

ECONOMIC OUTLOOK REPORT 3



RIO | regional
investment
opportunities

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Murraylands Economic Outlook Report 3: Headline Analysis

A report prepared for



Prepared by



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Contents

List of Tables	iv
List of Figures	iv
Abbreviations	v
Document History and Status	v
1. Introduction.....	1
2. Method	2
3. Data and Assumptions	4
3.1 The Economic Impact of Tourist Accommodation Growth	4
3.2 The Economic Impact of Expansion in Arts and Cultural Activities.....	5
3.3 The Economic Impact of Large Scale Investment in Conference Centres and High Level Infrastructure	6
4. The Regional Economic Impact of Tourist Accommodation Growth	8
4.1 Economic Impact of 10 per cent Growth in Tourist Accommodation	8
4.2 Economic Impact of 25 per cent Growth in Tourist Accommodation	9
5. The Regional Economic Impact of Expansion of Arts and Cultural Activities.....	10
5.1 Economic Impact of a 5 per cent Increase in Holiday and Leisure Visitors	10
5.2 Economic Impact of a 15 per cent Increase in Holiday and Leisure Visitors	11
6. The Regional Economic Impact of Large Scale Investment in Conference Centres and High Level Infrastructure.....	12
6.1 Economic Impact of a 20 per cent Increase in Business Visitors.....	12
6.2 Economic Impact of a 50 per cent Increase in Business Visitors.....	13
7. Summary Results	14
References	2
Appendix 1 Input-Output Methodology.....	3
Appendix 2 Glossary of Input-Output Terminology	6

List of Tables

Table 3.1	Accommodation occupancy, number of guests and accommodation takings in the Murraylands, 2006/07	5
Table 3.2	Average day trip visitors' expenditure by purpose of visit, 2007	6
Table 3.3	Average overnight visitors' expenditure by purpose of visit, 2007	7
Table 4.1	Estimated regional economic impact of 10 per cent growth in tourist accommodation	8
Table 4.2	Estimated regional economic impact of 25 per cent growth in tourist accommodation	9
Table 5.1	Estimated regional economic impact of a 5 per cent increase in holiday and leisure visitors	10
Table 5.2	Estimated regional economic impact of a 15 per cent increase in holiday and leisure visitors	11
Table 6.1	Estimated regional economic impact of a 20 per cent increase in business visitors	12
Table 6.2	Estimated regional economic impact of a 50 per cent increase in business visitors	13
Table 7.1	Summary of results of tourism growth scenarios for the Murraylands region	1

List of Figures

Figure 7.1	Distribution of employment impacts for growth in the tourism sector	1
Figure 7.2	Distribution of GRP impacts for growth in the tourism sector	1

Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
CPI	Consumer Price Index
fte	full time equivalent
GRP	Gross Regional Product
RIO	Regional Investment Opportunities
SATC	South Australian Tourism Commission
TRA	Tourism Research Australia

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1. Introduction

EconSearch Pty Ltd was contracted by the Murraylands Regional Development Board Inc to prepare a series of Economic Outlook Reports that provide investors, stakeholders and the community with an overview of the status of the Murraylands economy. Each Murraylands Economic Outlook Report consists of three key aspects, namely:

- Headline Analysis;
- Regional Investment Opportunities (RIO) Sector Analysis; and
- Standard Economic Analysis.

The aim of the Headline Analysis, the subject of this report, was to provide estimates of the regional economic impact in the Murraylands of a range of scenarios for the tourism sector across the region, namely:

- impact of tourist accommodation growth;
- impact of expansion in arts and cultural activities; and
- impact of large scale investment in conference centres and high level infrastructure.

The analysis presented in this report was undertaken by Lizzie Clark and Julian Morison (EconSearch Pty Ltd).

2. Method

The estimates of economic impact presented in this report were based on a *RISE* (Regional Industry Structure and Employment) model for the Murraylands region for 2002/03 prepared by the consultants for the Office of Regional Affairs (EconSearch 2005).

The method employed for estimation of economic impacts was input-output analysis. Input-output analysis provides a comprehensive economic framework that is extremely useful in the resource planning process. Broadly, there are two ways in which the input-output method can be used.

First, the input-output model provides a numerical picture of the size and shape of an economy and its essential features. The input-output transactions table can be used to describe some of the important features of an economy, the interrelationships between sectors and the relative importance of the individual sectors.

Second, input-output analysis provides a standard approach for the estimation of the economic impact of a particular activity. The input-output model is used to calculate industry multipliers that can then be applied to various growth or decline scenarios.

For a technical description of the input-output modelling procedure refer to Appendix 1 and for a glossary of input-output terminology refer to Appendix 2.

Economic impacts in this report have been specified in terms of the following indicators:

- output;
- employment; and
- contribution to gross regional product (GRP).

Output is a measure of the gross revenue of goods and services produced by commercial organisations plus gross expenditure by government agencies. This indicator needs to be used with care as it includes elements of double counting.

Employment is a measure of the number of working proprietors, managers, directors and other employees, in terms of the number of full-time equivalent (fte) jobs.

Contribution to GRP is a measure of the net contribution of an activity to the regional economy. Contribution to GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. It can also be measured as household income plus other value added (gross operating surplus and all taxes, less subsidies). It represents payments to the primary inputs of production (labour, capital and land). Using contribution to GRP as a measure of economic impact avoids the problem of double counting that may arise from using value of output for this purpose.

Estimates of the economic impact are presented in terms of

- direct impacts;
- flow-on (or indirect) impacts; and
- total impacts.

Direct impacts are the initial round of output, employment and household income generated by an economic activity.

Flow-on (or indirect) impacts are the sum of production-induced effects and consumption-induced effects. Production-induced effects are additional output, employment and household income resulting from re-spending by firms (e.g. transport contractors) that receive payments from the sale of services to firms undertaking, for example, meat processing. Consumption-induced effects are additional output, employment and household income resulting from re-spending by households that receive income from employment in direct and indirect activities.



3. Data and Assumptions

The purpose of this section of the report is to summarise the data sources and assumptions that were used in imputing the regional economic impact of each scenario.

It should be noted that analysis of each of the scenarios assumed that the Murraylands economy has the capacity to meet any additional demands for goods, services and labour. In a relatively open economy which has the capacity to increase output in most of the key supply industries, this is a valid assumption. However, if local supply conditions are tight (for either material inputs or labour), costs may increase as a result of higher demand and inputs, including labour, may be sourced from outside the region.

Each year the South Australian Tourism Commission (SATC) prepares a regional profile for each tourism region in South Australia (SA). For the Murraylands the regional tourism profile includes:

- visitation statistics;
- market structure;
- visitor profiles; and
- influences.

The 2006 regional tourism profile for the Murraylands was used as a basis for estimating visitor numbers and expenditure to calculate the economic impact of each scenario. The 2006 estimates of visitor expenditure have been updated to 2007 using the consumer price index (CPI).

Results of the *National Visitor Survey* (Tourism Research Australia, 2007) undertaken by Tourism Research Australia (TRA) were also used in the calculation of the economic impacts.

3.1 The Economic Impact of Tourist Accommodation Growth

Selected tourism statistics were obtained from the Australian Bureau of Statistics (ABS) (*Tourist Accommodation, Small Area Data, South Australia*, Cat. No. 8635.4.55.001), these data include:

- number of establishments;
- number of room nights occupied;
- occupancy rate;
- number of guests; and
- takings from accommodation.

Selected tourist accommodation statistics are summarised in Table 3.1 for 2006/07.

Table 3.1 Accommodation occupancy, number of guests and accommodation takings in the Murraylands, 2006/07

	Hotels, Motels and Serviced Apartments				Caravan Parks			
	Number	Nights occupied	Guest Nights	Takings	Number	Site Nights Occupied	Guest Nights ^a	Takings
		(no)	(no)	(\$'000)		(no)	(no)	(\$'000)
July	13	2,452	2,779	194	10	15,700	17,794	161
August	13	2,498	2,610	190	10	15,400	16,090	144
September	13	2,804	3,868	233	10	16,600	22,899	176
October	13	3,523	3,594	272	10	17,500	17,853	233
November	13	3,206	3,310	271	10	15,300	15,796	148
December	13	3,206	3,310	271	10	16,900	17,448	172
January	13	2,881	4,077	234	9	15,327	21,690	229
February	13	2,215	2,768	163	9	12,677	15,842	164
March	13	3,227	3,862	250	9	14,668	17,554	204
April	13	3,024	3,850	247	9	15,000	19,097	247
May	13	3,013	2,834	233	9	13,000	12,228	152
June	13	2,573	2,731	204	9	12,400	13,161	176
Total	13	34,622	39,593	2,763		180,472	207,453	2,206

^a Estimated based on the average number of guests per night occupied.

Source: ABS (2007a)

In addition to hotels, motels, serviced apartments and caravan parks in the Murraylands region, it is likely that there are a large number of holiday rentals and house boats available for short-term tourist accommodation.

Estimates of economic impact were based on the assumption that demand for accommodation would increase in line with current occupancy rates to meet the additional supply.

Estimates of economic impact have been calculated for the following scenarios:

- Tourist accommodation capacity in the Murraylands increases by 10 per cent (approximately 24,700 additional overnight visitors).
- Tourist accommodation capacity in the Murraylands increases by 25 per cent (approximately 61,800 additional overnight visitors).

Economic impact estimates are based on the assumption that average expenditure per visitor night is approximately \$86 (SATC 2007 and ABS 2007b).

3.2 The Economic Impact of Expansion in Arts and Cultural Activities

In 2006, 70 per cent of total overnight visits to the Murraylands region visited for the purpose of leisure or holiday. In addition to the significant number over overnight visitors to the Murraylands, there were a large number of domestic day trip visits. For the purpose of this analysis it has been assumed that 70 per cent of domestic day visitors visit the region for the purpose of leisure or holiday.

An expansion of arts and cultural activities in the Murraylands has the potential to increase the number visitors to the region. Estimates of economic impact have been calculated for the following scenarios:

- Number of domestic day visits for holiday and leisure purposes increases by 5 per cent.
- Number of domestic day visits for holiday and leisure purposes increases by 15 per cent.

In 2006, the average expenditure for day trip visitors to the Murraylands was approximately \$55 per visit (SATC 2007). The 2006 estimates of expenditure have been updated to 2007 based on the consumer price index (ABS 2007b). Results of the 2007 *National Visitor Survey* (TRA, 2007) provide some insight into the different magnitudes of expenditure by purpose of visit. These survey results have been used to calculate the average expenditure by purpose of visit for visitors to the Murraylands.

Table 3.2 Average day trip visitors' expenditure by purpose of visit, 2007

Purpose of Visit	Australia		Murraylands ^a
	Average per Night	Difference from Average	Average per Night
	\$	%	\$
Holiday/Leisure	114	14%	63
Visit Friends/Relatives	74	-26%	41
Business	103	3%	57
Education/Other	101	1%	56
All Visits	100		55

^a Estimates for the Murraylands are based on the national average.

Source: SATC (2007), TRA (2007), ABS (2007b) and EconSearch analysis.

Estimates of economic impact were based on the assumption that holiday and leisure visitors spend \$63 per day visit (Table 3.2).

3.3 The Economic Impact of Large Scale Investment in Conference Centres and High Level Infrastructure

In 2006, approximately 7 per cent of total overnight visits to the Murraylands region visited for business purposes. In addition to the significant number over overnight visitors to the Murraylands, there were a large number of domestic day trip visits. For the purpose of this analysis it has been assumed that 7 per cent of domestic day visitors visit the region for business purposes.

An investment in conference centre facilities and high level business infrastructure in the Murraylands has the potential to increase the number of business visitors to the region. Estimates of economic impact have been calculated for the following scenarios:

- Number of domestic day visits and overnight visits for business purposes increases by 20 per cent.
- Number of domestic day visits and overnight visits for business purposes increases by 50 per cent.

In 2006, the average expenditure for overnight visitors to the Murraylands was approximately \$86 per night (SATC 2007). The 2006 estimates of expenditure have been updated to 2007 based on the consumer price index (ABS 2007b). Estimates of overnight visitor expenditure by purpose of visit are provided in Table 3.3. These estimates are based on the results of the 2007 *National Visitor Survey*.

Table 3.3 Average overnight visitors' expenditure by purpose of visit, 2007

Purpose of Visit	Australia		Murraylands ^a
	Average per Night	Difference from Average	Average per Night
	\$	%	\$
Holiday/Leisure	171	13%	98
Visit Friends/Relatives	105	-31%	60
Business	196	30%	112
Education/Other	98	-35%	56
All Visits	151		86

^a Estimates for the Murraylands are based on the national average.

Source: SATC (2007), TRA (2007), ABS (2007b) and EconSearch analysis.

Estimates of economic impact are based on the assumption that business visitors spend \$112 per overnight visit (Table 3.3) and \$57 per day visit (Table 3.2).

4. The Regional Economic Impact of Tourist Accommodation Growth

4.1 Economic Impact of 10 per cent Growth in Tourist Accommodation

Estimates of the net regional economic impact of 10 per cent growth in tourist accommodation in the Murraylands in 2006/07 are provided in Table 4.1.

Table 4.1 Estimated regional economic impact of 10 per cent growth in tourist accommodation

	Output ^a \$m	Employment fte	Contribution to GRP \$m
<i>Accommodation, Restaurants & Cafes</i>	0.36	4	0.14
<i>Trade</i>	0.46	6	0.21
<i>Transport</i>	0.09	1	0.04
<i>Other</i>	0.33	2	0.14
Total direct	1.23	12	0.54
Flow-ons		6	0.39
Total ^b		18	0.93

^a To avoid double counting only direct output impacts have been reported.

^b Totals may not sum due to rounding.

Source: EconSearch analysis.

Tourism expenditure in the Murraylands region (i.e. direct output impacts) is concentrated in the accommodation, cafes and restaurants, trade and transport sectors. An increase in tourist accommodation of 10 per cent is expected to increase tourism related expenditure in the region by approximately \$1.2 million. Flow-on output impacts are not reported as there is a problem with double counting which can give a misleading impression of the significance of individual industries.

Tourism expenditure associated with a 10 per cent increase in tourist accommodation would generate direct employment of around 12 fte in the Murraylands region. Flow-on business activity would generate a further 6 fte jobs, to give a total employment impact of approximately 18 fte jobs.

As noted above, the contribution to gross regional product (GRP) is measured as the value of output less the costs of goods and services (including imports) used in producing the output. The total contribution to GRP in the Murraylands region attributable to a 10 per cent increase in tourist accommodation was estimated to be approximately \$930,000, \$540,000 generated by tourism expenditure directly and \$390,000 generated in other sectors of the regional economy.

4.2 Economic Impact of 25 per cent Growth in Tourist Accommodation

Estimates of the net regional economic impact of 25 per cent growth in tourist accommodation in the Murraylands in 2006/07 are provided in Table 4.2.

Table 4.2 Estimated regional economic impact of 25 per cent growth in tourist accommodation

	Output ^a \$m	Employment fte	Contribution to GRP \$m
<i>Accommodation, Restaurants & Cafes</i>	0.89	9	0.35
<i>Trade</i>	1.16	14	0.54
<i>Transport</i>	0.22	1	0.10
<i>Other</i>	0.82	4	0.36
Total direct	3.09	29	1.35
Flow-ons		15	0.97
Total ^b		44	2.32

^a To avoid double counting only direct output impacts have being reported.

^b Totals may not sum due to rounding.

Source: EconSearch analysis.

An increase in tourist accommodation of 25 per cent is expected to increase tourism related expenditure in the region by approximately \$3.1 million.

Tourism expenditure associated with a 25 per cent increase in tourist accommodation would generate direct employment of around 29 fte in the Murraylands region. Flow-on business activity would generate a further 15 fte jobs, to give a total employment impact of approximately 44 fte jobs.

The total contribution to GRP in the Murraylands region attributable to a 25 per cent increase in tourist accommodation was estimated to be approximately \$2.3 million, almost \$1.4 million generated by tourism expenditure directly and \$1.0 million generated in other sectors of the regional economy.



5. The Regional Economic Impact of Expansion of Arts and Cultural Activities

5.1 Economic Impact of a 5 per cent Increase in Holiday and Leisure Visitors

Estimates of the net regional economic impact of a 5 per cent increase in the number of holiday and leisure visitors to the Murraylands (in response to expansion of arts and cultural activities) are provided in Table 5.1.

Table 5.1 Estimated regional economic impact of a 5 per cent increase in holiday and leisure visitors

	Output ^a \$m	Employment fte	Contribution to GRP \$m
<i>Accommodation, Restaurants & Cafes</i>	0.28	3	0.11
<i>Trade</i>	0.37	5	0.17
<i>Transport</i>	0.07	0	0.03
<i>Other</i>	0.26	1	0.12
Total direct	0.98	9	0.43
Flow-ons		5	0.31
Total		14	0.74

^a To avoid double counting only direct output impacts have being reported.

^b Totals may not sum due to rounding.

Source: EconSearch analysis.

A 5 per cent increase in holiday and leisure visitors as a result of expansion of arts and cultural activities is expected to increase tourism related expenditure in the region by almost \$1.0 million.

Tourism expenditure associated with a 5 per cent increase in holiday and leisure visitors would generate direct employment of around 9 fte in the Murraylands region. Flow-on business activity would generate a further 5 fte jobs, to give a total employment impact of approximately 14 fte jobs.

The total contribution to GRP in the Murraylands region attributable to a 5 per cent increase in holiday and leisure visitors was estimated to be approximately \$0.7 million, just over \$0.4 million generated by tourism expenditure directly and approximately \$0.3 million generated in other sectors of the regional economy.

5.2 Economic Impact of a 15 per cent Increase in Holiday and Leisure Visitors

Estimates of the net regional economic impact of a 15 per cent increase in the number of holiday and leisure visitors to the Murraylands (in response to expansion of arts and cultural activities) are provided in Table 5.2.

Table 5.2 Estimated regional economic impact of a 15 per cent increase in holiday and leisure visitors

	Output ^a \$m	Employment fte	Contribution to GRP \$m
<i>Accommodation, Restaurants & Cafes</i>	0.85	9	0.33
<i>Trade</i>	1.11	14	0.51
<i>Transport</i>	0.21	1	0.10
<i>Other</i>	0.78	4	0.35
Total direct	2.94	28	1.29
Flow-ons		14	0.92
Total		42	2.21

^a To avoid double counting only direct output impacts have being reported.

^b Totals may not sum due to rounding.

Source: EconSearch analysis.

A 15 per cent increase in holiday and leisure visitors as a result of expansion of arts and cultural activities is expected to increase tourism related expenditure in the region by approximately \$2.9 million.

Tourism expenditure associated with a 15 per cent increase in holiday and leisure visitors would generate direct employment of around 28 fte in the Murraylands region. Flow-on business activity would generate a further 14 fte jobs, to give a total employment impact of approximately 42 fte jobs.

The total contribution to GRP in the Murraylands region attributable to a 15 per cent increase in holiday and leisure visitors was estimated to be approximately \$2.2 million, almost \$1.3 million generated by tourism expenditure directly and just over \$0.9 million generated in other sectors of the regional economy.

6. The Regional Economic Impact of Large Scale Investment in Conference Centres and High Level Infrastructure

6.1 Economic Impact of a 20 per cent Increase in Business Visitors

Estimates of the net regional economic impact of a 20 per cent increase in the number of business visitors to the Murraylands (in response to investment in conference centres and infrastructure) are provided in Table 6.1.

Table 6.1 Estimated regional economic impact of a 20 per cent increase in business visitors

	Output ^a	Employment	Contribution to GRP
	\$m	fte	\$m
<i>Accommodation, Restaurants & Cafes</i>	0.25	3	0.10
<i>Trade</i>	0.33	4	0.15
<i>Transport</i>	0.06	0	0.03
<i>Other</i>	0.23	1	0.10
Total direct	0.88	8	0.38
Flow-ons		4	0.27
Total		13	0.66

^a To avoid double counting only direct output impacts have being reported.

^b Totals may not sum due to rounding.

Source: EconSearch analysis.

A 20 per cent increase in business visitors to the Murraylands as a result of investment in conference centres and infrastructure is expected to increase tourism related expenditure in the region by approximately \$0.9 million.

Tourism expenditure associated with a 20 per cent increase in business visitors would generate direct employment of around 8 fte in the Murraylands region. Flow-on business activity would generate a further 4 fte jobs, to give a total employment impact of approximately 13 fte jobs.

The total contribution to GRP in the Murraylands region attributable to a 20 per cent increase in business visitors was estimated to be approximately \$0.7 million, almost \$0.4 million generated by tourism expenditure directly and almost \$0.3 million generated in other sectors of the regional economy.

6.2 Economic Impact of a 50 per cent Increase in Business Visitors

Estimates of the net regional economic impact of a 50 per cent increase in the number of business visitors to the Murraylands (in response to investment in conference centres and infrastructure) are provided in Table 6.2.

Table 6.2 Estimated regional economic impact of a 50 per cent increase in business visitors

	Output ^a	Employment	Contribution to GRP
	\$m	fte	\$m
<i>Accommodation, Restaurants & Cafes</i>	0.63	7	0.25
<i>Trade</i>	0.82	10	0.38
<i>Transport</i>	0.15	1	0.07
<i>Other</i>	0.58	3	0.26
Total direct	2.19	21	0.96
Flow-ons		11	0.69
Total		31	1.65

^a To avoid double counting only direct output impacts have being reported.

^b Totals may not sum due to rounding.

Source: EconSearch analysis.

A 50 per cent increase in business visitors to the Murraylands as a result of investment in conference centres and infrastructure is expected to increase tourism related expenditure in the region by approximately \$2.2 million.

Tourism expenditure associated with a 50 per cent increase in business visitors would generate direct employment of around 21 fte in the Murraylands region. Flow-on business activity would generate a further 11 fte jobs, to give a total employment impact of approximately 31 fte jobs.

The total contribution to GRP in the Murraylands region attributable to a 50 per cent increase in business visitors was estimated to be \$1.7 million, almost \$1.0 million generated by tourism expenditure directly and approximately \$0.7 million generated in other sectors of the regional economy.

7. Summary Results

The results of each of the analyses are summarised in Table 7.1. Details of the data used and assumptions made in undertaking each analysis are provided in Section 3.

As each of the analyses was based on growth in the tourism sector in the Murraylands, the distribution of the impacts was similar for all scenarios. The overall distribution of the impacts of growth in the tourism sector are summarised in Figures 7.1 and 7.2.

Employment impacts are concentrated in trade (32 per cent), accommodation, restaurants and cafés (21 per cent) and transport and storage (10 per cent). Flow-on employment into other sectors of the regional economy account for approximately 34 per cent of the total employment impact.

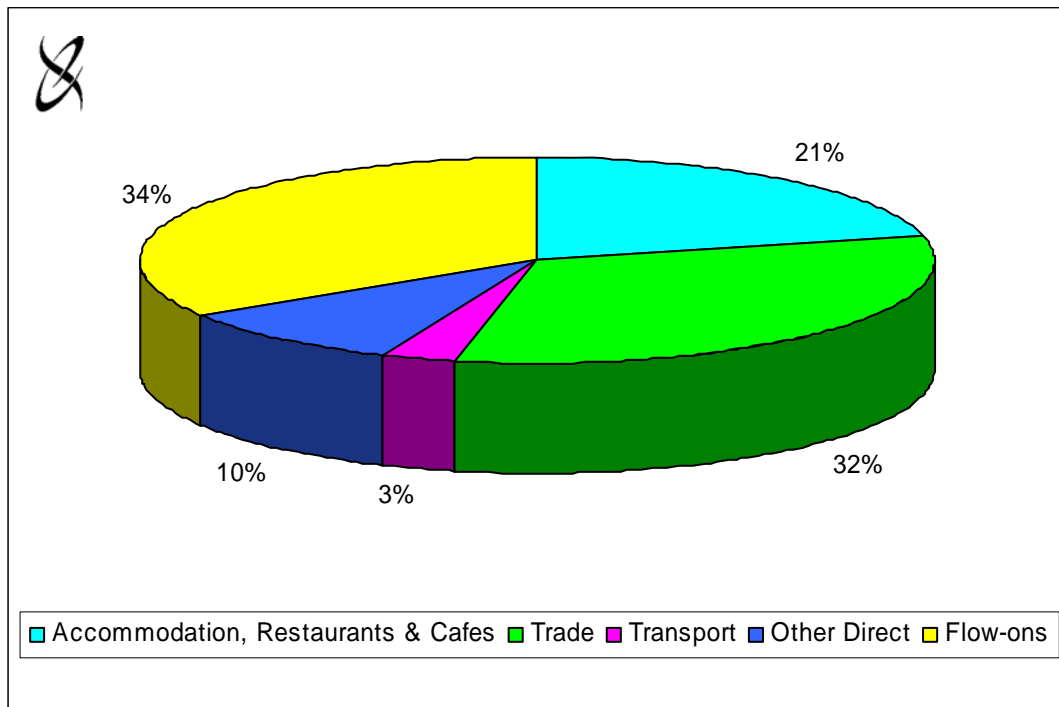
GRP impacts would be concentrated in trade (23 per cent), accommodation, restaurants and cafés (15 per cent) and transport and storage (4 per cent). Flow-on GRP into other sectors of the regional economy account for approximately 42 per cent of the total GRP impact.

Table 7.1 Summary of results of tourism growth scenarios for the Murraylands region

	Tourist Accommodation Growth		Arts and Culture Growth		Conference and Business Growth	
	10%	25%	5%	15%	20%	50%
Regional Expenditure (\$m)						
Output	1.23	3.09	0.98	2.94	0.88	2.19
Employment (fte)						
Direct	12	29	9	28	8	21
Flow-on	6	15	5	14	4	11
Total	18	44	14	42	13	31
Gross Regional Product (\$m)						
Direct	0.54	1.35	0.43	1.29	0.38	0.96
Flow-on	0.39	0.97	0.31	0.92	0.27	0.69
Total	0.93	2.32	0.74	2.21	0.66	1.65

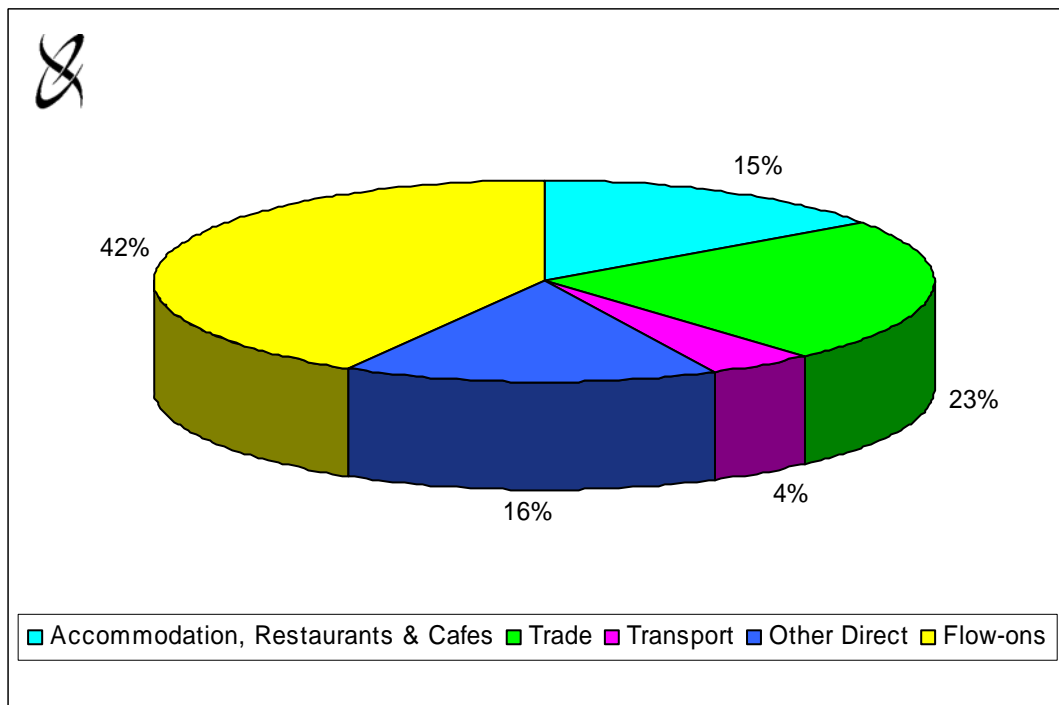
Source: EconSearch analysis.

Figure 7.1 Distribution of employment impacts for growth in the tourism sector



Source: EconSearch analysis.

Figure 7.2 Distribution of GRP impacts for growth in the tourism sector



Source: EconSearch analysis.



References

- Australian Bureau of Statistics, 2007a, *Tourist Accommodation, Small Area Data, South Australia*, Cat. No. 8635.4.55.001, Canberra, June.
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Disclaimer

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Appendix 1 Input-Output Methodology

Overview of Input-Output Analysis

Input-output analysis provides a comprehensive economic framework that is extremely useful in the resource planning process. Broadly, there are two ways in which the input-output method can be used.

First, the input-output model provides a numerical picture of the size and shape of an economy and its essential features. The input-output transactions model can be used to describe some of the important features of an economy, the interrelationships between sectors and the relative importance of the individual sectors.

Second, input-output analysis provides a standard approach for the estimation of the economic impact of a particular activity. The input-output model is used to calculate industry multipliers that can then be applied to various development scenarios.

Linkages between sectors

The standard approach for the estimation of the regional economic impact of a particular activity, such as pig production, is to employ *input-output analysis*. The input-output model conceives the economy of the region as being divided up into a number of sectors, and this allows the analyst to trace expenditure flows.

To illustrate this, consider the example of a piggery that, in the course of its operation, purchases goods and services from other sectors. These goods and services would include feed, power, and, of course, labour. The direct employment created is regarded in the model as an expenditure flow into the household sector, which is one of several non-industrial sectors recognised in the input-output model.

Upon receiving expenditure by the piggery, the other sectors in the regional economy engage in their own expenditures. For example, as a consequence of winning a contract for work with a piggery, a feedstuff producer buys materials from its suppliers and labour from its own employees. Suppliers and employees in turn engage in further expenditure, and so on. These *indirect effects*, as they are called, are part of the impact of the piggery on the regional economy. They must be added to the *direct effects* (which are expenditures made in immediate support of the piggery itself) in order to arrive at a measure of the total impact of the piggery.

It may be thought that these indirect effects go on indefinitely, and that their amount adds up without limit, the presence of *leakages*, however, prevents this from occurring. In the context of the impact on a *regional* economy, an important leakage is expenditure on imports, that is, products or services that originate from *outside the region, state or country* (e.g. machinery).

Thus some of the expenditure on imports to the region is lost to the local economy. Consequently, the indirect effects get smaller and smaller in successive expenditure rounds, due to this and other leakages. Hence the total expenditure created in the local economy is limited in amount, and so (in principle) it can be measured.

The performance of the input-output analysis calculations require a great deal of information. The analyst needs to know the magnitude of various expenditures and where they occur. Also needed is information on how the sectors receiving this expenditure share *their* expenditures among the various sectors from whom they buy, and so on, for the further expenditure rounds.

In applying the input-output model, the standard procedure is to determine the direct or first-round expenditures only. No attempt is made to pursue such inquiries on expenditure in subsequent rounds, not even (for example) to trace the effects in the local economy on household expenditures by piggery employees on food, clothing, entertainment, and so on, as it is impracticable to measure these effects for an individual case, here the piggery.

The input-output model is instead based on a set of assumptions about constant and uniform proportions of expenditure. If households in general in the local economy spend (say) 13.3 per cent of their income on food and non-alcoholic beverages, it is assumed that those working in piggeries do likewise. Indeed, the effects of all expenditure rounds after the first are calculated by using such standard proportions (*multiplier* calculations).

Multipliers

Multipliers are an indication of the strength of the linkages between a particular sector and the rest of the regional economy. As well, they can be used to estimate the impact of a change in that particular sector on the rest of the economy. As noted above, detailed explanations on calculating input-output multipliers (and the underlying assumptions) are provided in any regional economics or input-output analysis textbook (see for example Jensen and West (1986)). Suffice to note that they are calculated through a routine set of mathematical operations based on coefficients derived from the input-output transactions model.

Input-output transactions model

The structure and linkages of a local economy can be described with the aid of input-output analysis. Input-output analysis, as an accounting system of inter-industry transactions, is based on the notion that no industry exists in isolation.

This assumes, within any economy, each firm depends on the existence of other firms to purchase inputs from, or sell products to, for further processing. The firms also depend on final consumers of the product and labour inputs to production. An input-output transactions model is a convenient way to illustrate the purchases and sales of goods and services taking place in an economy at a given time.

Input-output models provide a numerical picture of the size and shape of the economy and its essential features. Products produced in the economy are aggregated into a number of groups of industries and the transactions between them recorded in the transactions model. The rows and columns of the input-output model can be interpreted in the following way:

- The rows of the input-output model illustrate sales for intermediate usage (to other firms) and for final demand (consumers, exports, capital formation).
- The columns show the origin of the inputs and hence the purchases made at that time (labour, capital and intermediate inputs).

- Each item is shown as a purchase by one sector and a sale by another, thus constructing two sides of a double accounting schedule.

In summary, the input-output transactions model can be used to describe some of the important features of a regional economy, the interrelationships between sectors, and the relative importance of the individual sectors. The model is also used for the calculation of sector multipliers and the estimation of economic impacts arising from some change in the local economy.



Appendix 2 Glossary of Input-Output Terminology

Basic value is the price received for a good or service by the producer. It is also known as *producers' price*. It excludes indirect taxes and transport, trade and other margins.

Consumption-induced effects are additional output, employment and income resulting from re-spending by households that receive income from employment in direct and indirect activities. Consumption-induced effects are sometimes referred to as "induced effects".

Contribution to gross state/regional product is calculated as the value of output less the cost of goods and services (including imports) used in producing the output. It represents payments to the primary inputs of production (labour, capital and land). Contribution to GSP/GRP is consistent with standard measures of economic activity, such as gross domestic, State or regional product and it provides an assessment of the net contribution to regional economic growth of a particular enterprise or activity.

Direct effects are the initial round of output, employment and income generated by an economic activity.

Employment is the number of working proprietors, managers, directors and other employees, in terms of the number of full-time equivalent jobs.

Exports refers to the sale of goods and services to final consumers outside the region of interest. In a state input-output model, exports refers to the sale of goods and services interstate and overseas. In a regional input-output model exports refers to the sale of goods and services interstate, overseas and to other regions within the state.

Flow-on effects are the sum of the production-induced effects and the consumption-induced effects.

Household income is wages and salaries, drawings by owner operators and other payments to labour including overtime payments and income tax, but excluding payroll tax.

Input-output analysis is an accounting system of inter-industry transactions based on the notion that no industry exists in isolation.

Input-output model is a transactions model that illustrates and quantifies the purchases and sales of goods and services taking place in an economy at a given point in time. It provides a numerical picture of the size and shape of the economy and its essential features. Each item is shown as a purchase by one sector and a sale by another, thus constructing two sides of a double accounting schedule.

Multiplier is an index (ratio) indicating the overall change in the level of activity that results from an initial change in economic activity. They are an indication of the strength of the linkages between a particular sector and the rest of the regional economy. They can be used to estimate the impact of a change in that particular sector on the rest of the economy.

Other Final Demand includes government expenditure, private and public sector investment (gross fixed capital formation) and change in stocks (inventories).

Other Value Added includes gross operating surplus and all taxes, less subsidies.

Output is gross revenue of goods and services produced by commercial organisations plus gross expenditure by government agencies.

Purchasers' price is the price paid for a good or service paid by the purchaser. It includes indirect taxes and transport, trade and other margins.

Production-induced effects are additional output, employment and income resulting from re-spending by firms that receive income from the sale of goods and services to firms undertaking, for example, agricultural activities. Production-induced effects are sometimes referred to as "indirect effects".

Total impact is the sum of the direct effects and the flow-on effects.

Type I multiplier is calculated as $(\text{direct effects} + \text{production-induced effects})/\text{direct effects}$.

Type II multiplier is calculated as $(\text{direct effects} + \text{production-induced effects} + \text{consumption-induced effects})/\text{direct effects}$.

