Australian Government
Rural Industries Research and Development Corporation

Economic Analysis of the Australian Lucerne Seed Industry

RIRDC Publication No. 08/103

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by Rural Solutions SA and the Department for Trade and Economic Development

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FOREWORD

Primary industries and the rural communities they support are essential to the survival, growth and prosperity of Australia.

New industries, new ways of doing things – especially during this difficult period in our rural and metropolitan landscape, will ensure the continued survival of those industries and communities, and most importantly, the families that rely upon them.

The Rural Industries Research and Development Corporation invests in both new and established industries on behalf of government and industry stakeholders. These provide opportunities to be captured by rural producers and investors. They also provide avenues for farmers facing adjustment pressure to diversify and to manage change. The establishment of new, or expansion of current industries, contributes to community resilience and regional development. Increasingly, industries are contributing to a distinctive regional character in rural Australia.

Primary industries face a number of challenges – developing product quality and quantity, developing markets and supply chains, and industry leadership. However, rising to these challenges requires an understanding of the industry and its intended directions. Underpinning the growth of industries is research and development. Often, such research and development is hampered by a lack of basic statistical information, which is why RIRDC has invested in this report.

This report is the first step in considering the contribution, and therefore the basis for growth, of the lucerne seed industry in Australia.

The importance of this report is that it provides baseline information for an emerging industry sector. This report will be a useful basis for those contemplating investment or formulating policy and will help to inform RIRDC as it plans its research and development priorities into the future.

This project was co-funded by the Australian Government and Lucerne Australia which provided cash and in-kind contribution.

This report, an addition to RIRDC's diverse range of over 1700 research publications, forms part of our Pasture Seeds R&D Program, which covers levied temperate pasture seeds of which the major crops comprise lucerne, medicago species, clover and sub-clover seeds.

Most of our publications are available for viewing, downloading or purchasing online through our website:

- downloads at www.rirdc.gov.au/fullreports/index.html
- purchases at www.rirdc.gov.au/eshop

Peter O'Brien
Managing Director
Rural Industries Research and Development Corporation

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The assistance and feedback provided by the Executive Committee of Lucerne Australia, Peter Smith (Seed Services Australia), Tim Teague (Teague Australia), Luke Kirkby (Premier Seeds) and Annette Sugden (RIRDC) is gratefully acknowledged.

ABBREVIATIONS

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
AOSCA	Association of Official Seed Certifying Agencies
ASA	Australian Seeds Authority
FOB	Free On Board
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GSP	Gross State Product
GVP	Gross Value of Production
OECD	Organisation for Economic Co-operation and Development
PIRSA	Primary Industries and Resources South Australia
RIRDC	Rural Industries Research and Development Corporation
RSSA	Rural Solutions SA
VNS	Variety Not Specified

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What the report is about

This report is the culmination of an analysis of the Australian lucerne seed industry, providing an insight into its increasing growth and success. The report prepared by Rural Solutions SA was commissioned and co-funded by Lucerne Australia and RIRDC. It provides an important first step in establishing a baseline dataset to show the value and economic position of the industry.

Background

Lucerne Australia strives to become an integral part of the information distribution and research extension networks and to provide a single contact point where lucerne information can be accessed by growers. It also presents an efficient vehicle for researchers to distribute results to growers.

With this report, Lucerne Australia establishes the overall lucerne seed industry's value, not only to growers, but its worth to specific regions (in this case South Eastern South Australia). It also shows the significant economic impact that lucerne seed production has on the communities that benefit from the revenue and flow-on effects generated by the industry.

The Australian lucerne industry has been an extremely feasible and important pasture specification for over 40 years, and has continued to expand through constant improvement in farming systems, allowing the industry to become more efficient and resulting in greater yields. The lucerne industry contributes significantly to the RIRDC budget with approximately 51 percent of its Pasture Seeds R&D Program budget coming from levies generated by lucerne seed production.

In South Australia the lucerne seed industry is a major economic contributor to the towns of Keith, Naracoorte, Tintinara and Bordertown with those regional communities relying on lucerne seed production for employment, wealth generation and strength of social character.

The industry is experiencing an increase in demand for lucerne seed on the local market, and very strong export demand driven by the United States as their growers turn away from producing lucerne seed in favour of more lucrative crops that are supplying the ever growing biofuel industry. Other factors such as lucerne being a difficult crop to grow and the average age of the lucerne grower in the US between 60-65 have resulted in the reduction in lucerne crops and provided Australia with a new customer rather than competitor as in previous years.

It is therefore imperative that information on the current lucerne seed industry in Australia, and its contributors, is reported and updated. This will ensure that current and future investors understand the potential of the industry and invest accordingly in the industry's direction and success.

Using economic indicators, economic impact analysis, consultation and general research, this report provides an understanding of this growing industry. Whilst some data has been presented on an Australia-wide basis, much has been confined to more data-ready regions, such as South East South Australia. It is recommended that similar analysis is undertaken in other regions as the required information and relevant data becomes available.

Findings of this Report:

- The overall lucerne seed industry in Australia is currently worth around $AUD 95 million per year, with exports contributing around $AUD 30 million and domestic sales of $AUD 8.7 million. The remainder of the value lies in associated inputs and the allied industries (eg. seed processors and marketers) that are crucial to the lucerne seed value and supply chain.

- A comparative economic contributor is the overall value of the hay which is cut from the lucerne plant before seed is produced. Current volatility in hay market has seen average prices double in recent years as demand and the economic condition of the industry has increased. The current value of production for lucerne hay in Australia is estimated to be around $AUD 210 million per year.

- Production of lucerne seed in the period 2002/03 (5652 tonnes) to 2006/07 (7913 tonnes) increased by 40%, while the total value grew by a massive 179.6% from $13.9 million in 2002/03 to $38.86 million in 2006/07.

- The average price for lucerne seed is at an all time high of between $5.00 and $5.50 per kilogram due to very strong demand resulting in an increase in total value of 14.7 percent between 2005/06 and 2006/07 from $AUD 33.89 million to $AUD 38.86 million.

- During the period 2002/03 to 2005/06 (12 months ending 30 September) the quantity of lucerne seed exported increased by 16.8 % from 6386 tonnes to 7459 tonnes while the total value increased by 56% from $AUD 18.3 million to $AUD 28.5 million.

- Due to the limited availability of production data for other key lucerne growing regions, the regional contribution and economic impact has been estimated for the major growing region of south eastern South Australia. The allied industries in this region contributed approximately $AUD 21.2 million in 2006/07 flowing through those regional economies and contributing significantly to the prosperity of townships and communities.

From the research and investigation undertaken in this report it has become evident that there are a certain limitations to collecting accurate production and industry data for economic analysis. Apart from the Australian Seeds Authority (ASA) that publishes statistics on certified varieties of lucerne seed, there appears to be no other organisation that collates and publishes lucerne seed data from either the private or public sectors.

In preparing this report we have provided a number of recommendations that aim to decrease the information gap regarding economic and production data thereby allowing the lucerne seed industry to be aware of the trends and vital economic indicators required to analyse the industry's future success.

Future priorities identified in this report:

- For this continually growing industry to realise its full potential within Australian agriculture, the producers and industry bodies need to direct investment and lobbying toward encouraging agricultural and data collection agencies (ABARE, ABS, Department of Primary Industries) and industry players (processors/marketers) to increase their scope and accuracy of reporting for industries, such as lucerne seed, to allow for meaningful analysis so that the economic status can be tracked at any given time.

- In order for the lucerne seed industry to accurately report on the economic indicators and overall contribution to Australian agriculture, industry players (producers, cleaners, marketers) should be encouraged to collect and report vital economic information on lucerne seed production (ie. tonnages for certified and un-certified seed) so that reports such as this can be

updated as required with the aim of building solid quantitative and qualitative data for future analysis.

- Industries such as rice and honey currently spend between 0.8% and 1% of their gross value of production on research and development through RIRDC projects. This may provide a key performance indicator for the lucerne seed industry and a benchmark for future investment taking into consideration the level of producer and in-kind contributions.

- Honeybee pollination services provide significant value to agriculture and horticulture in Australia which in 1999/2000 was estimated to be worth $1.7 billion per annum (Gordon & Davis 2003). Further research should be conducted into the value of bee pollination services specifically for the lucerne industry as to analyse the direct correlation between improved crop pollination and higher seed yields. The research will also need to report on the costs and risk to the lucerne industry associated with a possible varroa mite incursion and strategies for combating this threat such as the introduction of the American leafcutter bee which is resilient to the varroa mite.

Lucerne Harvest (photo supplied by Shane Oster)

1 INTRODUCTION

1.1 Study Background

Rural Solutions SA (RSSA) has been commissioned by Lucerne Australia through RIRDC funding to undertake an economic evaluation of the Australian lucerne seed industry.

The objective of this report, *Economic Analysis of the Australian Lucerne Seed Industry*, is to provide an outline of the industry's economic performance based on desktop research, consultation and an industry survey of lucerne seed service providers.

The aim of the study is to present a set of economic performance indicators for the lucerne seed industry as well as to develop a consistent time series of economic information to assist Lucerne Australia with strategic planning in future years.

1.2 The Australian Lucerne Seed Industry

The Australian lucerne seed industry produces in excess of 7,500 tonnes of seed per year of which over 85% is produced in South Australia with the remaining 15% produced in New South Wales, Victoria and Western Australia (Figure 1). In Australia 83% of total lucerne seed production is produced around Keith, Naracoorte, Tintinara and Bordertown in South Australia, encompassing more than 16,000 hectares (ha) of both irrigated and dryland area. This region hereafter will be referred to as South East SA.

The majority of seed production in New South Wales takes place between Forbes and Wagga Wagga with dryland enterprises found at Cootamundra and irrigation enterprises at Forbes. Traditionally, there has been no lucerne production in Western Australia, however the recent benefits derived from lucerne production in higher rainfall areas has also led to increased lucerne plantings in WA in recent years, (RIRDC 2001).

Centre pivot irrigation of lucerne crops (photo supplied by Shane Oster)

Figure 1 – Lucerne seed production regions within Australia (Source: RIRDC, 2001)

The increasing value of lucerne seed to the Australian pasture seed industry has made it a commodity requiring research and industry development to improve yields and grower returns. Being a high input crop it requires sustainable and efficient management practices that aim to reduce environmental impacts and look to best use resources, particularly in the current drought conditions that are having such a negative influence on primary production in Australia.

Growth of the Australian lucerne seed industry in recent years has been driven by a significant increase in export demand with approximately 86% of all lucerne seed produced going offshore. In 2005/06 the amount of lucerne seed exported was over 7000 tonnes returning over $AUD 28 million for the industry and the Australian economy. Currently the US is the largest importer of Australian lucerne seed, and that trend looks set to continue as US farmers decrease lucerne seed production in favour of lower risk crops, such as corn, that can be utilised for human consumption or the growing demand in ethanol fuel.

1.3 Seed Certification

Seed certification is a process that sets out to protect the genetic identity of seed. This means that plants grown from certified seed can be expected to look and perform in the way that the breeder originally described for that cultivar. Certified Seed produced in Australia is in accordance with national and international certification schemes that meet stringent standards for:

- varietal purity
- physical purity
- germination

These standards are recognised both nationally and internationally and are an essential component of trade. The Organisation for Economic Co-Operation and Development (OECD) only recognises OECD standards for certification, so for seed exported to OECD countries OECD certification must be provided.

The certification scheme ensures that seed produced consists wholly of the variety named on the bag, that it does not differ significantly from the original variety released by the breeder and does not contain excessive quantities of other crops or varieties. The scheme also ensures that the seed is viable and a sample of the crop is tested for undesirable weeds or seed exposed to down-gradable contaminants.

Final stage of seed processing (photo supplied by Shane Oster)

All crops of certified seed are inspected during the growing season by certification personnel to determine varietal purity and to detect the presence of unwanted weeds and other crop types. Certified seed which has been cleaned at an approved premises is sampled by an accredited sampler and submitted to a certification agency laboratory for purity and germination testing.

All certified seed must carry a coloured tag, which may be pre-printed or carry an adhesive label which gives details of the seed line. If the tag is not pre-printed and does not carry an adhesive label the seed has not completed certification and therefore should not be sold as certified seed.

Table 1 - Areas registered for lucerne seed certification, 2005 to 2007

	Area (ha)			
Varieties	**2005**	**2006**	**2007**	**2008**
Aurora	2731	2543	1530	1377
CUF 101	92	70	36	61
Hunterfield	1121	1016	254	177
Hunter River	845	862	551	641
Sequel	974	936	496	517
Siriver	4189	3617	2705	2897
Trifecta	479	419	178	162
Proprietary Varieties	12,397	16,267	9843	14876
Total Certified Lucerne*	**22,828**	**25,730**	**15,593**	**20,708**
Total Lucerne**	**26,134**	**27,959**	**24,576**	**28,194**

Source: Australian Seeds Authority (Certified Seed Report) & Lucerne Australia

Assumption: * Final Area for certified lucerne taken: 2005 - 1 Mar, 2006 - 3 Feb, 2007 - 24 Jan, 2008 - 31 Jan

**** Total lucerne includes the estimate for uncertified areas of production

Table 1 shows that the area registered for certification in Australia between 2005 and 2007 decreased by 10,137 hectares (39%). This has been largely due to drought conditions which have reduced the overall dry land crop area suitable for lucerne seed production.

Whilst the area registered for seed certification decreased between 2006 and 2007, the production for certified lucerne seed has increased, as reported in the next section, which may provide an indicator that improved crop management of irrigated lucerne seed combined with favourable weather conditions at critical stages of production has resulted in better than expected yields.

As shown in Figure 2 the area for certified lucerne seed production rebounded from 15,593 hectares in 2006/07 to 20,708 hectares in 2007/08 (32% increase). A strong export market, record prices and better seasonal conditions have been the leaders in this recovery which has given producers confidence that this perennial crop will maintain its high level of demand.

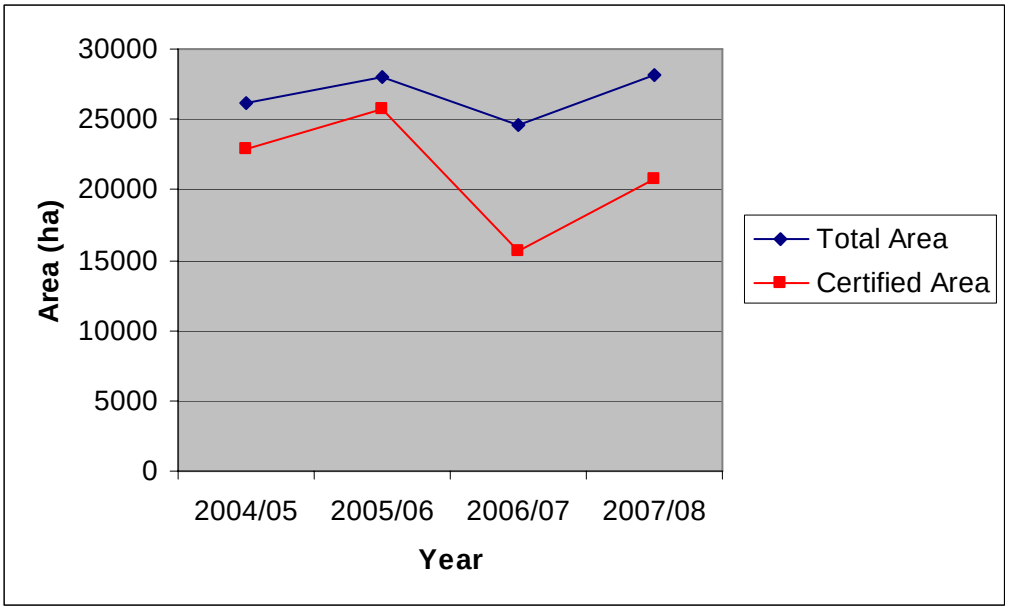

Figure 2 – Areas registered for lucerne seed certification in Australia, 2005 to 2007 compared with total area for lucerne seed production

1.4 Bee Pollination

Honeybees are the most significant pollinators of some crops due to the efficiency of their foraging activities (Gibbs and Muirhead 1998). Indeed, 65 per cent of horticultural and agricultural crops introduced in Australia since European settlement require honeybees for pollination (Jones 1995, cited in Gibbs and Muirhead 1998). Given the importance of primary industries to the Australian economy, the value of pollination services carried out by honeybees is likely to substantially exceed the value of honey and other apiary products into the future.[1]

Honeybee pollination services provide significant value to agriculture and horticulture in Australia which in 1999/2000 was estimated to be worth $1.7 billion per annum. When crops such as lucerne are added this estimate becomes even larger.

Valuation of honeybee pollination services will allow identification of what is potentially being put at risk should Australia's honeybee populations be threatened. For example, an incursion by varroa mite is a real threat to the honeybee and the lucerne industry which would see bee numbers and pollination of crops severely reduced.

Although the value of bee pollination services to the lucerne industry is unknown, it is important to note that interdependencies exists between lucerne production and pollination services which are currently being developed to increase value for both industries into the future. A recommendation

[1] Gordon,J. & Davis,L., 2003, *Valuing honeybee pollination*; RIRDC Publication No. 03/077

from this report is that research should be conducted into the value of this vital role for lucerne production.

Figure 3 shows a flow diagram of the role that bee pollination plays in broadacre industries.

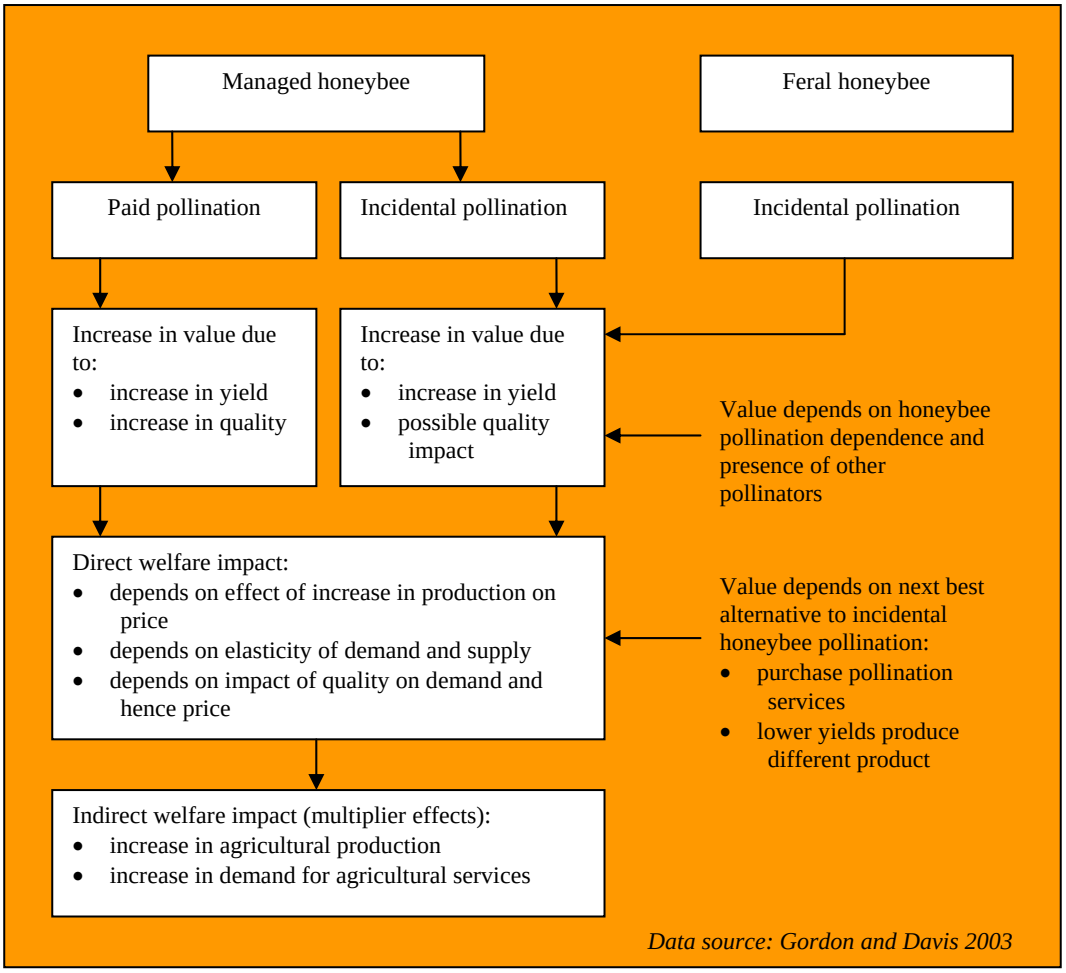

Figure 3 – Economic benefits attributable to honeybee pollination services (Gordon and Davis 2003)

2 METHODOLOGY

2.1 Economic Indicators

Estimates of economic contribution will be presented in terms of the following indicators:

- gross value of production (GVP) for lucerne seed for the period 2002/03 to 2006/07;
- cost of production based on gross margin analysis;
- lucerne seed exports from Australia (quantity and value);
- external factors that influence the economic condition of the lucerne seed industry;
- economic impact of the lucerne seed industry in South East South Australia being the major region for lucerne seed production in Australia;
- contribution to gross state product (GSP) from the lucerne seed industry in South East SA; and
- employment within the lucerne seed industry

2.2 Data Collection

2.2.1 Production Data

Crucial to the analysis was the collection and collation of data showing the value of output and economic contribution of lucerne seed production in Australia. This data was needed to:

- quantify the contribution of the lucerne seed industry to Australian economic activity; and
- validate the information collected from the lucerne seed industry survey.

The relevant data was drawn from the following sources:

- Australian Bureau of Statistics (ABS);
- Australian Seeds Authority Ltd (ASA);
- Primary Industries and Resources South Australia (PIRSA);
- Rural Industries Research & Development Corporation (RIRDC);
- Seed Services Australia; and
- Lucerne Australia (provided gross margin data for lucerne production)

2.2.2 Survey of Lucerne Seed Industry

An outline of the lucerne seed industry survey conducted for this project is provided below. This details the type of information sought, the businesses contacted and the survey response rate.

Questionnaire

To enable the estimation of the impact of the lucerne seed industry in the major production regions, a questionnaire was prepared for completion by lucerne seed service industry firms and other organisations that undertake related activity in those regions. The questions in the survey were designed to capture:

- the nature of the firm's lucerne seed industry activity;
- the firm’s employment levels and average wage;
- estimates of employment and the nature of goods and services provided by contractors to the firm;
- the magnitude of other costs incurred by the firm in the course of conducting lucerne seed operations; and
- a breakdown of lucerne seed industry related earnings and market share by broad category.

Respondents were asked to indicate what proportion of their business was allocated to lucerne seed related activity and to apportion, where possible, employment costs and revenue from lucerne seed activity in the region.

A covering letter for the questionnaire was prepared on SA Government letterhead to encourage participation in the survey. The letter outlined the background and objectives, explained why the survey was required and indicated that all survey data would be treated in confidence. A copy of the covering letter and questionnaire is reproduced in Appendix 2.

Service industry firms who received the questionnaire

The contact list of firms and contractors for inclusion in the survey was compiled in consultation with the Executive Committee of Lucerne Australia.

The covering letter and questionnaire were sent by post in mid September 2007. A detailed follow-up was undertaken by telephone and email during September and October 2007. The mail out of questionnaires and subsequent follow-up was completed by Rural Solutions SA.

Responses

The survey aimed to collect data from lucerne seed industry service providers from the relevant growing regions around Australia to allow an analysis of the economic impact of lucerne seed production from a national perspective. However, limited response to the questionnaire prevented the collection of sufficient data to conduct the analysis on a national scale. The difficulty in accessing vital information on the lucerne seed industry restricts the analysis that may be undertaken, therefore the authors were restricted to analysis of the economic impact from the major lucerne seed production region of South East SA from where the most survey responses were received.

A summary of the responses to the lucerne seed industry survey in the major growing region of South East of SA is presented in Table 2. While the rate of responses appears to be low it is important to note that at least 50 per cent of lucerne seed related activity in the region, by value, was recorded by the 16 completed, relevant responses.

Table 2 - Lucerne seed industry survey respondents

Total number of supply chain firms who received the questionnaire	30
Number of firms who reported no lucerne seed activity in the region	2
Net total of supply chain firms from whom data was sought	28
Firms that did not respond	
Cited confidentiality reasons	7
Incorrect contact details	1
No response despite follow up	4
Total non-respondents	12
Number of completed responses	16

Survey limitations

The lack of available data restricted the analysis that could be undertaken. With the intent of this study to develop baseline data and understanding of the industry from which it can develop and grow, this restriction of transparent and relevant data may reduce outside confidence in the lucerne seed industry's potential. Therefore, a priority must be to ensure greater participation in data collection from all players within the industry so that an accurate representation of its current economic status can be made and the industry's successful evolution can continue.

ECONOMIC INDICATORS FOR THE AUSTRALIAN LUCERNE SEED INDUSTRY

2.3 Gross Value of Production

Current published sources of production data for lucerne seed are limited to Australian Seeds Authority certified pasture seed reports and ABS export statistics which have made the estimation of GVP difficult. The amount of uncertified[2] seed produced in Australia is seemingly unknown as the industry does not publish data for this category of seed. Lucerne Australia has provided an estimate on the quantity of uncertified seed which has resulted in the figures shown in Table 3.

In the years 2002/03 and 2003/04 the large quantities of exported lucerne seed could be attributed to carry-over[3] seed from previous years. In 2002/03 the lucerne seed industry suffered from an oversupply on the worldwide market and poor prices, resulting in seed shifting very slowly and payment terms to growers (especially in the pools) being extended out to over two years. As production increased in the following years in line with price and demand, the export / production ratio (around 86%) has realigned.

Industry sensitivity around pricing data has resulted in the value of lucerne seed production for this report to be based on average farmgate prices for total production in each year, regardless of the varietal specification.

Total production of lucerne seed increased during the period 2002/03 to 2005/06 which was a significant result for the industry considering the drought has affected many of the dryland enterprises across Australia. The value of lucerne seed production has also increased significantly over the same period. Production in the period 2002/03 (5652 tonnes) to 2005/06 (8657 tonnes) increased by 53.1 per cent, while the total value grew by a massive 143 percent in from $13.9 million in 2002/03 to $33.9 million in 2005/06.

As with other major agricultural industries in recent years, lucerne seed production is not immune from the effects of drought and in 2006/07 recorded a fall in production from 8657 tonnes in 2005/06 to 7913 tonnes 2006/07 as a result of the extended dry conditions. Although production was down during this period the average price for lucerne seed was at an all time high due to very strong export demand resulting in an increase in total value by 14.7 percent between 2005/06 and 2006/07 from $AUD 33.89 million to $AUD 38.86 million.

Increasing export demand and world prices are primarily driving the increase in value of lucerne seed which looks set to continue in the coming years giving the industry great confidence for the future.

[2] Seed that has been produced but has not undergone quality assurance that is recognised by OECD, AOSCA and domestic seed certification schemes.
[3] Carry-over is seed that has been produced and stored from the year before.

Table 3 – GVP for certified and uncertified lucerne seed in Australia for the period 2002/03 to 2006/07

Australian Production (tonnes)					
Varieties	**2002/03**	**2003/04**	**2004/05**	**2005/06**	**2006/07**
Aurora	373	624	744	793	545
CUF 101	27	29	53	90	15
Hunterfield	218	192	242	100	72
Hunter River	423	547	480	320	347
Sequel	302	324	297	330	215
Siriver	1894	1971	2101	1688	1348
Trifecta	170	150	159	147	45
Proprietary Varieties	1680	2228	3388	4324	4377
Uncertified	565	673	829	865	949
Total Lucerne (t)	**5652**	**6738**	**8293**	**8657**	**7913**
Value ($m)	**13.9**	**18.9**	**26.01**	**33.89**	**38.86**

Source: Australian Seeds Authority Ltd.

Uncertified seed estimates provided by Lucerne Australia

Assumptions

Uncertified seed calculated by Lucerne Australia

Value calculated on average farmgate prices for each year

Table 4 shows the largest increase in GVP during the period was in 2003/04 to 2004/05 where production increased by 23.1 per cent from 6738 tonnes to 8293 tonnes. Production was matched by a significant increase in value from $18.9 million to $26 million (37.6 per cent) as export demand increased, which resulted in a rapid price spike per kilogram that has continued on into 2007/08.

The significant increase in value of total lucerne seed production over the 5 year period 2002/03 to 2006/07 is illustrated in Figure 4.

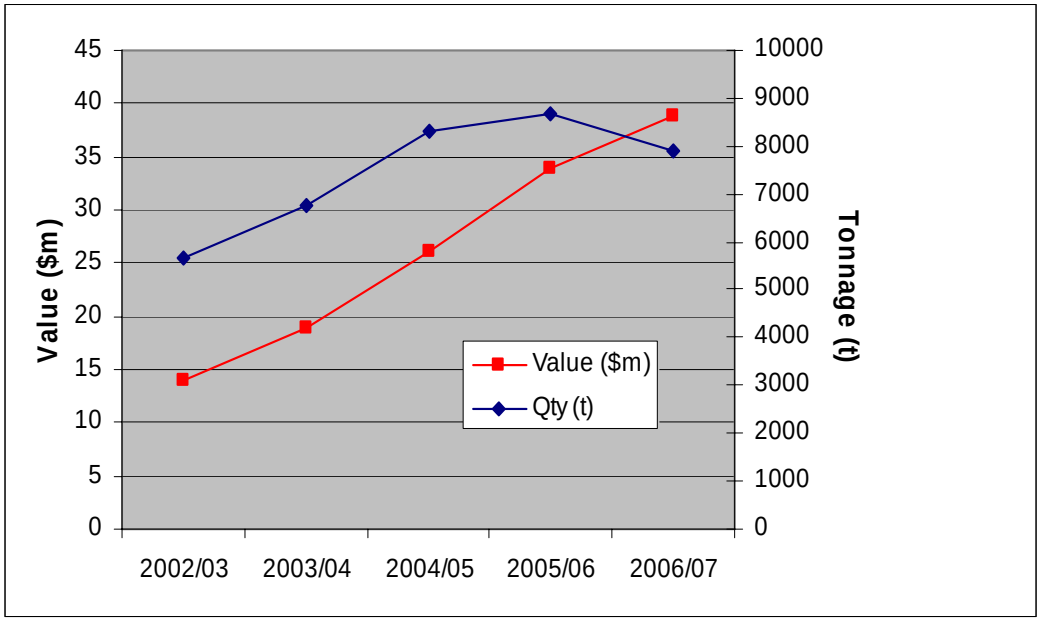

Figure 4 - GVP for lucerne seed for the period 2002/03 to 2006/07

2.4 Lucerne Seed Exports from Australia

Figures 5 and 6 provide a historical breakdown of total lucerne seed exports from Australia, by top 5 countries of destination, quantity and value(Free On Board[4]), for the period of 2002/03 to 2005/06 in the 12 months to 30 September. Over this period the total quantity of lucerne seed exported from Australia increased from 6386 tonnes in 02/03, 7134 tonnes in 03/04 (11.7% increase), 7186 tonnes in 04/05 (0.7% increase), 7459 tonnes in 05/06 (3.8% increase). Overall during this period lucerne seed exports have increased by 16.8 per cent in total quantity and 56 per cent in total value.

Over this period the most significant export destinations were Argentina, USA and Saudi Arabia, accounting on average for 32, 27 and 13 per cent respectively, of the total quantity of lucerne seed exports from Australia. In 2005/06 the most significant export destinations by quantity and value were USA (39 per cent of quantity, 38 per cent of value), Argentina (23 per cent of quantity, 24 per cent of value) and Saudi Arabia (15 percent of quantity, 17 per cent of value). As can be seen, the fall in exports in 2006/07 reflected the fall in overall production as a result of the drought conditions that affected yields in that year but it is important to note that the strong level of demand kept export values high. Table 4 provides a full breakdown of exports by countries of destination.

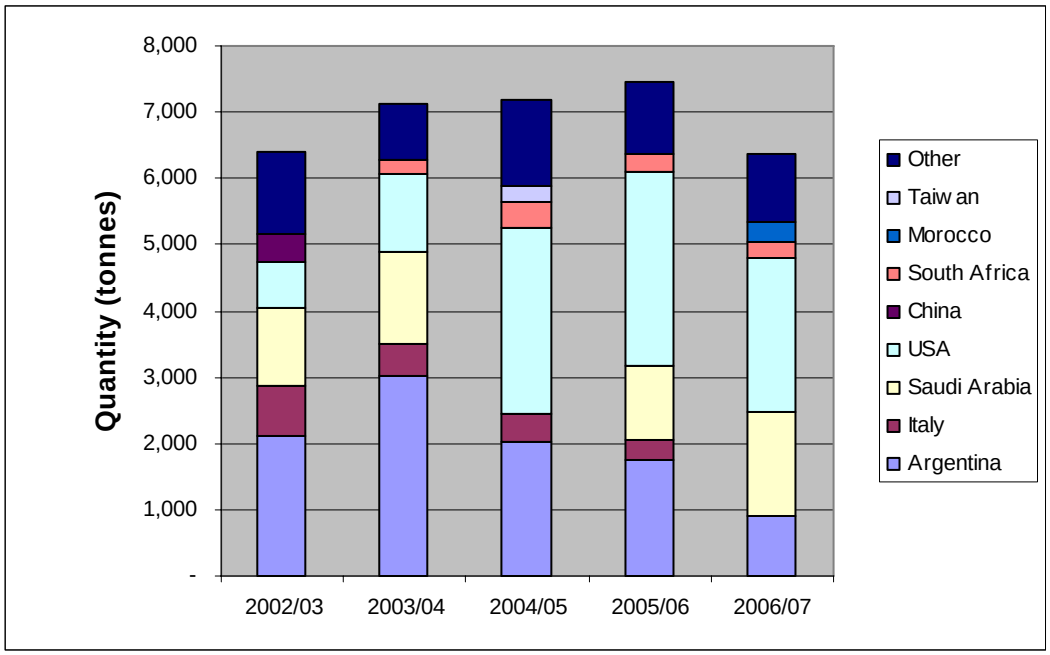

Figure 5 – Lucerne seed exports from Australia, quantity (t) by major countries of destination from 2002/03 to 2005/06 in the 12 months to 30 September

[4] Free On Board is a pricing method in which a producer bears only the costs involved of delivery of goods "free-on-board" to a local carrier's despatch point; at that time, title for the goods passes to the purchaser, who is responsible for the remainder of the freight charge.

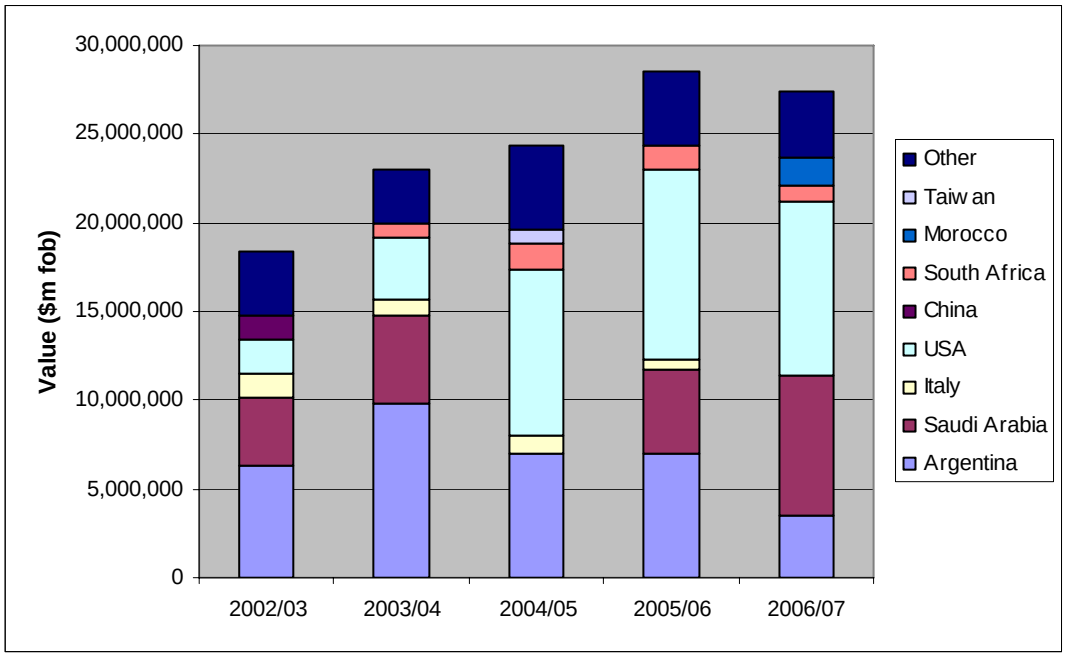

Figure 6 – Lucerne seed exports from Australia, value ($m FOB) by major countries of destination for each year from 2002/03 to 2005/06 in the 12 months to 30 September

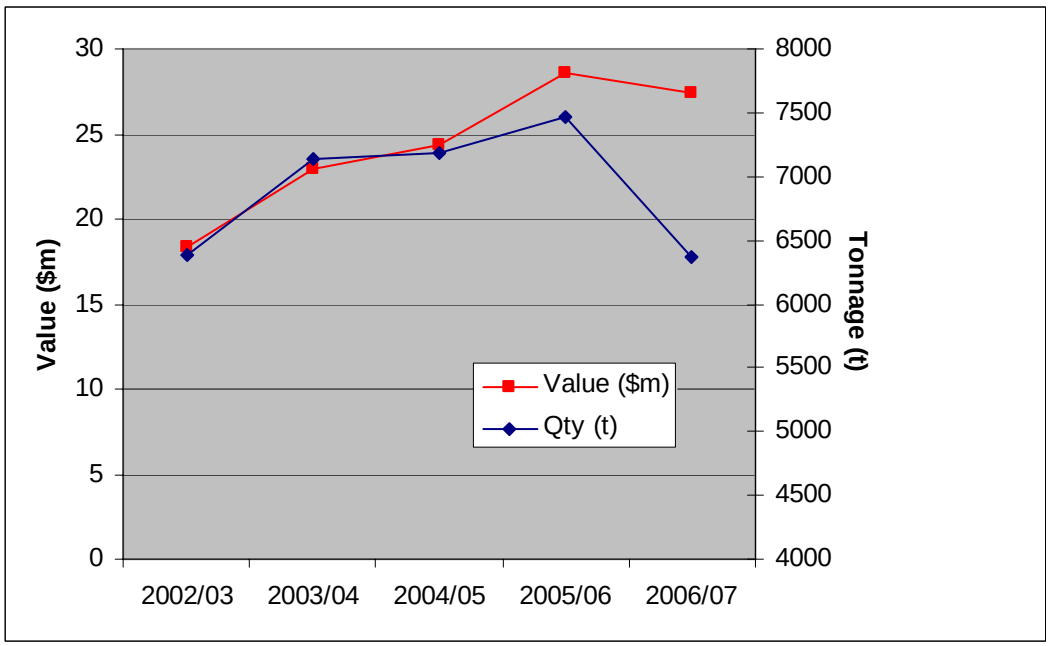

Figure 7 - Lucerne seed exports for the period 2002/03 to 2006/07 in the 12 months to 30 September (Value, Tonnage)

Table 4 - Lucerne seed exports from Australia, quantity (tonnes) and value by country of destination, 2002/03 to 2006/07 in the 12 months to 30 September

YEAR	QUANTITY (t)	VALUE ($'000 FOB)
2002/03		
Argentina	2108	$6,279
Saudi Arabia	1178	$3,819
Italy	756	$1,414
USA	686	$1,900
China	446	$1,325
Other	1212	$3,595
Total	**6386**	**$18,332**
2003/04		
Argentina	3021	$9,830
Saudi Arabia	1402	$4,976
USA	1178	$3,419
Italy	468	$910
South Africa	209	$828
Other	856	$2,989
Total	**7134**	**$22,952**
2004/05		
USA	2828	$9,366
Argentina	2032	$7,008
Italy	400	$992
South Africa	382	$1,455
Taiwan	244	$772
Other	1300	$4,738
Total	**7186**	**$24,331**
2005/06		
USA	2907	$10,752
Argentina	1741	$6,937
Saudi Arabia	1140	$4,829
Italy	298	$532
South Africa	297	$1,286
Other	1076	$4,222
Total	**7459**	**$28,558**
2006/07		
USA	2343	$9,889
Saudi Arabia	1565	$7,874
Argentina	907	$3,463
Morocco	322	$1,542
South Africa	220	$935
Other	1014	$3,744
Total	**6371**	**$27,447**

Source: ABS Export Statistics

In 1999 a glut in the international market was created when the US produced almost 5 times its average seed production which saw prices forced down in the following years. The shifting of excess

stock and reduced production due to drought conditions in Australia in the last 2 years have seen prices double.

In the next decade as populations of the smaller lucerne seed importing nations such as India, China and Africa increase, so will the growth of exports as these rapidly developing countries become major importers. This could increase the export seed trade by around 80%. With recent increases in the Australian dollar against foreign currency, in particular the US dollar, primary producers may be concerned about their commodity's global competitiveness because traditionally they are price takers, and the price they receive for their output will determine their gross margins and profitability.

The Australian lucerne seed industry however contradicts this statement as strong economic growth which is being fuelled by increasing export demand, particularly in the United States, has driven lucerne seed prices to their highest on record and has Australia placed as the major exporter of lucerne seed even with the declining US economy and strengthening Australian dollar.

Economists have pointed out that if you look at export volumes over time and the economic growth rates of our major trading partners, you will see a relationship, whilst there is less correlation with movements in the exchange rate. This is because exchange rates tend to affect export values rather than volumes.

The exchange rate is just one of the factors affecting our agricultural export markets. Recent economic evidence has shown that since the Australian dollar was floated over two decades ago our exporters have certainly been able to manage fluctuations in the exchange rate as part of their overall export strategy.

Of course, strong commodity prices matter as does the overall growth in the world economy. Long term growth in export volumes is mainly determined by global economic demand, so a continuation of above average trend growth in the world economy will be a more important factor affecting exports than an increase in the value of the Australian dollar.

2.5 Cost of Production

When considering the economic impacts of lucerne seed production it is also important to have an understanding of the value of investment at the grower level which considers the level of inputs required to produce good yields in any given season.

Based on an average gross margin (see Appendix 3) for lucerne production provided by Lucerne Australia the value of grower investment has been estimated in real terms[5] for the last 3 years from 2004/05 to 2006/07 presented in Table 5.

Gross margin analysis does not account for overhead/fixed costs (eg. farm machinery, depreciation, insurance, wages, loan repayments) that are factored in when determining the overall financial performance of broadacre cropping enterprises.

[5] Real terms is a measure of the value of money that removes the effect of inflation.

Table 5 - Producer cost of lucerne production, 2004/05 to 2006/07

Year	Area (ha)		Value ($m)		Total Value ($m)
	Irrigated	Dryland	Irrigated	Dryland	
2004/05	16,465	9,669	14.4	3.3	**17.7**
2005/06	17,614	10,345	15.4	3.6	**19.0**
2006/07	15,483	9,093	13.6	3.1	**16.7**

Assumption: Areas have been calculated based on the estimate that South East SA contributes 85% of total production.

The cost of lucerne production as a percentage of GVP was 68 per cent in 2004/05, 56 per cent in 2005/06 and 43 per cent in 2006/07. The rapid price increase and strong demand for lucerne seed in the past 2 years has generated higher gross margin incomes for producers and given them a great deal of confidence in this perennial crop going forward.

2.6 Estimated Economic Impact of the lucerne seed service industry in South East SA

The scenario presented below (Table 6) depicts the economic impact or flow-on effect[6] of the firms servicing the lucerne seed industry in South East South Australia – Table 6 assuming a 2.5% per annum real escalation in expenditure over the 5 year period (to simulate a growing industry) before levelling off. This scenario has been chosen to represent an estimate about the trajectory of expenditure and employment of the firms over the period in question. Tables 7 and 8 contained in Appendix 2 represent the service industry with Table 7 assuming flat expenditure over the 5 year period considered, and Table 8 presenting the 'net difference' to highlight the differences in each of the outputs between the 'real growth' and 'flat expenditure' scenarios.

Table 6 - Estimated Economic Impact – 2.5% real growth p.a.

	Year 1	Year 2	Year 3	Year 4	Year 5	PV 5 yrs^	PV 10 yrs^
Value Added ($m)							
Service Industry – wages	5.74	5.88	6.04	6.18	6.34	24.66	43.20
Service Industry - operating profit	3.80	3.88	3.98	4.08	4.18	16.30	28.52
Direct Suppliers (eg. seed processors, irrigation)	2.94	3.0	3.08	3.16	3.24	12.60	22.06
Indirect (eg. shopkeepers, newsagent)	3.70	3.78	3.88	3.98	4.08	15.86	27.78
Total	*16.16*	*16.56*	*19.98*	*17.40*	*17.84*	*69.40*	*121.56*
Employment (FTEs)							
Lucerne Seed Service Ind. - emp.	216	222	228	234	240		
Direct Suppliers (eg. seed processors, irrigation)	32	34	34	36	36		
Indirect (eg. shopkeepers, newsagent)	44	44	46	46	48		
Total	*292*	*300*	*308*	*316*	*324*		

Notes: Individual items may not tally due to rounding; ^ 7% real discount rate[7]
Data collected has been extrapolated out to represent 100% based on a consistent industry structure

2.5% real growth scenario – summary:

[6] Flow-on effects are the sum of production-induced effects and consumption-induced effects. Production-induced effects are additional output, employment and household income resulting from re-spending by firms (e.g. seed processors) that receive payments from the sale of goods and services to firms undertaking, in this example, lucerne seed production. Consumption-induced effects are additional output, employment and household income resulting from re-spending by households that receive income from employment in direct and indirect activities.

[7] Guidelines for the Evaluation of Public Sector Initiatives, Department of Treasury and Finance, 1997

- Based on the provided inputs, the industry generates an annual stimulus (in real Gross State Product (GSP) value added terms) of around $17.84m per annum – this amount comprised of $6.34m in wages, $4.18m in profit, $3.24m in incomes in supplying industries and $4.08m of value added via broader flow through effects. 5 years of operation would have a cumulative impact on GSP (i.e. value added) of about $69.40m and over 10 years of $121.56m in net present value terms.

- Associated with this industry's existence under the growth assumptions outlined is the generation of employment of a total of 234 Full Time Equivalents(FTE)[8] (by the end of the fifth year) – comprised of 240 direct FTEs within the industry, 36 FTEs in directly supplying industries and around 48 FTEs in broader flow-on effects.

Lucerne Australia open day (photo supplied by Shane Oster)

[8] FTE is the unit of measure which is equal to one filled, full time, annual salaried position.

3 DISCUSSION

The results from this report show the significant contribution being made to Australia's agricultural production by the lucerne seed industry. Increases in GVP and the high demand for lucerne seed internationally has bolstered the key performance indicators and generated confidence amongst growers and seed industry service providers that they are competitive with other grain crops.

The Australian lucerne seed industry and its major players have traditionally been very protective of their market and production data. This has resulted in very limited analysis of the industry's structure and performance being made available. For the lucerne seed industry to continue to grow, the economic indicators such as the ones presented in this report should be updated annually with more accurate data provided on an aggregate basis from willing industry players. The creation of strategies and incentives for extracting this information could form the basis for Lucerne Australia to lobby government and industry to set up or contract an impartial group to collect and analyse lucerne seed production data for the purpose of tracking and presenting the industry's performance into the future.

By their nature all industries/contributions have broad impacts, and this is particularly relevant when analysing the 'social dimensions' of primary industries. Perhaps the best recognised industry development reporting methodology is assessing the inter-relationship between economic measures and social dimensions. In most cases, and certainly with lucerne seed production, direct economic growth contributes to positive employment outcomes. Assessment of the economic impact of lucerne industry service providers in South East SA has shown that:

- Under the real growth scenario there would be a total of 162 FTEs generated, comprising of 120 direct FTEs within the industry, 18 FTEs in directly supplying industries and approximately 24 FTEs through the broader flow-on effects.

- $3.17m in service industry wages would be paid as a result of industry growth.

In the case of the lucerne seed industry it would seem on the basis of this desktop study and without insights gleaned from regional community consultation and interviews, that the economic and social benefit derived from this growing industry, even through this tough time of drought, is contributing significantly to the regional economy in which the lucerne industry operates, and its employees and their families who rely on the industry to provide income.

The continued growth of the lucerne seed industry and high level of foreign demand which has seen rapid price increases in the past 2 years represents an emerging industry that is certainly making a positive contribution to Australian agriculture while also working to service our trade deficit when other exports have declined.

If the lucerne seed industry can continue to grow through adaptive management, research, marketing and support from organisations such as Lucerne Australia, then that growth will lead to more jobs being created and more prosperous regional communities that drive lucerne seed production throughout the country.

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APPENDIX 1 METHODOLOGY FOR THE EVALUATION OF THE ECONOMIC IMPACT OF THE LUCERNE SEED SERVICE INDUSTRY IN SOUTH EAST SA[9]

With approximately 83 per cent of all lucerne seed production concentrated in the South East of South Australia, this section of the report will outline estimates of the economic impact of the lucerne seed industry on the South Australian and regional (South East SA) economies in 2005/06.

Once again it is important to note that the data collated from the survey responses is representative of at least 50 per cent of lucerne seed service industry providers in South East SA, and that data has been extrapolated out to 100 per cent based on the assumption that industry structure is relatively consistent throughout the region.

This section of the report presents an evaluation of the economic impact[10] associated with the existence and operation of the supply-chain service industry surrounding the lucerne seed industry in South East SA.

In this evaluation the concept of economic benefit relates to the creation of income and employment within the regional community, both directly and indirectly from the operation of the firms that together form an industry entity servicing the lucerne seed industry in this State. The impacts of the industry have been estimated using financial and other information provided by Rural Solutions SA (or derivations thereof, by the author), and by applying the SA RISE model developed by EconSearch. That information has been used to generate a gross economic impact estimate.

The evaluation does not include an independent assessment or audit of that information or of the model structure and hence it relies on the accuracy of those inputs and modelling instruments. The evaluation is also limited by the need to assume the accuracy of the survey data which was utilised to provide the inputs into calculating the industry impact. Any margin of error in the survey results will also be reflected in the findings indicated below. The relevant sections contain more detail about the evaluation's methodology and the assumptions adopted.

Assumptions

Due to the nature of the valuation contained in this report (a pre-existing industry), there are no 'investment' expenses as the modelling is focussed on valuing the contribution of an aggregate of firms (the lucerne seed service industry) which are already in existence and therefore the valuation is of the ongoing expenses and ongoing contribution to economic activity. There is also no 'base case' scenario or 'net impact' analysis as the focus is on the gross impact of the industry on the State economy in its present form.

The direct and indirect value added and employment figures generated by these expenditures were estimated using the SA Regional Industry Structure and Employment (RISE) model. The SA RISE model utilises input-output multipliers, based on the structure of the economy in 2002-03, to trace the value added and employment impacts of changes in expenditure. Impacts derived from General Equilibrium models would usually provide a slightly more conservative estimate than the straight application of input-output multipliers because they account for supply-side constraints.

9 Within the ability of the standard Input Output (IO) analysis framework. There may be broader economic impacts that cannot be captured within the standard IO analysis framework that will not be included in this evaluation.

Data on direct Full Time Equivalent's (FTE's), wages and expenditure by category was provided by Rural Solutions SA for the financial year 2005/2006. These expenditures have been utilised as required depending on the scenario adopted in the modelling – Scenario 1 (flat real growth) or Scenario 2 (2.5% annual growth in real expenditures over a five year period).

As the modelling here is attempting to account for the entire value-added contribution of the lucerne seed service industry, the profit margins of the industry are required to be added in. Since actual profits were not available, the calculated profit as entered into the spreadsheets was made by reference to ABS Catalogue 7506.0 Agricultural Industries, Financial Statistics, 1999-2000 (the last year in which they were published) and a document outlining costs and revenues for typical NSW lucerne production produced by the NSW Department of Primary Industries.

From these two documents, an industry and state 'typical' cash operating surplus was calculated (revenue figures were provided by Rural Solutions SA) and then an allowance of 50% was deducted to allow for income tax (~30% of total) and depreciation (~20% of total), which cash operating surplus does not take into account. Generally, Input-Output analysis[11] performed to determine the benefit to the State as a whole does not include the profits of the firms as they are deemed to be a private benefit accruing to the firm/s involved; however, this particular analysis is attempting to value the entire industry's contribution in respect of the SA economy (in value added[12] terms) and so profit has been included in this case.

All the expenditures associated with this proposal were traced through the SA RISE model in order to estimate the benefits in terms of value added and employment. It is assumed for the purposes of the modelling that industry (which is pre-existent) will also continue beyond the period of the analysis, so the analysis is confined to five operating years (plus a cumulative Gross State Product figure in Net Present Value[13] terms for ten years of operation).

Standard economic analysis assumes that benefits and costs matter more if they are experienced now rather than in the future. Consequently, a 7% p.a. discount rate[14] has been used in the net present value calculations in this document.

[11] Input-Output analysis is an accounting system of inter-industry transactions based on the notion that no industry exists in isolation. (Econsearch, 2005)

[12] Value-added is the market value of the product sold by a firm less the value of the goods purchased and used by the firm to produce the product

[13] Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows. NPV compares the value of a dollar today to the value of that same dollar in the future.

[14] Discount rate is the interest rate used to find the present value of an amount to be paid or received in the future

APPENDIX 2 ESTIMATED ECONOMIC IMPACT TABLES

The scenario presented below for the economic impact of the firms servicing the lucerne seed industry in South East South Australia – the first in Table 7 assuming flat (in real terms) expenditure over the 5 year period considered. This scenario has been chosen to represent an estimate about the trajectory of expenditure and employment of the firms over the period in question. Table 8 presents a 'net difference' table to highlight the differences in each of the outputs between the scenario in Table 10 and the real growth scenario presented in Section 3.4 of the report.

Table 7 - Estimated Economic Impact – 0% real growth p.a.

	Year 1	Year 2	Year 3	Year 4	Year 5	PV 5 yrs^	PV 10 yrs^
Value Added ($m)							
Industry - wages	5.60	5.60	5.60	5.60	5.60	22.96	39.34
Industry - operating profit	3.70	3.70	3.70	3.70	3.70	15.18	25.98
Direct Suppliers	2.86	2.86	2.86	2.86	2.86	11.72	20.08
Indirect	3.60	3.60	3.60	3.60	3.60	14.76	25.28
Total	*15.76*	*15.76*	*15.76*	*15.76*	*15.76*	*64.62*	*110.68*
Employment (FTEs)							
Lucerne Seed Ind. - emp.	210	210	210	210	210		
Direct Suppliers	32	32	32	32	32		
Indirect	42	42	42	42	42		
Total	*284*	*284*	*284*	*284*	*284*		

Notes: Individual items may not tally due to rounding; ^ 7% real discount rate[15]
Data collected has been extrapolated out to represent 100% based on a consistent industry structure

0% real growth scenario – summary:

- Based on the inputs provided, the industry generates an annual stimulus (in real GSP) of around $15.76m per annum – this amount comprised $5.6m in wages in the lucerne seed service industry, $3.7m in profit, $2.86m in incomes in supplying industries and $3.6m in value added via broader flow through effects. Five years of operation would have a cumulative impact on Gross State Product (GSP) (i.e. value added) of about $64.62m and over 10 years of $110.7m in net present value terms.

- Associated with this industry's existence in its present form is the generation of a total of 284 Full Time Equivalents (FTE) – comprising of 210 direct FTEs within the industry, 32 FTEs in directly supplying industries and around 42 FTEs in broader flow through effects.

[15] Guidelines for the Evaluation of Public Sector Initiatives, Department of Treasury and Finance, 1997

Table 8 - Estimated Economic Impact – Net Difference Table – Scenario 1 vs Scenario 2

	Year 1	Year 2	Year 3	Year 4	Year 5	PV 5 yrs^	PV 10 yrs^
Value Added ($m)							
Industry - wages	0.14	0.28	0.44	0.58	0.74	1.70	3.86
Industry - operating profit	0.10	0.18	0.28	0.38	0.48	1.12	2.52
Direct Suppliers	0.08	0.14	0.22	0.30	0.38	0.86	1.98
Indirect	0.08	0.18	0.28	0.38	0.48	1.10	2.50
Total	0.40	0.80	1.22	1.64	2.08	4.78	10.86
Employment (FTEs)							
Lucerne Seed Ind. - emp.	6	12	18	24	30		
Direct Suppliers	0	2	2	2	4		
Indirect	2	2	2	2	6		
Total	*8*	*16*	*24*	*32*	*40*		

Notes: Individual items may not tally due to rounding; ^ 7% real discount rate[16]
Data collected has been extrapolated out to represent 100 per cent based on a consistent industry structure

- Comparing the two scenarios (base case of 0% real growth and 2.5% real growth per annum in expenses over five years), the difference (by year 5) in real GSP per annum is around $2.08m – comprising of $0.74m difference in wages paid by the industry, $0.48m in profit, $0.38m in incomes in supplying industries and $0.48 million in value added via broader flow through effects. Over five years of operation, the difference in cumulative GSP is $4.78m and over 10 years is $10.86m in net present value terms.

The difference in industry employment generated between the two scenarios by year 5 is 40 FTEs per annum – comprising 30 direct FTEs within the industry, 4 FTEs in directly supplying industries and around 6 FTEs in broader flow through effects.

[16] Guidelines for the Evaluation of Public Sector Initiatives, Department of Treasury and Finance, 1997

APPENDIX 3 AVERAGE GROSS MARGIN FOR LUCERNE PRODUCTION – 2007/08

	IRRIGATED	DRYLAND
Income ($/ha)		
Hay	525	300
Seed	2500	625
Total Income	**3025**	**925**
Expenses ($/ha)		
Fertiliser	120	45
Liquid fertiliser (foliar sprays)	24	24
Herbicide	87	35
Insecticide	12	12
Spray applications	64	48
Hay operations	110	85
Harvesting	80	35
Freight	5	1.25
Pollination	12.5	2
Agronomy	25	12.5
Certification	10	8
Phytosanitary	6	6
Seed cleaning & packaging	85	25
Pumping costs (electricity or diesel approx. 1:1)	150	0
Pump replacement/maintenance	30	0
Infrastructure upgrade (earthmoving or pivot replacement)	35	0
LA membership	2	0.5
Labour	20	5
Total Expenses	**878**	**344**
Gross Margin ($/ha)	**2148**	**581**

Source: Lucerne Australia (2008)

APPENDIX 4 SURVEY COVERING LETTER AND QUESTIONNAIRE

Date

Title >> First Name >> Surname
Company

Address 1
Town >> Postcode

Dear Title >> Surname

The Economic Impact of the Lucerne Seed Industry in the South East of South Australia

The Executive Committee of Lucerne Australia has commissioned Rural Solutions SA to undertake a study to assess the economic impact of the Australian lucerne seed industry.

As part of the study, Rural Solutions SA is conducting a survey of firms involved in the service industry of lucerne seed production. A short questionnaire is attached. The survey will provide information that is not available from published sources. It will enable Rural Solutions SA to estimate the regional impacts of the lucerne seed industry, both direct and flow-on effects, in terms of a range of indicators (e.g. employment, contribution to regional income, etc.).

In order to maintain confidentiality of data from individual organisations, the final report will present results in aggregated forms only. All completed questionnaires will be held by Rural Solutions SA, treated in confidence and subsequently destroyed. Lucerne Australia will not have access to, nor will they seek to obtain access to, the completed questionnaires.

A representative from Rural Solutions SA (Martin Carter) will contact you by phone shortly to ensure that you have received the questionnaire and to see if you require any assistance in interpreting it. In the meantime if you have any queries regarding the project or questionnaire, please contact me on (08) 8226 0495 or Martin Carter at Rural Solutions SA on (08) 8226 0371.

I would be grateful if you would support this study by completing the attached questionnaire and returning it to Rural Solutions SA in the reply paid envelope by **20 October 2007**. The questionnaire can be provided in electronic form (via email) if preferred.

Yours sincerely

Daniel Casement
Business Manager
Rural Solutions SA

Rural Solutions SA
GPO Box 1671
Adelaide SA 5001
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Fax: 08 8463 3336
Email: carter.martin@saugov.sa.gov.au
Contact: Martin Carter or Daniel Casement

CONFIDENTIAL

LUCERNE SEED INDUSTRY ECONOMIC IMPACT STUDY

Please read this first:

• If exact figures are not available, please provide careful estimates.
• Please report all monetary values in ***thousands of dollars*** ($'000).

1. Company Information

Company Name:_____

Lucerne industry activities (*e.g. processing, marketing, transport, etc.*):
_____
_____
_____

Contact Name:_____

2. Employment

a) Please indicate the number of employees and associated costs incurred by your business: (*average for financial year 2005/06, including working proprietors, managers, directors*):

Employment	
Full Time (no. jobs)	
Part time (no. full time equivalent jobs)	
Total wages and salaries ($'000) (*including super, etc.)*	

b) Please indicate the proportion of employment in:

a. lucerne seed related activity (%)_____

b. seed processing and related activities (%)_____

3. Other Costs

a) Please indicate the magnitude of other costs incurred in the course of conducting your business in 2005/06:

Expenditure ($'000)	
Repairs and maintenance	
Contracted services	
Machinery & Equipment	
Communication Services	
Transport	
Insurance	
Fuel	
Other	

b) Please indicate the proportion of these costs incurred in:

a. lucerne seed related activity (%)_____

b. seed processing and related activities (%)_____

4. Earnings

Please break down your lucerne seed industry related earnings by broad category and estimate market share[17] for each.

Category	Revenue 2005/06 ($'000)	Market share (%)
Other (please specify)		
TOTAL		

Thank you for your time and cooperation. Please return the questionnaire by **20 October 2007** in the reply paid envelope **OR** Fax: (08) 8463 3336.
If you have any queries don't hesitate to contact Martin Carter on (08) 8226 0371 or email: carter.martin@saugov.sa.gov.au

[17] Market share relates to your impact on the Australian lucerne seed industry. Best guess response will be sufficient.

GLOSSARY

Gross Value of Production (GVP) is an indicator of economic prosperity. It measures the contribution to the economy of each individual producer, industry or sector.

GVP is the difference between gross output and intermediate inputs. Gross outputs of a production unit during a given period is equal to the gross value of the goods and services produced during the period and recorded at the moment they are produced. Intermediate inputs refer to the value of goods and services used in the production process during the accounting period.

Gross Domestic Product (GDP) Gross domestic product of Australia is the total market value of all goods and services produced within Australia in a given period of time.

GDP does not allow for the depreciation of plant and equipment which is why the measure is called 'gross' domestic product. Also, GDP does not differentiate between who produces the goods and services, i.e. residents or non-residents, this is left to the gross national income (GNI) measure—formely called gross national product (GNP)—which attributes production to residents irrespective of where the production occurs.

Gross State Product (GSP) is the value of output less the cost of goods and services (including imports) used in producing the output. It represents payments to the primary inputs of production (labour, capital and land). Contribution to GSP is consistent with standard measures of economic activity and provides an assessment of the net contribution to regional economic growth of a particular enterprise or activity. (Econsearch, 2005)

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

Input-output analysis is an accounting system of inter-industry transactions based on the notion that no industry exists in isolation. (Econsearch, 2005)

Direct impacts are the initial round of output, employment and household income generated by an economic activity, in this case lucerne seed production.

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

Freight On Board (FOB) is the export value of production without incurring the costs of loading the commodity on-board the ship.

Full Time Equivalent (FTE) is the unit of measure which is equal to one filled, full time, annual salaried position.

Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows. NPV compares the value of a dollar today to the value of that same dollar in the future.

Economic Analysis of the Australian Lucerne Seed Industry

RIRDC Publication No. 08/103

Australia produces pasture seeds ranging from temperate to subtropical species for domestic use and for export markets. The export value of certified pasture seeds exceeds $36 million. Lucerne and clover are the major leviable seed crops. Total production of leviable temperate legume seed currently exceeds 10,000 tonnes. Lucerne and clover seed exports to the world in 2004 were valued at over $25 million. In the three calendar years from 2002-04, the export value of lucerne seed exports rose by 55% and the export value of clover seed rose by 32%.

Perennial grasses are grown for seed in all States with Victoria having the greatest production. Perennial grass seed production is not yet levied for R&D. The main subtropical grasses grown for seed in north-eastern New South Wales, Queensland and the Northern Territory are Rhodes Grass, Setaria, Panicum, Carpet Grass and Paspalum.

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