

# ECONOMIC OUTLOOK REPORT



**RIO** | regional  
investment  
opportunities

A PROJECT OF  
THE MURRAYLANDS REGIONAL DEVELOPMENT BOARD INC

# Murraylands Economic Outlook Report: RIO Sector Analysis

A report prepared for



Prepared by



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## Document History and Status

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## 1. Introduction

EconSearch Pty Ltd was contracted by the Murraylands Regional Development Board Inc to prepare an Economic Outlook report that provides investors, stakeholders and the community with an overview of the status of the Murraylands economy. The 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 RIO Sector Analysis, the subject of this report, was to provide analysis of a major industry sector. This report provides estimates of regional economic impact of growth in intensive animal production and processing in the Murraylands in 2005/06.

The analysis presented in this report was undertaken by Matthew Ferris 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:

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

**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

For the purpose of this analysis, intensive animal production and processing refers to the pig, poultry and dairy industries. Estimates of current<sup>1</sup> production and value of production in the intensive animal production and processing sectors in the Murraylands region were derived from the *Food Scorecard* for the region obtained from PIRSA (Carina Cartwright, pers. comm.).

A growth scenario for intensive animal production and processing in the Murraylands was based on annual targets derived from the Strategic Plans for the respective intensive animal sectors.

- Pigs: *The South Australian Pork Industry's Strategic Plan for 2010* (PIRSA 2005a). The report forecasts a rate of growth in processing throughput at the state level of 7.5 per cent/annum. For the purpose of this analysis it was assumed that the pig processing and production sectors in the Murraylands region would both grow at 7.5 per cent/annum and that all additional production would be processed locally.
- Dairy: *South Australian Dairy Industry: Strategic Plan for 2010* (Dairy Industry Board 2002). Given that growth targets in the industry's Strategic Plan appear to be overly optimistic, it was assumed that the dairy processing and production sectors in the Murraylands region would both grow at 10 per cent/annum and that all additional production would be processed locally.
- Poultry: *Poultry Meat in SA - Strategic Directions 2005 – 2015* (PIRSA 2005b). The report forecasts a rate of growth in processing throughput at the state level of 12.5 per cent/annum. For the purpose of this analysis it was assumed that there was no local processing of poultry (for meat), however, poultry production in the Murraylands region would grow at 12.5 per cent/annum.

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<sup>1</sup> The latest year for which data were available was 2004/05.

#### 4. Regional Economic Impact of Growth in Intensive Animal Production and Processing

Estimates of the regional economic impact of a growth scenario for intensive animal production and processing in the Murraylands in 2005/06 are provided in Table 4.1.

Table 4.1 Regional economic impact of annual growth in intensive animal production and processing

Sector	Employment fte	Contribution to GRP \$m
Intensive animal production and processing		
<i>Pig, dairy and poultry production</i>	57	4.0
<i>Pig and dairy processing</i>	71	5.5
Total direct impacts	129	9.5
Flow-on impacts		
<i>Trade</i>	46	1.7
<i>Other service sectors</i>	48	3.1
<i>Other flow-ons</i>	32	3.2
Total flow-on impacts	126	8.0
Total	255	17.5
Proportion of regional total	1.6%	1.8%

Source: EconSearch Analysis.

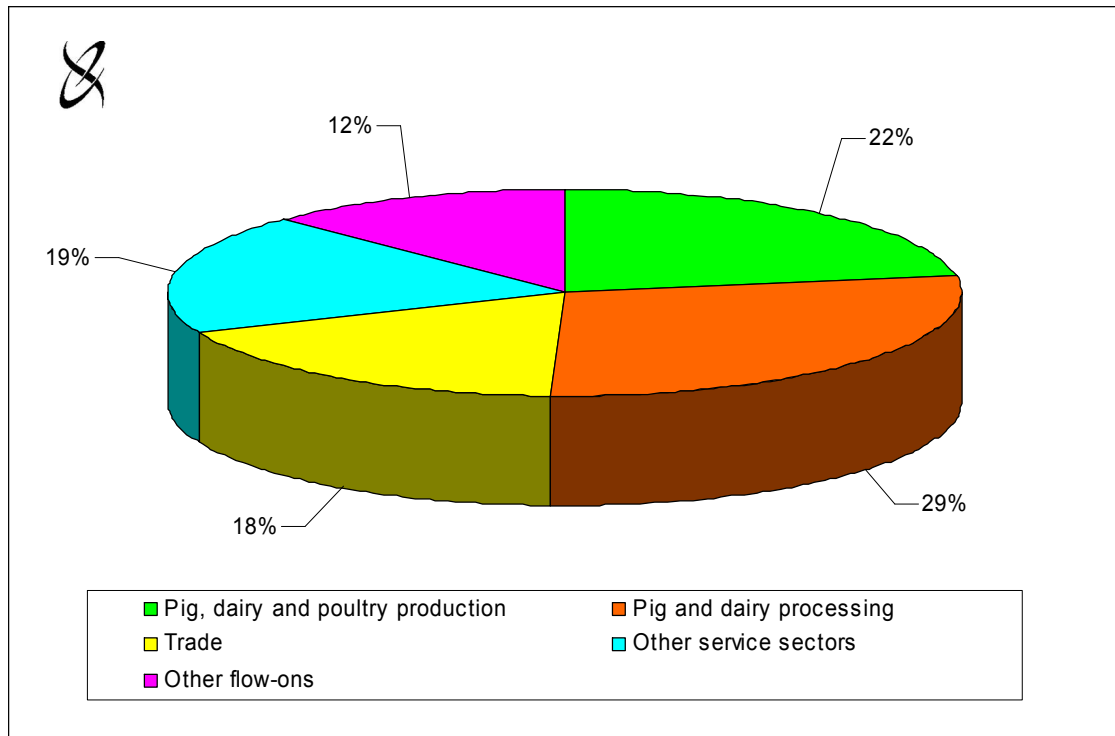
It was estimated that over 250 fte new jobs would be generated in the Murraylands regional economy each year in response to annual growth in intensive animal production and processing of the magnitude outlined above. Almost 60 of these jobs would be generated directly in the intensive animal production sectors, approximately 70 in the intensive animal processing sectors and almost 130 flow-on jobs would be generated in other sectors of the regional economy.

The total annual employment impact represents approximately 1.6 per cent of the regional total in 2005/06. Over a 5 year planning horizon, the cumulative impact of this growth would be an 8 per cent increase in regional employment above 2005/06 levels.

Jobs generated in the intensive animal production and processing sectors would account for approximately 50 per cent of the total employment impact (Figure 4.1). Flow-on jobs would account for the balance of the total employment impact and would be concentrated in the trade and other service sectors.

It was estimated that almost \$18m (in 2006 dollars) in additional GRP would be generated in the Murraylands regional economy each year in response to annual growth in intensive animal production and processing of the magnitude outlined above. Approximately \$4m in GRP would be generated directly in the intensive animal production sectors, over \$5m in the intensive animal processing sectors and approximately \$8m in flow-on GRP would be generated in other sectors of the regional economy.

Figure 4.1 Distribution of employment impacts for growth in intensive animal production and processing



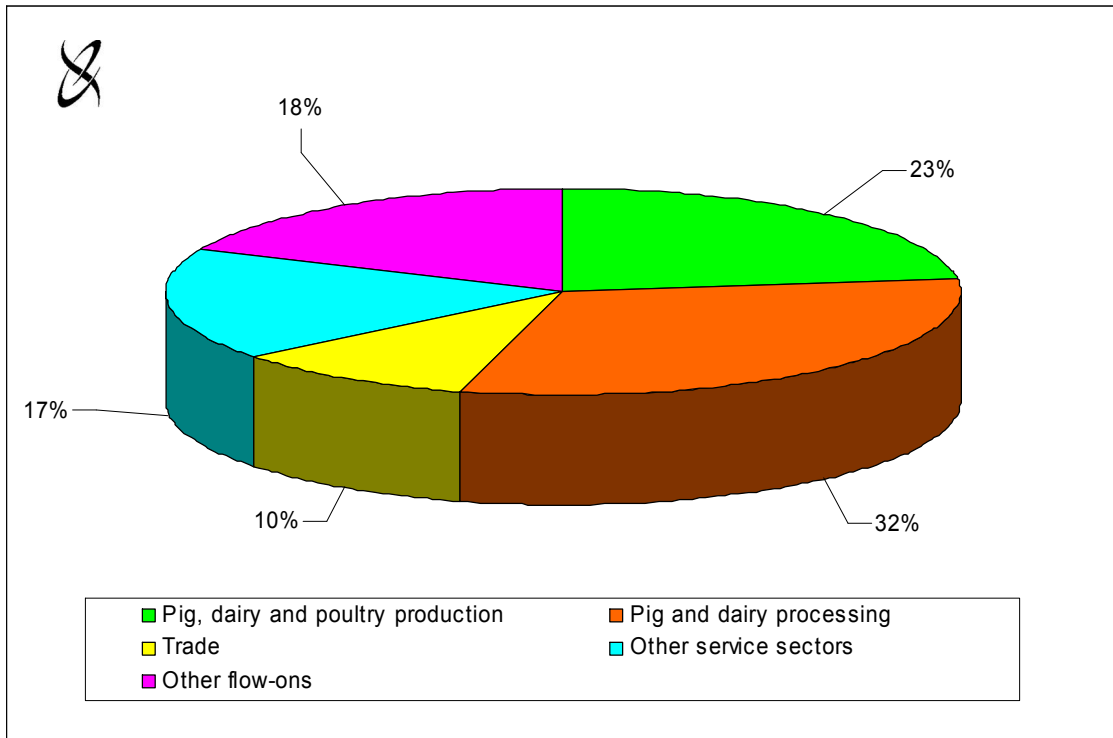
Source: EconSearch Analysis.

The total GRP impact represents almost two per cent of the regional total in 2005/06. Over a 5 year planning horizon, the cumulative impact of this growth would be to increase the size of the local economy by almost 10 per cent.

GRP generated in the intensive animal production and processing sectors would account for approximately 55 per cent of the total impact, with the balance being attributable to flow-ons in other sectors of the regional economy (Figure 4.2).



Figure 4.2 Distribution of GRP impacts for growth in intensive animal production and processing



Source: EconSearch analysis



## References

Dairy Industry Board 2002, *South Australian Dairy Industry: Strategic Plan for 2010*, South Australia

EconSearch 2005, *Regional Development Board Economic Models*, a series of RISE impact models prepared for the Office of Regional Affairs, Department of Trade and Economic Development.

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

PIRSA 2005a, *The South Australian Pork Industry's Strategic Plan for 2010*.

PIRSA 2005b, *Poultry Meat in South Australia – Strategic Directions 2005 – 2015*, October.

## Disclaimer

We have prepared the above report exclusively for the use and benefit of our client. Neither the firm nor any employee of the firm undertakes responsibility in any way whatsoever to any person (other than to the above mentioned client) in respect of the report including any errors or omissions therein however caused.

## 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  $(\text{direct effects} + \text{production-induced effects} + \text{consumption-induced effects}) / \text{direct effects}$ .



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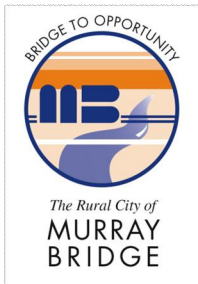
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