

SOUTH AUSTRALIAN VEGETABLES INDUSTRY DEVELOPMENT PLAN

1995 – 2000



**PRIMARY INDUSTRIES
SOUTH AUSTRALIA**

SARDI



**SOUTH AUSTRALIAN
RESEARCH AND
DEVELOPMENT
INSTITUTE**



**SOUTH AUSTRALIAN
FARMERS FEDERATION**

SOUTH AUSTRALIAN VEGETABLE INDUSTRY DEVELOPMENT PLAN

December 1995

This plan is a working document for consultation and negotiation between PISA/SARDI and other industry stakeholders. That consultation is crucial in assisting PISA/SARDI to progress this strategic plan into operational plans for implementation in 1996/97.

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EXECUTIVE SUMMARY

Potential exists to grow economic output of the vegetable industry by \$82m over the next 5 years.

South Australia has a strong and competitive fresh vegetable industry with a farm gate value of \$178m. Opportunities detailed in this plan have the potential to grow farm gate value by \$46m and downstream value adding by \$36m over the next 5 years.

PISA/SARDI has a strong technical support, regulatory and sustainability role with the vegetable industry. Support from this capability is needed to maintain a highly competitive vegetable industry.

Vegetables are second highest farm gate value horticulture crop

Australia's vegetable industry is now valued at \$1.44bn, as follows:

- Queensland \$413m
- Victoria \$413m
- New South Wales \$182m
- South Australia \$178m

SA vegetable plantings have expanded 47% during a period of slow national growth.

Between 1988-89 and 1993-94, SA's vegetable industry has exhibited strong growth with plantings increasing 47% from 8,008 ha to 11,730 ha, compared with a national increase of only 6.5% during the same period.

Low resource costs and production of high quality crops have enabled expansion of the vegetable industry in Murraylands, Mallee and South East Regions. Approximately half of the state's major vegetable crops (fresh potatoes, onions and carrots) are marketed on the eastern seaboard.

International trends indicate there will be major growth in fresh value added products and these could be more profitable for export.

The SA potato industry has a strong processing sector, but there is a need for downstream value adding to be adopted by other vegetable industries. There has been recent activity in the frozen carrot juice industry and production of fresh cut salad products by some small scale processors.

Opportunities exist to expand fresh vegetable and value added product markets, including:

- developing new vegetable based products (fresh cut salads, snack foods);
- facilitating expansion of fresh vegetable exports;
- developing the frozen vegetable juice industry;
- development of a frozen French fry export industry;
- investigating opportunities for dehydrated vegetable products;
- redevelopment of the SE vegetable freezing industry, and
- investigating opportunities for a pharmaceutical herb industry.

Industry will continue to need PISA/SARDI technical support but refocusing toward industry development is needed.

Significant growth of fresh and processed vegetable markets will occur in SE Asia over the next 5 years. While South Australia's vegetable industry has had limited success in realising export opportunities due to impediments such as transport logistics, high post farm gate handling costs, and getting sufficient scale of operation, localised export groups are having success.

The vegetable industry needs to address critical success factors and place itself in a position to secure these new and growing markets.

This will include:

- improving product quality;
- restructuring of national produce marketing systems;
- pursuing export development;
- development of a national promotion strategy;
- achieving scale of development by attracting vertically integrated multi national companies as occurs with the citrus, banana and intensive livestock industries;
- addressing sustainability issues;
- ensuring technological transfer;
- improving grower standards of education, and
- developing industry cohesiveness and networking.

Major industry structural issues must be addressed if SA vegetable growers are going to be internationally competitive.

Opportunities for PISA/SARDI to contribute to strategies targeting critical success factors are:

- provision of industry support systems;
- promoting industry and regional development;
- responding to market and product development opportunities, and
- addressing industry sustainability issues.

The vegetable industry needs to become a "food supplier" rather than a "raw product" supplier

The actual projects that PISA/SARDI will conduct will be determined during the next stage of the planning process. Criteria such as market failure and benefit/cost ratios will be used to assist in the prioritisation of projects for funding.

PISA/SARDI must take a more proactive role in fostering development of fresh cut, dehydrating, frozen and other downstream value adding industries.

Strengthening activity in development of new industries and value added food products will grow the SA vegetable industry and employment. By grasping these opportunities, many growers will move from being "raw product" vegetable growers to "food suppliers".

SOUTH AUSTRALIAN VEGETABLE INDUSTRY DEVELOPMENT PLAN

1 VEGETABLE INDUSTRY VISION

‘To increase the farm gate value of fresh and processed vegetable industry by \$46 million over the next five years.’

‘WHAT THIS MEANS’

- it means the vegetable industry will be led by the market - that is, meeting customer needs;
- it means an integrated industry with close links between growers and processor;
- it means industry will become much more export focused;
- it means industry will deliver a clean, quality product, and
- production will be undertaken in a sustainable way.

1.1 PURPOSE OF THE PLAN

The major purposes of the PISA/SARDI Industry Planning process are, in conjunction with Industry to:

- a examine existing industry profiles, structures and processes (such as marketing arrangements, relevant legislation and so on) and to determine their strengths, weaknesses, opportunities and threats. This will enable us to determine the critical factors that enhance or impede the international competitiveness of the industry in South Australia, and consider industry strategies to address those factors, and
- b determine and evaluate the major opportunities for sustainable economic development in our industries, and the role of PISA/SARDI in assisting industry to capture those opportunities. By aligning our resources in PISA/SARDI to reflect the identified opportunities, we will maximise our impact as an Economic Development Agency.

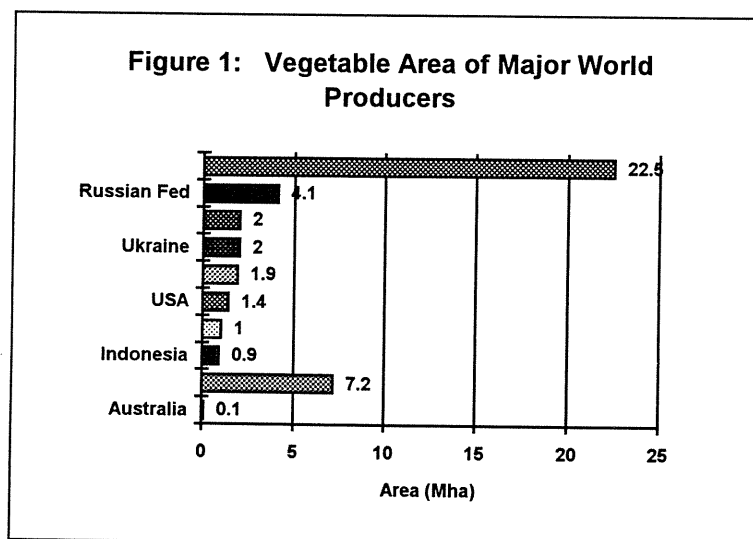
1.2 SCOPE OF THE VEGETABLE INDUSTRY PLAN

This Vegetable Industry Plan addresses industry development issues relating not only to the traditional production and marketing of vegetables and herbs, but also the downstream processing of vegetables into various frozen, dried, canned, preserved and other processed products. This industry plan also addresses ancillary production of essential oils, industrial and pharmaceutical products and seed from vegetable and oil crops.

2 INDUSTRY PROFILE

2.1 THE INTERNATIONAL SCENE

World vegetable production is expanding and grew by 2% pa between 1985 and 1990. Australia is a small vegetable growing nation by world standards (126,600 ha or 0.3% of the world's vegetable plantings of 43m ha). See Appendix 1. for world production details.



China, Russia, India, USA, Turkey and Indonesia are the world's leading vegetable producers. Production in China and India is increasing rapidly (18% increase in the past 5 years), but virtually all is being marketed domestically to meet needs of the expanding population. Up to 40% of production in these countries is grown by consumers of the product.

Productivity in developing countries is increasing rapidly as they adopt new technology; for example India's productivity has been increasing at 2.5% pa over recent years. In more developed countries such as Japan, total vegetable productivity has dropped slightly as growers are forced toward higher value crops because of high labour and land costs.

World trade in vegetables increased by 60% between 1985 and 1988, and Australia has an opportunity to capitalise on this, particularly with strong growth in Asia, increasing affluence and industrialisation in South East Asia.

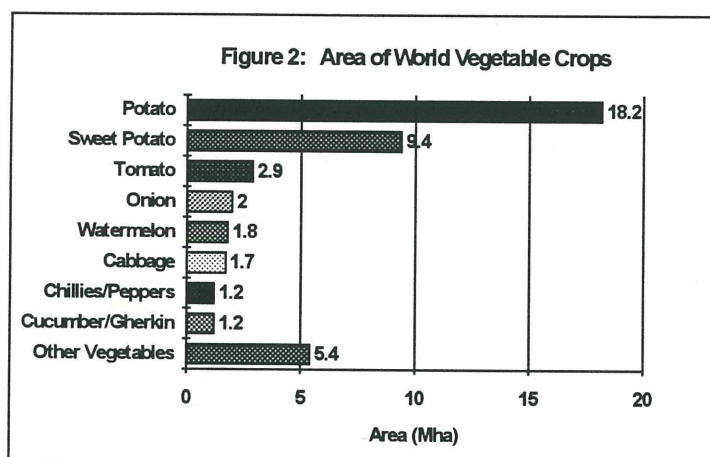
Most world trading of vegetables is centered on Western Europe, North America and South East Asia. Major vegetable importers in Europe are Germany, UK and France (total 45% of world vegetable imports in 1990 with a consumer population of 360m). In North America, most vegetable exports move north from Mexico into the USA and Canada and from the USA into Canada, a trend that will be reinforced by NAFTA. Major Asian import centres are Singapore, Malaysia, Japan, Taiwan and Hong Kong.

With Asia's population of 3 bn, major growth in vegetable trading will occur around the Pacific rim. Australia is well positioned to take advantage of this growth although there will be strong competition from other nations, especially USA. The weighted average for growth of food imports to East Asia is 13.8% pa compared with 6.7% for the EEC and 2.4% for the USA.

2.2 DISTRIBUTION SYSTEMS

Expansion of supermarket chains in developing countries such as Indonesia, Malaysia, Philippines and Thailand will result in greater demand for high quality produce from large and reliable suppliers rather than localised small producers. The upsurge in supermarket retailing is partly related to levels of urbanisation. Urbanisation is now growing rapidly in Indonesia (32% 1992), Philippines (44%), Thailand (23%), Malaysia (45%) and Korea (76%) but has reached relatively high static levels in Japan (77%), Hong Kong (94%) and Singapore (100%).

Per capita income of countries is a major factor influencing their ability to import foods. Per capita income of \$US4,000 is seen as a critical level at which consumers tend to begin to spend more on presentation and packaging rather than raw food products. Taiwan, Singapore, Korea, Hong Kong and Japan now exceed this level, with Thailand and Malaysia rapidly growing to \$US4,000 pa.



There are severe constraints in many East Asian economies to meet growth in food demand. These economies tend to redirect labour into higher productivity industrial activities rather than agriculture. Many of these countries have agricultural industries based on small land holdings, and agricultural production is declining with greater urbanisation.

On the other hand, there is a definite pattern of increased protection of horticultural and agricultural industries generally as they decline in importance in the economies of developing countries. This trend requires careful monitoring and vigorous opposition by horticultural exporters in the market access forums of WTO and APEC.

Internationally, potatoes are by far the most important vegetable crop (18.1m ha) followed by sweet potato (9.1m ha) and tomato (2.7m ha). See figure 2.

2.3 'CLEAN GREEN' STRATEGIES AND INDIVIDUAL MARKETS

One of Australia's key trade objectives is to boost food exports to Asia. The vision sees Australia demonstrating that we can produce clean, safe and nutritious food from a clean environment. The Asian region is where prospects will be greatest (Horticultural Task Force 1994).

2.3.1 Clean Green Strategies

The clean food export strategy aims to increase market preference for Australian exports of fresh and processed foods by building confidence in Australian products on the basis of quality and origin from a clean environment.

Initial funding of \$3 million has been provided to run a pilot program in Taiwan, with a further \$2 million funding for the expansion of the program if the initial promotion proves successful. All Government funding is conditional on matching industry funds. A consortium based on Mojo Australia has been chosen to develop and implement the strategy in Taiwan. The Taiwan promotion commenced in December 1993.

The August 1993 Federal Budget provided an additional \$1.3 million in 1994-95 to underpin domestic efforts to ensure that high quality, clean goods are produced and that the strategy is fully integrated with clean food programs being developed in the States and by industry.

2.3.2 Market Outlook

Analysis of individual Asian markets for Australian vegetable produce identified the following issues:

Taiwan

(Source Export Market Profile, Taiwan AHC 1995)

- Expansion of imports is imminent as Taiwan proceeds with World Trade Organisation membership (WTO). Currently, there are high tariff and non-tariff barriers with the US exempt from import restrictions. For example the current tariff on brassica and lettuce is 40% and 30% respectively. It is expected to fall to 20% under WTO rules.
- Opportunities exist for increased vegetable exports from Australia during the off season including celery, broccoli, cabbage, cauliflower, sweetcorn, carrot and lettuce.

Taiwan's imports of onions, brassica's and lettuce were valued at \$4.1m, \$3m and \$1.4m respectively in 1993. Other vegetables imports were worth \$2.5m.

Australia's exports of onions to Taiwan compete with Indonesia, Japan, Korea, New Zealand and the US .

Singapore

(Source: Austrade Trade Report 1995)

Singapore is a small, prosperous, highly-urbanised island-state with a population of about 3 million people. Singaporeans are becoming more affluent and have more disposable income. The per caput income now exceeds Australia's, and the strong Singapore dollar has made imports cheaper.

Almost all food and beverages are imported. Less than 5 000 tonnes of vegetables are produced domestically per year. Australia's proximity means that it is seen as a natural supplier, but its performance will depend on the quality of the produce shipped and the level of service provided by exporters.

Fresh fruit and vegetables enter Singapore duty free. The local government authorities require a phytosanitary certificate. Bills of Lading or Airway Bills together with commercial invoices should be sent to the importer direct, before the arrival of the goods. A GST (Goods and Services Tax) of 3% applies to all imports.

Indonesia

(Source: Austrade Trade Report 1995)

Fresh vegetables in the market place are mainly supplied by local produce. Although this market is open to all importers, the quantity imported is small due to the high price of the imported products compared to local products and the unfamiliarity in using imported products in local menus.

The main prerequisite for importing fresh produce is the procurement of a phytosanitary certificate issued by the appropriate authority in the country of origin. The consignments are subject to plant quarantine inspection upon arrival at the entry points in Indonesia.

The June 1992 deregulation lowered a number of import duties for fresh fruit and vegetables. On average, the import duty on fruit and vegetables is either 20% or 30%. Imports valued at US\$5 000 or more must undergo pre-shipment inspection.

Australia supplies most of the quality imported vegetables for the retail and hotel sectors because of air freight advantages.

Hong Kong

(from Austrade Trade Report 1995)

Vegetable production is an important horticultural industry in Hong Kong and supplies about 26% of the demand for fresh vegetables. The main crops are Chinese white cabbage, Chinese flowering cabbage, Chinese kale and lettuce (primarily the leaf species). These are grown throughout the year, with peak production in the cooler months. Some exotic temperate vegetables including tomatoes, sweet corn and celery are also grown, and straw mushrooms are produced using industrial cotton waste as the growing medium.

Hong Kong has good access to supplies of fresh fruit and vegetables from all over the world. In 1993, 295,000 tonnes of fresh vegetables (HK\$1,276 million) were brought into this market.

Principal kinds of vegetables imported into Hong Kong included potatoes, onions, lettuce, celery, broccoli, carrots, Chinese cabbages, cucumbers, and a wide variety of leafy and root vegetables. China is the dominant source, particularly of the leafy and root items, which alone account for some 63% of the overall imports (by volume) into the colony. United States and Taiwan are the next important suppliers, taking 15% and 8% respectively of the total import market. Australia at present contributes only about 7% of imports.

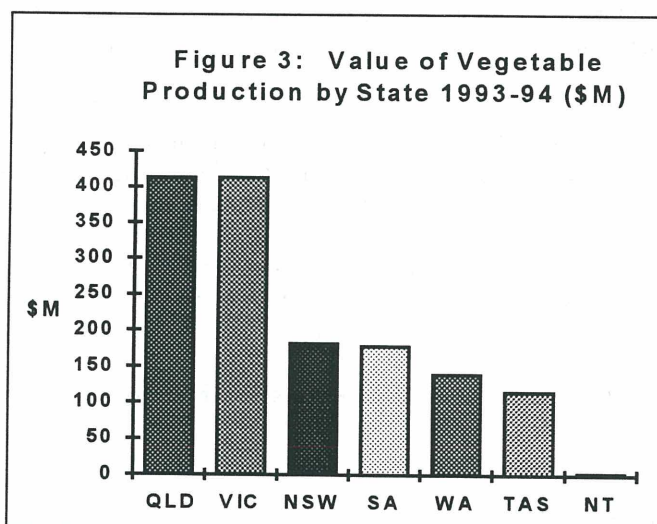
There is no tariff or any import restriction imposed on imports of fresh fruit and vegetables.

Australia currently accounts for about 5% of the overall imports of fresh fruit and vegetables, and ranks as the fourth largest supplier after China, the US and Thailand. Over the past 10 years, Australia's share of the import market has more than doubled.

In 1993, Australia exported around A\$100 million worth of produce to Hong Kong. Oranges, melons (rock and honeydew), pears, grapes and stone fruits (mainly cherries and plums), broccoli, Chinese cabbages, tomatoes, carrots, cauliflowers and asparagus were the main lines supplied.

2.4 NATIONAL VEGETABLE PRODUCTION

The Australian vegetable industry is now valued at \$1.44m (ABS 1993-94). Queensland (\$413m) and Victoria (\$413m) dominate national production followed by NSW (\$182m), SA (\$178m), WA (\$139m) and TAS (\$115m) (see Appendix 4).



The industry has a diverse range of crops. Potatoes are the most significant valued at \$338m and occupying almost half of the area of vegetable production. Tomatoes are next most important (\$173m) followed by a series of crops in the \$20m to \$100m range (beans, cabbage, carrot, cauliflower, lettuce, mushroom, onion, peas, pumpkins). There are more than 20 minor vegetables representing approximately \$350m or 26% of the industry value.

Australia's vegetable plantings expanded by approximately 9% during the mid 1980's but have been relatively static during the recent recession, increasing by 6.5% from 118,903 ha in 1988-89 to 126,700 ha in 1993-94. Plantings tend to follow cyclical patterns being influenced by short term market outlooks, and natural disasters such as flooding or severe drought.

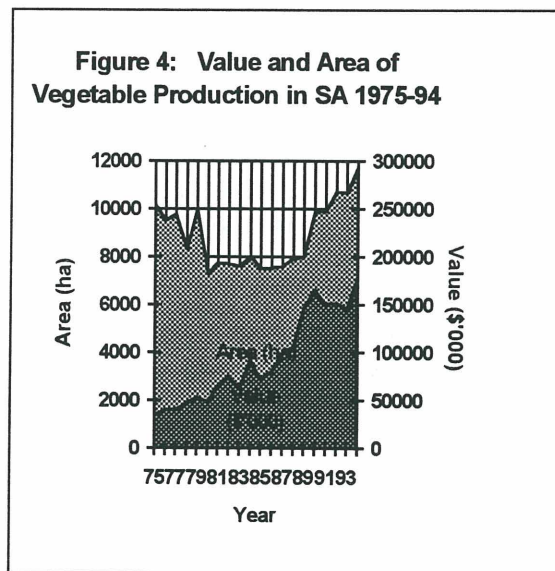
A key feature of the Australian vegetable industry over the last 20 years has been the movement of vegetable production from growing areas close to cities. Production has expanded rapidly in regions with a competitive climatic, soil and water advantage for specific crops (eg melons in Ord River, tomato in Bowen/Bundaberg, asparagus western Victoria, washed potato in Riverland and Mallee). This development has been possible through improved transport and post harvest technology.

Large scale vegetable production achieves better economies of production and creates an environment where industries can be more competitive on international markets.

Marketing of vegetables on Australian domestic markets is highly competitive. Any factor which influences consistency of supply, quality and cost of production (time of supply, grower technical and entrepreneurial skills, soil type, climate, industry infrastructure) will influence competitiveness and viability of a region.

2.5 STATE VEGETABLE PRODUCTION

South Australia's vegetable industry is valued at approximately \$178m (ABS 1993-94), or 12.4% of national production, making it the second most significant horticultural industry in the state (behind grapes). Vegetable plantings increased 47% from 8,008 ha to 11,730 ha between 1988-89 and 1993-94.

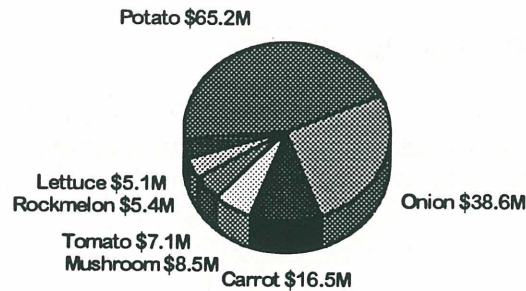


This expansion of plantings has occurred through:

- development of the french fry industry in the South East, and
- expansion of fresh potato and carrot production in the Riverland and Mallee (this expansion has been aimed at domestic markets and has displaced fresh vegetable production in other districts of Australia).

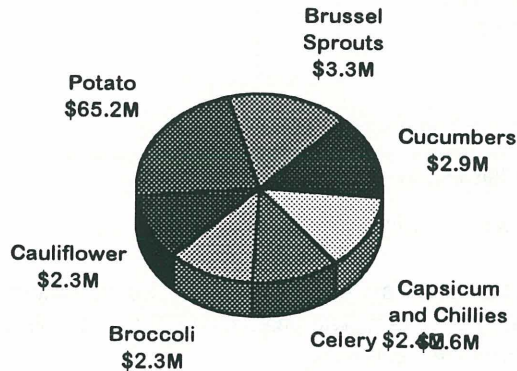
The value of SA vegetable production has grown steadily over the past 20 years with inflation and expanding plantings. However in the 3 years since 1990, value of SA vegetable production declined due to national over production and poor prices, but has since recovered with improved prices in 1993-94.

Figure 5: Value of Major Vegetable Crops (>\$5M pa) in South Australia 1993-94



Potatoes continue to be the most significant vegetable crop occupying 60% (7,085 ha) of the state's vegetable plantings and earning 37% (\$65.2 m) of the gross income. Other major vegetable industries (see Fig 5.) are onion (\$38.6 m), carrot (\$16.5 m), tomato (\$7.1 m), lettuce (\$5.1 m) and mushroom (\$8.8 m).

Figure 6: Value of Minor Vegetable Crops (\$2M-\$5M pa) in South Australia 1993-94



Key crops in which SA has advantages are potato, carrot and onion. The industry has a further 7 crops (rockmelon, pumpkin, cauliflower, broccoli, Brussels sprouts and capsicum valued at \$2-6m (Fig 6.). In addition there are 20-30 other minor vegetable crops, with new crops being continually developed as community eating patterns change (eg large range of Asian vegetables now becoming popular).

There is also a significant vegetable seed industry located in the South East of the state (1,657 ha). This industry produces approximately one third of the nation's vegetable seed production valued at approximately \$5m, much of which is exported.

Industry expansion can only occur through development of export markets, new processing industries or growth in per capita vegetable consumption. Rapid expansion is dependent on development of export markets.

2.6 REGIONAL VEGETABLE PRODUCTION

The SA vegetable industry is located in four major districts that exploit localised climatic, water and soil resources, and access to markets.

These are in order of importance:
(ABS 1993-94)

- Murraylands 3,865 ha
- South East 2,546 ha
- Northern Adelaide Plains 2,504 ha
- Mt Lofty Ranges 1,448 ha

Major crops in each of these districts are identified in Appendix 8.

The Mt Lofty Ranges and Northern Adelaide Plains have held relatively static areas of vegetable plantings over the past 5 years because of the limited availability of water resources. Virtually all of the state's 3,700 ha of expansion has occurred in the South East and Murraylands during that time. Access to water resources has been a key factor in expansion, and further expansion will occur if market opportunity exists, but vegetable growers will need to compete with other horticultural crops to access irrigation water.

Opportunity exists for expansion of horticultural plantings on the Northern Adelaide Plains by 1,000 to 2,000 ha through development of the Bolivar Effluent Distribution project. Much of this expansion is likely to occur with vegetables. Recent studies by the Murray Darling Commission indicate that significant underground water resources exist in the Murray Mallee region and offer future opportunity for industry expansion.

Mt Lofty Ranges production seasons coincide with Victorian districts, creating a barrier for development of main crops, but creating opportunity for niche marketing. Increasing constraints on cultivated land use (catchment region) and strong competition for water and land resources for vine planting mean that expansion opportunities are contained. There has been expansion of vegetable production around Lake Alexandrina in recent years because of greater availability of water licences in this area.

3 COMPETITIVENESS OF THE SOUTH AUSTRALIAN AND AUSTRALIAN VEGETABLE INDUSTRIES

There have been few vegetable benchmarking studies undertaken (only with broccoli, onion, processing potatoes) between Australia and overseas competitors. However these provide some indication of the cost competitiveness of the Australian vegetable industry, particularly with our major competitor, the US.

3.1 PRODUCTION SYSTEMS

Yield, on farm production costs, shipping and handling costs, and currency fluctuations are the key factors influencing competitiveness of Australian vegetable growers internationally.

SA growers are highly competitive producers of cool temperate vegetables (particularly washed potato, and carrots) and have expanded national market share because:

- mild winter climates and sandy soils give good growing conditions and high quality products;
- long rotations and inherently low levels of soil borne diseases enable production of high quality crops;
- potato and carrot plantings are expanding into Riverland, Mallee and South East districts where overhead costs of land and water are lower;
- centre pivot irrigation systems are reducing /ha investment cost;
- the state has grower skills and infrastructure for good prepackaging, and
- opportunity exists to develop low cost production of export crops like broccoli, cauliflower, carrot and lettuce in these regions.

3.1.1 Prices and Competitiveness

Net returns for growers exporting fresh vegetables to SE Asia are generally similar to those received for domestic produce. This is despite higher quality demands and greater risks. Consequently growers need to develop a commitment to and focus their business operations (scale, quality, logistics) on export to achieve success in this arena.

3.1.2 Yields

Potential exists for Australian growers to be internationally competitive with the adoption of current technology and an increase in average industry yields. Vegetable yields vary on a district and property basis. They are also influenced by planting season, climatic advantages of a district, market sector, seasonal conditions and individual grower performance.

As a summation, yields of many Australian vegetable crops are 20% lower (up to 50% in some circumstances) than in the US.. This is partly due to technology levels, but may in part be due to the practice of many growers understating yield information in ABS returns to avoid income tax implications.

SOUTH AUSTRALIAN VEGETABLE INDUSTRY DEVELOPMENT PLAN

COMPETITIVENESS OF THE SOUTH AUSTRALIAN AND AUSTRALIAN VEGETABLE INDUSTRIES

Table 2: World competitiveness of the Australian vegetable industry

VARIABLE INPUT	AUSTRALIA	USA	NEW ZEALAND	MEXICO & CENTRAL/SOUTH AMERICA
Land	Most growers own their land, but trend to land rental	Land rental \$687/ha		Land rental \$539/ha
Labour	\$8-10/hr	\$5.90-7.70/ha	lower than Aust	Chile \$1.40/hr Mexico \$1.74/hr
Fuel	\$0.60-0.70/L	\$0.19/L		
Packaging	Broccoli cartons \$1.80	Broccoli cartons \$1.25-\$1.53		
Machinery	Imported from US and Europe	Considerably cheaper		
Resources	Some opportunity for expansion Limited water Salinity problems in some districts	Irrigation water shortages in some states Land salinisation	Clean green product and environmental image	Chile - unlimited but polluted water supply Mexico - limited water in north west

Source: Horticultural Policy Council, Winning the Race: International Competitiveness in Australian Horticulture, Industry Report No 7.

Australian growers who have adopted "world's best practice" are achieving world competitive yields. A typical Australian french fry potato yield of 50t/ha is below expected yields of 57t/ha in Washington and 62t/ha in Oregon. By contrast, Australian onion yields are similar to those in the US, and considerably better than other competitors like Chile.

A French fry potato industry benchmarking study undertaken by Edgell Birdseye at Manjimup in 1993 indicated that average yield was 48t/ha, 14% of growers achieved greater than 60t/ha (comparable to yields achieved in similar production systems in US), but 38% of growers achieved less than 45t/ha. Raising industry average yields is an industry target.

3.1.3 Production Costs

The best Australian vegetable growers are internationally cost and quality competitive with the US (while average growers need to lift productivity). Smaller vegetable growers cannot hope to be internationally competitive because of their scale of operation. This highlights an opportunity for the introduction of large vertically integrated businesses that can introduce scale of operations not achievable by small family farms.

Most input costs in Australia (labour, fuel, machinery, packaging) are more expensive than North America while some (eg land) are cheaper. Many of these cost differences are induced by taxing policies in competitor countries. US growers have lower labour rates (\$6-8/hr compared with Australia \$8-10/hr) which gives them a cost advantage for crops which have a high labour component for harvesting and packaging. Production costs tend to be cheaper in Central and South American nations.

Machinery is also cheaper in the US, resulting in greater levels of mechanisation and cheaper production costs in crops such as potatoes and onions (eg potato harvest, transport and storage costs in US are approximately \$700-800/ha compared with \$1,400/ha in

Australia). Of significance is the increasing investment of US based companies in countries with cheaper labour costs (Mexico, Central and South America).

While Australian vegetable growers have limited control over the cost of inputs, they can improve efficiency of resource use, particularly for major cost items like machinery. Currently most growers own and operate their own machinery, meaning that major items like a \$150,000 harvester may only be used on 100-200 ha of crop per year when it has capability to handle many times this area. Opportunity exists to reduce production costs through syndication, use of "machinery rings", or use of contractors.

A recent study (SA Centre for Economic Studies 1995) addresses the question of the competitiveness of the Northern Adelaide Plains area particularly.

It makes these interesting observations:

- the cost structure of some interstate vegetable districts are lower than those in SA;
- there are specific reasons for the differences and some SA producers are overcoming the cost disadvantage through scale economies and low land costs, and
- the distinction between 'cost of production' and 'profit' is needed to explain the competitiveness and viability of SA vegetable production.

"Taken across the crops for which data is included, the NAP has the highest overall cost structure per unit (for produce delivered to the packing shed door). Production costs in the other regions were lower than those in the NAP by the following amounts:

Riverland, SA:	12 per cent
South Coast, QLD:	25 per cent
North-west Tasmania:	23 per cent"

"The cost difference is essentially the result of economies of scale present in horticultural production. Holdings and crop areas tend to be significantly smaller on the NAP than in the other regions surveyed and production techniques are modified accordingly.

One example is the use, in the Riverland, of centre-pivot irrigation systems which require much less labour than the hand-moved pipe systems used on the NAP. Centre-pivot systems make inefficient use of the land, especially in small holdings. This inefficiency is not a concern in the Riverland where the price of bare land is around \$300 per hectare, but it is important on the NAP. Centre-pivots may be viable there, but uncertainty about water supplies has inhibited successful growers, who would be able to sell the resulting produce profitably, from buying adjoining country in order to make the centre-pivots practicable."

"The price data for the other regions had not been confirmed at the time of writing, so profitability comparisons are not yet considered reliable, but it is reasonable to assume (as these figures suggest), that the NAP compares more favourably on a Net Margin basis than on costs."

The Report also addresses the important role that location plays in determining where and why vegetable areas are established and remain viable. and states that:

"Freight charges are a significant part of the overall cost of growing produce and delivering it to the retail outlet. This has two implications: it explains part of the price advantage for the NAP in comparison with more isolated regions such as the Riverland and north-

western Tasmania; and it suggests that freight costs still represent a significant barrier to competition between growers in different states. Those in the NAP would usually have a cost advantage in Adelaide and a cost disadvantage in other capital cities. This conclusion reinforces the point, made earlier, that the NAP's role in the national scene is as a supplier in certain seasonal niches and as a buffer against short-term, weather-induced fluctuations in supply from other regions. That is, availability of produce of a predictable standard appears to be the primary consideration with price being secondary."

3.2 PROCESSING AND VALUE ADDING

Scale of operation is a critical factor for major processing facilities. Higher labour and packaging costs (eg average broccoli carton cost in US is \$1.25-\$1.53 compared with \$1.80 in Australia), the need to import machinery from the US or Europe, and the smaller scale of operation means that processing costs tend to be higher in Australia. However by utilising the latest machine technology (eg colour sorting, automated production controls) labour and production costs can be competitive.

Careful planning can ensure year round raw product sourcing and operation of a processing facility.

3.3 MARKETING AND TRANSPORT

Australia has higher sea freight rates than many of its competitor countries (eg freight costs for a carton of citrus ex Melbourne to SE Asia was \$7.60 compared with \$5.00 ex California 1992). Rental on a 40' container for broccoli was \$8,154 ex Australia (Aug 1993) compared with \$5,400 ex USA. This is partly due to shipping and waterfront inefficiencies, but the fragmented and immature state of horticultural export activities also puts growers in a weak bargaining position with shipping lines.

It is estimated that 20% of the value of Australian exports is currently being lost through product deterioration. This loss rate could be halved through introduction of state of the art refrigerated containers and better in transit monitoring of performance.

Air freight is expensive and limited in capacity. Demand for horticultural air freight services is variable, and consignments are normally treated as "top up" freight and have to compete with other higher value freight, particularly during peak travel times.

Australian Quarantine Inspection Service (AQIS) inspection charges for export product are significant, although they can be greatly reduced through introduction of quality assurance schemes. Inspection services provided to US and European exporters are almost entirely government funded and so are not a direct cost to growers.

Some export produce is bought off domestic markets. This product incurs double handling, additional costs and loss of shelf life through additional time in the handling chain.

Australian growers face significantly higher shipping, packaging and marketing costs than competitors. With two thirds of export costs being experienced post farm gate, significant cost savings can be achieved through improved marketing and transportation systems.

Waterfront and shipping industry reforms offer long term solutions to high shipping costs.

4 SWOT ANALYSIS AND STRATEGIC ISSUES FOR THE SOUTH AUSTRALIAN VEGETABLE INDUSTRY

Strengths, weaknesses, opportunities and threats for the SA vegetable industry have been evaluated to identify industry development opportunities. It should be noted that the outcomes vary from crop to crop, but these have been broadly combined to provide an overall industry perspective (Appendix 3). Key issues identified were:

- The SA vegetable industry has major strengths in low cost land and water, good climate and soils in the Riverland, Mallee and South East;
- Growers are innovative, compete strongly with each other, but many have a small scale of operation;
- During a period of slow national growth the SA industry has expanded significantly;
- Many growers are not involved with representing bodies. They prefer to operate and market as competitive individuals. This poor networking, information exchange and cooperation (particularly across state borders), and lack of "teamwork" places the industry at a disadvantage when marketing internationally;
- Australia is generally over supplied with fresh vegetables, with shortages generally occurring with climatic variability;
- Australian vegetable growers operate in an environment of expensive packaging materials, chemicals, labour, machinery and shipping. These high costs impact on the international competitiveness of the industry;
- Limited major processing infrastructure in SA (apart from potatoes) is a constraint on long term industry development;
- There is an opportunity to develop a range of value adding industries to diversify and expand SA production, and reduce reliance on fresh markets. The emergence of the frozen carrot juice industry is an example of this, and
- Potential exists to increase per capita consumption of vegetables, as Australia's consumption levels are lower than many other "western" countries. Changing consumption patterns are placing increasing emphasis on fresh processed food products.

Critical success factors were reviewed in a strategic planning workshop between growers, industry leaders and PISA/SARDI staff on 6th February 1995.

Potential opportunities are allocated against each of these 10 critical success factors

4.1 IMPROVING PRODUCT QUALITY

Achieving high quality levels is essential for continued growth of domestic vegetable consumption and gaining a competitive advantage in export markets. Variation in quality creates additional costs in the marketing chain, results in higher wastage rates and costs at the retail level. Potato industry market research has revealed consumers are switching to alternative products (pasta and rice) partly because they are disenchanted with the quality of fresh potatoes.

Adopting technology and production systems that improve quality will in most cases improve yields and productivity. Chemical residue levels, variety improvement and post harvest handling will be important components.

There is a need for all sectors of the supply chain to adopt quality assurance systems to increase profitability. Quality decline and wastage occurs in the transport, wholesaling and retailing of vegetables, with loss rates as high as 15-20%. Increasingly, retail chains are looking to source produce from growers who are using quality management techniques, hence supermarkets will have a greater impact on grower quality management in the future.

Steps in developing a state vegetable quality strategy include:

- Identify which vegetable industries should develop quality programs first.
- Identify difficulties in the production system and a strategy for the project.
- Commence Quality Management system adoption at the packing shed, then extend it to growers, transporters and retailers.
- Utilise improved post harvest technology to overcome quality problems.
- Encourage adoption of product branding and producers guaranteeing the quality of their products.

Opportunities

- 1.5 Ensuring Vegetables Have Safe Levels of Chemical Residues.
- 2.1 Improving Production Efficiencies of the Potato and Vegetable Industries.
- 3.3 Improving South Australian Potato Quality
- 3.4 Retention of Market Share Through Potato Variety Improvement
- 4.5 Minimising Cadmium Levels in Potato and Carrot Industries

4.2 VEGETABLE CONSUMPTION, RETAIL TRENDS AND PROMOTION

Australian consumption of vegetables has increased from 128 kg/head/pa in 1980 to 140 kg/head/pa in 1993. Vegetables associated with the fast food industry (frozen potato products, processed tomato products) experienced rapid expansion during the 1980's, although US and European trends suggest consumption of these products may have plateaued.

Australian vegetable consumption is lower than other western countries. Daily per capita consumption of vegetables in Australia is two thirds that in the US, France, New Zealand and Japan, and half that in Italy, Turkey and Greece. Opportunities exist for joint promotion between health authorities and the vegetable industry (eg 5 fruit/vegetables per day in US is funded by the Anti Cancer Foundation). Recent medical research has identified compounds

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in brassicas which actively control breast and bowel cancers. Future plant breeding programs will seek to focus on increasing levels of these compounds in crops like broccoli.

Consumer trends include:

- health issues; consumers are concerned about health benefits of fresh fruit and vegetables in the diet and risks from agricultural chemical residues;
- convenience; prepacked salad and snack vegetables offer opportunity for expansion of preprepared fresh products. Fast food consumption is expanding rapidly in the Asia Pacific region, and
- quality; consumers are continually demanding a higher quality product. Inferior quality produce is becoming unmarketable and unprofitable.

There is a need to establish a national promotion funding system and strategy. Long term promotion and development of new appealing products are essential for growth. The vegetable industry has a very limited promotion program, with funding levels being totally inadequate.

Supermarket chains are gaining a greater share of produce sales, and have 60-70% of retail produce sales in Australia, with specialist fruit and vegetable outlets declining. The development of hypermarkets in Europe and North America indicates that there is unlikely to be a move away from supermarket retailing.

In Asia, more produce is being traded through supermarkets. In 1990, 60% of Hong Kong's groceries traded through supermarkets compared to 45% for Singapore/Philippines, 35% Taiwan, 28% Korea/Malaysia, 18% Thailand and 9% Indonesia.

Opportunities

- | | |
|-----|------------------------------|
| 3.6 | Vegetable Industry Promotion |
| 4.6 | Develop a Clean Green Image |

4.3 MARKETING SYSTEMS AND MARKET INTELLIGENCE

Australia's wholesale marketing system is made up of numerous small produce agents and a few larger traders in capital city markets. Small wholesalers are under cost pressures, and threat from the growing strength of supermarket chains with their move to trade outside of the wholesale markets. Large traders who can mount effective marketing programs for their suppliers and ensure effective contractual linkages with supermarket chains will grow in strength. This contrasts with the US which has a series of high volume national distributors.

Opportunities exist for adoption of wholesale auctioning or computer selling technologies. These systems provide high levels of information about commodity trading, and ensure growers receive accurate market signals about production, volume and price. Woolworths is currently considering establishment of an internationally linked electronic produce purchasing system.

Product description and quality inconsistencies force the market system to evaluate each line of produce, adding to marketing costs. While there has been some development of product description and financial management systems, there is a need to steer industry toward:

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- Development of marketing by description and product description standards;
- Use of electronic marketing to improve efficiency and reduce costs (similar to CALM or Dutch auction system) - SA could become a national electronic marketing hub;
- Development of cooperative marketing networks linking growers producing a range of high quality products to provide a marketing service to buyers (eg QVEG);.
- Linking producers in different districts to assure year round supply to their customers, and
- Review of marketing options including grower cooperatives or multinational corporations that can vertically integrate production and marketing (eg Chiquita).

Over production and depressed prices have contributed to ongoing trading difficulties between many agents and growers. Long delays in payments, and default on payment where a produce agent goes bankrupt is an ongoing problem.

Traditionally growers have relied on Farm Produce Agents Acts in some states to provide some protection against these hazards. The development of organisations such as SA Produce Credit Pty Ltd offer an industry organised vehicle for minimising bad debts. Development of a national network of these companies will provide greater security for financial transactions.

There is poor feedback of information on price quality and customer needs by exporters. Many packers would prefer that this situation continue so they can continue to have a marketing advantage over less well informed competitors. This environment makes it difficult for industry to make good decisions. The industry needs better market intelligence through:

- linkage between price and quality;
- better reporting of international market activity, prices, and major production issues;
- analysis of market data for trends and reasons for price movements;
- better data on volume of transactions, and
- intelligence on planting levels and seasonal events in each main production district.

Opportunities

- 3.5 Developing a More Efficient Produce Marketing System.

4.4 EXPORT DEVELOPMENT

Exports of fresh vegetables from SA totaled \$3.1m (ABS 1994-95), while processed vegetables totaled \$1.4m (mainly vegetable seeds) during the same period. This compares with national exports of \$201m of fresh and \$72m of processed vegetables. Main export vegetables for SA in 1994-95 were onions (\$0.97m), broccoli (\$0.58m), melons (\$0.42m) and leeks (\$0.29m). Note that SA export statistics are misleading because export produce being shipped through interstate ports are being recorded as an export for those states. There are factors contributing to SA's low export activity including:

- Transport cost and facility disadvantages;
- Grower returns for export are not commensurate with the additional risks;
- Grower views on export;
- Short term opportunistic export marketing in the past;
- Limited grower networks and cooperation make it more difficult to meet continuity of supply and quality demands of export markets;
- Perceived unreliability of supply, and
- High packaging and post farm gate infrastructure costs.

The SA vegetable industry has been expanding its market share on the domestic market through growing higher quality products and being more cost competitive than districts in the eastern states. Further development of the fresh vegetable industry in SA is reliant on accessing export markets. This will require:

- current transport and logistics problems to be addressed at a state and federal level;
- development of an export culture amongst growers;
- improved networking between grower groups and exporters, and
- improving international competitiveness by identifying key cost disadvantages and addressing these where possible.

Export profitability is often influenced by factors over which a grower has no control. Two thirds of the cost of marketing a carton of produce in South East Asia is incurred after the farm gate through transport, handling, inspection and insurance costs. The rising value of the \$A can also have a major impact on profitability. Success in export is highly dependent on comparative advantage in product quality, production costs and transport. There is a need to develop benchmarking processes that help industry identify their costs, strengths and weaknesses in comparison with other competitors (eg feasibility of exporting fresh potatoes to SE Asia).

Opportunities

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|-----|--|
| 2.1 | Increasing Exports of Frozen French Fries |
| 2.2 | Development of Frozen Vegetable Juice Concentrate Industry |
| 3.1 | Facilitate Export Market Development |

4.5 DEVELOPING NEW VALUE ADDED PRODUCTS AND IMPORT REPLACEMENT

Opportunities to expand value adding industries are available with fresh cut salads and snack foods, frozen French fries for export, frozen vegetable juices and dehydrated vegetable products provided Australian processing industries can become cost competitive.

Apart from potato crisp and french fry manufacturing plants, SA lacks major vegetable processing infrastructure. There are approximately 12 other processing operations across the state involved with carrot juice freezing, fresh cut salads, and potato processing.

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SWOT ANALYSIS AND STRATEGIC ISSUES FOR THE SOUTH AUSTRALIAN VEGETABLE INDUSTRY

Restructuring of production systems (both growing and processing) with improved cost efficiencies offers opportunity for current importing industries to be turned into exporting industries (eg pickled cucumber industry).

Australia imports \$154m of processed vegetables annually. Increasing labour costs in developing countries may provide future comparative advantages for SA vegetable processing industries.

4.5.1 Fresh Cut Salads

Fresh cut salads are a rapid growth area (6-7 small companies) with the sector moving from marketing solely to the service sector (hotel, restaurant, caterers) to retail sales. It accounts for up to 15% of produce sales (expected to grow to 25% by 2000) in the US and Europe, and the US fresh cut produce sector is expected to expand from the current \$US4bn to \$US10bn pa by 2000. To take advantage of anticipated growth, the SA industry will need fostering through:

- networking between companies to ensure good exchange of technology, establishing production codes of practice, and market development (particularly export);
- accessing the latest production and marketing information from the US and Europe, and
- developing an export focus as value added products offer opportunity for greater profit margin and brand identification in the export arena.

There is considerable produce prepackaging that is value adding but becomes an integral part of a fresh product marketing (eg development of prepacked fresh herbs over past 3 years). For some export markets there may be an import tax advantage in selling processed food vs fresh products (eg Japan's tariffs for agriculture products is 148.7% versus 53.6% for processed).

Opportunity exists for development of further fresh salad prepacks and fresh vegetable snack foods, and packaging of prepared vegetables in combination with other prepared foods such as pasta. Chilled fresh meals are now tending to displace similar frozen products (eg 65% of meal packs marketed by Marks & Spencer UK are now fresh products) - a trend suggesting growers will need to develop a "food product" marketing outlook rather than a "raw vegetable" outlook.

Growers who choose to develop value added products have the opportunity of accessing greater profit margin. Those who choose to supply raw product to this industry can expect to find themselves in a similar position to growers supplying the processing potato industry where prices are tight and profitability is highly dependent on efficient operations.

4.5.2 Frozen Products

The frozen French fry industry in the South East is currently processing approximately 80,000 t of potatoes annually with a farm gate value of \$14.4m. Further expansion of this production is dependent on construction of another freezing line. This may be possible if the industry can compete internationally and take advantage of the significant market developing for frozen potato products in SE Asia.

During the early 1970's, the South East had a major vegetable freezing industry (1,200 ha peas, 400 ha sweetcorn). There may be opportunity to reestablish this industry in conjunction with expanded potato freezing facilities if the market environment for frozen vegetables is suitable.

4.5.3 Herbs and Oils

There is an import replacement opportunity for dried herbs, pharmaceutical herbs and essential oils. Imports of dried herbs and spices were \$21m in 1994-95, along with essential oil valued at \$18m.

4.5.4 Imports of Processed Products

Quarantine restrictions make it difficult to import fresh vegetables. This is reflected in the \$13.2 m of fresh vegetables imported in 1994-95. The most significant fresh imports were garlic (\$7.9 m), mushroom (\$1.4 m), and peas (\$1.3 m). Despite this barrier, if fresh vegetable producers are inefficient, they will experience increasing threats from fresh vegetable imports.

Major processed vegetables imported are tomato (\$40.0 m mainly as paste), potato (\$18 m mostly frozen products) asparagus (\$17 m) and mushroom (\$15 m). A large proportion of pickled vegetables (onion and gherkin) are also imported. See Appendix 11.

Further development of vegetable processing industries in SA will require careful evaluation of feasibility, creating the right investment environment, and an efficient vegetable industry that can produce the volume, quality and consistency of supply essential for profitable processing.

Vegetable processing opportunities that require further exploration include:

- development of a dehydrating industry;
- consolidate frozen concentrate carrot juice industry to include other vegetable juices;
- extracting essential oils from a range of vegetable and herb crops;
- development of a pharmaceutical herb industry, and
- development of a pickling industry to replace current imports.

Opportunities

- | | |
|-----|--|
| 2.3 | Developing Fresh and Processed Lettuce Markets |
| 2.5 | Creating a High Value Pharmaceutical Herb Industry |
| 2.6 | Development of Dehydrated Vegetable Industry |
| 2.9 | Expansion of Vegetable Processing in the South East. |
| 3.2 | Capturing Expanding Markets for Fresh Prepack Vegetable Products |

4.6 INDUSTRY SUSTAINABILITY

Management practices need to be put in place that assure industry of being able to maintain quality and productivity in the long term without degrading natural resources. Many of these relate to the farm environment and include:

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SWOT ANALYSIS AND STRATEGIC ISSUES FOR THE SOUTH AUSTRALIAN VEGETABLE INDUSTRY

- hygiene and disease management practices that prevent spread and build up of diseases that reduce productivity or product quality;
- nutrient management practices that avoid build up of toxic levels of nutrients or heavy metals in the soil;
- irrigation practices that ensure efficient utilisation of limited water resources while preventing soil salinisation;
- cultivation practices that minimise erosion and depletion of soil organic matter levels;
- chemical use practices that prevent build up of soil or environmental residues, and
- protection of water resources from pollution.

Industry also needs to be conscious of other pollution and environmental issues that may impact on it including:

- appropriate disposal of waste produce, water, soil and other waste from packing/processing plants;
- using produce packaging materials that are biodegradable and "environmentally friendly", and
- adopting energy conservation principles for both farm and post farm gate activities.

Opportunities

- 1.3 Supporting Marketing by Pest, Disease and Weed Risk Management.
- 1.4 Maintain Market Access for SA Onion Industry (Onion Smut) Control)
- 1.6 Maintain Interstate Market by Provision of State Quarantine Services.
- 2.8 Using Recycled Water on the NAP
- 4.1 Efficient Utilisation of Vegetable Production Land & Water Resources.
- 4.2 Improving Efficiency of Utilisation of State Water Resources.
- 4.3 Retaining SA Vegetable Soils in a Healthy Condition.

4.7 NICHE MARKETS VS HIGH VOLUME PRODUCTION

SA has economies of scale and a competitive edge in major field vegetable crops, particularly potato, onion and carrot. Production units for these commodities are likely to grow in size with increasing specialisation and mechanisation. Smaller growers will not remain competitive.

There are numerous small volume vegetables that may be suitable for these growers. Some of the options worthy of investigation are Asian vegetables, native foods (bush tucker), pharmaceutical herbs, fresh herbs, baby vegetables etc. Some of the steps to successfully develop this industry segment include:

- identification of niche market opportunities;
- gathering of market intelligence;
- identifying varieties with suitable characteristics (market research) and develop specialised cultural systems;

- development of grower networks for continuity of supply, and
- development of promotion systems.

Opportunities

2.7 Develop Niche Market Vegetable Crops

4.8 INDUSTRY UNITY AND STRUCTURE

The independent and competitive approach to business used by many growers means there is a lack of cohesion in the SA vegetable industry. There is declining representation in state and national grower organisations. Some approaches to improve industry unity may be:

- network a forward thinking group of growers to develop a business opportunities;
- provide services and benefits that encourage growers to belong to industry groups;
- develop a register of growers to make communication between growers and industry organisations easier, and
- provide leadership training to groom and develop the skills of young growers for leading their industry in the future.

Despite these difficulties, industry has achieved some significant structural reforms in recent years and is rapidly moving to a position of greater political strength. Some of the recent achievements include:

- Founding in 1994 of a national umbrella body (AUSVEG) representing all state groups of potato and vegetable growers;
- Introduction of R&D levies by potato, mushroom, and processing tomato industries. A levy system for all other vegetable crops is currently being negotiated within industry and should commence in 1996, and
- Consideration of promotion levies by the potato industry in the near future.

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SWOT ANALYSIS AND STRATEGIC ISSUES FOR THE SOUTH AUSTRALIAN VEGETABLE INDUSTRY

Industry structure has an important impact on the environment for investment in new enterprises. Issues that may have an influence on new industry development are:

- is there a place for vertical integration with large companies investing in production operations (in conjunction with marketing or processing facilities) similar to the way Chiquita has entered the banana industry?
- what are the opportunities for joint venturing between growers and overseas buyers to establish production and packaging facilities?
- attracting entrepreneurs and industry champions who have vision and commitment to make new enterprises work, and
- availability of finance; many lending institutions view investing in vegetable growing businesses as high risk.

Opportunities

- 1.2 Creating a Policy Environment to Foster Vegetable Industry Development
- 1.7 Industry Leadership and Act as a Catalyst for Industry Development.
- 1.8 Create an Environment for Potato Research, Development and Promotion

4.9 GROWER EDUCATION

Australian vegetable growers have a relatively low standard of education when compared with their major competitors (only 25% of Australia's farm work force has completed secondary, trade or tertiary training, compared with 50% in NZ and 90% in Europe). A key issue in the success of NZ and Chile as horticultural exporters is industry education and training. Australian exporters tend to have less international marketing expertise than their competitors.

There is a need to:

- provide better training for growers including overseas visits and study tours;
- ensure agricultural trainees within the tertiary education system have a greater business and marketing orientation, and
- a national vegetable industry technology transfer strategy that provides a co-ordinated approach to improving industry technology.

TAFE have been providing some input to this arena through the development of Certificate in Farm Practice programs for vegetable growers. Consideration also needs to be given to the special education needs of various ethnic groups within the industry (eg Vietnamese glasshouse growers).

Opportunities

- 1.1 Improve Grower Education Levels to Improve Industry Competitiveness.
- 1.9 Glasshouse Industry Development and Education Program

4.10 TECHNOLOGY TRANSFER

Industry has made significant investment in research to develop new technology in recent years. A significant proportion of this technology has not found its way onto farms due to:

- declining resourcing for extension forcing servicing to a group approach;
- group extension methods are not highly suited to effectively transfer complex technology;
- growers have less time to evaluate new information, and many would prefer to pay and have it tailored to the specific applications on their property, and
- national research agencies require technology transfer to be attached to a research project, limiting assembly of a series of research finds into a complete package for growers.

The SE Potato Crop Management Service is an example of how a complex range of technology can be assembled and provided to growers in the form of a "user pays" service.

There is a need for a "team" approach to projects ensuring that PISA/SARDI, SAFF, regional grower groups and processors and marketers are involved in industry development programs.

Opportunities

- 1.9 Facilitate Dissemination of Technology and Industry Information.
- 2.11 Improve Potato Nutrition Application Efficiencies

5 OPPORTUNITIES FOR PISA/SARDI AND INDUSTRY ORGANISATIONS TO CONTRIBUTE TO STRATEGIES TARGETING CRITICAL SUCCESS FACTORS

5.1 PROVISION OF INDUSTRY SUPPORT SYSTEMS

Vegetable industry success has been stated earlier to depend on a clean green strategy, continuity of supply of quality products which are pest and disease free and which are wholesome (ie safe residue levels).

Lack of cohesion in the SA industry has been identified. Representation on State and national bodies needs improvement.

Structural reform and creation of a policy environment to foster vegetable industry development is needed.

Grower education and technology transfer service should be developed and encouraged.

The opportunities in Appendix 13 (1.1 - 1.9) describe the industry actions to support industry achieve its objectives.

PISA/SARDI and Industry Organisations actions in this area are:

- adopt a higher profile with national industry bodies such as Horticulture 2000, Horticulture Export Council etc;
- develop stronger linkages with personnel in other state agencies and look to networking into national programs, and
- ensure a "team" approach is used with all projects to enlist the assistance and participation of all stakeholders in tackling projects (stronger relationships).

The outcome of these actions will be a cohesive industry, with a structure which delivers the range of services needed in R&D, product development, disease, pest and chemical residue monitoring and general industry support.

5.2 PROMOTING INDUSTRY AND REGIONAL DEVELOPMENT

Encouraging means of capturing scale economies to increase competitiveness in SA vegetable industries is required. Benchmarking studies are required to identify and update best practice and weaknesses in the production, processing and marketing chain compared to our competitors.

Research and Development will be critical to an ongoing viable vegetable industry. R&D will provide new varieties suited to particular growing areas, as well as more efficient growing practices generating increased productivity and substantial reductions in chemical use through the adoption of integrated pest management techniques. (Horticultural Task Force 1994 p9).

For long term development of the SA vegetable industry (and economic benefit to the state), projects and programs need to focus on opportunities that:

- develop new markets for fresh vegetables (primarily export);
- assist industry to improve product quality and efficiency so they improve competitiveness in domestic and export markets;
- develop new value added products and industries, particularly for export;
- assist industry to identify and develop new niche markets for vegetables;
- promote and increase per caput consumption, and
- replace some of the \$154m processed vegetables and \$43m herb/spice imports.

Maintaining a comparative advantage is critical for industry survival, and this can only occur with maintenance and improvement of the vegetable industry's technology base. Applying much of the current technology (as has occurred with the SE Potato Crop Monitoring Service) can achieve significant improvements in production and quality.

For the vegetable industry to seize these opportunities and maintain a competitive advantage there is a need to develop programs and projects in the following key areas:

- improve industry productivity through getting more growers to achieve "world's best practice" production standards;
- introduce financial efficiencies to reduce production costs (eg machinery ownership costs);
- address quality concerns throughout the production, packing, transport, wholesaling and retailing chain;
- establish a system for industry and product promotion;
- improve grower/industry skills and education levels, and
- seek greater access to Federal funding, particularly in the Agrifood, Agribusiness Regional Development arenas.

The annualised benefit to the State is \$18.23m.

5.3 RESPONDING TO MARKET AND PRODUCT DEVELOPMENT OPPORTUNITIES

For SA growers and industry a commitment to market requirements means that product quality must be excellent and that a clean food export strategy is implemented.

In the domestic market, a range of new high value-added products are likely to be developed. New value adding industries require economic evaluation, market development and good production technology.

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OPPORTUNITIES FOR PISA/SARDI AND INDUSTRY ORGANISATIONS TO CONTRIBUTE TO STRATEGIES TARGETING CRITICAL SUCCESS FACTORS

Quality assurance will be a cornerstone of viable production systems.

In export markets, North Asia and SE Asia offers prospects for growth. Market access will be a key factor in achieving the vision for growth including the removal of barriers to access. An appropriate response to market requirements includes thorough understanding of (Asian markets) and of the products and services of major international competitors.

Improved vegetable marketing requires a combination of a shift toward larger scale production units, 'cluster/network' formation and establishment of large scale logistic and marketing arrangements (SACES 1995piii).

Increased volumes of exports will be made in chartered refrigerated ships with produce packed in modified atmosphere packaging. This will reduce the need for air freight and will increase the competitiveness of produce previously uncompetitive due to the cost of air freight and these will be predominantly to smaller niche markets not well served by shipping, to meet seasonal demand, or will be of high value or highly perishable products.

Substantial achievements will also need to continue through microeconomic reform to our labour market and also in our domestic transport system. (p8 - Horticultural Task Force 1994).

There are opportunities for wholesale auctioning or computer selling technology. There is also need for development of marketing by description and produce description standards.

Better market intelligence is also needed.

The annualised benefit to the State is \$3.17m.

5.4 INDUSTRY SUSTAINABILITY

Industry sustainability should be continuously addressed to consider land, water, chemical, pest, and weed control issues as they impinge on vegetable production.

The key actions in this area are:

- develop a clean green image;
- efficient and appropriate land utilisation;
- improve efficiency of State water resources;
- maintain quarantine access to markets;
- maintain land resources, and
- minimise residues.

The annualised benefit to the State is:

Land management	\$ 2.02m
Planning & strategic development	\$ 4.03m
Water management	\$ 7.08m
Annual-pest plant control	\$ 2.20m
Revegetation	\$ 6.39m
Farm chemicals	<u>\$38.29m</u>
	\$60.01m

6 PROJECTS AND RESOURCES

6.1 CURRENT PROJECTS AND ALLOCATION OF RESOURCES

PISA and SARDI currently have approximately 35 vegetable industry projects operating. The majority of these are in the technology development, transfer and sustainability arenas (Appendix 3).

Much activity has been focused on the potato industry because it has been able to put in place an adequate research and development funding structure. With cut backs in state funding, there has been little activity in other vegetable industries because of difficulty in generating project funding. This situation may be rectified if the vegetable industry introduces a national R&D levy (possibly in 1996).

With the emphasis on seeking funding from existing industries, there has been little focus on developing new industries with growth opportunities.

An analysis of current project resourcing shows:

- strong project activity in technical aspects of crop productivity, quality, and sustainability improvement including: nutrition, varietal development, pest, disease and weed management, post harvest handling; and industry support through providing technical trouble shooting. Activity will need to continue in this arena to ensure industry has the best technology available;
- activity in facilitating export development and marketing (there have been recent losses of key market and industry development personnel). In light of the need for significant market restructuring, there is an ongoing role for PISA/SARDI to act as a catalyst to stimulate activity in this arena;
- activity in attracting value adding businesses has largely revolved around supporting growers supplying product to processing companies to ensure that they have competitively priced high quality raw material. There is a need for PISA/SARDI to take a more proactive role in creating an environment attractive to these businesses;
- expansion of processing and value adding activities could have a more significant impact on the state's economy (through turnover and employment) than fresh vegetable production. If additional resources are available for development of the vegetable industry, they should be channeled toward industries with value adding potential, and
- industry unity and structure has traditionally been the domain of SAFF and other grower organisations. To assist industry development it is important for PISA/SARDI to work more closely with industry organisations on the development of leadership training, grower education, and joint industry development programs.

6.2 IMPACT ON SOUTH AUSTRALIAN ECONOMY

The most significant opportunities for growth of the SA vegetable industry are shown in Table 2. An estimate of the gross impact of these key opportunities on the state economy indicates it is possible to grow SA farm gate value vegetable production (currently \$178m in 1993-94) by \$46m to over \$220m during the next 5 years. In addition, development of these opportunities will result in downstream value adding of a further \$36m total impact on the economy could exceed \$82m pa.

Table 2: Gross impact of vegetable industry opportunities on the state economy - 1995-96 to 2000-2001

VEGETABLE INDUSTRY GROWTH OPPORTUNITIES	FARM GATE VALUE \$m pa	VALUE ADDING \$m pa
Expansion of French fry industry	\$10	\$15
Expansion of vegetable juice industry	\$ 6	\$ 9
Development of a dehydrating vegetable industry	\$ 3	\$ 6
Growth of per capita consumption by 10kg/head	\$11	\$ 0
Growth of fresh cut vegetable industry	\$ 6	\$ 3
Development of fresh export markets	\$ 5	\$ 3
Continued trend toward greater national market share	\$ 5	\$ 0
Total Gain in Economic Activity	\$46	\$36

The SA fresh vegetable industry is in a competitive position nationally. The Riverland, Mallee and South East are cost efficient districts. Creating an environment for entrepreneurial activity to take advantage of these new opportunities is a major industry barrier and may require fostering of vertically integrated corporate activity.

Maintaining current industry productivity and sustainability through traditional technical support also has a high opportunity value. Without sustainably high productivity levels, the industry cannot hope to be competitive with other production districts and countries. We must seek to maintain and develop comparative advantages.

6.3 THE SA VEGETABLE INDUSTRY IN 5 YEARS

Successful implementation of the 10 strategic issues could achieve the following goals for the SA vegetable industry over the next 5 years:

- grow farm gate value of the vegetable industry from \$178m pa to \$220m pa;
- expand vegetable export trade from \$3.1m to \$6.0m (5% of national exports);
- implement quality assurance systems in 75% of major vegetable packing sheds;
- expand french fry processing capacity by additional 50,000t pa raw potato throughput;
- develop SE vegetable processing industry with \$10m pa turnover for frozen and \$5m pa turnover for oil products;
- establish a cohesive group of fresh cut produce manufacturers to grow to \$25m pa;
- develop a vegetable juice industry with raw product throughput of \$10m pa;
- replace 50% of current dehydrated vegetable imports;
- establish a pharmaceutical herb industry;
- restructure vegetable industries on the Adelaide Plains and Mt Lofty Ranges through development of specialist niche market crops for both domestic and export markets;
- foster reform of the national produce marketing system;
- encourage a national vegetable promotion strategy with appropriate funding, and
- develop better structures with higher levels of grower participation in industry bodies.

Industry and PISA/SARDI do not have the resources necessary to tackle all of the opportunities identified in this plan, and so it will not be possible to achieve all of these goals. However through closer liaison between agencies, industry, agribusiness and growers, it may be possible to achieve a significant number.

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Vegetable Program Development Group

Barry Philp	Norbert Maier
Mark Heap	Chris Williams
Trevor Wicks	Shirley Sylvia
Steve West	Mark Bartzeko
Venton Cook	Michael Nguyen

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Note: Throughout this document, Australian Bureau of Statistics data is used for calculations. ABS vegetable industry data is normally conservative and is commonly 25% below independent industry surveys. ABS data for the glasshouse industry is extremely inaccurate and survey data has been used as the basis for calculations.

8 APPENDICES

APPENDIX 1: WORLD VEGETABLE PRODUCTION 1994 - Source: FAO Yearbook, Production, Vol 48, 1994

	AFRICA		NORTH/CENTRAL AMERICA		SOUTH AMERICA		ASIA		EUROPE		OCEANIA		WORLD TOTAL		MAIN 4 WORLD PRODUCERS
CROP	Area 1,000's ha	Prod'n 1,000 T	Area 1,000's ha	Prod'n 1,000 T	Area 1,000's ha	Prod'n 1,000 T	Area 1,000's ha	Prod'n 1,000 T	Area 1,000's ha	Prod'n 1,000 T	Area 1,000's ha	Prod'n 1,000 T	Area 1,000's ha	Prod'n 1,000 T	(order of importance)
Artichoke	8	82	4	51	6	93	2	25	90	984	-	-	110	1234	Italy Spain Argentina France
Beans	29	189	33	185	29	94	233	1595	130	1070	8	44	462	3176	China Turkey Spain Italy
Cabbage	33	841	106	2139	25	569	928	22299	265	6685	4	127	1713	40250	China Russian Fed India Japan
Carrots	66	739	64	1958	40	685	179	4075	143	4535	6	229	666	14176	China Russian Fed Poland UK
Cauliflower	9	160	28	383	5	67	407	7704	148	2445	5	107	606	10888	India China France Italy
Cucumber/gherkin	23	392	105	1398	4	54	802	13465	90	2453	1	19	1215	19261	China Iran Turkey USA
Chillies/peppers	213	1758	140	1586	27	245	739	5414	118	2115	-	1	1249	11192	China Turkey Nigeria Mexico
Eggplant	27	527	3	86	-	5	501	7791	19	547	-	-	556	8979	China Turkey Japan Egypt
Onion	182	2560	88	3136	138	2259	1181	17735	216	4587	5	216	2023	32546	China India USA Turkey
Garlic	21	326	23	299	35	203	617	6516	85	461	-	1	813	7914	China Korea Rep India Egypt
Peas	50	248	145	1233	60	148	198	935	184	1450	18	129	742	4346	USA China France India
Potato	745	7981	795	26003	935	11873	5386	74914	3933	78053	49	1411	18191	265436	China Russia Fed Poland USA
Pumpkin/squash	77	1136	74	443	71	786	279	3951	110	1135	12	163	668	8404	China Ukraine Argentina Romania
Rock melon	55	1014	116	1793	30	262	448	8304	130	2440	4	80	803	13894	China Turkey Iran Spain
Sweet potato	1384	6944	166	1140	116	1248	7587	114347	5	60	121	600	9380	124339	China Vietnam Uganda Indonesia
Tomato	428	8315	326	14874	157	5335	1182	27430	402	15537	11	433	2852	77540	USA China Turkey Italy
Watermelon	125	1978	133	2364	129	1162	900	17378	128	2561	5	80	1824	29360	China Turkey Iran USA
Total vegetables	3475		2349		1671		21569		6196		220		43873		China Russian Fed India Ukraine

APPENDIX 2: SWOT ANALYSIS OF THE SA VEGETABLE INDUSTRY

FACTORS	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
ON FARM FACTORS (Quality, productivity, crop management, new products, environmental, sustainability)	Availability of low cost land and water in SE, Riverland and Mallee. Mild climate in NAP, Riverland and SE regions Well drained sandy soils for winter production in NAP and Riverland Core of highly skilled and innovative growers	Small profit margins on many crops over past 3 years. Lack of good cooperation and coordination between growers - they are very independent.	Greater use of IPM systems. Better irrigation scheduling Productivity improvement through closer crop monitoring. Changing grower outlook from vegetable supplier to a food supplier and improve profitability through more value adding operations.	Greater disease incidence through poor hygiene and crop rotation Increasing input costs and poor produce prices Pest and disease chemical resistance Poorly managed chemical use - residue levels Grower commitment to export
MARKET FACTORS (Market system, signals, servicing, servicing, development)	Responsive with price reflecting product supply	Short term advantage/profitability attitude of most produce agents. Poor national market/production intelligence system. Lack of processing outlets for most vegetables Lack of grower export knowledge	Development of new processed vegetable products, frozen juice concentrate, salad prepacks, dried products, snack foods Coordination of export market supply between different production districts (intra and interstate)	Lack of coordination within the market system Exporting product packed for domestic markets Large number of exporters competing with each other in overseas markets. Poor production and marketing intelligence systems. Small size and high overheads of market agents.
OFF FARM FACTORS (Production base, world trade, education, government policies)	Australia has a relatively clean image in world markets. Australia is relatively close to the SE Asia region where significant growth in vegetable trading will occur.	Limited export freight capacity and inconsistency of shipping services High cost of freight to SE Asian markets	Closer economic monitoring and benchmarking of production systems against competitors.	International competitiveness of processing industry and its plants. Value of \$A High cost of export inspection Competition for land and water resources at the rural/urban interface.
RELATED INDUSTRIES FACTORS (Input supplies, finance, storage, transport, processing, agribusiness)	Good infrastructure of machinery, fertiliser, chemical and other input suppliers Competitive refrigerated road transport to interstate markets More consultants now servicing industry	High cost of packaging material compared with overseas competitors. Range of chemicals for minor vegetables being limited by higher registration costs. Machinery and fuel costs significantly higher than US.	Development of value added exports - both fresh and processed. Import replacement of dehydrated products Development of new products (eg pharmaceutical herbs)	Lack of strong competition in the packaging and overseas shipping industries.
INDUSTRY STRUCTURE (Organisations, structure, education needs)	Research levy for potato, mushroom, processing tomato, but yet to be developed for other crops.	Growers tend to have a district focus on industry representation rather than a state or national perspective. Lack of interest by growers in industry structure and organisation.	Development of AUSVEG offers greater opportunity for stronger ties between various industry groups. Opportunity exists for large vertically integrated companies to take over the vegetable industry.	Poor networking slows synergistic development of innovations, their adoption within industry and its ability to be at the forefront of technology.
RISK MANAGEMENT (Abnormal weather, sustainability of soils and water, price management)	Large properties for long rotations to minimise disease risk in Riverland and SE.	Limited opportunity for income protection	Diversify marketing and product range Introduce quality management systems to reduce costs and improve market competitiveness	Reliability of water supplies. Specific diseases restricting access to some markets. Heavy metal or pesticide "scare" impacting on market image.

APPENDIX 3: CURRENT RESOURCE ALLOCATION TO THE SA VEGETABLE INDUSTRY

FACTORS	CURRENT ACTIVITIES	GAPS IN ACTIVITY	OPPORTUNITY
Improving Product Quality	Evaluation and Development of New Potato Genotypes Physiological Changes in Onions During Storage Development of a National Fry Colour Chart for Research Use Development of Crop Management Strategies for Improved Productivity and Quality of Potatoes Grown on Highly Acid Sands Developing Potato Production on Water Repellant Sands Evaluation of Introduced Garlic Varieties	No direct encouragement of packing shed QA programs Need for development of on farm "world best practices" - this is happening with SE potato industry	2.4. Improving Production Efficiency of the SA Glasshouse Industry. 3.1. Improving Production Efficiencies of the Potato and Vegetable industries. 3.5. Developing Technology to Meet Specific Industry Needs. 4.3. Improving Quality in the SA Produce Industry. 4.4. Retaining Market Competitiveness Through Potato Variety Improvement. 5.4. Minimising Chemical Use in the SA Vegetable Industry. 6.2. Ensure Consumers Receive Vegetables With Safe Levels of Chemical Residues.
Vegetable Consumption, Retail Trends and Promotion	Fresh Potato Market Research	No national promotion levy Lack of market research on fresh vegetables Could access increasing health information on vegetables Need to develop linkages with health agencies	4.6. Maintaining Vegetables as a Key Food Item and Developing a National Promotion Strategy Identify Consumer Needs and Undertaking Market Research for Specific Vegetables.
Marketing Systems and Market Intelligence		Limited activity New marketing technology is being used in other agricultural industries	4.5. Creating a More Efficient and Responsive Market System. Providing Industry With Better Market Intelligence.
Export Development	Investigation in Harvest Maturity, Curing Requirements and Storage Life of White Onions for Export Establishment of the French Fry Potato Industry in SE Australia Facilitating development of vegetable export markets (I.Lewis)	Activity by individuals (exporters) and organisations (Adelaide Plains Producers) tends to be opportunistic in nature. Some macro issues being addressed at a government level (eg air freight). Limited project input by PISA/SARDI	2.1. Increasing Exports of Frozen French Fries 2.2. International Marketing of Frozen Vegetable Juice Concentrate. 2.3. Developing Fresh and Processed Lettuce Markets. 2.8. Developing New Vegetable Production Areas on the Northern Adelaide Plains and Mallee Regions. 4.1. Expanding Export Markets for Vegetables. 5.1. Maintain Quarantine Access for the SA Potato Industry to Interstate and Overseas Markets. 6.1. Maintain Interstate and Overseas Market Access for the SA Onion Industry.
Developing New Value Added Products	Developing essential oils for export (T.Deer)	Development of new products largely undertaken by companies and small businesses. Need for greater networking. New fresh potato products being developed in Vic.	2.10. Expansion of Vegetable Processing in the South East. 4.2. Capturing Expanding Markets for New Fresh Prepack Vegetable Products.
Import Replacement	Establishment of a Navy and Dry Bean Industry in the South East	Needs close examination of economic feasibility and scale of operations.	2.5. Creating a High Value Pharmaceutical Herb Industry 2.6. Replacing Imports of Dehydrated Vegetables.
Niche Markets vs High Volume Production		Initial project development for Mt Lofty Ranges Development of alternative horticulture crops for the Riverland	2.7. Introduce Programs for Restructuring of Vegetable Industries in the Mt Lofty Ranges and Adelaide Plains. Development of Asian Vegetables for Both Domestic and Export Markets.

APPENDIX 4: VALUE OF AUSTRALIAN VEGETABLE PRODUCTION (\$M 1993-94)

CROP	NSW	VIC	QLD	SA	WA	TAS	AUST
Potato	36.6	104.4	37.7	65.2	33.8	60.5	338.1
Tomato	19.9	27.3	109.1	7.1	8.4	1.3	173.2
Mushroom	33.3	94.2	11.4	8.8	5.2	0.0	152.9
Onion	11.6	8.6	21.8	38.6	6.0	19.2	105.8
Carrot	3.2	34.4	9.4	16.5	23.8	3.4	90.7
Lettuce	4.9	16.3	25.5	5.1	5.5	1.6	59.2
Rockmelon	11.0	4.4	24.0	5.4	5.3	0.0	51.5
Broccoli	2.2	24.9	13.2	2.3	2.3	2.0	46.9
Asparagus	14.7	26.4	3.2	0.0	0.4	0.1	45.0
Cauliflower	4.2	12.4	4.8	2.3	15.3	3.8	42.8
Capsicum and Chillies	1.0	3.3	29.7	2.6	5.2	0.0	42.0
Beans, french and runner	1.7	3.4	25.2	0.8	2.2	2.6	36.0
Watermelon	3.9	0.2	19.0	0.3	3.8	0.0	27.3
Pumpkin	6.2	1.9	9.7	4.5	3.8	0.7	27.2
Sweet Corn	8.7	5.1	9.5	0.5	0.8	0.9	25.5
Celery	0.1	10.6	8.1	2.4	3.2	0.4	24.8
Cabbage	2.6	7.8	4.6	1.3	2.5	0.7	19.5
Green peas	1.5	1.0	1.5	0.4	0.7	10.6	15.6
Other Vegetables	14.6	26.8	46.2	14.3	10.6	7.2	119.8
Total vegetables for human consumption	181.9	413.2	413.3	178.3	139.0	115.0	1443.6

Source: Australian Bureau of Statistics

APPENDIX 5: VEGETABLE AREA PLANTED IN SA FOR THE YEARS 1989/90 TO 1993/94 (HA)

CROP	South Australia					Australia	% Aust
	1989-90	1990-91	1991-92	1992-93	1993-94	1993-94	1993-94
Potato	5082	5375	5954	6276	7085	40259	17.6
Onion	1107	1171	1204	905	1170	5202	22.5
Carrot	454	419	520	582	621	5436	11.4
Vegetable - other	709	474	522	531	697	33869	2.1
Pumpkin	404	402	436	512	410	6449	6.4
Lettuce	369	345	313	329	289	3955	7.3
Broccoli	400	414	480	325	395	5731	6.9
Cauliflower	340	329	274	257	236	3678	6.4
Rockmelon	279	301	298	218	182	3253	5.6
Cabbage	236	230	200	207	188	2007	9.4
Tomato-field	158	145	156	166	137	8853	-
Brussel sprouts	129	100	153	140	108	334	32.2
Sweetcorn	57	67	56	71	68	5765	1.2
Celery	65	56	51	43	43	814	5.2
Cucumber	57	47	44	40	49	767	6.3
Tomato- glasshouse	43	42	39	34	43	-	-
Mushroom	-	-	13	14	10	155	6.2
Total	9889	9917	10713	10650	11730	126578	9.3
Area of Vegetable Seed Production							
Beans, french and runner				2	0	97	0
Carrot				452	336	366	91.9
Chinese Cabbage				308	272	319	85.2
Green Peas				37	0	343	0
Onion				32	10	74	13.2
Vegetables - other				433	189	776	24.4
Potato				196	375	4529	8.3
Pumpkin				1	0	33	0
Radish				462	475	506	93.8
Coriander			2111	3466	4817	4817	100
Total excluding coriander			-	1922	1657	7042	23.5

Source: Australian Bureau of Statistics

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APPENDIX 6: SA VEGETABLE PRODUCTION FOR THE YEARS 1989-90 TO 1993-94 (T)

CROP	South Australia					Australia	% Aust
	1989-90	1990-91	1991-92	1992-93	1993-94	1993-94	1993-94
broccoli	1550	2598	2970	2048	2409	33331	7.2
brussel sprouts	2411	1248	3124	2241	2538	5903	43.0
cabbage	8240	6259	6212	6113	3396	64531	5.3
carrot	13422	13053	16033	22970	22885	194839	11.7
cauliflower	15322	14964	8339	7290	5441	75235	7.2
celery	5128	4448	4235	2496	4167	40697	10.2
cucumber	3104	1915	1655	1507	1693	11458	14.8
lettuce	6803	9314	7369	9217	7143	92965	7.7
rockmelon	5329	6152	7563	4876	4517	70783	6.4
onion	48616	55781	58188	35120	53301	213206	25.0
potato	161257	175330	198644	179273	202645	1184705	17.1
pumpkin	7274	8097	8919	10374	8945	82922	10.8
sweetcorn	811	804	730	835	727	72686	1.0
tomato - field	5876	6234	5436	5147	4496	214661	2.1
tomato - glasshouse	2012	2688	2070	1525	1542	2208	69.8
mushroom	-	-	1747	1450	1938	34176	5.7
Production (t) of Vegetable Seed							
green peas				66	0	723	0
carrot				152	133	142	93
chinese cabbage				276	287	309	93
beans, french and runner				1	0	123	0
onion				2	3	103	3
vegetables - other				142	276	589	47
potato				3916	6141	108764	100
pumpkin				0	0	23	0
radish				327	519	589	88
coriander			2111	3426	2047	2047	100
veg seed excluding potato			1327				

Source: Australian Bureau of Statistics

APPENDIX 7: VALUE OF VEGETABLE PRODUCTION IN SA FOR THE YEARS 1989/90 TO 1993/94 (\$,000)

CROP	South Australia					Australia	% Aust
	1989-90	1990-91	1991-92	1992-93	1993-94	1993-94	1993-94
potato	60562	56330	57719	58860	65227	338145	19.3
onion	28878	22521	17807	16832	38636	105794	36.5
carrot	11340	9852	10559	14681	16455	90686	18.1
tomato	6782	9021	9295	8387	7106	173155	4.1
lettuce	8626	10106	9041	7031	5051	59173	8.5
mushroom	6858	7824	7713	5952	8782	152864	5.7
rockmelon	4286	4462	6621	4438	5402	51529	10.5
pumpkin	2182	2045	2590	3351	4456	27151	16.4
cauliflower	6006	5339	3359	2974	2323	42780	5.4
broccoli	1748	3226	4714	2823	2339	46880	5.0
brussel sprouts	3086	1333	3874	2779	3261	6660	49.0
cabbage	5104	3082	1518	2745	1284	19510	6.6
capsicum	1478	1658	2337	2214	2559	41973	6.1
cucumber	na	1953	1721	1824	2915	12489	23.3
celery	3431	2441	2216	1772	2419	24789	9.8
leeks	783	1181	1525	1230	1834	9446	19.4
turnips & swedes	597	482	1088	1025	1096	4253	25.8
silverbeet/spinach	683	474	478	769	411	3534	11.6
sweetcorn	760	745	622	708	540	25495	2.1
garlic	na	885	615	663	587	1305	45.0
parsley	403	777	1531	655	395	5846	6.8
parsnip	446	359	476	358	523	7231	7.2
beans	413	381	962	313	768	36019	2.1
watermelon	238	492	396	250	266	27268	1.0
other vegetables	5275	3564	3220	3026	3613	129656	2.8
Total	164975	150537	151997	145660	178250	1443628	12.3

Source: Australian Bureau of Statistics

APPENDIX 8: SOUTH AUSTRALIAN VEGETABLE PLANTINGS BY REGION (HA 1993/94)

CROP	Northern Adelaide Plains	Mt Lofty Ranges	Murray lands	South East	SA Total
potato	1092.3	961.1	1632.9	2129.5	7085.2
onion	134.2	34.7	787.3	214.1	1170.3
carrot	247.4	0.1	311.3	62.5	621.3
pumpkin	15.9	7.9	384.4	0	410.2
broccoli	193.4	39.7	152	10	395.1
lettuce	175.6	97.3	11.5	1.4	288.8
cauliflower	153.2	42.7	15.2	0.5	235.6
cabbage	99.2	65.6	13.8	0.5	188.1
rockmelon	0.2	0	181.9	0	182.1
tomato - field	52.6	0.7	80.8	0	136.9
radish	8.9	0	0	107.5	116.4
brussel sprouts	0	87.6	0	0	107.6
beans - french and runner	36	5.5	46.8	0.1	90.4
capsicum and chillies	37.8	0.3	38.7	0	79
green peas	20	2.5	27.4	15	73.1
sweet corn	1.7	6.8	59.6	0	68.1
cucumber	39.6	0	8.8	0	48.6
tomato - glasshouse	27.5	0	15	0	42.9
celery	42.6	0	0	0	42.6
watermelon	0	0	31.1	0	32.3
leeks	4.6	22.6	0.1	1.5	30.8
silverbeet and spinach	22.2	3.5	0	0	25.7
zucchini	6.3	2.3	13.8	0	25.7
garlic	1.3	0	19.8	0.5	21.6
swedes	1.6	16.3	0	2	19.9
marrow/squash	0	0.2	19.3	0	19.5
parsnip	14.8	0.5	4	0	19.3
spring onion/shallot	17.3	0	1	0	18.3
white turnip	5.8	11.4	0	0	17.2
rhubarb	0.1	14.1	0	0.6	14.8
beetroot	12.7	0.2	0	0	12.9
horseradish	0	12	0	0	12
chinese cabbage	11.7	0	0	0	11.7
parsley	10.2	1	0	0	11.2
mushrooms	9.6	0	0	0	9.6
other vegetables	7.6	11.2	8.2	0	27
Total vegetable area	2503.9	1447.8	3864.7	2545.7	11711.8
Vegetable Seed (ha)					
coriander	24	0	68	3751.5	4816.5
carrot	0	0	0	336.4	336.4
chinese cabbage	0	0	0	272	272
onion	1.6	0	8.1	0	9.7
potato	66.6	97.3	90.9	105.5	375.1
radish	0	9	0	465.7	474.7
other vegetable	0.8	0	2.2	186.4	189.4
Total vegetable seed excluding coriander	69	106.3	101.2	1366	1657.3

Source: Australian Bureau of Statistics

APPENDIX 9: AUSTRALIAN EXPORTS OF FRESH VEGETABLES (\$ '000) 1990-91 TO 1994-95

CROP	1990-91	1991-92	1992-93	1993-94	1994-95	MAJOR MARKETS
Potato	4573	4915	4863	5434	6025	Singapore, Mauritius, Malaysia, PNG
Tomato	3294	5114	5959	8181	9190	NZ, Hong Kong, Singapore, Indonesia
Onion	23221	29878	15757	31874	35659	Japan, Germany, UK, Singapore, France
Garlic	829	550	334	235	586	Fiji, New Caledonia, Germany, New Zealand
Leeks	568	722	873	1118	1179	Japan, UK, Singapore, Indonesia
Cauliflower	9433	12708	15548	17579	20661	Singapore, Malaysia, Hong Kong, Brunei
Broccoli	4319	6388	11745	14102	19076	Singapore, Japan, Hong Kong, Malaysia
Brussels sprouts	502	1102	2251	1011	1027	New Zealand, Hong Kong, Malaysia, Singapore
Chinese cabbage	3783	5413	6406	6241	6883	Hong Kong, Singapore, Taiwan, Japan
Cabbage	955	869	1229	1349	934	Indonesia, Hong Kong, Singapore, Malaysia
Lettuce	2957	4445	5983	5483	5824	Hong Kong, Singapore, Malaysia, Philippines
Witloof/chicory	61	53	56	45	55	Singapore, Hong Kong, Philippines
carrot/turnip	10882	14661	18427	21079	28263	Malaysia, Singapore, Hong Kong, Japan
Beetroot/radish	127	295	524	1511	1799	UK, Hong Kong, New Zealand, Singapore
Cucumber	508	363	324	375	342	NZ, Hong Kong, Germany, Finland
Peas	126	97	80	119	239	Mauritius, Hong Kong, Singapore, New Zealand
Beans	1322	1195	1385	1951	1796	NZ, Japan, Hong Kong, Indonesia
Legume veg	25	125	22	9	66	Netherlands, New Zealand, Kiribati, Hong Kong
Artichoke	113	28	21	218	449	Japan, Singapore, New Caledonia, Thailand
Asparagus	13782	20743	21284	28372	23245	Japan, Singapore, Hong Kong, New Zealand
Eggplant	22	24	5	3	1	Hong Kong
Celery	1273	1479	1932	2388	3642	Hong Kong, Taiwan, Malaysia, Singapore
Mushroom	124	82	336	233	181	Hong Kong, Indonesia, French Polynesia, PNG
Capsicum	679	958	1337	1369	498	Hong Kong, Singapore, Indonesia, Sri Lanka
Spinach	51	14	90	113	182	Hong Kong, Taiwan
Melons	5804	8604	8928	11225	13737	Hong Kong, Singapore, NZealand, United Arab Em
Other vegetables	2091	3117	6077	17387	19438	Hong Kong, Singapore, NZ, Japan
Total Vegetables	81424	123942	131776	179004	200976	Japan, Singapore, Malaysia, Hong Kong

Source: Australian Bureau of Statistics

APPENDIX 10: AUSTRALIAN EXPORTS OF FRESH VEGETABLES (\$ '000) BY STATE
1994-95

CROP	NSW	VIC	QLD	SA	WA	TAS	OTHER	AUST	SA/AUST %
onion	866	1381	713	966	1989	29744	0	35659	2.7
carrot	406	530	617	17	24722	1956	0	28247	0.1
asparagus	5266	17506	458	16	1	0	0	23245	0.1
cauliflower	531	2053	185	91	17796	1	4	20661	0.4
broccoli	3105	7605	7441	582	242	99	3	19076	3.0
melon	1937	1184	9750	425	441	0	0	13737	3.1
tomato	970	360	7789	47	23	1	0	9190	0.5
chinese cabbage	50	115	2191	1	4525	0	0	6883	0
potato	675	1262	606	14	3310	158	0	6025	0.2
lettuce	2699	948	549	70	1558	0	0	5824	1.2
celery	171	1377	423	0	1561	110	0	3642	0
beetroot/radish	4	10	367	0	1215	203	0	1799	0
beans	3	67	1532	0	0	194	0	1796	0
leek	131	512	63	289	184	0	0	1179	24.5
brussel sprouts	533	441	50	2	0	0	0	1027	0.2
cabbage	77	94	238	0	512	12	0	934	0
garlic	489	44	6	46	1	0	0	586	7.9
capsicum	123	55	247	6	66	0	0	498	1.2
globe artichokes	12	433	4	0	0	0	0	449	0
cucumber/gherkin	18	12	306	6	0	0	0	342	1.7
shallot	24	6	0	3	0	226	0	260	1.2
peas	60	12	19	0	149	0	0	239	0
spinach	177	5	0	0	0	0	0	182	0
mushroom	135	5	36	5	0	0	0	181	2.5
legume vegetables	19	0	20	27	0	0	0	66	40.7
whitloof/chicory	0	12	10	0	33	0	0	55	0
turnip	0	0	6	0	0	10	0	16	0
eggplant	1	0	0	0	0	0	0	1	0
other vegetables	9588	2100	5090	469	841	1087	2	19178	2.4
Total Vegetables	28074	38128	38717	3079	59170	33800	9	200976	1.5

Source: Australian Bureau of Statistics

APPENDIX 11: AUSTRALIAN IMPORTS OF FRESH AND PROCESSED VEGETABLES (\$'000) 1994-95

CROP	QUANTITY			VALUE \$'000		
	Unit	SA	Aust	SA	Aust	% Aust
Fresh Vegetables						
garlic	t	60	4349	173	7089	2.4
mushroom	kg	0	484296	0	1380	0
peas	kg	0	550163	0	1277	0
asparagus	kg	0	235573	0	1198	0
onion	t	0	1085	0	737	0
chicory/whitloof	kg	0	36695	0	208	0
carrot/turnip	kg	420	1053805	0	123	0.4
tomato	kg	0	59497	0	120	0
beans	kg	0	61065	0	87	0
shallot	t	0	11	0	50	0
capsicum	kg	0	2170	0	7	0
potato	t	0	2	0	4	0
spinach	kg	0	250	0	3	0
cabbage	kg	0	300	0	2	0
cucumber/gherkin	kg	0	405	0	1	0
lettuce	kg	0	405	0	1	0
leek	t	0	0	0	0	0
vegetable - other	kg	0	0	0	926	0
Total fresh veg				174	13213	
Processed Vegetables						
tomatoes				1743	40000	4.4
peas & beans				730	20308	3.6
potatoes				347	18060	1.9
asparagus				211	16663	1.3
mushrooms				789	15441	5.1
sweetcorn				411	13666	3.0
onion & garlic				93	7837	1.2
cucumber & gherkin				939	6074	15.5
spinach				32	2537	1.3
cabbage				11	123	8.7
truffles				0	89	0
other vegetables				672	30567	2.2
Total Processed Veg				5976	171366	
Herbs & Spices						
pepper	kg	1580	1861878	47	7030	0.7
capsicum	kg	811	574100	6	2703	0.2
curry	kg	12280	527644	50	2083	2.4
paprika	kg	263	555832	1	1859	0.1
vanilla	kg	0	28501	0	1560	0
cinnamon	kg	2866	353093	25	821	3.0
ginger	kg	126	158786	1	588	0.1
thyme	kg	16	161859	0	382	0
cumin	kg	177	165639	1	356	0.3
nutmeg	kg	35	134792	1	354	0.3
turmeric	kg	0	276513	0	242	0
cardamon	kg	65	22552	0	202	0.1
caraway	kg	80	62650	1	191	0.3
saffron	kg	0	849	0	190	0
pimenta	kg	550	61207	1	166	0.7
anise	kg	500	23332	3	104	2.8
clove	kg	90	53600	0	94	0.3
fennel	kg	209	57548	2	88	2.2
coriander	kg	186	25769	1	62	1.5
mace	kg	0	2783	0	14	0
other herb/spice	kg	2823	1225763	24	4282	0.6
Total Herbs & Spices				139	20902	

TABLE 11: AUSTRALIAN IMPORTS OF FRESH AND PROCESSED VEGETABLES (\$'000) 1994-95 (CONTINUED)

Vegetable Seed						
other vegetables	kg	11927	1507395	50	15306	0.3
cabbage	kg	824	284531	68	1341	5.1
melon	kg	0	75929	0	1011	0
rutabaga	kg	327	2300	31	447	6.8
Total Veg Seed				148	18105	
Essential Oils						
other essential oils	kg	1659	571283	90	7283	1.2
peppermint	kg	341	53888	14	2382	0.6
lemon	kg	519	115566	2	2232	0.1
orange	kg	10	375738	2	1947	0.1
mint	kg	0	37436	0	1716	0
lavender	kg	212	28434	10	834	1.3
lime	kg	0	16578	0	454	0
citrus-other	kg	20	7703	2	399	0.6
geranium	kg	10	1439	2	196	0.9
bergamot	kg	0	1939	0	92	0
vetiver	kg	8	2512	3	82	3.2
jasmir	kg	2160	4509	3	29	8.7
Total Essential Oils				127	17644	

Source: Australian Bureau of Statistics

APPENDIX 12: INTERNATIONAL COMPETITIVENESS INFORMATION**Table 1: Comparative yields of key vegetable crops**

COUNTRY	POTATO	BROCCOLI	ONION
Australia	NSW 21.2 t/ha Vic 25.9 t/ha Qld 23.5 t/ha SA 28.6 t/ha WA 41.0 t/ha Tas 44.1 t/ha Aust 29.1 t/ha (1992-93)	NW Tas 10.9 t/ha WA 10.9 t/ha Gatton(Qld) 4.9 t/ha East Gippsland 5.7 t/ha Australia 6.2 t/ha	WA 56 t/ha Tas 52 t/ha SA 48 t/ha Qld 26 t/ha NSW 25 t/ha Vic 24 t/ha Australia 38.2 t/ha
USA	Columbia Basin 61-70 t/ha Idaho 35-53 t/ha	California 7.6-12.4 t/ha Other states 3.8-5.0 t/ha	40 t/ha
Chile		12.4 t/ha	31 t/ha
Mexico		12.0 t/ha	

Source: Horticultural Policy Council, Winning the Race: International Competitiveness in Australian Horticulture, Industry Report No. 7.

Table 2: Cost comparison - french fry potatoes

FACTOR	AUSTRALIA	NEW ZEALAND	IDAHO	WASHINGTON	OREGON	UK	HOLLAND
Expected yield (t/ha)	50	50	44	57	62	43	50
Average Price \$/t	\$200	\$141	\$161	\$140	\$124	\$140	\$120
Grower Variable Costs (\$/ha)	\$2,919	\$2,599	\$3,118	\$4,316	\$3,189	\$2,688	\$3,293
To point of harvest	\$1,400	\$1,198	\$332	\$839	\$710	\$1,953	\$1,264
Harvest, transport & storage	\$86	\$76	\$78	\$90	\$63	\$108	\$91
Total variable costs (\$/t)							
Fixed Costs (\$/t)	\$57	\$23	\$41	\$30	\$15	\$19	\$18
Total Costs (\$/t)	\$143	\$99	\$119	\$120	\$78	\$127	\$110

Source: Delroy N. Edgell's Technote, Targeting World Best Practice for French Fry Production, 1993.