Know-how for Horticulture™

Identifying and assessing opportunities in the processed vegetable market

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IDENTIFYING & ASSESSING OPPORTUNITIES IN THE PROCESSED VEGETABLE MARKET

STAGE 1 REPORT

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IDENTIFYING & ASSESSING OPPORTUNITIES IN THE PROCESSED VEGETABLE MARKET

STAGE 1 REPORT

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Part A

Introduction, Objectives & Methodology

Executive Summary

The report has been initiated and funded by Australian vegetable growers to identify opportunities in processed vegetables either as suppliers to the processing industry, or as active participants in processing in their own right either as individuals or collectively through various entities.

It is clear from the research undertaken that regrettably there are no silver bullet opportunities, which would provide a high volume, profitable, processing opportunity for growers. The processed vegetable industry, like the food industry at large, is extremely competitive globally making it difficult for new entrants. Despite this caution, the report has identified a number of opportunities that are worth greater scrutiny. The potential for vertical integration into processed vegetables is limited and risky, with the best opportunity being in the domestic market for fresh unprocessed vegetables.

The report has reached the conclusion that it is unrealistic to expect growers (either individually or as a consortium) to undertake a major project producing consumer ready, packaged, branded products in a processing operation which will compete head on with major multi-national which dominate the industry. There are a number of significant barriers to entering this market including:

1. There is a major consumer/market push back to fresh and minimally processed vegetables.
2. Large capital requirements to build a processing facility and markets.
3. Strong brands are required supported by a significant marketing investment and expertise.
4. Profitability of these enterprises is low and only highly efficient specialists can survive.

5. Mainstream categories of canned and frozen are in a mature stage of lifecycle meaning that sales are slowing, margins are narrowing and there are a growing percentage of housebrand generics.

While Australia has enjoyed limited export success of processed vegetables to date, it is a net importer. The long-term outlook for the vegetable processing industry for Australia is not bright. The growing globalisation of the food industry and the emergence of low cost producers (e.g. China) will make it difficult for Australian companies to compete.

Most industry observers have a rather pessimistic view of Australia's long-term competitive situation due to:

- Rapid expansion of production of third world countries
- Australia's high labour costs
- Economies of scale
- Freight cost disadvantages
- Water supply issues.

The above are likely to result in imported product taking a growing share of the domestic market for processed vegetables.

A strong point to emerge from the consumer research pertains to the need for convenience and products, which appeal to the time conscious homemaker. Industry marketing on the nutrient value of processed

vegetables and engaging the consumer would assist in realising the excellent potential to increase per capita consumption in Australia.

The shelf stable (canned) vegetable category is mature and is likely to be subject to further industry rationalisation due to the significant threat of imported product. Owner/operators in Australia are making only modest profit, not sufficient to fund re-investment in their plants.

While the frozen food category is in better shape than the shelf stable category, it is coming under increasing pressure. It is a robust category due to the dominance of the strong brands, making it difficult for a new entrant to come into the market. Without doubt, the frozen categories will continue to move more into value added product and meal solutions. This will grow the processor demand for the more exotic vegetable lines, although unfortunately the volumes are likely to be relatively small.

The whole convenience meal solutions category is likely to grow at a rapid rate for many years because it is delivering to the consumer requirements of convenience, taste and value for money. This category comprises pasta, cook in, pour over and simmer sauces. It is expected that it will expand rapidly with the introduction of new ethnic-styles such as, Thai, Malaysian, Indonesian, Korean and so forth. New entrants into this category will find it difficult, due to the dominance of the strong brands and the need for large marketing budgets, which are essential in this category.

There is a major opportunity to take advantage of the market/consumer interest in fresh, minimally processed vegetables including salads and pan ready vegetables both for retail and food service outlets. This market will continue to show strong growth over the next decade opening the way for new entrants. However, margins are thin, largely because the control of retail over this category, together with low

cost, backyard operators. To succeed will require strong integration of the supply chain; the adoption of new technologies to improve product quality and shelf life and strong brand based marketing programs.

There are a number of opportunities enabled by emerging on-farming technologies, such as MAP, germ plasm development and optical technologies, to add value in improving on farm return. These include, improving eating quality, enhancing functionality, enhancing the environment, cost reduction and optimising marketable yield. These technologies have applications for both high value branded vegetables, as well as various processing applications.

Rather than attempting to compete head on with the major processors, there are opportunities for growers interests to form strategic alliances for various projects including the processing of specialist ingredient product and branded minimally processed product. The major processors are increasing in size in this direction and are looking to secure tighter, better-managed supply chains.

The following are identified as opportunities worthy of closer scrutiny in the next stage of this project.

1. Establishing a first stage processing plant of ingredients for sale to major food processors
2. Producing fresh cut salads, herbs and vegetables
3. Forming a strategic alliance with a processor to product specialty or niche products
4. Adopting on-farm technology to produce high value products
5. A community based multi-purpose food hall.

There are significant question marks over all identified opportunities although closer examination would be worthwhile.

This report details the background research and the underlying reasons from where we form our conclusions.

What processors can bring to the equation is capital, strong established trading and expertise, marketing, category management and distribution.

Introduction, objectives & methodology

1. Introduction

This report is intended to provide a comprehensive review of opportunities in the processed vegetable sector for Australia.

The project has been initiated and funded by various growers' interests in partnership with Horticulture Australia Ltd.

In most part, the project has been driven by concerns by growers of dwindling opportunities for processing vegetables. With the rationalisation that has taken place in the Australian industry, many processing operations, notably canning and frozen operations, have closed down taking away market outlets for large volumes of processed vegetables. This has in turn adversely affected the profitability of vegetable growing operations, which need the larger volumes and product runs to achieve the economies of scale required to drive profitability.

As we interpreted the brief, the aim of this study is two fold; to identify possible opportunities for processed vegetables and, at the same time, undertake a comprehensive assessment of the health and performance of the Australian processed vegetable industry.

The intention in conducting the review has been to broadly assess all possible opportunities.

The review has been conducted on three fronts:

- A review of the major existing categories including canned, frozen and fresh value added product.
- A review of markets and market opportunities including, domestic and export, retail, food service and ingredient markets.
- A review of existing and emerging opportunities to assess whether there are any opportunities emerging from them.

The report is divided into seven parts with this Part A covering introduction, objectives and methodology. Part B presents the review of the existing categories; Part C contains the assessment of markets and market segments. Part D provides an overview of global trade and competition. Part E provides a review of new and emerging technologies both on-farm and beyond farm processing. Part F provides a strategic assessment of the processing industry and Part G identifies and assesses opportunities.

2. Objectives

1. To conduct a study, which will describe the current vegetable processing industry and will identify potential opportunities (domestically and exports) for vegetable processing, especially those opportunities that maximise the benefit to vegetable growers.
2. To document the results of the study in a report that will be widely distributed within the vegetable industry.
3. To conduct a more detailed commercial analysis of the more promising opportunities
4. To prepare a report based on the commercial analysis directed to potential investors and government organisations working on regional development.
5. To organise and conduct a series of workshops for stakeholders to highlight those opportunities identified in the study.
6. To act only within the guidelines established by, and in conjunction with, the steering committee.

3. Methodologies

The methodology has involved a comprehensive program of research and analysis covering the following steps:

1. **Briefing and familiarisation**
   - Visitations and comprehensive briefings in Bairnsdale, Bundaberg, Ord River and Broome growing areas
2. **Industry scoping**
   - Comprehensive desk research to assess the current situation.
3. **Processor research**
   - Extended meetings with senior executives of Heinz Watties (in New Zealand), Simplot, SPC/Ardmona, Golden Circle and Gourmet Garden (Berri Ltd.)
4. **Retailer research**
   - Extensive meetings with fresh chilled and shelf stable vegetable category managers in Coles, Woolworths, Metcash and Foodland.
5. **Ingredient and commercial user analysis**
   - Personal and phone interviews with a cross section of suppliers of ingredient and commercial vegetable products including Eurest, Qantas Inflight Catering, Spotless and Unilever.
6. **Emerging on-farm technologies**
   - This component of the project was conducted in close consultation with Institute of Horticulture Development at Knoxfield with a team led by Russell Sully.

7. Processing technologies

- Heyhoe & Associates, a leading consultancy in food technology with extensive experience in vegetable products and processing, conducted this component of the project in collaboration.

8. Consumer research

- Six consumer focus groups conducted in Melbourne, Sydney and Brisbane covering:
  1. Parents with kids living at home aged 5-18 years old; mid to upper socio-economics
  2. Mixed males/females 45-60 years old; mid socio-economics
  3. Older retirees 60 - 75 years old, mixed sexes, mid socio-economics
  4. Parents with kids living at home aged 5-18 years old; mid to lower socio-economics
  5. Mothers of young children (with one under school age - may also have older children); mid socio-economics
  6. Young singles and partnered; 18-25 year old; no kids; own or shared household; mid socio-economics

9. Food service research

- A combination of in-depth personal and phone interviews with a cross section of food service representatives

10. Strategic analysis and opportunity assessment

- Applying the knowledge gained, together with our extensive experience, to assess the identified opportunities.

Part B

Category Analysis

Section

1

Shelf Stable

1.1 Overview

- The shelf stable segment comprises cans, jars and tetra brik/combi bloc products.
- The total canned vegetable market has been growing in value since 1995 and continues to grow at 3.7%. Despite this modest growth, canned food is now considered to be a mature category.
- However, behind these aggregate figures lies major variation in performance. Asparagus, beetroot, mushrooms and peas are declining in volume terms. All vegetables, except mushrooms and peas, have shown some modest value growth mainly due to the practice of value adding with special sauces, etc. the introduction of smaller can sizes. Tomatoes and seed beans continue to grow heavily, largely because of the consumer trend towards Mediterranean diet and cooking styles.
- The tomato market has become increasingly competitive, with more imported brands coming into the market, using deep cut promotions to attract consumers and there has been continued focus on the value-added tomato segment. The canned tomato market is dominated by opportunistic importers who bring in cheap product from Italy, Turkey, etc.
- Value added canned tomato products have enjoyed substantial growth. Chopped tomatoes have overtaken whole peeled and tomatoes with basil and other added herbs have shown growth.

Whole peeled tomatoes are a price driven commodity, with the Australian produce struggling to compete on price with their European counterparts. Tomato paste is the ultimate commodity market sold on price.

1.2 Key table & commentary

Category	Volume			Value			Key Players			Imports		
	Tonnes	Segment Share	Growth	$m	Segment Share	Trend	Company	Market Share (Value)	Market Share (Volume)	Source	Tonnes	$'000s
Asparagus	3,726.7	3.8%	-10.6%	27.5	13.9%	4.7%	Edgell	23.9%	21.5%	China	1,118.9	2,932.5
							John West	25.3%	22.6%	New Zealand	700.2	2,649.0
							Generics	21.3%	27.7%	Peru	1,584.9	5,742.0
Beetroot	20,212.3	20.7%	-2.8%	35.5	13.9%	1.9%	Golden Circle	59.6%	58.1%	China*	0.4	3.4
							Edgell	23.8%	20.9%	New Zealand*	0.7	1.8
							Generics	15.9%	20.7%	Philippines*	0.4	0.5
Cabbage				2.0		0.7%						
Capsicum				0.9		12.0%						
Carrots				2.9		7.8%				New Zealand	409.0	377.0
Champignons				8.7		9.4%						
Corn	15,927.6	16.3%	-1.8%	38.1	15.3%	3.5%	Edgell	52.9%	43.6%	New Zealand	221.7	654.0
							Golden Circle	17.6%	18.4%	Thailand	2,273.0	2,872.0
							Generics	20.7%	29.8%			
Mixed Vegetables				8.8		2.0%				Italy	1,878.2	5,144.0
										Thailand	2,311.0	3,279.0
										Spain	1,552.0	4,208.0
Mushrooms	2,454.1	2.5%	-7.6%	9.3	3.8%	-1.1%	Edgell	36.5%	28.5%	China*	76.0	271.0
							Generics	45.6%	54.6%	New Zealand*	145.0	507.0
										Thailand*	29.0	169.0
Peas	6,278.0	6.4%	-7.7%	10.7	5.7%	-2.3%	Edgell	48.5%	43.3%	Italy	326.0	320.0
							Golden Circle	21.0%	20.8%	New Zealand	267.0	311.0
							Generics	22.4%	28.7%			
Potato granules	657.5	0.7%	1.6%	5.1	2.1%	6.8%	DEB	75.4%	70.1%	Canada	735.6	883.5
Potato - canned	1,690.7	1.7%	2.6%	3.7	1.5%	7.8%	Edgell	54.6%	44.4%	New Zealand	8,962.1	8,958.0
							Generics	32.6%	44.1%			
String Beans				4.0		10.3%				Italy	2,895.1	1,230.0
										USA	1,057.6	2,166.0
										New Zealand	17,764.0	19,773.0
Tomatoes	32,869.3	33.6%	4.5%	71.0	27.9%	3.6%	SPC	18.6%	17.7%	China	1,882.4	2,110.0
							Ardmona	15.6%	15.8%	Italy	28,909.7	28,479.0
							Generics	19.6%	26.6%	Turkey	1,528.8	1,744.0
							Others	23.8%	21.9%	USA	2,110.2	2,383.0
Wet seed bean	6,693.6	6.8%	3.7%	22.4	8.3%	4.2%	Edgell	55.4%	51.9%			
							Masterfoods	27.6%	27.7%			

* denotes fresh imports

Source: Aztec / ABS (2001) / Retail World (2002)

- Historically Edgell has dominated the canned vegetables market and continues to dominate, despite losing share since 1999. This share loss has been driven by Edgell's range rationalisation in the tomatoes segment. It made the decision to withdraw from tomatoes because it could not compete with cheap imported product.
- Golden Circle dominates in the canned beetroot segment and currently enjoys a 60.2% value share and 57.7% volume share. It packs the vast majority of beetroot sold in Australia. It also co-packs for Edgell.
- SPC/Ardmona is market leader in tomato products and control over 40% of the tomato processing. Its focus is on value added product, whole peeled, diced, added herbs, etc.
- While the aggregate figures do not show it, there is massive growth in the super sweet and value added sweet corn. Golden Circle is enjoying massive growth in the segment with Simplot also performing well. Baby carrots are also a growth category.
- Much of the canned asparagus and mushroom is imported, along with significant quantities of imported beetroot and string beans. Most of the imports are to be sold under house brands and generics.

1.3 Consumer behaviour and perspective

- While virtually every Australian household has a stock of canned vegetables in its pantry, it is a mature category with modest growth and structural adjustments occurring. The main reason for this is that consumers are switching over to fresh and frozen product and the general change in eating and food preparation styles.
- There is a widespread consumer view that canned vegetables are a lower grade product and lack taste and texture. This particularly relates to products, such as canned peas and beans. The younger consumer prefers crisp, crunchier vegetables and finds canned vegetables to be soft and mushy.
- There is also a perception, which is generally incorrect, that canned vegetables lack the nutritional qualities or goodness of fresh food.
- Canned vegetables are viewed as an old-fashioned pantry item kept in case of emergency.
- The canned products experiencing growth are those which are used in recipes or salads such as beetroot, potato, corn, asparagus and tomatoes; the latter enjoying massive growth from the popularity of Italian meals.
- Ethnic eating trends, particularly Asian and Mexican, have grown in popularity in recent years, providing the opportunity to develop a canned Asian style vegetable range or value added Mexican seed beans.
- There is an increasing trend towards smaller, easy open and highly priced product for use in recipes and salads and purchased because of their convenience. This partially explains why value is growing faster than volume.

1.4 Retailer dynamics

- One sure sign that a product is mature and reaching commodity status is when there is a high percentage in retail house brand and generics. For most, product upwards of 20% are housebrand/generics and, in the case of mushrooms, as high as 45.8%.
- The underlying rationale is that when a product reaches the maturity stage, consumers become less brand conscious and buy on price.
- Another trend, which is driven by this, is the large share in some categories of imported generics, prominently from China, Thailand, Philippines, New Zealand and Canada. This reflects the fact that Australian producers are finding it increasingly difficult to compete on price for these commodity lines.
- There is a worldwide over capacity in canning and food processors discount price to keep their volumes up.
- Yet a further sign of the maturity of the category is the declining shelf space being allocated to canned vegetables by retailers. This, in turn, has led to price wars as processors offer promotional pricing incentives to hold their share of shelf space.
- As a result of the above, an increasing share of canned vegetables is being sold through advertised price specials.
- Although canned products respond well to advertising and price cuts, such promotions don't actually increase consumption. The consumer simply purchases the price reduced products and pantry stocks. Even though the sales graph peaks during advertised periods, it eventually evens out.
- In tomatoes, house brands have lost share since 1999 as consumers are purchasing less volume less often. The main reason for their decline is linked to the proliferation of low priced imported

branded tomatoes. House brands in the major accounts have begun to re-establish themselves with new packaging designs and new products including "Organics" as retailers try to take the store branding, e.g. Farmland and Coles, up market.

- Generic brands are facing supply issues as major manufacturers choose to limit or cease supply.

1.5 Processor industry dynamics

- Overall, processors are struggling to hold profitability in the canned vegetables category and are diversifying into other categories to achieve their overall target returns.
- The key problem is that the prices they receive are generally declining in real terms together with the fact that they have very high levels of capital investment and large labour bills.
- Profitability in the canning vegetable industry is dominated by economies of scale. Canneries look for long runs as the down time and cost to change product, or can size, is high.
- As a result of the above there is an increasing tendency to outsource (buy in) product in the case of short run production, such as beetroot. For example, Simplot outsources its beetroot product for its Edgell brand to Golden Circle.
- Canners claim that they are being squeezed at both ends; increasing costs, particularly raw material and reducing sell pricing.
- A key driver of this is the growing volume of imported generic product, which is being sold at well below Australia's cost of production.
- Over the past decade there has been a large amount of rationalisation in the industry with many canning plants closed.
- Increasingly, location is becoming a major issue for canneries; they need to be located in an area with access to product for extended production. For example, Bathurst and Brisbane are ideal for corn because they have access to raw material for up to four months. Freight costs and quality deterioration are also important reasons why location is a key issue.
- Golden Circle is well placed because the vegetables tend to be counter to pineapple meaning that they can achieve high levels of plant utilisation.

1.6 Competitive threats

- As has been highlighted, the Australian canned food industry is coming under increasing pressure for cheap imports, notably from China, Indonesia, Thailand, Philippines, South Africa and mainly sold under housebrands/generics. In some categories Australian processors have stopped supplying generics because they cannot compete.
- These countries have far lower production costs, both for raw materials and labour.
- There are also allegations that some of these countries may receive direct or indirect government subsidies.

1.7 Conclusion

- It is difficult to show any optimism for the future of the canned vegetables industry in Australia.
- The industry is in a mature stage with most categories declining in volume terms.
- Processors are being forced into promotional discounting to protect their sales and shelf space, which is undermining profitability.
- On the other side, growers are requiring higher prices to cover their costs as labour and other import costs are rising.
- It is most unlikely that there will be any major involvement in new canning lines or canneries. At best we will see up-grades of existing facilities.
- With the cost of investment in a high-speed cannery in excess of $20 million, given the mature state of the industry and the threat from imports, food companies will not be prepared to invest in new plants.
- If anything, we will see further rationalisation with companies focusing on higher value lines and buying in the core categories. It is likely that canners will progressively concentrate on value added product, meal solutions and higher value products and pull back from straight canned vegetable product. It is likely that cheaper imported product will start to dominate the commodity lines such as peas, beans, etc.
- The canning industry has suffered from the fact that it has been slow to innovate, both in terms of the cans and the products that they put in them.

1.8 Opportunities

- Given the growing consumer interest in exotic ingredients such as Asian vegetables, mini sweet carrots, speciality gourmet beans either in natural form or in special juices or sauces, there may be an opportunity here. However, this would only be feasible for growers located near a cannery interested in these products or a snap freezing line where frozen product can be transported to a cannery.
- The volumes would not be sufficient to justify a dedicated cannery; these would have to be produced in an existing facility.
- Opportunities exist in the canned market to explore similar concepts to the frozen sector, which have combined vegetables to have Asian Style or Italian Style mixes. Other concepts include rice salad or coleslaw in a can. New varieties in the seed bean segment could be launched capturing consumer trends to Asian and Mexican style dining.
- The consumer stigma associated with canned products will limit opportunities for new products.
- With the trend towards smaller pack sizes, products such as a four pack of small cans will soon be released. These products will attract a price discount (four small cans for the price of three) with the overall aim of increasing consumption. Such an initiative will work well with sweet corn.
- A niche market to emerge from the growing ageing of the population is fresh, pureed, vegetable products that have balanced nutritional levels and which are easier to eat and digest.

Section

2

Frozen

2.1 Overview

- The frozen vegetable category has undergone an evolution starting out with single vegetables then various mixed and more recent lines for meal solutions such as stir fry mixes, either dry or in a sauce, or various combination packs with vegetables and a protein content.
- The overall category is static; 3.7% volume terms but growing at 5.7% value. This reflects the trend towards higher value specialised mixes, gourmet vegetables, sauces, etc.
- Potatoes are by far the largest category in frozen vegetables (French fries, chips, hash browns) but they are not included in this study. The large volumes of potato product, which carries the less profitable lines, drive the profitability of the major frozen food companies.

- Segments within the frozen vegetable category are defined as follows:
  - Core Vegetables – single packaged vegetables eg peas, corn, beans. This segment accounts for 61.3% of volume and 51.3% of value within the total frozen vegetable category (flat).
  - Support Vegetables – single packaged vegetables eg carrot, cauliflower, broccoli, onion, Brussels sprouts. This segment accounts for 12.6% of volume and 14.3% of value (growing).
  - Vegetable Mixes – more premium style mixed vegetable pieces. This segment accounts for 6.5% of volume and 9.2% of value (growing rapidly).
  - Mixed Vegetables – a mix of diced/cut vegetables and account for 9.4% of volume and 6.1% of value.
  - Meal Starters – packaged vegetables with a sauce that require the addition of a protein or carbohydrate for completion. This segment is in accelerated growth 5.7% volume share and 10.2% value share.
- In general value added vegetables contribute 20.9% volume share and 29.8% value share.
- Growth in frozen vegetables appears to be reasonably static, which is a sign of a mature category. Consumer demand for value added products, exotic and ethnic mixes and stir-fry products, drive the marginal growth that has been achieved.
- Food service use of frozen vegetables is high.

2.2 Key table and commentary

Category	Volume		Value		Imports			Key Players		
	Tonnes	Segment Share	$m	Segment Share	Source	Tonnes	$'000s	Company	Market Share (Value)	Market Share (Volume)
Brocolli		1.0%		1.8%	China*	0.4	3.4	Simplot (Birds Eye / Edgell)	34.0%	26.1%
					New Zealand*	0.7	1.8	McCain	28.0%	22.7%
					Philippines*	0.4	0.5	Watties	8.0%	9.7%
Brussell Sprouts		0.7%		1.0%				Generics	20.0%	33.2%
Carrots		2.0%		2.2%	New Zealand*	409.0	377.0	Logan Farm	7.0%	
Cauliflower		0.7%		0.9%	New Zealand*	7.7	14.0	Other	2.0%	8.2%
Corn Cobs		17.2%	23.6	17.0%	New Zealand	7587.0	10280.0			
Corn Kernels			17.8		South Africa	363.8	404.0			
					Thailand	362.9	761.0			
					USA	336.0	335.0			
Mixed Vegetables (other)		9.0%	51.3	6.1%	Belgium/Luxembourg	133.7	158.0			
Mixed Vegetables (premium)		11.4%		13.6%	China	102.7	299.0			
					Mexico	273.7	701.0			
					New Zealand	7625.8	9132.0			
Peas		35.4%	72.0	28.3%	China	192.8	440.0			
					New Zealand	15938.3	14527.0			
					Taiwan	15.6	34.0			
Stir Fry		8.8%		4.3%						
String Beans		13.9%	29.5	12.4%	Belgium/Luxembourg	529.6	512.0			
					Netherlands	793.6	759.0			
					New Zealand	2511.2	2667.0			
					USA	635.4	565.0			
					China	237.4	310.0			
Support Vegetabes		1.1%	35.0	0.6%						

* denotes fresh imports

Source: Aztec / ABS (2001) / Retail World (2002)

- Peas dominate the category by a long way, followed by corncobs and string beans. Mixed vegetables account for 20% of the market.
- Core segments (single packaged vegetables) now represent more than 60% of the total frozen vegetable market.
- The frozen vegetable market is highly competitive due to the presence of major players Birds Eye, McCain, Heinz Wattie, Logan Farm and a range of house brands and generics.

2.3 Frozen dinners and meals

- The frozen meal category has taken off in the last few years after a very slow start. The category is now growing at 14.7% in volume and 18.10% in value, again reflecting the trend towards higher quality meals and ingredients.
- Prominent in this category are pasta and chicken based meals, although roast meals with vegetables and various beef, lamb and veal dishes are also popular.
- These products generally include a protein and vegetable component.
- The category is dominated by McCain (Healthy Choice), Maggi and Lean Cuisine.
- These products stagnated initially because they were not delivering to the consumer's value for money expectation. The portion sizes were small relative to the cost. The processors had to charge higher prices to cover the cost of the better quality ingredients required to delivered the desired eating quality. This situation has now been rectified and consumers are now less price sensitive.
- Pizza also figures prominently in this category, most of which have a vegetable component.
- Research suggests that up to 50% of shoppers don't know what they will serve for dinner at 4pm on that day. Busier lifestyles have left consumers looking for meals that are quick to prepare and are nutritionally balanced. This trend has driven the demand for prepared frozen meals.

2.4 Consumer behaviour and perspective

- The situation for frozen vegetables is largely a reflection of changes in consumption and food preparation methods. The traditional "meat and three veg" (usually frozen) has now given away to stir fries and pasta. Whilst frozen stir fry mixes are popular, a large percentage of consumers prepare from fresh because of the perception of fresh being better in terms of taste and nutritional value. Nevertheless, stir fry mixes, with or without sauces, are growing rapidly.
- This trend towards fresh has slowed the growth of the frozen categories. Penetration in the number of homes that have frozen vegetables in their freezer declined from 91.65% to 89.3% in just 12 months and this trend is likely to continue.
- Per capita consumption of frozen vegetables in Australia is low by world standards, for example 5.3 kg per annum in Australia compared to 8.2 in UK. This is because of year round availability of high quality fresh product at reasonable prices. Seasonal availability and price is a big factor in frozen vegetable sales. Consumers generally prefer to buy fresh if it is available and prices are reasonable.
- Whilst consumers generally prefer fresh vegetables, the convenience of frozen vegetables and the value for money makes them very appealing to consumers. As people become more time poor, they are looking for solutions to make meal preparation simpler and quicker.
- With regard to nutrition, consumers have mixed views; whilst most believe that fresh is more nutritious, frozen is well up there especially against cans. This is undoubtedly because the processing companies have spent millions printing the message of being snap frozen.

2.5 Retail dynamics

- Without doubt the frozen cabinet in supermarkets is by far the most strongly contested of all shelf space.
- In particular there is major pressure on frozen convenience meals and home meal replacement products, which is pulling some of the slow moving commodity vegetables under pressure.
- The category is strongly contested by Simplot (Edgell/Birdseye), McCain, Heinz/Watties and Logan Farms as a specialist player.
- Undoubtedly it is the strength of these brands that has allowed the category to hold on in the light of strong competition. It would be very difficult for a new entrant into this category.
- However, despite the strength of the brands there is a high level of price competitiveness with at least one brand on special virtually every week of the year.
- Retailers are rationalising branded players in core frozen vegetables, to increase the space allocated to their own house brands and the value added area. Private label have become a strong competitor in the frozen category, especially in the core vegetable segments. Many consumers perceive these segments as commodity products with little quality difference, hence, their price sensitivity. Private labels differentiate themselves on price and enjoy strong retailer support, good distribution and shelf position.
- Frozen meals are squeezing out traditional vegetable lines because they deliver better gross profits to the retailers.
- Frozen vegetables are frequently sold through promotional price specials. Consumers tend to buy whatever brand is on special.

2.6 Processed industry dynamics

- As for canned, processors are being squeezed by downward pressure on selling price and escalating costs although the situation isn't bad as for canned.
- The food service market for frozen vegetables is very large which provides volume and economies of scales and allows processors to remain profitable in a highly competitive market.
- Australian processors are concerned about the threat from New Zealand in the core categories of peas and beans. New Zealand has a substantial production cost advantage because of much higher yields, variation, less water usage, lower costs. This has allowed Heinz Watties to be strong in the market.
- Most of the Australian production comes from Tasmania, which is progressively becoming less price competitive because of small scale production, lower yields compared with New Zealand and freight costs.

2.7 Conclusion

- While the frozen food category is in better shape than the shelf stable category, it is coming under increasing pressure.
- The category is robust, due to the dominance of the strong brands, which would be difficult for a new entrant to come into the market. Without doubt, the frozen categories will continue to move more into value added product and meal solutions. This will grow the processor demand for the more exotic vegetable lines although unfortunately the volumes are likely to be relatively small.

2.8 Opportunities

- There may be some limited opportunity for specialised product such as super sweet corn, Asian vegetables, mini-carrots, etc., but the volumes are small and to succeed would require growing close to the plant.
- There is a market to replace imports of high quality asparagus spears (as exported to Japan), spinach and baby corn. The key challenge here is to be price competitive particularly against countries such as China, Thailand, Philippines, Chile, Peru South Africa, which have far lower production costs.
- Potentially there is an import replacement opportunity with spinach and asparagus although, ultimately, this gets down to whether Australia can be cost competitive vis a vis low cost overseas production.
- The spinach category is large and growing but at present is totally supplied by imports.
- There are some potential opportunities for frozen vegetable including import replacement and some of the exotic vegetables that consumers are now demanding.
- As has been highlighted elsewhere in this report, it would probably not feasible to establish a new operation to process these products given that excess capacity exists in the industry. From the grower perspective the logical thing would be to form a strategic alliance to grow for one of the existing operators in a joint venture operation. This is discussed in more detail later in the report.
- Opportunities to export frozen and convenience meals exist throughout Asia, especially in Singapore and Malaysia where there is demand for healthy, convenient and innovative gourmet foods. Limitations on the local availability of raw materials and technology underpin the growing demand for prepared vegetables in the food service sector and also for household consumption.

Section

3

Sauces & condiments

3.1 Overview

- This section covers the miscellaneous recipes-based product including pasta, cook-in sauces, dips, condiments, pickles, etc.

3.2 Key table and commentary

Category	Volume			Value			Key Players		
	Tonnes	Segment Share	Growth	$m	Segment Share	Trend	Company	Market Share (Value)	Market Share (Volume)
Sauces									
Fresh Pasta Sauces	2019		5.5%	17.7		8.9%	Latina	76.9%	
Cooking Sauces				8.1					
Pasta Bakes				18.2					
Pesto Bases				9.3					
Premium Sauces				16.1					
Core Sauces				91.7			Raguletto	19.4%	
							Dolmio	34.6%	
							Leggos	15.4%	
							Five Brothers	6.3%	
Meat Sauces				10.9					
Tomato Paste				42.1	18.40%	-1.40%	House Brand Generics	20.2%	
							Leggos	61.7%	
							Fountain	7.0%	
Pickled Vegetables									
Onions		21.9%	-0.9%				Always Fresh	17.5%	
Gherkins		21.6%	-1.2%				Aristocrat	13.2%	
Cucumbers		14.0%	-0.4%				Three Threes	11.9%	
Dips	3416		3.20%	25.6		4.40%			
Tomato		75.4%			75.0%		Masterfoods	36.5%	35.6%
Bean		6.4%			6.5%		Tostidos (Pepsi)	26.4%	27.8%
Frozen Dinners	41.4m units		14.70%	160.3		18.10%	McCain		20.2%
							Healthy Choice		12.3%
							Maggi		15.0%
							Lean Cuisine		14.1%
Frozen Meals	26791		6.70%	253.2		16.20%	McCain		20.7%
							Inghams		13.1%

Source: Retail World (2002)/ Aztec/ABS (2001)

3.3 Pasta sauces and cooking sauces

- The pasta and cooking sauces market has enjoyed large growth over the past 20 years fuelled by the popularity of pasta and convenience meals.
- The pasta sauce market growth is at double figure rates through the last decade and although there are strong signs of it slowing down it is still growing steadily. Volume growth is less than the value growth reflecting the trend towards value added and higher quality products. Most of these products are sold in glass jars and include premium ingredients.
- The pasta sauce market is dominated by five key players, Lattina, Ragulleto, Dolmio, Leggos and Five Brothers (Unilver).
- There are also some boutique players in the niche 'health food' section comprising, Prue Sober's "Serendipity" pasta sauces (Australia), "Naked Foods" pasta sauces (Australia), "Freedom Foods" pasta sauces (Australia), "Whole Earth"pasta sauces (England), "Green Gables Organic Produce" (Australia) and "Muir Glen Organic" (US).
- The sauces are predominantly packed in glass jars, with a small selection in tubes (as a concentrate) and plastic bowls and tubs with plastic peel tops and in sachets.
- Total Italian meals market has shown significant growth in the past two years, fuelled by the buoyant pasta bake market. Tomato paste and meat sauces remain flat with little innovation and decreasing consumer relevance of canned pasta sauce and tomato paste.

- Tomato paste enjoys a high household penetration, however, growth is flat with inter-purchase intervals lengthening. Overall the paste market is in decline due to the trend towards semi-prepared meals. Tomato paste is a commodity market sold on price.
- There has been an increase in imported brands, which offer high quality and low price. This poses the risk that the category will be devalued long-term and consumers will trial/switch to higher quality imported products.

- Dolmio dominates the pasta sauce segment, however, failure to launch new products has driven Dolmio's share down. Both Dolmio and Raguletto have depth and breadth of range in the key volume segments of Core and Pasta Bakes. Raguletto has strengthened share via line extensions.
- House Brands and Generics share of volume and growth has increased and has continued to gain share through the introduction of smaller pack types and competitive price.
- Apart from pasta sauces, the cook-in sauce category (Chicken Tonight type products) is also large. Chicken Tonight (Unilever) dominates this category with 36.7% value share and Kantong (MasterFoods) with 29.6% value share. Most of these products are sold in glass jars.
- Maggi, Campbell's and Gravox are the primary producers of vegetable stock. Maggi (1 litre) and Campbell's (375 & 500ml packs) package their product in tetra packs, while Gravox uses a glass bottle.
- The dips and dipping sauces market has also shown dramatic growth over the past few years with the category dominated by MasterFoods (36.5%) and Tostitos (26.4%).

3.4 Pickled, roasted vegetables and antipastos

- The pickled vegetable market is a mature category, declining steadily in volume terms. This is largely a reflection of changing eating patterns.
- Traditionally, small operators have dominated the pickled business but in recent years there has been much rationalisation, with operators merging and the smaller ones going out of business. Always Fresh (Riviana Foods) continues to dominate the pickled vegetable market with 17.5% volume share followed by Aristocrat (Fawcett Bros) with 13.2% share.
- There are a plethora of producers supplying products such as corn relish, marinades, pickled onions, kalamata olives, Giardiniera and chutneys and include, Masterfoods, Cerebos (Fountain), Nestle (Maggi), Sandhurst Fine Foods, Fletchers, Carmelina, Hoyt's, Valcorp (La Gina, Gee Vee), Farmland, Savings, Unilever (Rosella), Crosse & Blackwell, Three Threes, Kings-Strikeforce (Baxters), Manassen Foods (Trident), Conga (Green Valley, Sacla), Coles, Henry Jones Foods Pty Ltd (Taylor's), Muir Glen Organics, Viva, Jill's Cuisine, Krakus, Gundelsheim, Blue Banner and Fehlbergs.
- All the aforementioned companies package their products in glass jars.
- By far the biggest use of pickles in food service is with the likes of McDonalds and Hungry Jacks. Heinz has a joint venture with Pahl Enterprises to supply McDonalds, which grows and processes at its Riverina operation.
- Roasted and grilled vegetables are enjoying steady growth due to the popularity of antipasto dining. Much of the produce is imported, although there are a number of smaller regional players.

- Wattle Valley packaged its three antipasto varieties in small plastic tubs, which were located in the chilled section.

3.5 Soups

- Soups in the canned category comprise chunky, condensed, premium and single serve. There are dry, wet and fresh processed soups available.
- In the wet soup category, the market leader is Campbell's with a 47.2% value share. Heinz Wattie's follows with a 38.2% value share.
- Surprisingly, the House of Winston, one of the few fresh processed varieties, only holds an overall 2% value share.
- In the packet/dry category, Unilever (Continental range) holds a commanding 57.3% value share. Uncle Toby's and its 'Country Cup' range follows with a 30.4% value share.
- While soups are predominantly packaged in cans and sachets, there are a growing number of alternative packaging options, namely tetra bricks, plastic containers (usually single serve). The growing 'singles' market largely drives this portion control.
- Most dehydrated vegetable products, including onion, potato, carrot, parsley, corn and leek, which are used in dry soups are sourced under global contracts and are imported to Australia.
- There is a dehydration plant in Victoria, which provides some product when market conditions and exchange rates are favourable.
- Large multi-nationals, such as Unilever, are now outsourcing elements of the processing cycle such as packaging wet soups into tetra bricks.

3.6 Consumer behaviour perspective

- Consumers have embraced prepared pasta sauces, cook-in sauces and dips because they fit perfectly with the consumer trend towards assembling meals and providing convenience.
- Unlike the counterparts in other countries, Australian consumers prefer to assemble convenience ingredients to make their own meals, rather than to buy a ready prepared meal. These sauces save the time and mess by allowing the consumer to open the jar and pour over the chicken or beef and produce a tasty meal in minutes.
- Marinades and simmer sauces are also popular because they greatly enhance the meal with minimal effort. The traditional Aussie banquet of sausages, chops and steaks has now given way to marinated chicken, seafood, etc.
- Dips and salsa sauces are also very popular as a snack food to accompany drinks.
- Unlike most other categories, consumers have demonstrated a willingness to experiment with new products and to pay a premium for convenience.
- Loss of cooking skills and consumer perceptions of having less time has resulted in a demand for convenient meal solutions and components.
- Consumers have taken to grilled vegetables in antipasto, which is big in delis and food service applications.

3.7 Retailer perspective

- Retailers are extremely positive about these products because they deliver a high level of gross profit for the shelf space allocated.
- The shelf space allocated to shelf stable pasta and cook-in sauces is large and continues to increase.
- Another attraction to retailers is that they generate add on sales such as meat, seafood, corn, etc.

3.8 Processor industry dynamics

- Most of the major food companies are developing convenience meals and sauce type ranges because of the popularity with consumers, but more pointedly because they deliver higher profits than most of the standard products.
- Rather than producing these products from raw materials, almost without exception the food companies are assembling these products from outsourced ingredients. They buy in semi-prepared sliced, diced vegetables, purees, etc. While they cost substantially more, because of the relatively small volumes, it is more economical to buy these low volumes in processed form rather than to start from scratch. This provides a potential opportunity for on-farm value adding involving first stage value adding, which is discussed later in this report.
- Branding and marketing is very important in this category. Consumers prefer to buy trusted brands, making it difficult for a new entrant. This category is heavily promoted on television and in magazines.
- Processors are investing heavily in innovations to develop new, high value meal solutions products. As a result, we are likely to see the continuing expansion and growth of this category.

3.9 Conclusion

- The whole convenience meal category is likely to continue to grow at a rapid rate for many years because it is delivering to the consumer requirements of convenience, taste and value for money.
- It is expected that the category will continue to expand rapidly with the introduction of new ethnic style, Thai, Malaysian, Indonesian, Korean and so forth.
- It will be very difficult for a new entrant in this category because of the dominance of the strong brands and the need for large marketing budgets, which are essential in this category.

3.10 Opportunities

- The growth of this category presents an opportunity for specialist growth and on-farm value adding of specialist vegetable products.
- As has been indicated food processing are totally outsourcing the production of the ingredient to the stage that they can be simply added to the recipe. There is, therefore, the opportunity to provide specialist, first stage processed vegetables, such as sliced, diced, grilled, pureed and concentrated products, which are all quantity controlled to specifications established by the processor.
- As consumers become more educated about the food products that they eat, it is likely they will become more discerning and demand greater control over nutrition, fat and sugar intake and food safety. This may open up new product opportunities in areas of functional/fortified foods (food plus), low and light foods (food minus) and natural, organic and vegetarian products.

Section

4

Fresh salads, herbs & pan ready vegetables

4.1 Overview

- Australian retail sales of salad mixes and fresh cut vegetables have shown phenomenal growth from $15 million in 1990 to $70 million in 2000 accounting for 2.5% of all produce sales by volume.
- This trend is a reflection of the strong consumer trend towards fresh rather than processed vegetables, mainly on the basis of perceived superior taste and nutrition. It also reflects the consumer trend towards crispier and crunchier vegetables.
- It is also a reflection of the contemporary food style, where salads and stir fries are taking over from the "traditional meat and three vegies".
- There are four basic sub-categories; lettuce/spinach/salad mixes, coleslaws, stir fry mixes and fresh processed herbs.
- The shelf space being allocated to these products is expanding, reflecting the sales growth.
- The biggest player in the fresh leaf and salad market is Harvest Fresh/Vegco, which operates two plants; one in Bairnsdale and the other in Queensland. Other suppliers include Mrs Crockett and Houston Farm.
- Gourmet Garden, a subsidiary of Berri Ltd dominates the fresh processed herb market.

- The vast majority of these products are sold under retailer store brands.

4.2 Consumer beliefs and perspectives

- The dramatic growth of this category from a zero base less than a decade ago indicates that it is filling a need for the time poor, convenience-seeking consumer. The key drivers being:
  - Greater popularity of salad and stir-fries in the contemporary modern diet
  - Perception that fresh vegetables are healthier and more nutritious
  - Trend towards crispier, crunchier vegetables
  - That modern food preparation styles of assembling meals from fresh rather than buying finished meals.
  - Growing interest in more exotic lettuce, salad, herbs and vegetable combinations.
- Despite the fast growth of this segment, our research suggests that this category is servicing a particular market niche of people who demand and are prepared to pay for convenience.
- A high percentage of consumers don't buy these products because of a combination of the higher price and concerns about the freshness and quality of pre-packaged product.
- There are complaints among regular purchasers of these products that the product is often soggy and sweaty.

4.3 Retailer dynamics

- Retailers are keen to drive this category because it fits perfectly with the strategy to provide complete meal solutions to their customers and to differentiate their fresh food product offerings.
- The other attraction is that these fresh products carry a bigger gross profit margin compared to packaged grocery lines.
- One of the major concerns for retailers is managing such a short shelf life product, especially given that the product starts to noticeably deteriorate towards the end of the use by date. Even under the best case scenario, the product loses two to three days in the supply chain. Due to the potentially high losses, inventory control is essential. Almost certainly retailers would be putting pressure on for a sale, or return trading term, whereby the cost of out of use by date product is bourn by the suppliers.
- A very significant point is the fact that virtually the entire fresh cut product carries the store brand, rather than proprietor brand. While there is some branded product such as Mrs Crockets (complete salads), Houston Farm (70% + Spinach) and Earthline (Harvest Fresh), most of the product carries the store brand. The underlying rationale of retailers is the desire to differentiate their fresh food offer and to achieve a bigger margin. Fresh and convenience foods are the only real opportunity for retailers to differentiate these offers; otherwise they basically sell the same branded products at around the same price.
- All of the major retailers have invested heavily in building their profile in fresh meal solutions. By housebranding these products, it allows them to differentiate themselves from their competitors.
- The other reason is that house branding gives them much greater control over the category. For example, several years ago Edgell made an all out attempt to launch a range of fresh vegetables under their brand, but eventually were discouraged by major pressure from retailers.

- House branding allows retailers to enjoy a much bigger margin. Strong brands always attract a premium, which reflects the strength of the brand. With housebrands the brand equity and the profit margin stays with the retailer.
- The concern regarding this is that it is often difficult for processors to achieve an adequate margin to provide a high quality product, manage a tight supply chain and make a profit.

4.4 Processor industry dynamics

- There are two main operators in this market, Harvest Fresh Cut/Vegco and Mrs Crockett. From what we understand, the former company has achieved 25% per annum growth over the past three years.
- As was indicated earlier, 90% of this company's sales are in private label product where margins are slim.
- Gourmet Garden operates solely in the fresh processed herb market and has also enjoyed substantial growth since inception. The company has achieved year round tubing and developed a product with a longer shelf life than fresh produce.
- The key to success in the industry is to tightly manage the supply chain because of the very short shelf life of the product. It is therefore important to have the processing plant located close to the raw material supplies.
- From our network we know that over the year major companies, such as Heinz/Watties, Simplot and others have looked at getting into branded fresh value added vegetable products. They have seen great potential because of the overwhelming consumer trend towards fresh produce and the commensurate maturity and decline in sales growth of canned and frozen products.
- Several attempts have been made to enter the category through to the stage of full feasibility studies. In all cases they have abandoned their plans. A key factor has been that the retailers' insistence on store brands means that they cannot realise the value of their brand, which is an essential element in being profitable. Another factor is that these large processors are concerned that they do not have adequate control over the supply chain, which is essential in this category.

- There are a large number of small, back yard operators, who are producing salads and coleslaws and pan ready vegetables mainly to food service customers. This sector is highly competitive and profit margins are slim.

4.5 Conclusion

- There is little doubt that this category will continue to grow rapidly, both through sales growth and expansion of the number of products.
- Furthermore, as technology improves, particularly Modified Atmosphere Packaging (MAP), it will be possible to improve the quality and increase shelf life. It is also highly likely that the growth of this category will largely come at the expense of canned and frozen product.
- One of the drawbacks of this category from a grower's point of view is that it uses very small volumes of product. A handful of growers can supply the majority of the requirements of fresh produce.
- There are opportunities for new entrants both in the retail and food service sectors. However, margins are slim for processors and to succeed will require using new technologies. A grower-based cluster probably has a better chance of success because they have better control of the supply chain.
- There is a strong likelihood that some of the major processors may consider a joint venture to fund a range of brand-packaged, fresh value-added vegetables.

4.6 Opportunities

- Because of the massive growth of this category it has to be considered to be an opportunity.
- Given the sustained interest in this category by the major food processing companies, there may be an opportunity to form a strategic alliance between a grower lead consortium and a major processor, such as Simplot, to get into branded value added product.
- There is the opportunity to pursue the large, more sophisticated food service customer with pan ready vegetable salads and salad mixes.

Part C

Key Stakeholders

Section 1

Consumers

1.1 General behaviour

- It appears that the vast majority of consumers have boosted their general fruit and vegetable intake, although in most cases consumption levels still fall short of the recommended daily intake. "*I have increased my vegetable consumption. I can't just have meat for dinner. I need to have at least a couple of vegies as a side.*"
- Fruit and vegetables are purchased largely at supermarkets and markets. However, there is a general perception that the markets provide the better quality produce. "*I try to go to the market as much as I can. I think market produce tastes better and is fresher*."
- While convenience is high on the agenda, there are some short cuts consumers would rather forsake. "*I haven't seen the pre-peeled vegetables, but they are probably disgusting on the inside and you don't know how long they have been peeled. They would undoubtedly be more expensive and you would probably have to peel the outer layer again*."
- Notwithstanding the push back to fresh produce, many hold concerns about the integrity of the produce and the harvesting processes employed. "*I buy fruits and vegetables because they are whole*

foods, not processed. However, I do wonder about soil fertility and whether vegetables have all the minerals they are supposed to have."

- Many also believe that a healthy diet should consist of eating different coloured vegetables. The inherent belief is that the variety of colours has different nutritional and health benefits. Some also use the colours to appeal to fussier appetites. "*My kids love it when I chop the vegies into little cubes and they say, 'look it's a green cube and now I am eating a red one.'"*
- However, there were a number of consumers who were displeased with the quality of fresh produce. "*I am not too impressed with the quality of today's fruits and vegetables. I don't think they really care about the product – they just want to get it into the marketplace."*
- *"I think they consider shelf life, rather than taste."*
- Quite a number believe that fresh produce is not as wholesome as it once was. *"I don't think vegetables are as nutritious as they used to be and they don't taste as good."*
- Opinions were many and varied in relation to organic produce, with some perceiving an improvement in quality. "*I think organic is getting better and there is more of it around. Initially, it was all wilted because it had been sitting around for ages and that undid any of the positives for having organic produce."*
- "*The organic growers do seem to be making an effort re making sure the vegetables taste better*."
- There were a number of consumers who were not convinced of the product's integrity. "*I don't really believe organic vegetables are organic. It's all just hear say."*
- Not surprisingly, price was a major barrier to purchase. "*I only buy organic if it is on sale. It is very expensive."*
- "*There is no way I can afford to feed a family on organic vegetables every night of the week."*

- The subject of functional foods provoked a number of reactions, largely relating to price and absorption. "*If a compound is already in there, why would they need to double, or triple the amount? It would also depend on price*."
- "*If you have too little vitamin C you get scurvy, but on the flip side if you have too much of something it will put a strain on your liver, for example. I would be concerned about my kids consuming excessive doses of a compound*."
- "*It would depend on taste. My kids live on zucchini, so it wouldn't matter to me what the price was – I would still buy it*."
- "*My kids usually wont eat a fruit or vegetable that doesn't look good, as well as taste good*."
- Many were a little sceptical or wary of such vegetables and their associated claims. "*I would have to have someone that I really trusted, like Rosemary Stanton, to endorse such produce. She wouldn't put her name to a fraudulent product*."
- "*I don't think I would believe it anyway. For example, if you give a company $400,000 and tell them to uncover the health benefits of olive oil they will. Maybe I'm just too cynical*."
- A high number held that people should simply adhere to a healthy, sensible diet. "*I think balance is key. You don't need to force feed your body vitamins, etc*."
- Some, however, were comfortable with the concept of adding vitamins to vegetables. "*I would buy processed vegetables with added vitamins, provided they were reasonably priced. However, I usually prefer fresh vegetables*."
- "I feed my kids meat and some sort of vegetable everyday and back that up with a multivitamin. I would consider vegetables with added nutrients though."

- The subject of GMOs elicited many and varied responses. The most frequently cited concern related to the lack of publicly available information. "*I am not really concerned about GM foods, as I don't know that much about the technology. However, I don't like the idea of someone meddling with fresh foods. Vegetables come out of the garden and they're natural and healthy. I would need a great deal more information.*"
- "*I just don't think we know enough about GMOs and their effect on the planet.*"
- Many were also of the opinion that GM was not a novel phenomenon. "*I know that GM, in some form or another, has been going on for a while now and that is fine, but I do not want them to use animal genes to make my vegetables bigger or better. I do want to know that what I buy is not GM and I am worried about health/allergies, particularly for future generations.*"
- Some claim to purchase non-GM products without giving it much thought. "*I buy non-GM soy milk but I don't think it's a conscious thing. It's just the brand I prefer.*"
- Upon mentioning the possibility of enhancing the functional compounds in vegetables, most consumers immediately presumed that GM would be involved. "*I don't like the idea of scientists tampering with natural produce. I gather they will be using genetic engineering to modify the fruit and vegetables.*"
- Consumers are largely in favour of natural breeding, but wary of genetically modified food. "*We shouldn't be playing with nature.*" "*Not enough research has been done.*"
- Not knowing what the long-term effects could be, consumers felt it was dangerous to experiment. "*People got AIDS from eating monkey's brains. We could be unleashing another AIDS epidemic.*"
- One consumer is particularly concerned about Genetically Modified food. "*I always look for GM free food. It's very hard to find. They don't have to include GM foods on labels in Australia.*" This

consumer either bought foods, which specifically stated "*GM free*" or chose foods with very basic ingredients.

- One consumer is concerned that the big businesses responsible for genetically modified food will push the local farmers out of the market. This led to a discussion on importing and exporting. Consumers thought Australian farmers were losing business because produce was being imported from overseas. *"Why do they sell American oranges in Australia?"*
- As with GMOs, most consumers required more information, in order to make an informed decision regarding the use of natural breeding methods to increase the amount of functional compounds in vegetables. " *I would want to know a bit more before I would feel comfortable about natural breeding methods to elevate the levels of certain compounds*."
- There was rather widespread concern regarding the body's ability to tolerate amplified levels. "*Some things are toxic if you have them in too high a dose, like vitamin A*."
- However, a small proportion would consider supporting fruit and vegetable tweaking. "*Depends how they modify them. I wouldn't worry if it were natural. For example, boosting vitamin C without using fish scales. But they can't tamper with their genetic make-up*."
- Some consumers held that the natural functionality of vegetables should be promoted ahead of natural breeding. "*I think if you advertise the functional benefits of vegetables people will take note, as many don't know why certain vegetables are good for you*."
- However, quite a number do seem to be familiar with the cancer and broccoli association. "*I switched from beans to broccoli because of the link between broccoli and bowel cancer and I also eat Chinese vegetables*."
- There is a strong belief that fruits and vegetables have natural functional properties and that by simply eating more of them diseases will be prevented.

- Rather than tampering with a vegetable's composition, some believe that simpler means to improve the nutritional content should be employed. "*I think you're better off putting vegetables in a good quality soil – so many are leeched. All you need is good organic matter in the soil to bolster the mineral content. A would buy something if it had been nourished in good, nourished earth.*"
- "*I don't think modification is natural. It's like putting a lemon on an apple tree. Besides wouldn't you need to eat a vast amount of broccoli for it to impart any sort of benefit*?"
- Some are of the opinion that the nutritional content is of relatively low importance. "*I think fruit and vegetables are poorly merchandised. There are a myriad of Asian vegetables, but I don't know what to do with them. Maybe they should worry about promoting preparation methods, etc.*"
- There is a general belief that fresh fruit and vegetables are far more nutritious than processed foods: although many are under the false impression that "*processing kills all the goodness in foods.*"
- Some consumers believe that frozen vegetables are equally, if not more, nutritious than their fresh counterparts. "*I heard they put them in air tight bags and snap freeze them to keep in all the goodness.*" Others are of the opinion that while they may be better than canned goods, they are not as good as fresh.
- There is a general feeling that fresh foods aren't as nutritious as they used to be because of the extended period in the supply chain, including the time spent in supermarkets.
- There is also a belief that they currently treat fruit and vegetables to improve their shelf life and that this interferes with their nutrient content.
- Many of the younger consumers and parents of young children did not appear to be overly fastidious about their eating habits. In fact, most adopted a reactive, rather than proactive approach to their diets. "*I would classify myself as healthy, as I rarely get ill. However, I don't think it*

has anything to do with my eating habits. I don't feel compelled to eat a healthier diet because I feel fine now."

- A few consumers held that diet had little or no influence on one's wellbeing. "*I think that most illnesses are attributable to stress. My parents don't have particularly healthy diets and my father smokes, yet they are both very healthy and laidback.*"
- Among the younger age groups, the plethora of study findings did not overwhelm or confuse them. "*Conflicting study findings don't really bother me. I just take in what suits me.*"
- Various supermarket magazines are the source of much consumer health information. "*I love the 'Super Food Ideas' magazine. It details many health issues, has fantastic dietary/recipe ideas and many interesting anecdotes.*"
- However, some obscure and unsourced notions were expressed. "*I have heard that the carcinogenic agents in ham are counteracted if you consume it with tomato.*"
- Not surprisingly, the older age brackets possessed high levels of health/diet knowledge and were far more proactive in their approach to disease prevention.

1.2 Key trends

- Consumers are increasingly seeking food that is not only good to eat, but is convenient and good for them.
- Variety appears to be a key driver in altering cooking habits. "*I used to microwave my vegies, now I want more variety. I cook more stir fries and give my vegies a quick steam.*"
- "*I am starting to make Mexican and Asian dishes. Just serving the same thing all the time is boring. I'm always looking for new recipes.*"
- The desire for a varied diet is resulting in an increased reliance on cookery books. "*When I was growing up it was just Italian food in the house, but now we try and have a bit of variety. I regularly use recipes from cookbooks now.*"
- Ease of preparation is also a prime consideration. "*The dishes I tend to cook now are much simpler. I look for fresh ingredients and simple ways of putting them together. These days it's into the Donna Hays and those types of cookbooks.*"
- There is also a noticeable shift away from spending many hours slaving over a hot stove. Many complain that they do not have the time, or the energy to whip up culinary masterpieces on a daily basis. "*I don't do the long, slow simmer dishes anymore – they just take too long. I use fresh vegetables, but there are some things I like frozen, like raspberries and asparagus. I always have the tomato paste, tinned tomatoes and corn kernels on stand by.*"
- Some consumers attribute their more adventurous culinary habits to the increasing Asian population. "*A number of Asian supermarkets are popping up and there is such a variety of produce to choose from. Also the regular supermarkets have a bigger range of vegetables, including the Asian ones.*"

- Age and disease risk are also guiding factors in terms of the styles consumed and the level of nutritional knowledge. "*We are all in the older age groups and we are more aware than we were ten years ago, particularly regarding things like the GI. I am reverting to my grandparent's habits, namely the Mediterranean diet. I watch the GI because there is diabetes in my family and I am trying to avoid it.*"
- Additionally, the taste buds of younger consumers strongly influence the styles and preparation methods. "*I make 'au gratin' a lot. I bake some vegetables in a white sauce and cover with breadcrumbs – the kids love it.*"
- "*I try and mix in as many vegetables as I can, particularly in soups. I try to vary the ways in which I serve them, otherwise my kids get bored and wont eat them. I try and cook/bake them in scones or pikelets.*"
- Convenience, variety and availability are also driving factors in determining the type of shelf stable product selected. "*We try to eat different foods every day for the variety and this may include ethnic dishes. We use a lot of 'aluminium foil sealed' packets, which contain all the nutritional information, etc and they are reasonably priced. All you have to do is re-heat them.*"
- There is an increasing tendency to prepare nutritious, home cooked meals from products acquired at the local supermarket. "*I love supermarkets now because if you're in a hurry you can just grab some 'Chicken Tonight' and some mushrooms and just throw it in a pan and there's a meal. I do like to make sure there's something fresh in it.*"
- While there is a proclivity to purchase fresh produce, many lament the perishability of fresh herbs and are turning to the processed varieties. "*I love the herb tubes, especially the coriander one. They sit in the vegetable section and are easy to locate and not wasteful. There is no way I would use a whole bunch of basil. I also prefer the tubes to the dried varieties. Moreover, the tunes are available all year round, whereas some fresh herbs are not.*"
- There is also evidence to suggest that certain products are not restricted to their target markets. "*I am a big fan of the jars of baby food; I regularly eat them myself – they are so easy! However, I do feel*

guilty about feeding them to my daughter, as I know they are not as nutritious as fresh foods. I do tend to buy the organic ones."

- "*I quite like the fruit baby food jars, but I wouldn't touch the casseroles. However, I do really like the chicken and vegetable one.*"
- The vast majority of respondents use, or maintain a back-up supply, of canned products. Many, however, are of the opinion that fresh is superior. "*I always buy fresh. I buy canned corn for convenience, for example when I am making a rice salad. I use fresh most of the time – I don't think the canned stuff compares.*"
- A small number are also of the opinion that canned is less wholesome than both the fresh and frozen varieties. "*I don't think canned vegies are as nutritious as fresh and some frozen may be more nutritious, as you don't know how long the cans have been on the shelf.*"
- On the flip side, many prefer canned to the frozen varieties. "*A recent survey revealed that frozen vegies more or less didn't have any nutrients. Some canned varieties, like corn, were OK. Since that survey we have cut back on frozen and now rely more on canned, but we still prefer fresh.*"
- Most consumers maintain a steady supply of "palatable" canned produce. "*I only really use canned tomatoes, kidney/chick/baked beans and sometimes artichokes – the others just don't taste as nice tinned. They just don't have that firmer, crisper texture.*"
- The preservatives and additional ingredients in canned products also concern many consumers. "*I find in some canned and frozen vegetables there are additives and added spices, etc. I wont buy them.*"
- "*Canned beetroot nearly always has sugar or salt added. It can set some asthmatics off. However, tinned tastes better than the home-boiled beetroot.*"
- It appears that canned goods are primarily used as ingredients in cooked dishes. "*I would use the tinned stuff for cooking, but not for salads.*"

- While canned soup has long been a pantry staple, alternative forms are increasing in popularity. "*I always have canned soup as back up, but the soups in pouches are much creamier and tastier.*"

- "*We eat a lot of canned soups and I quite like the Campbell's tetra pack varieties. We have the dried ones maybe as a snack, but as a meal they are not substantial enough.*"
- Alternative uses are also increasing in popularity. "*My daughter bought the packet French onion soup and made it up with mustard and poured it over a leg of lamb and baked it. It was absolutely delicious.*"
- "*I think 'cup a soups' are great for students and children. It fills them up and because it is made in a cup there is little to wash up.*"
- Moreover, canned soup is not a universal favourite. "*I don't like canned soups, they taste too fake.*"
- "*I left my son some 'soup for one' varieties when I went away and he thought they were horrible. There were 10 in the pantry when I returned.*"
- "*I've only ever had home made soups, so when I tried the canned and the packet I didn't like them.*"
- On the other hand, canned fruit appears to have a strong following among younger consumers. "*Normally my kids eat canned fruit over fresh, probably because of the sweet juice and because it is easy for them to handle.*"
- "*Sometimes my kids have tinned fruit with cereal or custard for breakfast. They love anything that's full of sugar.*"
- Adults too like to indulge. "*I buy the SPC fruits in four packs, once or twice a week. They are good if I want a treat.*"
- There is an emerging consumer preference for "clean foods", free of genetic modification or excessive processing. This trend is creating a sense of mistrust of large manufacturers.

- Gone are the days of slaving over a hot stove to prepare dinner. 92% of Australian homes have a microwave oven and 65% of consumers say they prefer to spend less than 30 minutes preparing the evening meal.
- The advice to eat more vegetables is one of the few positive and consistent health messages that consumers hear. Despite this, many do not eat the recommended number of servings per day. The Australian Commonwealth Department of Health and Family Services make clear recommendations that at least five servings of vegetables are consumed daily as part of a well-balanced diet. Both Australian and New Zealand agencies specifically include frozen vegetables as part of these recommendations.
- The Australian Department of Health and Family Services "The Australian Guide to Healthy Eating" states: "Use frozen, canned vegetables as an alternative to fresh. They are nutritious, often cheaper, quick and easy to prepare, easily stored and available in remote communities."
- The results of the New Zealand National Nutrition Survey showed that one in three New Zealanders over 15 year (38% of males and 27% of females) do not eat three servings of vegetables each day as recommended in the New Zealand guidelines. Furthermore, the survey showed at least 12% of New Zealanders were eating only one, or less that one, serving of vegetables each day.

1.3 Performance issues

- Many consumers voiced their concerns about the freshness of produce in both cans and cartons. "*I am not sure about soups in cartons. I would want to know that they were made that morning and that's not going to happen. It's just as easy to make your own. It takes about 10 minutes to cut everything up and then throw it in the blender.*"
- "*It really annoys me that many things no longer have the use by date printed on them, especially cans.*"
- "*If I was going to buy those vegetable juices in boxes I would want to see a date stamp.*"
- A number of consumers held that certain processes more effectively maintained the nutrient levels and thus were a favoured option. "*I would almost prefer carrot juice in the dehydrated form, as I would think that the nutrients would be better preserved than the carton varieties. It would also be lighter to carry home.*"
- There was little support in favour of pre-packaged fruit/vegetable combination juices. "*We know that oranges lose their vitamin C content within hours of being juiced, so there would be little point in buying cartons of carrot and orange juice because the nutrients would have been lost.*"
- Fruit and vegetable juices are a popular staple in most households, however, packaging concerns abound. "*Popper tetra packs are a nuisance, particularly the straw hole. I like to have a lid on my drinks.*"
- "*I don't really like the tetra packs, but I think they are better for the environment than plastic.*"
- Consideration regarding the safety of younger household members strongly influences the type of packaging purchased. "*I prefer plastic packaging because I have too many children running around, so glass is not an option.*"
- "*Tetra packs are too small. I have a family of six and therefore I need a big, family size pack.*"

- Many parents are introducing their children to vegetable juices at an early age. "*My young daughter loves tomato juice and I will regularly buy a four litre bottle. However, she is not too fond of my favourite, V8 juice.*"
- Taste is also a crucial element in the purchase decision. "*I would buy canned vegetable juices if they tasted good. My husband loves tomato juice and it one of the few juices that actually tastes like the vegetable.*"
- "*I sometimes buy pineapple juice, but I don't think I would buy vegetable juice in a can.*"
- Fiscal constraints also strongly influence the purchase decision. "*Juice is not the sort of thing you buy when you are on a budget. I sometimes have to resort to cordials.*"
- Taste has also emerged as a major issue. There is a widespread view among consumers that vegetables do not taste as good as they used to.

1.4 Consumer complaints about vegetables

- The perceived disadvantages of processed vegetable centre around issues relating to health and nutrition:
  - Additives/artificial ingredients/preservatives. There is a perception that fresh vegetables are more nutritious and of higher quality than processed vegetables. This is due to the overriding belief that processed (especially canned) vegetables contain additives and artificial preservatives and due to the negative perceptions associated with the can.
  - Nutritionally poor/goodness lost
  - Don't know what is in it
- Concerns exist regarding product quality:
  - Lower grade product
  - Bland and soggy – younger consumers tend to prefer crisper, crunchier vegetables
- Further concerns relate to the packaging form itself:
  - Unknown shelf life
  - Difficult to open cans
  - Environmentally unfriendly
  - Risk of contamination
- Users of processed vegetables are seen to be:
  - Lazy and inept at cooking
  - Paying a premium to fresh

1.5 Conclusions

- This research confirms the notion that generally consumers would prefer to purchase fresh vegetables and prepare meals from raw ingredients. However, processed vegetables, particularly frozen, offer many major advantages and will always have a place in the pantry.
- It is highly likely that the ready to serve and minimally processed fresh vegetables will grow in usage and popularity because they offer the best of both worlds; i.e. perceived nutritional, taste and texture advantages of fresh food and the convenience of processed.
- A key issue to the adoption of fresh, minimally processed vegetables will be quality and price. To gain widespread acceptance they will need to be priced at not too much above the fresh, unprocessed equivalent.

1.6 Opportunities

- This research identifies four significant opportunities.

1. Better tasting vegetables

- There is a widespread view that vegetables do not taste as good as they used to. There is an opportunity to use breeding and farming techniques to improve eating quality and taste. With a suitable product range backed by strong brand based marketing, there is an opportunity to carve out a premium market.

2. Organics

- Demand for organics is not being met and will continue to grow at double figure rates for many years to come.

3. Functional vegetables

- The consumer research indicates that there would a strong demand for vegetables with demonstrable functional properties as a prevention to cancer, diabetes, heart diseases, cholesterol, etc. New breeds and production technology are being developed to produce vegetables with enhanced levels of naturally occurring functional properties.

4. Minimally processed vegetables

- There is a lot more growth potentially in salad mixes and minimally processed vegetables and plenty of room for new entrants.

Section 2

Processors

Key Players

Processor	Brand/s	Location	Vegetables	Process	Packaging
Golden Circle	Golden Circle	Queensland	Beans, beetroot, carrots, corn, cucumber, capsicum, peas	Canned	Glass, plastic, tin
Heinz-Watties	Heinz Frozen Food Garden Mix Earth's Best	NZ	Peas (baby), green beans, broad beans, corn, carrots Carrots, sweet corn, garden peas	Frozen	Plastic bags
Logan Farm	Logan Farm Frozen Vegetables	Queensland	Super sweet corn, corn cobs, peas (baby/garden), spinach, beans, broad beans, mixed vegetables, potatoes, broccoli	Frozen	Plastic bags/Boxes
McCains	McCains	Ballarat Victoria	Peas (baby/minted), super juicy corn, peas, corn kernels, carrots, baby beans, broccoli, cauliflower, beans, capsicum, potatoes	Frozen	Plastic Bags
Simplot	Edgell Bird's Eye Country Harvest Leggo's Hy Peak	Victoria	Asparagus, beans, beetroot, capsicum, carrots, corn, mushrooms, peas, potatoes, cabbage, sauerkraut, carrots (sliced/julienne/whole), beans (whole/sliced), capsicum, peas (snap frozen/ baby/mint), super sweet corn kernels, mini corn cobs for kids, corn	Canned Frozen Shelf stable	Tins Plastic Bags Jars, plastic containers

			cobs, cauliflower, yellow beans, Brussels sprouts, chopped onion		
SPC Ardmona	Ardmona SPC	Victoria	Tomatoes Beans, beetroot, mushrooms, chick peas	Canned	Cans
Nestle	Lean Cuisine	NSW	Eggplant, zucchini, capsicum, onion, beans, peas, broccoli, potato, corn, carrot, mushrooms, asparagus, spinach	Frozen	Plastic bags
MasterFoods	Dolmio Kan Tong MasterFoods	NSW	Chickpeas, beans, potatoes, garlic, onion	Shelf stable	Glass, plastic
Unilever	Continental Soups, Rosella tomato sauce, Chicken Tonight	Victoria	Onions, potatoes, carrots, corn, capsicum, parsley, leek, zucchini, celery, garlic, tomatoes, eggplant	Shelf stable	Cans, sachets Glass Glass
Kraft	Dewcrisp	Victoria	Miscellaneous vegetables	Frozen	Plastic bags
Berri Limited	Gourmet Garden	Victoria	Miscellaneous vegetable and herbs - condiments	Processed - fresh	Tubes

Section

3

Retailers

3.1 Key players

National Market Share	1997 %	1998 %	1999 %	2000 %	2001 %
Woolworths	33.6	35.5	35.9	37.5	38.6
Coles (incl Bi-Lo)	28.0	30.0	32.0	32.0	32.5
Davids (C&C)	17.4	15.3	13.0		
Franklins	15.0	14.1	13.4	11.3	7.9
FAL (include Action)	4.0	4.0	3.8	3.4	3.8
Australian Independent Wholesalers	-	0.9	1.7	1.7	1.6
Others	2.0	0.2	0.2	1.9	2.5

- Three big players dominate the Australian retail market. Between them, Coles and Woolworths hold over 70% of the grocery market. This gives them immense market power, which they exercise to reduce margins for processors. It also allows them to control new categories such as the minimally processed vegetables.
- Despite concerns by Coles and Woolworths of Aldi's entrance into the market, it is not expected to be a serious threat. It is a niche market operator, which locates stores in low-income areas, has a

limited range and almost of the products are housebrands. It is only expected to get less than 7% of the market.

- The entrance of Aldi has increased retailer focus on house brands resulting in Woolworths launching Hillendale and Coles reviving the Coles brand. These house brands are moving closer in positioning to proprietary branded players such as Edgell.

3.2 Key trends in retailing

- Continued expansion and development of fresh food departments, with increased ranges and a focus on strengthening supply chain to improve quality.
- Strong focus on meal solutions in fresh, chilled and frozen departments with particular emphasis on selling components that consumers can assemble rather than complete meals.
- Reduction in canned food shelf space and increase in frozen and chilled.
- Currently focussing on re-vamping store/brands to improve quality and value for money.
- The threat of the new entrant Aldi has forced Coles and Woolworths to review these systems, lower costs and improve the performance of their housebrand program.
- Major retailers are testing new formats including home meal replacement centres, smaller convenience outlets and gourmet food outlet. These have met with mixed success. For example, the David Jones Food Chain has been a failure.
- All retailers have experimented with e-commerce and home delivery systems with very limited success. Key concerns by consumers are the quality and consistency of fresh products and the cost of delivery.

3.3 Patterns in processed vegetables

- All retailers have reported that the moving annual total for the canned has shown decline over last year, with the current trend continuing to decline. This may be attributed to the fresh food sector. Fresh vegetable tonnage has increased despite sales dollars being down, which would indicate that fresh produce has become cheaper. Although no research has conclusively proven that there is a direct, inverse relationship between the price of fresh produce and demand for processed vegetables, it is commonly thought to be the case. Favourable weather conditions, for example, will improve crop yields creating an oversupply of fresh produce and consequently reduce the fresh food price point. Cheaper fresh produce will cause reduced demand for canned and frozen goods.
- Furthermore, deliveries of fresh produce to remote areas have increased in recent years resulting in a reduction in demand for canned/frozen produce.
- The top six selling canned vegetable categories account for 80% of sales, these being:
  - tomatoes
  - beetroot
  - corn
  - asparagus
  - seed beans
  - peas
- The top three are huge category leaders.
- The demand for peas and beans depends on the price and availability of fresh produce.
- The seed bean category is growing and Edgell is pouring significant research into expanding this area.

- House brand sales in the canned category are increasing due to the price point advantage. It is expected that this trend will continue especially with the opening of Aldi supermarkets, which rely largely on home brand sales. Overseas trends also show continued reliance of supermarkets on their home brands. The profit of Sainburys in the UK is largely attributed to growth in the home brand market and now dominates premium shelving.
- Although the overall trend for the canned vegetable sector shows decline, products that have a value added component have shown growth, as they appeal to the time conscious shopper.
- Overseas markets indicate a trend toward organic vegetables in a jar or tin however retailers are sceptical whether this will be successful unless the entire menu is organic. A company brought out an organic pasta source a few years ago, which failed, as the market didn't have organic pasta available.
- Frozen foods contribute approximately $2.1m in weekly sales for Coles Supermarkets. Of this total, 30% comprises of house brands and this figure continues to increase. The frozen food category has enjoyed continued growth of approximately 5.3% in recent years and this trend is expected to continue.
- The best selling frozen lines are peas and potato chips and these products are clear category leaders. The generic brand 500g bags of peas are the best seller. There is a growing trend towards larger size packaging.
- Growth in the frozen sector can be attributed to the introduction of value added products and also increased sales of generics. Sales in commodity products have fallen as a result of increased sales of the value added range, however, commodity lines still make up most of the volume. Value added products have grown by approximately 24% while commodity products have increased turnover by approximately 8%.

- A trend developed overseas has introduced vegetables coated with a transparent substance, which enhances flavours and enables grilling and baking. Vegetables will be crunchier and crispier which would expect increased sales. Such products are expected on the market next year. Kentucky Fried Chicken currently uses coated potato chips in their stores and such products are expected to become more widely available. Golden Crunch also uses this process.
- A high percentage of frozen and canned vegetables are sold on advertised price promotion.

3.4 Performance Issues

- Retailers complain that the vegetable processors are not sufficiently innovative relative to other categories. The complaint is that they are slow to bring out new products or to adequately promote their category. This, they believe, is a reason for stagnation and consumer boredom with the category.
- A current limitation in the canned category is the canning process where anticipated demand and the volume to be canned is estimated and planned 12 months in advance. Therefore if a product is heavily promoted then it is almost certain that it will run out. This has been experienced with some Italian tomato ranges which can in March and will run out soon after Christmas.
- Packaging in the canned category is a real issue and ideas need to be explored in order to make canned vegetables more attractive.
- Some processors have explored other packaging concepts including:
  - asparagus and peas in plastic
  - tomatoes in UHT containers
  - other vegetables in pouches
- These were not successful because the packaging process was expensive and pushed the price point up at the store. It is however a good concept as people like to see the product.
- The space allocated to core vegetables is being reduced to allow for the growth of value added.

3.5 Market dynamics

- House brands may encourage consumers to trade down to commodity products rather than trading up to value added products, and as a result, dampen growth in the market value.
- Super sweet corn has recently been introduced with growing success. The product consists of premium quality corn, which has been placed into glass containers as opposed to cans so that consumers can see the product. As it is better quality corn kernels, it is priced at a premium. The glass product is expensive to transport and there is a high breakage factor. It currently averages about 10-15% of the sales of its canned cousins and has the advantage of being resealable.
- Another product, which has been introduced is adding vinegar to asparagus and providing a pickled product.
- The value of the ring pull top is still largely debated. It appeals to the time conscious however is not suitable for the elderly. Such cans cannot even be opened using the conventional can opener due the shape of the can.
- Stackable cans are also a recent innovation with cans stacking inside one another. It provides huge benefits to retailers because as all shelves are hand stacked such cans reduce droppages and lowers wastage (consumers will not buy a dented can).
- Fruit has recently been packaged into resealable plastic containers, which would work well for beetroot.
- Another idea would be to explore corn in a tetra brick. Currently in the UK baked beans are being sold in square tins.

Section

4

Food Service

4.1 Overview

- The food service sector is a very large and important user of vegetables. An often used figure is that approximately 40% of the food dollar is consumed away from home. This suggests that roughly 30% of vegetables by volume are consumed in food service applications.
- The food service market for minimal processed vegetables alone is estimated to be $50m per annum. Food service outlets account for close to one-third of all canned and frozen food value.
- The food service sector is quite disparate, comprising a large number of quite diverse segments.
- The following list indicates the diversity of food service venues:
  - High End
    - Five Star Hotels
    - Restaurants
    - Entertainment venues
  - Medium end
    - Bistros
    - Clubs / Pubs
    - Airlines / Travel

- Delis / Sandwich Bars
- Juice Bars

- Low end
  - Hospitals
  - Nursing Homes and Aged Care facilities
  - Prisons and Detention Centres
  - Military

4.2 Usage patterns

- The usage and behavioural characteristics of the three broad categories are discussed below:

High End

- Five star hotels, restaurants, and cafes (from fine dining to street cafes) have indicated that they mainly purchase fresh locally produced vegetables which are washed, peeled and cut by apprentice chefs. This is because of their desire for top quality.
- Fresh vegetables account for approximately 95% of produce with 5% being processed. Commonly used processed vegetables include:
  - Frozen peas
  - Canned or frozen sweet corn
  - Tomato paste
  - Snap frozen broad beans which have a better colour than the fresh variety
  - Semi-dried tomatoes
- Processed foods tend to be used in the lower end outlets within five star hotels such as coffee shops, food service and banquet functions.
- These findings differed among of ethnic restaurants, which generally indicated that pre-diced vegetables were purchased as well as many imported products. Such techniques were more cost effective due to the high costs of Australian labour. Although most places indicated that they would try to purchase locally first, it was often cheaper to import produce from Pakistan or Vietnam.

Medium End

- Airlines tend to use the entire spectrum of vegetables from leeks, potato products, beans, peas, carrots etc – anything that they can obtain in the tonnage required. The tonnage they use is far greater than any supermarket procurer.
- The majority of the vegetables purchased by airline caterers are fresh which undergo minimal processing. They do use frozen peas and canned Italian tomatoes. The airlines source semi-prepared vegetables from small operators in each city. All produce is Australian with the exception of the Italian tomatoes, which are better quality at a cheaper price.

Low End

- The frozen products used by institutional caterers consist mainly of peas, baby carrots, green beans and broccoli. The canned products are generally beetroot, tomatoes, corn kernels and potato salads.
- Vegetable purchases have increased and make up approximately 15% of their overall food spend. Of the vegetables purchased 80% is fresh (minimally processed), 15% frozen and 5% canned.

4.3 Key trends

Restaurant Styles

- The growing trend in Europe is organic produce with most supermarkets offering every type of vegetable in an organic range. There is increasing interest in organics by Australian restaurants.
- The rise in overseas chefs and TV chefs has generated waves of vegetable popularity and trends.
- In recent years, more casual style cafes have dominated the market in favour of fine dining.

Eating Styles

- Less than 5 years ago, most of the vegetables purchased by institutional caterers were frozen however consumers now demand fresher produce such as roasted carrots and stir fried vegetables. Consumers are more health conscious and prefer Asian style dining which dictates less meat and more vegetables.
- The sandwich market is increasing with consumers demanding fresh (minimally processed) produce. There is a growing interest in sandwiches with salad or some vegetable content. Gourmet sandwiches with exotic ingredients such as rocket or antipasto vegetables are popular.
- With vegetarian dining becoming more popular, vegetable orders and consumption has increased by approximately 10%.
- One of the biggest trends in eating style is the so-called fusion food. These are east meets west styles, i.e. an Australian version of Asian food or vice versa. Asian herbs and spices and Asian vegetables figure strongly.
- Middle Eastern foods are also very popular including beans, herbs and spices.

Food Preparation

- Gourmet juice bars have become popular. These are small bars that make fruit and vegetable mixes to order from fresh ingredients. Carrot and celery based mixes are popular. Another new fad is wheat grass shots sold to provide a chlorophyll boost.
- The market is strongly moving to prepared foods. As the cost of labour in Australia is expensive, it has become more cost efficient to bring in prepared vegetables. Caterers are moving away from peeled potatoes due to the time involved in peeling and towards high quality washed products. Chefs are then encouraged to cook the potatoes with the skins on.
- The minimally processed market is increasingly rapidly with so many different ways to cut vegetables available. It has become a more cost effective method of preparing food.
- Another key trend is the propensity to outsource in institutional catering outlets. Increasingly, hospitals, aged care and canteens are outsourcing their kitchens to major contractors.
- Increasingly, the medium and lower end outlets are buying in food such as soups, salads, desserts, etc.

Major Food Service Companies

- The trend towards outsourcing is leading to the growth of major food service contract companies. These companies bid for the contracts of hospitals, the military, mining companies, sporting venues, etc.
- The major players are listed in the table below:

Company	Industries	Client Summary
Spotless Services	Events, functions and corporate entertainment	Local Government, Sporting Arenas, Zoos, Royal Show Grounds
Qantas Inflight Catering	Airline Catering and Food Service	International Airlines, Rail, Hospitals
Eurest	Food Service and retail	Zoos, Defence Forces, Police, Schools, Universities, Television Stations, Airports, Prisons, Detention Centres, Mining, Hospitals
Delaware North	Food service, hospitality and facilities management	Military, Parliament House, Univerisities, Rail, Airports, Convention Centres, Sporting Venues

4.4 Key drivers

- Quality and price are key drivers with catering purchases being price driven where the best quality vegetables are obtained at a specified price.
- On plate cost is a major driver. Margins are extremely thin in most sections of the food service industry. Large food service categories get to the level of costing meals down to fractions of a cent.
- Labour is by far the biggest cost, especially given that much of it is at penalty rates for every weekend and public holiday. This has driven the strong trends towards semi-prepared food as it allows them to reduce the number of chefs and kitchen hands.
- Airline catering procurement tends to be mostly quality driven although price is beginning to play a larger factor.
- Food safety is become a key driver, particularly for the large organizations. Increasingly they are seeking to deal with larger, more sophisticated suppliers who have HACCP conformance systems, traceability, etc. Undoubtedly, this will result in a rationalisation of the industry with many of the smaller backyard operators being forced out because of the high cost of compliance.

4.5 Performance issues

- Low and fixed price. Because on plate costs are an issue, there is strong pressure to reduced prices. Price stability is also an issue as contract caterers have to lock themselves into menus at fixed prices up to six months ahead.
- Growers need to focus on better production planning and improved growth cycles to limit price fluctuations of products. Institutional caterers are price driven and work with strict budgets. They will stay away from products that have growth/price peaks and troughs as it prohibits accurate budgeting. Caterers will focus on vegetables that hold a firm price. Capsicum is an example of a vegetable whose price fluctuates tremendously.
- Consistency of Australian produce tends be a large problem both in terms of quality and volume of supply
- Shelf life is an issue especially given the need to store product for extended periods or to transport to remote locations such as mining camps.
- In terms of gaps in the market, there needs to be improved methods to transport products around Australia. The packaging at this stage is not satisfactory to enable a longer shelf life for the vegetables.
- Product integrity and food safety is increasingly becoming an issue, especially given the various food poisoning incidents. Major food service caterers are demanding HACCP accredited suppliers.
- Taste is a major issue for high-end outlets. Increasingly they feature origin of food on their menu and seek out boutique suppliers with high quality tasty product.

- Australian growers are obsessed with the perfect looking vegetable and size and are not focussed on flavour. The overall quality and flavour of vegetables in Italy and France is much more superior.

4.6 Opportunities

- There is no doubt that the food service market for semi-prepared and minimally processed vegetables will continue to grow. This is being driven by two factors. The first is the desire to reduce labour costs by buying in ready to serve product. The second is that, like the household market, there is a trend towards crunchier, crisper and fresh vegetables.
- There is likely to be a continuous process of rationalisation in the supply side of the food service sector. As the larger contract catering firms get larger, they will seek to work with larger suppliers who can produce a high quality product and comply with strict food safety and integrity standards on a year round basis. Many of the smaller backyard operators will struggle to survive because of the compliance costs.
- There is therefore an opportunity for large, high efficient, minimally processed vegetable operators utilising new technology in processing and packaging in highly efficient plants close to growing areas.
- There are significant emerging opportunities in food service in the Asian region. Five start hotels, family restaurants and contract caterers are increasingly looking to source prepared and semi-prepared meals close to where they are grown. For example, there is a large Japanese operator located in Melbourne preparing complete frozen meals for use in its family restaurant chain in Japan.

Part D

Global Trade & Competition

Contents

Section 1

Australian export markets

All data is sourced from the ABS – 2001 calendar year

Frozen Exports

Species	Processing	Total		China		Indonesia		Japan		New Zealand		Papau New Guinea		Philippines		Singapore		South Africa		Taiwan	
		Quantity (kgs)	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*			*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*
Beans	Frozen	211,770	285							135,058	215									61,500	41
Mixed Vegetables	Frozen	4,818,709	7,829					1,835,210	2,546	702,000	1,411	417,584	789			445,774	562				
Peas	Frozen	726,594	1,171			63,300	80	300,732	531	85,548	174	189,303	284								
Potatoes	Frozen	7,557,624	9,117							1,895,686	2,760			1,629,504	1,727	2,358,445	2,465				
Spinach	Frozen	2,600	6									600	1	2,000	5						
Sweet Corn	Frozen	2,672,943	3,920	380,648	632					1,896,300	2,387							196,944	596		

- Although only the most recent figures are displayed, analysis of trends over the past three years indicates that our frozen vegetable exports have declined in quantity by 20%. This is no doubt due to Australia's reduced price competitiveness compared with countries such as China.
- New Zealand, Japan and Singapore continue to be Australia's major trading partners of frozen vegetables.
- Potatoes, mixed vegetables and sweet corn are Australia's major frozen vegetable exports.

Shelf Stable Exports

Species	Processing	Total		Fiji		Hong Kong		India		Indonesia		Japan		Kiribati		New Zealand		Malaysia		Papau New Gui		Philippines		Singapore		Thailand		United Arab Emirates		United Kingdom		United States	
		Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)			Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)	Quantity (kgs)	$ ('000s)
Asparagus	Shelf Stable	4,974	24					734	4	40	1							4,200	19														
Beans	Shelf Stable	1,582,483	2,508													684,819	1,044			205,732	379			378,379	625								
Mixed Vegetables	Shelf Stable	325,120	854			41,641	57									112,029	293			35,216	51												
Mushrooms/Truffles	Shelf Stable	304,726	7,829									53,921	44	35,100	36	135,150	322											37,080	57				
Peas	Shelf Stable	111,226	207													103,437	185																
Potatoes	Shelf Stable	490,421	1,726													110,713	276									281,145	1,176						
Sweet Corn	Shelf Stable	1,478,981	2,549			33,883	169	39,586	60			1,296,864	1,710			47,486	388					31,078	125										
Tomatoes	Shelf Stable	1,977,765	3,762	73,965	99							227,751	590			1,348,514	1,569													51,005	81	63,470	1,011

- New Zealand, Japan and Singapore are Australia's major trading partners of shelf stable vegetables.
- Tomatoes, beans and sweet corn are Australia's major shelf stable vegetable exports.
- Important markets that have seen phenomenal growth rates in the sales of potato snack foods include Japan, Western Europe, Russia, India and South America. This may represent an opportunity for Australian products.

Pickled Vegetable Exports

Species	Processing	Total		Indonesia		New Zealand		Malaysia		Philippines	
		Quantity (kgs)	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*
Cucumber/Gherkins	Pickled	67,402	121	21,670	28	14,993	29	19,089	15		
Onions	Pickled	30,000	12							30,000	12

- The ABS data only defines cucumbers, gherkin and onions as specified products. Figures for miscellaneous pickled product suggest that large export quantities are sent to the UK and USA.

Vegetable Juice Exports

Species	Processing	Total		China		Hong Kong		Indonesia		Japan		New Zealand		Singapore		United States	
		Quantity (kgs)	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*
Tomatoes (litres)	Juice	843,683	859	104,875	83	188,868	174	219,645	216					101,742	127		
Vegetable (litres)	Juice	10,490,508	30,751			248,354	525	193,338	369	8,728,909	26,646	524,302	1,117	163,975	561	101,076	322

- Australia's vegetable juice exports have increased by 110% since calendar year 1999 with most exports to Japan. Australian carrot juice has become increasingly popular in Japan.
- In Victoria alone, vegetable juice exports increased by $A11 million (92%) from 2000 to 2001, almost entirely to Japan. South Australian carrot production has

tripled to cater for export demand for juices. Victoria accounts for approximately 27% of production with Tasmania being the largest provider.

- ICP in Irymple is processing around 50,000 tonnes of carrots concentrate for the speciality juice market in Singapore.

Hong Kong

- Hong Kong is heavily reliant on food imports and is the gateway for the supply of many food products into mainland China. Food imports are expected to continue to grow due to the increasing number of supermarkets, with a move away from wet markets, the demand for convenience food (value added products, frozen and packaged goods) and the increase in western-style ingredients in everyday cooking.
- Increasingly the Hong Kong market will be satisfied by mainland China.

Malaysia

- Increased health consciousness and concern about the quality of locally produced juices will sustain the growing demand for imported health drinks.
- Limitations on the local availability of raw materials and technology underpin the growing demand for prepared foods for the food service sector. There is also an opportunity to supply frozen and convenience foods for household consumption.

Singapore

- The large tourist trade and a growing preference for western style food, including eating out, provide good opportunities for Australian exporters. It is also an important regional hub for re-export to the rest of Asia.
- There are good prospects for value-added vegetables. The demand for health, convenience and innovative foods is strongly growing and presents opportunities for chilled and convenience food and branded premium and gourmet products.

Japan

- A large market exists in Japan, which imports more than $A3.6 billion fresh and processed vegetables each year. Processed vegetables make up the most of this figure.
- Food imports are expected to grow strongly over the medium term due to the decline in Japan's agricultural sector, further trade liberalisation, increasing health consciousness and the Japanese diet increasingly influenced by the "west". The expanding volume of imports are predominately coming from China.
- There is year round demand for frozen potatoes, organic frozen french fries and frozen broccoli, carrots and corn.
- Japan considers Australia to be an efficient producer of highly mechanised agricultural products with the ability to satisfy the growing trend toward Shinzuke (lightly pickled vegetables)

- An opportunity exists to export processed Asian vegetables to both Japan and Korea. Of the 1.5 million tonnes of processed vegetables imported into the Japanese market in 1997, the market share of processed Asian vegetables was 36%. The main suppliers of processed Asian vegetables include China, Thailand and Vietnam.
- Processed Asian vegetables include cucumbers, gherkins, ginger, Japanese apricots, scallions and eggplants, all of which are important commodities in the Japanese import markets. Prices of these products have remained virtually unchanged since 1988.

Middle East

- Expansions in the manufacturing base and food processing industries have opened new export opportunities for suppliers of bulk and intermediate food products, as well as processed foods.
- The United Arab Emirates and Saudi Arabia have large food processing sectors and manufacturing bases, however, the market demand for imported processed food remains strong.
- The Saudi economy is relatively open and exporters face few restrictions, nevertheless, competition is fierce.
- The Middle East is a dramatically different environment in which to do business, yet it can provide an array of attractive benefits, such as:

- free trade zones
- low import duties
- growing populations
- high disposable incomes
- increasing demand for Western style products

Section 2

Australian imports

All information has been sourced from the ABS and contains calendar year data for 2001.

Frozen Imports

Species	Processing	Total		Belguim/Luxembourg		China		India		Indonesia		Mexico		Netherlands		New Zealand		South Africa		Taiwan		Thailand		USA		Vietnam	
		Quantity (kgs)	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*
Beans	Frozen	4,792,366	4,907	529,578	512	237,390	310							793,584	759	2,511,231	2,667							635,433	565		
Mixed vegetables	Frozen	8,265,015	10,523	133,656	158	102,648	299					273,738	701			7,625,753	9,132										
Mushrooms/Truffles	Frozen	4,954,980	8,523			4,094,427	6,823			215,800	338															427,651	644
Onions	Frozen	287,518	314					221,240	149					25,600	22	30,160	78										
Peas	Frozen	16,164,397	15,055			192,840	440									15,938,302	14,527			15,560	34						
Potatoes	Frozen	2,745,656	3,088													2,708,390	3,001							25,299	63	6,767	12
Spinach	Frozen	2,678,666	4,016	1,556,364	2,082									804,454	1,237									293,067	663		
Sweet Corn	Frozen	8,674,615	11,834													7,586,991	10,280	363,836	404			362,847	761	335,898	355		

- Although only recent figures are shown in the tables, analysis of trends over the past three years indicates that frozen vegetable imports have increased by 50%.
- With the exception of sweet corn, all frozen vegetable imports have increased, especially peas and potatoes.
- Australia's major trading partners of frozen vegetables include New Zealand, Benelux, USA and Canada.

Shelf Stable Imports

Species	Processing	Total		Canada		China		Italy		New Zealand		Peru		South Africa		Spain		Thailand		Turkey		USA	
		Quantity (kgs)	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*
Asparagus	Shelf Stable	3,423,363	11,395			1,118,869	2,932			700,203	2,649	1,584,861	5,742										
Beans	Shelf Stable	22,550,788	25,677					2,895,076	1,230	17,764,031	19,773											1,057,610	2,166
Mixed vegetables	Shelf Stable	10,545,944	22,123					1,878,194	5,144							1,551,969	4,208	2,310,964	3,279				
Peas	Shelf Stable	746,995	1,092					326,034	320	267,139	311												
Potatoes	Shelf Stable	12,376,554	13,587	735,572	883,451					8,962,116	8,958											2,665,349	3,687
Sweet Corn	Shelf Stable	2,508,165	3,661							221,673	654							2,272,991	2,872				
Tomatoes	Shelf Stable	36,566,348	37,817			1,882,430	2,110	28,909,714	28,479	1,664,803	1,650									1,528,809	1,744	2,210,161	2,383

- Shelf stable imports quantities have increased by 36% since 1999. Peas and beans imports have grown at a rate in excess of 100% over this period, while asparagus imports have fallen by 30%
- The majority of Australia's asparagus imports previously originated from New Zealand and Peru, whereas in recent years China has become a dominant player.
- Italy and New Zealand remain Australia's largest import trading partner of shelf stable vegetables.

Pickled Vegetable Imports

Species	Processing	Total		Canada		Croatia		Hungary		India		Yugoslavia (former Republic)	
		Quantity (kgs)	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*
Cucumber/Gherkins	Pickled	2,585,562	3,864	205,434	607	238,377	308	243,122	224	807,771	903	307,773	391

- The majority of Australia's pickled vegetable imports originate in India. Although, no specific vegetable could be identified, figures sourced from the ABS indicate that China is also a large source of such product. These figures are not included in the table until further detailed information is provided.

Vegetable Juice Imports

Species	Processing	Total		Austria		Italy		USA	
		Quantity (kgs)	*$ ('000s)*			*Quantity (kgs)*	*$ ('000s)*	*Quantity (kgs)*	*$ ('000s)*
Tomatoes	Juice	37,021	193					63,025	184
Vegetable	Juce	3,659,662	16,332	236,488	1,002	421,966	2,621	967,055	6,970

- ABS could not provide figures with the specific vegetable juice imported, however, we understand that much of the juice could be sourced from the USA for Campbells, which source ingredient products under global contracts.
- The USA and Italy remain the two largest providers of imported vegetable juice in Australia.

Section

3

Global production

3.1 Major world producers

- Please refer to graph below
- China is the world's leading producer of most vegetable products. The US is the world's second leading producer of tomatoes, carrots and mushrooms. The US is the world's third largest producer of potatoes, dry onions, asparagus, watermelon and spinach.

World table 1--Selected vegetable production in leading countries and the world, 1993-2001 1/

Commodity/countr	1993	1994	1995	1996	1997	1998	1999	2000	2001p
				-- Mil cwt --					
Potatoes:									
China	1,012.8	966.4	1,013.8	1,170.2	1,262.4	1,424.6	1,237.7	1,462.2	1,411.9
Russian, Fed.	830.0	745.8	879.8	852.1	816.6	692.7	691.0	749.6	760.6
World	6,629.9	5,952.2	6,284.4	6,851.3	6,665.6	6,608.1	6,591.6	7,232.3	6,794.5
Tomatoes:									
China	230.2	265.2	290.4	342.5	360.9	376.9	394.8	426.0	443.9
United States	230.2	268.2	259.8	261.8	232.2	220.7	293.5	248.5	226.0
World	1,711.1	1,825.6	1,912.2	2,048.8	1,969.0	2,079.8	2,300.9	2,248.2	2,210.3
Onions, dry:									
China	143.9	168.2	180.9	212.6	221.4	238.9	248.6	268.6	274.2
India	88.4	89.1	89.9	92.2	70.5	117.5	108.0	108.0	108.0
World	722.4	757.8	834.2	869.6	867.0	964.7	1,022.3	1,025.8	1,030.7
Carrots:									
China	62.3	75.6	80.6	96.5	98.7	99.5	102.9	110.0	112.9
United States	38.8	44.7	41.4	45.0	50.0	46.9	43.8	42.8	41.9
World	340.7	346.1	364.6	393.5	416.6	412.3	423.1	436.3	432.8
Cauliflower:									
India	63.3	83.3	88.2	99.2	110.2	121.3	132.3	143.3	143.3
China	65.4	76.3	80.6	96.6	98.6	102.8	102.5	110.1	113.5
World	218.9	249.5	259.3	288.9	300.6	318.6	325.8	343.8	346.5
Cabbages:									
China	246.6	284.1	312.0	359.7	372.7	390.3	413.6	443.1	467.3
India	79.1	86.2	88.2	88.2	92.6	92.6	93.7	94.8	94.8
Russian, Fed.	61.7	50.9	50.5	63.3	66.8	62.3	86.9	92.6	83.8
World	934.0	937.4	992.0	1,051.8	1,058.2	1,072.1	1,122.7	1,174.3	1,201.6
Sweet potatoes:									
China	2,498.7	2,373.3	2,587.7	2,732.9	2,261.4	2,549.4	2,781.0	2,605.3	2,538.0
Uganda	43.2	46.9	49.0	34.1	41.8	48.0	51.9	52.9	55.4
Nigeria	7.9	6.7	25.7	32.6	32.9	34.4	36.6	54.4	54.4
World	2,908.3	2,767.1	3,006.6	3,142.0	2,685.1	2,973.7	3,219.0	3,061.1	2,996.5
Asparagus:									
China	46.5	50.9	53.1	59.7	63.0	66.3	69.6	75.1	77.3
Peru	2.1	2.9	2.4	2.8	3.2	3.0	3.9	3.7	4.0
World	59.7	64.5	66.2	73.0	76.8	79.7	84.7	90.4	93.2
Spinach:									
China	75.1	92.9	97.3	117.1	119.3	123.7	122.6	132.5	135.8
United States	4.6	5.2	4.7	4.8	5.8	5.2	5.5	7.8	7.8
Japan	8.3	8.1	7.9	7.9	7.3	7.1	7.3	7.0	7.3
World	112.6	130.0	135.6	155.4	157.7	161.4	160.5	174.4	179.1
Cucumbers/gherkins:									
China	204.0	232.5	255.2	294.4	314.5	332.4	351.1	378.5	398.3
Turkey	23.1	25.1	27.6	28.7	30.9	32.5	34.2	34.2	34.2
World	459.0	490.2	529.5	568.5	590.5	618.7	640.4	667.2	688.3
Artichokes:									
Italy	10.5	11.8	11.4	9.9	11.5	11.2	10.4	11.3	10.2
Spain	7.4	6.2	5.5	6.1	6.1	5.8	5.6	6.3	6.5
World	25.3	26.1	25.2	24.5	27.4	27.3	26.4	29.1	28.2
Mushrooms:									
China	10.2	10.8	11.2	11.3	12.4	13.1	14.5	15.6	17.8
United States	7.5	7.8	7.8	7.8	8.1	8.5	8.5	8.6	8.6
World	43.1	45.5	45.4	46.9	48.6	49.3	52.0	53.1	55.3
Eggplant:									
China	139.4	161.4	174.2	205.5	221.0	232.1	243.3	262.6	269.6
India	110.5	97.4	137.3	132.3	134.5	136.7	138.9	141.1	141.1
World	331.0	345.3	399.4	430.6	449.0	465.7	474.5	498.3	505.4
Snap beans:									
United States	17.3	20.5	18.6	19.7	18.4	19.5	21.2	22.6	20.0
France	6.0	6.8	7.2	7.8	8.7	8.5	8.5	8.1	7.9
World	29.3	33.4	32.3	34.4	34.1	34.6	36.6	37.4	33.8
Pumpkin/squash:									
China	68.3	68.3	69.4	70.5	72.8	73.9	75.0	86.0	86.0
India	43.3	49.7	54.4	65.5	67.8	71.2	73.9	79.3	83.7
World	272.8	279.9	296.4	313.3	323.0	331.0	328.6	357.3	357.3
Peppers:									
China	95.4	110.7	121.1	143.9	155.1	160.6	165.8	179.4	181.6
Mexico	19.3	16.9	20.2	21.7	31.9	40.8	39.6	38.2	43.2
World	266.0	282.2	306.2	344.5	366.9	392.0	402.1	419.1	429.8
Sweet corn:									
United States	73.3	96.7	88.3	89.1	90.5	91.4	93.2	89.5	90.5
Nigeria	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
World	153.5	183.3	175.8	176.1	177.6	183.5	184.4	184.7	181.5
Okra:									
India	53.0	66.8	86.0	83.8	81.6	79.4	74.5	75.0	75.0
Nigeria	12.6	13.2	13.9	14.3	13.5	14.1	15.9	15.9	15.9
World	80.1	95.1	115.5	113.8	111.5	110.2	107.3	105.1	105.1
Green peas:									
India	47.4	52.9	55.1	44.1	48.5	50.7	44.1	44.1	44.1
China	12.7	15.8	16.3	20.3	22.4	24.3	25.8	27.9	28.5
World	139.1	154.3	161.6	149.9	156.1	160.7	153.4	163.9	155.5
All veg/melons:									
China	3,789.0	4,150.6	4,465.9	4,988.5	5,347.7	5,541.1	5,941.1	6,455.1	6,663.9
India	1,167.6	1,192.1	1,240.6	1,249.1	1,273.8	1,392.5	1,446.6	1,500.4	1,500.4
United States	707.5	804.1	772.5	784.8	787.3	757.3	861.0	821.5	782.9
Turkey	408.6	433.1	482.1	489.4	462.3	479.0	513.7	485.0	485.0
Italy	311.5	315.9	304.5	334.8	315.9	326.5	340.4	356.4	329.4
Others	4,822.6	4,827.9	5,076.9	5,240.4	5,219.8	5,415.6	5,616.1	5,635.2	5,629.3
World	11,206.8	11,723.7	12,342.5	13,087.1	13,406.8	13,912.0	14,718.8	15,253.6	15,391.1

p = Preliminary. -- = Not available. 1/ Includes fresh and processing production.
Source: Derived from data supplied by the Food and Agriculture Organization, United Nations.

3.2 Emerging market and opportunities

- Traditionally, vegetable produce was traded as a commodity but processed and consumer ready products are becoming increasingly popular and are adding value to the industry.
- Strong existing and emerging market opportunities have been identified for "consumer ready" fresh vegetables and value-added, niche vegetable products in both domestic and export markets.
- Such products include:
  - minimally processed vegetables, such as shredded lettuce
  - juices
  - salads
  - stir-fry mixes
  - semi dried vegetables
  - nutraceuticals (products that promote and utilise the "health giving' chemicals found in vegetables).
- Overseas trends indicate vegetable juices, which have a shelf life of 12 months, have been successful in export markets
- Other trends include mini-peeled fresh carrots have taken up to 60% of the US fresh carrot market. Some major Australian carrot growers are hoping to develop export markets for baby-peeled carrots in the near future.

- Australia's high cost of production and transport and the long distances to export markets mean that the greatest chance of increasing exports to sell high-value products, which include processed vegetables.
- Australian is a net importer of processed vegetables. In 1997/98 Australia exported $40.5 million of processed vegetables but imported about $A131.8 million of these products.
- Opportunities in Asian markets exist due to the growing demand for healthy and convenience foods and growth of the supermarket sector.
- With many Asian countries now demanding organic produce, an opportunity exists in this sector for vegetable processing. A major barrier to the importation of fresh organic produce is an importing requirement to fumigate the majority of fresh imports to destroy possible pests. Fumigation eliminates the organic certification and renders potential price-premiums negligible. Value-adding techniques, such as IQF (Individually Quick Frozen), may enable the organic integrity of such vegetables to be maintained.
- The bulk of Japan's food manufacturers require the supply of prepared vegetable inputs at 12 hours notice. Therefore, prepared vegetables (retort or frozen) need to be supplied regularly to maintain service requirements. Communication with importers is crucial and supply chains must be efficiently co-ordinated. Recently a Japanese food manufacturing business established a portion control meal processing facility near Melbourne. This facility may provide key outlets for producers to grow specialty vegetable products under contract.

- Exports of consumer ready vegetables offer strong potential for inward investment. Overseas companies considering investing in this area may benefit from doing so in collaboration with existing Australian companies.
- There may also be business opportunities for Australian companies to coordinate production and marketing in other countries and to export technical expertise, education and training services.
- In order to be successful in export market, marketing opportunities need to be explored including recipe brochures written in local language and smaller 500g package samples, designed to suit Asian consumer preferences.
- Imported product in the canned category consists of:
  - tomatoes from Italy
  - exotic Asian vegetables such as champignons, bamboo shoots, corn spears mostly from Thailand
  - peas and beans mostly from Thailand
  - asparagus – Australian growers cannot grow enough to meet consumer demand. The best asparagus comes from Peru while China can seriously compete on price.
- Most generic brands are imported from China
- Last season, carrot growers experienced significant crop failure and therefore processors had to purchase imported stock.
- The government currently imposes a tariff on imports and sets the price.

- Imported frozen vegetables predominantly originate from New Zealand and Europe. Logan Farm is a national market leader in the pea and corn market and is a wholly owned New Zealand company.
- Most spinach products are imported from Benelux). Although, no specific reason could be provided, it was stated that each year when supply goes out to tender, the European spinach producers are much more price competitive.

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Part E: Technology on-farm and beyond

Part E

Technology on-farm & beyond

Section 1

On-farm technology

1.1 Overview

- Australian retail sales of salad mixes and fresh cut vegetables have shown phenomenal growth from $15 million in 1990 to $70 million in 2000 accounting for 2.5% of all produce sales by volume.
- Despite these figures, the central focus of the project regards the opportunities for processed vegetables, after researching the subject we feel that it is important to highlight the significant on farm opportunities for value improved.
- Essentially this project has been commissioned and funded by grower interests. The key interest of growers is to seek out opportunities to add value to their operations, either by developing new markets with the greatest potential and achieving a higher return from the existing production capacity from achieving higher value for products and/or reducing costs.
- This section considers opportunities and enabling technologies to improve performance at the farm level.

1.2 Global context

- There is increasing evidence that the Australian vegetable industry is becoming less competitive in a global sense. While the competitive threat for fresh vegetables in the domestic markets is minimal, Australia is under increasing pressure in export markets and from importers of processed products.
- Major processors indicate that for many products they are finding it difficult to compete. In many commodities such as peas and beans, New Zealand has a competitive advantage because of higher yields, less water usage and lower product costs. China, Indonesia, Thailand, Vietnam, South Africa, Chile, Peru and Argentina are becoming an increasing threat in processed vegetables because of their much lower costs.
- Progressively, Australian categories of competitive advantage are narrowing. This has lead most informed observers to believe that for the Australian industry to compete globally, it must:
    - Capitalise on the growth of the fresh and minimally processed domestic markets
    - Lower on farm production costs
    - Improve quality, particularly eating quality
    - Pursue niche market opportunities
- The following section examines opportunities in this area.

1.3 On-farm opportunities to add value

- Broadly speaking, opportunities to add value at the farm level comprise:
  - Precision farming
  - Germ plasma development
  - Optical technologies
  - Ultrasonic technologies
  - Organic vegetable production systems
  - Packing and minimal processing
  - Fumigants
  - Storage and transport technology
- As well as being powerful opportunities in their own right, there is also the potential to utilise several sets of technology in a synergistic manner, to leverage the value adding opportunities.

1.4 Precision Farming

- Precision Farming describes a platform comprising a suite of sophisticated measuring and application technologies. It can be variously applied to:
  - Improve eating quality
  - Enhance environmental sustainability
  - Lower costs
  - Optimise marketable yield
- The technologies utilise the Geographic Positioning System (GPS), the Geographic Information System (GIS), Remote Sensing (RS) and Direct Sensing (DS) to fine tune planting rates, fertilising application rates and irrigation. It enables highly accurate crop protection programs, more timely crop management and culture, crop monitoring and knowledge of yield and crop variation within a field.
- The technologies are best suited to vegetable production on a large, broad acre scale, such as carrots, onions, broccoli, celery, cabbage, capsicum, sweet corn, tomato, potatoes and celery. However, the application to smaller crops is likely to be feasible in the near future.
- Controlled environments, fully enclosed or protected cropping systems are well suited to these technologies. However, there are far higher costs and as such is only really feasible for high value, niche market product or counter seasonal supply.

1.5 Applications

- There are a number of opportunities enabled by these technologies to add value in improving on farm return. These include:

1. *Improving eating quality*

- The most frequent concern emerging from consumer research is that vegetables don't have the taste that they used to and therefore, by inference, probably are not as nutritious.
- Processor production systems have the potential to improve eating quality by allowing the achievement of far tighter specifications in terms of the management of water, temperature, humidity and radiation. This, in turn, can be applied to achieving higher and tighter specifications, or sweetness or acidity, texture, colour, shape, size and freedom from defects.

2. *Enhancing functionality*

- There is an increasing interest in the natural functional properties of fruit and vegetables, namely their ability to treat or prevent common ailments/diseases, such as cancer, heart disease and stroke, diabetes, obesity, etc. Prominent on the list of vegetables with functional properties are carrots (beta carotene), onions (cysteine sulphoxides), onions and garlic, glucosinolates and flavones in broccoli and brassicas and lycopene in tomato.
- Research is currently being conducted to isolate and better understand these naturally occurring elements and the production systems to optimise their content. Precision production technologies lend themselves to enhancing the functional properties of vegetables.

3. Enhancing the environment

- Using GPS and field maps allows growers to pre-program the application rate of pesticides and fertilisers and vary the rate according to the soil and crop conditions across the field.

4. Cost reduction

- There is overwhelming research that indicates the potential cost savings for from precision production technology.

5. Optimise marketable yield

- Better targeted chemical management has shown to significantly improve the marketable yield. For example, it can be applied to selected multiple pickings, etc.

1.6 Germ plasm development

- There is unlimited potential to add value to vegetables by improved breeding technology.
- New hybrid varieties have been introduced into the market using traditional variety crossing and screening. Hybrid vegetable seeds produce crops, which are earlier, higher yield, better eating quality and more uniform.
- Genetically modified varieties use gene mapping, crossing and computer system modelling to quickly improve yield, composition quality, pest/disease resistance and herbicide tolerance. The downside of GMOs is the huge consumer backlash, which potentially could negate any advantage. Increasingly, there is a trend toward using PBR legislation to acquire exclusive rights. There is a large and yet largely untapped potential to link this with branding or marketing programs as a means of differentiating the product. Not may companies have successfully done this.
- Improved trading can be applied to:
    - Improving eating quality
    - Enhancing functionality
    - Lowering costs
    - Environmental sustainability
    - Improving shelf life
    - Supply chain performance
    - Optimising marketable yield

1.7 Optical technologies

- Arguably some of the most exciting technological breakthroughs have come in the form of sensors, which measure specific internal and external quality parameters in real time, without damaging or destroying the product.
- While the technology is in the early stages of commercialisation in the research applications, researchers have successfully used Visible (VIS) and Near Infrared (NIR) sensors, multi spectral and chlorophyll fluorescence imaging and machine vision to measure attributes, such as:
    - Soluble solids
    - Ripeness
    - Colour
    - Acidity
    - Sweetness
    - Dry matter
    - Product development
    - Shape
    - Fungal disease
    - Chemical analysis
    - Chlorophyll content

Attributes that can be measured by optical sensors

Attributes	Possible Vegetables
Colour	Carrots, tomatoes, green peas, broccoli, beans, capsicum, lettuce and cucumbers.
Sweetness, acidity & dry matter	Carrots, parsnips, onion, garlic, tomatoes, sweet corn, pumpkins, squash, lettuce, celery, radish, cucurbits and potatoes.
Internal defects	Carrots, onion, garlic, tomatoes, sweet corn (grubs) and potatoes.
External defects	Most vegetables
Shape	Carrots, cucumbers, zucchini, tomatoes and potatoes.
Maturity	Carrots, onion, garlic, tomatoes, potatoes and zucchinis.

- These optical sensing technologies, while relatively cheap, have huge potential to improve eating quality and consistency. It has the potential to be used in projects to increase functionality or taste, which has the potential to give a significant market advantage. For example, the technology can be used to test soluble solids moisture content, sugar and beta carotene (carrot), lycopene (tomato), allin (garlic and onion) and glucosimelate (brassicas).

- As such these technologies would have applications to providing entrance of enhanced ingredients for the production of high beta carotene juices, etc. These technologies also have applications for reducing costs, reducing chemical use and optimising marketing yield. In particular, it has great potential to improve performance in the supply chain through more precise, mechanical sorting.

1.8 Ultrasonic technology

- Ultrasonic sensors are based on acoustic transducers, which emit ultrasonic frequency to measure some physical application of vegetables. This technology is in the early stage of development but is seen to have potential to be used in grading and sorting to detect internal defects. It has particular applications to potatoes, onions, cucumber, carrot, sweet corn and lettuce. This technology has partial potential to improve performance in eating quality, functionality, improving shelf life, etc.

1.9 Organic vegetable production systems

- Demand for organic fruit and vegetables continues to outstrip supply. The organic market in the USA and Europe is estimated to be increasing by 20% per year. The organic food market in the USA is estimated at $16 billion. Consumer demand for organics is being driven on three fronts:
  - Perception of being healthier
  - Being seen to be better for the environment
  - Perception of better tasting
- The main barriers to entering this segment have been the inability to receive a reliable long-term supply in the volumes required. Commercially viable organic production systems are becoming more achievable through improved knowledge.

1.10 Minimally processed vegetables and modified atmosphere packaging

- The technology required to do this is relatively cheap, although it is extremely labour intensive. Because of the rapid breakdown of produce after cutting it needs to be packaged in modified atmosphere packaging (MAP). Again the technology is readily available and relatively inexpensive.
- MAP greatly improves the appearance, eating quality and nutritional quality, i.e. extend the marketable shelf life. These systems are making in roads in to the USA, Europe and Asian markets. One of the critical success factors for this type of operation is the ability to produce a wide range of products and varieties on a year round basis. A plant would, therefore, need to be located adjacent to a market with year round production potential.
- This market is highly competitive and very price sensitive. To succeed in this highly price competitive market in our opinion would require produce more exotic and specialised product. Again there is the potential to link a minimal processing facility with other technologies, which have the ability to enhance taste or functionality, organics, etc.

1.11 Fumigants

- Agrofresh® (al methylcyclopropene) is a new technology, which slows the ageing and senescence of horticultural crops after harvest. This technology is still undergoing further development pending registration. Research has shown that it can increase the post-harvest life and quality of some horticultural products (mainly fruit). This can be used in low dose to improve shelf life at a low cost. This may have application for export markets, especially to the Europe and USA markets, where shipping time is a problem.

1.12 Storage and transport

- Some of the previously mentioned technologies, such as MAP and Agrofresh®, have application to improved performance in the storage and transport stage of the supply chain. Other advances in technology have involved faster supply, web based tracking system to monitor shipping containers in transit.
- Modified atmosphere and controlled atmosphere shipping containers are used to minimise quality loss during sea freight. However, because of the substantial additional cost, only higher value crops can justify this technology.
- New web based product monitoring and tracking systems have recently been released, which allows exporters to monitor from their computers such things as temperature, humidity and shock. This is being used to make claims against supply companies but can also be used to gain quality control of the supply chain. For example, consignment of product en-route from Australia to Europe via Singapore (most shipping these days goes through a hub) if it is found that control protocols were violated, e.g. temperature gets above optimum range, the product can be off-loaded in Singapore and sold whilst still in marketable condition rather than dumped when it arrives in Europe. This technology also facilitates the management of claims against shipping companies.

1.13 Conclusions

- When all things are considered there is probably far better potential for the growing sector to add value and improve on-farm profitability by adopting technology that will add value on farm rather than being involved in beyond farm gate processing. A more detailed assessment of beyond farm gate processing opportunities is made later in this report. The potential to add value at the farm level through adopting one or more of these technologies is potentially large.
- One of the common themes to emerge from the previous market analysis is the strong consumer preference for fresh and minimally processed vegetables. There is no doubt that this category will continue to grow steadily. The majority of processors are frustrated in seeing these categories eating into their core businesses and showing strong growth and with obvious long term potential but not being able to be part of the action.
- There already exists proven low cost technologies with the ability to add value through improving the eating quality, enhancing functionality, extending shelf life, improving nutritional quality and appearance. The big potential comes from leveraging several of the technologies into a market focussed value added package.
- A hypothetical example might be to use breeding to create carrots with high beta carotene, then using precision agriculture technology to maximize performance on-farm, then to use optical technology to quality levels to guarantee minimum beta carrot performance levels then putting this into the value add process, which can be shipped in frozen form to Japan to produce high performance functional fruit juice.

- This is just one example, but there are countless other options that can be assembled. There is a large potential for individual producers or a consortium to develop strategic alliances with major processors and to develop high value product for their mutual benefit.
- To maximise this potential, the best approach would be to enter into a strategic alliance with one of the big processors to produce highly specification produce for some particular product. This option is expanded upon later.

Section

2

Beyond farm gate processing technology

2.1 Introduction

- This section covers new technology, equipment and processes applicable to vegetables and new product opportunities for vegetables.
- In developing this section we have applied an extensive search and have not limited the possibilities or considered their economic feasibility at this stage. In putting forward some of these technologies it is recognised that some of them are unlikely to be economically viable; they are put forward in the interest of completeness.
- No attempt has been made at this stage to seriously assess the feasibility of these projects; this will come later in the report.

2.2 Irradiation

- Irradiation of food is accomplished using one of two methods, gamma irradiation and electron beam. The source of the gamma rays is a high energy radioisotope, either cbalt-60 or caesium-137. Electron beams are generated using a heated cathode to generate electrons and then accelerated by a high voltage electrostatic field. The electron beams can be used direct or focussed on a suitable material to produce X-rays.
- Irradiation is used to inhibit sprouting of potatoes, onions and garlic, sterilise herbs and spices, inhibit mould growth in berry fruits such as strawberries, destroy pathogens such as Salmonella in meat and fish and disinfest grain, dried fruits, etc. The main advantage is that it extends the shelf life, which for example can allow shipping to distant markets such as Europe which would otherwise be risky. Irradiation can also be used to remove threat of pest and disease which enables market access into Japan, for example.
- Irradiation does away with the need for chemical preservatives, works on packaged and frozen foods, little or no heat up during processing so that taste and other desirable sensory characteristics are maintained.
- There has been substantial consumer resistance to irradiation and irradiated foods, it requires specific labelling, eg "irradiated paprika".
- Irradiation is approved in Australia for spices, herbs and herbal teas and consideration being given to approval for pest eradication on specified tropical fruits. Approved in the USA for raw meat, vegetables and fruit, probably to be approved for precooked, ready-to-eat foods. Approved in a number of Asian countries including China, India, Indonesia and Thailand.

- The capital costs of establishing an irradiation plant are very high, meaning that it would probably require a large corporation, consortium or a government backed facility.
- Opportunities exist for use of irradiation in combination with other treatments to reduce microbial contamination of vegetable products. Conversely, some products may need additional treatments to counter changes bought about by irradiation. Relevant recent research work in the USA includes:
  - Increasing shelf life of diced capsicum from 5 days to 21 days;
  - Improving shelf life of fresh-cut lettuce;
  - Irradiating peas to reduce the canning sterilisation times by 10 to 25%;
  - Dipping diced tomatoes in calcium chloride solution to inhibit softening caused by irradiation.
- We understand that there are applications to build two irradiation plants in Queensland; one by Steri Tech and another by Sure Beams. If these proceed, they will almost certainly be available for contract packaging.

2.3 Biofungicide coatings

- As described in a previous section these are coatings applied to fruit and vegetables, which prevent or inhibit fungal growth. The coatings consist of a live yeast (Candida saitoana) culture mixed with either chitosan or lysozyme. The yeast works by preferentially consuming nutrients on fruit and vegetable skins, which would otherwise be used by rot-causing fungi to grow. The chitosan and lysozyme both have anti-fungal properties.
- Biofungicide coatings have applications for all fruit and vegetables subject to fungal rot.
- This is a 'natural' method of control, which would replace the use of chemicals with varying degrees of toxicity.
- The main disadvantages are possibly higher cost than the materials the coatings would replace, special care required in storage and handling to ensure the yeast cultures remained active.
- Legal status in Australia is unknown and would require consideration by Food Standards Australia New Zealand. At best, would be deemed a processing aid with no labelling required and at worst, could be deemed a new food additive or 'novel food' and would require an expensive and time-consuming application.
- Cost is unknown but expected to be higher than that for existing anti-fungal, anti-mould treatments.
- Fungal decay is estimated to destroy over one quarter of the world's fruit harvest so use potential is high.

2.4 Modified atmosphere packaging (MAP)

- MAP was discussed in the previous section with regard to on-farm value adding. It also has application beyond farm gate. MAP is a well-established but constantly developing group of technologies.
- Broadly speaking, there are four approaches, all aimed at extending the shelf-life of packaged foods:
  - Replacing normal air in an airtight package with a special atmosphere (or no atmosphere at all). Simple examples are vacuum packaging of ground coffee and nitrogen flushing of nut packs. In both cases, the aim is to prevent loss of flavour through oxidation. More complex gas mixtures, eg 20% carbon dioxide, 40% oxygen and 40% nitrogen, are used for retail packs of red meat;
  - Selectively permeable packaging where the package atmosphere stabilises over time to extend shelf-life. This is the most used method for packs of fruit and vegetables where the pack contents are actively respiring. Typically, the packaging material prevents water loss, which would lead to wilting and has carefully adjusted gas barrier properties so that in-pack carbon dioxide content is elevated and oxygen content is reduced (but not eliminated) so that respiration activity is dramatically lowered;

- Control by gas absorption either by having the absorbent chemical incorporated in the packaging film or by placing a sachet containing the chemical inside the pack. Typical examples are oxygen-absorbing materials used to limit flavour deterioration of products with a high oil content and ethylene absorbents to ripening and senescence of fruit;
- Control by gas or vapour generation, which is mostly done by inserting a sachet in side a pack. Typical examples are sachets containing alcohol, which retard mould development in packaged cakes and sulphur dioxide-generating 'pillow' in cartons of grapes for export.

➢ Modified atmosphere packaging is widely used internationally for retail packs of both whole and minimally processed vegetables. Typical usages are for baby carrots, broccoli florets, cauliflower florets, peeled garlic, tomato slices, fennel, sliced zucchini and endive.

➢ Modified atmosphere packed produce reduces waste through the distribution system and expands the area of distribution. It also offers a non-chemical way of extending produce shelf life.

- The main disadvantages are increased production costs due to use of special packaging, gas mixtures and/or sachets. Slower production speeds with gas replacement process, as a vacuum needs to be drawn before the special gas mixture can be put into the pack. The major problem is, that to be fully effective in extending shelf life, the refrigeration chain right from harvest to take home must be strictly maintained. At the moment this is difficult, if not impossible, to achieve in Australia for retail products. Another problem is that each vegetable/cultivar combination requires a unique set of parameters to gain maximum shelf life extension. This again is not practically possible so there is always some shortfall in actual shelf life obtained.
- Legal status – generally approved, but care needs to be taken to check that no adverse effects, eg formation of botulinum toxin, are likely to occur over the extended storage period.
- Cost – relatively low but variable depending on system selected and desired output..
- Opportunities – modified atmosphere packed minimally processed vegetables do represent an area of opportunity, particularly with recent research indicating that argon/carbon dioxide mixtures can extend shelf life a further 25%. A further area of opportunity is with minimally processed Asian vegetables, which are of great interest to consumers. However the problems caused by an inadequate cold chain continue to limit achievements.

2.5 High pressure processing

- High involves subjecting packaged or unpackaged solid or liquid foods to pressures between 100 and 800 megapascals (Mpa) at temperatures from below 0oC to above 100oC. The exerted pressure can be applied over a set period of time or as a series of pulses and throughout the food mass independent of its size, shape and composition. It should be noted that the product heats up when pressure is applied and cools down when the pressure is released. Processing equipment has up until now been mostly batch type but continuous processing units are now available.
- Applications – there are a number of products on sale in Japan, including orange juice, jam, fruit yoghurt, salad dressings and fruit sauces. Last year, the first high-pressure product, guacamole, appeared on the US market. At the current level of technology, HPP will give acidified (pH < 4.6), eg tomato-based, products with a refrigerated shelf-life of up to three months and non-acidified products with a refrigerated shelf life of around 14 days. In both cases, the products contain no chemical preservatives. Use for enzyme inactivation and pathogen reduction in tomato and carrot juices has been extensively studied.
- Advantages – the high-pressure process reduces microbial counts and inactivates enzymes, which can cause deterioration in plant products but maintains much of the fresh character and taste of the original material. Eliminates or reduces the need for chemical preservatives.
- Disadvantages – generally low production rates, inability to kill bacterial spores and consumer distrust of new processes. Processing leafy vegetables such as spinach is a problem due to texture change.

- Legal status – most likely does not need specific approval but care needs to be taken to check that process parameters, i.e. pressure, time and temperature, are adequate to confer the desired degree of microbiological safety and stated shelf life.
- Cost – extremely high; $20 - $30 million per unit.
- Opportunities – With mild heating, say to 80oC, and higher (600 MPa) pressure, the shelf life of non-acidified, non-preservatised vegetables might be extended to 21 days. Heating to a higher (90oC) temperature and using significantly higher pressures may lead to shelf stable, non-acidified vegetable products particularly if coupled with the use of a preservative such as nisin. Overall, while HPP has promise and there are a number of products already in the market overseas, its high capital cost, limited output (compared to established processing/packaging techniques) and limited applicability leave it as of limited value.
- We understand that a high pressure processing plant is being established in South Australia; primarily to process seafood. This is likely to be also available for contract packaging.

2.6 Pulsed electric field

- Pulsed electric field technology is used for liquid products, which are subjected to a high voltage electric field (10-50 kV/cm) for 1-30 microseconds in a cell with the electrodes 3-5 cm apart. The product passes from treatment cell to treatment cell being exposed to 20-100 pulses along the way. As the product heats up when pulsed, it must be cooled between each cell.
- Applications – used on milk, liquid egg, diet drinks and fruit and vegetable juices as a substitute for pasteurisation (to reduce microbial load).
- Advantages – the process reduces microbial counts and results in less flavour deterioration than pasteurisation by heat.
- Disadvantages – suitable only for homogeneous liquids with relatively low electrical conductivity, does not completely kill all vegetative bacterial cells, ineffective against bacterial spores, does not denature enzymes (which cause product deterioration). Presence of fruit pulp in juices results in process non-uniformity due to distortion of the electric field and increased bacterial survival. Presence of air bubbles also gives this problem.
- Legal status – most likely does not need specific approval.
- Cost – not known as no commercial plant thought to be in operation.
- Opportunities – limited due disadvantages described above.

2.7 Pulsed light technology

- With this technology, high intensity (20,000 times the intensity of sunlight at the Earth's surface) is generated by an electrically ionised xenon lamp. Treatment consists of up to 20 pulses of light for a duration of 200-300 microseconds with a flash frequency of 1-10 per second. This is sufficient to kill both bacterial vegetative cells and resistant spores.
- Applications – used on clear liquids, eg water, packaging materials and produce.
- Advantages – the process substantially eliminates bacterial contamination.
- Disadvantages – the light works only on the surface of produce and coverage is incomplete for irregular surfaces. This means that there is less total microbial kill than with other competitive methods such as washing with ozonated water.
- Legal status – most likely does not need specific approval for use with produce.
- Cost – relatively low.
- Opportunities – very good for sterilisation of flexible packaging but limited for produce due to disadvantage described above.

2.8 High energy ultrasound

- High energy ultrasound is used for liquid products which are subjected to high energy (10-1000 W/cm2) , low frequency (20-100 kHz) ultrasound. This has a destructive effect on micro-organisms due to the shear forces produced by cavitation, localised heating and free radical formation.
- Applications – liquid products as a substitute or part substitute for heat pasteurisation by heat.
- Advantages – the process reduces microbial counts and results in less flavour deterioration than pasteurisation by heat.
- Disadvantages – suitable only for liquids, most likely would need to be used in conjunction with heating to obtain sufficient microbial kill.
- Cost – not known as no units being used commercially to treat food products.
- Opportunities – has some potential for extending the shelf life of fruit and vegetable juices, probably in combination with heat treatment.

2.9 Canning and canning related processes

- **Electric induction process (RapidCan)**
  - Replaces conventional retorting (sterilisation) by heating the can in an electrical induction coil. This results in extremely rapid product heat up compared to the conventional process.
  - This procedure gives canned products better texture, colour and flavour especially canned corn.
- **Modified retort process (Innovative Foods)**
  - Produces shelf-stable meals or meal components in flexible, plastic pouches up to 2.5kg net weight (with current equipment - 5kg possible with additional investment).
  - Process is a trade secret but is understood to be by retorting under "gentle sterilisation" conditions (possibly longer sterilisation at lower temperatures).
  - Production equipment located at Eurest Foods in Brisbane is at 10 tonnes per day capacity. Existing meat/vegetable based, mid-quality restaurant meals are being exported to UK.
  - Looking to license technology on basis of $50,000 fee (covering design/commissioning of plant) plus ongoing royalty of 3% on product sales. Initial product development fee of $6000 for trials at Eurest.
  - Ongoing product development covered by royalty payment.
  - Equipment cost (retort only) about $200,000 for a 3 tonne a day plant.

- Believe significant opportunity for vegetable products, eg corn cobs to Japan replacing NZ retort pouch product which receives conventional retorting which heat damages flavour (due to caramelisation of sugars).

➢ **New carton to replace steel cans**

- Tetra Pak has launched a new carton which can be used for products traditionally packed in steel cans.
- The carton consists of 75% paperboard with a polymer coating and an aluminium foil lining.
- Unfilled cartons are flat unlike cans which are preformed and take up a great amount of space. Additionally, the carton is lighter than a can and easier to open. Nestle has been the first to use the Tetra Pak innovation for its Friskies dog food.

2.10 Miscellaneous

- **Tomato peel utilisation**
  - California Polytechnic State University has developed a process to utilise alkali-peeled tomato waste.
  - The waste is acidified to neutralise the alkali then converted into puree or juice and incorporated into commercial bulk tomato products such as tomato sauce.

- **Contamination detection**
  - The US Agricultural Research Service is developing a machine vision system capable of detecting the presence of faecal bacteria, fungal deterioration and diseases on produce.
  - The system operates through a camera recording images using different colour filters and subsequent computer analysis of the images. It is expected that the system could be integrated with already existing colour and size graders.

Section

3

New product possibilities emerging from new technology

3.1 Introduction

- This section considers possible new product opportunities, which could emerge from the previously discussed technology.
- The food industry is extremely dynamic with endless opportunities to develop new products in response to changing consumption trends and emerging opportunities.

3.2 Coated vegetables

- The fastest growing category in frozen vegetables is the value added versions, e.g. cauliflower with cheese sauce. However, all the value added products suffer from one defect, the difficulty in preparing less than a one-pack quantity. All of the current ranges have the sauced added to the pack.
- There is a relatively simple method of post-processing frozen vegetables, which will allow consumers to take as much or as little from a pack as they like with the guarantee that the ratio of sauce to vegetable will remain fixed. The post-processing involves spraying sauce, stock, etc on individually quick-frozen vegetable pieces while they pass along inside a rotating barrel. This method of application is used to flavour potato crisps directly after frying and spray coating, eg adding mint flavour to peas, is known in the industry but no one has taken the logical next step.

3.3 New age stir fry and pre-grilled vegetables

- By far the fastest growing method of food preparation is stir frying. Frozen stir fry vegetable mixes are very popular. There is some new technology, which can produce better quality stir fry vegetables where the stir-frying has been done by using specialised machinery, such as direct flame searers or HeatWave frying systems. These products with a sauce applied as above would only need heating, i.e. no frying in a wok or addition of other ingredients by the consumer. Packing these in a microwave susceptor film pack would allow extremely rapid preparation by the consumer.
- Similar technology can be applied to produce pre-grilled vegetables for anti-pasta.

3.4 Dehydrated products

Standard dehydrated vegetables

- The major markets in Australia for dehydrated vegetables are air-dried onion (powder and flakes), garlic powder, capsicum (bell pepper) dice, parsley, mushrooms (pieces and powder), beetroot powder (as a colorant) and freeze-dried peas and corn (for instant soups). One company operated a conventional air drying plant for onion and garlic in Australia for some years and small businesses were supplying Australian dried capsicum.
- Additionally, there are a few low capacity freeze-dry units in Australia and a larger plant being refurbished in Queensland.
- Several studies have purported to show significant opportunities for import replacement of dried mushrooms. However, the Australian dehydrated vegetable industry remains in the doldrums. The reasons for this are diverse but include:
    - The disinterest of growers (or potential growers) in supplying product other than for the fresh market and their reluctance to commit to the special cultivars needed (eg high solids content onions);
    - Failure of local manufacturers to deliver contracted quantities by agreed dates;
    - Inability of local manufacturers to meet agreed specifications and quality standards.

- The major problem has been lack of understanding of the market structure. Gross import data shows substantial tonnages of dehydrated vegetables imported and assumptions are made that capture of significant market share is easily achievable. However, the Australian market is supplied by many importers, all with their own special niches (eg close customer with certain customers, ability to supply special size grades). Additionally, these importers vigorously defend their turf against competitors (either other importers or new local competitors) by cutting their own and their supplier's margins. To properly counter the above situation, local manufacturers have to be price competitive (on a long term basis) and need to establish a national sales/marketing presence so that their products are known.

Dried vegetable powders

- The market potential for specialised vegetable powders is more positive than for regular products.
- One product group of interest is powders, such as pumpkin for instant soups, which have a large share of the total soup market. Shortening the length of the supply chain and getting Australian made fresher product would be of interest to instant soup manufacturers.
- The second opportunity, related to the first, would be sale of vegetable powders for colouring specialty pastas, eg tricolore.
- A third opportunity is that of instant vegetable powders reconstituted with warm water as infant food. Cereal products of this nature have long been accepted by mothers as suitable for their babies and providing vegetable products in similar, easy to use (especially when travelling) form would be worthwhile. Of course, in making such a product, care would need to be taken to ensure that product microbiological quality was of the highest.

- The fourth product group is vegetable powders with health-promoting properties, i.e. nutraceutical-type products. A number of powdered vegetable products are already marketed on the basis of their specific nutrient contents. Examples of these are:
  - Broccoli (floret and stalk) – sulforaphane, vitamin C, carotene;
  - Carrot – carotene;
  - Garlic – allicin, glutamylcysteine;
  - Spinach (leaf and stem) – lutein, carotene, folate, calcium, iron;
  - Tomato – lycopene, vitamin C.
- There is also an established market for cereal leaf products such as barley, wheat and alfalfa and a growing demand for any green leaf vegetable powders. Also, recent research conducted at King's College, London, has demonstrated that a number of Asian vegetables contain significant quantities of natural antioxidants[*] and demand for dry powders made from these can be expected.

[*] Antioxidants neutralise oxygen free radicals that cause cell damage and there is much interest in their potential role in foodstuffs as preventive agents against diseases, including cancer and neuro-degeneration.)

3.5 Vegetable snacks

- There is increasing interest by food processors in healthy snacks because of the growing concern about obesity and related problems and the threat that junk food companies will take over from the tobacco industry from the litigious public. One range of products is vegetable 'chips' - potato chips (crisps) are an enduring snack favourite and some other root-type vegetable chips, eg kumara, taro, have small markets.
- Apple chips made in New Zealand and principally exported to Japan have been successful. The apple chips were made using a vacuum fryer which operates at a much lower temperature than a standard potato chip fryer. It is possible that a recent acrylamide scare will not go away and that lower temperature with, presumably, lower levels of acrylamide formation, will be seen as healthier.
- Vegetables, such as carrots, could be popular particularly given their nutritional assets, i.e. carotenoid content, as could many other 'solid' vegetables. Vacuum frying equipment is widely available from Asian countries such as China, Japan, Korea and Malaysia.
- Besides vacuum frying other processes such as hot air blasting and baking (oil spray plus salt before or after) to give a low fat product could be used. Further refining the options might include the use of vacuum impregnation with flavoured oils, eg garlic, chilli, after air drying to give unique flavours or extending to include a range of organically grown vegetable snacks.
- Puffed snacks – vegetable pieces explosion puffed (like Rice Bubbles). Products made from spinach and kale are now on the US market.

3.6 Vegetable juices and stocks

- There is a renewed interest in vegetable juices, especially the carrot based fruit drink mixes and exotic functional food. Fruit and vegetable blends, could be made using enzyme treatment to maximise yield then pasteurised and/or preservatised, chilled form. Alternatively, chilled juice could be bulk freighted to a UHT plant, such as a dairy factory for aseptic processing. Examples of juice blends with market appeal are tomato, tomato/vegetable, carrot, orange/carrot, pineapple/carrot and celery 'tonic'.

3.7 Vegetable concentrates

- Vegetable concentrates in puree or juice form can be produced on the same conventional equipment as vegetable juices (or using higher efficiency counter-current extraction) coupled with a vacuum concentrator. There is a large market for example for high betacarotene content carrot juice in Japan. There is also a large market for pumpkin puree.
- These concentrates bulk aseptically packed (or in frozen form) could be sold to local and international soup and beverage manufacturers and juice blenders. Another potential use for carrot juice concentrate is as a spread like honey because of its extremely sweet taste.
- Note: One of the by-products of juice and juice concentrate production is vegetable fibre which when dried and ground has reasonable value.

3.8 Vegetable/vegetarian dips

- The dip market is large and growing. Dips such as beetroot, spinach and spiced carrot have potential and can be made simply on a small scale. An extension of this could be vegetable and vegetarian patés using vegetable purees and pieces mixed through a cream cheese or whey protein base. Other specialty markets could also be targeted. As an example, it is noted that Poseidon is exporting its Halal-accredited dips to South-East Asia where the market for such products is very strong.

3.9 Vegetarian pet food

- Mars (Uncle Ben's) has just launched a vegetarian dog food in India. The product is based on rice, probably broken, i.e. lower grade material, and vegetables and Mars believes that worldwide sales potential is extremely high. The launch of such a product reflects a number of trends, including:
  - The desire of vegetarians for their pets to also have a meat-free diet;
  - The decreasing proportion of meat being used in commercially-made pet foods due to its high cost;
  - The advanced understanding of the nutritional needs of companion animals which allows the formulation of nutritionally complete, non-meat products;
  - Concerns about diseases such as BSE originating from meat and the desire for safe alternatives.
- Vegetarian pet foods could be made in Australia in canned or dry form. The canned form would, most likely, be made up of a gel base containing vegetables such as corn, carrot and peas. The needed protein could come from soy, other legumes, corn gluten or flax seed meal (which would also contribute omega-3 fatty acids). Specific amino acids such as methionine could be added to optimise protein quality as could any necessary vitamins and minerals. To provide an appropriate level of energy, vegetable oils or fats would need to be incorporated. Probably the most difficult problem in formulating a vegetarian pet food is getting a flavour which appeals to the animal. Yeast and yeast derivatives have proven appeal to both dogs and cats. For dogs, onion, garlic and carob are attractants. Sweetness also improves palatability for dogs whereas acidity does the same for cats.
- Dry pet foods are normally extruded cereal-based pieces with an appetite-enhancing coating. The coating used in a vegetarian product would normally consist of vegetable fat or oil combined with yeast (for flavour) and vegetable powders or purees (for colour).

- It is most unlikely that a grower-based group would enter the pet food industry in its own right because of the tight position of control held by the big multinationals. It may however be feasible to participate by supplying first stage, processed ingredients.

3.10 Canned vegetables

- Canned vegetables can be produced in a small-scaled operation with relatively little capital investment, but the market for such products is diminishing. Higher quality, i.e. more like fresh, products are possible using the RapidCan electrical induction process but capital cost is high and separate production lines are needed for each different can diameter.

3.11 Niche markets

- There are four niche market areas, which are worthy of further consideration; organic products, regional specialties, indigenous specialties and halal/middle eastern products. Any of these sets of products could form a subset of the major food production initiatives described above but they also lend themselves to small-scale/craft production. Overseas, one of the developments seen is the construction of small, purpose-built facilities to enable the production of local products. For example, Rodriguez Island in the Indian Ocean has a commercial sized kitchen used by women's groups to produce quantities of pickles and like products which are sold to tourists and in nearby Mauritius. Obviously, international sales are generated both through the 'exotic' location in which such products are made and the use of indigenous produce, eg masau (fruit) jam from Zimbabwe.
- Other relevant examples include:
  - The US organic food industry where growth in retail sales of organic foods has averaged more than 20% annually since 1990 and, in 2000, more organic food was sold in conventional supermarkets than any other venue.

- Middle Eastern and Asian specialties such as slata meshwiya and kim chi are considered to have potential. Slata meshwiya is made by roasting whole peppers, onions and ripe and unripe tomatoes which are then peeled and chopped, capers, salt, spices and oil are added and the product is canned or bottled. The essential ingredients of kim chi, Korea's national dish, are Chinese cabbage, salt, garlic and ginger but from there on, there are literally hundreds, perhaps thousands of variations including those specifically tuned to Japanese and Vietnamese palates. This is one of the two major problems in making ethnic specialties, is that it doesn't taste like mother used to make. The second problem is that people living overseas want to buy ethnic specialties produced in their home countries as a reminder of home. While these market opportunities exist on paper, in reality they are very difficult to crack because of the highly demanding nature of the market for the traditional recipes. To succeed in these types of products would almost certainly require a strategic alliance with a national office of the target countries. This applies to products as diverse as Polish jams and Vegemite.
- Sole Mio sell their Italian-style marinated, semi-dried and char-grilled vegetables throughout Australia and have, with Halal accreditation, developed extensive markets across South-East Asia.

3.12 Miscellaneous products

- **Reformed vegetables –** these are made by taking vegetable purees, mixing them with a gelling agent such as alginate, forming the pieces and then gelling them, eg by immersion in a calcium salt bath. The products can then be further processed if necessary. A typical example of such a product is reformed onion rings which have been battered, fried and frozen.
- **Vegetable jellies –** a somewhat similar concept to the above but with vegetable juices, pulps (eg spinach) or dried vegetable powders mixed with gelatine, salt and spices and formed into savoury aspic-style products.
- **Edible food wraps –** a concept similar to the simple flour-based pita bread but made from pureed vegetables (or fruit), gelling agent, preservatives, etc. An American researcher has developed such products using broccoli and carrots.
- **Vegetable waffles –** building on the wrap concept but producing a crisp formed container (eg like an ice cream cone) from a batter containing vegetable powders for colour and flavour. Waffle presses to do this are made in various sizes from individual plates up to high volume production lines.

3.13 Vegetable wines

- It is hard to believe that vegetable wines could ever be anything other than a micro-niche market but they are included for the sake of completeness and for the fact that recent research at Cornell University has shown that the limiting the fermentation of fruit and vegetable wines so that their alcohol content does not exceed 10.5% markedly improves flavour. Vegetable wines, which are currently sold include beetroot, parsnip and choko and banana.

3.14 Vegetable waste utilisation

- There is an opportunity to extract valuable materials, eg anthocyanins, from vegetable and fruit wastes. For instance, the German company, Herbstreith, is developing an enzymic process to extract bioactive components such as carotenoids and polyphenols from apple and carrot juice pomace. Aside from bioactive compounds, high value flavours can be extracted from vegetable wastes, particularly celery, onion and ginger tops. Extraction can by simple means such as steam distillation or by more advanced technology such as supercritical fluid or spinning cone extraction systems.

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Part F: Strategic analysis

Part F

Strategic Analysis

Section 1

Strategic & performance factors

1.1 Introduction

- This section considers some of the broader strategic issues that need to be considered by potential new entrants into the food industry in general, as well as the processed vegetable industry in particular.
- It is intended to provide a backdrop to the next section where the opportunities are discussed. In particular, it provides a sobering assessment of the extreme competitiveness of the global food industry and the significant barriers to entry and the reasons for the very high failure rate for new start up companies in the Australian food industry

1.2 Critical success factors

- As a precursor to evaluating the opportunities that have been identified throughout the report, this section highlights the critical success factors that need to be addressed when assessing opportunities.
- By way of an overview, it is important to stress that the global food industry is extremely competitive with only the very efficient surviving and many going out of business. Profit margins in the food industry are water thin and only the highly efficient specialists survive.
- Increasingly the food industry is going global and with each category dominated by mega trans-national companies with highly efficient plants and strong global brands, e.g. Simplot, Heinz, Nestle, Kraft. Progressively, they have rationalised their manufacturing, producing their requirements in large, highly efficient plants in the lowest production cost countries. It is far more economical for them to ship products to their markets, rather than produce in less efficient factories in market countries.
- The following are identified as being critical success factors for the processed vegetable operations:
    - Operational efficiency
    - Efficient supply chain linkages and management
    - Adequate capital
    - Skills in managing technology
    - Access to markets
    - Strong brands and marketing expertise

1.3 Operational efficiency

- As with any processing facility, operational efficiency is of paramount importance. It is particularly important in processed vegetables, which is an extremely price competitive industry.
- Operational efficiency in vegetable processing is driven by a number of factors, the key ones being:
  - Economies of scale, critical mass and long production runs
  - Level of plant utilisation
  - Mechanisation to replace labour
  - Factory layout and flow.

Economies of scale, critical mass and length of flow

- The efficiency of processing plants is heavily dependent on economies of scale and typically the biggest factor in low efficiency is short product runs. Change over between products requires long down time. For example, the change over for a canning line to a new product in pack size is around 8 hours.
- The most efficient processing plants are large, highly automated plants, which run for extended periods without downtime. Large factories in North America and Europe are highly efficient because of their long runs enabled by the size of their domestic markets.
- Critical mass is also an issue again because of the economies of scale, which are such that there needs to be a very large volume to reach worlds best practice in terms of production costs. Consequently, they are far better off to have a handful of very large efficient factories strategically located around the world rather than attempting to produce in each market. A manifestation of

this is Heinz decision to virtually withdraw all production in Australia. It is likely that others will follow suit.

- A related trend is the pattern of outsourcing of non-core business, rather than attempt to produce in less efficient factories, or with short production runs. An example here is Simplot's decision to outsource beetroot and tomato processing rather than doing it themselves. Their strong brands allow them to be a big player in the market without having to process in their own right.
- Another related factor is the length of the seasonal production window; the longer the season for a particular item, e.g. corn, the more efficient the plant will be. For this reason, the very efficient plants are located in areas, which have broad diversity in terms of seasonal micro climate which enable them to source product for an extended period of the year.
- Small, regional plants find it difficult to compete on costs and can only really survive by pursuing high value, niche markets.

Plant utilisation

- Another factor in plant efficiency is the level of plant utilisation. Typically processing plants are high capital intensive meaning that plant depreciation is a big factor in cost.
- One of the reasons that plants such as Golden Circle and SPC/Ardmona are more efficient is because of their high level of plant utilisation due to the volumes generated respectively by pineapple and stoned fruit, which provides the critical mass. The vegetable processing operations tend to occur at out of season times meaning that they can be utilised for most of the year.

Mechanisation to replace labour

- One of the biggest reasons for Australian food industries' lack of global competitiveness is the relatively high labour cost. As a result, food processing companies have been investing in technologies, which minimise labour costs.
- Unfortunately, this usually involves high capital investment, which then requires large volumes to be efficient.

Factory layout and flow through

- Factory layout and product flow through is also an important contributor to operational efficiency. Many food processing facilities in Australia are old and have to be re-jigged to accommodate new products and technologies, often in a sub-optimal manner. Often as a result they are highly inefficient. As a general rule, efficient food processing operations are those where they provide flow through in a continuous stream from raw material at one end through to finished product at the other end.

1.4 Efficient supply chain management

- Another common element of highly efficient food processing operations is having efficient supply chain management.
- The key to efficiency in vegetable processing is having on-going access to a supply of high quality raw material produced to specifications and competitive prices. Increasingly the pressures of the industry are such that processors need to be able to source from very large efficient producers who can produce to a very high quality standard and are HACCP accredited.
- A common reason for failure of grower-controlled organizations is that they have focussed on maximising farm-gate prices for growers often with the result that they were paying above the market rate for the material. This in turn made them uncompetitive in the market place. This probably nearly crippled the likes of Golden Circle and SPC until they dealt with it. Golden Circle, for example, now pays market prices for raw material and provides added returns to its grower shareholders in the form of dividends. This ensures that the correct market signals are sent and growers are continually striving to improve on-farm efficiency.
- Another issue in efficient supply chain management is having the raw materials produced reasonably close to the factory. There are two factors here, product quality and freight. Fresh vegetables deteriorate rapidly in transit without refrigeration with the result that if product has to be shipped long distances the quality suffers. Increasingly, processors are looking to minimise the time from field to plant. The second factor is freight cost, which can be significant with products where there is a lot of wastage. Shipping raw materials long distances can substantially add to cost and reduce overall economic viability.

1.5 Adequate, low cost capital

- Processing plants require a large amount of capital; not just for the processing plant but also the building, infrastructure, etc. Large processing facilities such as canning lines require upwards of $20 million in capital.
- Grower based operations often fail because they are inadequately capitalised and are often too heavily geared, making it difficult for them to service their capital.
- The only reason that many of the major food processing facilities can be profitable is because they have old, fully written down plants. Profitability of the mature industries, such as canned and frozen lines, is not sufficient to support re-investment. If processors costed their plants on their books at replacement cost most would undoubtedly show a book loss. The problem is that when these plants reach the end of their economic life, there will not be the capital available to replace them.
- In this highly competitive global environment it is very difficult for start up companies to succeed with high borrowings. Large established companies can expand through retained earnings and the ability to cross subsidise a new operation from profits from other business units.
- One of the most common reasons for business failure in the food industry is inadequate start up capital. Almost every food business has a two or three year break-even time because of the large start up costs and the inevitable teething problems with a new facility. Typically, it takes at least one year to bed a new factory down. Start up companies fail because they don't have the working capital to carry the operating losses in the first few years.

1.6 Skills in managing technology

- Typically, break through new product requires the adoption of sophisticated technologies, which in turn require a high level of expertise and specialist staff, which are often difficult to get.
- Increasingly food plants involve highly sophisticated computer driven robotics and control systems that require highly trained technical staff.
- Companies often underestimate how hard it is to get the skilled operators required to run a high tech operation.
- Availability of skilled staff in regional areas with basic training, such as refrigerator engineers and diesel mechanics, is becoming a problem.

1.7 Access to markets

- This point logically comes first, as without markets there is no business. To succeed, processing ventures need to have access to profitable, secure long-term markets. In most industries, it is necessary to have a diversified market portfolio to reduce the vulnerability of having the company's fortunes tied to one market. Successful companies typically have a portfolio of domestic and export markets. Export market development is time consuming and requires a whole new level of expertise.
- Existing companies have the advantage that they have established markets and proven reputation as reliable trading partners, which gives them momentum. This takes time for a new entrant to establish.

1.8 Strong brands and marketing expertise

- To succeed in consumer markets with food product almost always requires access to strong brands. Brands are extremely costly and time consuming to build and require a high level of expertise in marketing. Without established brands it is very difficult to achieve supermarket distribution, especially given the concentration in the retail sector.
- It is extremely difficult to establish new brands; multi-national companies invest tens of millions of dollar each year behind their brands. The problem for new start-ups is that it takes several years to establish brands and the margins aren't sufficient to support the levels of investment required.
- Branding is less important in food service markets but is still applicable.

Section 2

Australia's global competitiveness

- Whilst Australia has enjoyed substantial export of basic fresh and processed product to date, most observers of the industry have a rather pessimistic view of Australia's long-term competitive situation in mainstream processing industries.
- There are a number of factors at play, which will make it difficult for Australian food companies to compete in global markets. Not only will this effect exports but also poses on going threats for import replacement, disadvantaging local product out of traditional markets.
- The key factors at play include:
  1. The rapid expansion of production in third world countries
  2. Australian labour costs
  3. Economies of scale
  4. Freight costs
  5. Water
- These points are discussed below.

1. *The emerging third world countries*

- Over the past decade there has been massive expansion in the commercial production of vegetables in third world countries particularly China, Thailand, Philippines, Vietnam, Chile, Peru, Argentina and South Africa. In the Asian region there has been a transfer from peasant market garden operations into large, highly efficient commercial farms.
- Major investments are taking place to create highly efficient, low cost operations. Food companies from USA, Canada and Europe are building new, highly efficient plants in these countries to take advantage of their far lower cost.
- Improved varieties and agricultural practices have greatly improved the productivity, quality and integrity of products from these countries. Progressively they are adopting cleaner, greener agricultural systems and sophisticated management and trace back systems. Previously, customer concerns about quality, consistency, food safety and integrity were a barrier to these emerging countries but they are now rapidly overcoming these problems. They also have the advantage of very low labour costs, which is important in vegetables, as they tend to be labour intensive.
- These countries are already starting to squeeze Australia out of the traditional fresh markets in Singapore, Hong Kong, Malaysia, etc. offering highly quality produce at a fraction of the price.
- As a result, Australia can only compete in lines where it has a comparative advantage (e.g. carrots), seasonal window markets and speciality in niche market produce.
- There are already signs that this will impact on the domestic processed vegetable market. Low cost product from Thailand, Philippines, China and South Africa is already dislodging Australian product and this situation is likely to escalate.

2. *Labour costs*

- Benchmark studies indicate that Australia is generally cost competitive in terms of on-farm practices with productivity equal to and better than world best practice and competitive input costs, except for labour.
- Australia's Achilles' heel is labour costs, which make it difficult to compete in categories with a high labour content such as products requiring hand planting, picking, trimming, grading and packing, etc. Australia's hourly labour rate for an unskilled worker is more than the daily rate in many of these countries.

3. *Economies of scale*

- The economics of broad acre vegetable production are heavily driven by economies of scale. Again, benchmarking studies indicate that countries such as USA, Canada, Holland, etc., have significantly cheaper product costs, purely because of the size of their operations. In particular they get far better utilisation out of their capital equipment because they are farming far bigger acreages than their counterparts in Australia. A big issue in Australia is that the high capital items such as tractors, planters, harvesters and graders are virtually vastly under-utilised.
- A key factor in economies of scale in Australia is the size of the Australian domestic market. The highly efficient countries, such as USA and Canada again can export at low cost because of the benefits of their large domestic markets, which give them large scale. As a consequence, they can afford to cost exports at marginal cost putting them at one-third to one-half those of Australia and still be profitable. The domestic market volume covers their overheads, meaning that they can make a profit in exports just by covering direct costs.

4. *Freight costs*

- Despite Australia's proximity to rapidly developing Asian markets, Australian exporters of vegetables, both fresh and processed, struggle to compete because of high freight costs. Australia has a significant freight disadvantage (as high as 100% vis a vis North America and Europe) despite significantly shorter voyage times into Asian markets because of the structure of shipping routes the flow of trade and the general level of competition. Australia does not lie on the high volume world trade route.
- Another related problem is that there is an imbalance of trade, particularly for reefer containers, (chilled/frozen) meaning that shipping companies often have to ship empty containers to Australia to be loaded, which adds to cost. Furthermore, there is nowhere near the traffic in the high cube containers, which can take larger volumes for a given cost. In contrast, much of the trade freight imbalance is in the opposite direction of Europe or USA.
- There is also the issue that there is nowhere near as much competition on the Australian/New Zealand market, which further adds to cost. Shipping costs not only effect Australia's competitiveness in export markets but longer term contributes to the threat of import product replacement on the domestic market.

5. *Water*

- The problem of water shortage has been particularly highlighted by the current drought but without doubt water is a major long-term strategy issue for Australian horticulture.
- Cost and availability of water for vegetable growers will progressively become an issue. As water costs increase, it will no longer be economical to grow low value crops and growers will be forced to move towards higher value crops.

6. *Conclusions*

- The above analysis paints a rather pessimistic scenario for the Australian processed vegetable industry. In our view it will be close to impossible for a new entrant to launch a new range of packaged grocery vegetable product for the reasons outlined above. The barriers to entry are just too high for a newcomer.
- The long-term outlook for the mainstream processing vegetable industry is not bright. The growing globalisation of the food industry and the emergence of low cost producers, such as China, Thailand, Philippines, Peru, Chile and South Africa will make it difficult for Australian companies to compete in the mainstream vegetable lines such canned and frozen products except where Australia has a comparative advantage eg carrots.
- Realistically, the best prospects for a grower based group fall in to three broad categories:
    1. Pursuing niche market or specialist products, which are too small or difficult for the big multi-nationals to enter.
    2. Being a supplier of specialist ingredients to major food companies with components where the volumes are too small to justify them doing their own processing.
    3. Marketing value added and minimally processed fresh branded vegetables for the retail and food service markets.

Section 3

Market trends in vegetables

- Strong move towards fresh and minimally processed vegetables and away from canned and, to a lesser extent, frozen vegetables.
- Popularity of stir-fries as a mainstream family meal.
- Popularity of simmer and cook-in sauce meal solution type product.
- Consumer trends towards crispier, crunchier vegetables with minimal cooking.
- Popularity of grilled and dry roasted vegetables.
- Growing interest in the functional properties of vegetables particularly the effect on reducing risk of cancer and cardiovascular diseases.
- Growing demand for organic products.
- Growing interest in more exotic vegetables, particularly Asian vegetables.
- Trend towards smaller pack sizes and high value specialist ingredients.
- Growing popularity of gourmet barbecues with vegetables cook in sauces and dips featuring strongly.

Contents

Part G

Identified opportunities and assessment

Section

1

Summary of opportunities

- These ideas are put together on the basis that clusters of growers in one of the vegetable growing areas in Australia might invest in one or other of these projects.
- The following opportunities have been identified throughout the various stages of the analysis presented previously in the report. They are put forward without any critical appraisal at this stage which comes later.
- There is a high degree of overlap in the list. Furthermore, there is the opportunity to put a number of these ideas together in one place. The projects are not presented in any particular order.

Canned vegetables/shelf-stable

- Entering into arrangements to grow exotic ingredient vegetables for the major canners, such as Asian, mini sweet carrots, specialised gourmet beans.

Frozen

- As per above for the major frozen food companies.

Convenience meal ingredients

- Producing specialist ingredient components for major processors for frozen chilled and shelf stable convenience meals, pasta sauces, soups, dips, etc.

Grilled vegetables

- Grilled vegetables for use in antipasto, pizza and sale through delicatessens and gourmet retailers.

Fresh salads and pan ready vegetables

- Semi-prepared fresh salads and pan-ready vegetables in Modified Atmosphere Packaging (MAP).

Juices, purees and concentrates

- Juice, concentrates and purees as an ingredient into specialist juices and recipe products for the domestic and selected export markets.

Use of on-farm product technology to produce high value branded products

- Adoption of various on-farm production technologies to produce high quality, niche market product, including vegetables with enhanced nutrition, functionality and improved eating quality.

Functional foods

- Producing vegetables with enhanced functional properties as specialist ingredient for major food companies.

Dehydrated vegetables

- Dehydrated vegetables to be sold as ingredients to major food processors. Currently there is only one dehydration plant in Australia, which is utilised solely for onions and operates for about 10 weeks per year. There are large quantities of dehydrated vegetables being imported mainly for "just add water soups" as well as some other recipe foods.

Flexible multi-purpose food hall

- The establishment of a multi-purpose food hall for the production of pickles, relishes, jams, sauces, salsas, dips, etc.

Flexible multi-purpose first stage processing plant

- The establishment of a multi-purpose first stage processing plant for the processing of high value ingredients for both the domestic and export markets. This project picks up on some of the opportunities for ingredient components described above.
- This plant would be capable of processing a range of vegetables in various processed forms including sliced and dried , grilled as well as juices, purees, concentrates, pastes, juices.

Import replacement

- Spinach
- Asparagus
- Garlic
- Dehydrated vegetables for soups

New Product Opportunities

- Vegetable and vegetarian dips
- Vegetable Juices
- Vegetable Snacks
- Coated Vegetables
- Vegetarian pet food
- Vegetable wines

Section

2

Assessment of opportunities

2.1 Introduction

- This section provides a preliminary assessment of the opportunities that have been identified. The intention is to explain the opportunities and possible business model and identify the strategic issues that need to be considered.
- In embarking on this project the consultant sensed that there was a hope by the project proponents that we may identify a "silver bullet" opportunity that would provide a high volume, profitable processing opportunity for growers. In putting forward the following list of opportunities we expect that there will be some disappointment. Regrettably, there are no break through ideas. There are significant question marks over all of the listed opportunities although well worth closer examination. After conducting a rigorous search and analysis of opportunities we can find no great reason for optimism.
- It is our considered view that the best opportunity for vegetable growers is in the domestic market for fresh, unprocessed vegetables.

- In our view there are considerable risks with all of the projects which demand closer scrutiny before embarking on further stages of development. The economic viability of these projects will need to be validated in the next stage of this project.

- This assessment is put forward as a basis for consideration and discussion by the key stakeholders. No attempt is made at this stage at details and economic analysis. This will be undertaken for short listed opportunities as agreed between the stakeholder groups and the committee.

2.2 Overview

- Before getting on with assessing the specific opportunities, it will useful for the stakeholders to have some background on our thinking that lies behind the conclusions reached to date with respect to the options.
- The first point that needs to made is that this assessment has been conducted from the perspective of the growers' interest. The key reason for this project and the reason why it has been initiated and funded by growers is to identify opportunities for growers in processed vegetables, either as suppliers to the processing industry and/or as active participants in processing in their own right.
- Consequently, the emphasis has been on finding opportunities for individual growers or cluster growers to invest in vegetable processing projects.
- For reasons outlined in the previous section, we believe that it is unrealistic to expect that individual growers or grower consortiums could undertake a major project producing consumer ready packaged branded product, such as a canned or frozen operation that will compete head on with the major multi-nationals, such as Heinz, Simplot, Nestle, etc.

- To reiterate, there are a number of significant barriers to entering large scale consumer markets with finished branded consumer ready products including:
  1. The large capital requirements
     A major food processing facility requires a minimal investment of $20m and realistically two or three times this level. Furthermore, a new entrant can expect to sustain substantial losses for two or three years, which will require a substantial amount of additional working capital to sustain.
  2. To succeed in packaged food requires having strong brands and all of the investment and expertise that goes with them.
     In a market dominated by mega retailers such as Coles and Woolworths, a company will not succeed without a strong brand, marketing expertise and large marketing budget (in the tens of millions).
  3. The profitability of these enterprises is low.
     The large multinationals operations can survive on low margins because of economies of scale, highly efficient plants, cross product synergies and because they have older fully depreciated plants. Returns from most of the product can't service the capital needed to re-establish the plants.
  4. The mainstream categories of canned and frozen product are in the mature stage of the product lifecycle meaning that sales are slowing down, margins are narrowing and a growing percentage of sales are in housebrand/generics.

2.3 Broad areas of opportunity

- In our view there are five broad sets of opportunities, which warrant closer scrutiny by grower interest clusters:

  1. Establishing a first stage processing plant of ingredients for sale to major food processing companies in Australia and overseas. This might include:
     a) Juice, pulps purees and concentrates in chilled or frozen form
     b) Dehydrated product
     c) Grilled vegetables
  2. Producing salad and fresh cut vegetables for the retail and food service markets.
  3. Entering into strategic alliances and/in joint ventures to work closely with one or other of the large processors to produce specialty product to be marketed in fresh or frozen form. Possible projects here might include:
     a) Producing branded fresh value added vegetables such as speciality lettuce, stir fry mixes, coleslaw
     b) Growing specialist ingredients such as super sweet corn, culinary beans, mini carrots, etc.
     c) Organics
  4. Adopting on-farm technologies to produce high value products to be marketed as fresh or minimally processed. These might include:
     a) Functionally enhanced vegetables
     b) Products graded to a high level on specific attributes
     c) Organics
  5. A community based multi-purpose food hall.

- These options are discussed in the following pages.

2.4 The consumer

- The industry doesn't know enough about the consumer, nor has it attempted to seriously engage them in its product. There is excellent potential to increase per capita consumption in Australia.

2.5 First stage processing for the ingredient market

- There are significant opportunities for first stage processed product to be sold as specialist ingredients in processed recipe foods. Increasingly major food processors are purchasing in processed to specific ingredients and quantities, delivered just in time to be assembled into a recipe meal. The volumes are too small for them to be able to economically process themselves.
- One of the fastest growing categories in processed food is home meal solutions such as cook-in or simmer sauces, pasta sauces, pour over sauces, etc. These invariably comprise multi-component ingredients such as purees, concentrates, diced and sliced vegetables, grilled vegetables, etc.
- Processors will pay premium prices for product processed to a strict specification and quality standard. For example this may involve high beta carotene carrots, enhanced brix levels, high lycopone tomatoes, etc.

1. *Markets*

- This research has identified many opportunities for ingredient products, although it was beyond the scope of the first stage of research to conduct detailed assessments of the specifics including price, specifications, etc.
- We understand that there are significant markets for carrots, pumpkin, potato pulp, concentrates and purees as well as sliced and diced vegetables and juices. Significant markets exist both in Australia and overseas, notably Japan.
- The volumes are expected to be relatively small but by pulling together a portfolio of products it should be possible to establish a viable business.
- The business would need to be established on long term contracts to the level of underwriting the viability of the business
- The key to success is market and product diversity and concentrating on the higher value product and staying out of the commodity areas.

2. *Facilities*

- The intention would be to establish a multi-functional, multi-species plant.
- The nature of the equipment and the configuration of the plant will depend on market opportunities but logically the plant would have the capability to produce juices, purees, concentrates, pulp, peeled, sliced and diced product, dehydrated and grilling. An indicative investment is somewhere in the range of $3 – 7 million. We understand that there is much suitable second hand equipment.

- Product could be sold either in chilled, frozen and dry form. There is also the option to include minimal processing plant for pan ready vegetables, salad, etc.

3. *Business model*

- For the project to proceed, it would be necessary to have long term contracts or a significant commitment with a major processor. This venture could be funded either by a consortium of growers of as a joint venture with one or other of the major processors.
- As was mentioned, there is the option to also include a minimal processing plant for fresh cut vegetables, either for the retail or food service market. If it is decided to pursue the retail, branded produce option, it is strongly suggested that this be done as a joint venture with one of the major processors with the expertise in branding, distribution and category management.
- In order to minimise risk, it is strongly recommended that the business develops a diversified product/market mix including both domestic and export markets.

4. *Strategic issues*

- The critical success factors for this business include:
  1. Solid long term markets with a diverse product/market mix.
  2. Specialising in high value items that take it above the highly priced competitive commodity market.
  3. Strong control of the supply chain with access to year round supplies of high quality, specialty product and stable prices.

5. Downside

- The large food companies only outsource ingredients that involve small volumes and often specialised equipment or specialist raw materials. To succeed in this business requires a high degree of flexibility and a highly efficient plant. Much of this category is basic commodity lines which are often subject to supply and demand pressures. To succeed requires getting into specialty areas, higher quality and service levels which differentiate the product and place it above this basis commodity status.

2.6 Producing salad and fresh branded pan ready vegetables and salads

- The second possible set of opportunities is to establish a centre to produce fresh, branded, pan ready vegetables, salads and related product.
- In putting forward this option it is acknowledged that this is a crowded and highly competitive category. Despite this, the market can't be ignored as it has considerable growth potential with room for a new significant player.
- This option was included as an add-on to the previous option of a dedicated high value ingredient first stage processing plant. There are some synergies and economic benefits of including these two options particularly given that they share many common elements which improve the utilisation.
- This option is, however, worth considering as a self standing enterprise

1. Markets

- The market for ready to serve or cook salads, vegetables, stir fry mixes, etc. is growing rapidly both in retail and food service segments.
- The retail business is growing in the high 20% per annum as supermarkets extend the amount of shelf space available. Similarly, food service use of these products is growing as establishments strive to lower their labour costs. In our view this category will sustain some new entrants provided they have a strong business model.
- The lettuce mix market is dominated by Harvest Fresh with the vast majority of its product going into store brands.

- With regard to pan ready vegetables, stir fry mixes, etc. for retail, most of the products being marketed is in frozen form. The major processor companies (e.g. Simplot and Heinz) can see huge potential for fresh product, say in MAP, but have been frustrated on two fronts, retailer pressure to dominate the category with their store brands and inability to establish a reliable supply chain.
- There is no doubt about the market potential and sustained growth of this category, provided these issues can resolved.
- Similarly there is large potential for growth in the food service market. The key problems in the food service market is that it is extremely competitive. There are a large number of small backyard operations who work on very low prices to sustain their business. The key to competing against these operations is to target the large categories such as major catering companies eg Qantas, etc. who demand high quality product produced to tight specifications and high standards of food safety and integrity for which they are prepared to pay a price premium.
- Another area where a new entrant could take market share off existing operations is by adopting new technologies in terms of processing and packaging, particularly allowing extended shelf life.
- The use of new technology, coupled with a strong brand based marketing program, could allow a new entrant to succeed in the rapidly growing market in both retail and food service.

2. *Facilities*

- The entry point into pre-cut vegetables is very low; only very simple and relatively low cost equipment is required. However, to compete will require larger, more efficient plants and high technology to create a point of difference.
- As was mentioned earlier, there are considerable economies of scale and synergies by incorporating this into a large, multi-purpose plant which could also produce high quality specialist ingredients.
- The entire supply chain will need to be underpinned by a HACCP program.

3. *Business model*

- In our view, the key to success in pre-cut/semi-prepared vegetables is to have a brand based marketing program based around proprietary brands.
- The chances of success will be far greater and less risk if the project is based around a strategic alliance between grower clusters and a high profile branded food marketer (e.g. Heinz or Simplot).

4. *Strategic issues*

- The critical success factors from these projects are:
  1. Building a large diversified customer base covering both large supermarket accounts and major food service customers.
  2. Specialising in high value items that take it above the highly priced competitive commodity market.

Year round supply of a market garden test of product in close proximity to the facility.

5. *Downside*

- The main downside of this option is the inordinate power held by retailers, manifested by the dominance of the category by store branded product. The key to success in this category is to being able to launch a strong consumer brand. In our view this will be extremely difficult to do from scratch. The logical solution is to form a strategic alliance with company with a strong brand franchise in the category eg Edgell.

2.7 Strategic alliance with processors to produce specialist product for further processing

- Another viable option is to form a strategic alliance with one or other major food processor to provide specialist, high value ingredients.
- This project may involve the integration of new on-farm technology to produce high value specialist products. Such technologies might involve:
  1. Use of precision agriculture to produce vegetables with higher nutritional content or some other superior attribute, e.g. super sweet corn.
  2. Use of germ plasm technology to produce vegetables with enhanced functional benefits, better taste or other sensory characteristics.
  3. The use of sensor technology to more accurately grade products based on some selection criteria.
  4. Growing organic vegetables for processing.
- Again, major processors have considered getting into specialist product, as described in response to demonstrable market opportunities, but not proceeded with because of the difficulty in sourcing the raw material.
- The intention would be to enter into a strategic alliance to develop and produce such raw ingredients.

1. *Markets*

- The consumer interest is in specialist products such as super sweet corn, enhanced functionality, e.g. high beta carotene content in carrots. Similarly, there is phenomenal demand for organic foods, both in fresh and processed vegetables although we recognise the difficulty in producing them in commercial quantities.
- The major processors have all identified the opportunity but have pulled back from these projects because of supply chain limitations.

2. *Facilities*

- This project largely involves the adoption of on-farm technology including production, post-harvest and grading and potentially, and first stage processing.
- The market opportunity/need is obvious and the technology proven. It is simply a matter of bringing it all together.

3. *Business model*

- The key to success here is a strategic alliance between one of the major processors who have the facilities, expertise and resources to develop and market these products. There is no point in going to the expense unless it can be harnessed into a strong brand based marketing program to provide the necessary marketing edge.

4. *Strategic issues*

- The key point with the project is to prove up the market opportunities on the one hand and the efficiency of the technology on the other.

5. Downside

- The principal downside of this project is that it is a highly specialised field where the growers fortunes are totally tied to the market acceptance of the product. The establishment costs and risks are potentially high.

2.8 Adoption of on farm technology to produce value added fresh produce

- In our view, there is considerable opportunity to embrace some of the emerging on farm technologies discussed earlier in this report to produce higher value, specialist product either for the fresh, minimally processed or processed markets.
- The technologies discussed include:
  - Precision farming techniques
  - Breeding and germ plasm technology
  - Ultra sonic grading technology
  - Fumigants
  - Modified Atmosphere Packaging
- These technologies can be used individually and brought together into a package to produce various products including:
  - Better taste, higher quality fresh vegetables
  - Functionally enhanced vegetables
  - Organic fresh vegetables
  - Specialty high specification ingredients for processing.
- These technology will enable a grower consortium to develop unique, differentiated products which could be sold under a strong brand at substantial price premiums.
- The grower cluster could either do this in their own right or form a strategic alliance with one of the large processors/marketing companies.
- Products produced from these technologies have application both in domestic and export markets.

- The attraction is that the entry costs are far lower than any of the further processing option. Furthermore, they fall within areas of comparative advantage of growers.

2.9 A community based multi-purpose food hall

- The final option is to develop a multi-purpose food hall capable of providing a wide range of products.
- This would involve the establishment of a facility which can produce a range of products such as pickles, relishes, jams, sauces, purees, juices, concentrates, grilled product, soups, etc.
- This facility needs to be confined to vegetables. The same equipment could handle meat, seafood and all manner of recipe foods both for retail and food service.
- The size and nature of the facility would depend on the scope of the project including product, business partners, etc.
- In putting forward this option we recognise that it is unlikely to be of benefit to large scale commercial vegetable growers but is likely to assist small regional food companies.

1. Markets

- The Australian food industry is dominated by highly successful small companies with niche market products.
- One of the limiting factors to the development of these companies is the limitation of their technology, particularly in respect to their ability to increase production capacity, or to introduce new products requiring specialist equipment.

2. *Facility*

- The type and scale of equipment will depend on the scope of the project, products, volumes, etc. In essence the facility would be housed in an export quality facility equipped with commercial vegetable cutting and cooking equipment, bottle washers, filling lines, hot water pasteurisation and carton sealers.

3. *Business model*

- This type of facility has been successfully operated in other parts of the world based around a community model, whereby the facility is developed by local communities or government funding and is operated as a co-operative. Co-operative members would be eligible to hire the facility on a daily or hourly arrangement.
- There is also the logical option to add a joint brand market program whereby various operators market under a common regional brand. A good example of such a community brand is the Food Barossa branding program, which has 40 licensees.

4. *Strategic issues*

- The key strategic issue is to establish whether there is a need for such a facility and to scope out the need in terms of the type of equipment required, throughput capacity levels, etc.

5. *Downside*

- This option will be of little benefit to the larger commercial vegetable growers. The success of the project will depend on the extent that it is embraced by small food companies in the particular region.

Section 3

Items rejected

Item	*Reason why rejected*	*Comment*
Canned vegetables	Mature market, slow growth, very costly to enter, needs strong brands.	May be an opportunity to grow specialist product for canning such as exotic vegetables, functional vegetables and organics.
Frozen vegetables	Market dominated by strong brands, very difficult to enter, high capital cost of plant.	May be an opportunity to grow specialist product for freezing such as exotic vegetables, functional vegetables and organics.
Tomato product	Whilst tomato category continues to grow there is strong competition from imported product. Australia can only compete in value added product.	
Cook-in and simmer sauces	Large and dramatically growing market dominated by strong brands. Requires high	Opportunity to take advantage of the growth of this category by forming strategic

Item	***Reason why rejected***	***Comment***
	level of expertise and resources in marketing and category management.	alliances with companies to produce first stage processing in specialist ingredients.
Kim chi	Big opportunity in Korea but market very fickle; needs traditional recipe.	May be opportunity to form alliance with Korean company to provide specialist ingredients.
Juices	Big opportunity for specialist juice, mostly carrot based. Requires specialist marketing expertise, strong brands and high cost equipment.	Opportunity to supply specialist ingredients such as high beta carotene carrot puree or concentrate.

Horticulture Australia Ltd
VG01059
HA-0090

23 May, 2003

IDENTIFYING & ASSESSING OPPORTUNITIES IN THE PROCESSED VEGETABLE MARKET

STAGE 2 REPORT

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IDENTIFYING & ASSESSING OPPORTUNITIES IN THE PROCESSED VEGETABLE MARKET

STAGE 2 REPORT

Contents

Part A

Introduction, Objectives & Methodology

Executive Summary

- The report has been initiated and funded by Australian vegetable growers to identify opportunities in processed vegetables either as suppliers to the processing industry, or as active participants in processing in their own right either as individuals or collectively through various entities.
-
- It is clear from the research undertaken that regrettably there are no silver bullet opportunities, which would provide a high volume, profitable, processing opportunity for growers. The processed vegetable industry, like the food industry at large, is extremely competitive globally making it difficult for new entrants. Despite this caution, the report has identified a number of opportunities that are worth greater scrutiny. The potential for vertical integration into processed vegetables is limited and risky, with the best opportunity being in the domestic market for fresh unprocessed vegetables.
-
- The report has reached the conclusion that it is unrealistic to expect growers (either individually or as a consortium) to undertake a major project producing consumer ready, packaged, branded products in a processing operation which will compete head on with major multi-national which dominate the industry. There are a number of significant barriers to entering this market including:
- 1. There is a major consumer/market push back to fresh and minimally processed vegetables.

2. Large capital requirements to build a processing facility and markets.

3. Strong brands are required supported by a significant marketing investment and expertise.
4. Profitability of these enterprises is low and only highly efficient specialists can survive.
5. Mainstream categories of canned and frozen are in a mature stage of lifecycle meaning that sales are slowing, margins are narrowing and there are a growing percentage of housebrand generics.

While Australia has enjoyed limited export success of processed vegetables to date, it is a net importer. The long-term outlook for the vegetable processing industry for Australia is not bright. The growing globalisation of the food industry and the emergence of low cost producers (e.g. China) will make it difficult for Australian companies to compete.

Most industry observers have a rather pessimistic view of Australia's long-term competitive situation due to:

- Rapid expansion of production of third world countries
- Australia's high labour costs
- Economies of scale
- Freight cost disadvantages
- Water supply issues.

The above are likely to result in imported product taking a growing share of the domestic market for processed vegetables.

A strong point to emerge from the consumer research pertains to the need for convenience and products, which appeal to the time conscious homemaker. Industry marketing on the nutrient value of processed vegetables and engaging the consumer would assist in realising the excellent potential to increase per capita consumption in Australia.

The shelf stable (canned) vegetable category is mature and is likely to be subject to further industry rationalisation due to the significant threat of imported product. Owner/operators in Australia are making only modest profit, not sufficient to fund re-investment in their plants.

While the frozen food category is in better shape than the shelf stable category, it is coming under increasing pressure. It is a robust category due to the dominance of the strong brands, making it difficult for a new entrant to come into the market. Without doubt, the frozen categories will continue to move more into value added product and meal solutions. This will grow the processor demand for the more exotic vegetable lines, although unfortunately the volumes are likely to be relatively small.

The whole convenience meal solutions category is likely to grow at a rapid rate for many years because it is delivering to the consumer requirements of convenience, taste and value for money. This category comprises pasta, cook in, pour over and simmer sauces. It is expected that it will expand rapidly with the introduction of new ethnic-styles such as, Thai, Malaysian, Indonesian, Korean and so forth. New entrants into this category will find it difficult, due to the dominance of the strong brands and the need for large marketing budgets, which are essential in this category.

There is a major opportunity to take advantage of the market/consumer interest in fresh, minimally processed vegetables including salads and pan ready vegetables both for retail and food service outlets.

This market will continue to show strong growth over the next decade opening the way for new entrants. However, margins are thin, largely because the control of retail over this category, together with low cost, backyard operators. To succeed will require strong integration of the supply chain; the adoption of new technologies to improve product quality and shelf life and strong brand based marketing programs.

There are a number of opportunities enabled by emerging on-farming technologies, such as MAP, germ plasm development and optical technologies, to add value in improving on farm return. These include, improving eating quality, enhancing functionality, enhancing the environment, cost reduction and optimising marketable yield. These technologies have applications for both high value branded vegetables, as well as various processing applications.

Rather than attempting to compete head on with the major processors, there are opportunities for growers interests to form strategic alliances for various projects including the processing of specialist ingredient product and branded minimally processed product. The major processors are increasing in size in this direction and are looking to secure tighter, better-managed supply chains.

The following are identified as opportunities worthy of closer scrutiny in the next stage of this project.

1. Establishing a first stage processing plant of ingredients for sale to major food processors
2. Producing fresh cut salads, herbs and vegetables
3. Forming a strategic alliance with a processor to product specialty or niche products
4. Adopting on-farm technology to produce high value products
5. A community based multi-purpose food hall.

There are significant question marks over all identified opportunities although closer examination would be worthwhile.

This report details the background research and the underlying reasons from where we form our conclusions.

What processors can bring to the equation is capital, strong established trading and expertise, marketing, category management and distribution.

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Introduction, objectives & methodology

1. Introduction

This report is intended to provide a comprehensive review of opportunities in the processed vegetable sector for Australia.

The project has been initiated and funded by various growers' interests in partnership with Horticulture Australia Ltd.

In most part, the project has been driven by concerns by growers of dwindling opportunities for processing vegetables. With the rationalisation that has taken place in the Australian industry, many processing operations, notably canning and frozen operations, have closed down taking away market outlets for large volumes of processed vegetables. This has in turn adversely affected the profitability of vegetable growing operations, which need the larger volumes and product runs to achieve the economies of scale required to drive profitability.

As we interpreted the brief, the aim of this study is two fold; to identify possible opportunities for processed vegetables and, at the same time, undertake a comprehensive assessment of the health and performance of the Australian processed vegetable industry.

The intention in conducting the review has been to broadly assess all possible opportunities.

The review has been conducted on three fronts:

- A review of the major existing categories including canned, frozen and fresh value added product.
- A review of markets and market opportunities including, domestic and export, retail, food service and ingredient markets.
- A review of existing and emerging opportunities to assess whether there are any opportunities emerging from them.
-

The report is divided into seven parts with this Part A covering introduction, objectives and methodology. Part B presents the review of the existing categories; Part C contains the assessment of markets and market segments. Part D provides an overview of global trade and competition. Part E provides a review of new and emerging technologies both on-farm and beyond farm processing. Part F provides a strategic assessment of the processing industry and Part G identifies and assesses opportunities.

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2. Objectives

1. To conduct a study, which will describe the current vegetable processing industry and will identify potential opportunities (domestically and exports) for vegetable processing, especially those opportunities that maximise the benefit to vegetable growers.
2. To document the results of the study in a report that will be widely distributed within the vegetable industry.
3. To conduct a more detailed commercial analysis of the more promising opportunities
4. To prepare a report based on the commercial analysis directed to potential investors and government organisations working on regional development.
5. To organise and conduct a series of workshops for stakeholders to highlight those opportunities identified in the study.
6. To act only within the guidelines established by, and in conjunction with, the steering committee.

3. Methodologies

The methodology has involved a comprehensive program of research and analysis covering the following steps:

Part B

Category Analysis

Section

1

Dehydrated Vegetables

1.1 Overview

- The Australian dried vegetable industry is a newly established sector with only a few companies operating successfully. Dried vegetables include asparagus, beetroot, broccoli, capsicum, carrots, celery, eggfruit, leeks, mushrooms, onion, potato, pumpkin, spinach, tomatoes and zucchini.
- The industry faces several obstacles to growth including:
  - Technology and equipment is not readily available and therefore not affordable.
  - Large contracts with companies such as McCormick, Masterfoods and Unilever are tied up with long term overseas suppliers. Such companies source 99.9% of the dried vegetable products from overseas. Further these multi-nationals require a minimum of three years of operation before dialogue would be entered into and many stipulate that no greater than 30% of each ingredient can be purchased by one supplier. Australian operators need to have deep pockets to be able to survive for a minimum of three years servicing small companies and the cottage industry.
  - China and to a lesser degree Thailand dominate the market and regularly dump cheap imports into Australia to protect their turf. Imported product includes onion, tomato, carrot,

parsley, capsicum, garlic and beetroot. Australia will always struggle to compete due to China's labour cost advantages. Australian suppliers need to try to reduce costs in other ways including using cheaper drying processes such as coal instead of heat pumps.

- Despite Australian produce being fresher, more visible and stronger in flavour, company recipes and product shelve appeal are based on overseas product. If large companies such as McCormick were to incorporate Australian dried produce, recipes would need to be changed and a new product launched. The challenge for Australian operators is to attempt to get these multi-nationals to at least change their blend to include a small percentage of Australian product and gradually change the taste.

➢ One advantage of the dried vegetable industry is that with most products, especially capsicum, processing can occur year round enabling machinery to be used effectively for 12 months. Cheap Chinese imports threaten the 12 month processing cycle as Australian demand declines when Chinese product is in season.

➢ For large companies to recognise that an Australian dried vegetable industry exists, local manufacturers will need to establish a national sales and marketing presence so that their products are known.

➢ Other things to consider

- Review imports of dried vegetables to see where replacement opportunities exist.
- Explore a company called Kerry Ingredients

Standard dehydrated vegetables

- The major markets in Australia for dehydrated vegetables are air-dried onion (powder and flakes), garlic powder, capsicum (bell pepper) dice, parsley, mushrooms (pieces and powder), beetroot powder (as a colorant) and freeze-dried peas and corn (for instant soups). One company operated a conventional air drying plant for onion and garlic in Australia for some years and small businesses were supplying Australian dried capsicum.
- Additionally, there are a few low capacity freeze-dry units in Australia and a larger plant being refurbished in Queensland.
- Several studies have purported to show significant opportunities for import replacement of dried mushrooms. However, the Australian dehydrated vegetable industry remains in the doldrums. The reasons for this are diverse but include:
  - The disinterest of growers (or potential growers) in supplying product other than for the fresh market and their reluctance to commit to the special cultivars needed (eg high solids content onions);
  - Failure of local manufacturers to deliver contracted quantities by agreed dates;
  - Inability of local manufacturers to meet agreed specifications and quality standards.
- The major problem has been lack of understanding of the market structure. Gross import data shows substantial tonnages of dehydrated vegetables imported and assumptions are made that capture of significant market share is easily achievable. However, the Australian market is supplied by many importers, all with their own special niches (eg close customer with certain customers, ability to supply special size grades). Additionally, these importers vigorously defend their turf against competitors (either other importers or new local competitors) by cutting their own and their supplier's margins.

Dried vegetable powders

- The market potential for specialised vegetable powders is more positive than for regular products.
- One product group of interest is powders, such as pumpkin for instant soups, which have a large share of the total soup market. Shortening the length of the supply chain and getting Australian made fresher product would be of interest to instant soup manufacturers.
- The second opportunity, related to the first, would be sale of vegetable powders for colouring specialty pastas, eg tricolore.
- A third opportunity is that of instant vegetable powders reconstituted with warm water as infant food. Cereal products of this nature have long been accepted by mothers as suitable for their babies and providing vegetable products in similar, easy to use (especially when travelling) form would be worthwhile. Of course, in making such a product, care would need to be taken to ensure that product microbiological quality was of the highest.
- The fourth product group is vegetable powders with health-promoting properties, i.e. nutraceutical-type products. A number of powdered vegetable products are already marketed on the basis of their specific nutrient contents. Examples of these are:
    - Broccoli (floret and stalk) – sulforaphane, vitamin C, carotene;
    - Carrot – carotene;
    - Garlic – allicin, glutamylcysteine;
    - Spinach (leaf and stem) – lutein, carotene, folate, calcium, iron;
    - Tomato – lycopene, vitamin C.

- There is also an established market for cereal leaf products such as barley, wheat and alfalfa and a growing demand for any green leaf vegetable powders. Also, recent research conducted at King's College, London, has demonstrated that a number of Asian vegetables contain significant quantities of natural antioxidants[*] and demand for dry powders made from these can be expected.

[*] Antioxidants neutralise oxygen free radicals that cause cell damage and there is much interest in their potential role in foodstuffs as preventive agents against diseases, including cancer and neuro-degeneration.)

Section

2

Vegetable Juices & Stocks

1.1 Overview

- A growing opportunity exists for capsicum juice. Although the domestic market is soft, exports to Japan are very healthy. Capsicum juice has extremely high levels of beta carotene and three times more vitamin C than orange juice.
- There is a renewed interest in vegetable juices, especially the carrot based fruit drink mixes and exotic functional food. Fruit and vegetable blends, could be made using enzyme treatment to maximise yield then pasteurised and/or preservatised, chilled form. Alternatively, chilled juice could be bulk freighted to a UHT plant, such as a dairy factory for aseptic processing. Examples of juice blends with market appeal are tomato, tomato/vegetable, carrot, orange/carrot, pineapple/carrot and celery 'tonic'.

- Contact Irymple Juices and Mildura Fruit Juices based in Victoria to explore further

Section

1

Shelf Stable

1.1 Overview

- The shelf stable segment comprises cans, jars and tetra brik/combi bloc products.
- The total canned vegetable market has been growing in value since 1995 and continues to grow at 3.7%. Despite this modest growth, canned food is now considered to be a mature category.
- However, behind these aggregate figures lies major variation in performance. Asparagus, beetroot, mushrooms and peas are declining in volume terms. All vegetables, except mushrooms and peas, have shown some modest value growth mainly due to the practice of value adding with special sauces, etc. the introduction of smaller can sizes. Tomatoes and seed beans continue to grow heavily, largely because of the consumer trend towards Mediterranean diet and cooking styles.
- The tomato market has become increasingly competitive, with more imported brands coming into the market, using deep cut promotions to attract consumers and there has been continued focus on the value-added tomato segment. The canned tomato market is dominated by opportunistic importers who bring in cheap product from Italy, Turkey, etc.

- Value added canned tomato products have enjoyed substantial growth. Chopped tomatoes have overtaken whole peeled and tomatoes with basil and other added herbs have shown growth. Whole peeled tomatoes are a price driven commodity, with the Australian produce struggling to compete on price with their European counterparts. Tomato paste is the ultimate commodity market sold on price.

1.2 Key table & commentary

Category	Volume			Value			Key Players			Imports		
	Tonnes	Segment Share	Growth	$m	Segment Share	Trend	Company	Market Share (Value)	Market Share (Volume)	Source	Tonnes	$'000s
Asparagus	3,726.7	3.8%	-10.6%	27.5	13.9%	4.7%	Edgell	23.9%	21.5%	China	1,118.9	2,932.5
							John West	25.3%	22.6%	New Zealand	700.2	2,649.0
							Generics	21.3%	27.7%	Peru	1,584.9	5,742.0
Beetroot	20,212.3	20.7%	-2.8%	35.5	13.9%	1.9%	Golden Circle	59.6%	58.1%	China*	0.4	3.4
							Edgell	23.8%	20.9%	New Zealand*	0.7	1.8
							Generics	15.9%	20.7%	Philippines*	0.4	0.5
Cabbage				2.0		0.7%						
Capsicum				0.9		12.0%						
Carrots				2.9		7.8%				New Zealand	409.0	377.0
Champignons				8.7		9.4%						
Corn	15,927.6	16.3%	-1.8%	38.1	15.3%	3.5%	Edgell	52.9%	43.6%	New Zealand	221.7	654.0
							Golden Circle	17.6%	18.4%	Thailand	2,273.0	2,872.0
							Generics	20.7%	29.8%			
Mixed Vegetables				8.8		2.0%				Italy	1,878.2	5,144.0
										Thailand	2,311.0	3,279.0
										Spain	1,552.0	4,208.0
Mushrooms	2,454.1	2.5%	-7.6%	9.3	3.8%	-1.1%	Edgell	36.5%	28.5%	China*	76.0	271.0
							Generics	45.6%	54.6%	New Zealand*	145.0	507.0
										Thailand*	29.0	169.0
Peas	6,278.0	6.4%	-7.7%	10.7	5.7%	-2.3%	Edgell	48.5%	43.3%	Italy	326.0	320.0
							Golden Circle	21.0%	20.8%	New Zealand	267.0	311.0
							Generics	22.4%	28.7%			
Potato granules	657.5	0.7%	1.6%	5.1	2.1%	6.8%	DEB	75.4%	70.1%	Canada	735.6	883.5
Potato - canned	1,690.7	1.7%	2.6%	3.7	1.5%	7.8%	Edgell	54.6%	44.4%	New Zealand	8,962.1	8,958.0
							Generics	32.6%	44.1%			
String Beans				4.0		10.3%				Italy	2,895.1	1,230.0
										USA	1,057.6	2,166.0
										New Zealand	17,764.0	19,773.0
Tomatoes	32,869.3	33.6%	4.5%	71.0	27.9%	3.6%	SPC	18.6%	17.7%	China	1,882.4	2,110.0
							Ardmona	15.6%	15.8%	Italy	28,909.7	28,479.0
							Generics	19.6%	26.6%	Turkey	1,528.8	1,744.0
							Others	23.8%	21.9%	USA	2,110.2	2,383.0
Wet seed bean	6,693.6	6.8%	3.7%	22.4	8.3%	4.2%	Edgell	55.4%	51.9%			
							Masterfoods	27.6%	27.7%			

* denotes fresh imports

Source: Aztec / ABS (2001) / Retail World (2002)

- Historically Edgell has dominated the canned vegetables market and continues to dominate, despite losing share since 1999. This share loss has been driven by Edgell's range rationalisation in the tomatoes segment. It made the decision to withdraw from tomatoes because it could not compete with cheap imported product.
- Golden Circle dominates in the canned beetroot segment and currently enjoys a 60.2% value share and 57.7% volume share. It packs the vast majority of beetroot sold in Australia. It also co-packs for Edgell.
- SPC/Ardmona is market leader in tomato products and control over 40% of the tomato processing. Its focus is on value added product, whole peeled, diced, added herbs, etc.
- While the aggregate figures do not show it, there is massive growth in the super sweet and value added sweet corn. Golden Circle is enjoying massive growth in the segment with Simplot also performing well. Baby carrots are also a growth category.
- Much of the canned asparagus and mushroom is imported, along with significant quantities of imported beetroot and string beans. Most of the imports are to be sold under house brands and generics.
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1.3 Consumer behaviour and perspective

- While virtually every Australian household has a stock of canned vegetables in its pantry, it is a mature category with modest growth and structural adjustments occurring. The main reason for this is that consumers are switching over to fresh and frozen product and the general change in eating and food preparation styles.
- There is a widespread consumer view that canned vegetables are a lower grade product and lack taste and texture. This particularly relates to products, such as canned peas and beans. The younger consumer prefers crisp, crunchier vegetables and finds canned vegetables to be soft and mushy.
- There is also a perception, which is generally incorrect, that canned vegetables lack the nutritional qualities or goodness of fresh food.
- Canned vegetables are viewed as an old-fashioned pantry item kept in case of emergency.
- The canned products experiencing growth are those which are used in recipes or salads such as beetroot, potato, corn, asparagus and tomatoes; the latter enjoying massive growth from the popularity of Italian meals.
- Ethnic eating trends, particularly Asian and Mexican, have grown in popularity in recent years, providing the opportunity to develop a canned Asian style vegetable range or value added Mexican seed beans.
- There is an increasing trend towards smaller, easy open and highly priced product for use in recipes and salads and purchased because of their convenience. This partially explains why value is growing faster than volume.

1.4 Retailer dynamics

- One sure sign that a product is mature and reaching commodity status is when there is a high percentage in retail house brand and generics. For most, product upwards of 20% are housebrand/generics and, in the case of mushrooms, as high as 45.8%.
- The underlying rationale is that when a product reaches the maturity stage, consumers become less brand conscious and buy on price.
- Another trend, which is driven by this, is the large share in some categories of imported generics, prominently from China, Thailand, Philippines, New Zealand and Canada. This reflects the fact that Australian producers are finding it increasingly difficult to compete on price for these commodity lines.
- There is a worldwide over capacity in canning and food processors discount price to keep their volumes up.
- Yet a further sign of the maturity of the category is the declining shelf space being allocated to canned vegetables by retailers. This, in turn, has led to price wars as processors offer promotional pricing incentives to hold their share of shelf space.
- As a result of the above, an increasing share of canned vegetables is being sold through advertised price specials.
- Although canned products respond well to advertising and price cuts, such promotions don't actually increase consumption. The consumer simply purchases the price reduced products and pantry stocks. Even though the sales graph peaks during advertised periods, it eventually evens out.
- In tomatoes, house brands have lost share since 1999 as consumers are purchasing less volume less often. The main reason for their decline is linked to the proliferation of low priced imported

branded tomatoes. House brands in the major accounts have begun to re-establish themselves with new packaging designs and new products including "Organics" as retailers try to take the store branding, e.g. Farmland and Coles, up market.

- Generic brands are facing supply issues as major manufacturers choose to limit or cease supply.

1.5 Processor industry dynamics

- Overall, processors are struggling to hold profitability in the canned vegetables category and are diversifying into other categories to achieve their overall target returns.
- The key problem is that the prices they receive are generally declining in real terms together with the fact that they have very high levels of capital investment and large labour bills.
- Profitability in the canning vegetable industry is dominated by economies of scale. Canneries look for long runs as the down time and cost to change product, or can size, is high.
- As a result of the above there is an increasing tendency to outsource (buy in) product in the case of short run production, such as beetroot. For example, Simplot outsources its beetroot product for its Edgell brand to Golden Circle.
- Canners claim that they are being squeezed at both ends; increasing costs, particularly raw material and reducing sell pricing.
- A key driver of this is the growing volume of imported generic product, which is being sold at well below Australia's cost of production.
- Over the past decade there has been a large amount of rationalisation in the industry with many canning plants closed.
- Increasingly, location is becoming a major issue for canneries; they need to be located in an area with access to product for extended production. For example, Bathurst and Brisbane are ideal for corn because they have access to raw material for up to four months. Freight costs and quality deterioration are also important reasons why location is a key issue.
- Golden Circle is well placed because the vegetables tend to be counter to pineapple meaning that they can achieve high levels of plant utilisation.

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1.6 Competitive threats

- As has been highlighted, the Australian canned food industry is coming under increasing pressure for cheap imports, notably from China, Indonesia, Thailand, Philippines, South Africa and mainly sold under housebrands/generics. In some categories Australian processors have stopped supplying generics because they cannot compete.
- These countries have far lower production costs, both for raw materials and labour.
- There are also allegations that some of these countries may receive direct or indirect government subsidies.

1.7 Conclusion

- It is difficult to show any optimism for the future of the canned vegetables industry in Australia.
- The industry is in a mature stage with most categories declining in volume terms.
- Processors are being forced into promotional discounting to protect their sales and shelf space, which is undermining profitability.
- On the other side, growers are requiring higher prices to cover their costs as labour and other import costs are rising.
- It is most unlikely that there will be any major involvement in new canning lines or canneries. At best we will see up-grades of existing facilities.
- With the cost of investment in a high-speed cannery in excess of $20 million, given the mature state of the industry and the threat from imports, food companies will not be prepared to invest in new plants.
- If anything, we will see further rationalisation with companies focusing on higher value lines and buying in the core categories. It is likely that canners will progressively concentrate on value added product, meal solutions and higher value products and pull back from straight canned vegetable product. It is likely that cheaper imported product will start to dominate the commodity lines such as peas, beans, etc.
- The canning industry has suffered from the fact that it has been slow to innovate, both in terms of the cans and the products that they put in them.
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1.8 Opportunities

- Given the growing consumer interest in exotic ingredients such as Asian vegetables, mini sweet carrots, speciality gourmet beans either in natural form or in special juices or sauces, there may be an opportunity here. However, this would only be feasible for growers located near a cannery interested in these products or a snap freezing line where frozen product can be transported to a cannery.
- The volumes would not be sufficient to justify a dedicated cannery; these would have to be produced in an existing facility.
- Opportunities exist in the canned market to explore similar concepts to the frozen sector, which have combined vegetables to have Asian Style or Italian Style mixes. Other concepts include rice salad or coleslaw in a can. New varieties in the seed bean segment could be launched capturing consumer trends to Asian and Mexican style dining.
- The consumer stigma associated with canned products will limit opportunities for new products.
- With the trend towards smaller pack sizes, products such as a four pack of small cans will soon be released. These products will attract a price discount (four small cans for the price of three) with the overall aim of increasing consumption. Such an initiative will work well with sweet corn.
- A niche market to emerge from the growing ageing of the population is fresh, pureed, vegetable products that have balanced nutritional levels and which are easier to eat and digest.
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Section

2

Frozen

2.1 Overview

- The frozen vegetable category has undergone an evolution starting out with single vegetables then various mixed and more recent lines for meal solutions such as stir fry mixes, either dry or in a sauce, or various combination packs with vegetables and a protein content.
- The overall category is static; 3.7% volume terms but growing at 5.7% value. This reflects the trend towards higher value specialised mixes, gourmet vegetables, sauces, etc.
- Potatoes are by far the largest category in frozen vegetables (French fries, chips, hash browns) but they are not included in this study. The large volumes of potato product, which carries the less profitable lines, drive the profitability of the major frozen food companies.

- Segments within the frozen vegetable category are defined as follows:
  - Core Vegetables – single packaged vegetables eg peas, corn, beans. This segment accounts for 61.3% of volume and 51.3% of value within the total frozen vegetable category (flat).
  - Support Vegetables – single packaged vegetables eg carrot, cauliflower, broccoli, onion, Brussels sprouts. This segment accounts for 12.6% of volume and 14.3% of value (growing).
  - Vegetable Mixes – more premium style mixed vegetable pieces. This segment accounts for 6.5% of volume and 9.2% of value (growing rapidly).
  - Mixed Vegetables – a mix of diced/cut vegetables and account for 9.4% of volume and 6.1% of value.
  - Meal Starters – packaged vegetables with a sauce that require the addition of a protein or carbohydrate for completion. This segment is in accelerated growth 5.7% volume share and 10.2% value share.
- In general value added vegetables contribute 20.9% volume share and 29.8% value share.
- Growth in frozen vegetables appears to be reasonably static, which is a sign of a mature category. Consumer demand for value added products, exotic and ethnic mixes and stir-fry products, drive the marginal growth that has been achieved.
- Food service use of frozen vegetables is high.
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2.2 Key table and commentary

Category	Volume		Value		Imports			Key Players		
	Tonnes	Segment Share	$m	Segment Share	Source	Tonnes	$'000s	Company	Market Share (Value)	Market Share (Volume)
Brocolli		1.0%		1.8%	China*	0.4	3.4	Simplot (Birds Eye / Edgell)	34.0%	26.1%
					New Zealand*	0.7	1.8	McCain	28.0%	22.7%
					Philippines*	0.4	0.5	Watties	8.0%	9.7%
Brussell Sprouts		0.7%		1.0%				Generics	20.0%	33.2%
Carrots		2.0%		2.2%	New Zealand*	409.0	377.0	Logan Farm	7.0%	
Cauliflower		0.7%		0.9%	New Zealand*	7.7	14.0	Other	2.0%	8.2%
Corn Cobs		17.2%	23.6	17.0%	New Zealand	7587.0	10280.0			
Corn Kernels			17.8		South Africa	363.8	404.0			
					Thailand	362.9	761.0			
					USA	336.0	335.0			
Mixed Vegetables (other)		9.0%	51.3	6.1%	Belgium/Luxembourg	133.7	158.0			
Mixed Vegetables (premium)		11.4%		13.6%	China	102.7	299.0			
					Mexico	273.7	701.0			
					New Zealand	7625.8	9132.0			
Peas		35.4%	72.0	28.3%	China	192.8	440.0			
					New Zealand	15938.3	14527.0			
					Taiwan	15.6	34.0			
Stir Fry		8.8%		4.3%						
String Beans		13.9%	29.5	12.4%	Belgium/Luxembourg	529.6	512.0			
					Netherlands	793.6	759.0			
					New Zealand	2511.2	2667.0			
					USA	635.4	565.0			
					China	237.4	310.0			
Support Vegetabes		1.1%	35.0	0.6%						

* denotes fresh imports

Source: Aztec / ABS (2001) / Retail World (2002)

- Peas dominate the category by a long way, followed by corncobs and string beans. Mixed vegetables account for 20% of the market.
- Core segments (single packaged vegetables) now represent more than 60% of the total frozen vegetable market.
- The frozen vegetable market is highly competitive due to the presence of major players Birds Eye, McCain, Heinz Wattie, Logan Farm and a range of house brands and generics.

2.3 Frozen dinners and meals

- The frozen meal category has taken off in the last few years after a very slow start. The category is now growing at 14.7% in volume and 18.10% in value, again reflecting the trend towards higher quality meals and ingredients.
- Prominent in this category are pasta and chicken based meals, although roast meals with vegetables and various beef, lamb and veal dishes are also popular.
- These products generally include a protein and vegetable component.
- The category is dominated by McCain (Healthy Choice), Maggi and Lean Cuisine.
- These products stagnated initially because they were not delivering to the consumer's value for money expectation. The portion sizes were small relative to the cost. The processors had to charge higher prices to cover the cost of the better quality ingredients required to delivered the desired eating quality. This situation has now been rectified and consumers are now less price sensitive.
- Pizza also figures prominently in this category, most of which have a vegetable component.
- Research suggests that up to 50% of shoppers don't know what they will serve for dinner at 4pm on that day. Busier lifestyles have left consumers looking for meals that are quick to prepare and are nutritionally balanced. This trend has driven the demand for prepared frozen meals.

2.4 Consumer behaviour and perspective

- The situation for frozen vegetables is largely a reflection of changes in consumption and food preparation methods. The traditional "meat and three veg" (usually frozen) has now given away to stir fries and pasta. Whilst frozen stir fry mixes are popular, a large percentage of consumers prepare from fresh because of the perception of fresh being better in terms of taste and nutritional value. Nevertheless, stir fry mixes, with or without sauces, are growing rapidly.
- This trend towards fresh has slowed the growth of the frozen categories. Penetration in the number of homes that have frozen vegetables in their freezer declined from 91.65% to 89.3% in just 12 months and this trend is likely to continue.
- Per capita consumption of frozen vegetables in Australia is low by world standards, for example 5.3 kg per annum in Australia compared to 8.2 in UK. This is because of year round availability of high quality fresh product at reasonable prices. Seasonal availability and price is a big factor in frozen vegetable sales. Consumers generally prefer to buy fresh if it is available and prices are reasonable.
- Whilst consumers generally prefer fresh vegetables, the convenience of frozen vegetables and the value for money makes them very appealing to consumers. As people become more time poor, they are looking for solutions to make meal preparation simpler and quicker.
- With regard to nutrition, consumers have mixed views; whilst most believe that fresh is more nutritious, frozen is well up there especially against cans. This is undoubtedly because the processing companies have spent millions printing the message of being snap frozen.
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2.5 Retail dynamics

- Without doubt the frozen cabinet in supermarkets is by far the most strongly contested of all shelf space.
- In particular there is major pressure on frozen convenience meals and home meal replacement products, which is pulling some of the slow moving commodity vegetables under pressure.
- The category is strongly contested by Simplot (Edgell/Birdseye), McCain, Heinz/Watties and Logan Farms as a specialist player.
- Undoubtedly it is the strength of these brands that has allowed the category to hold on in the light of strong competition. It would be very difficult for a new entrant into this category.
- However, despite the strength of the brands there is a high level of price competitiveness with at least one brand on special virtually every week of the year.
- Retailers are rationalising branded players in core frozen vegetables, to increase the space allocated to their own house brands and the value added area. Private label have become a strong competitor in the frozen category, especially in the core vegetable segments. Many consumers perceive these segments as commodity products with little quality difference, hence, their price sensitivity. Private labels differentiate themselves on price and enjoy strong retailer support, good distribution and shelf position.
- Frozen meals are squeezing out traditional vegetable lines because they deliver better gross profits to the retailers.
- Frozen vegetables are frequently sold through promotional price specials. Consumers tend to buy whatever brand is on special.

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2.6 Processed industry dynamics

- As for canned, processors are being squeezed by downward pressure on selling price and escalating costs although the situation isn't bad as for canned.
- The food service market for frozen vegetables is very large which provides volume and economies of scales and allows processors to remain profitable in a highly competitive market.
- Australian processors are concerned about the threat from New Zealand in the core categories of peas and beans. New Zealand has a substantial production cost advantage because of much higher yields, variation, less water usage, lower costs. This has allowed Heinz Watties to be strong in the market.
- Most of the Australian production comes from Tasmania, which is progressively becoming less price competitive because of small scale production, lower yields compared with New Zealand and freight costs.
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2.7 Conclusion

- While the frozen food category is in better shape than the shelf stable category, it is coming under increasing pressure.
- The category is robust, due to the dominance of the strong brands, which would be difficult for a new entrant to come into the market. Without doubt, the frozen categories will continue to move more into value added product and meal solutions. This will grow the processor demand for the more exotic vegetable lines although unfortunately the volumes are likely to be relatively small.
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2.8 Opportunities

- There may be some limited opportunity for specialised product such as super sweet corn, Asian vegetables, mini-carrots, etc., but the volumes are small and to succeed would require growing close to the plant.
- There is a market to replace imports of high quality asparagus spears (as exported to Japan), spinach and baby corn. The key challenge here is to be price competitive particularly against countries such as China, Thailand, Philippines, Chile, Peru South Africa, which have far lower production costs.
- Potentially there is an import replacement opportunity with spinach and asparagus although, ultimately, this gets down to whether Australia can be cost competitive vis a vis low cost overseas production.
- The spinach category is large and growing but at present is totally supplied by imports.
- There are some potential opportunities for frozen vegetable including import replacement and some of the exotic vegetables that consumers are now demanding.
- As has been highlighted elsewhere in this report, it would probably not feasible to establish a new operation to process these products given that excess capacity exists in the industry. From the grower perspective the logical thing would be to form a strategic alliance to grow for one of the existing operators in a joint venture operation. This is discussed in more detail later in the report.
- Opportunities to export frozen and convenience meals exist throughout Asia, especially in Singapore and Malaysia where there is demand for healthy, convenient and innovative gourmet foods. Limitations on the local availability of raw materials and technology underpin the growing demand for prepared vegetables in the food service sector and also for household consumption.
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Section

3

Sauces & condiments

3.1 Overview

- This section covers the miscellaneous recipes-based product including pasta, cook-in sauces, dips, condiments, pickles, etc.
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3.2 Key table and commentary

Category	Volume			Value			Key Players		
	Tonnes	Segment Share	Growth	$m	Segment Share	Trend	Company	Market Share (Value)	Market Share (Volume)
Sauces									
Fresh Pasta Sauces	2019		5.5%	17.7		8.9%	Latina	76.9%	
Cooking Sauces				8.1					
Pasta Bakes				18.2					
Pesto Bases				9.3					
Premium Sauces				16.1					
Core Sauces				91.7			Raguletto	19.4%	
							Dolmio	34.6%	
							Leggos	15.4%	
							Five Brothers	6.3%	
Meat Sauces				10.9					
Tomato Paste				42.1	18.40%	-1.40%	House Brand Generics	20.2%	
							Leggos	61.7%	
							Fountain	7.0%	
Pickled Vegetables									
Onions		21.9%	-0.9%				Always Fresh	17.5%	
Gherkins		21.6%	-1.2%				Aristocrat	13.2%	
Cucumbers		14.0%	-0.4%				Three Threes	11.9%	
Dips	3416		3.20%	25.6		4.40%			
Tomato		75.4%			75.0%		Masterfoods	36.5%	35.6%
Bean		6.4%			6.5%		Tostidos (Pepsi)	26.4%	27.8%
Frozen Dinners	41.4m units		14.70%	160.3		18.10%	McCain		20.2%
							Healthy Choice		12.3%
							Maggi		15.0%
							Lean Cuisine		14.1%
Frozen Meals	26791		6.70%	253.2		16.20%	McCain		20.7%
							Inghams		13.1%

Source: Retail World (2002)/ Aztec/ABS (2001)

3.3 Pasta sauces and cooking sauces

- The pasta and cooking sauces market has enjoyed large growth over the past 20 years fuelled by the popularity of pasta and convenience meals.
- The pasta sauce market growth is at double figure rates through the last decade and although there are strong signs of it slowing down it is still growing steadily. Volume growth is less than the value growth reflecting the trend towards value added and higher quality products. Most of these products are sold in glass jars and include premium ingredients.
- The pasta sauce market is dominated by five key players, Lattina, Ragulleto, Dolmio, Leggos and Five Brothers (Unilver).
- There are also some boutique players in the niche 'health food' section comprising, Prue Sober's "Serendipity" pasta sauces (Australia), "Naked Foods" pasta sauces (Australia), "Freedom Foods" pasta sauces (Australia), "Whole Earth"pasta sauces (England), "Green Gables Organic Produce" (Australia) and "Muir Glen Organic" (US).
- The sauces are predominantly packed in glass jars, with a small selection in tubes (as a concentrate) and plastic bowls and tubs with plastic peel tops and in sachets.
- Total Italian meals market has shown significant growth in the past two years, fuelled by the buoyant pasta bake market. Tomato paste and meat sauces remain flat with little innovation and decreasing consumer relevance of canned pasta sauce and tomato paste.

- Tomato paste enjoys a high household penetration, however, growth is flat with inter-purchase intervals lengthening. Overall the paste market is in decline due to the trend towards semi-prepared meals. Tomato paste is a commodity market sold on price.
- There has been an increase in imported brands, which offer high quality and low price. This poses the risk that the category will be devalued long-term and consumers will trial/switch to higher quality imported products.

- Dolmio dominates the pasta sauce segment, however, failure to launch new products has driven Dolmio's share down. Both Dolmio and Raguletto have depth and breadth of range in the key volume segments of Core and Pasta Bakes. Raguletto has strengthened share via line extensions.
- House Brands and Generics share of volume and growth has increased and has continued to gain share through the introduction of smaller pack types and competitive price.
- Apart from pasta sauces, the cook-in sauce category (Chicken Tonight type products) is also large. Chicken Tonight (Unilever) dominates this category with 36.7% value share and Kantong (MasterFoods) with 29.6% value share. Most of these products are sold in glass jars.
- Maggi, Campbell's and Gravox are the primary producers of vegetable stock. Maggi (1 litre) and Campbell's (375 & 500ml packs) package their product in tetra packs, while Gravox uses a glass bottle.
- The dips and dipping sauces market has also shown dramatic growth over the past few years with the category dominated by MasterFoods (36.5%) and Tostitos (26.4%).
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3.4 Pickled, roasted vegetables and antipastos

- The pickled vegetable market is a mature category, declining steadily in volume terms. This is largely a reflection of changing eating patterns.
- Traditionally, small operators have dominated the pickled business but in recent years there has been much rationalisation, with operators merging and the smaller ones going out of business. Always Fresh (Riviana Foods) continues to dominate the pickled vegetable market with 17.5% volume share followed by Aristocrat (Fawcett Bros) with 13.2% share.
- There are a plethora of producers supplying products such as corn relish, marinades, pickled onions, kalamata olives, Giardiniera and chutneys and include, Masterfoods, Cerebos (Fountain), Nestle (Maggi), Sandhurst Fine Foods, Fletchers, Carmelina, Hoyt's, Valcorp (La Gina, Gee Vee), Farmland, Savings, Unilever (Rosella), Crosse & Blackwell, Three Threes, Kings-Strikeforce (Baxters), Manassen Foods (Trident), Conga (Green Valley, Sacla), Coles, Henry Jones Foods Pty Ltd (Taylor's), Muir Glen Organics, Viva, Jill's Cuisine, Krakus, Gundelsheim, Blue Banner and Fehlbergs.
- All the aforementioned companies package their products in glass jars.
- By far the biggest use of pickles in food service is with the likes of McDonalds and Hungry Jacks. Heinz has a joint venture with Pahl Enterprises to supply McDonalds, which grows and processes at its Riverina operation.
- Roasted and grilled vegetables are enjoying steady growth due to the popularity of antipasto dining. Much of the produce is imported, although there are a number of smaller regional players.

- Wattle Valley packaged its three antipasto varieties in small plastic tubs, which were located in the chilled section.

3.5 Soups

- Soups in the canned category comprise chunky, condensed, premium and single serve. There are dry, wet and fresh processed soups available.
- In the wet soup category, the market leader is Campbell's with a 47.2% value share. Heinz Wattie's follows with a 38.2% value share.
- Surprisingly, the House of Winston, one of the few fresh processed varieties, only holds an overall 2% value share.
- In the packet/dry category, Unilever (Continental range) holds a commanding 57.3% value share. Uncle Toby's and its 'Country Cup' range follows with a 30.4% value share.
- While soups are predominantly packaged in cans and sachets, there are a growing number of alternative packaging options, namely tetra bricks, plastic containers (usually single serve). The growing 'singles' market largely drives this portion control.
- Most dehydrated vegetable products, including onion, potato, carrot, parsley, corn and leek, which are used in dry soups are sourced under global contracts and are imported to Australia.
- There is a dehydration plant in Victoria, which provides some product when market conditions and exchange rates are favourable.
- Large multi-nationals, such as Unilever, are now outsourcing elements of the processing cycle such as packaging wet soups into tetra bricks.

3.6 Consumer behaviour perspective

- Consumers have embraced prepared pasta sauces, cook-in sauces and dips because they fit perfectly with the consumer trend towards assembling meals and providing convenience.
- Unlike the counterparts in other countries, Australian consumers prefer to assemble convenience ingredients to make their own meals, rather than to buy a ready prepared meal. These sauces save the time and mess by allowing the consumer to open the jar and pour over the chicken or beef and produce a tasty meal in minutes.
- Marinades and simmer sauces are also popular because they greatly enhance the meal with minimal effort. The traditional Aussie banquet of sausages, chops and steaks has now given way to marinated chicken, seafood, etc.
- Dips and salsa sauces are also very popular as a snack food to accompany drinks.
- Unlike most other categories, consumers have demonstrated a willingness to experiment with new products and to pay a premium for convenience.
- Loss of cooking skills and consumer perceptions of having less time has resulted in a demand for convenient meal solutions and components.
- Consumers have taken to grilled vegetables in antipasto, which is big in delis and food service applications.
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3.7 Retailer perspective

- Retailers are extremely positive about these products because they deliver a high level of gross profit for the shelf space allocated.
- The shelf space allocated to shelf stable pasta and cook-in sauces is large and continues to increase.
- Another attraction to retailers is that they generate add on sales such as meat, seafood, corn, etc.

3.8 Processor industry dynamics

- Most of the major food companies are developing convenience meals and sauce type ranges because of the popularity with consumers, but more pointedly because they deliver higher profits than most of the standard products.
- Rather than producing these products from raw materials, almost without exception the food companies are assembling these products from outsourced ingredients. They buy in semi-prepared sliced, diced vegetables, purees, etc. While they cost substantially more, because of the relatively small volumes, it is more economical to buy these low volumes in processed form rather than to start from scratch. This provides a potential opportunity for on-farm value adding involving first stage value adding, which is discussed later in this report.
- Branding and marketing is very important in this category. Consumers prefer to buy trusted brands, making it difficult for a new entrant. This category is heavily promoted on television and in magazines.
- Processors are investing heavily in innovations to develop new, high value meal solutions products. As a result, we are likely to see the continuing expansion and growth of this category.
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3.9 Conclusion

- The whole convenience meal category is likely to continue to grow at a rapid rate for many years because it is delivering to the consumer requirements of convenience, taste and value for money.
- It is expected that the category will continue to expand rapidly with the introduction of new ethnic style, Thai, Malaysian, Indonesian, Korean and so forth.
- It will be very difficult for a new entrant in this category because of the dominance of the strong brands and the need for large marketing budgets, which are essential in this category.

3.10 Opportunities

- The growth of this category presents an opportunity for specialist growth and on-farm value adding of specialist vegetable products.
- As has been indicated food processing are totally outsourcing the production of the ingredient to the stage that they can be simply added to the recipe. There is, therefore, the opportunity to provide specialist, first stage processed vegetables, such as sliced, diced, grilled, pureed and concentrated products, which are all quantity controlled to specifications established by the processor.
- As consumers become more educated about the food products that they eat, it is likely they will become more discerning and demand greater control over nutrition, fat and sugar intake and food safety. This may open up new product opportunities in areas of functional/fortified foods (food plus), low and light foods (food minus) and natural, organic and vegetarian products.

Section

4

Fresh salads, herbs & pan ready vegetables

4.1 Overview

- Australian retail sales of salad mixes and fresh cut vegetables have shown phenomenal growth from $15 million in 1990 to $70 million in 2000 accounting for 2.5% of all produce sales by volume.
- This trend is a reflection of the strong consumer trend towards fresh rather than processed vegetables, mainly on the basis of perceived superior taste and nutrition. It also reflects the consumer trend towards crispier and crunchier vegetables.
- It is also a reflection of the contemporary food style, where salads and stir fries are taking over from the "traditional meat and three vegies".
- There are four basic sub-categories; lettuce/spinach/salad mixes, coleslaws, stir fry mixes and fresh processed herbs.
- The shelf space being allocated to these products is expanding, reflecting the sales growth.
- The biggest player in the fresh leaf and salad market is Harvest Fresh/Vegco, which operates two plants; one in Bairnsdale and the other in Queensland. Other suppliers include Mrs Crockett and Houston Farm.
- Gourmet Garden, a subsidiary of Berri Ltd dominates the fresh processed herb market.

- The vast majority of these products are sold under retailer store brands.

4.2 Consumer beliefs and perspectives

- The dramatic growth of this category from a zero base less than a decade ago indicates that it is filling a need for the time poor, convenience-seeking consumer. The key drivers being:
  - Greater popularity of salad and stir-fries in the contemporary modern diet
  - Perception that fresh vegetables are healthier and more nutritious
  - Trend towards crispier, crunchier vegetables
  - That modern food preparation styles of assembling meals from fresh rather than buying finished meals.
  - Growing interest in more exotic lettuce, salad, herbs and vegetable combinations.
- Despite the fast growth of this segment, our research suggests that this category is servicing a particular market niche of people who demand and are prepared to pay for convenience.
- A high percentage of consumers don't buy these products because of a combination of the higher price and concerns about the freshness and quality of pre-packaged product.
- There are complaints among regular purchasers of these products that the product is often soggy and sweaty.
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4.3 Retailer dynamics

- Retailers are keen to drive this category because it fits perfectly with the strategy to provide complete meal solutions to their customers and to differentiate their fresh food product offerings.
- The other attraction is that these fresh products carry a bigger gross profit margin compared to packaged grocery lines.
- One of the major concerns for retailers is managing such a short shelf life product, especially given that the product starts to noticeably deteriorate towards the end of the use by date. Even under the best case scenario, the product loses two to three days in the supply chain. Due to the potentially high losses, inventory control is essential. Almost certainly retailers would be putting pressure on for a sale, or return trading term, whereby the cost of out of use by date product is bourn by the suppliers.
- A very significant point is the fact that virtually the entire fresh cut product carries the store brand, rather than proprietor brand. While there is some branded product such as Mrs Crockets (complete salads), Houston Farm (70% + Spinach) and Earthline (Harvest Fresh), most of the product carries the store brand. The underlying rationale of retailers is the desire to differentiate their fresh food offer and to achieve a bigger margin. Fresh and convenience foods are the only real opportunity for retailers to differentiate these offers; otherwise they basically sell the same branded products at around the same price.
- All of the major retailers have invested heavily in building their profile in fresh meal solutions. By housebranding these products, it allows them to differentiate themselves from their competitors.
- The other reason is that house branding gives them much greater control over the category. For example, several years ago Edgell made an all out attempt to launch a range of fresh vegetables under their brand, but eventually were discouraged by major pressure from retailers.

- House branding allows retailers to enjoy a much bigger margin. Strong brands always attract a premium, which reflects the strength of the brand. With housebrands the brand equity and the profit margin stays with the retailer.
- The concern regarding this is that it is often difficult for processors to achieve an adequate margin to provide a high quality product, manage a tight supply chain and make a profit.
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4.4 Processor industry dynamics

- There are two main operators in this market, Harvest Fresh Cut/Vegco and Mrs Crockett. From what we understand, the former company has achieved 25% per annum growth over the past three years.
- As was indicated earlier, 90% of this company's sales are in private label product where margins are slim.
- Gourmet Garden operates solely in the fresh processed herb market and has also enjoyed substantial growth since inception. The company has achieved year round tubing and developed a product with a longer shelf life than fresh produce.
- The key to success in the industry is to tightly manage the supply chain because of the very short shelf life of the product. It is therefore important to have the processing plant located close to the raw material supplies.
- From our network we know that over the year major companies, such as Heinz/Watties, Simplot and others have looked at getting into branded fresh value added vegetable products. They have seen great potential because of the overwhelming consumer trend towards fresh produce and the commensurate maturity and decline in sales growth of canned and frozen products.
- Several attempts have been made to enter the category through to the stage of full feasibility studies. In all cases they have abandoned their plans. A key factor has been that the retailers' insistence on store brands means that they cannot realise the value of their brand, which is an essential element in being profitable. Another factor is that these large processors are concerned that they do not have adequate control over the supply chain, which is essential in this category.

- There are a large number of small, back yard operators, who are producing salads and coleslaws and pan ready vegetables mainly to food service customers. This sector is highly competitive and profit margins are slim.
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4.5 Conclusion

- There is little doubt that this category will continue to grow rapidly, both through sales growth and expansion of the number of products.
- Furthermore, as technology improves, particularly Modified Atmosphere Packaging (MAP), it will be possible to improve the quality and increase shelf life. It is also highly likely that the growth of this category will largely come at the expense of canned and frozen product.
- One of the drawbacks of this category from a grower's point of view is that it uses very small volumes of product. A handful of growers can supply the majority of the requirements of fresh produce.
- There are opportunities for new entrants both in the retail and food service sectors. However, margins are slim for processors and to succeed will require using new technologies. A grower-based cluster probably has a better chance of success because they have better control of the supply chain.
- There is a strong likelihood that some of the major processors may consider a joint venture to fund a range of brand-packaged, fresh value-added vegetables.
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4.6 Opportunities

- Because of the massive growth of this category it has to be considered to be an opportunity.
- Given the sustained interest in this category by the major food processing companies, there may be an opportunity to form a strategic alliance between a grower lead consortium and a major processor, such as Simplot, to get into branded value added product.
- There is the opportunity to pursue the large, more sophisticated food service customer with pan ready vegetable salads and salad mixes.

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Part C

Key Stakeholders

Section 1

Consumers

1.1 General behaviour

- It appears that the vast majority of consumers have boosted their general fruit and vegetable intake, although in most cases consumption levels still fall short of the recommended daily intake. "*I have increased my vegetable consumption. I can't just have meat for dinner. I need to have at least a couple of vegies as a side.*"
- Fruit and vegetables are purchased largely at supermarkets and markets. However, there is a general perception that the markets provide the better quality produce. "*I try to go to the market as much as I can. I think market produce tastes better and is fresher*."
- While convenience is high on the agenda, there are some short cuts consumers would rather forsake. "I haven't seen the pre-peeled vegetables, but they are probably disgusting on the inside and you don't know how long they have been peeled. They would undoubtedly be more expensive and you would probably have to peel the outer layer again."
- Notwithstanding the push back to fresh produce, many hold concerns about the integrity of the produce and the harvesting processes employed. "*I buy fruits and vegetables because they are whole*

foods, not processed. However, I do wonder about soil fertility and whether vegetables have all the minerals they are supposed to have."

- Many also believe that a healthy diet should consist of eating different coloured vegetables. The inherent belief is that the variety of colours has different nutritional and health benefits. Some also use the colours to appeal to fussier appetites. "*My kids love it when I chop the vegies into little cubes and they say, 'look it's a green cube and now I am eating a red one.'*"
- However, there were a number of consumers who were displeased with the quality of fresh produce. "I am not too impressed with the quality of today's fruits and vegetables. I don't think they really care about the product – they just want to get it into the marketplace."
- "I think they consider shelf life, rather than taste."
- Quite a number believe that fresh produce is not as wholesome as it once was. "I don't think vegetables are as nutritious as they used to be and they don't taste as good."
- Opinions were many and varied in relation to organic produce, with some perceiving an improvement in quality. "*I think organic is getting better and there is more of it around. Initially, it was all wilted because it had been sitting around for ages and that undid any of the positives for having organic produce.*"
- "*The organic growers do seem to be making an effort re making sure the vegetables taste better*."
- There were a number of consumers who were not convinced of the product's integrity. "*I don't really believe organic vegetables are organic. It's all just hear say.*"
- Not surprisingly, price was a major barrier to purchase. "*I only buy organic if it is on sale. It is very expensive.*"
- "*There is no way I can afford to feed a family on organic vegetables every night of the week.*"

- The subject of functional foods provoked a number of reactions, largely relating to price and absorption. "*If a compound is already in there, why would they need to double, or triple the amount? It would also depend on price*."
- "*If you have too little vitamin C you get scurvy, but on the flip side if you have too much of something it will put a strain on your liver, for example. I would be concerned about my kids consuming excessive doses of a compound*."
- "*It would depend on taste. My kids live on zucchini, so it wouldn't matter to me what the price was – I would still buy it*."
- "*My kids usually wont eat a fruit or vegetable that doesn't look good, as well as taste good*."
- Many were a little sceptical or wary of such vegetables and their associated claims. "*I would have to have someone that I really trusted, like Rosemary Stanton, to endorse such produce. She wouldn't put her name to a fraudulent product*."
- "*I don't think I would believe it anyway. For example, if you give a company $400,000 and tell them to uncover the health benefits of olive oil they will. Maybe I'm just too cynical*."
- A high number held that people should simply adhere to a healthy, sensible diet. "*I think balance is key. You don't need to force feed your body vitamins, etc*."
- Some, however, were comfortable with the concept of adding vitamins to vegetables. "*I would buy processed vegetables with added vitamins, provided they were reasonably priced. However, I usually prefer fresh vegetables*."
- "I feed my kids meat and some sort of vegetable everyday and back that up with a multivitamin. I would consider vegetables with added nutrients though."

- The subject of GMOs elicited many and varied responses. The most frequently cited concern related to the lack of publicly available information. "*I am not really concerned about GM foods, as I don't know that much about the technology. However, I don't like the idea of someone meddling with fresh foods. Vegetables come out of the garden and they're natural and healthy. I would need a great deal more information.*"
- "*I just don't think we know enough about GMOs and their effect on the planet.*"
- Many were also of the opinion that GM was not a novel phenomenon. "*I know that GM, in some form or another, has been going on for a while now and that is fine, but I do not want them to use animal genes to make my vegetables bigger or better. I do want to know that what I buy is not GM and I am worried about health/allergies, particularly for future generations.*"
- Some claim to purchase non-GM products without giving it much thought. "*I buy non-GM soy milk but I don't think it's a conscious thing. It's just the brand I prefer.*"
- Upon mentioning the possibility of enhancing the functional compounds in vegetables, most consumers immediately presumed that GM would be involved. "*I don't like the idea of scientists tampering with natural produce. I gather they will be using genetic engineering to modify the fruit and vegetables.*"
- Consumers are largely in favour of natural breeding, but wary of genetically modified food. "*We shouldn't be playing with nature.*" "*Not enough research has been done.*"
- Not knowing what the long-term effects could be, consumers felt it was dangerous to experiment. "*People got AIDS from eating monkey's brains. We could be unleashing another AIDS epidemic.*"
- One consumer is particularly concerned about Genetically Modified food. "*I always look for GM free food. It's very hard to find. They don't have to include GM foods on labels in Australia.*" This

consumer either bought foods, which specifically stated "*GM free*" or chose foods with very basic ingredients.

- One consumer is concerned that the big businesses responsible for genetically modified food will push the local farmers out of the market. This led to a discussion on importing and exporting. Consumers thought Australian farmers were losing business because produce was being imported from overseas. *"Why do they sell American oranges in Australia?"*
- As with GMOs, most consumers required more information, in order to make an informed decision regarding the use of natural breeding methods to increase the amount of functional compounds in vegetables. " *I would want to know a bit more before I would feel comfortable about natural breeding methods to elevate the levels of certain compounds*."
- There was rather widespread concern regarding the body's ability to tolerate amplified levels. "*Some things are toxic if you have them in too high a dose, like vitamin A*."
- However, a small proportion would consider supporting fruit and vegetable tweaking. "*Depends how they modify them. I wouldn't worry if it were natural. For example, boosting vitamin C without using fish scales. But they can't tamper with their genetic make-up*."
- Some consumers held that the natural functionality of vegetables should be promoted ahead of natural breeding. "*I think if you advertise the functional benefits of vegetables people will take note, as many don't know why certain vegetables are good for you*."
- However, quite a number do seem to be familiar with the cancer and broccoli association. "*I switched from beans to broccoli because of the link between broccoli and bowel cancer and I also eat Chinese vegetables*."
- There is a strong belief that fruits and vegetables have natural functional properties and that by simply eating more of them diseases will be prevented.

- Rather than tampering with a vegetable's composition, some believe that simpler means to improve the nutritional content should be employed. "*I think you're better off putting vegetables in a good quality soil – so many are leeched. All you need is good organic matter in the soil to bolster the mineral content. A would buy something if it had been nourished in good, nourished earth.*"
- "*I don't think modification is natural. It's like putting a lemon on an apple tree. Besides wouldn't you need to eat a vast amount of broccoli for it to impart any sort of benefit*?"
- Some are of the opinion that the nutritional content is of relatively low importance. "*I think fruit and vegetables are poorly merchandised. There are a myriad of Asian vegetables, but I don't know what to do with them. Maybe they should worry about promoting preparation methods, etc.*"
- There is a general belief that fresh fruit and vegetables are far more nutritious than processed foods: although many are under the false impression that "*processing kills all the goodness in foods.*"
- Some consumers believe that frozen vegetables are equally, if not more, nutritious than their fresh counterparts. "*I heard they put them in air tight bags and snap freeze them to keep in all the goodness.*" Others are of the opinion that while they may be better than canned goods, they are not as good as fresh.
- There is a general feeling that fresh foods aren't as nutritious as they used to be because of the extended period in the supply chain, including the time spent in supermarkets.
- There is also a belief that they currently treat fruit and vegetables to improve their shelf life and that this interferes with their nutrient content.
- Many of the younger consumers and parents of young children did not appear to be overly fastidious about their eating habits. In fact, most adopted a reactive, rather than proactive approach to their diets. "*I would classify myself as healthy, as I rarely get ill. However, I don't think it*

has anything to do with my eating habits. I don't feel compelled to eat a healthier diet because I feel fine now."

- A few consumers held that diet had little or no influence on one's wellbeing. "*I think that most illnesses are attributable to stress. My parents don't have particularly healthy diets and my father smokes, yet they are both very healthy and laidback.*"
- Among the younger age groups, the plethora of study findings did not overwhelm or confuse them. "*Conflicting study findings don't really bother me. I just take in what suits me.*"
- Various supermarket magazines are the source of much consumer health information. "*I love the 'Super Food Ideas' magazine. It details many health issues, has fantastic dietary/recipe ideas and many interesting anecdotes.*"
- However, some obscure and unsourced notions were expressed. "*I have heard that the carcinogenic agents in ham are counteracted if you consume it with tomato.*"
- Not surprisingly, the older age brackets possessed high levels of health/diet knowledge and were far more proactive in their approach to disease prevention.

1.2 Key trends

- Consumers are increasingly seeking food that is not only good to eat, but is convenient and good for them.
- Variety appears to be a key driver in altering cooking habits. "*I used to microwave my vegies, now I want more variety. I cook more stir fries and give my vegies a quick steam.*"
- "*I am starting to make Mexican and Asian dishes. Just serving the same thing all the time is boring. I'm always looking for new recipes.*"
- The desire for a varied diet is resulting in an increased reliance on cookery books. "*When I was growing up it was just Italian food in the house, but now we try and have a bit of variety. I regularly use recipes from cookbooks now.*"
- Ease of preparation is also a prime consideration. "*The dishes I tend to cook now are much simpler. I look for fresh ingredients and simple ways of putting them together. These days it's into the Donna Hays and those types of cookbooks.*"
- There is also a noticeable shift away from spending many hours slaving over a hot stove. Many complain that they do not have the time, or the energy to whip up culinary masterpieces on a daily basis. "*I don't do the long, slow simmer dishes anymore – they just take too long. I use fresh vegetables, but there are some things I like frozen, like raspberries and asparagus. I always have the tomato paste, tinned tomatoes and corn kernels on stand by.*"
- Some consumers attribute their more adventurous culinary habits to the increasing Asian population. "*A number of Asian supermarkets are popping up and there is such a variety of produce to choose from. Also the regular supermarkets have a bigger range of vegetables, including the Asian ones.*"

- Age and disease risk are also guiding factors in terms of the styles consumed and the level of nutritional knowledge. "*We are all in the older age groups and we are more aware than we were ten years ago, particularly regarding things like the GI. I am reverting to my grandparent's habits, namely the Mediterranean diet. I watch the GI because there is diabetes in my family and I am trying to avoid it.*"
- Additionally, the taste buds of younger consumers strongly influence the styles and preparation methods. "*I make 'au gratin' a lot. I bake some vegetables in a white sauce and cover with breadcrumbs – the kids love it.*"
- "*I try and mix in as many vegetables as I can, particularly in soups. I try to vary the ways in which I serve them, otherwise my kids get bored and wont eat them. I try and cook/bake them in scones or pikelets.*"
- Convenience, variety and availability are also driving factors in determining the type of shelf stable product selected. "*We try to eat different foods every day for the variety and this may include ethnic dishes. We use a lot of 'aluminium foil sealed' packets, which contain all the nutritional information, etc and they are reasonably priced. All you have to do is re-heat them.*"
- There is an increasing tendency to prepare nutritious, home cooked meals from products acquired at the local supermarket. "*I love supermarkets now because if you're in a hurry you can just grab some 'Chicken Tonight' and some mushrooms and just throw it in a pan and there's a meal. I do like to make sure there's something fresh in it.*"
- While there is a proclivity to purchase fresh produce, many lament the perishability of fresh herbs and are turning to the processed varieties. "*I love the herb tubes, especially the coriander one. They sit in the vegetable section and are easy to locate and not wasteful. There is no way I would use a whole bunch of basil. I also prefer the tubes to the dried varieties. Moreover, the tunes are available all year round, whereas some fresh herbs are not.*"
- There is also evidence to suggest that certain products are not restricted to their target markets. "*I am a big fan of the jars of baby food; I regularly eat them myself – they are so easy! However, I do feel*

guilty about feeding them to my daughter, as I know they are not as nutritious as fresh foods. I do tend to buy the organic ones."

- "*I quite like the fruit baby food jars, but I wouldn't touch the casseroles. However, I do really like the chicken and vegetable one.*"
- The vast majority of respondents use, or maintain a back-up supply, of canned products. Many, however, are of the opinion that fresh is superior. "*I always buy fresh. I buy canned corn for convenience, for example when I am making a rice salad. I use fresh most of the time – I don't think the canned stuff compares.*"
- A small number are also of the opinion that canned is less wholesome than both the fresh and frozen varieties. "*I don't think canned vegies are as nutritious as fresh and some frozen may be more nutritious, as you don't know how long the cans have been on the shelf.*"
- On the flip side, many prefer canned to the frozen varieties. "*A recent survey revealed that frozen vegies more or less didn't have any nutrients. Some canned varieties, like corn, were OK. Since that survey we have cut back on frozen and now rely more on canned, but we still prefer fresh.*"
- Most consumers maintain a steady supply of "palatable" canned produce. "*I only really use canned tomatoes, kidney/chick/baked beans and sometimes artichokes – the others just don't taste as nice tinned. They just don't have that firmer, crisper texture.*"
- The preservatives and additional ingredients in canned products also concern many consumers. "*I find in some canned and frozen vegetables there are additives and added spices, etc. I wont buy them.*"
- "*Canned beetroot nearly always has sugar or salt added. It can set some asthmatics off. However, tinned tastes better than the home-boiled beetroot.*"
- It appears that canned goods are primarily used as ingredients in cooked dishes. "*I would use the tinned stuff for cooking, but not for salads.*"

- While canned soup has long been a pantry staple, alternative forms are increasing in popularity. "*I always have canned soup as back up, but the soups in pouches are much creamier and tastier.*"

- "*We eat a lot of canned soups and I quite like the Campbell's tetra pack varieties. We have the dried ones maybe as a snack, but as a meal they are not substantial enough.*"
- Alternative uses are also increasing in popularity. "*My daughter bought the packet French onion soup and made it up with mustard and poured it over a leg of lamb and baked it. It was absolutely delicious.*"
- "*I think 'cup a soups' are great for students and children. It fills them up and because it is made in a cup there is little to wash up.*"
- Moreover, canned soup is not a universal favourite. "*I don't like canned soups, they taste too fake.*"
- "*I left my son some 'soup for one' varieties when I went away and he thought they were horrible. There were 10 in the pantry when I returned.*"
- "*I've only ever had home made soups, so when I tried the canned and the packet I didn't like them.*"
- On the other hand, canned fruit appears to have a strong following among younger consumers. "*Normally my kids eat canned fruit over fresh, probably because of the sweet juice and because it is easy for them to handle.*"
- "*Sometimes my kids have tinned fruit with cereal or custard for breakfast. They love anything that's full of sugar.*"
- Adults too like to indulge. "*I buy the SPC fruits in four packs, once or twice a week. They are good if I want a treat.*"
- There is an emerging consumer preference for "clean foods", free of genetic modification or excessive processing. This trend is creating a sense of mistrust of large manufacturers.

- Gone are the days of slaving over a hot stove to prepare dinner. 92% of Australian homes have a microwave oven and 65% of consumers say they prefer to spend less than 30 minutes preparing the evening meal.
- The advice to eat more vegetables is one of the few positive and consistent health messages that consumers hear. Despite this, many do not eat the recommended number of servings per day. The Australian Commonwealth Department of Health and Family Services make clear recommendations that at least five servings of vegetables are consumed daily as part of a well-balanced diet. Both Australian and New Zealand agencies specifically include frozen vegetables as part of these recommendations.
- The Australian Department of Health and Family Services "The Australian Guide to Healthy Eating" states: "Use frozen, canned vegetables as an alternative to fresh. They are nutritious, often cheaper, quick and easy to prepare, easily stored and available in remote communities."
- The results of the New Zealand National Nutrition Survey showed that one in three New Zealanders over 15 year (38% of males and 27% of females) do not eat three servings of vegetables each day as recommended in the New Zealand guidelines. Furthermore, the survey showed at least 12% of New Zealanders were eating only one, or less that one, serving of vegetables each day.

1.3 Performance issues

- Many consumers voiced their concerns about the freshness of produce in both cans and cartons. "*I am not sure about soups in cartons. I would want to know that they were made that morning and that's not going to happen. It's just as easy to make your own. It takes about 10 minutes to cut everything up and then throw it in the blender.*"
- "*It really annoys me that many things no longer have the use by date printed on them, especially cans.*"
- "*If I was going to buy those vegetable juices in boxes I would want to see a date stamp.*"
- A number of consumers held that certain processes more effectively maintained the nutrient levels and thus were a favoured option. "*I would almost prefer carrot juice in the dehydrated form, as I would think that the nutrients would be better preserved than the carton varieties. It would also be lighter to carry home.*"
- There was little support in favour of pre-packaged fruit/vegetable combination juices. "*We know that oranges lose their vitamin C content within hours of being juiced, so there would be little point in buying cartons of carrot and orange juice because the nutrients would have been lost.*"
- Fruit and vegetable juices are a popular staple in most households, however, packaging concerns abound. "*Popper tetra packs are a nuisance, particularly the straw hole. I like to have a lid on my drinks.*"
- "*I don't really like the tetra packs, but I think they are better for the environment than plastic.*"
- Consideration regarding the safety of younger household members strongly influences the type of packaging purchased. "*I prefer plastic packaging because I have too many children running around, so glass is not an option.*"
- "*Tetra packs are too small. I have a family of six and therefore I need a big, family size pack.*"

- Many parents are introducing their children to vegetable juices at an early age. "*My young daughter loves tomato juice and I will regularly buy a four litre bottle. However, she is not too fond of my favourite, V8 juice.*"
- Taste is also a crucial element in the purchase decision. "*I would buy canned vegetable juices if they tasted good. My husband loves tomato juice and it one of the few juices that actually tastes like the vegetable.*"
- "*I sometimes buy pineapple juice, but I don't think I would buy vegetable juice in a can.*"
- Fiscal constraints also strongly influence the purchase decision. "Juice is not the sort of thing you buy when you are on a budget. I sometimes have to resort to cordials."
- Taste has also emerged as a major issue. There is a widespread view among consumers that vegetables do not taste as good as they used to.

1.4 Consumer complaints about vegetables

- The perceived disadvantages of processed vegetable centre around issues relating to health and nutrition:
  - Additives/artificial ingredients/preservatives. There is a perception that fresh vegetables are more nutritious and of higher quality than processed vegetables. This is due to the overriding belief that processed (especially canned) vegetables contain additives and artificial preservatives and due to the negative perceptions associated with the can.
  - Nutritionally poor/goodness lost
  - Don't know what is in it
- Concerns exist regarding product quality:
  - Lower grade product
  - Bland and soggy – younger consumers tend to prefer crisper, crunchier vegetables
- Further concerns relate to the packaging form itself:
  - Unknown shelf life
  - Difficult to open cans
  - Environmentally unfriendly
  - Risk of contamination
- Users of processed vegetables are seen to be:
  - Lazy and inept at cooking
  - Paying a premium to fresh

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1.5 Conclusions

- This research confirms the notion that generally consumers would prefer to purchase fresh vegetables and prepare meals from raw ingredients. However, processed vegetables, particularly frozen, offer many major advantages and will always have a place in the pantry.
- It is highly likely that the ready to serve and minimally processed fresh vegetables will grow in usage and popularity because they offer the best of both worlds; i.e. perceived nutritional, taste and texture advantages of fresh food and the convenience of processed.
- A key issue to the adoption of fresh, minimally processed vegetables will be quality and price. To gain widespread acceptance they will need to be priced at not too much above the fresh, unprocessed equivalent.

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1.6 Opportunities

➢ This research identifies four significant opportunities.

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1. *Better tasting vegetables*

➢ There is a widespread view that vegetables do not taste as good as they used to. There is an opportunity to use breeding and farming techniques to improve eating quality and taste. With a suitable product range backed by strong brand based marketing, there is an opportunity to carve out a premium market.

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2. *Organics*

➢ Demand for organics is not being met and will continue to grow at double figure rates for many years to come.

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3. *Functional vegetables*

➢ The consumer research indicates that there would a strong demand for vegetables with demonstrable functional properties as a prevention to cancer, diabetes, heart diseases, cholesterol, etc. New breeds and production technology are being developed to produce vegetables with enhanced levels of naturally occurring functional properties.

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4. *Minimally processed vegetables*

➢ There is a lot more growth potentially in salad mixes and minimally processed vegetables and plenty of room for new entrants.

Section 2

Processors

Key Players

Processor	Brand/s	Location	Vegetables	Process	Packaging
Golden Circle	Golden Circle	Queensland	Beans, beetroot, carrots, corn, cucumber, capsicum, peas	Canned	Glass, plastic, tin
Heinz-Watties	Heinz Frozen Food Garden Mix Earth's Best	NZ	Peas (baby), green beans, broad beans, corn, carrots Carrots, sweet corn, garden peas	Frozen	Plastic bags
Logan Farm	Logan Farm Frozen Vegetables	Queensland	Super sweet corn, corn cobs, peas (baby/garden), spinach, beans, broad beans, mixed vegetables, potatoes, broccoli	Frozen	Plastic bags/Boxes
McCains	McCains	Ballarat Victoria	Peas (baby/minted), super juicy corn, peas, corn kernels, carrots, baby beans, broccoli, cauliflower, beans, capsicum, potatoes	Frozen	Plastic Bags
Simplot	Edgell Bird's Eye Country Harvest Leggo's Hy Peak	Victoria	Asparagus, beans, beetroot, capsicum, carrots, corn, mushrooms, peas, potatoes, cabbage, sauerkraut, carrots (sliced/julienne/whole), beans (whole/sliced), capsicum, peas (snap frozen/ baby/mint), super sweet corn kernels, mini corn cobs for kids, corn	Canned Frozen Shelf stable	Tins Plastic Bags Jars, plastic containers

			cobs, cauliflower, yellow beans, Brussels sprouts, chopped onion		
SPC Ardmona	Ardmona SPC	Victoria	Tomatoes Beans, beetroot, mushrooms, chick peas	Canned	Cans
Nestle	Lean Cuisine	NSW	Eggplant, zucchini, capsicum, onion, beans, peas, broccoli, potato, corn, carrot, mushrooms, asparagus, spinach	Frozen	Plastic bags
MasterFoods	Dolmio Kan Tong MasterFoods	NSW	Chickpeas, beans, potatoes, garlic, onion	Shelf stable	Glass, plastic
Unilever	Continental Soups, Rosella tomato sauce, Chicken Tonight	Victoria	Onions, potatoes, carrots, corn, capsicum, parsley, leek, zucchini, celery, garlic, tomatoes, eggplant	Shelf stable	Cans, sachets Glass Glass
Kraft	Dewcrisp	Victoria	Miscellaneous vegetables	Frozen	Plastic bags
Berri Limited	Gourmet Garden	Victoria	Miscellaneous vegetable and herbs - condiments	Processed - fresh	Tubes

Section

3

Retailers

3.1 Key players

National Market Share	1997 %	1998 %	1999 %	2000 %	2001 %
Woolworths	33.6	35.5	35.9	37.5	38.6
Coles (incl Bi-Lo)	28.0	30.0	32.0	32.0	32.5
Davids (C&C)	17.4	15.3	13.0		
Franklins	15.0	14.1	13.4	11.3	7.9
FAL (include Action)	4.0	4.0	3.8	3.4	3.8
Australian Independent Wholesalers	-	0.9	1.7	1.7	1.6
Others	2.0	0.2	0.2	1.9	2.5

- Three big players dominate the Australian retail market. Between them, Coles and Woolworths hold over 70% of the grocery market. This gives them immense market power, which they exercise to reduce margins for processors. It also allows them to control new categories such as the minimally processed vegetables.
- Despite concerns by Coles and Woolworths of Aldi's entrance into the market, it is not expected to be a serious threat. It is a niche market operator, which locates stores in low-income areas, has a

limited range and almost of the products are housebrands. It is only expected to get less than 7% of the market.

- The entrance of Aldi has increased retailer focus on house brands resulting in Woolworths launching Hillendale and Coles reviving the Coles brand. These house brands are moving closer in positioning to proprietary branded players such as Edgell.

3.2 Key trends in retailing

- Continued expansion and development of fresh food departments, with increased ranges and a focus on strengthening supply chain to improve quality.
- Strong focus on meal solutions in fresh, chilled and frozen departments with particular emphasis on selling components that consumers can assemble rather than complete meals.
- Reduction in canned food shelf space and increase in frozen and chilled.
- Currently focussing on re-vamping store/brands to improve quality and value for money.
- The threat of the new entrant Aldi has forced Coles and Woolworths to review these systems, lower costs and improve the performance of their housebrand program.
- Major retailers are testing new formats including home meal replacement centres, smaller convenience outlets and gourmet food outlet. These have met with mixed success. For example, the David Jones Food Chain has been a failure.
- All retailers have experimented with e-commerce and home delivery systems with very limited success. Key concerns by consumers are the quality and consistency of fresh products and the cost of delivery.

3.3 Patterns in processed vegetables

- All retailers have reported that the moving annual total for the canned has shown decline over last year, with the current trend continuing to decline. This may be attributed to the fresh food sector. Fresh vegetable tonnage has increased despite sales dollars being down, which would indicate that fresh produce has become cheaper. Although no research has conclusively proven that there is a direct, inverse relationship between the price of fresh produce and demand for processed vegetables, it is commonly thought to be the case. Favourable weather conditions, for example, will improve crop yields creating an oversupply of fresh produce and consequently reduce the fresh food price point. Cheaper fresh produce will cause reduced demand for canned and frozen goods.
- Furthermore, deliveries of fresh produce to remote areas have increased in recent years resulting in a reduction in demand for canned/frozen produce.
- The top six selling canned vegetable categories account for 80% of sales, these being:
  - tomatoes
  - beetroot
  - corn
  - asparagus
  - seed beans
  - peas
- The top three are huge category leaders.
- The demand for peas and beans depends on the price and availability of fresh produce.
- The seed bean category is growing and Edgell is pouring significant research into expanding this area.

- House brand sales in the canned category are increasing due to the price point advantage. It is expected that this trend will continue especially with the opening of Aldi supermarkets, which rely largely on home brand sales. Overseas trends also show continued reliance of supermarkets on their home brands. The profit of Sainburys in the UK is largely attributed to growth in the home brand market and now dominates premium shelving.
- Although the overall trend for the canned vegetable sector shows decline, products that have a value added component have shown growth, as they appeal to the time conscious shopper.
- Overseas markets indicate a trend toward organic vegetables in a jar or tin however retailers are sceptical whether this will be successful unless the entire menu is organic. A company brought out an organic pasta source a few years ago, which failed, as the market didn't have organic pasta available.
- Frozen foods contribute approximately $2.1m in weekly sales for Coles Supermarkets. Of this total, 30% comprises of house brands and this figure continues to increase. The frozen food category has enjoyed continued growth of approximately 5.3% in recent years and this trend is expected to continue.
- The best selling frozen lines are peas and potato chips and these products are clear category leaders. The generic brand 500g bags of peas are the best seller. There is a growing trend towards larger size packaging.
- Growth in the frozen sector can be attributed to the introduction of value added products and also increased sales of generics. Sales in commodity products have fallen as a result of increased sales of the value added range, however, commodity lines still make up most of the volume. Value added products have grown by approximately 24% while commodity products have increased turnover by approximately 8%.

- A trend developed overseas has introduced vegetables coated with a transparent substance, which enhances flavours and enables grilling and baking. Vegetables will be crunchier and crispier which would expect increased sales. Such products are expected on the market next year. Kentucky Fried Chicken currently uses coated potato chips in their stores and such products are expected to become more widely available. Golden Crunch also uses this process.
- A high percentage of frozen and canned vegetables are sold on advertised price promotion.
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3.4 Performance Issues

➢ Retailers complain that the vegetable processors are not sufficiently innovative relative to other categories. The complaint is that they are slow to bring out new products or to adequately promote their category. This, they believe, is a reason for stagnation and consumer boredom with the category.

➢ A current limitation in the canned category is the canning process where anticipated demand and the volume to be canned is estimated and planned 12 months in advance. Therefore if a product is heavily promoted then it is almost certain that it will run out. This has been experienced with some Italian tomato ranges which can in March and will run out soon after Christmas.

➢ Packaging in the canned category is a real issue and ideas need to be explored in order to make canned vegetables more attractive.

➢ Some processors have explored other packaging concepts including:

- asparagus and peas in plastic
- tomatoes in UHT containers
- other vegetables in pouches

➢ These were not successful because the packaging process was expensive and pushed the price point up at the store. It is however a good concept as people like to see the product.

➢ The space allocated to core vegetables is being reduced to allow for the growth of value added.

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3.5 Market dynamics

- House brands may encourage consumers to trade down to commodity products rather than trading up to value added products, and as a result, dampen growth in the market value.
- Super sweet corn has recently been introduced with growing success. The product consists of premium quality corn, which has been placed into glass containers as opposed to cans so that consumers can see the product. As it is better quality corn kernels, it is priced at a premium. The glass product is expensive to transport and there is a high breakage factor. It currently averages about 10-15% of the sales of its canned cousins and has the advantage of being resealable.
- Another product, which has been introduced is adding vinegar to asparagus and providing a pickled product.
- The value of the ring pull top is still largely debated. It appeals to the time conscious however is not suitable for the elderly. Such cans cannot even be opened using the conventional can opener due the shape of the can.
- Stackable cans are also a recent innovation with cans stacking inside one another. It provides huge benefits to retailers because as all shelves are hand stacked such cans reduce droppages and lowers wastage (consumers will not buy a dented can).
- Fruit has recently been packaged into resealable plastic containers, which would work well for beetroot.
- Another idea would be to explore corn in a tetra brick. Currently in the UK baked beans are being sold in square tins.
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Section

4

Food Service

4.1 Overview

- The food service sector is a very large and important user of vegetables. An often used figure is that approximately 40% of the food dollar is consumed away from home. This suggests that roughly 30% of vegetables by volume are consumed in food service applications.
- The food service market for minimal processed vegetables alone is estimated to be $50m per annum. Food service outlets account for close to one-third of all canned and frozen food value.
- The food service sector is quite disparate, comprising a large number of quite diverse segments.
- The following list indicates the diversity of food service venues:
  - High End
    - Five Star Hotels
    - Restaurants
    - Entertainment venues
  - Medium end
    - Bistros
    - Clubs / Pubs
    - Airlines / Travel

- Delis / Sandwich Bars
- Juice Bars

- Low end
  - Hospitals
  - Nursing Homes and Aged Care facilities
  - Prisons and Detention Centres
  - Military

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4.2 Usage patterns

- The usage and behavioural characteristics of the three broad categories are discussed below:
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High End

- Five star hotels, restaurants, and cafes (from fine dining to street cafes) have indicated that they mainly purchase fresh locally produced vegetables which are washed, peeled and cut by apprentice chefs. This is because of their desire for top quality.
- Fresh vegetables account for approximately 95% of produce with 5% being processed. Commonly used processed vegetables include:
  - Frozen peas
  - Canned or frozen sweet corn
  - Tomato paste
  - Snap frozen broad beans which have a better colour than the fresh variety
  - Semi-dried tomatoes
- Processed foods tend to be used in the lower end outlets within five star hotels such as coffee shops, food service and banquet functions.
- These findings differed among of ethnic restaurants, which generally indicated that pre-diced vegetables were purchased as well as many imported products. Such techniques were more cost effective due to the high costs of Australian labour. Although most places indicated that they would try to purchase locally first, it was often cheaper to import produce from Pakistan or Vietnam.
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Medium End

- Airlines tend to use the entire spectrum of vegetables from leeks, potato products, beans, peas, carrots etc – anything that they can obtain in the tonnage required. The tonnage they use is far greater than any supermarket procurer.
- The majority of the vegetables purchased by airline caterers are fresh which undergo minimal processing. They do use frozen peas and canned Italian tomatoes. The airlines source semi-prepared vegetables from small operators in each city. All produce is Australian with the exception of the Italian tomatoes, which are better quality at a cheaper price.
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Low End

- The frozen products used by institutional caterers consist mainly of peas, baby carrots, green beans and broccoli. The canned products are generally beetroot, tomatoes, corn kernels and potato salads.
- Vegetable purchases have increased and make up approximately 15% of their overall food spend. Of the vegetables purchased 80% is fresh (minimally processed), 15% frozen and 5% canned.

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4.3 Key trends

Restaurant Styles

- The growing trend in Europe is organic produce with most supermarkets offering every type of vegetable in an organic range. There is increasing interest in organics by Australian restaurants.
- The rise in overseas chefs and TV chefs has generated waves of vegetable popularity and trends.
- In recent years, more casual style cafes have dominated the market in favour of fine dining.

Eating Styles

- Less than 5 years ago, most of the vegetables purchased by institutional caterers were frozen however consumers now demand fresher produce such as roasted carrots and stir fried vegetables. Consumers are more health conscious and prefer Asian style dining which dictates less meat and more vegetables.
- The sandwich market is increasing with consumers demanding fresh (minimally processed) produce. There is a growing interest in sandwiches with salad or some vegetable content. Gourmet sandwiches with exotic ingredients such as rocket or antipasto vegetables are popular.
- With vegetarian dining becoming more popular, vegetable orders and consumption has increased by approximately 10%.
- One of the biggest trends in eating style is the so-called fusion food. These are east meets west styles, i.e. an Australian version of Asian food or vice versa. Asian herbs and spices and Asian vegetables figure strongly.
- Middle Eastern foods are also very popular including beans, herbs and spices.

Food Preparation

- Gourmet juice bars have become popular. These are small bars that make fruit and vegetable mixes to order from fresh ingredients. Carrot and celery based mixes are popular. Another new fad is wheat grass shots sold to provide a chlorophyll boost.
- The market is strongly moving to prepared foods. As the cost of labour in Australia is expensive, it has become more cost efficient to bring in prepared vegetables. Caterers are moving away from peeled potatoes due to the time involved in peeling and towards high quality washed products. Chefs are then encouraged to cook the potatoes with the skins on.
- The minimally processed market is increasingly rapidly with so many different ways to cut vegetables available. It has become a more cost effective method of preparing food.
- Another key trend is the propensity to outsource in institutional catering outlets. Increasingly, hospitals, aged care and canteens are outsourcing their kitchens to major contractors.
- Increasingly, the medium and lower end outlets are buying in food such as soups, salads, desserts, etc.

Major Food Service Companies

- The trend towards outsourcing is leading to the growth of major food service contract companies. These companies bid for the contracts of hospitals, the military, mining companies, sporting venues, etc.
- The major players are listed in the table below:

Company	Industries	Client Summary
Spotless Services	Events, functions and corporate entertainment	Local Government, Sporting Arenas, Zoos, Royal Show Grounds
Qantas Inflight Catering	Airline Catering and Food Service	International Airlines, Rail, Hospitals
Eurest	Food Service and retail	Zoos, Defence Forces, Police, Schools, Universities, Television Stations, Airports, Prisons, Detention Centres, Mining, Hospitals
Delaware North	Food service, hospitality and facilities management	Military, Parliament House, Univerisities, Rail, Airports, Convention Centres, Sporting Venues

4.4 Key drivers

- Quality and price are key drivers with catering purchases being price driven where the best quality vegetables are obtained at a specified price.
- On plate cost is a major driver. Margins are extremely thin in most sections of the food service industry. Large food service categories get to the level of costing meals down to fractions of a cent.
- Labour is by far the biggest cost, especially given that much of it is at penalty rates for every weekend and public holiday. This has driven the strong trends towards semi-prepared food as it allows them to reduce the number of chefs and kitchen hands.
- Airline catering procurement tends to be mostly quality driven although price is beginning to play a larger factor.
- Food safety is become a key driver, particularly for the large organizations. Increasingly they are seeking to deal with larger, more sophisticated suppliers who have HACCP conformance systems, traceability, etc. Undoubtedly, this will result in a rationalisation of the industry with many of the smaller backyard operators being forced out because of the high cost of compliance.

4.5 Performance issues

- Low and fixed price. Because on plate costs are an issue, there is strong pressure to reduced prices. Price stability is also an issue as contract caterers have to lock themselves into menus at fixed prices up to six months ahead.
- Growers need to focus on better production planning and improved growth cycles to limit price fluctuations of products. Institutional caterers are price driven and work with strict budgets. They will stay away from products that have growth/price peaks and troughs as it prohibits accurate budgeting. Caterers will focus on vegetables that hold a firm price. Capsicum is an example of a vegetable whose price fluctuates tremendously.
- Consistency of Australian produce tends be a large problem both in terms of quality and volume of supply
- Shelf life is an issue especially given the need to store product for extended periods or to transport to remote locations such as mining camps.
- In terms of gaps in the market, there needs to be improved methods to transport products around Australia. The packaging at this stage is not satisfactory to enable a longer shelf life for the vegetables.
- Product integrity and food safety is increasingly becoming an issue, especially given the various food poisoning incidents. Major food service caterers are demanding HACCP accredited suppliers.
- Taste is a major issue for high-end outlets. Increasingly they feature origin of food on their menu and seek out boutique suppliers with high quality tasty product.

- Australian growers are obsessed with the perfect looking vegetable and size and are not focussed on flavour. The overall quality and flavour of vegetables in Italy and France is much more superior.

4.6 Opportunities

- There is no doubt that the food service market for semi-prepared and minimally processed vegetables will continue to grow. This is being driven by two factors. The first is the desire to reduce labour costs by buying in ready to serve product. The second is that, like the household market, there is a trend towards crunchier, crisper and fresh vegetables.
- There is likely to be a continuous process of rationalisation in the supply side of the food service sector. As the larger contract catering firms get larger, they will seek to work with larger suppliers who can produce a high quality product and comply with strict food safety and integrity standards on a year round basis. Many of the smaller backyard operators will struggle to survive because of the compliance costs.
- There is therefore an opportunity for large, high efficient, minimally processed vegetable operators utilising new technology in processing and packaging in highly efficient plants close to growing areas.
- There are significant emerging opportunities in food service in the Asian region. Five start hotels, family restaurants and contract caterers are increasingly looking to source prepared and semi-prepared meals close to where they are grown. For example, there is a large Japanese operator located in Melbourne preparing complete frozen meals for use in its family restaurant chain in Japan.