

Economic Impact Projections for
UNESCO World Heritage Site listing of the
Mount Lofty Ranges Agrarian Landscape

A report prepared for

The Mount Lofty Ranges Working Group

Prepared by



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Abbreviations

ABR	Australian Business Register
ABS	Australian Bureau of Statistics
ATO	Australian Tax Office
BAS	Business Activity Statement
BCR	benefit-cost ratio
C	City
DC	District Council
DECON	demographic-economic (model)
DEEWR	Department of Employment, Education and Workplace Relations
EVAO	Estimated Value of Agricultural Operations
fte	full-time equivalent
GRP	gross regional product
GRIT	Generation of Regional Input-Output Tables
GSP	gross state product
GST	goods and services tax
I-O	input-output
LGA	Local Government Area
NPV	Net Present Value
OASD	Outer Adelaide Statistical Division
PIRSA	Primary Industries and Regions South Australia
RISE	Regional Industry Structure and Employment (model)
SA	South Australia
SATC	South Australian Tourism Commission
TRA	Tourism Research Australia
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WHS	World Heritage Site

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Executive Summary

This report was prepared for the Mount Lofty Ranges Working Group. The objective is to provide economic analysis that will assist the Working Group in the preparation of a feasibility study for World Heritage Site listing of the Mount Lofty Ranges agrarian landscape. Specifically, the requirements were to provide:

- A baseline analysis of the value of agriculture and related industries to the four regional economies represented by the LGAs of Adelaide Hills, Barossa and Mt Barker and the non-metropolitan portion of the Onkaparinga LGA.
- A projection of the baseline into the future using existing trends of losses of agricultural land to alternative uses.
- An understanding of the context for the agricultural and related industries in each of the four LGAs.
- Identification of up to three scenarios (additional to the base case) around possible economic growth targets guided by evidence from other World Heritage sites and in consultation with the Working Group and others.
- An analysis of how each of the scenarios would impact the four LGAs in terms of employment impacts and contribution to gross regional product.

The projections of economic impact presented in this report were based on the use of the input-output method. The input-output models developed for this project were extended as a demographic-economic model. Tourism expenditure was incorporated in the models.

Profile of economic activity in the regions

Economic activity in the Adelaide Hills region is dominated by agriculture (predominantly fruit and nuts and viticulture) but it also has a significant resident population (approximately 40,100 persons at 30 June 2010) with associated housing stock and service sectors.

Economic activity in the Barossa region is dominated by manufacturing (predominantly wine) but it also has a significant agricultural industry associated winegrape growing. As well there is a significant resident population (approximately 22,900 persons at 30 June 2010) with associated housing stock and service sectors.

Economic activity in the Mt Barker region is dominated by significant resident population (approximately 30,500 persons at 30 June 2010) with associated housing stock and service sectors. Manufacturing and agriculture also contribute significantly to the regional economy.

Economic activity in the Southern Onkaparinga region is dominated by manufacturing, a large part of which is wine industry related, and agriculture which is predominantly viticulture. As well there is a significant resident population (approximately 43,500 persons at 30 June 2010) with associated housing stock and service sectors.

Contribution of agriculture to economic activity in the regions

Estimates of the economic contribution of the agriculture value chain to the regional economies in 2009/2010 are presented below. The definition of the agriculture value chain is consistent with that employed in PIRSA's Food for the Future value-chain analysis. The following stages in the marketing chain have, therefore, been included in the direct economic impact:

- the direct value of agricultural output (gross value of production)¹; and
- downstream impacts, including the net value of local agricultural products processing, and the net value of local retail and food service (e.g., hotels and restaurants) trade in these products.

The flow-on economic impacts (indirect effects) are the impacts felt in the input supply industries (transport services, fuel, merchandising, business services, etc.) and the industries supplying the goods and services to the households of employees in the agriculture value chain.

The direct and flow-on effects of regional agriculture were estimated in terms of gross regional product (GRP) and full-time equivalent (fte) employment. Estimates of these indicators for the four regional economies are detailed in Tables ES1 and ES2.

Adelaide Hills

In aggregate, it was estimated that the contribution of the agricultural value chain in the Adelaide Hills region in 2009/2010 (approximately \$349 million) generated the following level of regional economic activity (direct and flow-on):

- \$285 million in GRP, which represents 25 per cent of the regional total (\$1.1 billion) (Table ES1).
- Approximately 2,900 fte jobs, which represent 31 per cent of the regional total (9,750 fte) (Table ES2).

Barossa

In the Barossa region it was estimated that the contribution of the agricultural value chain in 2009/2010 (approximately \$1.014 billion) generated the following level of regional economic activity (direct and flow-on):

- \$710 million in GRP, which represents 57 per cent of the regional total (\$1.3 billion) (Table ES1).
- Approximately 6,300 fte jobs, which represent 56 per cent of the regional total (11,300 fte) (Table ES2).

Mount Barker

In aggregate, it was estimated that the contribution of the agricultural value chain in the Mount Barker region in 2009/2010 (\$144 million) generated the following level of regional economic activity:

¹ Value of output is a measure of the gross revenue of goods and services produced by commercial organisations (e.g. farm-gate value of production) and gross expenditure by government agencies. Total output needs to be used with care as it can include elements of double counting when the output of integrated industries is added together (e.g. the value of winery output includes the farm-gate value of grapes).

- \$139 million in GRP, which represents 16 per cent of the regional total (\$895 million) (Table ES1).
- Almost 1,500 fte jobs, which represent 17 per cent of the regional total (9,000 fte) (Table ES2).

Southern Onkaparinga

In the Southern Onkaparinga region it was estimated that the contribution of the agricultural value chain in 2009/10 (approximately \$425 million) generated the following level of regional economic activity (direct and flow-on):

- \$319 million in GRP, which represents 35 per cent of the regional total (\$903 million) (Table ES1).
- Approximately 3300 fte jobs, which represent 42 per cent of the regional total (7900 fte) (Table ES2).

Table ES1 Gross regional product attributable to agriculture by region, 2009/10 (\$m)

Region	Direct	Flow-on	Total	Regional Share
Adelaide Hills	161	125	285	25%
Barossa	434	276	710	57%
Mt Barker	76	63	139	16%
Southern Onkaparinga	197	122	319	35%
Total Mt Lofty Ranges Region	867	586	1,453	35%

Table ES2 Employment attributable to agriculture by region, 2009/10 (fte jobs)

Region	Direct	Flow-on	Total	Regional Share
Adelaide Hills	1,689	1,285	2,974	31%
Barossa	3,366	3,020	6,385	56%
Mt Barker	786	681	1,467	17%
Southern Onkaparinga	1,948	1,399	3,347	42%
Total Mt Lofty Ranges Region	7,788	6,385	14,174	38%

Clearly, the agricultural value chain is a significant contributor to each of the four regional economies that comprise the Mount Lofty Ranges Region. The agricultural value chain is most dominant in the Barossa region followed by Southern Onkaparinga, Adelaide Hills and Mt Barker.

In the Mt Barker region the contribution of the agricultural value chain is around 16 or 17 per cent of the regional economy (depending on the indicator). In the Barossa region the industry contributes well over 50 per cent of the economy in terms of both GRP and employment.

Across the whole Mt Lofty Ranges regional economy, the agricultural value chain generated over \$1.4 billion in gross regional product (35 per cent of the regional total) and more than 14,100 jobs (38 per cent of the regional workforce).

Contribution of tourism expenditure to economic activity in the regions

Whilst tourism is not specified as a separate sector within the extended I-O model, the relative contribution of tourism to economic activity in the region can be readily measured. Estimates of GRP and employment impacts provided in Tables ES3 and ES4 indicate both the direct and flow-on effects attributable to expenditure by tourists.

Adelaide Hills

In aggregate, it was estimated that expenditure by tourists in the Adelaide Hills region in 2009/2010 (\$55 million) generated the following level of regional economic activity:

- \$34 million in GRP, which represents 3.0 per cent of the regional total (\$1.1 billion) (Table ES3).
- Approximately 400 fte jobs, which represent 4.2 per cent of the regional total (9,750 fte) (Table ES4).

Barossa

In aggregate, it was estimated that expenditure by tourists in the Barossa region in 2009/2010 (\$128 million) generated the following level of regional economic activity:

- \$78 million in GRP, which represents 6.2 per cent of the regional total (\$1.3 billion) (Table ES3).
- Almost 1000 fte jobs, which represent 8.7 per cent of the regional total (11,000 fte) (Table ES4).

Mount Barker

In aggregate, it was estimated that expenditure by tourists in the Mount Barker region in 2009/2010 (\$46 million) generated the following level of regional economic activity:

- \$31 million in GRP, which represents 3.5 per cent of the regional total (\$895 million) (Table ES3).
- Almost 400 fte jobs, which represent 4.5 per cent of the regional total (9,000 fte) (Table ES4).

Southern Onkaparinga

In aggregate, it was estimated that expenditure by tourists in the Southern Onkaparinga region in 2009/2010 (\$105 million) generated the following level of regional economic activity:

- \$59 million in GRP, which represents 6.6 per cent of the regional total (\$3.7 billion) (Table ES3).
- Almost 800 fte jobs, which represent 9.9 per cent of the regional total (7,900 fte) (Table ES4).

In total, across the whole Mt Lofty Ranges regional economy, tourism generated over \$203 million in gross regional product (almost 5 per cent of the regional total) and more than 2,500 jobs (just under 7 per cent of the regional workforce).

Table ES3 Gross regional product attributable to tourism by region, 2009/10 (\$m)

Region	Direct	Flow-on	Total	Regional Share
Adelaide Hills	22	12	34	3.0%
Barossa	54	24	78	6.2%
Mt Barker	19	12	31	3.5%
Southern Onkaparinga	43	17	59	6.6%
Total Mt Lofty Ranges Region	139	64	203	4.9%

Table ES4 Employment attributable to tourism by region, 2009/10 (fte jobs)

Region	Direct	Flow-on	Total	Regional Share
Adelaide Hills	317	89	406	4.2%
Barossa	837	144	981	8.7%
Mt Barker	295	97	393	4.5%
Southern Onkaparinga	674	107	781	9.9%
Total Mt Lofty Ranges Region	2,124	437	2,560	6.8%

Trends in land use change

The implications of rural population growth and dwelling construction activity for the study region's agricultural land base become evident in data summarising land use change across the Mount Lofty Ranges more generally during the 1990s (Flavel and Ratcliff 2000). These data relate to an area that includes but is more than twice the size of the current study region. They indicate that there was a significant change in agricultural land use between 1993 and 1999, as well as an overall loss of agricultural land, attributable largely to rural living development.

ABS Agricultural Census data for 1996, 2001 and 2006 indicate, at the broadest level, a general decline in the area of land used for agricultural purposes in each of the local government areas. For the most part, the average annual rate of change in each of the LGAs was a decline of between 1 and 2 per cent, averaging 1.6 per cent per annum between 1996 and 2006 (excludes Barossa) and also averaging 1.6 per cent between 2001 and 2006 (includes Barossa).

Observations about the increasing number of sub-commercial agricultural properties and declining average property size are consistent with analyses of population growth and rural dwelling construction. They are also supported by data describing land division activity across South Australia. Unpublished analysis of so-called 'boundary realignments', where parcel boundaries are shifted but no new allotments created, suggests this activity is heavily concentrated in the Outer Metropolitan region. Anecdotal evidence from land use planners in Local and State government suggests that this type of land division is used to create an increasing number of rural lifestyle allotments. The corollary of this is a declining number of commercial scale properties.

Collectively, all of these data point to a steadily fragmenting and shrinking agricultural land base across the study region, with practical implications for remaining primary producers. While it is not possible to provide a definitive statement about land use change trends in the study area, it appears to be occurring at a rate somewhere

between 0.4 per cent per annum described by Flavel and Ratcliff and the 1.6 per cent derived from ABS data.

World Heritage inscription and trends in visitation and economic development

Gillespie Economics and BDA Group (2008) undertook an economic impact analysis of World Heritage Sites (WHSs) in Australia. They found no clear association between World Heritage inscription and an increase in visitor numbers, although the study did reveal significant increases in tourism numbers for several sites, and an increased proportion of international visitors.

An important difference between the proposed Mount Lofty Ranges agrarian landscape WHS and those analysed in Gillespie Economics and BDA Group (2008) is that the historical and cultural attributes of the region are not well known, and therefore World Heritage inscription has the potential to significantly lift awareness and therefore visitations to the area. Further research in Australia and the United States found those tourist sites that were already well-established destinations in their own right did not register any increase in visitor numbers as a result of WHS status, while lesser known sites did (Buckley (2004), Galvin (1997) cited in ERS (2006)). The Gillespie Economics study also clearly pointed to broader economic impacts at the regional, state and national levels.

The Rebanks assessment of 878 World Heritage Sites found that the motivation for WHS inscription fell into four broad categories, and that only a very small minority of sites perceive WHS status as being as a tool for socio-economic impact, perhaps as few as five to 10 per cent of sites. This implies that for those sites that do not seek it, there is no direct correlation between inscription and economic growth – and no ‘free lunch’ from simply getting the designation. However, if WHS designation is used to support programs for changing places and communities it can be and has shown to be a powerful catalyst to achieve those socio-economic outcomes.

Scenario Development

Three growth scenarios have been developed to consider the impact that WHS status may have on the economies of the four LGAs that comprise the proposed WHS. The impact projections reported below are for a range of modest industry growth targets assumed to be achieved over a period of 10 years following listing, as the experience of existing World Heritage sites indicates that economic growth attributable to inscription is likely to be experienced mostly in the early years following inscription, with economic activity likely to plateau or at least slow after a number of years.

Against a do nothing base case (no WHS designation), the impacts of three growth scenarios, detailed in Table ES5, were estimated:

1. Low growth scenario whereby there is minimal investment combined with a World Heritage overlay;
2. Medium growth scenario which involves World Heritage overlay with moderate funding; and
3. High growth scenario that involves World Heritage overlay with significant funding (e.g. more than \$100 million in infrastructure spending and landscape rehabilitation).

Table ES5 Growth scenarios in response to WHS status designation

	Scenario 1 Low Growth	Scenario 2 Medium Growth	Scenario 3 High Growth
Public/Private Investment (\$m)	0-5	5-20	100+
On-farm production	2.5%	5.0%	10.0%
Value adding	5.0%	10.0%	20.0%
Tourism visitations	3.0%	5.0%	10.0%

If the current trend of lost agricultural land were to continue, the total Mt Lofty Ranges region would lose around 15 per cent of agricultural land per decade. The on-farm production scenarios, detailed in Table ES5, range from a low of 2.5 per cent to a high of 10.0 per cent, which are modest increases in light of the likely declines under the base case of no WHS designation.

Growth in the processing and value adding of agricultural products will be driven by (i) an increase in the local supply of product, and (ii) increased opportunities for product transformation and product marketing related directly to WHS designation. The value adding scenarios, detailed in Table ES5, range from a low of 5.0 per cent to a high of 20.0 per cent.

If WHS designation is used to support programs for changing places and communities it can be a powerful catalyst to achieve socio-economic outcomes. The WHS support programs are likely to range from regional tourism marketing to infrastructure spending and landscape rehabilitation, each of which will be designed, in part at least, to increase the attractions and attractiveness of the region. The tourism visitation scenarios, detailed in Table ES5, range from a low of 3.0 per cent to a high of 10.0 per cent, which appear to be realistic targets under the proposed scope of funding and support scenarios.

Impact of WHS inscription on agriculture

Against a base case of continued loss of agricultural land at an average rate of 1.6 per cent per annum (15 per cent over 10 years), it has been assumed that the fall in production associated with the loss of agricultural land would be offset, at least partially, under WHS designation. This will increase the supply of product for processing/value adding activities and, additionally, WHS designation will create new opportunities for product transformation and product marketing.

The pattern of impacts is similar for the three scenarios; with the magnitude of the impacts increasing in line with the size of the stimulus generated by the WHS designation and associated activities. For scenario 2 (Table ES 6), medium growth, the results show:

- In absolute and relative terms the impacts are projected to be largest in the Barossa and smallest in Mt Barker.
- In the Barossa there are projected to be an additional 517 jobs and \$63 million in annual GRP, a rise of more than 5.0 per cent in GRP and 4.6 per cent in employment.

Table ES6 Impact of the increase in agriculture and agricultural value adding, medium-growth scenario (Scenario 2)

Region	GRP		Employment	
	Change from baseline (\$m)	Regional share	Change from baseline (fte)	Regional share
Adelaide Hills	11	1.0%	98	1.0%
Barossa	63	5.0%	517	4.6%
Mt Barker	4	0.5%	44	0.5%
Southern Onkaparinga	19	2.1%	137	1.7%
Total Mt Lofty Ranges Region	97	2.3%	797	2.1%
Total South Australia	141	0.2%	1,226	0.2%

- The impacts would be next largest in Southern Onkaparinga, with jobs rising by more than 130 and GRP up by \$19 million, representing rises of around 2 per cent in GRP and 1.7 per cent in employment.
- At the State level the impacts are considerably higher, over 1,200 jobs in aggregate and \$141 million in GSP. This represents an increase of just under 0.2 per cent for both indicators.

Impact of WHS inscription on tourism

Assuming the number of visitors to the regions will increase if World Heritage agrarian landscape status were achieved, there is likely to be a corresponding increase in visitor expenditure. As with the projected agriculture-related effects, the pattern of impacts from increased visitor expenditure is similar for the three scenarios; with the magnitude of the impacts increasing in line with the size of the stimulus generated by the WHS designation and associated activities. For Scenario 2 (Table ES7), medium growth impacts on tourism, the results show:

- In absolute and relative terms the impacts are projected to be largest in the Barossa and Southern Onkaparinga regions.
- In both regions there are projected to be an additional 40 to 50 jobs and \$3-4 million in annual GRP, in both cases a rise of more than 0.3 per cent above current levels.
- The impacts are projected to be similar in the Adelaide Hills and Mt Barker economies, jobs rising by 20 and GRP up by \$2 million, both impacts representing rises of around 0.2 per cent above current levels.
- At the State level the impacts are considerably higher, around 250 total jobs and \$21 million in GSP. Most of the additional jobs would be generated in Adelaide.

Table ES7 Impact of the increase in tourism, medium-growth scenario (Scenario 2)

Region	GRP		Employment	
	Change from baseline (\$m)	Regional share	Change from baseline (fte)	Regional share
Adelaide Hills	2	0.15%	20	0.21%
Barossa	4	0.31%	49	0.43%
Mt Barker	2	0.17%	20	0.23%
Southern Onkaparinga	3	0.33%	39	0.49%
Total Mt Lofty Ranges Region	10	0.24%	128	0.34%
Total South Australia	21	0.03%	245	0.03%

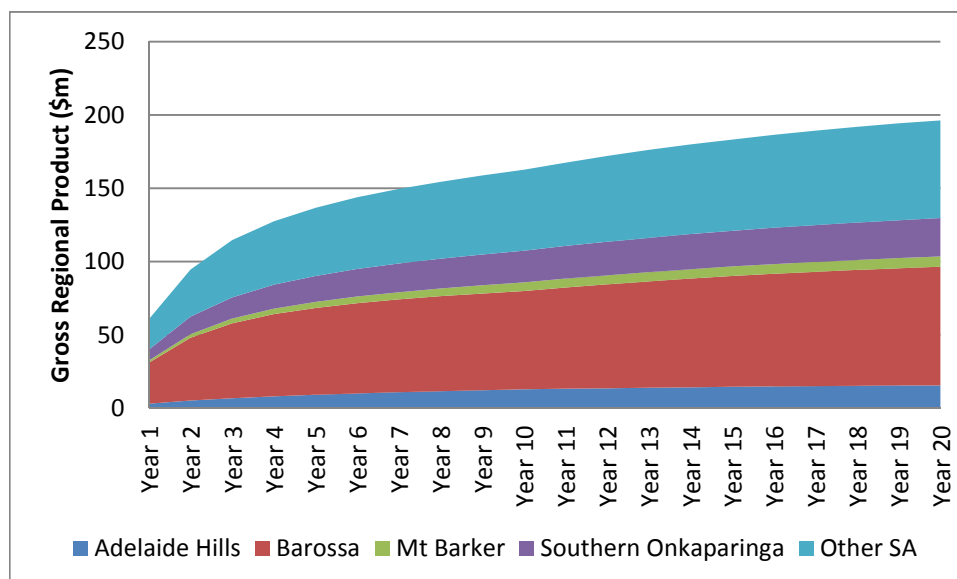
Aggregate and Longer Term Impacts

As mentioned previously, the impact projections reported above have been for a range of modest industry growth targets assumed to be achieved over a period of 10 years following listing.

Assuming that public and private investment in WHS-related infrastructure and marketing in the Mount Lofty Ranges WHS is supported and maintained in the longer term, it is likely that economic growth attributable to inscription will continue, albeit at a lower rate. For the purpose of these projections it was assumed the annual rate of growth in years 11 to 20 would be around 20 per cent of that achieved in Years 1-10. On this basis the 20 year impacts in terms of gross regional product and employment were estimated and are shown in Figures ES1 and ES2 for the medium growth scenario (Scenario 2).

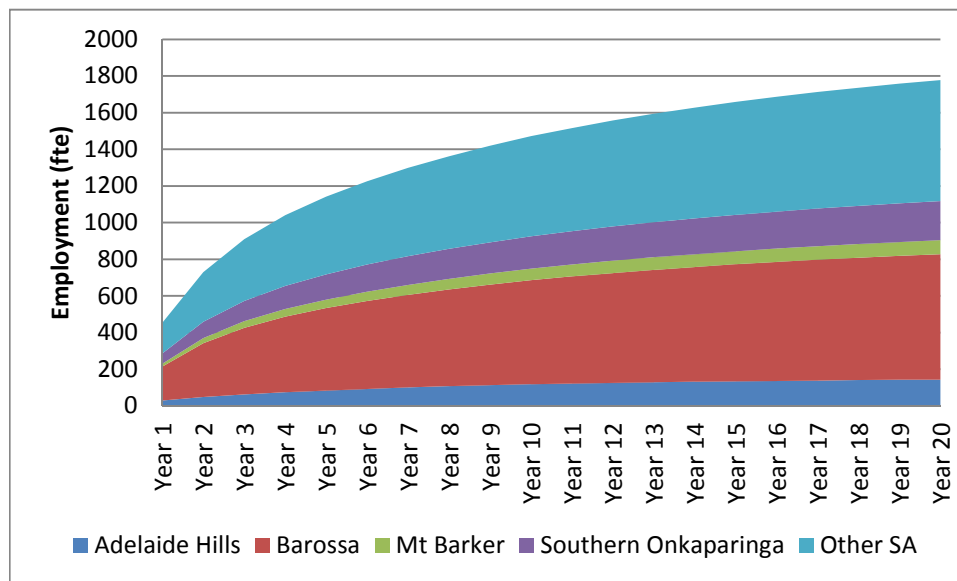
These projections attributed to WHS inscription include the estimated impacts from avoided agricultural land losses (which will increase with time), increased agricultural product processing (value adding) and increased tourist visitation levels. It should be noted that the estimated impacts illustrated in Figures ES1 and ES2 are annual impacts, not cumulative impacts.

Figure ES1 Projected GRP impacts of WHS inscription, years 1-20, medium growth scenario (Scenario 2)



Source: EconSearch analysis

Figure ES2 Projected employment impacts of WHS inscription, years 1-20, medium growth scenario (Scenario 2)



Source: EconSearch analysis

The experience of existing World Heritage Sites indicates that economic growth attributable to inscription is likely to be experienced mostly in the early years following inscription with economic activity likely to plateau, or at least slow after a number of years. Because part of the anticipated economic impact comes about from avoiding loss of agricultural land, and that avoided loss is accumulating over time, the annual impacts could be expected to increase with time as illustrated in Figures ES1 and ES2.

Cost Benefit Analysis

There are high levels of uncertainty surrounding the economic outcomes that may be generated by WHS inscription (i.e. those impacts projected in Figures ES1 and ES2) and the level of both private and public investment required to achieve those outcomes. Despite these uncertainties, a cost benefit analysis was undertaken to give an indication of the net benefits associated with the estimated regional economic impacts and the types of investment that would likely be required to generate those benefits.

The results of the analysis are presented in Table ES8. The results are expressed in terms of two evaluation criteria, the net present value (NPV) and the benefit-cost ratio (BCR). The NPV is a measure of the aggregate, annual net benefits (i.e. benefits – costs) of the project over a 25-year period, discounted (i.e. expressed as a present value²) using a discount rate of 7 per cent. The BCR is the ratio of the present value of benefits to the present value of costs.

The net present value of Scenario 1 (low growth) for the financial analysis was estimated to be approximately \$79 million. This indicates that the investment in Scenario 1 generates higher net benefits to the community than the base case (no WHS) scenario. The BCR for Scenario 1 was calculated to be 2.9 which is greater than 1.0 and therefore indicates a potentially attractive investment.

² The present value is the value now of a sum of money arising in the future. Money now is worth more than money in the future because it could be invested now to produce a greater sum in the future. The present value of money in the future is calculated by discounting it at a rate of interest equivalent to the rate at which it could be invested (Bannock et al. 1979).

Table ES8 Cost benefit analysis summary results

	Present Value Benefits (\$m)	Present Value Costs (\$m)	Net Present Value (\$m)	Benefit Cost Ratio
Scenario 1 (low growth)	121	42	79	2.9
Scenario 2 (medium growth)	241	92	149	2.6
Scenario 3 (high growth)	486	312	175	1.6

Source: EconSearch analysis

The interpretation is identical for Scenarios 2 and 3 and both scenarios show strong and positive returns. Note that estimated NPV increases as the level of investment increases whereas the BCR and therefore the rates of return decline, suggesting a greater level of risk associated with the higher level of investment.

In conclusion, the cost benefit analysis shows strong returns for all three investment scenarios based on achieving WHS listing, while recognising that these results are based on high levels of uncertainty surrounding the economic outcomes that may be generated by WHS inscription. That said, the proposed Mount Lofty Ranges site falls into the category of an under-recognised region with strong heritage attributes, a region that is motivated by socio-economic development and is therefore likely to benefit significantly from WHS inscription.

1. Introduction

This report was prepared for the Mount Lofty Ranges Working Group. The objective is to provide economic analysis that will assist the Working Group in the preparation of a feasibility study for World Heritage Site listing of the Mount Lofty Ranges agrarian landscape. Specifically, the requirements were to provide:

- A baseline analysis of the value of agriculture and related industries to the four regional economies represented by the Local Government Areas (LGAs) of Adelaide Hills, Barossa and Mt Barker and the non-metropolitan portion of the Onkaparinga LGA.
- A projection of the baseline into the future using existing trends of losses of agricultural land to alternative uses.
- An understanding of the context for the agricultural and related industries in each of the four LGAs.
- Identification of up to three scenarios (additional to the base case) around possible economic growth targets guided by evidence from other World Heritage sites and in consultation with the Mount Lofty Ranges Working Group and others.
- An analysis of how each of the scenarios would impact the four LGAs in terms of employment impacts and contribution to gross regional product.

The projections of economic impact presented in this report were based on the use of the input-output (I-O) method. The I-O models developed for this project were extended as a demographic-economic model. Tourism expenditure was incorporated in the models.

An outline of the construction of the I-O models and indicators of economic impact used in the analysis is provided in Section 2 of the report, a profile of economic activity in the regions is provided in Section 3. Section 4 describes the contribution of agriculture to economic activity in the regions and Section 5 details the contribution of tourism to economic activity in the regions. A description of possible economic growth targets and an analysis of how the targets will impact the four LGAs is provided in Section 6.

2. Input-Output Models for the Adelaide Hills, Barossa, Mt Barker and Onkaparinga LGA Regions

2.1 Method of Analysis

The estimates of economic impact presented in this report were based on the use of the I-O method. I-O analysis provides a comprehensive economic framework that is extremely useful in the resource planning process. Broadly, there are two ways in which the method can be used.

First, the I-O transactions table provides a numerical picture of the size and shape of the economy and its essential features. It 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, I-O analysis provides a standard approach for the estimation of the economic impact of a particular activity. The I-O model is used to calculate industry multipliers that can then be used to estimate of economic impacts arising from some change in the local economy (e.g. 'tourism growth opportunities').

2.2 I-O Model Construction

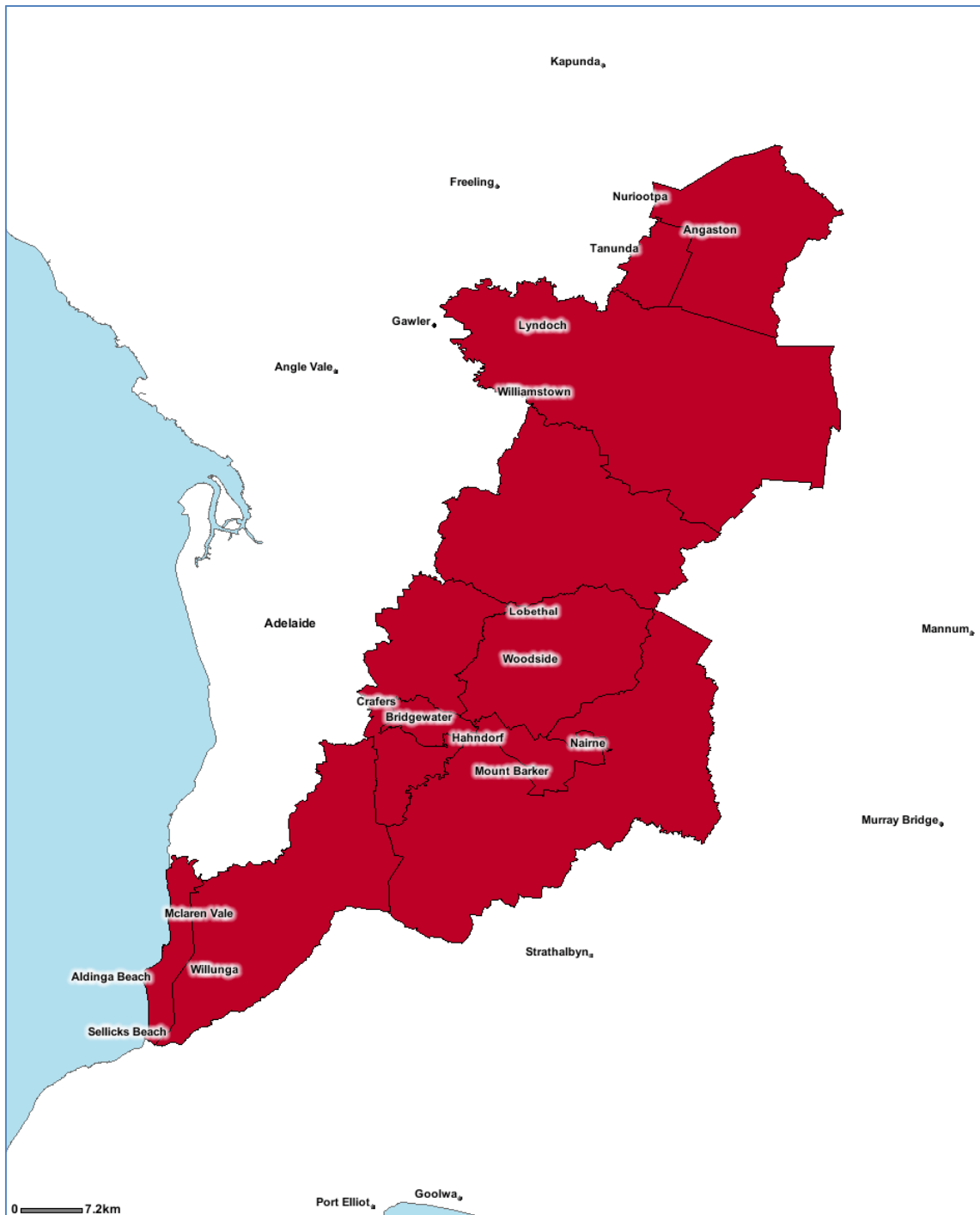
The Adelaide Hills, Barossa and Mt Barker economic impact models were based on the LGA boundaries for these regions. The Southern Onkaparinga model was based on the southern, non-metropolitan portion of the Onkaparinga LGA and includes the Statistical Local Areas (SLAs) of Onkaparinga Hills and Onkaparinga South Coast. The four regions and component SLAs are listed in Table 2.1 and illustrated in Figure 2.1.

Table 2.1 The four regions by Statistical Local Area

Region	Statistical Local Area ^a
Adelaide Hills LGA	Adelaide Hills (DC) - Central
	Adelaide Hills (DC) - Ranges
	Adelaide Hills (DC) - North
	Adelaide Hills (DC) - Bal
Barossa LGA	Barossa (DC) - Angaston
	Barossa (DC) - Barossa
	Barossa (DC) - Tanunda
Mt Barker LGA	Mount Barker (DC) - Central
	Mount Barker (DC) - Bal
Southern Onkaparinga	Onkaparinga (C) - Hills
	Onkaparinga (C) - South Coast

^a DC refers to 'district council' and C refers to 'city'.

Figure 2.1 Mount Lofty Ranges study area



Source: ABS Table Builder

For the purpose of estimating the value of agriculture and related industries in the regions and in order to describe the current level of regional economic activity, regional input-output (I-O) models were constructed for 2009/10. The data sources and method used to construct the models are detailed below.

Standard I-O models for the Adelaide Hills, Barossa, Mt Barker and Southern Onkaparinga regions for 2009/10 were developed using the GRIT (Generation of Regional Input-Output Tables) method, a ‘hybrid’ method which utilises local data and

computer methods to generate I-O tables. Whilst the majority of data compilation and manipulation was undertaken in *Microsoft Excel®* spreadsheets, the first stage of the GRIT procedure (based on the use of output-based location quotients) was undertaken using *IO9* software (West 2009). The 'parent' table for the regional I-O models was an I-O table for South Australia for 2009/10³.

An important characteristic of GRIT-produced I-O tables relates to their accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some will not be important because they are very small values and, therefore, have no possibility of generating inaccurate estimates of multipliers and economic impacts. Others will not be important because of the lack of linkages that relate to the particular sectors that are being studied.

The GRIT method involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. Research resources are targeted to data gathering in these areas. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen 1980). That means the table provides a generally accurate representation of the economy, but does not guarantee the accuracy of any particular cell.

Sources of data for the regional I-O model included:

- the Australian Bureau of Statistics (ABS);
 - *2006 Census of Population and Housing*⁴;
 - *2006 Agricultural Census (ABS 2008)* and *AgStats* data for 2009/10 (ABS 2011a);
 - *2003/04 Household Expenditure Survey* (ABS 2006);
 - *2009/10 Australian National Accounts, State Accounts* (ABS 2010a);
 - *Regional Population Growth, Australia and New Zealand* (ABS 2011b);
- Department of Employment and Workplace Relations (DEWR 2011); and
- the Australian Taxation Office (ATO 2011).

2.3 Extending the I-O Model as a DECON Model

Based on work undertaken by Mangan and Phibbs (1989), the I-O model developed for this project was extended as a demographic-economic (DECON) model. The two key characteristics of the DECON model, when compared with a standard economic model, are as follows.

- The introduction of a population 'sector' (or row and column in the model) makes it possible to estimate the impact on local population levels of employment growth or decline.
- The introduction of an unemployed 'sector' makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

³ This is an updated version of the model developed by the consultants for the Department of Trade and Economic Development (EconSearch 2009).

⁴ Detailed employment data from the *2006 Census of Population and Housing* were extracted from the *TableBuilder* database and represent place of remuneration rather than place of residence. That is, they are a measure of the number of jobs in the region rather than the number of employed residents.

A range of data for construction of the DECON model was obtained from the Australian Bureau of Statistics' *2006 Census of Population and Housing* (using the ABS *TableBuilder* database).

2.4 Incorporating Tourism Expenditure in the I-O Model

Another important aspect of the I-O model developed for the four regions for 2009/10 was the inclusion of an additional column in the final demand quadrant of the model, namely a profile of sales of goods and services to visitors to the region (i.e. expenditure by tourists).

The following method and data sources were used to estimate a profile of tourism expenditure (or sales to final demand) in the regions for 2009/10.

- The base data for 2009/10 were sourced from Tourism Research Australia (TRA) (www.tra.australia.com). These data were supplemented with information obtained from TRA (Kathryn Gillies, pers. comm.).
 - The key data were total tourism expenditure by tourism region and average expenditure profiles, by region, across a range of goods and services (e.g. food and drink, fuel, shopping, etc.).
 - Estimates were available for domestic day, domestic overnight and international visitor expenditure.
- The first significant adjustment to the base data was the application of a more detailed expenditure breakdown from the ABS *Australian National Accounts: Tourism Satellite Account, 2009/10* for both domestic and international visitor expenditure (ABS 2010b, Table 13).
- The second significant adjustment to the base data was the conversion of tourism expenditure estimates from purchasers' to basic prices (i.e. reallocation of net taxes (taxes minus subsidies) and marketing and transport margins) to make the data consistent with accounting conventions used in both the national and regional transactions (I-O) tables. Purchasers' to basic price ratios were derived from ABS (2009, Table 9).
- The final adjustment to the base data was the allocation of the tourism expenditure data in basic prices to the relevant input-output sectors (66 intermediate sectors, other value added or imports) in which the expenditure occurred, thus compiling a profile of sales to final demand. This process was undertaken for each type of tourism expenditure (domestic day, domestic overnight and international visitor) and the results aggregated to form a single tourism demand profile.

2.5 RISE Models

The data described above were incorporated into a *Microsoft Excel®* spreadsheet based economic impact model for the region (i.e. *RISE v3.0*)⁵. This type of model allows for description of the structure of the economy. It can also be used for the estimation of economic impacts over time in response to the introduction of a new industry or a change in the final demand for the output of one or many sectors. Model assumptions can be modified to account for:

⁵ For further details on the use and application of this type of model see EconSearch (2010a and 2010b).

- price changes between the model construction year (2009/10) and the base year for the analysis;
- labour productivity change over time (as above and for the subsequent 10 years); and
- the level of regional migration (e.g. for a positive employment impact, the proportion of new jobs filled by previously unemployed locals).

The economic impact models developed for this project were specified in terms of 66 intermediate sectors. Sector specification in terms of the national input-output sectors is detailed in Appendix 1. An overview of economic impact analysis methodology, including a description of extending the standard I-O model as a DECON model and incorporating a tourism demand profile, is provided in Appendix 2. A glossary of I-O terminology is provided in Appendix 3.

2.6 Indicators of Economic Impact

The following indicators of economic impact were generated using the economic modelling framework described above:

- value of output
- gross regional/state product (GRP/GSP)
- household income
- employment.

(Value of) Output is a measure of the gross revenue of goods and services produced by commercial organisations (e.g. farm-gate value of production) and gross expenditure by government agencies. Total output needs to be used with care as it can include elements of double counting when the output of integrated industries is added together (e.g. the value of winery output includes the farm-gate value of grapes).

Gross regional/state product (GRP/GSP) is a measure of the net contribution of an activity to the regional/state economy. GRP/GSP is measured as value of output less the cost of goods and services (including imports) used in producing the output. In other words, it can be measured as the sum of household income, 'gross operating surplus and gross mixed income net of payments to owner managers' and 'taxes less subsidies on products and production'. It represents payments to the primary inputs of production (labour, capital and land). Using GRP/GSP as a measure of economic impact avoids the problem of double counting that may arise from using value of output for this purpose.

Household income is a component of GRP/GSP and is a measure of wages and salaries paid in cash and in-kind, drawings by owner operators and other payments to labour including overtime payments, employer's superannuation contributions and income tax, but excluding payroll tax.

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. Employment is measured by place of remuneration rather than place of residence.

Estimates of economic impact are presented in terms of:

- direct impacts

- flow-on impacts
- total impacts.

Direct (or initial) impacts are an estimate of the change in final demand or level of economic activity that is the stimulus for the total impacts.

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

- Production-induced impacts are the sum of first-round impacts (i.e. estimates of the requirement for or purchases of goods and services from other sectors in the economy generated by the initial economic activity) and industrial support impacts (i.e. output and employment resulting from second, third and subsequent rounds of spending by firms). Production-induced impacts are sometimes referred to as 'indirect effects'.
- Consumption-induced impacts are additional output and employment 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'.
- Offsetting consumption effects are 'lost' consumption expenditure by the local unemployed before taking a job or 'new' consumption expenditure of those losing a job as they shift to welfare payments.

Total impacts are the sum of direct and flow-on impacts.

The demographic impact of changes in the level of employment in the region was measured using **population** (i.e. the number of people resident in the region) as an indicator.

Direct (or initial) impacts are an estimate of the change in final demand or level of economic activity that is the stimulus for the total impacts.

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

- Production-induced impacts are the sum of first-round impacts (i.e. estimates of the requirement for or purchases of goods and services from other sectors in the economy generated by the initial economic activity) and industrial support impacts (i.e. output and employment resulting from second, third and subsequent rounds of spending by firms). Production-induced impacts are sometimes referred to as 'indirect effects'.
- Consumption-induced impacts are additional output and employment 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'.
- Offsetting consumption effects are 'lost' consumption expenditure by the local unemployed before taking a job or 'new' consumption expenditure of those losing a job as they shift to welfare payments.

Total impacts are the sum of direct and flow-on impacts.

Note that this report is a statement of regional economic impact (i.e. so many jobs, so much income, etc.) arising from industry activity. The results of the analysis do not

indicate whether the costs to the region of the current level of activity in these industries or changes to these levels of activity outweigh the benefits. An assessment of this nature would require a comprehensive cost-benefit analysis.

3. Profile of Economic Activity in the Regions

A profile of economic activity for 2009/10 is outlined below by region and in terms of employment (fte jobs) and gross regional product (GRP).

Adelaide Hills

The top five contributors to fte jobs in the region (regional total 9,750) in 2009/10 were:

- agriculture, forestry and fishing (12.0 per cent);
- retail trade (11.6 per cent);
- education (10.6 per cent);
- building and construction (9.7 per cent); and
- property and business services (8.8 per cent).

The top five contributors to GRP (regional total \$1,122m) were:

- ownership of dwellings (14.7 per cent);
- agriculture, forestry and fishing (8.8 per cent);
- property and business services (8.4 per cent);
- public administration and defence (8.3 per cent); and
- building and construction (8.2 per cent).

Economic activity in the Adelaide Hills region is dominated by agriculture (predominantly fruit and nuts and viticulture) but it also has a significant resident population (approximately 40,100 persons at 30 June 2010) (ABS 2011c) with associated housing stock and service sectors.

Barossa

The top five contributors to fte jobs in the region (regional total 11,339) in 2009/10 were:

- manufacturing (29.1 per cent, of which food and beverage 20.5 per cent);
- agriculture, forestry and fishing (10.7 per cent);
- retail trade (10.4 per cent);
- health and community services (7.1 per cent); and
- education (6.5 per cent).

The top five contributors to GRP (regional total \$1,252m) were:

- manufacturing (38.1 per cent, of which food and beverage 31.0 per cent);
- ownership of dwellings (8.3 per cent);
- wholesale trade (5.6 per cent);
- agriculture, forestry and fishing (5.5 per cent); and
- property and business services (4.6 per cent).

Economic activity in the Barossa region is dominated by manufacturing (predominantly wine) but it also has a significant agricultural industry associated winegrape growing. As well there is a significant resident population (approximately 22,900 persons at 30 June 2010) (ABS 2011c) with associated housing stock and service sectors.

Mt Barker

The top five contributors to fte jobs in the region (regional total 8,693) in 2009/10 were:

- retail trade (17.8 per cent);
- health and community services (11.6 per cent);
- manufacturing (10.6 per cent, of which food and beverage 3.2 per cent);
- education (9.7 per cent); and
- building and construction (8.2 per cent).

The top five contributors to GRP (regional total \$895m) were:

- ownership of dwellings (14.0 per cent);
- manufacturing (9.2 per cent, of which food and beverage 3.4 per cent);
- property and business services (8.1 per cent);
- agriculture, forestry and fishing (7.3 per cent); and
- building and construction (7.2 per cent).

Economic activity in the Mt Barker region is dominated by significant resident population (approximately 30,500 persons at 30 June 2010) (ABS 2011c) with associated housing stock and service sectors. Manufacturing and agriculture also contribute significantly to the regional economy.

Southern Onkaparinga

The top five contributors to fte jobs in the region (regional total 8,909) in 2009/10 were:

- manufacturing (14.5 per cent, of which food and beverage 11.3 per cent);
- retail trade (14.4 per cent);
- agriculture, forestry and fishing (11.6 per cent, of which viticulture 7.9%);
- education (10.9 per cent); and
- health and community services (7.2 per cent).

The top five contributors to GRP (regional total \$903m) were:

- ownership of dwellings (19.1 per cent);
- manufacturing (17.4 per cent, of which food and beverage 15.0 per cent);
- building and construction (7.6 per cent);
- agriculture, forestry and fishing (6.8 per cent, of which viticulture 3.8%); and
- property and business services (5.4 per cent).

Economic activity in the Southern Onkaparinga region is dominated by manufacturing, a large part of which is wine industry related, and agriculture which is predominantly viticulture. As well there is a significant resident population (approximately 43,500 persons at 30 June 2010) (ABS 2011c) with associated housing stock and service sectors.

4. The Contribution of Agriculture to Economic Activity in the Regions

Estimates of the economic contribution of the agriculture value chain to the regional economies in 2009/10 are presented below.

The definition of the agriculture value chain is consistent with that employed in PIRSA's *Food for the Future* value-chain analysis. The following stages in the marketing chain have, therefore, been included in the direct economic impact:

- the direct value of agricultural output (gross value of production)⁶; and
- downstream impacts, including the net value of local (i.e. regional) agricultural products processing and the net value of local retail and food service (e.g. hotels & restaurants) trade in these products.

Estimates of the net value of local processing margins and retail and food service trade margins were derived from PIRSA's *Scorecard* for the region for 2005/06 (PIRSA, pers. comm.).

In aggregate, it was estimated that the contribution of the agricultural value chain in the Adelaide Hills region in 2009/10 (approximately \$349 million) generated the following level of regional economic activity (direct and flow-on) (Table 4.1).

- \$166 million in GRP which represents 25 per cent of the regional total (\$1.1 billion).
- Approximately 3,140 full-time and part-time jobs which represent 29 per cent of the regional total (almost 11,000 total jobs).
- Approximately 2,900 fte jobs which represents 31 per cent of the regional total (9,750 fte).
- \$150 million in household income which represents 26 per cent of the regional total (\$578 million).

In the Barossa region it was estimated that the contribution of the agricultural value chain in 2009/10 (approximately \$1,014 million) generated the following level of regional economic activity (direct and flow-on) (Table 4.2).

- \$710 million in GRP which represents 57 per cent of the regional total (\$1.3 billion).
- Approximately 6,400 full-time and part-time jobs which represent 54 per cent of the regional total (almost 12,000 total jobs).
- Approximately 6,300 fte jobs which represents 56 per cent of the regional total (11,300 fte).
- \$326 million in household income which represents 53 per cent of the regional total (\$610 million).

⁶ Value of output is a measure of the gross revenue of goods and services produced by commercial organisations (e.g. farm-gate value of production) and gross expenditure by government agencies. Total output needs to be used with care as it can include elements of double counting when the output of integrated industries is added together (e.g. the value of winery output includes the farm-gate value of grapes).

Table 4.1 The contribution of Agriculture to the Adelaide Hills regional economy, 2009/10

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	12	7	44	37	2
Beef Cattle	7	4	129	147	5
Dairy Cattle	5	2	69	61	2
Viticulture ^b	28	18	241	230	11
Vegetables	5	3	64	63	3
Fruit and Nuts	61	40	349	349	15
Other Agriculture	12	8	150	159	7
Services to Agriculture	20	14	81	85	6
Meat Processing	79	16	232	222	12
Fruit and Vegetable Processing	14	4	39	37	2
Wine	100	41	215	208	14
Retail	6	3	68	88	2
Food Services	2	1	9	13	0
Total Direct Impact	349	161	1,689	1,699	80
Flow-on Impact					
Trade		16	255	300	12
Transport		8	81	78	4
Property and business services		12	110	129	9
Other manufacturing		9	88	92	5
Accommodation, restaurants and cafes		6	89	127	4
Ownership of dwellings		21	-	-	-
Other sectors		52	662	717	35
Total Flow-on Impact		125	1,285	1,443	69
Total Agriculture Impact		285	2,974	3,142	150
Adelaide Hills regional total		1,122	9,750	10,940	578
Agriculture share of regional total		25.4%	30.5%	28.7%	25.9%

^a Flow-on (indirect) and total output impacts are not reported as there are problems with double counting which can give a misleading impression of the significance of individual industries. For example, the value of winegrapes processed locally is included in both the wine and viticulture sectors. If the two values were added together the farm-gate value of winegrapes would be included twice.

^b The value of output for the viticultural sector is for the Adelaide Hills GI regions for 2009/10 (PGIBSA 2010).

Source: EconSearch analysis.

Table 4.2 The contribution of Agriculture to the Barossa regional economy, 2009/10

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	14	8	112	103	4
Viticulture ^b	57	37	755	735	31
Other Agriculture	6	4	106	99	4
Services to Agriculture	15	10	68	67	5
Meat Processing	19	4	59	68	3
Wine	897	367	2,083	1,977	124
Retail	4	2	50	62	1
Food Services	3	1	19	24	1
Total Direct Impact	1,014	434	3,251	3,134	173
Flow-on Impact					
Trade		47	777	853	34
Transport		18	194	168	9
Property and business services		16	163	177	12
Other manufacturing		45	363	356	20
Accommodation, restaurants and cafes		18	294	380	13
Ownership of dwellings		43	-	-	-
Other sectors		89	1,344	1,347	64
Total Flow-on Impact		276	3,134	3,281	152
Total Agriculture Impact		710	6,385	6,415	326
Barossa regional total		1,252	11,339	11,795	610
Agriculture share of regional total		57%	56%	54%	53%

^a Flow-on (indirect) and total output impacts are not reported as there are problems with double counting which can give a misleading impression of the significance of individual industries. For example, the value of winegrapes processed locally is included in both the wine and viticulture sectors. If the two values were added together the farm-gate value of winegrapes would be included twice.

^b The value of output for the viticultural sector is for the Barossa Valley GI regions for 2009/10 (PGIBSA 2010).

Source: EconSearch analysis.

In aggregate, it was estimated that the contribution of the agricultural value chain in the Mt Barker region in 2009/10 (\$144 million) generated the following level of regional economic activity (Table 4.3).

- \$139 million in GRP which represents 16 per cent of the regional total (\$895 million).
- Almost 1,600 full-time and part-time jobs which represent 16 per cent of the regional total (10,000 total jobs).
- Almost 1,470 fte jobs which represents 17 per cent of the regional total (8,700 fte).
- \$68 million in household income which represents 15 per cent of the regional total (\$464 million).

In the Southern Onkaparinga region it was estimated that the contribution of the agricultural value chain in 2009/10 (approximately \$425 million) generated the following level of regional economic activity (direct and flow-on) (Table 4.4).

- \$319 million in GRP which represents 35 per cent of the regional total (\$903 million).
- Approximately 3,600 full-time and part-time jobs which represent 40 per cent of the regional total (approximately 8,900 total jobs).
- Almost 3,350 fte jobs which represents 42 per cent of the regional total (7,900 fte).
- \$151 million in household income which represents 39 per cent of the regional total (\$392 million).

Clearly, the agricultural value chain is a significant contributor to each of the four regional economies that comprise the Mount Lofty Ranges region. The agricultural value chain is most dominant in the Barossa region followed by Southern Onkaparinga, Adelaide Hills and Mt Barker.

In the Mt Barker region the contribution of the agricultural value chain is around 16 or 17 per cent of the regional economy. In the Barossa region the industry contributes well over 50 per cent of the economy in terms of both GRP and employment.

Across the whole Mt Lofty Ranges regional economy, the agricultural value chain generated over \$1.4 billion in gross regional product (35 per cent of the regional total) and more than 14,100 jobs (38 per cent of the regional workforce).

Table 4.3 The contribution of Agriculture to the Mt Barker regional economy, 2009/10

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	8	5	50	48	2
Beef Cattle	9	5	176	177	6
Dairy Cattle	8	4	90	88	3
Poultry	7	4	26	24	1
Viticulture	3	2	76	83	3
Vegetables	36	24	61	83	2
Fruit and Nuts	4	3	20	28	1
Other Agriculture	4	3	85	81	3
Services to Agriculture	10	7	46	55	3
Meat Processing	3	1	9	7	0
Fruit and Vegetable Processing	24	7	73	77	4
Wine	25	10	58	58	3
Retail	1	1	14	19	0
Food Services	0	0	2	2	0
Total Direct Impact	144	76	786	832	33
Flow-on Impact					
Trade		9	172	209	7
Transport		3	29	28	1
Property and business services		6	55	66	4
Other manufacturing		7	70	73	4
Accommodation, restaurants and cafes		2	39	52	2
Ownership of dwellings		9	-	-	-
Other sectors		27	316	322	17
Total Flow-on Impact		63	681	749	35
Total Agriculture Impact		139	1,467	1,581	68
Mount Barker regional total		895	8,693	10,010	464
Agriculture share of regional total		16%	17%	16%	15%

^a Flow-on (indirect) and total output impacts are not reported as there are problems with double counting which can give a misleading impression of the significance of individual industries. For example, the value of winegrapes processed locally is included in both the wine and viticulture sectors. If the two values were added together the farm-gate value of winegrapes would be included twice.

Source: EconSearch analysis.

Table 4.4 The contribution of Agriculture to the Southern Onkaparinga regional economy, 2009/10

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	10	6	16	16	1
Viticulture ^b	53	34	628	635	24
Vegetables	0	0	2	11	0
Fruit and Nuts	5	3	65	67	2
Other Agriculture	5	3	67	74	3
Services to Agriculture	12	8	58	61	4
Fruit and Vegetable Processing	1	0	4	3	0
Wine	306	125	758	733	42
Retail	18	9	248	334	7
Food Services	15	6	103	134	4
Total Direct Impact	425	197	1,948	2,068	87
Flow-on Impact					
Trade		14	254	301	10
Transport		6	68	66	3
Property and business services		10	95	110	7
Other manufacturing		15	126	122	7
Accommodation, restaurants and cafes		7	120	157	5
Ownership of dwellings		21	-	-	-
Other sectors		50	736	778	33
Total Flow-on Impact		122	1,399	1,534	64
Total Agriculture Impact		319	3,347	3,603	151
Southern Onkaparinga regional total		903	7,926	8,909	392
Agriculture share of regional total		35%	42%	40%	39%

^a Flow-on (indirect) and total output impacts are not reported as there are problems with double counting which can give a misleading impression of the significance of individual industries. For example, the value of winegrapes processed locally is included in both the wine and viticulture sectors. If the two values were added together the farm-gate value of winegrapes would be included twice.

^b The value of output for the viticultural sector is for the McLaren Vale GI regions for 2009/10 (PGIBSA 2010).

Source: EconSearch analysis.

5. The Contribution of Tourism Expenditure to Economic Activity in the Regions

Whilst tourism is not specified as a separate sector within the extended I-O model, the relative contribution of tourism to economic activity in the region can be readily measured. Additional explanation of how the profile of tourism expenditure was estimated is provided in Section 2.4. Total tourism expenditure in the regions includes net taxes (principally GST) and expenditure on imported goods and services from other regions in SA, interstate and overseas. Estimates of tourism expenditure are in basic prices, that is, net of net taxes (i.e. taxes minus subsidies) and marketing and transport margins.

Estimates of GRP, employment and household income impacts in Tables 5.1 to 5.4 account for both the direct and flow-on effects attributable to expenditure by tourists. For example, whilst there is little or no tourism expenditure in the education or health and community services sectors (i.e. direct effects), there is significant flow-on activity generated in these sectors of the regional economy as a result of subsequent rounds of production and consumption induced expenditure.

In aggregate, it was estimated that expenditure by tourists in the Adelaide Hills region in 2009/10 (\$55 million) generated the following level of regional economic activity (Table 5.1).

- \$34 million in GRP which represents 3.0 per cent of the regional total (\$1.1 billion).
- Approximately 500 full-time and part-time jobs which represent 4.6 per cent of the regional total (almost 11,000 total jobs).
- Approximately 400 fte jobs which represents 4.2 per cent of the regional total (9,750 fte).
- \$19 million in household income which represents 3.2 per cent of the regional total (\$578 million).

In aggregate, it was estimated that expenditure by tourists in the Barossa region in 2009/10 (\$128 million) generated the following level of regional economic activity (Table 5.2).

- \$78 million in GRP which represents 6.2 per cent of the regional total (\$1.3 billion).
- Almost 1,200 full-time and part-time jobs which represent 9.8 per cent of the regional total (12,000 total jobs).
- Almost 1,000 fte jobs which represents 8.7 per cent of the regional total (11,000 fte).
- \$40 million in household income which represents 6.5 per cent of the regional total (\$610 million).

Table 5.1 The contribution of tourism to the Adelaide Hills regional economy, 2009/10

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	4	2	16	17	1
Wholesale Trade	3	2	23	23	2
Retail Trade	14	8	186	243	6
Accomm Rest Cafes	7	4	55	79	3
Transport	2	1	16	14	1
Cultural & Recreational Serv	2	1	20	24	1
Other Sectors	6	12	89	104	6
Net Taxes ^b	5	5	-	-	-
Imports	13	-	-	-	-
Total Tourism	55	34	406	504	19
Adelaide Hills Region	-	1,122	9,750	10,940	578
Tourism Share of Region	-	3.0%	4.2%	4.6%	3.2%

^a In basic prices, that is, net of net taxes (taxes minus subsidies) and marketing and transport margins. Further description of the method used to estimate this profile of tourism expenditure is provided in Section 2.4.

^b Indirect taxes (principally GST) less subsidies.

Source: EconSearch analysis

Table 5.2 The contribution of tourism to the Barossa regional economy, 2009/10

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	11	5	50	52	2
Wholesale Trade	4	4	51	48	3
Retail Trade	28	17	424	523	12
Accomm Rest Cafes	32	14	227	293	10
Transport	4	3	34	27	2
Cultural & Recreational Serv	6	2	51	63	2
Other Sectors	12	24	144	154	9
Net Taxes ^b	9	9	-	-	-
Imports	22	-	-	-	-
Total (Tourism)	128	78	981	1,161	40
Regional Total ^c	-	1,252	11,339	11,795	610
Tourism Contribution to Regional Total	-	6.2%	8.7%	9.8%	6.5%

^{a, b} See footnotes for Table 5.1.

Source: EconSearch analysis

In aggregate, it was estimated that expenditure by tourists in the Mt Barker region in 2009/10 (\$46 million) generated the following level of regional economic activity (Table 5.3).

- \$31 million in GRP which represents 3.5 per cent of the regional total (\$895 million).
- Almost 500 full-time and part-time jobs which represent 4.9 per cent of the regional total (10,000 total jobs).
- Almost 400 fte jobs which represents 4.5 per cent of the regional total (9,000 fte).
- \$17 million in household income which represents 3.6 per cent of the regional total (\$464 million).

Table 5.3 The contribution of tourism to the Mt Barker regional economy, 2009/10

	Tourism		Employment		Household
	Expenditure ^a	GRP	fte	Total Jobs	Income
	\$m	\$m			\$m
Food Products	3	1	10	10	1
Wholesale Trade	2	2	22	22	1
Retail Trade	12	7	182	242	5
Accomm Rest Cafes	6	3	50	68	2
Transport	2	1	16	13	1
Cultural & Recreational					
Serv	2	1	15	22	1
Other Sectors	5	12	97	112	6
Net Taxes ^b	4	4	-	-	-
Imports	11	-	-	-	-
Total (Tourism)	46	31	393	488	17
Regional Total ^c	-	895	8,693	10,010	464
Tourism Contribution to Regional Total	-	3.5%	4.5%	4.9%	3.6%

^{a, b} See footnotes for Table 5.1.

Source: EconSearch analysis

In aggregate, it was estimated that expenditure by tourists in the Southern Onkaparinga region in 2009/10 (\$105 million) generated the following level of regional economic activity (Table 5.4).

- \$59 million in GRP which represents 6.6 per cent of the regional total (\$3.7 billion).
- Approximately 1,000 full-time and part-time jobs which represent 11.2 per cent of the regional total (8,900 total jobs).
- Almost 800 fte jobs which represents 9.9 per cent of the regional total (7,900 fte).
- \$30 million in household income which represents 7.5 per cent of the regional total (\$392 million).

Table 5.4 The contribution of tourism to the Southern Onkaparinga regional economy, 2009/10

	Tourism		Employment		Household
	Expenditure ^a	GRP	fte	Total Jobs	Income
	\$m	\$m			\$m
Food Products	9	3	34	34	2
Wholesale Trade	4	3	34	33	2
Retail Trade	24	13	355	479	10
Accomm Rest Cafes	25	11	187	244	8
Transport	2	1	19	17	1
Cultural & Recreational Serv	4	2	45	76	1
Other Sectors	8	17	107	119	6
Net Taxes ^b	9	9	-	-	-
Imports	21	-	-	-	-
Total Tourism	105	59	781	1,001	30
Southern Onkaparinga Region	-	903	7,926	8,909	392
Tourism Share of Region	-	6.6%	9.9%	11.2%	7.5%

^{a, b} See footnotes for Table 5.1.

Source: EconSearch analysis

In total, across the whole Mt Lofty Ranges regional economy, tourism generated over \$203 million in gross regional product (almost 5 per cent of the regional total) and more than 2,500 jobs (just under 7 per cent of the regional workforce).

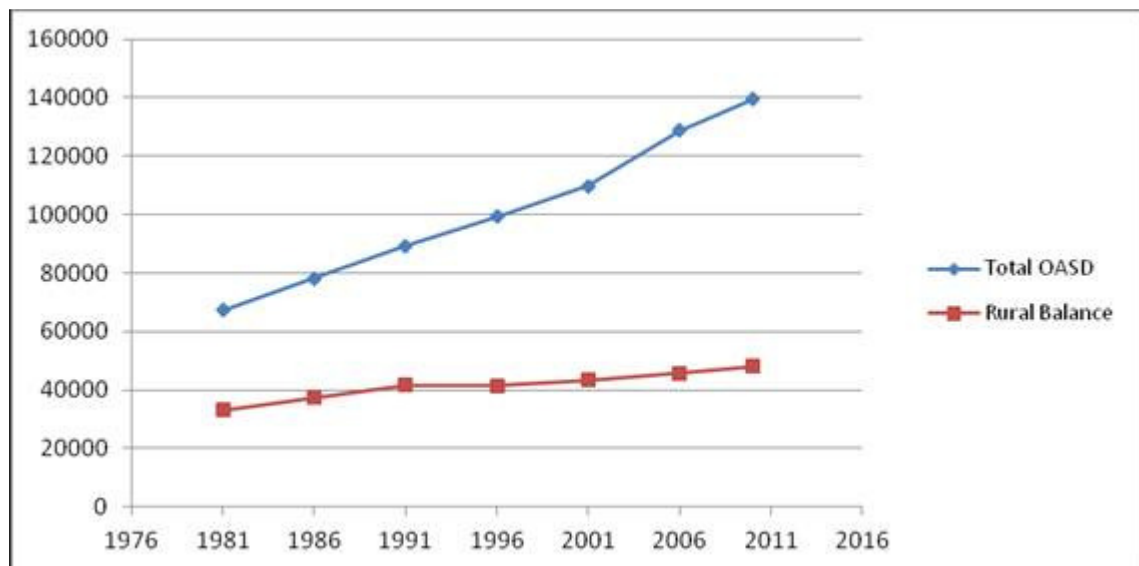
6. Economic Impact Projections

6.1 Trends in Land Use Change

A comprehensive and standardised time series of data indicating spatially precise trends in land use change is, unfortunately, not available for the study region or, indeed, any other part of South Australia. However, various data are available that provide partial insights into aspects of land use change across the four Council areas and the Mt Lofty Ranges more generally. In combination they indicate steady urban encroachment into the study region and an associated trend of losses of agricultural land to alternative uses, mainly non-commercial rural lifestyle properties, over the past two decades.

The process of urbanisation in Adelaide's peri-urban region has been well documented previously (Menzies and Bell (1981); Ford (1997)). Urban encroachment in its dispersed form (i.e. rural lifestyle or rural living development, as distinct from township expansion) is evident in unpublished analysis of the Rural Balance⁷ component of population growth across the Outer Adelaide Statistical Division (OASD) from 1981-2010 (PIRSA 2011). This reveals a steadily increasing population living in the rural landscape, away from urban centres and small towns (Figure A). The three OASD Council areas of the current study region (i.e. Barossa, Adelaide Hills and Mt Barker) accounted for 47 per cent (22,485) of the total OASD Rural Balance population in 2010. Including the City of Onkaparinga, the total 2010 Rural Balance population of the study region was 29,225.

Figure 6.1 Total estimated resident population for the Outer Adelaide Statistical Division^a, 1981-2010, showing Rural Balance component.



^a Pending the release of 2011 Census data this time series uses 2010 ERP data based on 2006 boundaries.

Source: Ford (1997), ABS Population & Housing Census 1981-2006 and Department of Planning & Local Government.

⁷ Rural Balance is the term used to describe population residing outside of defined urban centres and localities.

While population change is not the same as land use change, it is reasonable to assume that the vast bulk of this Rural Balance population growth took the form of dispersed rural living development. This conclusion is supported by unpublished analysis of rural dwelling construction activity across the Outer Metropolitan region (Houston and Baldock 2007). This analysis maps the pattern and extent of that construction activity and reveals a 30 per cent (3,766) increase in the number of dwellings outside of towns and Rural Living Zones from 1985-2005. During this period, the four Council areas of the current study region accounted for 61 per cent (2,284) of that construction activity.

The implications of rural population growth and dwelling construction activity for the study region's agricultural land base become evident in data summarising land use change across the Mount Lofty Ranges more generally during the 1990s (Flavel and Ratcliff 2000). These data relate to an area that includes but is more than twice the size of the current study region. They indicate that there was a significant change in agricultural land use between 1993 and 1999, as well as an overall loss of agricultural land, attributable largely to rural living development (Table 6.1).

Because the current study region is more accessible to metropolitan Adelaide than the wider Mount Lofty Ranges area examined by Flavel and Ratcliff, it is highly likely that the vast bulk of permanent conversions out of agriculture recorded in their data (as opposed to land use substitutions within agriculture) occurred in this region. This conclusion is clearly supported by the analysis of dwelling construction activity described above (Houston and Baldock 2007), in particular the 61 per cent of dwelling construction activity in the four LGAs. As a consequence, estimates of agricultural land losses presented in Table 6.1 are probably conservative for the study region. Annual rates of agricultural land loss would have likely been significantly higher than 0.4 per cent.

Table 6.1 Selected land use type and area in Mount Lofty Ranges ^a, 1993 and 1999

Land use	Area (ha)		Avg Annual Change
	1993	1999	1993 - 1999
<i>Agriculture:</i>			
Crops	88,008	37,648	-13.2%
Dairy	45,902	41,960	-1.5%
Grazing	310,230	335,487	1.3%
Horse	5,232	11,870	14.6%
Horticulture - trees	5,513	6,663	3.2%
Vegetables	5,177	1,976	-14.8%
Vine	11,436	23,358	12.6%
<i>Total Agriculture</i>	<i>473,491</i>	<i>460,961</i>	<i>-0.4%</i>
<i>Residential:</i>			
Rural Living	8,922	18,234	12.7%
Urban	11,943	13,733	2.4%
<i>Total Residential</i>	<i>20,865</i>	<i>31,967</i>	<i>7.4%</i>

a Larger region than the study area.

Source: Flavel and Ratcliff (2000)

The data shown in Table 6.1 were compiled from aerial photography with visual interpretation of photography and field attribution⁸. Recognising the limitations of the data, the following observations can be made:

- of the area lost from vegetable production (net 3,200 ha), 61 per cent changed to grazing and 16 per cent to vines;
- of the area lost from cropping (net 50,400 ha), 84 per cent changed to grazing and 9 per cent to vines;
- of the increased area of rural living (net 9,300 ha), 83 per cent was previously grazing, 4 per cent cropping and 4 per cent dairy; and
- of the increased area of urban residential (net 1,800 ha), 33 per cent was previously grazing, 12 per cent rural living and 7 per cent cropping. A significant proportion of the increase in urban residential (40 per cent) was unmapped.

Agricultural Census data⁹ collected and compiled by the ABS for 1996, 2001 and 2006 show a trend consistent with that illustrated in Table 6.1, albeit more pronounced. There are slight differences between census years in the scope of the census, the response rates (e.g. 93 per cent in 2006) and boundaries of the local government areas, which mean the data are not strictly comparable between years.

Nevertheless, at the broadest level, the data do indicate a general decline in the area of land used for agricultural purposes in each of the local government areas (Table 6.2). For the most part, the average annual rate of change in each of the LGAs was a decline of between 1 and 2 per cent, averaging 1.6 per cent per annum between 1996 and 2006 (excludes Barossa) and also averaging 1.6 per cent between 2001 and 2006 (includes Barossa).

Table 6.2 Total area of agricultural establishments by LGA^a, 1996 to 2006

LGA	Total Area (ha)			Average Annual Change		
	1996	2001	2006	1996-2001	2001-2006	1996 - 2006
Adelaide Hills	38,371	37,148	34,177	-0.6%	-1.7%	-1.2%
Barossa ^a	-	65,440	61,221	-	-1.3%	-
Mt Barker	40,505	35,972	33,449	-2.3%	-1.4%	-1.9%
Onkaparinga	26,131	24,260	21,423	-1.5%	-2.5%	-2.0%
<i>Total (excl Barossa)</i>	<i>105,007</i>	<i>97,380</i>	<i>89,049</i>	<i>-1.5%</i>	<i>-1.8%</i>	<i>-1.6%</i>
<i>Total (incl Barossa)</i>	<i>-</i>	<i>162,820</i>	<i>150,270</i>	<i>-</i>	<i>-1.6%</i>	<i>-</i>

^a Council amalgamations between 1996 and 2001 mean that comparable data for those two years are not available.

Source: ABS Agricultural Census

⁸ The accuracy of the land use attribution is dependent on when the data were captured, the interpretative ability of the observer and the level of input from regional staff who know the area being mapped well. Tertiary level agricultural attributes (such as commodity groups or pasture types) can only be collected if there is a mature crop on the field or ancillary data are available to support the classification and there is time available to collect this information (Randall 2001).

⁹ The scope of the Agricultural Census is all agricultural businesses above a minimum size cut-off recorded on the Australian Business Register (ABR) maintained by the ATO. For the 2005-06 Agricultural Census, the measure of size was the ABS's Estimated Value of Agricultural Operations (EVAO) where available; or where it was not available a Business Activity Statement (BAS) turnover size was derived. A minimum size cut-off of \$5,000, based on either EVAO or BAS Turnover, was used to determine whether a unit was in-scope for the Census (ABS 2007).

Although the total area of agricultural establishments declined over the 10 years to 2006, the number of establishments actually increased (Table 6.3). This increase was most prominent in the Adelaide Hills (an average annual increase of 2.5 per cent per annum) and Onkaparinga (2.4 per cent per annum). The rate of increase was markedly higher over the latter half of the 10 year period, increasing at a rate of 3.9 per cent per annum if Barossa is excluded from the calculation or 3.2 per cent per annum when Barossa is included.

Table 6.3 Number of agricultural establishments by LGA ^a, 1996 to 2006

LGA	No. of Properties			Average Annual Change		
	1996	2001	2006	1996-2001	2001-2006	1996 - 2006
Adelaide Hills	492	518	632	1.0%	4.1%	2.5%
Barossa ^a	-	551	592	-	1.4%	-
Mt Barker	348	321	384	-1.6%	3.6%	1.0%
Onkaparinga	479	498	605	0.8%	4.0%	2.4%
<i>Total (excl Barossa)</i>	<i>1,319</i>	<i>1,337</i>	<i>1,621</i>	<i>0.3%</i>	<i>3.9%</i>	<i>2.1%</i>
<i>Total (incl Barossa)</i>	<i>-</i>	<i>1,888</i>	<i>2,213</i>	<i>-</i>	<i>3.2%</i>	<i>-</i>

^a Council amalgamations between 1996 and 2001 mean that comparable data for those two years are not available.

Source: ABS Agricultural Census

It should be noted, however, that it is likely that this increase in the number of agricultural establishments was principally the result of a change in the frame used in the 2005-06 Agricultural Census. It was changed to include all farm businesses recorded on the Australian Business Register with the requirement that they have an Estimated Value of Agricultural Operations (EVAO) or a derived Business Activity Statement (BAS) turnover value of \$5,000 or more. Australia wide, this change in definition was expected to increase the Census coverage by more than 20 per cent, from around 130,000 to 160,000 agricultural establishments (ABS 2005).

The implication of a falling area of agricultural land and an increasing number of agricultural establishments is a declining average property size. This is illustrated by the data (Table 6.4) which show that from 1996 to 2001 the average size of agricultural establishments across the Mt Lofty Ranges region (excluding Barossa) fell from 80 to 73 hectares, a rate of decline of 1.8 per cent per annum. The rate was much faster in the period 2001 to 2006, 5.5 per cent region wide if Barossa is excluded and 4.7 per cent per annum when Barossa is included. As explained above, this would have been largely due to the change in the 2005-06 Agricultural Census frame where a high proportion of the additional establishments were likely to be small farms with a relatively low turnover.

Table 6.4 Average area of agricultural properties by LGA ^a, 1996 to 2006

LGA	Average Area (ha)			Average Annual Change		
	1996	2001	2006	1996-2001	2001-2006	1996 - 2006
Adelaide Hills	78	72	54	-1.7%	-5.5%	-3.6%
Barossa ^a	-	119	103	-	-2.7%	-
Mt Barker	116	112	87	-0.8%	-4.9%	-2.9%
Onkaparinga	55	49	35	-2.2%	-6.2%	-4.2%
<i>Total (excl Barossa)</i>	<i>80</i>	<i>73</i>	<i>55</i>	<i>-1.8%</i>	<i>-5.5%</i>	<i>-3.6%</i>
<i>Total (incl Barossa)</i>	<i>-</i>	<i>86</i>	<i>68</i>	<i>-</i>	<i>-4.7%</i>	<i>-</i>

^a Council amalgamations between 1996 and 2001 mean that comparable data for those two years are not available.

Source: ABS Agricultural Census

Observations about the increasing number of sub-commercial agricultural properties and declining average property size are consistent with the above-mentioned analyses of population growth and rural dwelling construction. They are also supported by data describing land division activity across South Australia. Unpublished analysis of so-called 'boundary realignments', where parcel boundaries are shifted but no new allotments created, suggests this activity is heavily concentrated in the Outer Metropolitan region (PIRSA 2007). Anecdotal evidence from land use planners in Local and State government suggests that this type of land division is used to create an increasing number of rural lifestyle allotments. The corollary of this is a declining number of commercial scale properties.

Collectively, all of these data point to a steadily fragmenting and shrinking agricultural land base across the study region, with practical implications for remaining primary producers. While it is not possible to provide a definitive statement about land use change trends in the study area, it appears to be occurring at a rate somewhere between 0.4 per cent per annum described by Flavel and Ratcliff (2000) and the 1.6 per cent derived from ABS data.

6.2 World Heritage Inscription and Trends in Visitation

Gillespie Economics and BDA Group (2008) undertook an economic impact analysis of 15 of Australia's 17 World Heritage Sites (WHS). Their approach to estimating the economic activity was to measure expenditures associated with management of the sites as well as expenditure of visitors to the sites. While they were able to do this, the more difficult task was to attribute that economic activity to world heritage inscription. Historical visitation data spanning the WHS inscription date was available for only five of the 15 World Heritage Sites. The results are summarised in Table 6.5 below.

Clearly the association between world heritage inscription and an increase in visitor numbers has not been well-established in the Australian context. An importance difference between the proposed agrarian landscape WHS and those cited in Table 6.5 is that the historical attributes of the region are not well-known and the WH inscription has the potential to significantly lift awareness knowledge and therefore visitations to the area.

Table 6.5 Trends in visitation following world heritage inscription in Australia

World Heritage Site	Change in visitation following WH inscription
Shark Bay	No discernible change in visitation levels following WH inscription
Naracoorte	Initial doubling of visitation but dropped back to 60-70% above pre-inscription level
Purnululu	No discernible change in visitation levels following WH inscription
Kakadu 1 st inscription	Visitation levels rapidly increased a couple of years after inscription
Kakadu 2 nd inscription	This occurred during a period of rapid growth in visitation levels with no change to this pattern after inscription
Kakadu 3 rd inscription	An initial increase in visitation followed by a gradual decline since 1995
Uluru-Kata Tjuta National Park	Inscription was during a period of rapid growth in visitation, with no change in growth after inscription

Source: Gillespie Economics and BDA Group (2008), Bourne (2010).

A 2005 study reported in PricewaterhouseCoopers (2007, p.54) looked at the changes in tourism numbers since inscription by sampling 86 World Heritage sites. Fifty one of these sites suggested that there had been no increase and of the remainder, 22 said there had been a large increase and 13 a small increase in visitor numbers. The research pointed to the fact that those tourist sites that were already well established destinations in their own right did not register any increase in visitor numbers as a result of WHS status, while lesser known sites did (Buckley (2004), Calvin (1997) cited in ERS (2006)).

This result was consistent with findings of PricewaterhouseCoopers (2007) own analysis of six case study sites which provided visitor numbers for the five years prior to inscription and the five years after inscription. The trends are summarised in Table 6.6.

Only one of the sites, Blaenavon, showed a substantial and immediate increase which deviated from the existing trend prior to subscription.

A third assessment of World Heritage Sites by Rebanks Consulting (2009, pp. 9-10) found that a majority of sites did not have a clear socio-economic objective and indeed most sites would fall into one of four diverse conceptual categories:

1. A 'Celebration' Designation

Many places treat it as a celebration or reward designation for heritage already preserved. Places that see designation as a 'Celebration' do not use it to achieve socio-economic impacts:

- preserving the heritage was the achievement
- World Heritage Site status the reward

Table 6.6 Trends in visitation following world heritage inscription in the UK

World Heritage Site	Change in visitation following WH inscription
Tower of London	Minor rise following WH inscription then returning to previous trend
Castles of Edward 1	Minor rise following WH inscription then returning to previous trend
Blaenavon (Big Pit)	A substantial and immediate increase following WH inscription (100% increase after 5 years)
Fountains Abbey	Visitation levels rapidly increased a couple of years after inscription (more than 30% increase after 5 years), although visitations were trending upwards prior to inscription
Edinburgh	No change for four years following inscription but an increase of over 60% in the fifth year
Dorset & Devon	A decline in visitation in the two years following inscription – no later data provided

Source: PricewaterhouseCoopers (2007)

2. A Heritage ‘SOS’ Designation

Many places treat it as an emergency attention designation for unique heritage at risk. The origins of the UNESCO World Heritage convention lie in this concept of the designation. Places that want the designation as an ‘SOS’ to save heritage, go on to try and do just that, namely saving heritage—the results are efforts to preserve heritage.

3. A Marketing/Quality Logo/Brand

A growing minority of sites have come to the realisation that UNESCO/WHS designation has value as a marketing or quality brand for historic places. Places that want designation for marketing or branding purposes go on to use it in their marketing with little additional activity other than that related to the development of tourism.

4. A ‘Place Making’ Catalyst

This view treats World Heritage Site status as a powerful catalyst for economic development using heritage as a tool to develop new identities for places, and programmes of actions to change places fundamentally. Only the ‘Place Making’ sites use WHS status to generate wider socio-economic impacts and fundamental change to communities and places.

In one of the case studies reported in Rebanks Consulting (2009), Bamberg City in southern Germany, a visitation increase of 64 per cent was reported from the time of inscription in 1993 to 2008. The Tourism and Congress Service in Bamberg “believes this growth is not possible to attribute to other factors other than the UNESCO designation and their use of it (Rebanks Consulting 2009, p.24).

Another German case study, the city of Volklingen in the heart of industrial Saarland experienced a doubling in visitation between 2000, the year of inscription, and 2008. “The marketing team at Volklingen are convinced that UNESCO/WHS status has given them a profile boost that manifests itself in tour operators from a range of international locations bringing visitors to the site” (Rebanks Consulting 2009, p.24).

The important finding of the research was that “whilst World Heritage Site status has been a powerful catalyst for socio-economic change in some communities, the nature of the interventions made to achieve this were highly site specific - there is no simple road map of where the designation can lead a place” (Rebanks Consulting 2009, p.10).

This implies that for those sites that do not seek it, there is no direct correlation between inscription and economic growth and no free lunch from simply getting the designation. However, if WHS designation is used to support programs for changing places and communities it can be and has shown to be a powerful catalyst to achieve those socio-economic outcomes.

6.3 Scenario Development

In light of the discussion in Sections 6.1 and 6.2, three growth scenarios have been developed to consider the impact that WHS status may have on the economies of the four local government areas that comprise the proposed WHS.

The impact projections reported below are for a range of modest industry growth targets assumed to be achieved over a period of 10 years following listing, as the experience of existing World Heritage sites indicates that economic growth attributable to inscription is likely to be experienced mostly in the early years following inscription, with economic activity likely to plateau or at least slow after a number of years.

Against a do nothing base case (no WHS designation), the impacts of three growth scenarios, detailed in Table 6.7, were estimated:

1. Low growth scenario whereby there is minimal investment combined with a World Heritage overlay;
2. Medium growth scenario which involves World Heritage overlay with moderate funding; and
3. High growth scenario that involves World Heritage overlay with significant funding (e.g. more than \$100 million in infrastructure spending and landscape rehabilitation).

Table 6.7 Growth scenarios in response to WHS status designation

	Scenario 1 Low Growth	Scenario 2 Medium Growth	Scenario 3 High Growth
Public/Private Investment (\$m)	0-5	5-20	100+
On- farm production	2.5%	5.0%	10.0%
Value adding	5.0%	10.0%	20.0%
Tourism visitations	3.0%	5.0%	10.0%

If the current trend of lost agricultural land, shown in Section 6.2 to be around -1.6 per cent per annum, were to continue, the total Mt Lofty Ranges region would lose around 15 per cent of agricultural land over a 10-year period. The on-farm production scenarios, detailed in Table 6.7, range from a low of 2.5 per cent to a high of 10.0 per cent, which are modest increases in light of the likely declines under the base case (no WHS designation).

An increase in the processing and value adding of agricultural products will be driven by (i) an increase in the local supply of product; and (ii) increased opportunities for product transformation and product marketing related directly to WHS designation. The value adding scenarios, detailed in Table 6.7, range from a low of 5.0 per cent to a high of 20.0 per cent. Growth rates for each scenario are almost or equal to doubles those assumed for tourism. This is because the investment required to develop new product and attract new visitors to the region was assumed to be substantially greater and require longer lead times than that required for marketing of regional processed product and increased utilisation of existing processing capacity.

As noted in Section 6.1, if WHS designation is used to support programs for changing places and communities it can be a powerful catalyst to achieve socio-economic outcomes. The WHS support programs are likely to range from regional tourism marketing to infrastructure spending and landscape rehabilitation, each of which will be designed, in part at least, to increase the attractions and attractiveness of the region. The tourism visitation scenarios, detailed in Table 6.7, range from a low of 3.0 per cent to a high of 10.0 per cent, which appear to be realistic targets under the proposed scope of funding and support scenarios.

6.4 Agriculture

Against a base case of continued loss of agricultural land at an average rate of 1.6 per cent per annum (15 per cent over 10 years), it has been assumed that the fall in production associated with the loss of agricultural land would be offset, at least partially, under WHS designation. This will increase the supply of product for processing/value adding activities and, additionally, WHS designation will create new opportunities for product transformation and product marketing.

Three scenarios have been developed to analyse a change in the value of agricultural production and agricultural product processing, as detailed in Table 6.7. The results of the three scenarios are presented in Tables 6.8 to 6.10 with detailed tables of results provided in Appendix 4.

The pattern of impacts is similar for the three scenarios; with the magnitude of the impacts increasing in line with the size of the stimulus generated by the WHS designation and associated activities. For Scenario 2 (Table 6.9), medium growth, the results for agricultural impacts show:

- In absolute and relative terms the impacts are projected to be largest in the Barossa and smallest in Mt Barker.
- In the Barossa there are projected to be an additional 517 jobs and \$63 million in annual GRP, a rise of more than 5.0 per cent in GRP and 4.6 per cent in employment.
- The impacts would be next largest in Southern Onkaparinga, jobs rising by more than 130 and GRP up by \$19 million, representing rises of around 2 per cent in GRP and 1.7 per cent in employment.
- At the State level the impacts are considerably higher, over 1,200 jobs in aggregate and \$141 million in GSP. This represents an increase of 0.2 per cent for both indicators.

Scenario 1: 2.5% increase in agricultural production and 5% increase in the value of agricultural product processing

Table 6.8 Impact of the increase in agriculture and agricultural value adding, Scenario 1

	GRP	Employment		Household Income
	\$m	fte	Total	\$m
Change against Baseline:				
Adelaide Hills	6	49	52	3
Barossa	32	259	260	14
Mt Barker	2	22	23	1
Southern Onkaparinga	9	69	71	4
Total Mt Lofty Ranges Region	49	399	406	21
Total South Australia	71	613	631	34
Impact on Regional Economy:				
Adelaide Hills	0.5%	0.5%	0.5%	0.5%
Barossa	2.5%	2.3%	2.2%	2.2%
Mt Barker	0.2%	0.3%	0.2%	0.2%
Southern Onkaparinga	1.0%	0.9%	0.8%	0.9%
Total Mt Lofty Ranges Region	1.2%	1.1%	1.0%	1.0%
Total South Australia	0.1%	0.1%	0.1%	0.1%

Source: Appendix 4

Scenario 2: 5% increase in agricultural production and 10% increase in the value of agricultural product processing

Table 6.9 Impact of the increase in agriculture and agricultural value adding, Scenario 2

	GRP	Employment		Household Income
	\$m	fte	Total	\$m
Change against Baseline:				
Adelaide Hills	11	98	103	6
Barossa	63	517	519	27
Mt Barker	4	44	47	2
Southern Onkaparinga	19	137	142	7
Total Mt Lofty Ranges Region	97	797	811	42
Total South Australia	141	1,226	1,260	67
Impact on Regional Economy:				
Adelaide Hills	1.0%	1.0%	0.9%	1.0%
Barossa	5.0%	4.6%	4.4%	4.5%
Mt Barker	0.5%	0.5%	0.5%	0.5%
Southern Onkaparinga	2.1%	1.7%	1.6%	1.8%
Total Mt Lofty Ranges Region	2.3%	2.1%	1.9%	2.1%
Total South Australia	0.2%	0.2%	0.2%	0.1%

Source: Appendix 4

Scenario 3: 10% increase in agricultural production and 20% increase in the value of agricultural product processing

Table 6.10 Impact of the increase in agriculture and agricultural value adding, Scenario 3

	GRP	Employment		Household Income
	\$m	fte	Total	\$m
Change against Baseline:				
Adelaide Hills	22	196	207	11
Barossa	126	1,034	1,038	54
Mt Barker	9	88	94	4
Southern Onkaparinga	37	275	283	14
Total Mt Lofty Ranges Region	194	1,593	1,622	84
Total South Australia	278	2,409	2,476	132
Impact on Regional Economy:				
Adelaide Hills	2.0%	2.0%	1.9%	1.9%
Barossa	10.1%	9.1%	8.8%	8.9%
Mt Barker	1.0%	1.0%	0.9%	1.0%
Southern Onkaparinga	4.1%	3.5%	3.2%	3.7%
Total Mt Lofty Ranges Region	4.7%	4.2%	3.9%	4.1%
Total South Australia	0.3%	0.3%	0.3%	0.3%

Source: Appendix 4

6.5 Tourism

Assuming the number of visitors to the regions will increase if World Heritage agrarian landscape status were achieved, there is likely to be a corresponding increase in visitor expenditure. Three growth scenarios have been developed to show how a 3 per cent increase (scenario 1), 5 per cent increase (scenario 2) and 10 per cent increase (scenario 3) in visitor expenditure would contribute to the regional economies.

Three scenarios have been developed to analyse a change in tourist visitation levels, as detailed in Table 6.7. The results of the three scenarios are presented in Tables 6.11 to 6.13 with detailed tables of results provided in Appendix 5.

As with the projected agriculture-related effects, the pattern of impacts from increased visitor expenditure is similar for the three scenarios; with the magnitude of the impacts increasing in line with the size of the stimulus generated by the WHS designation and associated activities. For scenario 1 the results show:

- In absolute and relative terms the impacts are projected to be largest in the Barossa and Southern Onkaparinga regions.
- In both regions there are projected to be an additional 40 to 50 jobs and \$3-4 million in annual GRP, in both cases a rise of more than 0.3 per cent above current levels.
- The impacts are projected to be similar in the Adelaide Hills and Mt Barker economies, jobs rising by 20 and GRP up by \$2 million, both impacts representing rises of around 0.2 per cent above current levels.
- At the State level the impacts are considerably higher, around 250 total jobs and \$21 million in GSP. This represents an increase of 0.03 per cent for both indicators. Most of the additional jobs would be generated in Adelaide.

Scenario 1 – 3 per cent increase in tourism expenditure

Table 6.11 The total contribution of tourism to the regional economies, Scenario 1

	GRP	Employment		Household Income
	\$m	fte	Total	\$m
Change against Baseline				
Adelaide Hills	1	12	15	1
Barossa	2	29	35	1
Mt Barker	1	12	15	1
Southern Onkaparinga	2	23	30	1
Total Mt Lofty Ranges Region	6	77	95	3
Total South Australia	13	147	170	7
Impact on Regional Economy:				
Adelaide Hills	0.09%	0.12%	0.14%	0.10%
Barossa	0.19%	0.26%	0.30%	0.20%
Mt Barker	0.10%	0.14%	0.15%	0.11%
Southern Onkaparinga	0.20%	0.30%	0.34%	0.23%
Total Mt Lofty Ranges Region	0.15%	0.20%	0.23%	0.15%
Total South Australia	0.02%	0.02%	0.02%	0.02%

Source: Appendix 5

Scenario 2 – 5 per cent increase in tourism expenditure

Table 6.12 The total contribution of tourism to the regional economies, Scenario 2

	GRP	Employment		Household Income
	\$m	fte	Total	\$m
Change against Baseline				
Adelaide Hills	2	20	25	1
Barossa	4	49	58	2
Mt Barker	2	20	24	1
Southern Onkaparinga	3	39	50	1
Total Mt Lofty Ranges Region	10	128	158	5
Total South Australia	21	245	284	11
Impact on Regional Economy:				
Adelaide Hills	0.15%	0.21%	0.23%	0.16%
Barossa	0.31%	0.43%	0.49%	0.33%
Mt Barker	0.17%	0.23%	0.24%	0.18%
Southern Onkaparinga	0.33%	0.49%	0.56%	0.38%
Total Mt Lofty Ranges Region	0.24%	0.34%	0.38%	0.26%
Total South Australia	0.03%	0.03%	0.03%	0.03%

Source: Appendix 5

Scenario 3 – 10 per cent increase in tourism expenditure

Table 6.13 The total contribution of tourism to the regional economies, Scenario 3

	GRP	Employment		Household Income
	\$m	fte	Total	\$m
Change against Baseline				
Adelaide Hills	3	41	50	2
Barossa	8	98	116	4
Mt Barker	3	39	49	2
Southern Onkaparinga	6	78	100	3
Total Mt Lofty Ranges Region	20	256	315	10
Total South Australia	43	490	568	23
Impact on Regional Economy:				
Adelaide Hills	0.30%	0.42%	0.46%	0.32%
Barossa	0.62%	0.87%	0.98%	0.65%
Mt Barker	0.35%	0.45%	0.49%	0.36%
Southern Onkaparinga	0.66%	0.99%	1.12%	0.75%
Total Mt Lofty Ranges Region	0.49%	0.68%	0.76%	0.51%
Total South Australia	0.05%	0.06%	0.07%	0.05%

Source: Appendix 5

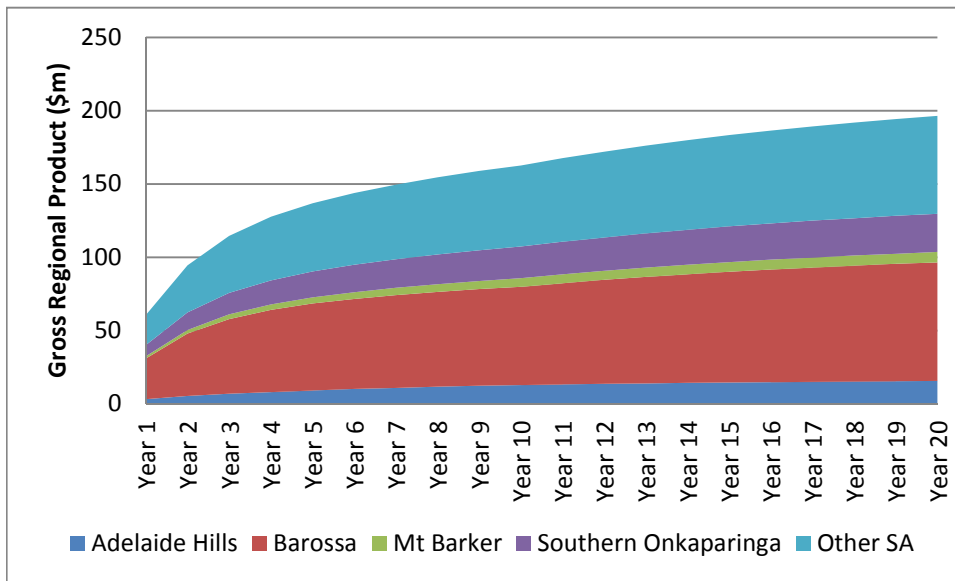
6.6 Aggregate and Longer Term Impacts

As mentioned previously, the impact projections presented in the preceding sections have been for a range of modest industry growth targets assumed to be achieved over a period of 10 years (Tables 6.8 to 6.13 show projected impacts for year 10). The experience of existing World Heritage Sites indicates that economic growth attributable to inscription is likely to be experienced mostly in the early years following inscription with economic activity likely to plateau, or at least slow after a number of years.

Assuming that public and private investment in WHS-related infrastructure and marketing in the Mount Lofty Ranges WHS is supported and maintained in the longer term, it is likely that economic growth attributable to inscription will continue, albeit at a lower rate. For the purpose of these projections it was assumed the annual rate of growth in years 11 to 20 would be around 20 per cent of that achieved in Years 1-10. On this basis the 20 year impacts in terms of gross regional product and employment were estimated and are shown in Figures 6.2 and 6.3 for the medium growth scenario (Scenario 2).

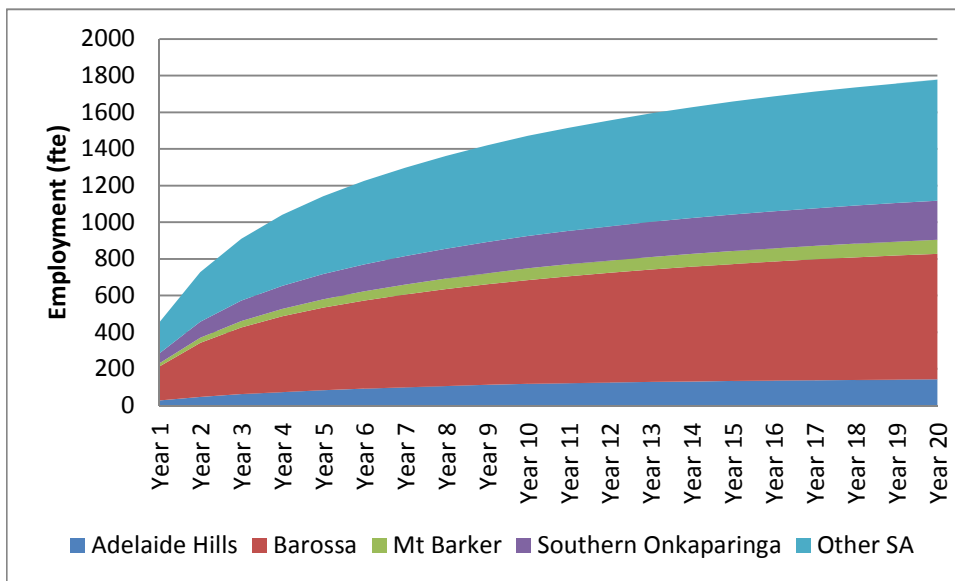
These projections attributed to WHS inscription include the estimated impacts from avoided agricultural land losses, increased agricultural product processing (value adding) and increased tourist visitation levels. Because part of the anticipated economic impact comes about from avoiding loss of agricultural land, and that avoided loss is accumulating over time, the annual impacts could be expected to increase with time as illustrated in Figures 6.2 and 6.3.

Figure 6.2 Projected GRP impacts of WHS inscription, years 1-20, medium growth scenario (Scenario 2)



Source: EconSearch analysis

Figure 6.3 Projected employment impacts of WHS inscription, years 1-20, medium growth scenario (Scenario 2)



Source: EconSearch analysis

6.7 Cost Benefit Analysis

There are high levels of uncertainty surrounding the economic outcomes that may be generated by WHS inscription (i.e. those impacts projected in Figures 6.2 and 6.3) and the level of both private and public investment required to achieve those outcomes. Despite these uncertainties, a cost benefit analysis was undertaken to give an indication of the net benefits associated with the impacts presented in Sections 6.4 to 6.6 and the types of investment that would likely be required to generate those benefits.

The cost benefit analysis conducted for this project conforms to South Australian and Commonwealth Government guidelines for conducting evaluations of public sector projects (Department of Treasury and Finance (2007) and Department of Finance and Administration (2006)).

Given that costs and benefits were specified in real terms (i.e. constant 2012 dollars), future values were converted to present values by applying a 7 per cent discount rate.

The analysis was conducted over a 25 year time period and results were expressed in terms of net benefits, that is, the benefits relative to the costs for each option. The evaluation criteria employed for these analyses were as follows.

- Net present value (NPV) – discounted¹⁰ project benefits less discounted project costs. Under this decision rule an option was considered to be potentially viable if the NPV was greater than zero. The NPV for option i has been calculated as an incremental NPV, using the standard formulation:

$$\text{NPV } i = (\text{PV (option } i \text{ benefits)}) - (\text{PV (option } i \text{ costs)})$$

- Benefit-cost ratio (BCR) – the ratio of the present value of benefits to the present value of costs. Under this decision rule option i was considered to be potentially viable if the BCR was greater than one. The ratio was expressed as:

$$\text{BCR } i = \text{PV (option } i \text{ benefits)} / \text{PV (option } i \text{ costs)}$$

It was assumed that expenditure associated with achieving World Heritage inscription would occur over a seven year period, ranging from a low of \$1.38 million (Scenario 1) to a high of \$1.45 million (Scenario 3). Annual operational expenditure, including administration, was assumed to range from \$0.25 million (Scenario 1) to \$1.0 million (Scenario 3).

Investment in regional infrastructure (natural resource management works, tourism signage, visitor centre upgrades, etc.) and associated industry development will require a mix of public and private capital. Levels of investment required to generate the type of impacts projected in Sections 6.4 to 6.6 were assumed to range from \$4 million (Scenario 1) up to \$40 million (Scenario 3) shared between the public and private sectors. While the private sector investment would be on-going (assuming the success of the WHS), it was assumed that public sector investment would be limited to a 5-year period following WHS inscription.

An additional cost is the forgone capital gain for undeveloped agricultural land that, under the base case, may have been realised with a change in zoning from, for example, rural to rural living or residential use. Anecdotal evidence from land agents suggests that the forgone capital gain, although extremely variable between locations, would typically be around \$10,000 per hectare in current (2012) values.

Net benefits were drawn from the impact analysis results presented in Sections 6.4 to 6.6. Benefits were restricted to measures of 'producer surplus', an indicator of business profitability attributable to the project investment. Estimated gross regional product (e.g. Figure 6.2), provides the starting point for this calculation. Reported GRP includes direct plus flow-on estimates; in a cost benefit analysis only the direct effects are

¹⁰ Discounting refers to the process of adjusting future benefits and costs to their equivalent present-day values (Sinden and Thampapillai 1995).

relevant. GRP is comprised principally of household income (e.g. wages and salaries) and gross operating surplus. It is the gross operating surplus (business profit) component that is relevant to the cost benefit analysis and was used in this analysis to estimate changes in producer surplus.

The results of the analysis are presented in Table 6.14. The results have been expressed in terms of two evaluation criteria, the net present value (NPV) and the benefit-cost ratio (BCR). The NPV is a measure of the aggregate, annual net benefits (i.e. benefits – costs) of the project over a 25 year period, discounted (i.e. expressed as a present value¹¹) using a discount rate of 7 per cent. The BCR is the ratio of the present value of benefits to the present value of costs.

The net present value of Scenario 1 (low growth) for the financial analysis was estimated to be approximately \$79 million. This indicates that the investment in Scenario 1 generates higher net benefits to the community than the base case (no WHS) scenario. The BCR for Scenario 1 was calculated to be 2.9 which is greater than 1.0 and therefore indicates a potentially attractive investment.

The interpretation is identical for Scenarios 2 and 3. Note that estimated NPV increases as the level of investment increases whereas the BCR and therefore the rates of return decline, suggesting a greater level of risk associated with the higher level of investment.

Table 6.14 Cost benefit analysis summary results

	Present Value Benefits (\$m)	Present Value Costs (\$m)	Net Present Value (\$m)	Benefit Cost Ratio
Scenario 1 (low growth)	121	42	79	2.9
Scenario 2 (medium growth)	241	92	149	2.6
Scenario 3 (high growth)	486	312	175	1.6

Source: EconSearch analysis

In conclusion, the cost benefit analysis shows strong returns for all three investment scenarios based on achieving WHS listing, while recognising that these results are based on high levels of uncertainty surrounding the economic outcomes that may be generated by WHS inscription. That said, the proposed Mount Lofty Ranges site falls into the category of an under-recognised region with strong heritage attributes, a region that is motivated by socio-economic development and is therefore likely to benefit significantly from WHS inscription.

¹¹ The present value is the value now of a sum of money arising in the future. Money now is worth more than money in the future because it could be invested now to produce a greater sum in the future. The present value of money in the future is calculated by discounting it at a rate of interest equivalent to the rate at which it could be invested (Bannock et al. 1979).

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Appendix 1 Intermediate Sector Specification

Appendix Table 1.1 Intermediate sector specifications for the RISE models

Regions, 2009/10, 66 Sectors		National I-O Table, 109 Sectors	
1	Sheep	1	0101 Sheep
2	Grains	2	0102 Grains
3	Beef cattle	3	0103 Beef cattle
4	Dairy cattle	4	0104 Dairy cattle
5	Pigs	5	0105 Pigs
6	Poultry	6	0106 Poultry
7	Viticulture	7	0107 (part) Other agriculture
8	Vegetables		0107 (part) Other agriculture
9	Fruit and nuts		0107 (part) Other agriculture
10	Other agriculture		0107 (part) Other agriculture
11	Services to agriculture	8	0200 Services to agric., hunting & trapping
12	Forestry	9	0300 Forestry and logging
13	Commercial fishing	10	0400 Commercial fishing
14	Coal	11	1101 Coal
15	Oil and gas	12	1201 Oil and gas
16	Iron & non-ferrous ores	13	1301 Iron ores
		14	1302 Non-ferrous metal ores
17	Other mining	15	1400 Other mining
18	Services to mining	16	1500 Services to mining
19	Meat & meat products	17	2101 Meat & meat products
20	Dairy products	18	2102 Dairy products
21	Fruit & vegetable products	19	2103 Fruit and vegetable products
22	Oils & fats	20	2104 Oils and fats
23	Flour mill products & cereal foods	21	2105 Flour mill products & cereal foods
24	Other food products		22
		23	2107 Confectionery
		24	2108 Other food products
25	Wine	25	2113 Wine, spirits and tobacco products
26	Other beverages	26	2109 Soft drinks, cordials and syrups
		27	2110 Beer and malt
27	Textiles, clothing and footwear	28	2201 Textile fibres, yarns etc.
		29	2202 Textile products
		30	2203 Knitting mill products
		31	2204 Clothing
		32	2205 Footwear
		33	2206 Leather & leather products
28	Sawmill products	34	2301 Sawmill products
29	Other wood products	35	2302 Other wood products
30	Pulp, paper & paperboard	36	2303 Pulp, paper & paperboard
31	Paper containers & products	37	2304 Paper containers and products
32	Printing & services to printing	38	2401 Printing & services to

Regions, 2009/10, 66 Sectors	National I-O Table, 109 Sectors
	printing
33 Publishing, recorded media, etc.	39 2402 Publishing; recorded media etc
34 Petrochemical & other chemical products	40 2501 Petroleum & coal products
	41 2502 Basic chemicals
	42 2503 Paints
	43 2504 Medicinal & pharmaceuticals products, pesticides
	44 2505 Soap & detergents
	45 2506 Cosmetics & toiletry preparations
	46 2507 Other chemical products
	47 2508 Rubber products
	48 2509 Plastic products
35 Non-metallic mineral products	49 2601 Glass & glass products
	50 2602 Ceramic products
	51 2603 Cement, lime and concrete slurry
	52 2604 Plaster & other concrete products
	53 2605 Other non-metallic mineral products
36 Iron and steel	54 2701 Iron & steel
37 Basic non-ferrous metals & products	55 2702 Basic non-ferrous metals & products
38 Metal products	56 2703 Structural metal products
	57 2704 Sheet metal products
	58 2705 Fabricated metal products
39 Motor vehicles & parts; other transport equip	59 2801 Motor vehicles & parts; other transport equip
40 Other machinery & equipment	60 2802 Ships and boats
	61 2803 Railway equipment
	62 2804 Aircraft
	63 2805 Photographic & scientific equipment
	64 2806 Electronic equipment
	65 2807 Household appliances
	66 2808 Other electrical equipment
	67 2809 Agricultural, mining etc. machinery
	68 2810 Other machinery & equipment
	69 2902 Furniture
42 Other manufacturing	70 2901 Prefabricated buildings
	71 2903 Other manufacturing
43 Electricity supply	72 3601 Electricity supply

Regions, 2009/10, 66 Sectors		National I-O Table, 109 Sectors	
44	Gas supply	73	3602 Gas supply
45	Water supply, sewerage & drainage services	74	3701 Water supply, sewerage & drainage services
46	Residential building	75	4101 Residential building
47	Other construction	76	4102 Other construction
48	Construction trade services	77	4201 Construction trade services
49	Wholesale trade	78	4501 Wholesale trade
		79	4502 Wholesale mechanical repairs
		80	4503 Other wholesale repairs
50	Retail trade	81	5101 Retail trade
		82	5102 Retail mechanical repairs
		83	5103 Other retail repairs
51	Accommodation, cafes & restaurants	84	5701 Accommodation, cafes & restaurants
52	Road transport	85	6101 Road transport
53	Rail, pipeline & other transport	86	6201 Rail, pipeline & other transport
54	Water transport	87	6301 Water transport
55	Air & space transport	88	6401 Air & space transport
56	Services to transport; storage	89	6601 Services to transport; storage
57	Communication services	90	7101 Communication services
58	Finance & insurance	91	7301 Banking
		92	7302 Non-bank finance
		93	7401 Insurance
		94	7501 Services to finance investment & insurance
59	Ownership of dwellings	95	7701 Ownership of dwellings
60	Property & business services	96	7702 Other property services
		97	7801 Scientific research, technical & computer serv.
		98	7802 Legal, accounting, marketing & business serv.
		99	7803 Other business services
61	Government administration	100	8101 Government administration
62	Defence	101	8201 Defence
63	Education	102	8401 Education
64	Health & community services	103	8601 Health services
		104	8701 Community services
65	Cultural & recreational services	105	9101 Motion picture, radio and television services
		106	9201 Libraries, museums & the arts
		107	9301 Sport, gambling and recreational services
66	Personal services	108	9501 Personal services
		109	9601 Other services

Source: EconSearch analysis and ABS (2009).

Appendix 2 An Overview of Economic Impact Analysis using the Input-Output Method

Economic impact analysis based on an input-output (I-O) model provides a comprehensive economic framework that is extremely useful in the resource planning process. Broadly, there are two ways in which the I-O method can be used.

First, the I-O model provides a numerical picture of the size and shape of an economy and its essential features. The I-O 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, I-O analysis provides a standard approach for the estimation of the economic impact of a particular activity. The I-O model is used to calculate industry multipliers that can then be applied to various development or change scenarios.

The input-output database

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 I-O database is a convenient way to illustrate the purchases and sales of goods and services taking place in an economy at a given point in time.

As noted above, I-O models provide a numerical picture of the size and shape of the economy. Products produced in the economy are aggregated into a number of groups of industries and the transactions between them recorded in the transactions table. The rows and columns of the I-O table can be interpreted in the following way:

- The rows of the I-O table illustrate sales for intermediate usage (i.e. to other firms in the region) and for final demand (e.g. household consumption, exports or capital formation).
- The columns of the I-O table illustrate purchases of intermediate inputs (i.e. from other firms in the region), imported goods and services and purchases of primary inputs (i.e. labour, land and capital).
- 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 I-O model can be used to describe some of the important features of a state or 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 economy.

Using input-output analysis for estimation of economic impacts

The I-O 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 vineyard that, in the course of its operation, purchases goods and services from other sectors. These goods and services would include

fertiliser, chemicals, transport services, and, of course, labour. The direct employment created by the vineyard is regarded in the model as an expenditure flow into the household sector, which is one of several non-industrial sectors recognised in the I-O model.

Upon receiving expenditure by the vineyard, the other sectors in the regional economy engage in their own expenditures. For example, as a consequence of winning a contract for work with vineyard, a spraying contractor 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 and induced (or flow-on) effects¹², as they are called, are part of the impact of the vineyard on the regional economy. They must be added to the direct effects (which are expenditures made in immediate support of the vineyard itself) in order to arrive at a measure of the total impact of the vineyard.

It may be thought that these flow-on effects (or impacts) 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 by the vineyard (i.e. expenditure on imports to the region) is lost to the regional economy. Consequently, the flow-on effects get smaller and smaller in successive expenditure rounds due to this and other leakages. Hence the total expenditure created in the regional economy is limited in amount, and so (in principle) it can be measured.

Using I-O analysis for estimation of regional economic impacts requires 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 I-O model to economic impact analysis, 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 regional economy on household expenditures by vineyard employees on food, clothing, entertainment, and so on, as it is impracticable to measure these effects for an individual case, here the vineyard.

The I-O model is instead based on a set of assumptions about constant and uniform proportions of expenditure. If households in general in the regional economy spend, for example, 13.3 per cent of their income on food and non-alcoholic beverages, it is assumed that those working in vineyards do likewise. Indeed, the effects of all expenditure rounds after the first are calculated by using such standard proportions (i.e. multiplier calculations). Once a transactions table has been compiled, simple mathematical procedures can be applied to derive multipliers for each sector in the economy.

Input-output multipliers

Input-output multipliers are an indication of the strength of the linkages between a particular sector and the rest of the state or regional economy. As well, they can be

¹² A glossary of I-O terminology is provided in Appendix 3.

used to estimate the impact of a change in that particular sector on the rest of the economy.

Detailed explanations on calculating I-O multipliers, including the underlying assumptions, are provided in any regional economics or I-O analysis textbook (see, for example, Jensen and West (1986)). They are calculated through a routine set of mathematical operations based on coefficients derived from the I-O transactions model, as outlined below.

The transactions table may be represented by a series of equations thus:

$$\begin{aligned} X_1 &= X_{11} + X_{12} + \dots + X_{1n} + Y_1 \\ X_2 &= X_{21} + X_{22} + \dots + X_{2n} + Y_2 \\ X_n &= X_{n1} + X_{n2} + \dots + X_{nn} + Y_n \end{aligned}$$

where X_i = total output of intermediate sector i (row totals);
 X_{ij} = output of sector i purchased by sector j (elements of the intermediate quadrant); and
 Y_j = total final demand for the output of sector i .

It is possible, by dividing the elements of the columns of the transactions table by the respective column totals to derive coefficients, which represent more clearly the purchasing pattern of each sector. These coefficients, termed 'direct' or 'I-O' coefficients, are normally denoted as a_{ij} , and represent the direct or first round requirements from the output of each sector following an increase in output of any sector.

In equation terms the model becomes:

$$\begin{aligned} X_1 &= a_{11}X_1 + a_{12}X_2 + \dots + a_{1n}X_n + Y_1 \\ X_2 &= a_{21}X_1 + a_{22}X_2 + \dots + a_{2n}X_n + Y_2 \\ X_n &= a_{n1}X_1 + a_{n2}X_2 + \dots + a_{nn}X_n + Y_n \end{aligned}$$

where a_{ij} (the direct coefficient) = X_{ij}/X_j . This may be represented in matrix terms:

$$X = AX + Y$$

where $A = [a_{ij}]$, the matrix of direct coefficients.

The previous equation can be extended to:

$$(I-A)X = Y$$

where $(I-A)$ is termed the Leontief matrix,

$$\text{or } X = (I-A)^{-1}Y$$

where $(I-A)^{-1}$ is termed the 'general solution', the 'Leontief inverse' or simply the inverse of the open model.

The general solution is often represented by:

$$Z = (I-A)^{-1} = [z_{ij}]$$

The I-O table can be 'closed' with respect to certain elements of the table. Closure involves the transfer of items from the exogenous portions of the table (final demand and primary input quadrants) to the endogenous section of the table (intermediate quadrant). This implies that the analyst considers that the transferred item is related more to the level of local activity than to external influences. Closure of I-O tables with respect to households is common and has been adopted in this project.

The 'closed' direct coefficients matrix may be referred to as A^* . The inverse of the Leontief matrix formed from A^* is given by:

$$\vec{Z} = (I - A^*)^{-1} = [z^*_{ij}]$$

\vec{Z} is referred to as the 'closed inverse' matrix.

A multiplier is essentially a measurement of the impact of an economic stimulus. In the case of I-O multipliers the stimulus is normally assumed to be an increase of one dollar in sales to final demand by a sector. The impact in terms of output, contribution to gross regional product, household income and employment can be identified in the categories discussed below.

- (i) The initial impact: refers to the assumed dollar increase in sales. It is the stimulus or the cause of the impacts. It is the unity base of the output multiplier and provides the identity matrix of the Leontief matrix. Associated directly with this dollar increase in output is an own-sector increase in household income (wages and salaries, drawings by owner operators etc.) used in the production of that dollar. This is the household income coefficient h_j . Household income, together with other value added (OVA), provide the total gross regional product from the production of that dollar of output. The gross regional product coefficient is denoted v_j . Associated also will be an own-sector increase in employment, represented by the size of the employment coefficient. This employment coefficient e_j represents an employment/output ratio and is usually calculated as 'employment per million dollars of output'.
- (ii) The first round impact: refers to the effect of the first round of purchases by the sector providing the additional dollar of output. In the case of the output multiplier this is shown by the direct coefficients matrix $[a_{ij}]$. The disaggregated effects are given by individual a_{ij} coefficients and the total first-round effect by $\sum a_{ij}$. First-round household income effects are calculated by multiplying the first-round output effects by the appropriate household income coefficient (h_j). Similarly, the first-round gross regional product and employment effects are calculated by multiplying the first-round output effects by the appropriate gross regional product (v_j) and employment (e_j) coefficients.
- (iii) Industrial-support impacts. This term is applied to 'second and subsequent round' effects as successive waves of output increases occur in the economy to provide industrial support, as a response to the original dollar increase in sales to final demand. The term excludes any increases caused by increased household consumption. Output effects are calculated from the open Z inverse, as a measure of industrial response to the first-round effects. The industrial-support output requirements are calculated as the elements of the columns of the Z inverse, less

the initial dollar stimulus and the first-round effects. The industrial support household income, gross regional product and employment effects are defined as the output effects multiplied by the respective household income, gross regional product and employment coefficients. The first-round and industrial-support impacts are together termed the production-induced impacts.

- (iv) Consumption-induced impacts: are defined as those induced by increased household income associated with the original dollar stimulus in output. The consumption-induced output effects are calculated in disaggregated form as the difference between the corresponding elements in the open and closed inverse (i.e. $z_{ij}^* - z_{ij}$, and in total as $\Sigma(z_{ij}^* - z_{ij})$). The consumption-induced household income, gross regional product and employment effects are simply the output effects multiplied by the respective household income, gross regional product and employment coefficients.
- (v) Flow-on impacts: are calculated as total impact less the initial impact. This allows for the separation of 'cause and effect' factors in the multipliers. The cause of the impact is given by the initial impact (the original dollar increase in sales to final demand), and the effect is represented by the first-round, industrial-support and consumption-induced effects, which together constitute the flow-on effects.

Each of the five impacts are summarised in Appendix Table 2.1. It should be noted that household income, gross regional product and employment multipliers are parallel concepts, differing only by their respective coefficients h_j , v_j and e_j .

The output multipliers are calculated on a 'per unit of initial effect' basis (i.e. output responses to a one dollar change in output). Household income, gross regional product and employment multipliers, as described above, refer to changes in household income per initial change in output, changes to gross regional product per initial change in output and changes in employment per initial change in output. These multipliers are conventionally converted to ratios, expressing a 'per unit' measurement, and described as Type I and Type II ratios. For example, with respect to employment:

Type I employment ratio = [initial + first round + industrial support]/initial
and

Type II employment ratio = [initial + production induced¹³ + consumption induced]/initial

Appendix Table 2.1 The structure of input-output multipliers for sector i ^a

Impacts	General formula
<i>Output multipliers (\$)</i>	
Initial	1
First-round	$\Sigma_i a_{ij}$
Industrial-support	$\Sigma_i z_{ij} - 1 - \Sigma_i a_{ij}$
Consumption-induced	$\Sigma_i z_{ij}^* - \Sigma_i z_{ij}$
Total	$\Sigma_i z_{ij}^*$
Flow-on	$\Sigma_i z_{ij}^* - 1$
<i>Household Income multipliers (\$)</i>	

¹³ Where (first round + industrial support) = production induced.

Initial	h_j
First-round	$\Sigma_i a_{ij} h_i$
Industrial-support	$\Sigma_i z_{ij} h_i - h_j - \Sigma_i a_{ij} h_i$
Consumption-induced	$\Sigma_i z_{ij}^* h_i - \Sigma_i z_{ij} h_i$
Total	$\Sigma_i z_{ij}^* h_i$
Flow-on	$\Sigma_i z_{ij}^* h_i - h_j$
<i>Gross regional product multipliers (\$)</i>	
Initial	v_j
First-round	$\Sigma_i a_{ij} v_i$
Industrial-support	$\Sigma_i z_{ij} v_i - v_j - \Sigma_i a_{ij} v_i$
Consumption-induced	$\Sigma_i z_{ij}^* v_i - \Sigma_i z_{ij} v_i$
Total	$\Sigma_i z_{ij}^* v_i$
Flow-on	$\Sigma_i z_{ij}^* v_i - v_j$
<i>Employment multipliers (full time equivalents)</i>	
Initial	e_j
First-round	$\Sigma_i a_{ij} e_i$
Industrial-support	$\Sigma_i z_{ij} e_i - e_j - \Sigma_i a_{ij} e_i$
Consumption-induced	$\Sigma_i z_{ij}^* e_i - \Sigma_i z_{ij} e_i$
Total	$\Sigma_i z_{ij}^* e_i$
Flow-on	$\Sigma_i z_{ij}^* e_i - e_j$

^a In a DECON model, Z^* (the 'closed inverse' matrix), includes a population and an unemployed row and column (see below for details).

Model assumptions

There are a number of important assumptions in the I-O model that are relevant in interpreting the analytical results.

- Industries in the model have a linear production function, which implies constant returns to scale and fixed input proportions.
- Another model assumption is that firms within a sector are homogeneous, which implies they produce a fixed set of products that are not produced by any other sector and that the input structure of the firms are the same. Thus it is preferable to have as many sectors as possible specified in the models and the standard models for this study were compiled with 66 sectors (see Appendix 1 for further detail).
- The model is a static model that does not take account of the dynamic processes involved in the adjustment to an external change, such as a permanent change in natural resources management.

Extending the standard economic impact model as a DECON model

Based on work undertaken by EconSearch (2009 and 2010a) and consistent with Mangan and Phibbs (1989), the I-O model developed for this project was extended as demographic-economic (DECON) model. The two key characteristics of the DECON model, when compared with a standard economic model, are as follows.

1. The introduction of a population 'sector' (or row and column in the model) makes it possible to estimate the impact on local population levels of employment growth or decline.
2. The introduction of an unemployed 'sector' makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

The population 'sector'

The introduction of a population 'sector' to the standard I-O model allows for the calculation of population multipliers. These multipliers measure the flow-on population impact resulting from an initial population change attributable to employment growth or decline in a particular sector of the regional economy.

Calculation of population multipliers is made possible by inclusion of a population row and column in the 'closed' direct coefficients matrix of the I-O model.

Population row: the population coefficient (p_j) for sector j of the DECON model is represented as:

$$p_j = -rho_j * e_j * family\ size_j$$

where rho_j = the proportion of employees in sector j who remain in the region after they lose their job (negative employment impact) or the proportion of new jobs in sector j filled by previously unemployed locals (positive employment impact);

e_j = the employment coefficient for sector j ; and

$family\ size_j$ = average family size for sector j .

Population column: the population column of the DECON model is designed to account for growth or decline in those sectors of the economy that are primarily population-driven (i.e. influenced by the size of the population) rather than market-driven (i.e. dependent upon monetary transactions). Clearly, many of the services provided by the public sector fit this description and, for the purpose of this analysis, it was assumed that the following intermediate sectors were primarily population-driven:

- public administration and defence;
- education;
- health and community services; and
- cultural and recreational services.

Thus, the non-market coefficient for sector j of the DECON model is represented as expenditure on that non-market service (by governments) in \$million per head of population.

The population multiplier for sector j is represented as: z_{pj}^* / ρ_{pj}

where z_{pj}^* = coefficient of the 'closed inverse' matrix in the population row for sector j ; and

ρ_{pj} = coefficient of the direct coefficients matrix in the population row for sector j .

Sources of local data for the population sector of the DECON models used in this project included the following.

- rho: little or no published data are available to assist with estimation of this variable, particularly at a regional level. The DECON models have been constructed to enable the analyst to estimate this variable on the basis of the availability superior data or assumptions.
- Family size: in order to estimate average family size by industry, relevant data were extracted from the Australian Bureau of Statistics *2006 Census of Population and Housing* using the *TableBuilder* database. These data were modified by the consultants in order to ensure consistency with the specification and conventions of the I-O models.

The unemployed 'sector'

As outlined above, the introduction of an unemployed 'sector' to the standard I-O model makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

Through the inclusion of an unemployed row and column in the 'closed' direct coefficients matrix of the standard I-O model it is possible to calculate Type III multipliers (for output, gross regional product, household income and employment).

The key point to note is that, in the situation where at least some of the unemployed remain in a region after losing their job (negative employment impact) or some of the new jobs in a region are filled by previously unemployed locals (positive employment impact), Type III multipliers will be smaller than the more frequently used Type II multipliers.

Unemployed row: the unemployed coefficient (u_j) for sector j of the DECON model is represented as:

$$u_j = -rho_j * (1-ess_j) * e_j$$

where rho_j = the proportion of employees in sector j who remain in the region after they lose their job (negative employment impact) or the proportion of new jobs in sector j filled by previously unemployed locals (positive employment impact);

ess_j = the proportion of employed in sector j who are not eligible for welfare benefits when they lose their job; and

e_j = the employment coefficient for sector j .

Unemployed column: the unemployed column of the DECON model is an approximation of total consumption expenditure and the consumption pattern of the unemployed. It is represented as dollars per unemployed person rather than \$million for the region as a whole, as is the case for the household expenditure column in a standard I-O model.

Sources of local (i.e. state and regional) data for the unemployed sector of the DECON models used in this study included the following.

- ess : in order to estimate the proportion of employed by industry who are not eligible for welfare benefits when they lose their job, relevant data were extracted from the Australian Bureau of Statistics *2006 Census of Population and Housing* using the *TableBuilder* database. These data were modified by the consultants in order to ensure consistency with the specification and conventions of the I-O models.
- Unemployed consumption: total consumption expenditure by the unemployed was based on an estimate of the *Newstart Allowance* whilst the pattern of consumption expenditure was derived from household income quintiles in the *2003/04 Household Expenditure Survey* (ABS 2006).

Incorporating a tourism demand profile in the I-O model

Tourism expenditure is a measure of the value of sales of goods and services to visitors to the state or region. The following method and data sources were used to estimate tourism expenditure by industry sector for the region.

- The primary data were sourced from Tourism Research Australia (TRA).
- Base datasets included total tourism expenditure by TRA tourism region and average expenditure profiles, by region, across a range of goods and services (e.g. food and drink, fuel, shopping, etc.).
- Estimates were available for domestic day, domestic overnight and international visitor expenditure.
- The first adjustment to the base data was the development of a concordance between the TRA tourism regions and I-O model regions and the allocation of these base data to the relevant I-O model region. These allocations were based, in turn, on an ABS concordance between TRA tourism regions and SLAs.
- The second adjustment to the base data was the application of a more detailed expenditure breakdown from the ABS *Australian National Accounts: Tourism*

Satellite Account for both domestic and international visitor expenditure (ABS 2010d).

- The third adjustment to the base data was the conversion of tourism expenditure estimates from purchasers' to basic prices (i.e. reallocation of net taxes (taxes minus subsidies) and marketing and transport margins) to make the data consistent with accounting conventions used in the national, state and regional I-O models. Purchasers' to basic price ratios for tourism expenditure categories were derived from ABS data.
- The final adjustment to the base data was the allocation of the tourism expenditure data in basic prices to the relevant input-output sectors (intermediate sectors, taxes less subsidies or imports) in which the expenditure occurred, thus compiling a profile of sales to final demand. This process was undertaken for each type of tourism expenditure (domestic day, domestic overnight and international visitor) and the results aggregated to form a single tourism demand profile. Profiles were developed at the state and regional levels.

Constructing a RISE v3.0 economic impact model

In the final model construction stage the data described above were incorporated into a *Microsoft Excel*[®] spreadsheet based economic impact model for the region and state (i.e. *RISE v3.0*)¹⁴. This model allows for description of the structure of the economy. It can also be used for the estimation of economic impacts over time in response to the introduction of a new industry or a change in the final demand for the output of one or many sectors. Model assumptions can be modified to account for:

- price changes between the model construction year (2009/10) and the base year for the analysis;
- labour productivity change over time (as above and for the subsequent 10 years);
- the level of regional migration (e.g. for a positive employment impact, the proportion of new jobs filled by previously unemployed locals).

¹⁴ For further details on the use and application of this type of model see EconSearch (2010b).

Appendix 3 Glossary of Input-Output Terminology

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

Changes in inventories (stocks) "consist of stocks of outputs that are held at the end of a period by the units that produced them prior to their being further processed, sold, delivered to other units or used in other ways and stocks of products acquired from other units that are intended to be used for intermediate consumption or for resale without further processing" (ABS 2008b).

Consumption-induced impacts are additional output and employment 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'.

DECON model is a demographic-economic model based on a traditional input-output model. The introduction of a population 'sector' (or row and column in the model) makes it possible to estimate the impact on local population levels of employment growth or decline. The introduction of an unemployed 'sector' makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

Direct (or initial) impacts are an estimate of the change in final demand or level of economic activity that is the stimulus for the total impacts.

Employment is a measure of the number of working proprietors, managers, directors and other employees, in terms of the number of full-time equivalents and total (i.e. full-time and part-time) jobs. Employment is measured by place of remuneration rather than place of residence.

ess is an estimate of the proportion of employed who are not eligible for welfare benefits when they lose their job.

Exports (other) are a measure of the value of goods and services sold from the region/state of interest to consumers in other regions, interstate and overseas, net of sales to visitors to the region.

Final demand quadrant (components of) includes household and government consumption expenditure, gross fixed capital formation, changes in inventories (stocks), tourism expenditure and 'other' exports.

First-round impacts are estimates of the requirement for (or purchases of) goods and services from other sectors in the economy generated by the initial economic activity.

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

Government consumption expenditure includes "net expenditure on goods and services by public authorities, other than those classified as public corporations, which does not result in the creation of fixed assets or inventories or in the acquisition of land and existing buildings or second-hand assets. It comprises expenditure on compensation of employees (other than those charged to capital works, etc.), goods

and services (other than fixed assets and inventories) and consumption of fixed capital. Expenditure on repair and maintenance of roads is included. Fees, etc., charged by general government bodies for goods sold and services rendered are offset against purchases. Net expenditure overseas by general government bodies and purchases from public corporations are included. Expenditure on defence assets that are used in a fashion similar to civilian assets is classified as gross fixed capital formation; expenditure on weapons of destruction and weapon delivery systems is classified as final consumption expenditure" (ABS 2008b).

Gross fixed capital formation (GFCF) includes government, private and public corporation expenditure on new fixed assets plus net expenditure on second-hand fixed assets, including both additions and replacements (see ABS 2008b for further detail).

Gross operating surplus and gross mixed income. Gross operating surplus (GOS) is a measure of the operating surplus accruing to all enterprises, except unincorporated enterprises. It is the excess of gross output over the sum of intermediate consumption, household income and taxes less subsidies on production and imports. Gross mixed income (GMI) is a measure of the surplus or deficit accruing from production by unincorporated enterprises (ABS 2008b). The National Accounts definition of this indicator, as specified in the 2004/05 National I-O table (ABS 2008a), includes drawings by owner operators (or managers). In the state model used in this project, drawings by owner operators have been included in household income.

Gross regional/state product (GRP/GSP) is a measure of the net contribution of an activity to the regional/state economy. GRP/GSP is measured as value of output less the cost of goods and services (including imports) used in producing the output. In other words, it can be measured as the sum of household income, 'gross operating surplus and gross mixed income net of payments to owner managers' and 'taxes less subsidies on products and production'. It represents payments to the primary inputs of production (labour, capital and land). Using GRP/GSP as a measure of economic impact avoids the problem of double counting that may arise from using value of output for this purpose.

Household consumption expenditure includes "net expenditure on goods and services by persons and expenditure of a current nature by private non-profit institutions serving households. This item excludes expenditures by unincorporated businesses and expenditures on assets by non-profit institutions (included in gross fixed capital formation). Also excluded is expenditure on maintenance of dwellings (treated as intermediate expenses of private enterprises), but personal expenditure on motor vehicles and other durable goods and the imputed rent of owner-occupied dwellings are included. The value of 'backyard' production (including food produced and consumed on farms) is included in household final consumption expenditure and the payment of wages and salaries in kind (e.g. food and lodging supplied free to employees) is counted in both household income and household final consumption expenditure" (ABS 2008b).

Household income is a component of GRP/GSP and is a measure of wages and salaries paid in cash and in-kind, drawings by owner operators and other payments to labour including overtime payments, employer's superannuation contributions and income tax, but excluding payroll tax.

Imports are a measure of the value of goods and services purchased by intermediate sectors and by components of final demand in the region/state of interest from other regions, interstate and overseas.

Industrial-support impacts are output and employment resulting from second, third and subsequent rounds of spending by firms.

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 table 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 state or regional economy. They can be used to estimate the impact of a change in that particular sector on the rest of the economy.

Offsetting consumption effects are 'lost' consumption expenditure by the local unemployed before taking a job or 'new' consumption expenditure of those losing a job as they shift to welfare payments.

Output (Value of) is a measure of the gross revenue of goods and services produced by commercial organisations (e.g. farm-gate value of production) and gross expenditure by government agencies. Total output needs to be used with care as it can include elements of double counting when the output of integrated industries is added together (e.g. the value of winery output includes the farm-gate value of grapes). For sectors where superior regional data are not available, value of output by industry is allocated across regions on an employment basis, rather than in terms of the location of other factors of production such as land and capital.

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.

Primary input quadrant (components of) includes household income, gross operating surplus and gross mixed income net of payments to owner managers, taxes less subsidies on products and production and imports.

Production-induced impacts are the sum of first-round and industrial support impacts. Production-induced impacts are sometimes referred to as 'indirect effects'.

rho is an estimate of the proportion of employees who remain in the region after they lose their job (negative employment impact) or the proportion of new jobs filled by previously unemployed locals (positive employment impact).

Taxes less subsidies on products and production (TLSP) is defined as 'taxes on products' plus 'other taxes on production' less 'subsidies on products' less 'other subsidies on production'. Taxes on products are taxes payable per unit of some good or service. Other taxes on production consist of all taxes that enterprises incur as a result of engaging in production, except taxes on products. Subsidies on products are subsidies payable per unit of a good or service. Other subsidies on production consist of all subsidies, except subsidies on products, which resident enterprises may receive as a consequence of engaging in production (ABS 2008b).

Tourism expenditure is a measure of the value of sales of goods and services to visitors to the state or region.

Total impacts are the sum of initial (or direct) and flow-on impacts.

Type I multiplier is calculated as (direct effects + production-induced effects)/direct effects.

Type II multiplier is calculated as (direct effects + production-induced effects + consumption-induced effects)/direct effects.

Type III multiplier is a modified Type II multiplier, calculated by including a population and unemployed row and column in the 'closed' direct coefficients matrix of the standard I-O model. Calculated as (direct effects + production-induced effects + consumption-induced effects + offsetting consumption effects)/direct effects.

Appendix 4 Detailed Results: Agricultural Production and Agricultural Product Processing

Appendix Table 4.1: Adelaide Hills - Scenario 1

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	12	8	45	38	2
Beef Cattle	7	4	131	149	5
Dairy Cattle	5	2	69	61	2
Viticulture ^b	28	18	241	230	11
Vegetables	5	3	64	63	3
Fruit and Nuts	61	40	349	349	15
Other Agriculture	12	8	150	159	7
Services to Agriculture	20	14	81	85	6
Meat Processing	83	17	243	233	13
Fruit and Vegetable Processing	14	4	41	39	2
Wine	105	43	225	219	15
Retail	6	3	68	88	2
Food Services	2	1	9	13	0
Total Direct Impact	360	164	1,716	1,726	82
Flow-on Impact					
Trade		17	261	306	12
Transport		8	83	80	4
Property and business services		12	113	132	9
Other manufacturing		10	92	95	5
Accommodation, restaurants and cafes		6	92	131	5
Ownership of dwellings		21	-	-	-
Other sectors		53	667	723	36
Total Flow-on Impact		127	1,307	1,468	70
Total Impact		291	3,024	3,194	152
Regional total		1,122	9,750	10,940	578
Proportion of regional total		25.9%	31.0%	29.2%	26.4%

^a Flow-on (indirect) and total output impacts are not reported as there are problems with double counting which can give a misleading impression of the significance of individual industries. For example, the value of winegrapes processed locally is included in both the wine and viticulture sectors. If the two values were added together the farm-gate value of winegrapes would be included twice.

Source: EconSearch analysis

Appendix Table 4.2: Adelaide Hills - Scenario 2

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	13	8	46	39	2
Beef Cattle	7	4	133	151	5
Dairy Cattle	5	2	69	61	2
Viticulture ^b	28	18	241	230	11
Vegetables	5	3	64	63	3
Fruit and Nuts	61	40	349	349	15
Other Agriculture	12	8	150	159	7
Services to Agriculture	20	14	81	85	6
Meat Processing	87	18	255	245	13
Fruit and Vegetable Processing	15	4	43	41	2
Wine	110	45	236	229	15
Retail	6	3	68	88	2
Food Services	2	1	9	13	0
Total Direct Impact	370	167	1,743	1,752	83
Flow-on Impact					
Trade		17	267	313	12
Transport		8	86	83	4
Property and business services		13	116	136	9
Other manufacturing		10	95	98	5
Accommodation, restaurants and cafes		6	95	135	5
Ownership of dwellings		22	-	-	-
Other sectors		53	672	729	36
Total Flow-on Impact		129	1,329	1,493	72
Total Impact		297	3,073	3,245	155
Regional total		1,122	9,750	10,940	578
Proportion of regional total		26.4%	31.5%	29.7%	26.8%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.3: Adelaide Hills - Scenario 3

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	13	8	49	41	2
Beef Cattle	7	4	136	155	5
Dairy Cattle	5	2	69	61	2
Viticulture ^b	28	18	241	230	11
Vegetables	5	3	64	63	3
Fruit and Nuts	61	40	349	349	15
Other Agriculture	12	8	150	159	7
Services to Agriculture	20	14	81	85	6
Meat Processing	95	20	278	267	15
Fruit and Vegetable Processing	17	5	46	44	2
Wine	120	49	258	250	17
Retail	6	3	68	88	2
Food Services	2	1	9	13	0
Total Direct Impact	390	174	1,798	1,805	86
Flow-on Impact					
Trade		18	278	326	13
Transport		9	91	88	5
Property and business services		13	122	143	10
Other manufacturing		11	101	105	6
Accommodation, restaurants and cafes		7	100	142	5
Ownership of dwellings		22	-	-	-
Other sectors		54	682	741	36
Total Flow-on Impact		134	1,373	1,544	74
Total Impact		308	3,171	3,349	161
Regional total		1,122	9,750	10,940	578
Proportion of regional total		27.4%	32.5%	30.6%	27.8%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.4: Barossa - Scenario 1

	Value of	GRP	Employment		Household
	Output ^a		fte	Total	Income
	\$m	\$m			\$m
Direct Impact					
Sheep	15	9	119	110	5
Viticulture ^b	57	37	755	735	31
Other Agriculture	6	4	106	99	4
Services to Agriculture	15	10	68	67	5
Meat Processing	19	4	62	71	3
Wine	942	386	2,187	2,076	130
Retail	4	2	50	62	1
Food Services	3	1	19	24	1
Total Direct Impact	1,061	453	3,366	3,243	180
Flow-on Impact					
Trade		49	811	891	35
Transport		19	203	176	10
Property and business services		17	170	186	12
Other manufacturing		47	380	372	21
Accommodation, restaurants and cafes		19	308	398	14
Ownership of dwellings		45	-	-	-
Other sectors		93	1,406	1,409	67
Total Flow-on Impact		288	3,278	3,431	159
Total Agriculture Impact		741	6,644	6,675	339
Barossa regional total		1,252	11,339	11,795	610
Agriculture share of regional total		59.2%	58.6%	56.6%	55.6%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.5: Barossa - Scenario 2

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	16	9	127	117	5
Viticulture ^b	57	37	755	735	31
Other Agriculture	6	4	106	99	4
Services to Agriculture	15	10	68	67	5
Meat Processing	20	4	65	74	3
Wine	987	404	2,292	2,175	136
Retail	4	2	50	62	1
Food Services	3	1	19	24	1
Total Direct Impact	1,107	472	3,480	3,352	186
Flow-on Impact					
Trade		51	846	928	37
Transport		19	212	184	10
Property and business services		18	178	194	13
Other manufacturing		49	397	389	22
Accommodation, restaurants and cafes		20	321	415	15
Ownership of dwellings		47	-	-	-
Other sectors		97	1,469	1,471	70
Total Flow-on Impact		301	3,422	3,582	166
Total Agriculture Impact		773	6,902	6,934	353
Barossa regional total		1,252	11,339	11,795	610
Agriculture share of regional total		61.7%	60.9%	58.8%	57.8%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.6: Barossa - Scenario 3

	Value of	GRP	Employment		Household
	Output ^a		fte	Total	Income
	\$m	\$m			\$m
Direct Impact					
Sheep	17	11	142	131	6
Viticulture ^b	57	37	755	735	31
Other Agriculture	6	4	106	99	4
Services to Agriculture	15	10	68	67	5
Meat Processing	22	5	70	81	3
Wine	1,077	441	2,500	2,372	149
Retail	4	2	50	62	1
Food Services	3	1	19	24	1
Total Direct Impact	1,201	510	3,709	3,571	200
Flow-on Impact					
Trade		55	914	1,004	40
Transport		21	230	199	11
Property and business services		19	193	210	14
Other manufacturing		53	431	422	24
Accommodation, restaurants and cafes		22	349	451	16
Ownership of dwellings		50	-	-	-
Other sectors		105	1,593	1,596	76
Total Flow-on Impact		326	3,710	3,883	180
Total Agriculture Impact		836	7,420	7,453	380
Barossa regional total		1,252	11,339	11,795	610
Agriculture share of regional total		66.8%	65.4%	63.2%	62.3%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.7: Mt Barker - Scenario 1

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	8	5	52	49	2
Beef Cattle	9	5	179	180	6
Dairy Cattle	8	4	90	88	3
Poultry	7	4	26	24	1
Viticulture	3	2	76	83	3
Vegetables	36	24	61	83	2
Fruit and Nuts	4	3	20	28	1
Other Agriculture	4	3	85	81	3
Services to Agriculture	10	7	46	55	3
Meat Processing	3	1	10	8	0
Fruit and Vegetable Processing	25	7	77	81	4
Wine	26	11	61	61	4
Retail	1	1	14	19	0
Food Services	0	0	2	2	0
Total Direct Impact	147	77	797	843	33
Flow-on Impact					
Trade		10	176	213	7
Transport		3	30	29	1
Property and business services		6	56	67	4
Other manufacturing		7	72	74	4
Accommodation, restaurants and cafes		3	39	53	2
Ownership of dwellings		10	-	-	-
Other sectors		27	319	325	17
Total Flow-on Impact		64	691	761	36
Total Agriculture Impact		141	1,488	1,605	69
Mount Barker regional total		895	8,693	10,010	464
Agriculture share of regional total		15.8%	17.1%	16.0%	14.8%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.8: Mt Barker - Scenario 2

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	8	5	53	51	2
Beef Cattle	9	5	181	182	6
Dairy Cattle	8	4	90	88	3
Poultry	7	4	26	24	1
Viticulture	3	2	76	83	3
Vegetables	36	24	61	83	2
Fruit and Nuts	4	3	20	28	1
Other Agriculture	4	3	85	81	3
Services to Agriculture	10	7	46	55	3
Meat Processing	3	1	10	8	0
Fruit and Vegetable Processing	27	7	81	85	4
Wine	28	11	63	63	4
Retail	1	1	14	19	0
Food Services	0	0	2	2	0
Total Direct Impact	150	78	808	854	34
Flow-on Impact					
Trade		10	179	217	7
Transport		3	30	30	1
Property and business services		6	57	69	4
Other manufacturing		7	74	76	4
Accommodation, restaurants and cafes		3	40	54	2
Ownership of dwellings		10	-	-	-
Other sectors		27	322	328	17
Total Flow-on Impact		65	702	774	36
Total Agriculture Impact		143	1,510	1,628	70
Mount Barker regional total		895	8,693	10,010	464
Agriculture share of regional total		16.0%	17.4%	16.3%	15.1%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.9: Mt Barker - Scenario 3

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	9	5	56	54	2
Beef Cattle	10	5	186	188	6
Dairy Cattle	8	4	90	88	3
Poultry	7	4	26	24	1
Viticulture	3	2	76	83	3
Vegetables	36	24	61	83	2
Fruit and Nuts	4	3	20	28	1
Other Agriculture	4	3	85	81	3
Services to Agriculture	10	7	46	55	3
Meat Processing	4	1	11	9	1
Fruit and Vegetable Processing	29	8	88	93	4
Wine	30	12	69	69	4
Retail	1	1	14	19	0
Food Services	0	0	2	2	0
Total Direct Impact	156	80	830	877	35
Flow-on Impact					
Trade		10	186	225	7
Transport		3	32	31	2
Property and business services		6	60	72	4
Other manufacturing		7	78	80	4
Accommodation, restaurants and cafes		3	42	56	2
Ownership of dwellings		10	-	-	-
Other sectors		28	327	334	18
Total Flow-on Impact		67	724	798	37
Total Agriculture Impact		148	1,554	1,675	72
Mount Barker regional total		895	8,693	10,010	464
Agriculture share of regional total		16.5%	17.9%	16.7%	15.5%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.10: Southern Onkaparinga - Scenario 1

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	10	6	17	16	1
Viticulture ^b	53	34	628	635	24
Vegetables	0	0	2	11	0
Fruit and Nuts	5	3	65	67	2
Other Agriculture	5	3	67	74	3
Services to Agriculture	12	8	58	61	4
Fruit and Vegetable Processing	1	0	4	4	0
Wine	321	132	796	769	44
Retail	18	9	248	334	7
Food Services	15	6	103	134	4
Total Direct Impact	441	203	1,987	2,106	89
Flow-on Impact					
Trade		14	261	310	10
Transport		6	71	68	3
Property and business services		10	98	114	7
Other manufacturing		16	131	127	7
Accommodation, restaurants and cafes		7	125	163	5
Ownership of dwellings		21	-	-	-
Other sectors		50	743	786	33
Total Flow-on Impact		125	1,430	1,568	66
Total Agriculture Impact		328	3,416	3,674	155
Southern Onkaparinga regional total		903	7,926	8,909	392
Agriculture share of regional total		36.3%	43.1%	41.2%	39.6%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.11: Southern Onkaparinga - Scenario 2

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	11	7	17	17	1
Viticulture ^b	53	34	628	635	24
Vegetables	0	0	2	11	0
Fruit and Nuts	5	3	65	67	2
Other Agriculture	5	3	67	74	3
Services to Agriculture	12	8	58	61	4
Fruit and Vegetable Processing	1	0	4	3	0
Wine	337	138	834	806	46
Retail	18	9	248	334	7
Food Services	15	6	103	134	4
Total Direct Impact	456	209	2,025	2,143	91
Flow-on Impact					
Trade		15	269	319	11
Transport		6	73	71	3
Property and business services		10	101	118	7
Other manufacturing		16	136	131	7
Accommodation, restaurants and cafes		8	130	169	6
Ownership of dwellings		22	-	-	-
Other sectors		51	751	794	34
Total Flow-on Impact		128	1,460	1,602	67
Total Agriculture Impact		337	3,485	3,744	159
Southern Onkaparinga regional total		903	7,926	8,909	392
Agriculture share of regional total		37.3%	44.0%	42.0%	40.5%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix Table 4.12: Southern Onkaparinga - Scenario 3

	Value of Output ^a	GRP	Employment		Household Income
	\$m	\$m	fte	Total	\$m
Direct Impact					
Sheep	11	7	19	18	1
Viticulture ^b	53	34	628	635	24
Vegetables	0	0	2	11	0
Fruit and Nuts	5	3	65	67	2
Other Agriculture	5	3	67	74	3
Services to Agriculture	12	8	58	61	4
Fruit and Vegetable Processing	1	0	4	3	0
Wine	367	150	910	879	51
Retail	18	9	248	334	7
Food Services	15	6	103	134	4
Total Direct Impact	488	222	2,102	2,217	96
Flow-on Impact					
Trade		16	283	336	11
Transport		7	78	75	4
Property and business services		11	107	125	7
Other manufacturing		17	146	141	8
Accommodation, restaurants and cafes		8	139	181	6
Ownership of dwellings		23	-	-	-
Other sectors		52	767	811	35
Total Flow-on Impact		133	1,520	1,669	70
Total Agriculture Impact		356	3,622	3,886	166
Southern Onkaparinga regional total		903	7,926	8,909	392
Agriculture share of regional total		39.4%	45.7%	43.6%	42.3%

^a See footnote a to Appendix Table 4.1.

Source: EconSearch analysis

Appendix 5 Detailed Results: Tourism Expenditure

Appendix Table 5.1: Adelaide Hills - Scenario 1

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	4	2	16	17	1
Wholesale Trade	3	2	24	24	2
Retail Trade	14	8	192	250	6
Accomm Rest Cafes	8	4	57	81	3
Transport	2	1	17	14	1
Cultural & Recreational Serv	2	1	21	25	1
Other Sectors	6	12	92	107	6
Net Taxes ^b	5	5	-	-	-
Imports	14	-	-	-	-
Total Tourism	57	35	418	519	19
Adelaide Hills Region	-	1,122	9,750	10,940	578
Tourism Share of Region	-	3.1%	4.3%	4.7%	3.3%

^a In basic prices, that is, net of net taxes (taxes minus subsidies) and marketing and transport margins. Further description of the method used to estimate this profile of tourism expenditure is provided in Section 2.4.

^b Indirect taxes (principally GST) less subsidies.

Source: EconSearch analysis

Appendix Table 5.2: Adelaide Hills - Scenario 2

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	4	2	17	18	1
Wholesale Trade	3	2	24	24	2
Retail Trade	15	8	195	255	6
Accomm Rest Cafes	8	4	58	83	3
Transport	2	1	17	15	1
Cultural & Recreational Serv	2	1	21	25	1
Other Sectors	6	12	93	109	6
Net Taxes ^b	5	5	-	-	-
Imports	14	-	-	-	-
Total Tourism	58	36	426	529	19
Adelaide Hills Region	-	1,122	9,750	10,940	578
Tourism Share of Region	-	3.2%	4.4%	4.8%	3.4%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.3: Adelaide Hills - Scenario 3

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	4	2	17	18	1
Wholesale Trade	3	2	25	25	2
Retail Trade	15	9	205	267	6
Accomm Rest Cafes	8	4	61	87	3
Transport	2	2	18	15	1
Cultural & Recreational Serv	2	1	22	27	1
Other Sectors	6	13	98	114	7
Net Taxes ^b	5	5	-	-	-
Imports	15	-	-	-	-
Total Tourism	61	37	446	554	20
Adelaide Hills Region	-	1,122	9,750	10,940	578
Tourism Share of Region	-	3.3%	4.6%	5.1%	3.5%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.4: Barossa - Scenario 1

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	12	5	52	54	2
Wholesale Trade	4	4	53	50	3
Retail Trade	29	17	437	539	12
Accomm Rest Cafes	33	15	234	302	11
Transport	4	3	35	28	2
Cultural & Recreational Serv	6	2	53	65	2
Other Sectors	12	24	148	159	9
Net Taxes ^b	9	9	-	-	-
Imports	23	-	-	-	-
Total Tourism	132	80	1,010	1,196	41
Adelaide Hills Region	-	1,252	11,339	11,795	610
Tourism Share of Region	-	6.4%	8.9%	10.1%	6.7%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.5: Barossa - Scenario 2

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	12	5	53	55	3
Wholesale Trade	5	5	54	51	3
Retail Trade	29	17	445	549	13
Accomm Rest Cafes	33	15	238	308	11
Transport	4	3	36	29	2
Cultural & Recreational Serv	6	2	54	66	2
Other Sectors	13	25	151	162	9
Net Taxes ^b	9	9	-	-	-
Imports	23	-	-	-	-
Total Tourism	135	82	1,030	1,219	42
Adelaide Hills Region	-	1,252	11,339	11,795	610
Tourism Share of Region	-	6.5%	9.1%	10.3%	6.9%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.6: Barossa - Scenario 3

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	12	5	55	57	3
Wholesale Trade	5	5	56	53	3
Retail Trade	31	18	466	575	13
Accomm Rest Cafes	35	16	250	323	11
Transport	5	3	37	30	2
Cultural & Recreational Serv	6	3	56	69	2
Other Sectors	13	26	158	170	10
Net Taxes ^b	10	10	-	-	-
Imports	24	-	-	-	-
Total Tourism	141	86	1,079	1,278	44
Adelaide Hills Region	-	1,252	11,339	11,795	610
Tourism Share of Region	-	6.8%	9.5%	10.8%	7.2%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.7: Mt Barker - Scenario 1

	Tourism		Employment		Household
	Expenditure ^a	GRP	fte	Total Jobs	Income
	\$m	\$m			\$m
Food Products	3	1	10	10	1
Wholesale Trade	2	2	23	22	1
Retail Trade	12	7	188	249	5
Accomm Rest Cafes	6	3	52	70	2
Transport	2	1	16	13	1
Cultural & Recreational Serv	2	1	15	23	1
Other Sectors	5	12	100	116	6
Net Taxes ^b	4	4	-	-	-
Imports	11	-	-	-	-
Total Tourism	48	32	404	503	17
Adelaide Hills Region	-	895	8,693	10,010	464
Tourism Share of Region	-	3.6%	4.7%	5.0%	3.8%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.8: Mt Barker - Scenario 2

	Tourism		Employment		Household
	Expenditure ^a	GRP	fte	Total Jobs	Income
	\$m	\$m			\$m
Food Products	3	1	11	11	1
Wholesale Trade	2	2	23	23	1
Retail Trade	12	8	191	254	6
Accomm Rest Cafes	7	3	53	71	2
Transport	2	1	17	14	1
Cultural & Recreational Serv	2	1	16	23	1
Other Sectors	5	13	102	118	7
Net Taxes ^b	4	4	-	-	-
Imports	12	-	-	-	-
Total Tourism	49	33	412	513	18
Adelaide Hills Region	-	895	8,693	10,010	464
Tourism Share of Region	-	3.7%	4.7%	5.1%	3.8%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.9: Mt Barker - Scenario 3

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	3	1	11	11	1
Wholesale Trade	2	2	24	24	1
Retail Trade	13	8	200	266	6
Accomm Rest Cafes	7	4	55	74	3
Transport	2	1	17	14	1
Cultural & Recreational Serv	2	1	16	24	1
Other Sectors	5	13	107	123	7
Net Taxes ^b	4	4	-	-	-
Imports	12	-	-	-	-
Total Tourism	51	34	432	537	19
Adelaide Hills Region	-	895	8,693	10,010	464
Tourism Share of Region	-	3.8%	5.0%	5.4%	4.0%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.10: Southern Onkaparinga - Scenario 1

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	9	3	35	35	2
Wholesale Trade	4	3	35	34	2
Retail Trade	24	14	365	493	10
Accomm Rest Cafes	26	11	193	252	8
Transport	2	2	20	17	1
Cultural & Recreational Serv	5	2	46	78	2
Other Sectors	8	17	110	122	6
Net Taxes ^b	9	9	-	-	-
Imports	22	-	-	-	-
Total Tourism	108	61	804	1,031	30
Southern Onkaparinga Region	-	903	7,926	8,909	392
Tourism Share of Region	-	6.8%	10.1%	11.6%	7.8%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.11: Southern Onkaparinga - Scenario 2

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	9	4	35	36	2
Wholesale Trade	4	3	36	35	2
Retail Trade	25	14	372	503	10
Accomm Rest Cafes	26	12	197	256	8
Transport	2	2	20	18	1
Cultural & Recreational Serv	5	2	47	80	2
Other Sectors	8	18	112	125	6
Net Taxes ^b	9	9	-	-	-
Imports	22	-	-	-	-
Total Tourism	111	62	820	1,051	31
Southern Onkaparinga Region	-	903	7,926	8,909	392
Tourism Share of Region	-	6.9%	10.3%	11.8%	7.9%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis

Appendix Table 5.12: Southern Onkaparinga - Scenario 3

	Tourism				Household
	Expenditure ^a	GRP	Employment		Income
	\$m	\$m	fte	Total Jobs	\$m
Food Products	9	4	37	38	2
Wholesale Trade	4	3	38	36	2
Retail Trade	26	15	390	527	11
Accomm Rest Cafes	27	12	206	269	9
Transport	2	2	21	19	1
Cultural & Recreational Serv	5	2	49	83	2
Other Sectors	9	19	117	130	7
Net Taxes ^b	10	10	-	-	-
Imports	23	-	-	-	-
Total Tourism	116	65	859	1,101	33
Southern Onkaparinga Region	-	903	7,926	8,909	392
Tourism Share of Region	-	7.2%	10.8%	12.4%	8.3%

^a See footnote a to Appendix Table 5.1.

^b See footnote b to Appendix Table 5.1.

Source: EconSearch analysis