value of salmonoids production in Victoria (Edward Meggitt, personal communication, October 2005).

Table 26 Value of salmonoid production, Goulburn Broken Catchment, 1999 to 2005 ($'000)

Year	Victoria ($M)	GBC ($M)
1999-2000	$11.1	$8.9
2000-1	$11.3	$9.0
2001-2	$11.2	$8.9
2002-3	$11.0	$8.8
2003-4	$12.1	$9.7
2004-5	$13.0	$10.4

Source: Anon (2004) Fisheries Victoria *"Commercial Fish Production Information Bulletin"*

The balance includes yabbies, native warm water species and eels.

Investigations are being undertaken to evaluate the feasibility of value-adding the by-product (waste) water from Australian Aquaculture Industries in Euroa. This water (60 ML per year) is rich in nutrients, which could be utilised by another industry. Given the large investment into the Euroa-based eels business, it is expected that their contribution to the total catchment production from aquaculture will increase significantly.

5.7. Specialised rural industries

The specialised rural industries in the catchment is growing steadily since 1996 with growth in horse breeding industry, olive groves, exotic vegetables and nurseries, cut-flowers and turf.

5.7.1. Horse breeding/stud farm

The Strathbogie Shire is being promoted successfully as an ideal location to base horse breeding enterprises. The area has a moderate climate, decomposed sandy soils (similar to the Hunter Valley breeding areas), suitable sized parcels of land and is accessible to Melbourne. It has back-up veterinary services and investors can take advantage of Victorian Ordinary Breeds Incentive Scheme (VOBIS). VOBIS provides additional prize money for thoroughbreds bred in Victoria, over and above existing amounts for nominated races. Eleven major horse breeding facilities, including several Hunter Valley and South Australian thoroughbred studs, have already been established in the area and more are coming. The area is now second only to the Hunter Valley in NSW as a thoroughbred horse breeding area.

A report prepared by the Alpine Valleys Agribusiness Forum[2] estimates that there are 7,000 to 10,000 horses in the Alpine region with an estimated value of between $3.5 million to $5 million, excluding stud stock (Young, 2000). It further estimates the value of equipment, clothing, support services, feed, Thoroughbred Racing, major events such as the Great Mountain Race of Victoria and the once-in-four-years Mountain Cattlemen Annual Get Together at Mansfield and Trail/Safari Rides, to be an additional $13.5million to $21million.

[2] The Alpine Valleys Agribusiness Forum roles are to foster and stimulate the development of viable and sustainable agribusiness in the NorthEast and to create the right climate in which agribusiness can successfully operate. It covers the shires of Alpine, Towong, Indigo and the Rural Cities of Benalla, Wodonga and Wangaratta.

The value of the horse industry in the GBC could be higher than in the Alpine Region because of the catchment's higher population density and closeness to Melbourne and the growing concentration of major thoroughbred studs and services in the Strathbogie Shire. The Tatura Racing Club alone is a $1 million business annually. This is replicated at the Shepparton, Cobram Echuca and Kilmore Racing Clubs and at other regional racing clubs including Benalla, Mansfield and Seymour. The industry is growing rapidly in the catchment with direct and indirect employment related to the horse industry expected to be about 1,500 people in 2000.

Races are held in the following locations in the catchment:

- Tatura
- Shepparton
- Benalla
- Echuca
- Kilmore
- Mansfield
- Cobram
- Seymour
- Alexandra
- Merton

5.7.2. Olive production

The value of olive production in the catchment increased from $35,089 in 1995-96 to $375,808 in 2002-3. (These data are included in the value of fruit production shown in Table 3).

5.7.3. Mushroom Industry

The mushroom industry is growing rapidly in the Benalla and Strathbogie Shires, with major developments near Euroa and Nagambie. It is building strategic linkages with major contract pig growers to utilise pig waste as a source of composting material. The mushroom industry is anticipating the need to employ up to 600 staff over the next ten years.

Chiquita Mushrooms near Nagambie, Australian Mushrooms at Euroa and Benalla Mushrooms near Benalla are the major producers.

6. National Regional Profile – Goulburn Statistical Division

This section is a snap shot of the catchment. According to ABS, the National Regional Profile (NRP) presents a brief statistical summary of key economic and social information for various levels of the Australian Standard Geographical Classification (ASGC).

It includes data from the following sources:
- Australian Taxation Office
- Commonwealth Department of Family and Community Services
- Department of Employment and Workplace Relations
- Federal Chamber of Automotive Industries, and
- ABS censuses and surveys

The NRP has been designed to assist users of regional statistics to understand the broad composition and structure of a region and to enable easy comparison across regions of Australia. As shown in Table 27, 94% of the population in the catchment are in inner regional areas.

Table 27 National regional profile of Goulburn Statistical Division, 1999 to 2003

		1999	2000	2001	2002	2003
LAND AREA	km^2	-	-	-	-	27,270.5
PROPORTION OF POPULATION IN REMOTENESS AREA - Census 2001						
Major cities	%	-	-	0.0	-	-
Inner regional	%	-	-	94.2	-	-
Outer regional	%	-	-	5.8	-	-
Remote	%	-	-	0.0	-	-
Very remote	%	-	-	0.0	-	-
POPULATION - at 30 June						
Total - all persons	no.	188,649	191,283	193,999	195,914	198,504
Aged 14 years and younger	no.	43,446	43,585	43,686	43,469	43,448
Aged 15 years to 44 years	no.	74,777	75,266	75,867	76,258	76,783
Aged 45 years to 64 years	no.	43,889	45,337	46,758	47,841	49,213
Aged 65 years and over	no.	26,537	27,095	27,688	28,346	29,060
Proportion of total population						
Aged 14 years and younger	%	23.0	22.8	22.5	22.2	21.9
Aged 15 years to 44 years	%	39.6	39.3	39.1	38.9	38.7
Aged 45 years to 64 years	%	23.3	23.7	24.1	24.4	24.8
Aged 65 years and over	%	14.1	14.2	14.3	14.5	14.6
Population density	persons/ km^2	6.9	7.0	7.1	7.2	7.3
Births - year ended 30 June	no.	2,404	2,405	2,322	2,420	2,371
Crude birth rate	rate	12.8	12.7	12.1	12.4	12.0
Deaths - year ended 30 June	no.	1,420	1,398	1,469	1,473	1,547
Crude death rate	rate	7.6	7.4	7.6	7.6	7.8
INDEX OF RELATIVE SOCIO-ECONOMIC ADVANTAGE/ DISADVANTAGE - Census 2001	decile	-	-	5	-	-
ESTIMATES OF UNEMPLOYMENT - September quarter						
Unemployment	no.	-	-		5,323	4,359
Unemployment rate	%	-	-		5.6	4.6
SELECTED INCOME SUPPORT CUSTOMERS - at June						
Age pension	no.	-	-	-	20,426	21,046
Disability support pension	no.	-	-	-	7,300	7,427
Newstart allowance	no.	-	-	-	5,257	5,579
Parenting payment - single	no.	-	-	-	4,560	4,705
Youth allowance	no.	-	-	-	3,832	4,006
Other pensions and allowances	no.	-	-	-	6,430	7,536
Total selected income support customers	no.	-	-	-	47,805	50,300
Percentage of long-term Newstart allowance customers	%	-	-	-	62.3	58.8
AVERAGE INDIVIDUAL ANNUAL TAXABLE	$	$28,783	$29,914	$32,119	$33,263	-

		1999	2000	2001	2002	2003
INCOME - year ended 30 June						
WAGE AND SALARY EARNERS - year ended 30 June						
Wage and salary earners	no.	66,167	66,802	67,252	69,027	-
Wage and salary income	$M	$1,780.2	$1,865.0	$1,953.7	$2,086.9	-
Total income	$M	$1,878.1	$1,943.5	$2,064.2	$2,198.4	-
Average wage and salary income	$	$26,905	$27,919	$29,050	$30,233	-
Average total income	$	$28,384	$29,093	$30,694	$31,849	-
SOURCE OF PERSONAL INCOME - year ended 30 June						
Proportion of total personal income						
Wage and salary	%	66.2	66.3	64.4	-	-
Own unincorporated business	%	9.1	9.1	10.7	-	-
Investment	%	7.5	7.3	7.8	-	-
Superannuation and annuity	%	2.6	2.6	2.6	-	-
Government cash benefit	%	14.3	14.4	14.0	-	-
Other income	%	0.4	0.3	0.5	-	-
Total personal income from all sources	$M	$2,750.8	$2,906.7	$3,198.2	-	-
BUILDING APPROVALS - year ended 30 June						
Private sector houses	no.	1,214	1,715	1,077	1,725	1,700
Total dwelling units	no.	1,251	1,821	1,122	1,855	1,756
Value of total residential building	$M	$156.1	$245.4	$171.1	$292.5	$303.9
Value of total non-residential building	$M	$73.9	$69.1	$94.3	$96.0	$92.6
Value of total building	$M	$230.0	$314.5	$265.4	$388.5	$396.5
NEW MOTOR VEHICLE SALES - year ended 30 June						
Passenger vehicles	no.	-	-	-	3,785	3,765
Other vehicles	no.	-	-	-	3,081	3,299
Total vehicles	no.	-	-	-	6,866	7,064
VALUE OF AGRICULTURAL PRODUCTION - year ended 30 June						
Value of crops	$M	$468.7	$441.6	$551.9	$558.5	$563.5
Value of livestock slaughtering and other disposals	$M	$254.6	$255.8	$333.0	$363.2	$321.6
Value of livestock products	$M	$490.8	$418.3	$604.4	$720.8	$496.3
Total value of agriculture	$M	$1,214.1	$1,115.7	$1,489.3	$1,642.5	$1,381.4

Sources: ABS "National Regional Profile" Catalogue no. 1379.0.55.001
Value of agricultural production (1999, 2000, 2002, and 2003) – ABS Survey of agriculture

7. Challenges and Opportunities

7.1. Water reform

In response to the National Water Initiative, the Victorian Government launched its White Paper on Water Reform ("Securing Our Water Future Together") in 2004. It sets out a range of reforms to improve the way in which Victoria's water is shared.

The changes in water allocation and supply will have a huge impact to the economy of the GBC considering that more than a third of the value of its economic activity is from irrigated agriculture and related processing sector.

One of the key features of the Water Reform is unbundling of water entitlements into three components – a water share, a water-use licence and a delivery share. 'Sales' water will also be turned into a separate and tradeable lower reliability water share.

As part of the unbundling of water entitlements, G-MW will implement tariff changes from 1 July 2006. G-MW[3] stated that the revised tariffs would help to ensure that:

- payments reflect the services received by customers
- revenue is available to reduce the risk of 'stranded assets' in locations where customers are permanently transferring water out of the area, and
- mechanisms are introduced now to provide stability in water prices as well as a sensible transition to the way that tariffs will be structured when state-wide reforms lead to the unbundling of water entitlements.

The next five years will see many changes in the farm sector as farmers adjust their management as a response to the Water Reform and to the broader objective of sustainable agriculture.

7.2. Limitations to unplanned development – water, harvest labour and markets

The major limitation to new horticulture expansion outside the existing irrigation areas is access to a reliable supply of irrigation water. Being adjacent to a river or waterway is not a guarantee that access to water entitlement is available. This currently needs to be negotiated on a case-by-case basis and is subject to New Irrigation Development Controls, with the expectation that water entitlement will be purchased, through normal water trading facilities and the entitlement transferred to the development site.

This is of particular importance in the dryland shires in the GBC but also applies to the dryland areas within the designated irrigation areas.

The other significant limitation to unplanned development of intensive horticulture is the seasonal availability of casual harvest labour. The Northern Victorian Fruitgrowers Association (NVFA), in close consultation with producers and regional employment services, is developing a coordinated approach to attracting and retaining a reliable supply of seasonal harvest labour for intensive horticulture industries. It can be difficult to attract and retain labour to locations that are isolated from acceptable accommodation and services. The Harvest Labour Office assists in allocating staff and expediting the essential employment related paper work. Some growers are prepared to transport pickers from their accommodation sites to the crop site and return, each day.

New horticultural investment projects need to include thorough investigations of the market prospects for the product. Horticulture product markets, in particular, have very specific varietal and quality specifications and relatively inelastic demand. New markets have to be fought for, won and maintained. This applies equally whether the product is apples, nectarines, winegrapes or olives. To say, for example, that import replacement is a ready-made market, eg. olives, walnuts or some timber products, fails to recognise that all markets also have to meet price, volume and quality criteria. If the scale of the business and the quality of management enable these market

[3] Goulburn-Murray Water website, Tariff and Unbundling - Frequently Asked Questions. More information is available at www.g-mwater.com.au.

criteria to be met then they may compete successfully with imports or other domestic suppliers.

The Free Trade Agreement (FTA) with the United States and the proposed FTA with China present both an opportunity and a challenge to the agricultural sector. The application of New Zealand to export apples to Australia is a major threat to the horticulture industry because of the risk of fire blight infestation.

7.3. Industry structural adjustment - resource rationalisation – change

In the irrigation area, there is strong evidence that land and water resources are being moved into higher value farming activities, from low intensity grazing of sheep and beef cattle to more intensive dairying and horticulture (pome and stone fruit and wine grapes).

Prime Development Zones (PDZ) have been identified as areas capable of accommodating new investment into high-value irrigation development. These areas have a combination of good soils for irrigation, existing or potential for economic development of irrigation and drainage infrastructure, low salinity risk, access to irrigation water and reasonable proximity to services and markets for the preferred rural industry and are unlikely to contain native vegetation. Delivery of water will be the key constraint for these areas.

Similarly, in the dryland areas, there are opportunities for diversification of farming enterprises such as:

- increase in cropping relative to grazing (where that is possible)
- farm forestry, and
- many alternative farm enterprises, usually requiring good entrepreneurial skills to make them successful (ranging from herbs to low-line cattle, olives and wine grapes).

7.4. Rural residential and urban fringe development

The southern extremities of the Mitchell, Murrindindi and Mansfield Shires have been recognised as being within commuter distance (< 1 hour) from Melbourne. This is especially applicable from Seymour, south along the Hume Freeway as well as Woods Point, Marysville and Kinglake. The development of significant urban and small farm subdivisions is becoming more obvious, where land costs and the semi-rural lifestyle is attracting city workers. All local governments in the dryland catchment report significant increases in subdivision development applications.

7.5. Agriculture vs urban water use

There is a planned pipeline to divert water from the Goulburn System to Bendigo via Waranga for urban use. Ballarat is also considering building pipelines and buying water from farmers in the Goulburn System for urban use.

7.6. Natural resource-based tourism

Natural resource-based tourism is a growth industry in the GBC, taking advantage of the natural and man-made waterways and their environment, the native forests, national and state parks and the alpine areas.

The snowfields at Mt Buller and Mt Stirling are the closest, reliable, snowfields to Melbourne, for winter skiing and summer bushwalking. The Lake Mountain ski field is even closer to Melbourne, a short drive from Marysville. The Cathedral Ranges are a Mecca for rock climbing enthusiasts.

The Murray River, from Yarrawonga to Echuca, attracts thousands of tourists who enjoy swimming, boating and fishing. The Barmah Forest, on the Murray River, is the world's largest River Red Gum forest and contains the Barmah Lakes and a network of interconnecting streams and billabongs that are flooded periodically to maintain their ecological balance. There are also some important aboriginal sites within the forest and an aboriginal cultural information centre.

The Goulburn River and its tributaries attract tourists to Nagambie, from the Goulburn Weir, all the way back to Eildon Dam and Lake Eildon and the streams that feed it. A world-class rowing facility has been constructed at Nagambie, providing the opportunity for international regattas to be held there. Similarly, waterways such as Lake Nillahcootie on the Broken River System provide many recreational opportunities. The Murrindindi Shire has the highest concentration of State "outdoor" camps in Victoria, with one camp alone, at Rubicon, employing 140 staff, with a throughput of 14,000 children per year.

Further to the west, Waranga Basin, Lake Cooper and Green's Lake provide recreational opportunities for water skiing, sailing, fishing and swimming. Fishermen actively fish all streams in the catchment, with the chance of catching native species such as Murray Cod, Silver Perch and Crayfish as well as introduced species, including Trout and Redfin. A number of trout farms also provide self-catch facilities for the less adventurous anglers.

The tourism and recreation industry in the GBC employs approximately 1200 workers, with an emphasis on the ski fields in the winter and along the waterways, particularly the Murray River and around Eildon, in the summer. There has been an increase in Bed and Breakfast and FarmStay accommodation facilities, particularly in the mountains and adjacent to the rivers.

8. Institutional Support

The GBC is serviced by a number of key organisations that help in the management of the region's natural resources.

8.1. Goulburn Broken Catchment Management Authority

The Goulburn Broken Catchment Management Authority (GBCMA) is a non-profit statutory authority. It is the peak natural resource management organisation in the GBC responsible for the coordination, planning and implementation of the Regional Catchment Strategy. It had an operating budget in 2004-5 of $27 million, with $17 million spent in the SIR. In doing so, it brings together and delivers the region's:

- Irrigation and Dryland Salinity programs
- River Health program
- Floodplain Management program
- Bio-diversity program, and
- Pest, Plants and Animals program

The GBC Regional Catchment Strategy is internationally recognised as one of the world's leading natural resource protection and management programs. It has

evolved through a 15-year partnership between government at all levels, the farming community, supporting research, development and education agencies and the wider regional community and businesses.

8.2. Goulburn-Murray Water

Goulburn-Murray Water is a government owned business enterprise charged with the responsibility of managing the allocation of bulk water entitlements along the Murray and Goulburn river systems to irrigators and urban users of water. It conducts an on-going research and development program that aims to meet regional needs, relating to water transmission loss prevention, water quality improvement and improved operational efficiency. Its total expenditure in 2004-5 was $87.5 million and employs more than 600 staff in various locations in Victoria.

8.3. Goulburn Valley Water

Goulburn Valley Water (GVW) is the catchment's major urban and industrial water supply and waste disposal authority. It was formed by the amalgamation of most of the small, local government-based, and town water and sewerage authorities, following local government amalgamation. Their newfound economic power, coupled with effective regional strategic planning for infrastructure needs, has enabled a coordinated program of urban and industrial water supply and waste disposal infrastructure upgrade to be implemented across the catchment.

As stated in its Annual Report, GVW generated annual revenue in 2004-5 of $49 million and managed an asset base valued at over $479 million including:

- 40 water treatment plants
- 27 wastewater management facilities
- 340 pumping stations
- 92 tanks and reservoirs over 1,500 kilometres of water mains, and
- 920 kilometres of pressure and gravity sewers

GVW directly employs around 170 people, in operational, engineering, financial and administrative roles.

In 2004-5, GVW continued to work closely with its catchment partners, the GBCMA and G-MW and other stakeholders to ensure a consistent strategic approach is taken with initiatives to improve river health and the environmental values of the Goulburn-Broken catchment (GVW 2004/2005 Annual Report).

8.4. Department of Primary Industries and Department of Sustainability and Environment

The Department of Primary Industries (DPI) and the Department of Sustainability and Environment (DSE) play a major role in supporting the farm sector in the GBC through:

- Conducting research - natural resource management, dairying, horticulture and cropping
- Information provision relating to production and resource management
- Regulating issues relating to crop and animal health and public land management.

DPI Tatura Centre is a world-class research establishment, with a staff of approximately 200 scientists and support staff, conducting research into salinity and natural resource management, horticulture and irrigated crops. The Kyabram Dairy

Centre conducts dairy research and extension programs and DPI Cobram supports research and extension programs for the horticulture, cropping and dairy industries. These research groups have played a significant role in supporting the development of the catchment's land and water management plans.

DPI and DSE maintain district offices in Echuca, Benalla (North East Regional Office), Seymour, Broadford, Euroa, Mansfield, Yarrawonga, Nathalia and Alexandra. DPI is also responsible for the Snobb's Creek Fish Hatchery.

8.5. Education and training facilities

The catchment is well served by high quality education and training facilities that support the industries and communities in the region.

Melbourne University's Dookie College Campus - Institute of Land and Food Resources - has grown significantly since the mid-1990s through building strategic alliances with the food manufacturing sector, the farming sector and the Goulburn-Ovens Institute of Technical and Further Education (TAFE). Melbourne University has also made a significant social commitment to the GBC through the establishment of their Rural Medicine Program at the Shepparton Campus of Goulburn Valley Health.

La Trobe University has a campus in Shepparton, concentrating mainly on Business Management disciplines. La Trobe has also established the Australian Alpine Institute within the Mt Buller Alpine Village. It provides Travel, Tourism and Recreation studies in a year-round alpine environment.

Goulburn Ovens Institute of TAFE provides invaluable support to industry in the region through their training in a cross section of industry and business skills and trades. With the growth of the dairy industry and the gradual restructuring to larger commercial farming operations, there has been a growing demand for stainless steel fabricators to manufacture milk vats, coolers, milk lines and bulk haulage tankers. Similarly, the upgrading of dairies to increase their throughput rate has resulted in the need for a range of other fabrication and refrigeration skills.

Major infrastructure investment in the food processing industries (milk, tomatoes and fruit) has created high demand for skills in the manufacturing of storage, processing and handling equipment. Higher quality standards for food production have seen the need for more skilled laboratory technicians and equipment supervisors. A greater dependence on information technology has seen a massive development in training in the use of specific computer software applications, including farm record keeping and accounting but also equipment monitoring, coolstore management, automated product sorting and a broad range of telecommunications applications.

8.6. Industry organisations

Industry groups that support the major rural industries in the region:

- The Victorian Farmers Federation - across most commodity groups
- United Dairyfarmers Victoria
- Murray Dairy - promoting dairy industry research, development and education
- Northern Victorian Fruitgrowers Association
- Victorian Irrigated Cropping Council

9. Conclusions

- The GBC provides unique opportunities to value add agricultural produce and provide competitive output.

- Enhancement of environmental and sustainability values is being achieved with new opportunities to value-add waste products by converting them to an input for another industry, whether it be milk by-products, horticultural processing waste, piggery waste, timber by-products or aquaculture waste.

- Opportunities exist to form strategic alliances and provide the volume, scale and competitiveness of vertical integration between industries and sectors. This benefits all parties and the catchment environmental, social and economic viability.

- The tourism industry has considerable potential in all shires and can benefit from cooperative development of "Theme" trails that link the major regional features and industries across adjacent areas eg all around Lake Eildon; or Nagambie to Rushworth, Echuca, Yarrawonga, Shepparton and back to Nagambie.

- The irrigation region (City of Greater Shepparton, Moira Shire and Campaspe Shire) has a secure productivity base for future development.

- The Water Reform provides both challenges and opportunities to the farming sector as it rebuilds after the drought and makes adjustment brought about by the Water Reform.

- The economy of the dryland shires is being insured against the effects of variable seasonal conditions and commodity prices for largely bulk commodities – timber, meat and wool - by the investment in new industries. Implementing best management practices in the traditional industries will keep them competitive.

- The capacity to develop high value alternatives (especially intensive horticulture – winegrapes and others) to the bulk commodities of cereal cropping, wool and beef will depend on the capacity of individuals to access reliable water resources.

- Value adding opportunities emerge through innovative segregation of traditional bulk commodities and processing to meet specific needs of emerging and boutique markets – new processes, product differentiation, special packaging, target marketing. Hence, product development and marketing skills are in high demand.

- Many of the future profitable developments in the dryland are less reliant on traditional agriculture/horticulture commodity enterprises. Irrigation water will enhance opportunities for enterprises such as specialist horticulture, intensive livestock production (piggery and poultry), mushrooms, thoroughbred horses or herbs.

- There is a strong competition between the existing irrigation areas and the dryland for the investment dollars for high value horticulture development, whether it be for fruit, winegrapes, olives, nuts or any other enterprise. In this regard, the irrigation area already is well served. It has the water, the irrigation infrastructure and many of the supporting services to enable new development to occur.

- Future investment needs to be profitable and take full advantage of natural and man-made support systems.

- Investors need to be fully aware of all production, marketing and institutional rules that affect their potential investments.

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- Seymour
- Shepparton
- Tungamah
- Violet own
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Appendix A Goulburn Statistical Division, sub-divisions, local areas and corresponding local government area

Statistical Sub-division	Statistical Local Area name	Local Government name
Greater Shepparton City Part A	Gr Shepparton (C) - Pt A	Greater Shepparton City Council
North Goulburn	Campaspe (S) – Echuca Campaspe (S) – Kyabram Campaspe (S) – Rochester Campaspe (S) – South	Campaspe Shire Council
	Gr. Shepparton (C) - Pt B East Gr. Shepparton (C) - Pt B West	Greater Shepparton City Council
	Moira – West Moira – East	Moira Shire Council
South Goulburn	Benalla (RC) - Benalla Benalla (RC Balance	Benalla Rural City Council
	Mansfield (S)	Mansfield Shire Council
	Strathbogie (S)	Strathbogie Shire Council
	Mount Buller Alpine Resort *	Yarriambiack Shire Council
	Mount Stirling Alpine Resort *	Yarriambiack Shire Council
South West Goulburn	Mitchell (S) – North Mitchell (S) - South	Mitchell Shire Council
	Murrindindi (S) – East Murrindindi (S) - West	Murrindindi Shire Council
	Lake Mountain Alpine Resort*	Yarriambiack Shire Council

Note:

* Mt Buller Alpine Resort, Mt Stirling Alpine Resort and Lake Mountain Alpine Resort have been created in 2003 and are also included in the Goulburn SD (Mark Taylor personal communication, June 2006, ABS Australian Standard Geographical Classification 2003, ABS Catalogue No. 1216.0 ISSN 1441–1814)

Appendix B Total farm gate gross value of production, Goulburn Broken Catchment by industry and local government area, 2001 ($000)

Local Government Area		Pastures and grasses	Crops cut for hay	Cereals for grain	Oilseeds	Legumes for grain	Other crops	Vegetables	Fruit excluding grapes	Grapes
Campaspe (S)	I	$20,112	$5,197	$24,038	$2,100	$1,349	$1,630	$30,017	$7,323	$830
Gr Shepparton (C)	I	$15,426	$3,456	$10,868	$2,078	$335	$2,190	$33,918	$137,322	$1,371
Moira (S)	I	$19,720	$4,319	$40,631	$7,927	$583	$3,232	$11,083	$68,858	$568
Benalla (RC)	D	$3,424	$159	$8,348	$1,659	$143	$1,346	$479	$523	$482
Mansfield (S)	D	$9,468	$0	$0	$15	$19	$528	$0	$161	$168
Mitchell (S)	D	$985	$60	$148	$0	$0	$4,391	$338	$105	$505
Murrindindi (S)	D	$8,319	$56	$85	$0	$5	$15,959	$1,947	$5,155	$937
Strathbogie (S)	D	$3,005	$340	$6,881	$976	$213	$7,050	$1,516	$2,110	$7,415
Total		**$80,459**	**$13,587**	**$91,000**	**$14,755**	**$2,645**	**$2,145**	**$79,297**	**$221,556**	**$12,276**
% of total FGVP		5.2%	0.9%	5.9%	1.0%	0.2%	2.3%	5.1%	14.3%	0.8%

Local Government Area		Wool	Milk	Eggs production	Honey and Beeswax	Livestock and poultry slaughtered	Total value of agriculture	Forestry	Fishery	
Campaspe (S)	I	$6,160	$222,743	$13	$284	$98,673	$420,468	$800		
Gr Shepparton (C)	I	$4,426	$142,751	$267	$221	$57,314	$411,943			
Moira (S)	I	$6,031	$159,740	$496	$214	$74,804	$398,205			
Benalla (RC)	D	$6,688	$6,346	$0	$170	$22,248	$52,015	$26,200	$10,000 (estimate)	
Mansfield (S)	D	$3,639	$54	$0	$0	$12,701	$26,751			
Mitchell (S)	D	$8,776	$284	$4,116	$21	$14,722	$34,451	$2,600		
Murrindindi (S)	D	$4,137	$1,785	$6,703	$0	$26,368	$71,456	$21,000		
Strathbogie (S)	D	$15,171	$962	$2,059	$131	$26,170	$73,998			
Total		**$55,028**	**$534,666**	**$13,654**	**$1,041**	**$332,999**	**$1,489,287**	**$50,600**	**$10,000**	**$1,549,887**
% of total FGVP		3.6%	34.5%	0.9%	0.1%	21.5%	96.1%	3.3%	0.6%	100%

Notes: (I) = predominantly irrigation (D) = predominantly dryland
Other crops = nurseries, flowers and turf and other crops not elsewhere classified.

Sources: ABS Census of Agriculture 2001; Plantation North East Inc, May 2002; Fishery Victoria November 2000

Appendix C Estimate of the gross value of agricultural production in the dryland and irrigation areas of the Goulburn Statistical Division ($M)

NOTE: ***The values of agricultural production in the dryland and irrigated areas are estimates based on the average proportion from these areas between 1993-4 and 2000-1 and should be used with caution.***

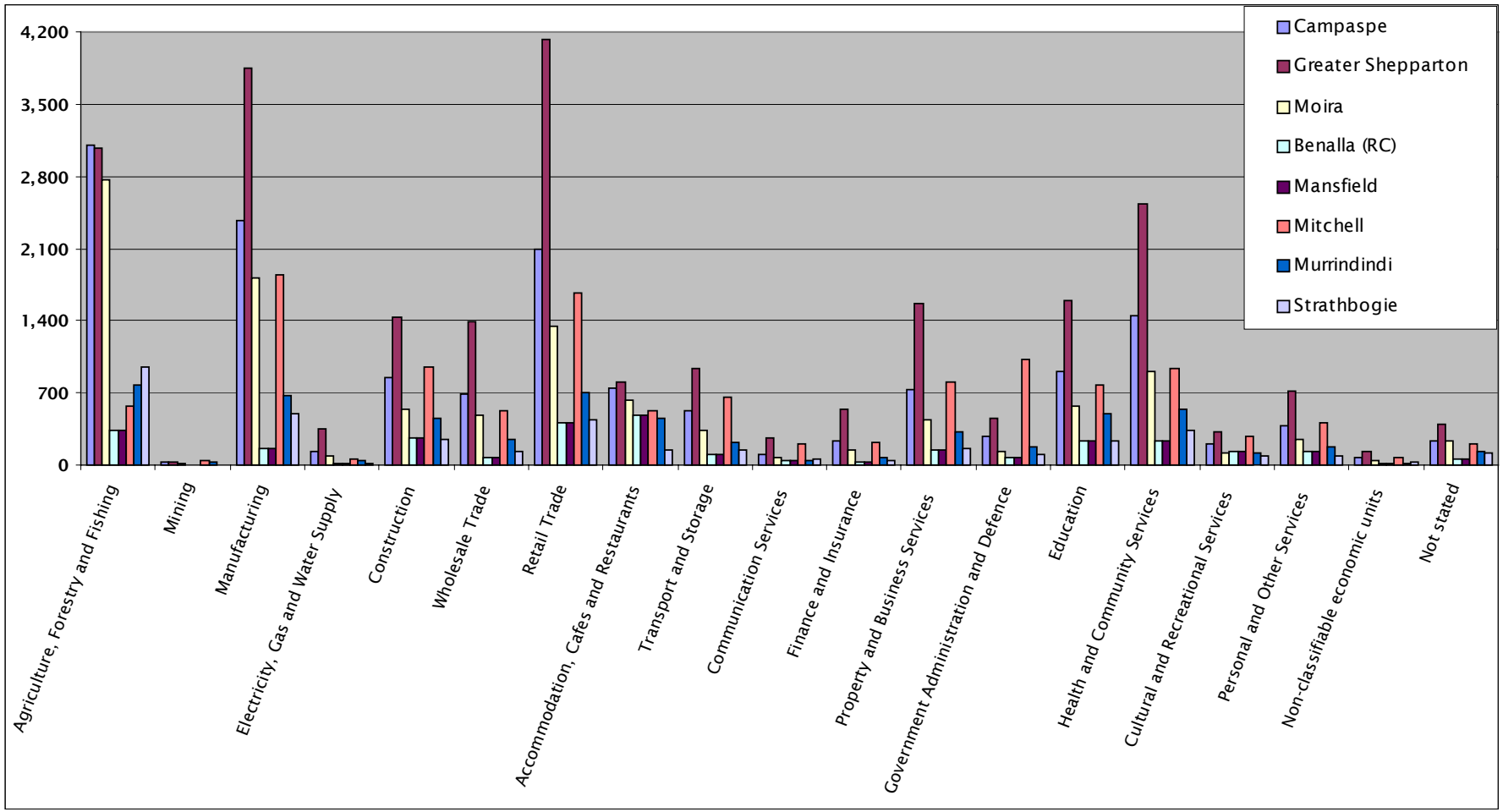
2001-2	Goulburn SD	Dryland	Irrigation
Pastures and grasses	$71.9	$20.6	$51.3
Cereals for grain	$106.0	$18.3	$87.7
Oilseeds	$18.9	$1.9	$17.0
Legumes for grain	$2.9	$0.7	$2.2
Crops cut for hay	$6.8	$0.6	$6.2
Total vegetables	$72.2	$7.3	$64.9
Total fruit excluding grapes	$227.8	$4.6	$223.2
Grapes	$9.5	$7.1	$2.4
Other crops	$42.5	$34.6	$7.9
Wool	$56.8	$39.7	$17.2
Milk	$649.7	$15.6	$634.1
Eggs produced for human consumption	$14.3	$12.3	$2.0
Total value of livestock slaughtering	$363.2	$114.4	$248.8
Total value of agriculture	**$1,642.5**	**$277.7**	**$1,364.9**

2002-3	Goulburn SD	Dryland	Irrigation
Pastures and grasses	$68.3	$19.6	$48.7
Cereals for grain	$47.4	$8.2	$39.2
Oilseeds	$8.8	$0.9	$7.9
Legumes for grain	$1.1	$0.3	$0.9
Crops cut for hay	$12.3	$1.1	$11.2
Total Vegetables	$85.8	$8.7	$77.2
Total fruit excluding grapes	$276.7	$5.5	$271.2
Grapes	$9.4	$7.0	$2.4
Other crops	$53.6	$43.6	$10.0
Wool	$71.0	$49.5	$21.4
Milk	$411.6	$9.9	$401.7
Eggs produced for human consumption	$13.7	$11.7	$1.9
Total value of livestock slaughtering	$321.6	$101.3	$220.3
Total value of agriculture	**$1,381.4**	**$267.4**	**$1,114.0**

2003-4	Goulburn SD	Dryland	Irrigation
Pastures and grasses	$123.3	$35.4	$87.9
Cereals for grain	$104.3	$18.0	$86.2
Oilseeds	$23.2	$2.4	$20.8
Legumes for grain	$3.2	$0.7	$2.5
Crops cut for hay	$68.3	$6.1	$62.3
Total Vegetables	$89.6	$9.0	$80.5
Total fruit excluding grapes	$280.2	$5.6	$274.6
Grapes	$14.4	$10.7	$3.6
Other crops	$48.5	$39.4	$9.1
Wool	$49.4	$34.5	$14.9
Milk	$388.6	$9.3	$379.3
Eggs produced for human consumption	$16.8	$14.4	$2.4
Total value of livestock slaughtering	$307.9	$97.0	$210.9
Total value of agriculture	**$1,517.7**	**$282.7**	**$1,235.0**

Source of Goulburn SD data: ABS Survey of Agriculture 2002, 2003, and 2004

Appendix D Employment by economic sectors and local government areas, Goulburn Broken Catchment, 2001



Source: ABS 2001Census of Population and Housing, Usual Residents Profile, Catalogue No. 2004.0

Note: Rural City of Benalla and Mansfield Shires were formed in 2002 from Delatite Shire.

Appendix E Population by country of birth, Goulburn Broken Catchment, 1996 and 2001

Country	1996	2001
Argentina		17
Australia	156,417	160,310
Austria		130
Born elsewhere overseas	2,051	1,056
Bosnia and Herzegovina		9
Cambodia		17
Canada	108	118
Chile	12	11
China (excludes SAR's and Taiwan Province)		157
China (excluding Taiwan Province)	81	
Croatia	101	115
Cyprus		23
East Timor		12
Egypt	56	58
Fiji	53	76
France		51
Germany	777	781
Greece	398	354
Hong Kong	90	
Hong Kong (SAR of China) (note 1)		57
Hungary	101	90
India	190	259
Indonesia	57	51
Iran		21
Iraq		379
Ireland	229	254
Italy	2,384	2,172
Japan		59
Korea, Republic of (South)		38

Country	1996	2001
Lebanon	19	31
Macedonia, FYR (note 2)	115	
Macedonia, FYROM (note 3)		120
Malaysia	125	114
Malta	203	203
Mauritius		25
Netherlands	866	803
New Zealand	1,148	1,531
Not stated	5,964	10,656
Overseas visitor	629	
Papua New Guinea		70
Philippines	243	322
Poland	220	174
Portugal		12
Romania		45
Russian Federation		27
Serbia and Montenegro, FYR (note 2)	15	
Singapore	44	39
South Africa	96	157
Spain		52
Sri Lanka	85	95
Taiwan		27
Thailand		58
Turkey		382
Ukraine		40
United Kingdom (note 4)	5,522	5,412
United States of America	189	209
Viet Nam	18	32
Yugoslavia, Federal Republic of		193

Sources:

- ABS 1996 Census of Population and Housing " Basic Community Profile"
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Notes:

1. SAR is an abbreviation of 'Special Administrative Region'. SARs comprise 'Hong Kong (SAR of China)' and 'Macau (SAR of China)'
2. FYR is an abbreviation of Former Yugoslav Republic
3. FYROM is an abbreviation of 'Former Yugoslav Republic of Macedonia'
4. Includes 'England', 'Scotland', 'Wales', 'Northern Ireland', 'Channel Islands', 'Isle of Man', and 'United Kingdom.