Know-how for Horticulture™

Development of an internationally competitive Eastern Australian cauliflower industry

Clarrie Beckingham
NSW Agriculture

Project Number: VG00037

VG00037

This report is published by Horticulture Australia Ltd to pass on information concerning horticultural research and development undertaken for the vegetable industry.

The research contained in this report was funded by Horticulture Australia Ltd with the financial support of the vegetable industry.

ISBN 0 7341 0383 2

Published and distributed by:
Horticultural Australia Ltd
Level 1
50 Carrington Street
Sydney NSW 2000
Telephone: (02) 8295 2300
Fax: (02) 8295 2399
E-Mail: horticulture@horticulture.com.au

Horticulture Australia

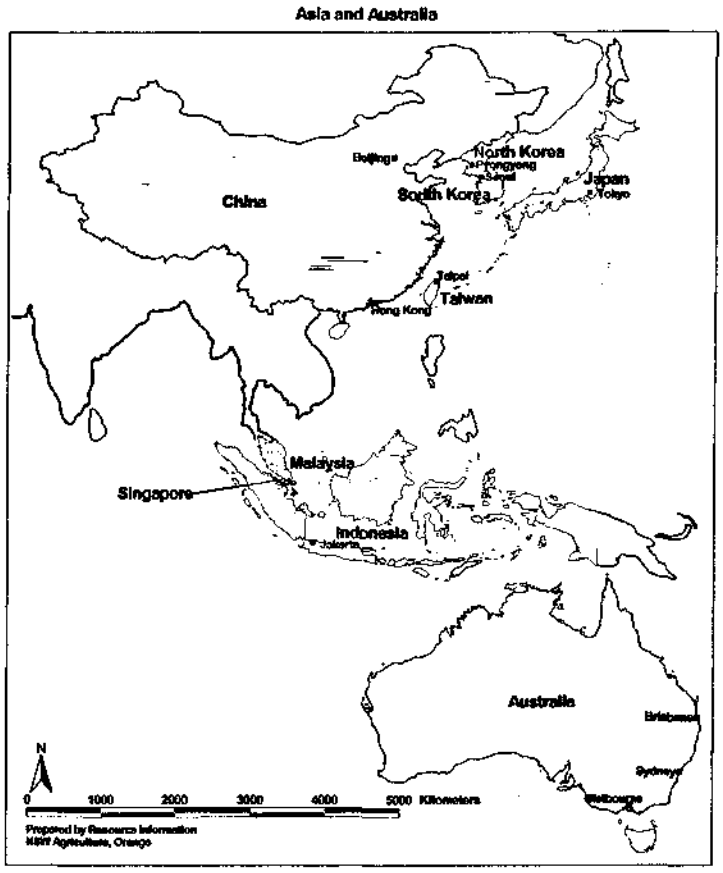
DEVELOPMENT OF AN INTERNATIONALLY COMPETITIVE EASTERN AUSTRALIAN CAULIFLOWER INDUSTRY

Final Report for the Project VG 00037

(31 December 2001)

Compiled by:

Clarrie Beckingham



Horticulture Australia

NSW Agriculture

HORTICULTURE FOR US AND THE WORLD
LVHN

Lachlan Valley Horticultural Network

Development of an Internationally Competitive Eastern Australian Cauliflower Industry.

Final Report for Horticulture Australia Limited

Project: VG 00037

Principal Investigator:

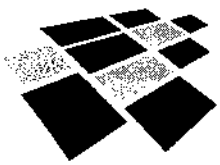
Clarrie Beckingham
Former District Horticulturist (Vegetables)
NSW Agriculture
PO Box 1386
Bathurst NSW 2795
Tel: (02) 6330 1200
Fax: (02) 6332 1458
Email: clarrie.beckingham@agric.nsw.gov.au

Team Members:

Jim Murison
Manager, Agsell
NSW Agriculture
PO Box K220
Haymarket NSW 2000
Tel: (02) 9372 0126
Fax:: (02) 9372 0155
Email: jim.murison@agric.nsw.gov.au

Rod Attwood
Executive Officer
Lachlan Valley Horticultural Network
PO Box 839
Cowra NSW 2794
Tel: (02) 6341 2777
Fax: (02) 6341 2788
Email: lvhn@westserv.net.au

Purpose of Report : To prove that it is feasible to develop an internationally competitive eastern Australian cauliflower industry by using a scoping study to identify new viable markets, consumer and retail requirements and provide trial shipments of product to buyer specifications to test the markets.



Horticulture Australia

NSW Agriculture

Lachlan Valley Horticultural Network

CONTENTS

1. Industry Summary

The primary aim of this 1 year project is to prove that it is feasible to develop an internationally competitive eastern Australian cauliflower industry by using a scoping study to identify new viable markets and grower networks, consumer and retailer requirements and provide trial shipments of product to buyer specification to test export markets.

During the 13 years 1986-1999, NSW and Victoria which are domestic market focussed have suffered respectively a 42% and 58% decline in production.

Domestic per capita consumption has declined by 52% in the same period and the eastern Australian industry needs revitalisation.

This project has identified export and domestic market opportunities and that importantly, there is interest amongst growers to develop exports. A strong viable industry and production base will need export growth for future survival.

Key findings are:

1.1 Export Markets

Profitability studies have shown that the Japanese market has potential to nett return 40c-86c per kg for the window April to September. Importers in Japan are interested in progressing import of Australian cauliflowers. There is a reasonably stable demand for fresh cauliflowers. Competition from China is thought to be a developing issue and over a longer period there could be export opportunities.

Taiwan is also a market with potential as importers were keen to source more product following a trial shipment.

Export infrastructures in NSW are a limiting factor and need to be developed at the production base.

- **Planning:** Careful planning and market research is a priority and should be ongoing. Research should include a market profile A service directory is provided and it is preferable to work with export coordinators who have experience.

Important variables to consider include freight rates, currency fluctuations, competitors, weather etc.

Success will happen by being professional, and building positive customer relationships also beginning to export and building infrastructure, developing an identity (brand), avoiding simple mistakes, timeliness, providing a service and providing big volumes.

- **Networks and Alliances**: The biggest opportunity to bring more growers into exporting and improve their position in an export chain, will be achieved by working together, as networks and/or alliances, to provide consistency of product quality and scale of production. Developing networks or alliances with experienced export coordinators who are already exporting, is a means to getting started smoothly and will provide all the benefits of a coordinated approach to marketing. Two arrangements were initiated, a local Central West NSW network and an alliance between the Lachlan Valley Horticultural Network and Lockyer Valley Export Group to prepare two trial shipments.
- **Cultivar Evaluation:** Possibly the most important decision a grower will have to make is what cultivar to plant. Cultivar performance will vary with district, management time slots etc. Cultivars are the single most important determinant of quality and are critical to meeting customer specifications. Cultivar evaluation needs to be ongoing as breeders continue to release new lines. Cultivars must not be only specification at harvest, but also after 15-21 days of sea freight storage time.

  Buyers need to visit farms to see cultivars and plant breeders also need to be kept informed.
- **Profitability:** Grower profitability to justify development of the farm production base is also a priority and an "electronic model" has been developed to prepare budgets. Profit margins will always be challenged and economies of scale will be an important flow on from networking.
- **Export Chains**: Five different export chains are described which require a coordinator, either a grower, packing shed, export agent, export broker or e-commerce. It is important to know industry structures, members and their roles in each chain.
- **Contracts:** There is an opportunity to develop contractual arrangements as exists in the domestic processing industries. This will build confidence, relationships and improved relationships with the buyers.
- **Direct Sales:** Going direct to supermarkets through a reduced number of intermediaries and europeanisation of supermarkets, offers opportunities; eg Japan – Justco, Taiwan – Walmart, Hong Kong – Park.
- **Specifications:** Asian markets are particular about product quality and specifications. Producing to customer needs requires special care and consideration.
- **Innovation:** There is a need to be aware of and evaluate developments in new innovations and styles of marketing eg E-commerce, video conferencing.
- **Trial Shipments:** Trial shipments will develop awareness and experience of exporting and begin to build customer relationship. There may be a commitment to provide immediate follow up commercial shipments. Alternatively research and plan in advance and commence with commercial shipments that can be gradually built up.
- **Domestic Priorities:** A strong domestic market base will be a priority, before exporting.

- **Customer Relationships:** Golden rules have been developed (Section 7.1.3). There needs to be openness to ensure flow of information from customers through to plant breeders.

There is no substitute for meeting and developing relationships with buyers in a professional manner.

- **Quality Assurance:** A Quality Assurance program must be appropriate for customer and market to deliver the best quality possible. QA will be important in identifying hazards from farm to consumer especially during harvest and post harvest management.
- **Quality Improvement – "handle very carefully":** WA and Victoria researchers have looked at quality improvement associated with storage and handling.
- **Bruising**: is considered to be associated with over-maturity, dehydration and high temperatures. Bruising was directly related to black spots. Cultivars have a possible influence on these quality concerns.
  - **Cooling**: cauliflower field heat must be removed ASAP after harvest, preferably no longer than 12 hours to reach a core temperature of 0-1°C with a relative humidity of 95-100%.
  - **Extended shelf life**: after considerable research, *modified atmosphere, controlled atmosphere, active packaging*, etc, technologies have not been widely adopted, possibly due to customer preferences, limited benefits and grower experiences.
- **Growing the Crop:** Field management must deliver the best possible results to provide uniform maturity and correct harvest window. Seedlings must be healthy and true to type. The first two weeks after planting is critical and management must be good to prevent setbacks to growth.
- **Logistics:** Australia could be considered an experienced producer because of distances to markets, and improved transport systems is an ongoing issue for industry and sea freight councils. For example most ships travel Sydney, Melbourne, Brisbane and serious consideration by NSW growers needs to be given to negotiating favourable road freight, for export out of Brisbane port. Some ships will drop off at, then travel to Melbourne and pick up on second visit to Sydney.
- **Grower Organisation:** An opportunity exists for growers to more actively participate in export development, become more collaborative, develop communications and facilitate exporting. Two options that would need to include production (grower) base representation are:
- Vegetable Export Council of Australia and/or,
- NSW Vegetable Export Council

Future R & D

The trial shipments and networking are significant first steps in developing exports and should be secured and developed further with R & D support for improved marketing of brassicas so as to carefully nurture the opportunities identified.

1.2 Domestic Markets

New marketing and promotion initiatives are recommended to revitalise and secure the importance of cauliflowers and give them a more contemporary place in Australian weekly meals. Retailers can then turn cauliflowers over more quickly than they currently do.

2. Technical Summary

The primary aim of this 1 year project is to prove that it is feasible to develop an internationally competitive eastern Australian cauliflower industry by using a scoping study to identify new viable markets and grower networks, consumer and retailer requirements and provide trial shipments of product to buyer specification to test export markets.

During the 13 years 1986-1999, NSW and Victoria which are domestic market focussed have suffered respectively a 42% and 58% decline in production. Domestic per capita consumption has declined by 52% in the same period.

This project has identified export and domestic market opportunities and that can revitalise the cauliflower industry and importantly, that there is interest amongst growers to develop exports.

Methodology used included desktop market research, export market testing and quality improvement investigation of WA and Vic research.

Key findings are:

1.1 Export Markets

Profitability studies have shown that the Japanese market has a profitable window April to September. Importers in Japan are interested in progressing import of Australian cauliflowers. There is a reasonably stable demand for fresh cauliflowers. Competition from China is thought to be a developing issue and over a longer period China could be an export opportunity.

Taiwan is also a market with potential as importers were keen to source more product following a trial shipment.

Export infrastructures in NSW are a limiting factor and need to be developed at the production base.

Planning: Careful planning and market research should start with a market profile.

- **Networks and Alliances**: The most important opportunity for growers to enter exporting and improve their position in an export chain, will be achieved by working together, as networks and/or alliances, to provide consistency of product quality and scale of production. Developing networks or alliances with experienced export coordinators who are already exporting, is a means to getting started smoothly and will provide all the benefits of a coordinated approach to marketing. Two arrangements were initiated, a local Central West NSW network and an alliance between the Lachlan Valley Horticultural Network and Lockyer Valley Export Group to prepare two trial shipments.

  Profitability: A need to focus on grower profitability to justify development of the farm production base is also a priority and an "electronic model" has been developed to prepare budgets. Economies of scale will be an important result of networking.

- **Export Chains**: Five different export chains are described which require a coordinator, either a grower, packing shed, export agent, export broker or e-commerce. It is important to know industry structures, members and their roles in each chain.

- **Cultivar Evaluation:** Possibly the most important decision a grower will have to make is what cultivar to plant. Cultivar performance will vary with district, management time slots etc. Cultivars would be the single most important determinant of quality and are critical to meeting customer specifications. Cultivar evaluation needs to be ongoing as breeders continue to release new lines. Cultivars must not be only specification at harvest, but also after 15-21 days of sea freight storage time.

  Buyers need to visit farms to see cultivars and plant breeders also need to be kept informed.

- **Direct Sales:** Going direct to supermarkets through a reduced number of intermediaries and europeanisation of supermarkets, offers opportunities; eg Japan – Justco, Taiwan – Walmart, Hong Kong – Park.

- **Specifications:** Asian markets are particular about product quality and specifications. Producing to customer needs requires special care and consideration.

- **Market Access:** Market access issues will also require special attention particularly quarantine, packing, grading and labelling of product.

- **Innovation:** There is a need to be aware of and evaluate developments in new innovations and styles of marketing eg E-commerce, video conferencing.

- **Trial Shipments:** Trial shipments help develop awareness and experience of exporting and begin to build customer relationship. There may be a commitment to provide immediate follow up commercial shipments

- **Domestic Priorities:** A strong domestic market base will be a priority, before exporting.

- **Customer Relationships:** Golden rules have been developed (Section 7.1.3). There needs to be openness to ensure flow of information from customers through to plant breeders.

  Assistance is provided in Australia to find buyers and there is no substitute for meeting and developing relationships with buyers in a professional manner.

- **Quality Assurance:** A Quality Assurance program must be appropriate for customer and market to deliver the best quality possible. QA will be important in identifying hazards from farm to consumer especially during harvest and post harvest management.

- **Quality Improvement:** WA and Victoria researchers have looked at quality improvement associated with storage and handling.
  - **Bruising**: is considered to be associated with over-maturity, dehydration and high temperatures. Bruising was directly related to black spots. Cultivars are a possible influence on these quality concerns.
  - **Cooling**: cauliflower field heat must be removed ASAP after harvest, preferably no longer than 4 hours to reach a core temperature of 0-1°C with a relative humidity of 95-100%.
  - **Extended shelf life**: after considerable research, *modified atmosphere*, *controlled atmosphere*, *active packaging*, etc, technologies have not been widely adopted, possibly due to customer preferences, limited benefits and grower experiences.
- **Growing the Crop:** Field management must deliver the best possible results to provide uniform maturity and correct harvest window for the cultivar grown. Seedlings must be healthy and true to type. The first two weeks after planting is critical and management must be good to prevent setbacks to growth.
- **Logistics:** Australia could be considered an experienced producer because of distances to markets, and improved transport systems is an ongoing issue for industry and sea freight councils. Most ships travel Sydney, Melbourne, Brisbane and NSW industry needs to consider road freight to Brisbane port when sending by sea freight.

Grower Organisation

An opportunity exists for growers to more actively facilitate and participate in export development, by becoming more collaborative, developing communications and facilitate exporting. Two options to include production (grower) base representation are:

- Vegetable Export Council of Australia and/or,
- NSW Vegetable Export Council

Alternatively, improved representation in existing groups (eg freight councils) is recommended.

Future Developments

Small but significant steps have been taken with trial shipments and networking. These gains need to be secured and developed further with R & D support for improved marketing of other brassicas so as to carefully nurture the opportunities identified.

1.2 Domestic Markets

New marketing and promotion initiatives are recommended to revitalise and secure the importance of cauliflowers to consumers and give them a more contemporary place in Australian weekly meals. Retailers can then turn them over more quickly than they currently do.

3. Recommendations

3.1 Export Marketing

Networks, Alliances and Export Infrastructures

Growers should form networks and alliances at regional and national levels, to be able to work together more effectively and develop profitable export opportunities in an increasingly competitive export market place. Suitable export infrastructures must be available at the farm (production base) level.

Cauliflower growers who network can provide the consistency of quality and scale of production over a longer harvest period that is increasingly sought after by customers..

Networking will enhance farm profitability by cost sharing, rationalising operations, provide cost savings past farm gate, improved prices, and reduced transaction costs.

Relationships with buyers will be strengthened, exporting risks can be minimised and domestic markets can remain a priority. There will also be improved negotiating powers for buying and selling, and more effective R & D outcomes.

Profitability

Fair and reasonable profits and prices should be provided to growers. Electronic modelling for gross margins will need to be carefully prepared. Cauliflower export production is demanding, especially field packing for exports.

Cultivar Evaluation

Planned cultivar evaluation programs must be undertaken and ongoing. Cultivars need to be evaluated at the district level since quality can vary with one cultivar between districts. Cultivars are the major determinate of quality and product meeting customer specifications. Cultivar evaluation needs to happen in the field at harvest, during and after long-term freight storage conditions up to 28 days.

Customer Relations

Customers should meet growers on farms and growers should visit customers and markets. Developing business to business and business to customer relationships is a priority.

Quality Assurance

Needs to be implemented and appropriate for the customer. QA will provide the checklist of operations and hazards that need to be considered so as product meets customer specifications especially during post harvest management.

Planning and Market Profiles

Planning at national and farm levels provides the vision and targets necessary for industry revitalisation. Networking provides an opportunity to plan most effectively. Plans should be looked at as often as necessary in order to review and adjust.

Export market profiles will also be necessary before exporting and need to be on going. Coordinators of export chains are critical to success and communication and consultation with stakeholders in the chains needs to thorough.

Trial Shipments

Trial shipments are recommended for the inexperienced to gain a better understanding of the demanding export market requirements and infrastructure needed and also provides the experienced export grower an opportunity for cautious diversification. Customer relationships will develop sensibly and alternative technologies eg, packaging can be evaluated properly.

New products

Major alternative markets eg food services, need to be evaluated by feasibility studies for value added opportunities that are prepacked, processed or semi (fresh) processed.

Marketing Advisors and Grower Involvement in Export Planning

A more focussed approach, and ongoing support needs to be provided by industry and service providers to build the production base including employing/commissioning export market Industry Development facilitators. There exists, a strong emphasis on domestic production and related technologies for R & D programs amongst industry and many service providers. This situation needs to be reversed and far greater emphasis given to export marketing, so that industry can collectively prosper and develop. Growers could be more influential in export development by their representatives meeting and planning as a specialised export group at a state and/or national level.

Further Research

A three to four year project on improved marketing of brassicas should be initiated through HAL to consolidate and nurture the opportunities identified in this scoping study, revitalise the eastern Australian cauliflower industry and

secure the small but significant initiatives and interest already shown by growers. A desire by growers not to lose the benefits of market development to date also underpins the need for ongoing R & D.

3.2 Domestic Markets

A range of recommendations follow. The opportunities for improved domestic marketing is significant.

Retailers, wholesalers and food editors have suggested that the cauliflower has an old fashioned image and needs 'smartening up'.

Convenience is the single most overriding consumer food trend and products could be developed to satisfy this need, eg, small cauliflowers, florets in punnets. Presentation needs to be smart.

Point of sale information for the under 34 year olds is needed and will show them how to select a good cauliflower.

Cauliflowers need to be positioned more strongly as a stir fry vegetable as over 90% of households own a wok.

Cauliflowers need to be talked up in terms of nutrition, as consumers over 20 years old are increasingly interested in nutrition.

Cauliflower recipes need to be featured more often in women and lifestyle magazines.

Consumers need re-educating and inspiration on how to use cauliflowers, eg, recipe cards and brochures.

Industry needs to develop public relations activities with food writers and the food service industry and undertake promotions with retailers to reinvigorate interest in cauliflowers and reposition them as a favourite vegetable.

Opportunities exist in working with Meat and Livestock Australia to extend the use of cauliflower and also companies who make convenience products like summer sauces.

Sydney Markets retailer support program needs to include cauliflower growers.

1 kg all white 'balded' cauliflower before and after wrapping

4. Acknowledgments and Contact Directory on Industry Structures

The support and cooperation of the following is gratefully acknowledged. The people listed have very graciously offered valued advice and assistance that has ensured the projects success.

Industry Structure: The people and organisations listed provide an important introduction to understanding of industry structures associated with export and domestic marketing.

Note: The information is brief for contacts listed and is related to activities associated with the scoping study. Representatives should be consulted to clarify full services offered so that the contact directory can be developed further.

Word Processing: Suzanne Webb, **NSW Agriculture**
Freda Garside, **NSW Agriculture**
Colleen Page, **NSW Agriculture**
Technical Assistance: Adrian Lynch, **NSW Agriculture**

NETWORKS AND ALLIANCES

Lachlan Valley Horticultural Network PO Box 839 COWRA NSW 2794 Tel: 02 6341 2777 Fax: 02 6341 2788	Contact: Rod Attwood Position: Executive Officer	
Queensland Fruit & Vegetable Growers PO Box 19 BRISBANE MARKET QLD 4106 Tel: 07 3213 2444 Fax: 07 3213 2480	Contact: Shane Comiskey Position: Agribusiness Consultant Contact: Noel Harvey Position: Executive Officer	

EXPORT MARKET ADVICE AND RESEARCH

Don Smith Horticulture Pty Ltd 4/172 pacific Highway NORTH SYDNEY NSW 2060 Tel: 02 9922 5777 Fax: 02 9922 5999	Contact: Don Smith Position: Managing Director	
NSW Agriculture – Agsell Level 17 157 Liverpool Street SYDNEY NSW 2000 Tel: 02 9372 0126 Fax: 02 9372 0155	Contact: Jim Murison Position: Manager	
Austrade Level 24 201 Kent Street SYDNEY NSW 2000 Tel: 02 9390 2019 Fax: 02 9390 2052	Contact: John Dixon Position: Senior Export Advisor	
Supermarkets to Asia Locked Bag 4911 KINGSTON ACT 2604 Tel: 02 6270 8800		

Australian Horticultural Corporation, now Horticulture Australia Ltd Tel: 02 8295 2300	Contact: James Kallaway	
NSW Dept State & Regional Development 235 Russell Street BATHURST NSW 2795 Tel: 02 6332 1129	Contact: Amit Misra	

CAULIFLOWER EXPORT TRIAL SHIPMENT

No. 1 Central West NSW Network And Don Smith Horticulture Pty Ltd	Contact: - George Smith, Bathurst - Bert Bravenboer, Bathurst - John Willott, Bathurst - Vince Galea, Cowra	
No. 2 Interstate Alliance And Mulgowie Farming Company	Contact: - Rod Attwood, Cowra - Vince Galea, Cowra - Rod Emerick, Gatton	

MARKET ACCESS

AQIS Po Box 782 COWRA NSW 2794 Tel/Fax: 02 6342 1078	Contact: Dennis Stevens	

ECONOMICS AND ELECTRONIC MODEL

Dick Benson & Associates 6 Gemini Place ORANGE NSW 2800 Tel: 02 6372 7317 Fax: 02 7472 7650	Contact: Dick Benson Position: Management Consultant	

EXPORT COUNCILS AND INSTITUTE

Seafreight Council of NSW GPO Box 4280 SYDNEY NSW 2001 Tel: 02 9350 8116	Contact: Chris De Jong Position: Executive Officer	
Airfreight Council of NSW Tel: 02 9350 8117	Contact: Malcolm Bush Position: Executive Officer	

Australian Institute of Export Level 12 83 Clarence Street SYDNEY NSW 2000 Tel: 02 9350 8170		

INTERNATIONAL SEAFREIGHT SERVICES

Maersk Shipping Level 25 264/278 George Street SYDNEY NSW 2000 Tel: 02 9251 8155	Contact: Position: National Reefer Manager	Specialising: Containers and Sea vessel services
IMC Seafast Pty Ltd 2 Weston Street PARKES NSW 2870 Tel: 02 6863 8830 Fax: 02 6863 8833 Email: seafast@ix.net.au	Contact: Richard Guise Position: Manager Mobile: 0428 638 839 Contact: Leisel Walters Position: Logistics Support	Specialising: Perishable Seafreight (Internation Seafreight) (Inland Consolidating) (Cool Chain Management) (Refrigerated Road Transport)
Port Authorities	Gerry McCormick Sydney: (02) 9296 4999 Dennis d,Cotta Brisbane (07) 3258 4888 David Rose Melbourne: (03) 9628 7555	Sepcialising: Interstate Port Services

INTERNATIONAL AIRFREIGHT SERVICES

Vision International International Forwarding Unit 14/33 Maddox Street ALEXANDRIA NSW 2015 Tel: 02 9519 2825 Fax: 02 9519 2836	Contact: Gary Silis Position: Manager NSW Mobile: 0409 011 956	Specialising: Airfreight Seafreight
IMC Airfast Pty Ltd 2 Weston Street PARKES NSW 2870 Tel: 02 6863 8830 Fax: 02 6863 8833 Email: airfast@ix.net.au	Contact: Craig Burge Position: Manager Mobile: 0429 638 800 Contact: Sarah Priest Position: Logistics Support	Specialising: Perishable Airfreight (International Air Express) (Inland Consolidating) (Cool Chain Management) (Refrigerated Road Transport)
CT Freight Pty Ltd PO Box 88 MASCOT NSW 2020 Tel: 02 8337 8823 Fax: 02 9669 2335	Contact: Wade Bollard Position: NSW Manager	Specialising: Perishable Airfreight

LOGISTICS CONSULTING

Inland Marketing Corp. 302 Clarinda Street PARKES NSW 2870 Tel: 02 6863 8800 Fax: 02 6863 8822 Email: info@inlandmarketing.com.au	Contact: David Sutton Position: General Manager Logistics Mobile 0410 539 964 Email: david.sutton@inlandmarketing.com.au	Specialising: Airfreight Seafreight Road Freight Rail Freight Warehousing Packing, Distribution

DOMESTIC ROAD TRANSPORT SERVICES

IMC Seafast 2 Weston Street PARKES NSW 2870 Tel: 02 6863 8830 Fax: 02 6863 8833 Email: seafast@ix.net.au	Contact: Richard Guise Position: Manager Mobile: 0410 539 964 Contact: Leisel Walters Position: Logistics Support	Specialising: Seafreight Road Freight Rail Freight, Warehousing Packing Distribution
IMC Airfast Pty Ltd 2 Weston Street PARKES NSW 2870 Tel: 02 6863 8830 Fax: 02 6863 8833 Email: airfast@ix.net.au	Contact: Craig Burge Position: Manager Mobile: 0429 638 800 Contact: Sarah Priest Position: Logistics Support	Specialising: Warehousing Packing Distribution (Refrigerated Road Transport)

INLAND RAIL SERVICES

IMC Seafast 2 Weston Street PARKES NSW 2870 Tel: 02 6863 8830 Fax: 02 6863 8833 Email: seafast@ix.net.au	Contact: Richard Guise Position: Manager Mobile: 0410 539 964	Specialising: Seafreight Road Freight Rail Freight Warehousing Packing Distribution

CUSTOMS

Customs Information Centre Tel: 1300 363 263		

EXPORT FINANCE AND INSURANCE CORPORATION (EFIC)

Tel: 1800 685 107		

PACKAGING

Amcor Fibre Packaging Orange Tel: 02 6362 1339 Flemington Tel: 02 9763 1494	Contact: Peter Keegan	
Visy Board Pty Ltd 19 Towac Raod ORANGE NSW 2800 Tel: 02 6362 3517		

RESEARCH COLLABORATION

(i) Post Harvest IHD Dept Natural Resources and Environment KNOXFIELD VIC Tel: 03 9210 9222	Contacts: Post Harvest Technology Team - Ian Wilkinson (Cool Chain, Storage & Quality Improvement) - Bruce Tomkins (Cool Chain, Storage & Quality Improvement) - John Lopresti (Logistics)	
(ii) Australian Food Industry Science Centre Tel: 02 9490 8333	Contact: Dr Stephen Morris Position: Principle Research Scientist	

(iii) NSW Agriculture Horticultural Research & Advisory Station Locked Bag 26 GOSFORD NSW 2250 Tel: 02 4381 9000	Contact: Andrew Jessup Position: Research Horticulturist	
(iv) Agriculture WA Manjimup District Office 57 Ruse Street MANJIMUP WA 6258 Tel: 08 9777 0000	Contact: Rachel Lancaster Position: Research Officer (Vegetables)	
(v) Bunbury Regional Office PO Box 1231 BUNBURY WA 6231 Tel: 08 9780 6196	Contact: Vynka McVeigh Position: Research Officer (Vegetables)	

DOMESTIC MARKET RESEARCH

Susan G Dodd 17 Lamorna Avenue BEECROFT NSW 2119 Tel: 02 9871 2520	Contact: Susan Dodd Position: Marketing Consultant (Fresh Produce)	
A V Nielsen 11 Talavera Road MACQUARIE PARK NSW 2113 Tel: 02 8873 7000	Contact: Lyndell Rouzaire Position: Client Service Executive	

MARKET RESEARCH SOCIETY OF AUSTRALIA

Tel: 02 9955 4830		

5. Introduction

5.1 Background

Domestic cauliflower per capita consumption has fallen by 52% during the period 1986-1999. At the same time, Australian production fell 25% and major east coast states NSW and Vic., with strong domestic market based declined by 42% and 58% respectively. Western Australia however, with a strong export base (more than 80% of production), has recorded a 21% increase in production and a local value of production that is 2-3 times that of NSW and Victoria. LVP per hectare for Western Australia is $16,003 whilst eastern states average $6364 per hectare.

Domestically, the cauliflower has a poor or fading image. On farms, innovation has been slowing.

The Eastern Australian industry requires revitalisation. This revitalisation needs to be market driven, and market opportunities analysed. Export market development will be a critical measure of future industry success and will involve product development and the building of strategic relationships with buyers.

The industries would also benefit from improved supply networking and communication between growers in major states and with Western Australia and Victoria., researchers and "research to practice" strategy, eg WA quality improvement research.

AIM OF RESEARCH: the primary aim of this project is to prove that it is feasible to develop an internationally competitive eastern Australian cauliflower industry by using a scoping study to identify new variable markets, grower networks, consumer and retailer requirements and provide trial shipments of product to buyer specifications to test the markets.

The likely impact of the project results include

- Viable new export markets identified for the eastern Australian cauliflower industries,
- Domestic market retailer and consumer requirements identified and cauliflower identified by consumers as a modern contemporary vegetable,
- A grower network and improved export infrasturctures to provide continuous supply and industries focussed on expanding viable markets and
- Improved quality control and management.

This project has linked to Western Australian and Victorian research management programs.

The first trial shipment for Asia ready to leave from Bathurst

5.2 Industry Statistics

Australian Cauliflower – Industry Summary Beginning 1986: Source ABS.

Table 1: Australian Production by State (tonnes) from 1986

	NSW	VIC	QLD	WA	SA	TAS	NT	ACT	TOTAL
1986	20702	39581	9452	17409	12676	3876	-	-	103767
1999	11908	16306	14997	21046	4315	4861	-	-	77432
% Change	-42	-58	+58	+21	-66	+25	-	-	-25
1996	10,743	20780	9290	19200	624	4415	-	-	71052
% Change	-48	-48	-2	+10	-48	+13	-	-	-32

Table 2: Australian Production per hectare by State (tonnes)

	NSW	VIC	QLD	WA	SA	TAS	TOTAL AUSTRALIAN PRODUCTION (tonnes)		
1999 (ha)	697	1100	614	1306	181	304	**1999**	**1998**	**1997**
Tonnes/ha	17.1	14.8	24.4	16.1	23.9	16.0	4202	4065	3997
1986 /(ha)	565	1249	395	1191	258	09	**1986**	**1987**	**1988**
Tonnes/ha	19	17	24	16	27	14	3967	3674	3407

Table 3: Australian Local Value of Production $M (Value at farmgate obtained by deducting marketing costs from gross value of goods).

	NSW	VIC	QLD	WA	SA	TAS	NT	ACT	AUST
1999	3.6	7.8	4.2	20.9	1.9	1.9	-	-	40.3
$/ha (000)	5164	7090	6840	16003	10497	6250	-	-	9590
1986	1.7	9.1	2.2	7.9	3.4	1.3	-	-	25.4
$/ha (000)	3008	7285	5569	6633	13178	4207	-	-	6402

Table 4: Australian gross value of production $M (Value placed on recorded production of the wholesale price realised in the market)

	NSW	VIC	QLD	WA	SA	TAS	NT	ACT	AUST
1999	6.4	10.8	8.0	25.3	2.7	2.4	-	-	55.6
$/ha (000)	9182	9818	13029	19372	14917	7894	-	-	13231
1986	4.1	11.4	3.2	8.8	3.7	1.3	-	-	32.5
$/ha (000)	7256	9127	8101	7388	14341	4207	-	-	8192

Table 5: Gross Unit Value $/tonne 1999

	NSW	VIC	QLD	WA	SA	TAS	NT	ACT	AUST
$/tonne	541	659	530	1200	624	499	-	-	756

Key points for each table

1 - Australian production increasing since 1996.
- Major increase in production by Queensland.
- Further decline in Victoria and South Australia.
- Continued growth in Western Australia, Tasmania and New South Wales.

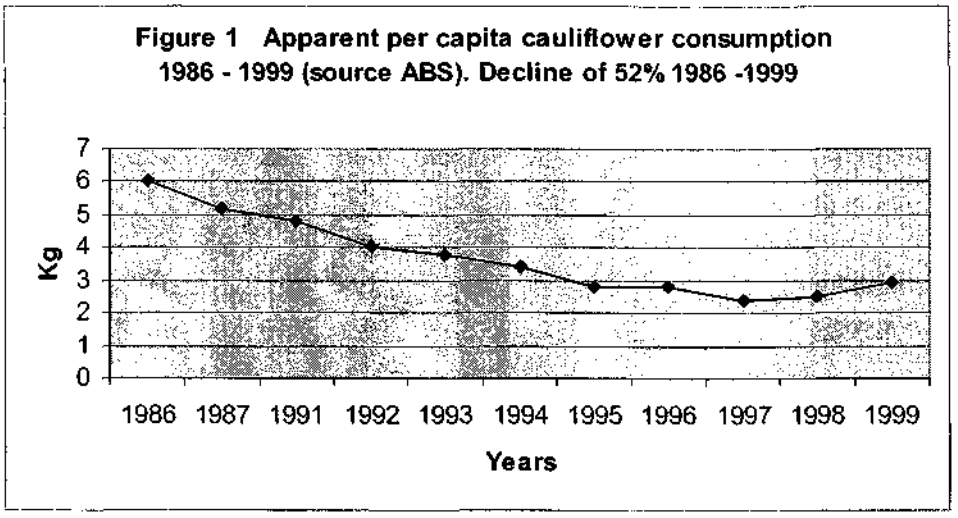
2 - Planted area in Australia slowly rising since 1997
- Queensland production per hectare remains high.

3 - Dominant position of Western Australia which is export focussed

- Poor performance of New South Wales

4 - Dominant position of Western Australia which is export focussed
- Poor performance of New South Wales

5 - Significantly higher value of Western Australia's product.



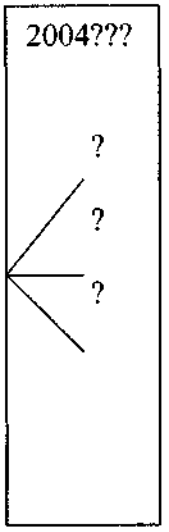


Table 6: Export performance

Destination	Malaysia	Singapore	Hong Kong	Taiwan	Japan	All Countries	
						Total Tonnes	Value $M
1997 %	57	34	5	-	-	19357	25.2
1998 %	55	37	4	-	-	17318	22.5

Table 7:

	Production Ranking	Export Value Ranking
1986	5	>6
1996	11	6

Table 8: Cauliflower intake at Sydney Markets – Tonnes Source: Flemington Market Reporting Service (now Sydney Market Reporting Service)

1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	% Change
22613	22432	34523	23739	27813	31106	34408	18920	16974	20476	-10

5.3 Literature Review

5.3.1 Export Marketing Product Specification and Markets

Service providers from private enterprise and government offer a wide range of information. Austrade provides commissioned information and other free information on a web site and in printed handouts. Other sources of printed information include supermarkets to Asia, export agents, freight councils, freight forwarders, freight services, NSW Agriculture, Agsell and QAIS.

5.3.2 Quality Management

McVeigh et al (1998) offer a wide range of recommendations for optimum quality control of export cauliflowers from harvesting before curds show signs of over-maturity, through careful handling to prevent bruising, black spot control and cool chain management Lopresto et al (2000) identified appropriate handling practices from harvest to export.

5.3.3 Cool Chain Management

Palmer and Dahlenurg (2000) highlight cooling management required once cauliflowers have been harvested to ensure consumers are satisfied with their purchase.

5.3.4 Extended Shelf Life

Wilkinson et al (1994) evaluated modified atmosphere packaging for extended self life when using sea freight and carton liners. Carrier Transicold (1999) provide recommendations for O_2/CO_2, temperature and relative humidity levels for sea freight.

5.3.5 Cultivars

Lancaster et al (2001) have undertaken cultivar evaluation from harvest to 15 days later under cool storage at recommended temperature. Cultivar quality at harvest must be maintained for an extended time if sending by sea freight.

6. Materials and Method

Overview

- A situation analysis was prepared (May 1998) detailing size of industry and location, constraints to development and access, Research and Development needed and other brassica projects.
- Specialist team members were identified and consulted.
- Linkages were developed with Western Australia and Knoxfield (Vic) researchers beginning with consultation and planning meeting in August 2000.

  Project review and consultation with Brassica group and SA IDO (Brassica) was undertaken.

  Action plans were prepared.
- Specific focus research areas are:

Marketing

- Desktop research on new export markets, overseas' retail linkages; profiles and investigation undertaken with support of NSW Agriculture's Agsell, Austrade and export agents. Product specifications prepared.
- Subsequent export market testing with trial samples from selected grower **network**[1] sites in NSW.
- Identify constraints, market access issues, develop producer confidence in export marketing and build dialogue with buyers.
- An **alliance**[2] of growers from NSW and Qld to provide continuous supply for export will be evaluated.
- Investigate and document economics.
- Investigate domestic market, consumer and retailer requirements by small survey.

Quality improvement

- WA and NSW Genetic improvement program (Cultivar evaluation) will be reviewed to provide product to buyer specifications, determine suitability for export market and the cultural requirements to produce to specifications.
- Improved quality research from WA to be promoted to industry.
- Investigate MAP packaging research in Victoria, for sea freight possibilities.

Research to practice

- Extension program will include consultation with Alison Anderson, NSW IDO, to ensure communication and technology transfer strategy is appropriate ie group activity (workshops), publicity, newsletter (NSW IDO) and final report.

[1] **Network:** people or system connected; establish contact with others to supply

[2] **Alliance:** relationship resulting from shared interests. Agree to Cooperate

7. Results

7.1 Export Marketing- Fresh Cauliflower

7.1.0 Plan Plan Plan – Networks and Alliances

Export marketing is a very complex business compared to domestic marketing. Initially the challenges seem daunting and the faint hearted may be easily discouraged. However, there is a wealth of experience and considerable business support to call upon for support. The benefits of exporting can manifest themselves in a number of ways;

- greater wealth and profits,
- cash flow spread more widely throughout the year,
- skills development,
- job opportunities,
- an improvement in company/management standards and products and
- improved planning at all levels of the farm business.

Networks and Alliances

These two options offer the greatest potential for developing and securing export business. Growers can do it on their own or network with others. The latter is the preferred way to go as it is obvious major customers are (as always, but increasingly so) interested in consistency of supply and quality and in large quantities. In addition, competitors can deliver or are gearing up to deliver accordingly. Unless the cauliflower business is a major company or a multinational, for most growers, networking and developing alliances will be necessary. Production can be shared, risks minimised and harvest time slots spread to advantage.

To avoid disappointment, thorough planning is essential and remember that "failure to plan is to plan to fail".

Austrade in their handbook "Steps to Successful Exporting" have identified the following considerations when developing an export plan.

Export Planning

- Information on overseas markets (level of economic activity, political, financial, legal, culture, business custom and practices.
- Systematic analysis
- Commitment
- Preparing product/market profiles
- SWOT analysis
- Visiting the market.

Preparing a marketing plan

- Product decisions
- Pricing decisions
- Distribution
- Promotion

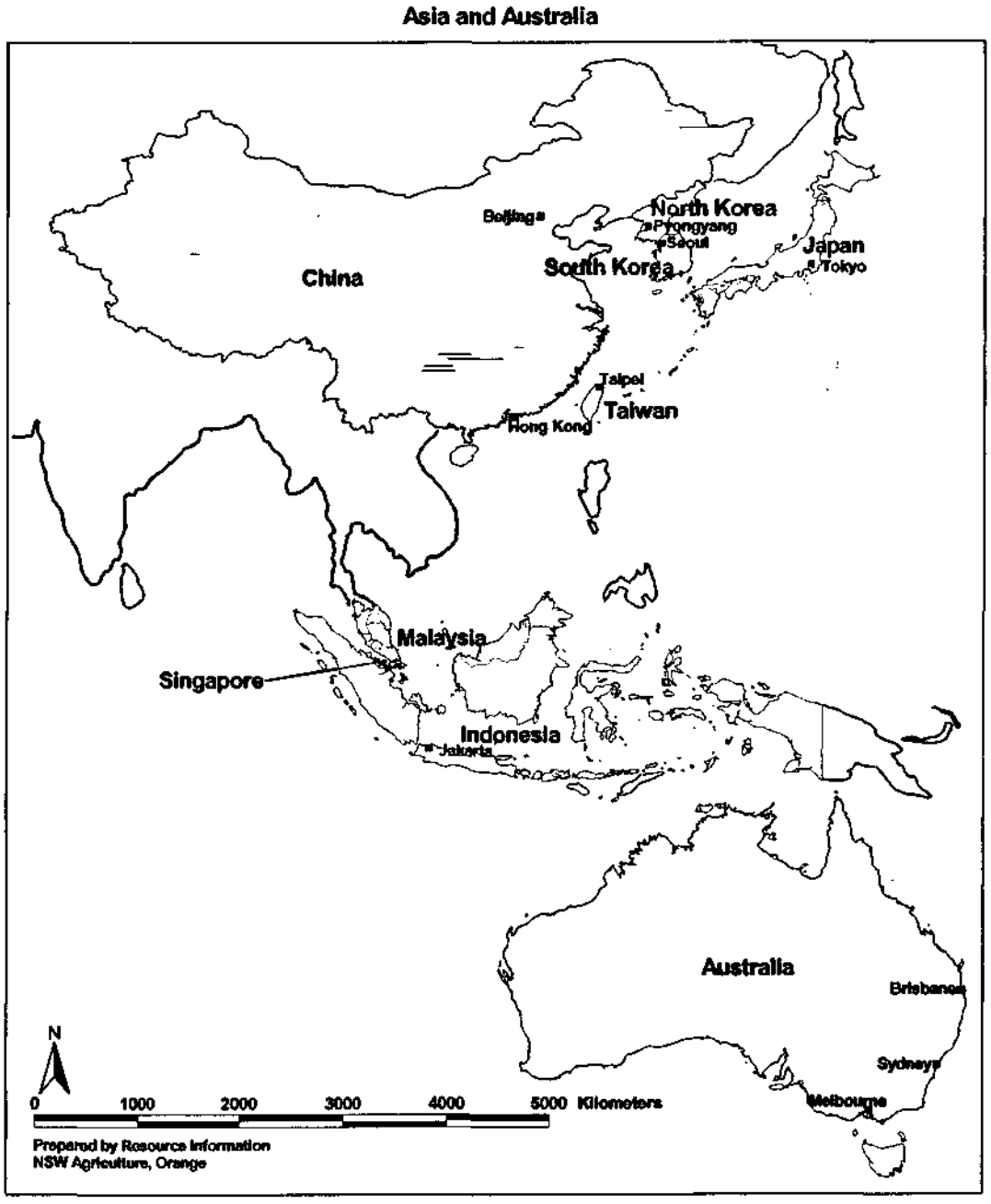
When thinking of export development a wide range of assistance is available including the provided by Austrade (see section 4 and 8 of this report). Two options are

i) Do your own planning and this may take time or,

ii) Commission the experienced to fast track the task.

It is important to know industry structures and work with those involved.

7.1.1 The Export Market Place



7.1.2 The Export Chain

The flow chart following briefly describes the export chains or pathways and the organisation flow of business from the farm to the retailer ie. by implication, industry structures. What is common to all chains is the need for a coordinator. The grower is at one end of each chain and the biggest opportunity for growers is to move further up a chain by building scale of operation, developing alliances and networks.

Some clarification follows for those involved in coordinating

i. Export broker – involves considerable trust and a broker is paid a commission or a flat fee to move product.

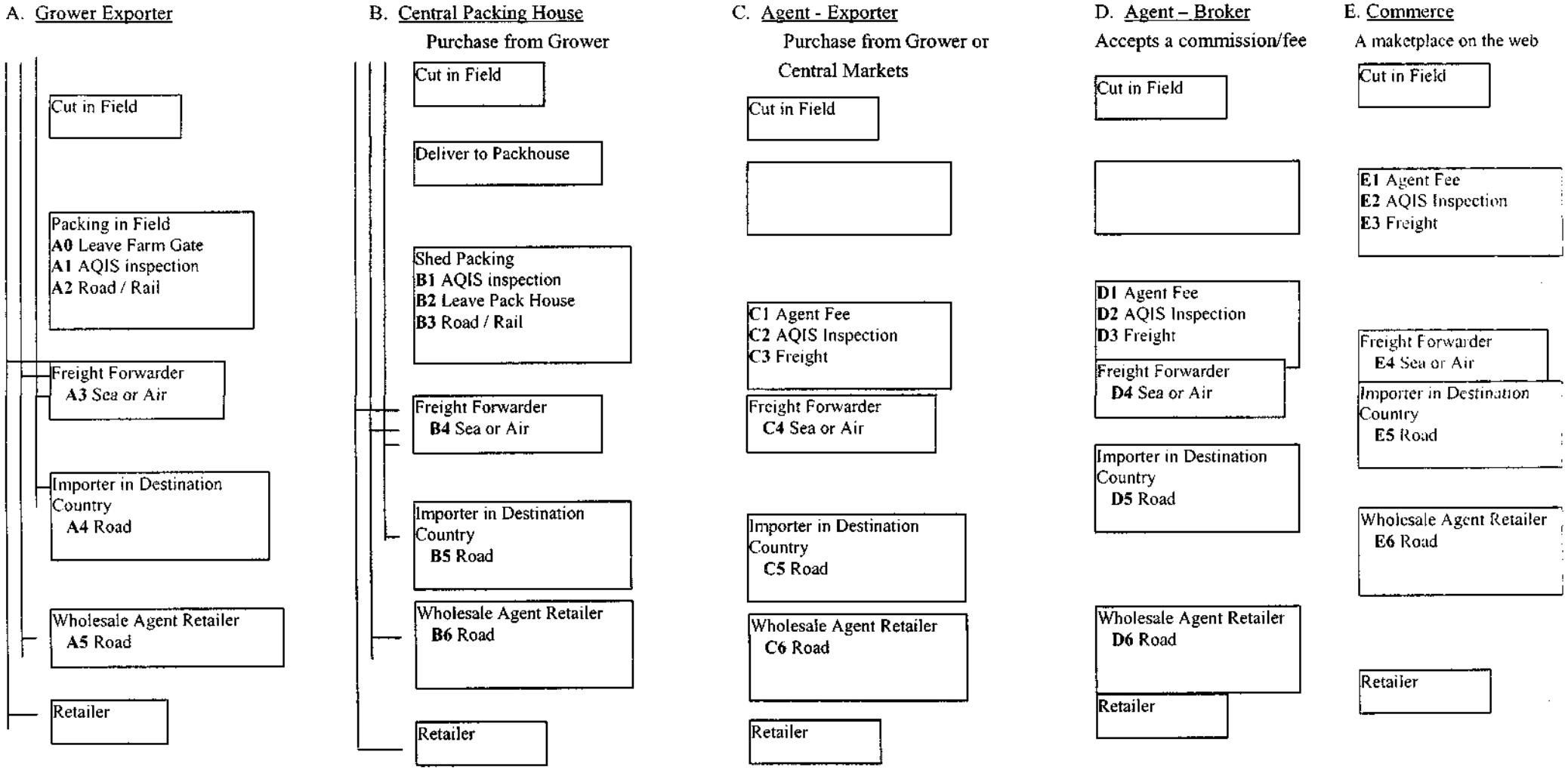
ii. Export Agent – takes ownership of product

iii. E-commerce – in recent years increasing use of electronic commerce (a marketplace on the web) has created interest. A fully commercial E-commerce operation is like an online auction place with buyers and sellers online and there are a number of businesses already operating. A commission is charged depending on turnover volume.

Knowing someone and trusting someone is important and communication is critical. Whilst business to business arrangements are common, business to consumer is more desirable.

E Commerce provides the ability to handle a lot of information efficiently, direct links are formed, a "complete" business service is offered. Farmers can see right away prices, and everything is methodically handled

7.1.2 FIGURE 1 - THE EXPORT CHAINS - Exporting By Sea or Air from New South Wales; a snapshot of industry structures



♦ **Typical operations for Product Exported to Taiwan from Bathurst in May 2001. (Information has also been provided below by Ian Wilkinson, IHD Knoxfield)**

1. Pre-harvest visits to assess crops **2.** Harvest in field, trim, wrap, pack **3.** Transport to cool room **4.** Weigh and stamp cartons with weight and growers name and address
5. Forced air cooling to recommended 0 – 2°C **6.** AQIS inspection **7.** Load refrigerated truck **8.**Transport cartons to freight forwarder **9.** Load container **10.** Hold container at airport
11. Transfer container to aircraft **12.** Air transport **13.**Transfer container for inspection **14.** Hold container at inspection **15.** Unload container and transfer to importer coolstore **16.** Cool storage at importer **17.** Transfer to sales outlet
18. Cool storage at sales outlet **19.** Sales outlet display

Wrapped and packed cauliflowers for export to Asia

7.1.3 The Golden Rules of Cauliflower Customer Relationships

Plan Plan Plan. Failure to plan is to plan to fail!

- Build business by research of the customers
    - Customer specifications must be followed exactly
    - Have a good understanding of the importing countries requirements
    - Provide trial shipment of product to test your capability and customer response
- Build networks and alliances to provide product and scale of operation
- Logistics and communication must be good
- Provide Consistency of :
    - Supply
    - Quality
    - Packaging
    - Size and price
- Have an export focus
- Develop an identity (Brand) and appropriate public relations to promote the brand and its association with high quality
- Build relationship with customers – have them visit and reciprocate
- Build customer confidence
    - Watch product specifications
    - Avoid simple mistakes
    - Attend to detail (eg airflow in containers to prevent freezing or heating)
- Packaging needs to suit customer preferences; eg preference for 2 piece non waxed 58 L cardboard)
- Be cost conscious
- Be quality conscious
    - Handle carefully as for eggs
    - Do not drop cauliflowers
    - Avoid bruising when handling cauliflowers
    - Maintain cool chain
    - Only pack to specifications (white, dense)
    - Follow quarantine protocols
- Cultivars must be suitable for timeslot and storage.

7.1.4 Market profiles

This project was provided with an opportunity to investigate new markets, in particular Japan. The traditional markets have been Malaysia, Singapore and Hong Kong where Chinese peoples are keen customers of fresh cauliflowers.

Japan is an important importer of vegetables and the USA and China already export reasonable quantities of cauliflowers to Japan.

The market profile is an important planning process. The issues listed below were considered important for preparing market profiles for Japan, Taiwan and Hong Kong. Austrade, AQIS and Supermarkets to Asia were consulted and provided much of the detail. Valuable assistance was also provided by Jim Murison from NSW Agriculture's Agsell marketing service and Don Smith from Don Smith Produce.

Export Market Profile – proforma for GV00037, May 2001

Countries Domestic Details

- CIF and wholesale prices/currency
- Importers/traders/retailers/market agents
- Any exports
- Cauliflower specifications

Logistics and transport

- Packaging
- Transport –method times
- Storage requirements

Market access

- Tariffs/taxes
- Quarantine issues
- Customs

Situation analysis

- Customer and consumer trends
- Customer and consumer details
- Customer and consumer needs

Business support

- Funding
- Information

Australia

- Export chains

Economics

- Exchange rates
- Gross margin – profitability
- Insurance
- Letter of credit

JAPAN – DOMESTIC MARKET

A) Consumption Characteristics

Source: Austrade

Produce purchases

According to the Survey on Household Expenditures, 56% of households routinely buy produce every two or three days, 18% almost daily, 14% once a week. and 11% when needed. This indicates that three in four consumers buy produce frequently.

The most popular locations to purchase produce are supermarkets at 55%, fruit and vegetable stores at 24%, and coop stores at 12%. These are followed by direct buying from producers and from organic growers. The survey also asked for the primary reason in choosing the particular type of retail outlet. The reasons included the convenience of supermarkets which offer many items, lower prices of general retail stores, and the safety of coops. The reasons cited overall were price 41%, availability of items other than produce 34%, freshness 28%, close proxinity 25%, good quality 18%, and safety (no or low pesticide residue) 15%.

Consumers want produce sellers to provide:

Freshness:	44%
Wide selection with unusual size items:	41%
Less packaging and wrapping materials such as styrofoam trays:	27%
Good quality produce:	22%
Lower prices:	19%

As the survey indicates, the most desired quality is freshness.

Vegetables are an essential part of the Japanese diet. They are eaten in various styles such as fresh, stewed, stir-fried and pickled.

Most Japanese are fussy about taste. When selecting vegetables, the Japanese tend to choose the freshest ones available. This fondness of freshness may stem in part from both the cultural preoccupation with cleanliness and the high level of fresh produce consumption compared with other countries.

Consumers pay close attention to shape, colour, brightness, damage and dirt. They have concerns over produce safety as it relates to pesticide use. This was a finding in the Survey on Household Expenditures.

Not many Japanese buy produce in large quantities at a single time. Instead, they buy small amounts due to concerns over freshness, limited storage space, and the close proximity of stores. In Japan, there are always fruit and vegetable stores near commuter railway stations and supermarkets are often located in close proximity to the stations. Moreover, produce peddlers make routine stops at housing complexes. Thus sheer convenience enables frequent buying.

Historically, produce was imported to augment low supplies during the off seasons or in cases of poor harvests. Today, there are additional reasons for importing produce, including lower prices, the yen's strength and popularity of Western cuisine that require certain imported produce not cultivated in Japan.

Adverse weather of the summer of 1998 resulted in a mass distribution of imported produce, an event that accelerated the acceptance of imports among Japanese consumers. Now, over half the consumers in metropolitan areas have knowingly purchased imported produce, and continue to do so because of the lower prices. As a case in point, according to a survey conducted by the Ministry of Agriculture, Forestry and Fisheries in 1997, imported broccoli was selling for 20% less in Tokyo and 50% less in Osaka than locally produced broccoli. The chief reason cited by consumers who avoid imports was their uncertainty over safety.

B) Production and Import Trends

In 1997, 10.7 million tons of domestically grown produce were shipped inside Japan (based on wholesale figures). In the same year, 600 000 tonnes of produce were imported, a volume representing only 5.3% of the 11.3 million tonne market.

After peaking at 12.2 million tonnes in 1987, produce volumes have been slowly decreasing. Japanese daikon (radish) accounts for the greatest volume, followed by cabbages and onions. These three combined account for about one third of produce shipments.

Imports amounted to 740 000 tonnes in 1995, but decreased somewhat in 1996 and 1997. The decrease was likely caused by the downward movement in the yen" value in 1996 and 1997 after appreciating in 1995. Still, the long term trend since 1993 has seen the volume of imports increasing. By item, onions and pumpkins combined account for about 50% of the imported produce volume. On the other hand, a far greater variety of produce is being imported than before. In the cases of garlic and broccoli, imports are doing better than their domestic counterparts.

Produce imports as a whole are projected to increase and continue to do well for the following reasons: First the number of domestic producers is declining due to the aging of the population, and this, in turn, will lower domestic production.

Second, technological advances will further extend the freshness period for produce. Finally, direct commercial importing will increase.

C) Cauliflower Prices

1 Table 9 - Japanese Imports 2000

	China			USA		
	kg	Value	Price	Kg	Value	Price/kg
Jan	15 410	1 386				
Feb	57 000	5 456	95.72			
Mar						
Apr				3 764	469	124.60
May				6 132	815	132.9
June				2 358	292	123.8
July				8 518	1 302	152.8
August				36 353	5 364	147.6
Sept				45 364	5 623	123.9
Oct	1 900	245	128.95	9 006	1 411	156.7
Nov	34 073	3 016	88.52	2 540	409	161.1
Dec	290 593	21 898	75.36	3 798	622	163.8
Total	398 976	32 001	80.21	117 833	16 307	138.4

NB: Value in CIF Yen 1000. Price in CIF Yen per kg. Yen / AUD (June 2001)

Source: Customs and Tariff Bureau, Ministry of Finance Japan

2 Table 10 -Tokyo Wholesale Prices and Supply of Cauliflowers

Source: Vegetable Edition, 2000 Year Book of Tokyo Central Wholesale Markets

1996	J	F	M	A	M	J	J	A	S	O	N	D
Tonnes	413	541	755	400	431	230	144	110	183	657	748	549
Yen/kg	218	225	167	244	149	201	317	431	240	136	110	185
2000					window of opportunity for Australian exports							
Tonnes	690	519	440	382	370	219	120	117	158	298	520	459
Yen/kg	142	179	198	178	148	204	290	341	256	194	158	193

3 Table 11 - Japanese Imports, monthly 1997-1999

Source: Customs and Tariff Bureau, Ministry of Finance, Japan (Quantities in 1000kg)

1996	J	F	M	A	M	J	J	A	S	O	N	D	Av. Price/kg CIF
China	9.0												175
USA		2.5	1.3	3.2	5.1	5.1	2.1	-	16.5	17.3	14.5	13.3	216
Aust													
1999													
China		10.2	8.3										85
USA	9.5	10.1	6.4	5.1	5.1	6.4	7.3	15.4	15.2	16.6	13.3	3.5	181
Aust													

Table 12

	1995		1996		1998	
	Kg	CIF	Kg	CIF	Kg	CIF
China	-	-	-	-	52.3	117
USA	17.9	291	91.7	217	126.3	220
Aust	5.1	161	7.6	294	2.6	274

D) Logistics And Transport

1 Distribution Channels

Basically, there are two distribution channels for domestic produce: one through wholesale markets (the general route), and the other without going through wholesale markets (the direct route).

Regarding the general route, 80% or more of domestic produce is distributed through the network of producers to distributors (eg JA) to wholesale markets near consumption areas, to retailers, to consumers. At wholesale markets, typically brokers sell to retailers, but there are other kinds of transactions. As part of the wholesale market, some retailers buy directly from wholesalers, and some products are distributed horizontally to other wholesale markets. Finally, some food processors distribute their excess produce through wholesale markets.

As for the direct route, less than 20% of domestic produce is distributed directly to processors and retailers. The direct route calls for distribution directly from producers and packers in the growing region to large retailers (supermarkets) and food processors. This method of distribution continues to gain favour.

Imported produce is routed in much the same way as domestic produce. The typical route is from importers (trading companies and packers) to wholesale markets near consumption areas, to retailers, to consumers. About 70% of imported produce is distributed this way. In the past, imported produce consisted mainly of onions for commercial use, and less than 50% of the imports were distributed through wholesale markets. Today however, the proportion of imported produce distributed through wholesale markets is increasing as the variety widens.

Imported items with a high proportion of distribution through wholesale markets include pumpkins, broccoli, and asparagus. Nearly 100% of matsutake mushrooms are traded via wholesale markets.

The use of wholesale markets has advantages for retailers, producers and packers. The markets offer retailers a wide variety of produce, and offer producers and packers an efficient way to sell produce and receive quick payment.

Distribution channels

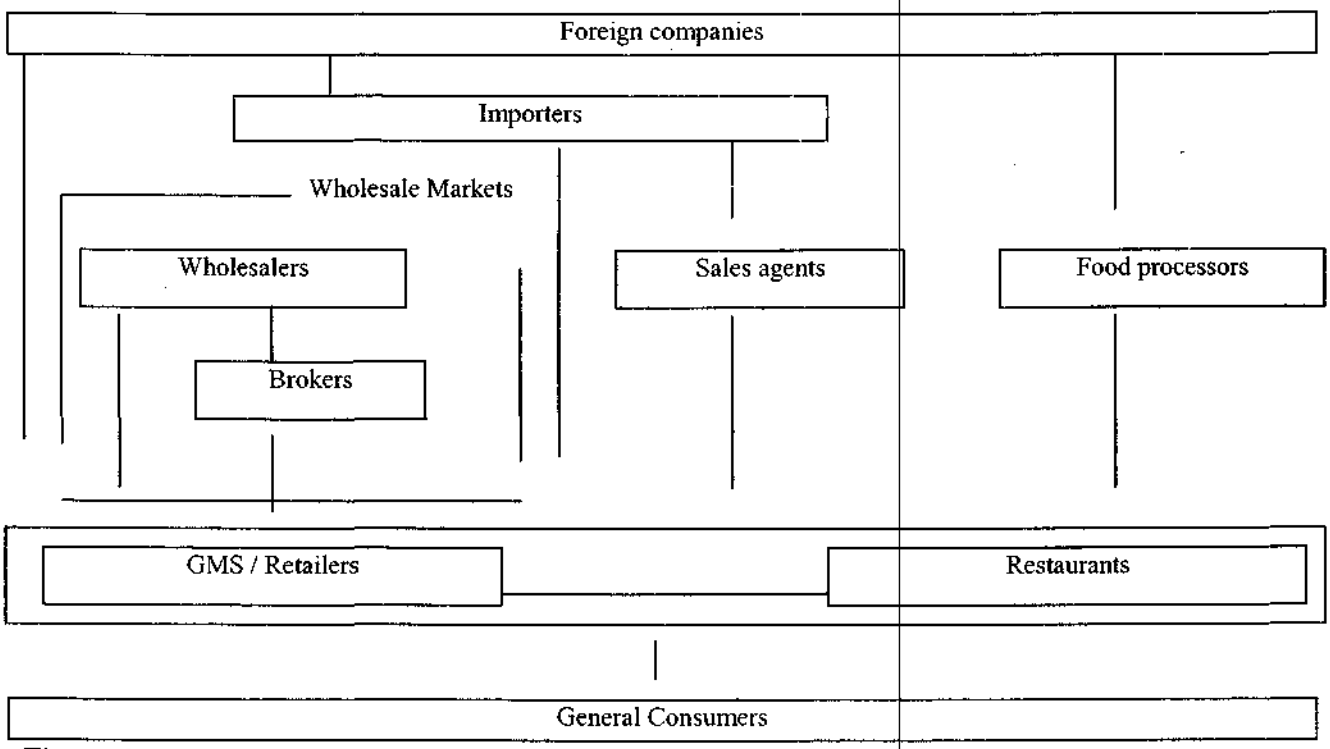


Figure 1

Sources: 'Produce Distribution," Ministry of Agriculture, Forestry and Fisheries and other references.

2 'Seri' Trading in Wholesale Markets

In wholesale markets where produce, fish, meats are sold, wholesalers conduct a type of auction whereby multiple buyers (brokers and large volume buyers) participate according to an integrated management system in which produce is consigned by groups of packers. This auction system is unique to Japan and is caller 'seri' trading in Japanese.

'Seri' trading involves responding to a 'seri' anchor. Buyers (brokers and large volume buyers) put prices on commodities, which are eventually sold to the buyer who bids the highest price. This kind of trading is conducted every day except Sundays and national holidays starting around 7am at wholesale markets throughout Japan.

Not all produce sold at wholesale markets is auctioned; in fact, about 50% is auctioned. Produce that has a relatively stable supply because it can be stored, is sold on a direct one-on-one buyer/seller basis or at a fixed price. According to

the Ministry of Agriculture, Forestry and Fisheries, in 1996 there were seventy-two central wholesale markets and about seven hundred and eighty local wholesale markets operating in Japan.

3 Direct Import Trends

A large portion of the produce brought into Japan is imported directly, bypassing the wholesale markets. In the 1980's the practice of direct import was restricted to a small number of items, including pumpkins from New Zealand. In the 1990's direct import began to expand and include a wider variety of items from a greater number of countries. The main purpose of direct import is to develop an import products that match Japanese consumers tastes. Produce seeds are taken from Japan, along with Japanese growing technologies, and are introduced abroad.

The chief proponents of direct importing are partnerships between large supermarkets or food processing companies and import traders. Produce handled in this way range in variety an include onions, shitake mushrooms, asparagus, 'ohba' leaf, kidney beans, spring onions, an burdock.

JASCO, a leading supermarket chain, has engaged in the direct import of white spring onions grown in China since 1993. The product is popular among consumers.

While direct import is riskier than spot importing, it can actually provide a constant, stable supply of products that suit consumer tastes. Thus, direct importing may increase.

4 Distribution Prices

Distribution prices for produce vary widely based on factors such as the size of the harvest, place of origin, wholesale market conditions an distribution channels.

Retail prices are set 2 to 4 times the producers' prices. Wholesale and retail margins range between 30 and 40% an broker margins between 10 and 20%. (This is not the case for Chinese cabbage).

A price comparison at the Tokyo central markets of domestic and imported broccoli showed the imports to be 30% lower at the wholesale level and 20% lower at the retail level. Much the same situation was found at Osaka central wholesale markets where imports were priced 40% below their domestic counterparts at the wholesale level (domestic Y7,201 versus imported Y4,005 per 10kg) and 50% or more lower at the retail level (domestic Y10,841 versus imported Y4,754 per 10kg).

5 Packaging Details of Cauliflowers

Domestic Products

Specifications

- 8kg per carton box
- Carton box size 52cm x 36cm x 19cm (high
  - LL Size = 8 heads per box
  - L – Size = 9 heads per box
  - M – Size = 12 heads per box
  - S – Size = 15 heads per box

Note: No individual wrapping, head is covered with stems / leaves for protection from the colour change of the head. The head length is 12cm and the head diameter is 12 – 14cm. 6kg carton boxes are more commonly used by local growers in the Japanese summer months of June – Setpember. Specifications of 6kg boxes are: LL – Size = 6 heads / carton, L – Size = 8 heads / carton and M – Size = 10 – 11 heads / carton.

USA Products

Specifications

- 25lbs (12 – 13kg) per carton box
- Carton box size 60cm x 50cm x 16cm (high
  - 20 heads / carton
  - 16 heads / carton
  - 14 heads / carton

Note: Importers of American cauliflowers advised that the most popular size they are importing into Japan is 16 heads / carton (700g per head) which is within the size range of the Japanese L-Size.

They also noted that US product is individually wrapped with a plastic sheet to protect the head. There are holes on the film and the area of the holes is over 2% of the total film area, which allows air through (Modified Atmosphere Packaging) and in the case of fumigation on arrival in Japan.

Also noted was that the length of stems / leaves are about a half length of domestic product. Importers explained the reason for this is that the shorter length means a smaller chance of insect contamination to be attached on the stems / leaves, thereby a smaller chance of the event of fumigation on arrival.

Waxed carton boxes are commonly used by American exporters. According to importers, these boxes are stronger and withstand compaction when piled up during storage. American ships cauliflowers to Japan in 12 m reefer containers and each carries 1,130 cartons.

China

Specifications: Same specifications as Japanese specifications. A typical carton box of Chinese cauliflowers at Tokyo Tsukiji Wholesale Market is as follows:

6kg per carton box, carton size: 52cm x 28.5cm x 15cm (high)

Product size: L-Size (8 heads / carton)

6 Transport from Australia

6.1

Table 13

	Air		Sea	
	To Japan	Time hrs	To Yokohama	Time days
Ex Sydney	14 flights/wk	9	14-16/mth	16
Ex Brisbane	3 flights/wk	8.5	14-16/mth	9
Ex Melbourne	2 flights/wk	9	14-16/mth	13

NB: Most ships travel Sydney-Melbourne-Brisbane-Yokohama

6.2 From farm to place of departure road freight is commonly used. When sending by sea there is an option to leave port with shortest travelling times eg. Road freight to Brisbane 1 day then shortest sailing time to Yokohama (9 days, saving of 5 days). However cost of road freight to Brisbane could affect options.

Storage

Source: Dr S Morris, CSIRO, Sydney Post Harvest Lab

- Crop: Cauliflower
- Botanical Name: Brassica oleracea var. botrytis (L.)
- Botanical Family: Brassicaceae (Cruciferae)
- Plant part: Flower
- **Refrigerated Container / Coolroom recommendations**:
  Optimum Product Temperature: 0.0 – 1.0^{0}C
- **Temperature Set Points for**:
  Air Delivery Control: 0.0 – 1.0^{0}C
  Return Air Control: 0.0 – 2.0^{0}C
- **Ventilation (Air Exchange) Settings for**:
  6m (20') Container: 15-30 m^3/h
  12m (40') Container: 30-60 m^3/h
  Fresh Air Exchange: 200% / hour
- **Acceptable product temperature at loading into container**: -0.5 – 5.0^{0}C

Table 14 Key Properties

Storage Time (days) +	Humidity % RH	Freezing Point C	Ventilation Rate	Storage Time Ambient (~20^{0}C)
14 – 28	95 - 100	-0.8	High	2 - 3

Table 15 Other Properties

Ethylene Production	Ethylene Sensitivity	Odour Effects	Affected by Odour of	Water Loss Rate (% / week) +	Compatibility with Ice
Very Low@	High	-	-	High (4.3)	Yes

@ <4 nM ethylene / kg / h at ~20^{0}C

+ at optimum storage temperature

Table 16 Controlled Atmosphere, Respiration Benefit of Controlled or Modified Atmosphere = slight (+7 days)

Controlled Atmosphere Conditions		
Oxygen %	**Carbon Dioxide %**	**Temp. ^{0}C**
2 - 3	3 – 5	1.0

Air is optimum atmosphere

Table 17

Respiration (Watts / tonne)@						Specific heat
0^{0}C	**5^{0}C**	**10^{0}C**	**15^{0}C**	**20^{0}C**	**25^{0}C**	**(kJ / kg / 0C)**
47 – 56	56 - 65	94 - 106	126 - 144	221 - 253	247 - 412	3.91

Compatibility in Mixed Storage

Not compatible with crops that produce ethylene..

Table 18 Seasonable availability

Country	Start Season	End Season	Start Peak	End Peak
Australia	Jan	Dec	Mar	Nov
USA	Jan	Dec		

E) Market Access

1 Tariffs: Rate is 5%

2 Quarantine

Source: AQIS

General Restrictions :

All plants and plant products which serve as hosts of injurious insects or pathogens unknown or of restricted occurrence in Japan; living insects and pathogens; soil and plants with soil, unless these are covered by a special Import Permit (only for experiment and research purposes).

Exportation under Post-Entry Quarantine is aimed at interception of virus and other injurious diseases and insects carried through the following:

Bulbs of lily, tulip and hyacinth, etc.

Tubers of potato and sweet potato,

Seedlings of fruit trees such as citrus, apple, pear and chestnut, etc

Live vine, leaf and underground portions of sugarcane.

They must be grown for a certain specified period (about one year) on isolated farms and inspected by the Plant Quarantine Service.

Underground portions of plants from countries declared to be infested by Radopholus citrophilus must be declared.

Hay or fodder exported from Australia should not contain any rice straw.

General Prohibitions :

All plants and plant products which serve as hosts of injurious insects or pathogens unknown or of restricted occurrence in Japan; living insects and pathogens; soil and plants with soil,

unless these are covered by a special Import Permit (only for experiment and research purposes).

Straw goods of wheat and barley groups from countries declared to be infested by Mayetiola destructor; rice straw bags, mats and other rice straw goods from all countries except Korea and

Taiwan (Republic of China), injurious animals or plants.

Rice straw (including rice straw products) paddy rice and rice hull.

Permits :

Special Import Permits obtainable from the Ministry of Agriculture and Fisheries is required for certain plants and plant products, whose entry is otherwise prohibited, to be used

for experiment and research purposes.

Legislation :

Acts:

Plant Protection Law, 1950.

Plant Protection Law Enforcement Regulations, Modifications and Ordinances.

Points of entry: There are five regional plant quarantine stations with branches and sub-branches established at principal ports of entry. Symbol (A) is for airport:

Station: Yokohama, Nagoya, Kobe, Moji Naha.

Branch: Sapporo, Fushiki, Itami (A), Fukuoka, Shiogama, Shimizu, Osaka, Kagoshima, Niigata (A), Hiroshima, Narita (A), Sakaide, Tokyo, New Tokyo.

International Airport: Osaka International Airport

Sub-branch: Kushiro, Toyama, Maizuru, Shimonoseki, Hirara, Tomakomai, Nanao, Amagasaki, Wakamatsu, Ishigaki, Muroran, Kanazawa, Himeji, Kanda, Naha (A), Hakodate, Uchiura, Tanabe, Miike, Kadena (A), Otaru, Tsuruga, Wakayama, Shimotsu, Imari, Rumoi, Tagonoura, Sakaminato, Sasebo, Hachinohe, Toyohashi, Uno, Misumi, Miyako, Gamagori, Mizushima, Yatsushiro, Offunato, Kinuura, Onomichi, Itozaki Oita, Ishinomaki, Yokkaichi, Kure, Saeki, Akita, Punakawa, Komatsu (A), Iwakuni, Hososhima, Sakata, Komaki (A), Hirao, Itazuke (A) **, Onahama, Komatsujima, Kumamoto (A), Hitachi, Takamatsu, Kagoshima (A), Kashima,

Hiruma, Chiba, Imabari, Yokosuka, Matsuyama, Naoetsu, Kochi, Haneda (A)*, Suzaki, Chitose (A)

* = Tokyo International Airport

** - Fukuoka Airport

In addition, ports of entry are designated for cereals, soybean and timber.

Certificates :

A Phytosanitary Certificate conforming to the model adopted by the International Plant Protection Convention, Rome 1951 (as amended 1979). The official phytosanitary inspection in the exporting country on which the Phytosanitary Certificate is based must take place not more than 30 days before shipment, unless a specific deadline is listed under the import requirements for the plant or plant product. Corrections are permitted only in the following sections:

Declared name and address of the consignee

Name of produce and quantity declared

Declared means of conveyance

Declared point of entry.

Each change must be initialled by the amending official. The Additional Declaration section of the certificate must restate the corrections made and bear the printed name, signature, and

affiliation of the amending officer.

Required for all plants and most plant products including:

seeds for sowing,

fruit and vegetables (refer "Special Requirements/Treatments").

living plants, bulbs, corms or parts of plants for propagation,

tissue culture

grains, cereals or pulses for consumption - until further notice hay

Pollen.

MAFF allow adhesive labels as an alternative to a Phytosanitary Certificate for cut and dried flowers, dried fruit and milled rice carried by passengers or sent by mail to Japan. The labels

are required to be applied to the boxes in the presence of AQIS Inspectors after inspection. An agreement is to be signed by the grower that he will adhere to the agreement. The exporter

has to contact the State Department of Agriculture in each State for an agreement to be negotiated.

A Phytosanitary Certificate is not required for:

Australian native dried flowers (however some flowers containing seed pods are prohibited)

timber

fresh or dried matsutake mushrooms

processed materials such as: cottonlint and linters, frozen fruit and vegetables, dried tea, malt, cubed, pelletised or milled stockfeed, dried hops, nuts that are roasted and/or salted, candy covered cotton seed (not for propagation).

Also. clearance by the Japanese will be quicker and easier if a

Phytosanitary Certificate is obtained.

Labelling :

Foodstuffs :

Strict controls govern the manufacture and sale of foodstuffs.

Use of food additives are strictly controlled.

Chemical residues are strictly controlled.

Quarantine Body :

Plant Protection Division of Ministry of Agriculture, Forestry and Fisheries

Language :

Japanese

Membership :

United Nations (1956)

3 Other

Nil

8) Situation Analysis - Source: Austrade

Domestic production is decreasing. Transport systems and freshness retention technologies are improving. Supermarkets are actively merchandising imported produce. Thus the environment for imported produce is good.

The following should be kept in mind when considering entering the Japanese market.

1. Understanding the consumption characteristics of the Japanese.

The Japanese are quite aware of sanitation, and are sensitive about what they put in their mouths. They eat fresh produce more frequently than other populations. They are also very sensitive to taste. These features should be understood.

2. Freshness is crucial

In choosing produce to buy, consumers consider freshness, shape, colour, brightness, etc as well as price. Among these factors freshness is crucial. No matter the price, if produce is not fresh, it will not be purchased. Although in one survey, low price was the primary reason for buying imported produce, it was assumed the produce was fresh.

In olden days, much produce was not suitable for import due to the ease of spoilage. Now, thanks to improved freshness retention technologies such as refrigerated containers, the variety of imported items has expanded.

Freshness has always been the most important factor.

3. Develop products that suit Japanese tastes

The Japanese are sensitive about taste, and in this regard, there are no exceptions for imported produce. Consumers will choose the tastiest products. Included in the element of taste are freshness and appearance. After one trial purchase, if a product is not judged to be tasty for its price, it will not be bought again. This is why for direct imports, many importers favour products grown using Japanese seeds since this eliminates the risk of taste failure.

Although some believe it is best if produce raised from native seeds satisfies Japanese tastes, it may sometimes be necessary to develop produce which satisfies Japanese tastes by, for example, modifying native seeds.

4. Promoting the assurance of safety is necessary

As described above, consumers who avoid buying imported produce do so largely over safety concerns. The safety issue involves pesticide and pests. These apprehensions must be eased through PR activities and other means. It is important to point out that imported produce distributed inside Japan has passed inspection under the Plant Quarantine Law and Food Sanitation Law of Japan.

Point of purchase signs giving assurance as to a product's safety an reliability would help ease apprehensions. Although all imported produce must be labelled with place of origin information, consumers do not consider this to be reliable. For example, some domestic producers of organic produce have gone as far as providing producer information on the labels. Although labelling is the responsibility of the seller, it should be included in discussions during the negotiation process with importers.

5. Create partnerships with supermarkets and trading companies.

Large supermarkets and trading companies are anxious to import produce. Produce is imported mainly for the following three purposes: to augment off season produce supplies, to make up for poor harvests and the accompanying price increases, and to introduce new produce items that help differentiate vendors from their competitors.

Creating partnerships with supermarkets and trading companies is a promising route to success.

6. For full access, establish a subsidiary or open a branch office in Japan.

Dole and Greenery International are examples of successful companies that established their own subsidiary or opened a branch office in Japan. As for Dole, it succeeded by carefully expanding its product line after examining market potential, whereas Greenery International succeeded through active promotions and PR.

It is necessary to establish a subsidiary or open a branch office in Japan for full market access.

7. Packaging considerations

As a technical issue, when shipping produce to Japan, the following matters should be considered.

Products of similar size and shape should be packaged together. The Ministry of Agriculture, Forestry and Fisheries has set standards on 26 produce items as guidelines aimed at efficient distribution. For example, for onions, those with diameter 8cm or more are classified as 2L, 7 to 8 cm as L, 6 to 7 cm as M and smaller as standard.

The other is to package products without excessive spacing to prevent damage from movement during transportation. There have been numerous cases of damaged produce due to poor packaging, which ultimately led to discarding the product.

As for broccoli, Dole introduced the 38 heads per package system, which has become the standard and eliminates the need for repackaging in Japan. As this example indicates, the packaging of some items has become standardised.

HONG KONG – DOMESTIC MARKET

A) HONG KONG IMPORT CAULIFLOWER PRICES (CIF, A$) and Quantities (Tonnes)

Source: (a) STARS, (b) ABS NB: p/k is in AUD

Table 19

	(a) China		(a) USA		(a) New Zealand		(a) Aust		(b) Aust		Total
	Tonnes	p/k	Tonnes	p/k	Tonnes	p/k	Tonnes	p/k	Tonnes	p/k	Tonnes (a)
1997	48	2.70	3076	1.46			482	1.55			3606
1998	60	1.95	2834	1.70			694	1.54	644	1.30	3588
1999	218	2.70	3667	2.03	4	1.35	4004	1.85	498	1.28	4289
2000	NA		NA		NA		NA		535	1.26	

NB: STARS information (a) estimated from quantities that originally combines cauliflower and broccoli in a ratio of 60% and 40% cauliflower. The information (a) above is for cauliflowers only.

Key Points

- Always ask for p/k quotes in A$CIF
- Ask for specific cauliflower information, not combined.

Indicative Prices

Source: Austrade

A number of key importers were consulted and various supermarket chains provided the following prices.

a) Imports

i. Australia A$2.05 – A$2.60/kg

ii. China A$1.00/kg

b) Wholesale

i. Australia A$3.75 – A$4.00/kg

ii. China A$1.50/kg

c) Supermarkets

i. Wellcome Australia A$2.97/kg (A$2.23 for 0.75kg price wrapped in plastic film)

ii. Park'N Shop China / local A$1.92/kg (A$1.47 for 0.75kg price wrapped in plastic film)

iii. Jusco (Japanese Store): China / local A$1.75/kg A$1.35 0.75kg price wrapped in plastic film)

iv. CRC (Chinese State Store) A$2.20/kg (A$1.65 0.75kg price wrapped in plastic film)

Both Wellcome and Park N Shop import directly from overseas suppliers.

B) IMPORTERS AND TRADERS

Dah Chong Hong Ltd
8/F, 20 Kai Cheung Rd

Kowloon Bay Kowloon
Hong Kong
Phone: 85 2 2768 3123
Fax: 85 2 2753 0966
Contact: Mr Alain Fung, Manager, Fresh Produce

A long established and diversified company which was taken over in 1992 by CITIC, the biggest Chinese trading and investment conglomerate. It has 46 retail food outlets (known as the DCH Food Mart). The DCH stores put a lot of emphasis on chilled and frozen products, most of which are imported by the firm itself, but also stock a selective range of packaged food and beverages. Firm has diversified into fresh fruits and vegetables since 1994 and has expanded so quickly that it is now one of the largest importer and distributor of fresh fruits and vegetables in this market.

Sunharvest Ltd
Room 607, Silvercord Tower 2
30 Canton Road, Kowloon
Phone: 85 2 2736 0300
Fax: 85 2 2375 6688
Contact: Mr Loman Ng

Established over five years. Mr Loman Ng, however, has been involved in the fruit and vegetable trade for some 20 years. Major fruit and vegetable importer. Distribute mainly through wholesale markets. Major items handled citrus, grapes, apples, pears, nashi, stone fruits, broccoli, tomatoes and a wide range of major fresh vegetables. Sources: USA, Australia, the Philippines, Chile and various Asian sources.

Wing Kee Produce Ltd
Hong Leong Industrial Building, G/F
4 Wang Kwong Road
Kowloon Bay, Kowloon
Hong Kong
Phone: 85 2 2796 3222
Fax: 85 2 2796 3666
Telex: 33854 WKHK HX
Contact: Mr Mark Lee, Purchasing Manager

Established over 25 years. Major importer of fruit and vegetables. Distribution: 80% to hotels and the food service industry, with the rest through wholesale markets. Major items handled: All kinds of fresh fruits and vegetables. Sources: USA, Australia, the Philippines, Japan, New Zealand, China, Taiwan, Thailand, South Africa, Chile, the Netherlands.

Wellcome Company Ltd
Fresh Food Centre
9 Chun Kwong Street
Tseung Kwan O Industrial Estate, New Territories
Hong Kong
Phone: 85 2 2995 1333
Fax: 85 2 2995 0618
Contact: Mr Stephen Chen, Group Category Manager, Wellcome Fresh Food Centre

Established over 50 years. Major supermarket chain with 220 stores. Distributes only through own retail stores. Major items handled: All kinds of fresh fruits and vegetables. Source: Well spread. Mostly from USA, Australia, New Zealand and Asian sources, using a few consolidating export agents in each of these countries. Wellcome's new fresh food packing / distribution centre started operations in late 1998.

C) CAULIFLOWER SPECIFICATIONS

Details provided by Austrade

The per capita consumption of fresh fruit and vegetables in Hong Kong is thought to be among the highest in the world. By virtue of its dependence on imports, Hong Kong offers considerable potential for major produce supplying countries, and in particular for off season supplier like Australia. While promoting the export of 'non Chinese' produce during the cross-season periods, consolidated export may compete well to the challenges from other Southern Hemisphere countries.

The Chinese peoples are major users of cauliflowers compared to Japanese.

The market prefers cauliflower with a white compact medium head, free from bruising, totally bald or well trimmed but with a few leaves left on the side of the curd.

Cauliflowers of an average size of 1kg per piece are the most favoured.

Cauliflowers are often individually wrapped in polyethylene (MAP?) or waterproof paper (as an added insulation to bruising), which is a presentation commonly adopted by both Australian and American suppliers. It is also done by food processing centres of supermarket chains as well.

Cauliflowers are extremely perishable vegetables, and deterioration in quality is the most common complaint. The trade demands the exporters to exert the strictest care to avoid over packing the produce in each carton as this would substantially increase bruising and contribute to predisposing the product to rapid breakdown and rotting of the flower.

In terms of quality and presentation, both Australian and American cauliflowers are considered very good. The Chinese products are actually of rather good eating quality, but are often delivered with less fine trimming and uneven grading. The Chinese supplies are very price competitive.

Don Smith Produce Specification

Colour: White

Size: 700gm to 1.2kg Preferred 800 to 900gm

Shape: Domed and tightly packed.

Presentation: Cauliflowers are cleanly trimmed of leaf; wrapped in dry waxed water repellent paper. Free from insects, soil, disease, blemishes and physical damage. Cartons are firmly packed with a cushion bubble-pad on top.

Packaging: 2 piece carton with double layer sides for extra protection. Average weight 20kg per carton. Preferred 22kg. Cartons are double strapped.

D) LOGISTICS AND TRANSPORT

Being a free market with no restriction on imports, Hong Kong has good access to supplies of fresh produce from all over the world. Indeed, the openness of the Hong Kong economy contributes to the extremely competitive nature of the fresh trade. There are presently over 100 fruit and vegetable traders in this market, all of which import from a number of overseas sources at the same time.

Over 90% of the fresh vegetables brought in by importers are sold through four wholesale markets, from which the local retailers (hawkers, street vendors, and green grocers) obtain their daily requirements. Currently there are two wholesale vegetable markets selling imported produce.

The four markets are comprised of about 700 wholesalers, each of which sells produce on behalf of a number of importers on a commission basis (normally 6%). A group of secondary wholesalers is sometimes incorporated in the distribution chain when sorting and repacking is needed for particular customers, such as hotels, restaurants, airlines and supermarkets. These secondary wholesalers normally draw their supplies from the wholesale markets, but some of them also obtain products direct from the importers. A few local importers have taken on the role of both the wholesalers and the secondary wholesalers and distribute direct t major catering end users and retailers.

The retail sector is extremely diverse and comprises hawkers, street vendors, wet markets and supermarkets. It is estimated that there are currently over 100 traditional wet markets and about 4 000 mobile hawkers and stationary street vendors retailing fruits and vegetables, and that together they account for over 80% of fruit and vegetable retail sales. These retailers get their supplies every morning from the wholesale markets and because of the lack f refrigeration facilities are looking to clear their stock the same day. The balance of sales is channelled through commercial fruit stores and large supermarkets.

In recent years, as it has become clear that significant growth in supermarket business can only come from the shifting of traditional wet market shoppers to supermarket stores. Major supermarket chains in Hong Kong are transforming their stores into so called 'superstores' where they incorporate the wet market set up into the supermarket stores. Higher quality, better hygiene and matched prices offered by these superstores are effectively attracting more shoppers to visit and to buy in supermarket stores.

Both USA and Australian products are imported by sea and air. Products imported from China and transported mostly by land.

1 Transport – approximate information

Table 20

	Daily Airline Flights	Time to Hong Kong	Shipping Per month	Time Days
Ex Sydney	14/week	7.5	14-16	16-22
Ex Brisbane	2/week	7	14-16	12-18
Ex Melbourne	4/week	8	17-19	17-19

2 Storage

Source: Dr S Morris, CSIRO, Sydney Post Harvest Lab

- Crop: Cauliflower
- Botanical Name: Brassica oleracea var. botrytis (L.)
- Botanical Family: Brassicaceae (Cruciferae)
- Plant part: Flower

- **Refrigerated Container / Coolroom recommendations**:
  Optimum Product Temperature: 0.0 – 1.0^{0}C
- **Temperature Set Points for**:
  Air Delivery Control: 0.0 – 1.0^{0}C
  Return Air Control: 0.0 – 2.0^{0}C
- **Ventilation (Air Exchange) Settings for**:
  6m (20') Containers: 15-30m^3/h
  12m (40') Containers: 30-60 m^3/h
  Fresh Air Exchange: 200% / hour
- **Acceptable product temperature at loading into container**: -0.5 – 5.0^{0}C

Table 21 Key Properties

Storage Time (days)	Humidity % RH	Freezing Point C	Ventilation Rate	Storage Time

+				**Ambient (~20^{0}C)**
14 - 28	95 - 100	-0.8	High	2 - 3

Table 22 Other Properties

Ethylene Production	Ethylene Sensitivity	Odour Effects	Affected by Odour of	Water Loss Rate (% / week) +	Compatibility with Ice
Very Low@	High	-	-	High (4.3)	Yes

@ <4 nM ethylene / kg / h at ~20^{0}C

+ at optimum storage temperature

- Controlled Atmosphere, Respiration

  Benefit of Controlled or Modified Atmosphere = slight (+7 days)

Table 23

Controlled Atmosphere Conditions		
Oxygen %	**Carbon Dioxide %**	**Temp. ^{0}C**
2 – 3	3 - 5	1.0

Air is optimum atmosphere

Table 24

Respiration (Watts / tonne)@						Specific heat
0^{0}C	**5^{0}C**	**10^{0}C**	**15^{0}C**	**20^{0}C**	**25^{0}C**	**(kJ / kg / 0C)**
47 – 56	56 - 65	94 - 106	126 – 144	221 - 253	247 – 412	3.91

Compatibility in Mixed Storage

Not compatible with crops that produce ethylene. Need to be stored above 6^{0}C.

Table 26 Seasonable availability

Country	Start Season	End Season	Start Peak	End Peak
Australia	Jan	Dec	Mar	Nov
USA	Jan	Dec		

E) MARKET ACCESS

There are no tariffs or any import restrictions imposed on imported vegetables into Hong Kong

General Restrictions :

Plants, Import Permits and Phytosanitary Certificates must be declared to the Customs and Excise Service on arrival.

Unauthorized plants with soil will be destroyed or may be returned to country of origin. Plants and consignments found with pests or with incomplete documentation may be confiscated

and destroyed or subject to Post Entry Quarantine or returned to country of origin.

The importation of biological control agents is controlled under the Agricultural Pesticides Ordinance.

General Prohibitions :

Arachis hypogaea, plant pests and soil.

Permits :

Import Permits are special authorisation granted by the plant protection service of Hong Kong to allow the entry of prohibited plants and plant products into Hong Kong. An Import Permit is

required for propagating and prohibited material but not for products meant for consumption or industrial use.

Application for Import Permits should be made in advance providing full details of the following: name, address and telephone number of the applicant, common and botanical name,

quantity, source/origin of the plant, name of ship/flight and number, expected date of arrival and purpose of importation. Conditions of entry stated in Import Permits.

Legislation :

Acts: Plant (Importation and Pest Control) Ordinance (Cap.207).

Points of entry: Hong Kong harbour and Hong Kong international airport.

Transit Shipments: Transiting shipments do not need to meet import requirements if they are sealed to prevent pest escape and either remain on board the carrier, or are moved to another

carrier in the same area for re-export.

Certificates :

Phytosanitary Certificates conforming to the model certificate adopted by the International Plant Protection Convention, Rome 1951, as amended 1979. Certificates must be in English or Chinese characters. The official phytosanitary inspection in the exporting country on which the Phytosanitary Certificate is based must take place not more than 14 days before shipment.

One copy of Phytosanitary Certificate the should accompany the consignment.

Plants, Import Permits and Phytosanitary Certificates must be declared to the Customs and Excise Service on arrival. Unauthorized plants with soil will be destroyed or may be

returned to country of origin.

Labelling :

Foodstuffs :

Foodstuffs are subject to random inspection upon arrival.

Quarantine Body :

Agriculture and Fisheries Department, Canton road Government Offices, 13th Floor, 393 Canton Road, Kowloon, Hong Kong

Language :

English, Chinese, Cantonese and Mandarin

Membership :

United Kingdom Dependencies (UKD)

F) SITUATION ANALYSIS

Source: Austrade

Vegetable production is a rather important horticultural industry in Hong Kong and supplies about 20% f the demand for fresh vegetables. The main crops are Chinese white cabbage, Chinese flowering cabbage, Chinese kale and lettuce (primarily the leaf species). These are grown throughout the year, with peak production in the cooler months.

Some exotic temperate vegetables including tomatoes, sweet corn and celery are also grown, and straw mushrooms are produced using industrial cotton waste as the growing medium.

There is significant local production of cauliflower in the Hong Kong winter time (December – February). Most local demand for cauliflowers is met by imports. Growth in market share has occurred for the USA and mainland China, whilst Australian imports have declined.

Market Characteristics and trends.

Hong Kong has good access to supplies of fresh vegetables from all over the world and in 1999 approximately $60 000 tonnes of fresh vegetables approximately HK $2 446 million (A$499 million) were imported.

Principal kinds of vegetables imported into Hong Kong included potatoes, onions, lettuce, celery, broccoli, carrots, Chinese cabbages, cucumbers and a wide variety of leafy and root vegetables. China is the dominant source, particularly of the leafy and root items, which alone account for some 50% of the overall imports (by volume) into the territory. United States and Australia are the next important suppliers, taking 27.5% and 12.2% respectively of the total import market.

Although at times the supplies of products were affected by ups and downs in the crops of exporting countries, overall imports into this market have maintained a consistently increasing trend.

In addition to the domestic market, Hong Kong is also a sizeable re-exporter of fresh produce. In 1999, re-exports of vegetables accounted for approximately 45% of the total imports (in value terms).

In 1999, Australia exported around A$1.54 million worth of produce to Hong Kong. Oranges, melons (rock and honeydew), pears, grapes and stone fruits (mainly cherries and plums), broccoli, Chinese cabbage, tomatoes, carrots, cauliflower, onions and asparagus were the main lines supplied.

China enjoys high market share in many fresh produce lines due to very low prices. Hence, other suppliers can only compete against products which the Chinese produce in large quantities, either during China's low / off seasons or in sophisticated niche sectors of the market. This is particularly true with vegetables, where China supplies some 45% of total imports.

The United States is Australia's biggest competitor in this region in terms of distribution efficiency. With advanced controlled atmosphere technology and the efficient shipping facilities, the Americans are exporting bulk quantities f the great majority of their produce to this market by sea at competitive prices.

Currency

Exchange Rate: June 2001 $HK4 to $A1

Taiwan – Domestic Market

A) IMPORTERS TRADERS

It is suggested that Australian companies establish good connections with supermarkets and importers in Taiwan who have good distribution channels. Follow up is crucial. Australian suppliers should visit the Taiwan market regularly to support their agent, build their relationship and quickly resolve any misunderstandings or other problems that occur. Participating in a promotional event in Taiwan (eg. Taipei International Food Industries show) is a good way to increase product profile and attract more consumer awareness of Australian vegetable.

For details contact:

Australian Business Centre
Australian Commerce & Industry Office
Suite 2605, 26th Floor
International Trade Building
333 Keelung Road, Section 1
Taipei, Taiwan
Republic of China
Switchboard: 886 2 8725 4200 Ext 233
Direct: 886 2 8725 4233
Facsimile: 886 2 2757 6707
Email: duli.chang@austrade.gov.au
Contact: Senior Business Development Manager

B) CAULIFLOWER SPECIFICATIONS

Don Smith Produce Specification

Colour: White

Size: 700gm to 1.2kg Preferred 800 to 900gm

Shape: Domed and tightly packed.

Presentation: Cauliflowers are cleanly trimmed of leaf; wrapped in dry waxed water repellent paper. Free from insects, soil, disease, blemishes and physical damage. Cartons are firmly packed with a cushion bubble-pad on top.

Packaging: 2 piece carton with double layer sides for extra protection. Average weight 20kg per carton. Preferred 22kg. Cartons are double strapped.

C) LOGISTICS AND TRANSPORT

1 Distribution Channels

Source: Austrade

1	One – Level Channel	Farmer → Retailer (8%)
2	Two – Level Channel	Farmer → Shipper → Retailer (12%)
3	Three – Level Channel	Farmer → Shipper → Jobber → Retailer (15%)
4	Direct Sales Channel Supermarket (20%)	Farmer (Farmers Associations) → Packaging and Distribution Centre →
5	Cooperative	Farmer (Farmers Associations) → Jobber → Retailer (45%) Marketing Channel

Shippers: the traders who buy agricultural products from producers or wholesale market and ship the products to the other markets.

Jobbers: The traders who buy agricultural products from wholesale market and sell the products to retailers or institutional consumers, such as military departments or schools.

There are several vegetable distribution channels. In Taiwan, approximately 65% of vegetables are distributed through no 4 & 5 channels with farmer association's involvement. Channels 1, 2 and 3 without farmer association's involvement are estimated to be around 35%.

For imported produce, steps in the traditional channel are often bypassed. Some importers, for example, also act as wholesalers and distributors. Produce sold in the traditional 'wet markets' still tends to go through the traditional channels of importer – wholesaler and / or distributor – retailer (wet market).

2 Transport – approximate information

Table 26

	Air		Sea	
	Flights	Time	Ships	Time
Ex Sydney	3/wk	10 hrs	14-16/mth	15 days
Ex Brisbane	2/wk	9.5 hrs	14-16/mth	9-17 days
Ex Melbourne	1/wk	10.5 hrs	14-16/mth	12-21 days

3 Storage

Source: Dr S Morris, CSIRO, Sydney Post Harvest Lab

- Crop: Cauliflower
- Botanical Name: Brassica oleracea var. botrytis (L.)
- Botanical Family: Brassicaceae (Cruciferae)
- Plant part: Flower
- **Refrigerated Container / Coolroom recommendations:**
  Optimum Product Temperature: 0.0 – 1.0^{0}C
- **Temperature Set Points for:**
  Air Delivery Control: 0.0 – 1.0^{0}C
  Return Air Control: 0.0 – 2.0^{0}C
- **Ventilation (Air Exchange) Settings for:**
  6m (20') Container: 15-30 m^3/h
  12m (40') Container: 30-60 m^3/h
  Fresh Air Exchange: 200% / hour
- **Acceptable product temperature at loading into container:** -0.5 – 5.0^{0}C

Table 27 - Key Properties

Storage Time (days) +	Humidity % RH	Freezing Point C	Ventilation Rate	Storage Time Ambient (~20^{0}C)
14 – 28	95 – 100	-0.8	High	2 - 3

Table 28 - Other Properties

Ethylene Production	Ethylene Sensitivity	Odour Effects	Affected by Odour of	Water Loss Rate (% / week) +	Compatibility with Ice
Very Low@	High	-	-	High (4.3)	Yes

@ <4 nM ethylene / kg / h at ~20^{0}C

+ at optimum storage temperature

Table 29 - Controlled Atmosphere, Respiration Benefit of Controlled or Modified Atmosphere = slight (+7 days)

Controlled Atmosphere Conditions		
Oxygen %	Carbon Dioxide %	Temp. ^{0}C
2 - 3	3 - 5	1.0

Air is optimum atmosphere

Table 30

Respiration (Watts / tonne)@						Specific heat
0^{0}C	5^{0}C	10^{0}C	15^{0}C	20^{0}C	25^{0}C	(kJ / kg / 0C)
47 – 56	56 - 65	94 – 106	126 - 144	221 - 253	247 - 412	3.91

- Compatibility in Mixed Storage
  Not compatible with crops that produce ethylene. Need to be stored above 6^0C.

Table 31 Seasonable availability

Country	Start Season	End Season	Start Peak	End Peak
Australia	Jan	Dec	Mar	Nov
USA	Jan	Dec		

D) MARKET ACCESS

1 Tariffs: Rate is 36% on CIF value

The following table shows volume, value and the tariff rate of the major vegetables items imported from Australia. Value amounts on shipping documents are often less than the real cost. Therefore, value figures are probably much higher than the reported figures.

Table 32 - Taiwans Vegetables Imports Volume, Value and Tariff from Australia 1999.

Item	Volume (MT) 1999	Value (US $'000) 1999	Tariff	Import Regulation
Carrot	1276.340	288.17	38.0%	B01, MWO
Chinese Cabbage	1803.329	598.39	25.0%	B01, MWO
Broccoli/Cauliflowers	785.136	582.43	36.0%	B01, MWO
Onion	2910.394	643.00	32.5%	B01.MWO
Asparagus	1554.857	4506.54	7.5%	B01, MWO

Source: Agricultural Trade Statistics of Directorate General of Customs 1999, Ministry of Finance.

B01: Importation shall be subject to the prescription set forth in the Table of Commodities Subject to Legal Animal and Plant Quarantine compiled by the Bureau of Animal and Health Inspection and Quarantine Council of Agriculture, Executive Yuan.

MWO: Importation of Mainland China products is prohibited.

2 Quarantine

Documentation	***Required***
Import Permit	NO
Phytosanitary Certificate	YES
Additional Declaration	YES
Post Entry Quarantine	NO
EX188	NO
EX46	NO
Radiation Certificate	NO
Commodity:	Vegetables
Common name:	Vegetables
Last Updated:	Thursday, 8 March 2001
Group:	Fruits/Vegetables
End Use:	Fresh

Restriction:

For vegetables not specifically mentioned elsewhere:

Vegetables require a Phytosanitary Certificate with additional declarations for specific pests.

Vegetables belong to one of three categories listed below. However some vegetables will belong to more than one category, these vegetables will require additional declarations for ALL pests.

1. Vegetables that are a Fruiting body (e.g. Pumpkin, squash, tomato, capsicum, etc) are considered hosts of Mediterranean fruit fly. NOTE: Tasmania only is considered fruit fly free

2. Vegetables that are above ground vegetative material (e.g. Celery, leafy vegetables, herbs, etc) are considered hosts of Stem nematode and Potato rot nematode

3. Vegetables that are below ground vegetative material (e.g. Root vegetables, carrots, turnips, swedes, radish, etc) are considered hosts of Stem nematode and potato rot nematode. Some

are also considered hosts of white fringed beetle (CHECK HYPERLINK).

To prevent the infestation of airfreight consignments of mainland commodities after fruit fly disinfestation and airfreight consignments of commodities from Tasmania, the new

requirements that must be complied with from 1 September are (a) that all vented cartons of fruit fly host commodities must have the vents screened with mesh of a diameter less 1.6mm; OR

(b) the transfer of fruit from the place of treatment to the airport loading for export must be in a closed vehicle.

For further information please check the Alert Section of PHYTO and refer to Industry Advice Notices 2000/38 and 2000/42.

Additional Declarations:

The plant or parts of plant has been thoroughly inspected and found free from Ditylenchus dipsaci, Ditylenchus destructor and Graphognathus leucoloma.

OR

1. The plant or parts of plant has been treated for Ditylenchus dipsaci. And

2. The plant or parts of plant has been inspected and found to be free from Ditylenchus destructor;

OR

The plant or parts of plant has been throughly inspected and found free from Ditylenchus dipsaci and Ditylenchus destructor;

OR

1. The plant or parts of plant has been treated for Ditylenchus dipsaci; And

2. The plant or parts of plant has been inspected and found to be free from Ditylenchus destructor and Graphognathus leucoloma.

OR

1. The plant or parts of plant has been treated for Ditylenchus dipsaci and Graphognathus leucoloma prior to shipment. And2. The plant or parts of plant has been inspected and found to

be free from Ditylenchus destructor.

OR

(Tasmania Seafreight)

Fruit has been inspected and found free of Ceratitis capitata, Cydia pomonella and Bactrocera tryoni.

OR

(Mainland Seafreight)

1. Fruit has been inspected and found free of Ceratitis capitata, Cydia pomonella and Bactrocera tryoni before treatment was started; AND

2. Subject to in-transit cold sterilisation.

OR

(Tasmania only)

The plant or parts of plant has been treated for Ditylenchus dipsaci and Ditylenchus destructor prior to shipment.

OR

(Tasmania only)

1. The plant or parts of plant has been treated for Ditylenchus dipsaci and Ditylenchus destructor prior to shipment.

2. The plant or parts of plant has been inspected and is free from Graphognathus leucoloma;

OR

(Tasmania only)

The plant or parts of plant has been treated for Ditylenchus dipsaci, Ditylenchus destructor and Graphognathus leucoloma prior to shipment.

OR

1. The plant or parts of plant has been thoroughly inspected and found free from Ditylenchus dipsaci and Ditylenchus destructor.

And

2. The plant has been treated for Graphognathus leucoloma prior to shipment.

(Tasmanian Airfreight)

1. Fruit has been inspected and found free of Ceratitis capitata, Cydia pomonella and Bactrocera tryoni. AND

2. The fruit in this consignment has been secured against infestation by fruit flies during transport.

OR

(Mainland Airfreight)

1. Fruit has been inspected and found free of Ceratitis capitata, Cydia pomonella and Bactrocera tryoni before treatment was started; AND

2. Fruit has been treated prior to shipment; AND

3. The fruit in this consignment has been secured against infestation by fruit flies during transport.

OR

(Tasmania only)

1. The plant or parts of plant has been thoroughly inspected and found free from Ditylenchus dipsaci; And

2. The plant or parts of plant has been treated with an appropriate treatment for Ditylenchus destructor prior to shipment.

OR

(Tasmania only)

1. The plant or parts of plant has been thoroughly inspected and found free from Ditylenchus dipsaci and Graphognathus leucoloma.

And

2. The plant or parts of plant has been treated with an appropriate treatment for Ditylenchus destructor prior to shipment.

OR

(Tasmania only)

1. The plant or parts of plant has been thoroughly inspected and found free from Ditylenchus dipsaci; And

2. The plant or parts of plant has been treated for Ditylenchus destructor and Graphognathus leucolomaprior to shipment.

OR

Treatment:

All fruits and vegetables exported to Taiwan must be subjected to either cold treatment or fumigation plus cold treatment prior to export in accordance with ONE of the following schedules:

*Methyl Bromide 32g/m3 at 21°C (69.8°F) or above, chamber load not to exceed 80% of volume.

a. 0 hours fumigation followed by 0.00°C (32F) for 12 days - Sea freight only
b. 0 hours fumigation followed by 1.67°C (35F) for 14 days - Sea freight only
c. 0 hours fumigation followed by 3.33°C (38F) for 18 days - Sea freight only
d. 2 hours fumigation followed by 0.0 - 2.8°C (33 - 37F) for 4 days - Sea and air freight
e. 2 hours fumigation followed by 3.3 - 8.3°C (38 - 47F) for 11 days - Sea and air freight
f. 2½ hours fumigation followed by 3.3 - 4.4°C (38 - 40F) for 4 days - Sea and air freight
g. 2½ hours fumigation followed by 5.0 - 8.3°C (41 - 47F) for 6 days - Sea and air freight
h. 2½ hours fumigation followed by 8.9 - 13.3°C (43 - 47F) for 10 days - Sea and air freight
i. 3 hours fumigation followed by 6.1 - 8.1°C (43 - 47F) for 3 days - Sea and air freight

j. 3 hours fumigation followed by 8.9 - 13.3°C (48 - 56F) for 6 days - Sea and air freight

Radiation Certificate:

None required

E) SITUATION ANALYSIS

Source: Austrade

Taiwan has imposed a range of tariff and non tariff barriers to protect its vegetables from import competition. Soaring labour costs plus shrinking amounts of farmland, however, have weakened the competitiveness of farmers in Taiwan. Imports have increased gradually over the past 10 years.

Fresh vegetables are in high demand during the summer season (June – August), particularly when typhoons cause serious damage to local vegetable plants. Vegetable prices will therefore increase significantly in summer. In winter, however, vegetables are generally over supplied as more farmers plant vegetables on the land where rice is reaped. Consequently, the vegetable price in winter is lower.

As Taiwan has recently introduced the two day weekend every fortnight, people are becoming more interested in how to make the most of their leisure time. They are turning to activities, which will improve their health and consequently are seeking healthier food products. In fact, organic vegetables are now becoming more and more popular in Taiwan. Increasing numbers of consumers are willing to pay higher prices for organic vegetables in Taiwan.

Australian vegetables are present in Taiwan and well established with the leading importers and supermarkets. The demand for imported vegetables from Australia has been growing steadily since 1995. In 1999, the total Australian vegetable and fruit exports into Taiwan increased from A$33.7 million in 1998 to A$38.9 million, representing a 15% growth rate to further indicate strong potential for Australian vegetables and fruit.

People in Taiwan are becoming more health conscious and are more aware of chemicals used on domestic vegetables. Once a vegetable is found to be contaminated by chemicals, sales drop dramatically. A natural and chemical – free image, therefore, is an important marketing tool for imported vegetables. The Australian vegetable is perceived as being 'clean and green' and should be marked as such.

Although traditional markets are the major outlets for local customers, there is a growing trend in purchasing vegetables in supermarkets and hypermarket chains such as Makro, Carrefour, Dollars, Costco, etc.

Some leading supermarkets have established their overseas vegetable sourcing networks and directly negotiate the price and other terms of trade with foreign vegetable suppliers. **To establish a vegetable brand name with marketable packaging in the supermarkets will be a trend in the future.**

Local Production: The major local vegetable production areas are Yunlin Hsien and Changhua Hsien, which are located in central Taiwan. According to 1999 statistics, the total vegetable production was markedly lower than in previous years. One of the major reasons for this drop in domestic vegetable production is due o the fact that traditional land owners have sold off their land because of increasing land prices.

Imports: The South East Asian countries and US are major competitors to Australia. The season for imported vegetables is from June to late September.

7.1.5 PROFITABILITY OF EXPORTING FRESH CAULIFLOWERS

Introduction:

1. From the export chains described in this report, there are a number of economic scenarios to consider.
2. If export business development is to happen, the business must be profitable.
3. Given the perceived complexity of exporting compared with domestic marketing, establishing an orderly a process of financial information gathering was considered an important prerequisite for growers considering exporting for the first time and which could also offer existing exporters, an opportunity to monitor more easily their profitability.

Objective:

To develop an electronic model for export development of horticultural commodities produced in Australia.

Method:

1. Investigate one export chain; for fresh cauliflower exports from Bathurst, NSW by sea freight to Yokohama, Japan.
2. Ensure economic creditability with support of experienced economist.
3. Document the costs and returns for the export chain from farm to CIF Yokohama.
4. Document average CIF prices for fresh cauliflowers produced by competitors to determine potential for profitability and most profitable marketing window for eastern Australia seaboard cauliflower production.

Prices for Cauliflowers

CIF Prices: (CIF is Costs, Insurance, Freight) This economic study is based on CIF prices, received for cauliflowers landed Yokohama. Table 2 lists the CIF prices for two exporting countries, China and the USA and also average monthly wholesale prices in Sydney for comparison.

The CIF prices relates to the cost of the cauliflowers up to and including the ship or plane reaching the port of destination. It does not include landed costs such as custom duties, transport costs in importing countries etc.

The average monthly price relates to the purchasing cost of the cauliflowers in a particular market and would include all landed costs plus whatever costs are associated with selling the goods in the market system.

CIF prices are those provided by importers and are preferable to wholesale prices in an export economic analysis because

CIF is more reliable than wholesale

CIF is more accurate than wholesale

CIF is less prone to outside influence.

CIF is a well established trade arrangement

CIF has more published information is available.

There are more unknowns associated with wholesale prices

CIF Avoids the logistic complexities once product leaves the air or sea ports.

Table 33: FRESH CAULIFLOWER EXPORT MODEL 2001

Unit: 1 hectare sprinkler irrigation. NSW 2001

Farm Gate GROSS MARGIN BUDGET				Average Monthly for CIF Japan USA & China Prices		Standard $/Ha	Your $/Ha
A. INCOME:	14000 heads (1kg) @			$1.69 /kg		$23,660.00	
		A. **Total Income**				$23,660.00	
VARIABLE COSTS:							
Transplants							
20 000 per ha				$0.08	per plant	$1,600.00	
Tractor costs							
Large equipment including labour, fuel, oil etc							
	2 cultivation	0.70	Hrs / Ha	$30.50	/ Hr	$21.35	
	1 drill fertiliser	0.50	Hrs / Ha	$30.50	/ Hr	$15.25	
	1 tyne cultivation	1.00	Hrs / Ha	$30.50	/ Hr	$30.50	
	1 sidedress	0.50	Hrs / Ha	$30.50	/ Hr	$15.25	
	1 inter row cult'n	0.50	Hrs / Ha	$30.50	/ Hr	$15.25	
	8 boomspray	0.20	Hrs / Ha	$30.50	/ Hr	$48.80	
	1 sowing	6.00	Hrs / Ha	$30.50	/ Hr	$183.00	
Irrigation	(6 applications)	3.00	ML / Ha	$70.00	/ ML	$121.00	
Fertiliser	Starter fert	500.00	Kg / Ha	$0.45	/ kg	$225.00	
	Urea	125.00	Kg / Ha	$0.38	/ kg	$47.50	
Pest Control	8 Insecticide	Various rates		Various		$269.00	
	4 Fungicide	2.50	Kg / Ha	$7.45	/ kg	$74.50	
	1 Fungicide	2.20	Kg / Ha	$8.30	/ kg	$18.26	
Weed Control	1 pre-emergent	2	L / Ha	$18.00	/ Litre	$36.00	
	chipping weeds	5.00	Hrs / Ha	$14.50	/ Hr	$72.50	
Casual Labour	Fixing rubber bands	75.00	Hrs / Ha	$14.50	/ Hr	$1,087.50	
	Rubber bands					$100.00	
Planting	4 Transplanting	6.00	Hrs / Ha	$14.50	/ Hr	$435.00	
	1 Driver						
Harvesting	5x Harvest labour	193.00	Hrs / Ha	$14.50	/ Hr	$2,858.50	
(4 picks)	Trailor pickup	21.00	Hrs / Ha	$30.50	/ Hr	$640.50	
	Cartons	700.00	/ Ha	$2.10	/ carton	$1,470.00	
	Cooling	700.00	cartons	$0.16	/ carton	$112.00	
Freight	48 ctns / pallet	700	Ctns / Ha	$0.90	/ carton	$630.00	
R & D Levy				0.50%		$118.00	
		B. Total Variable Costs				$10,246.66	73c / kg
		C. Plus On Costs (Table 4)				$10,920.00	78c /kg
		D.Total Costs CIF Japan				$21,166.66	151c / kg
		E. Gross Margin / Ha (A-D)				$2493.34	
		F. Gross Margin / ML				$831.00	

Table 33: Farm Gross Margin Explanatory Notes

Yields: Estimated 30% loss due to wastage from sibs, pest, disease, over-maturity. Each plant produces an average 1 kg curd (range 800gm – 1.2kg). Average crops range from 15 to 30 tonnes per hectare.

Production: Excessive exposure to sunlight turns the curd an undesirable pink colour. Leaves are often tied over the curd for protection against direct sunlight. Varieties are usually sown with about 20,000 plants per hectare.

Pests: Cabbage White Butterfly and Diamond Black Moth are the most common insect pests with black rot, club root, head rots, downy mildew and blackleg the most common diseases.

Harvesting: Harvesting is done by hand with the first 2-3 passes for export.

Short season varieties (70 to100 days) are grown over summer. Medium to long season varieties (115 to150 days) are sown for a winter and spring harvest.

Depending on expertise, the following assumptions are made for 2 possible harvesting and packing options.

a) Harvest into bins and transport to packing shed for paper wrapping and packing into 58L cartons. This is most common in Western Australia.

From a trial shipment at Canowindra NSW during spring 2001 to cut and trim/bald cauliflower of all leaf, rate of 2 cauliflowers per minute is possible at 2 kg per minute

- 14000 takes 116 hours
- 116 hours x $14.50 costs 21c/kg

a) Harvest 58L into cardboard cartons in the field at Bathurst: to cut, bald, wrap and pack, which is popular in Queensland and California and recommended for eastern Australia, experienced workers should be able to work at a rate of

- 14000 kg takes 193 hours
- 193 hours x $14.50 costs 20c/kg

Packaging: 58L unwaxed cardboard cartons are used minimum weight 18 kg average 20 kg packed with 20-25 cauliflowers/cartons.

Economic notes: This budget is ONLY A GUIDE and should be altered for movements in crop and input prices, changes in seasonal conditions and the export chain characteristics. Special attention should be given to harvesting, trimming, wrapping and packing.

NB: The budget does not include overhead costs or GST.

While the average weight per carton is 20 kg, for purposes of budgeting weight of 18 kg-23 kg is allowed for each carton, depending on curd weight

Table 34: Fresh Cauliflower Export Model 2001

GST excl **Your Budget** 14000 **KG/HA YIELD ASSUMED**

Road freight Bathurst-Sydney/Sea freight to Yokohama Japan	*Note*	**$/ha**	**Cost-AUDc/kg**	
a) Agent/Co-ordinator fee 4% of CIF port of discharge cost fee includes co-ordination of: growers, freight to Sydney, Freight Fowarder, buyers in Japan and insurance costs.	1	718	5.68	Based on 57,000kg exports; will vary depending on volumes exported
b) Direct growing and harvesting costs Transplants, fert, pest,weeds, rep/main, fuel, irrig'n, harvest, wrappers, cartons, packing, trailor pick-up, fork lift onto pallets, coolroom.	2	10,246	73.00	based on 3ha op'n, 14,000kg/ha yield, NSW Ag budget figures.
c) Fixed overheads business overheads including depreciation	3	3000	21.43	based on 3ha op'n; reference Manjimup WA Veg Budget Handbook.
d) Financing cost	4	271	1.94	Is a real cost with considerable scope for variation between farms.
e) AQIS inspection requirements shed registration $431; shed audit*2 @ $98/half hr, assume 2 hrs/visit, total $380; phytosanitary certificate $38; export permit $40.	5	300	2.14	based on 3ha op'n; Inspector based at Cowra
f) Refrigerated road transport to port loading cartons; refrigerated freight ex farm Bathurst/Sydney	6	990	7.07	Decision has to be made to export out of Syd or Bris; to freight cartons by refrig. truck or use containers
g) Freight Forwarder costs- shipment 12 metre reefer, cap. 19t reefer freight rate (US$ converted to AU$) $4528; port service charge $150; terminal handling $260; documentation $80; loading pallets onto container at Freight Forwarders $230; Cox Recorder $45; cartage to wharf $230	7	5641	40.29	Freight Fowarders will provide detailed quote
CIF port of discharge - AU$		$21,166	151.55	

CIF prices Japan 2000 based on current AU/Yen exchange rate of 64.50; profit is difference between CIF price Japan in any month and CIF landed cost

Destination	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Price in AUS c/kg													
China	139	148	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	200	137	117	124
USA	n.a	n.a.	n.a.	193	206	192	237	229	192	243	250	254	215
Sydney Wholesale 20/99	87	55	68	87	67	72	39	38	41	46	57	63	60

Sydney average wholesale prices for 1999/2000 are listed here for comparison

Table 34: Sensitivity Analyses - effect of yield and price on Gross Margin / Ha

Yield	Average price $/kg				
kg/ha	$1.29	$1.49	$1.69	$1.89	$2.00
12000	-$5,371.00	-$2,971.00	-$887.00	$1,829.00	$3,149.00
14000	-$3,107.00	-$307.00	$2,493.00	$5,293.00	$683.00
16000	-$843.00	$2,357.00	$5,873.00	$8,757.00	$10,517.00

Table 35: Breakeven Price $/ha

Yield	Direct Costs $				
kg/ha	$19,167	$20,167	$21,167	$22,167	$23,167
12000	$1.59	$1.68	$1.76	$1.84	$1.93
14000	$1.40	$1.44	$1.51	$1.58	$1.65
16000	$1.20	$1.26	$1.32	$1.38	$1.45

Table 2: Explanatory notes

General: This marketing exercise is based on a selling on a CIF port of discharge basis. For a small operation this can involve risks if produce arrives at its destination and disputes arise as to quality. Organising inspection and negotiation and possible travel can be costly. A less risky way to sell is on a fob basis.

1. The cost of 4% of CIF cost was a quote from an export agent. Detailing costing not available as dealing in commercially sensitive information. Agents role is to act as co-ordinator in the export operation. This involves co-ordinating grower supplies, freight to Freight Forwarder, buyer negotiations and all insurances. Insurance will generally cover Inherent vice (damage caused by shipping negligence, temperature fluctuations or mechanical failure), insurance against failure to arrive and insurance against failure to pay. Irrevocable letter of credit and currency hedging should also be included.

2. Costs have been referenced from State government of agriculture department publications. These include Farm Budget Handbook 2001- NSW Vegetables, NSW Agriculture and Vegetable Budgeting Handbook for the Manjimup District 1997, Agriculture Western Australia.

   Costs are based on the cost per hectare for a three hectare operation with 14,000kg/ha yield. Cauliflowers are packed in the field in cartons and cool stored before being transported to Sydney by refrigerated truck.

1. Business overheads include depreciation, phone, postage; electricity, gas; subscriptions; professional services; licences, registrations and insurances; rates. Costs shown in budget assume that other activities (mainly vegetable crops) share the same capital requirements and overheads.

2. Financing cost is not possible to calculate as it will be very specific to an individual enterprise funding arrangements both for the total farm enterprise and the specific cauliflower export arrangements.

3. Based on AQIS officer travelling from Cowra. Current AQIS cost is $98/half hour or $859/day.

4. Refrigerated transport to Sydney ex farm Bathurst of cartons on pallets costs $45/pallet (30 cartons to a pallet so $1.50/carton), truck can hold 22 pallets weighing 1t/pallet at a total cost of $990. Assume this is one container load of 19t net. Cartons are then fork lifted into containers by Freight Forwarder. Cost to Brisbane is $2.60/carton or approximately $2500 for 19t. Alternative method is to pack cartons into container on farm. Freighting 12m container to Sydney costs $1400 and $2500 to Brisbane, which includes return of empty container.

5. Quote from Vision International Forwarding Pty Ltd. Ex Sydney cost is $5730/12m container or $3760/6m container. Ex Brisbane costs are $30 more which is difference in port charges. Transit time ex Sydney is 13 days and 8 days ex Brisbane. Freight component is quoted in US dollars but converted to AUD in Export Model.

Acknowledgments:

The cooperation and assistance of those listed in the contacts/further advice section of this report is very gratefully acknowledged.

Special mention is made of the contribution provided by Mr Dick Benson, Consultant from Dick Benson & Associates from Orange.

Also greatly assisting the information collation was:

Mr John Cantrill, Nashdale via Orange

Mr John Dixon, Austrade

Mr Don Smith, Don Smith Produce

Mr Gary Silis, Vision International Forwarding Pty Ltd

Inland Marketing Corporation (Nicholas McKay, Peter England and Craig Burge) and Central West NSW Vegetable Growers, Mr John Willott, Mr George Smith, Mr Gert Bravenboer and Mr Vince Galea.

The Galea Family from Billimari Via Cowra helps with a trial shipment

7.1.6 Market Access or Conditions of Entry

Reference • AQIS and www.marketag.com

To clear cauliflowers smoothly and expeditiously upon arrival at a port of entry for the country of destination it is vital that conditions of entry are thoroughly researched and carried out well before harvest time.

Quarantine

In Australia, exporters will need to arrange with Australian Quarantine Inspection Service (AQIS) for a Notice of Intention to Export Prescribed Goods and a Phytosanitary Certificate is required not more than 30 days before shipment to Japan, Taiwan and Hong Kong. Special conditions may apply (eg. Taiwan for Stem Nematode and Frankliniella occidentals) so check with quarantine officials in Australia and the destination country.

In the importing country, the importer must submit a Food Import Information form (Japan to Ministry of Health).

Import Inspection at Country of Destination

Involves a check of type of product, area of production, the importer and exporter, disinfection treatment if any and its procedure in the exporting country. Samples are taken from consignments and inspected for the presence of pests and diseases.

Disinfection and destruction at import destination

If pests or diseases are found in a consignment, disinfection or destruction, including reshipment is possible. Depending on country, treatment could be;

Fumigation:

- Hydrogen cyanide is used for scales, aphids, thrips and whiteflies.
- Methylbromide is used for other pests.

Sorting is necessary if pests (insects, diseases, weeds) are found.

Destruction is ordered if disinfection is unavailable. Return shipment is an option.

Rules of Labelling

Each package will need to be labelled with product name, country of origin, grower and address, grade (eg. Cauliflowers in Japan, 900gm – 1.2kg are called grade M) volume or weight in kg and number per carton.

Tariffs

Tariffs rates are:

- Japan 3% on the CIF value
- Taiwan 36% on the CIF value (36% is also common throughout rest of Asia)
- Hong Kong 0%

NB: A consumption tax in Japan also impacts on imported cauliflowers because the tax is applied to the customs tariff and this affects the retail prices.

More specific conditions may apply in each country and the export coordinator needs to be aware of the latest requirements to ensure a successful import process.

7.1.7 Cultivar Selection

The most important decision a grower will have to make is to what cultivar to grow for a particular timeslot and marketing window.

Cultivar selection is important because

i) They are intrinsically linked to all important quality (specification) factors described by customers

ii) Cultivar quality will vary with growing conditions, management, time of year, post harvest management and it is important to select the right cultivar for a particular time of year (harvest time slot).

When selecting cultivars;

- Research thoroughly and consult widely (eg seed companies, researchers, customers, advisers and other growers)
- Always evaluate in advance of planting time
- Always plant only healthy true to type seedlings and provide the best management from farm to customer, especially in the two weeks immediately after planting.

Farm survey and discussions with researchers and seed companies has identified some cultivars that would be suitable for fresh export to Japan, Taiwan or Hong Kong either for short haul, airfreight or long haul seafreight.

Plant breeders have on going breeding and selection programs that include export specifications.

Specifications of the export cauliflower:- a typical description is subject to customer needs, eg, the export cauliflower will have whiteness, dome to ball shape, greater density (g/cm^3) or weight, compactness, good fill, better post harvest life and a 'tucked in' bottom of the curd. Heart leaves should provide good cover on the top of the cauliflower and be easy to trim off underneath the cauliflower. Size ranges preferred are:

- Weight: 700 gm – 1.2 kg
- Dimensions: 140mm – 165 mm (20-27 per 58L carton)

Cauliflowers should also be selected for ability to remain in good condition, after 15-21 days of cool storage at 0-1° without any MA or CA treatment.

Cultivars considered suitable for field evaluation and export include:

- New South Wales(All Year)

  Freemont, Summer Love, Trojan, Celsius, Virgin, Admiral, Chaser, Discovery, Forte, Atlantis, Morpheus, Monarch and Discovery.
- Southern Queensland (May – Sept)

  Freemont, Trojan
- Victoria (All Year)

  Prestige, Virgin, Forte, Chaser, Sirente
- Western Australia (All Year) Celsius, Plana, Vixen, Liberty, Bulla, Omeo, Gallaced, Escale, Summer Love, Virgin, Discovery, Freemont, Monarch, Morpheus, Chaser, Granite

This list of cultivars is not comprehensive and seed companies should be consulted for more information. Cultivars may vary in 'type' with latitude and seasonal conditions and they should be harvested in the most appropriate time slot for optimum quality.

Comprehensive cultivar evaluation is undertaken by, Agriculture Western Australian at the Manjimup Horticultural Research Centre and researchers should be consulted for detailed copies of reports.

7.1.8 Storage and Transport conditions for Cauliflower

References

i) Code of practice for the Road transport of Fresh Produce – Booklet 3

ii) CSIRO / Sydney Postharvest Lab/Morris Horticultural Consulting website: www.postharvest.com.au

iii) Wilkinson I, (2001) Personal Communication, Department of Natural Resources and Environment, Victoria

iv) Jessop, A., (2001), NSW Agriculture, Personal Communication

A) COOLROOM/CONTAINER/TRANSPORT

- Optimum product pulp temperature: 0.0-1.0°C (Storage time 14-30 days)
- Highest freezing point: -0.8°C
- Relative humidity: 95-100%
- Acceptable receiving pulp temperature for loading onto:

  Containers: 0.5-5°C

  Trucks: 0-3°C
- Maximum storage life: 0°C: 20-30 days

  3°C: 14 days

  5°C: 7-10 days

  10°C: 5 days

  15°C: days

  20°C: 2-3 days

  (NB: Publications may refer to room temperatures, unless other wise specified. Normally product pulp temperature will be a little higher than room temperature)
- Temperature set points

  Air delivery control: 0.0-1.0°C

  Return air control: 1.0-2.0°C
- Ventilation (air exchange) settings:

  6m (20') Container: 15-30 m^3/h

  12m (40') Container: 30-60 m^3/h

  Fresh air exchange 200%/hour

Important:

- Cool cauliflower rapidly within 3 hours, after harvest and keep cool at all times
- There are varietal differences to long term cold storage.
- Ethylene production: Very low
- Ethylene sensitivity: High-keep away from ethylene generating crops
- Odour effect:-
- Affected by odour:-
- Water loss rate % / week : High (4.3)
- Compatibility with ice: Yes
- Bruising susceptibility: High

B) CONTROLLED ATMOSPHERE

i) Benefit of controlled or modifies atmosphere: Slight (+ 7days)

CA Storage: Reference: Controlled Atmosphere Handbook, Carrier Transicold

- Low O^2 may aid in maintaining white curd, green leaves as well as reduce weight loss and curd spotting. Benefits of CA are slight than CA
- Good temperature and humidity control are more important than CA
- CA storage is risky because low O^2 (<2%) can cause off flavours and odours and >5% CO^2 can cause off odours. The problems do not show up until after cooking.

ii) Controlled Atmosphere Conditions

- Oxygen %: 2-3
- Carbon Dioxide %: 3-5
- Temperature: 1°C

Air is optimum atmosphere

iii) Respiration (watts/tonne)*

0°C: 45-56
5°C: 56-65
10°C: 94-106
15°C: 126-144
20°C: 221-253
25°C: 247-412

iv) Specific heat (kJ/kg/°C) 3.91

C) COMPATIBILITY IN MIXED STORAGE

- Not compatible with crops that need to be stored above 6°C
- Not compatible with crops that produce ethylene: eg.,

Asian Pear	Nectarine	Papaya	Fig	Peach
Kiwi Fruit	Guava	Rambutan	Breadfruit	Cherimoya
Jackfruit	Apricot	Banana	Mangosteen	Muskmelon
Nashi	Custard Apple	Feijoa	Sapodilla	Pear
Plum	Avocado	Mango	Cantaloupe	Tomato
Apple	Lychees		Honeydew	

Cauliflowers should not be shipped with commodities that produce ethylene.

7.1.9 Cool Chain

Reference and more information:

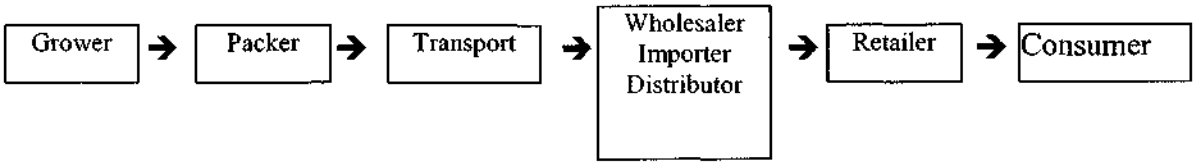
Cool Handling Vegetables, National Project Team
GPO Box 397
Adelaide SA 5001
or www.sardi.sa.gov.au/hort/coolchain/coolindx.htm

Recommended reading:

Palmer, M., Cool Handling Vegetables, Cool Handling Project Team, SARDI, South Australia.

To provide consistently higher quality of produce to the consumer, it is necessary and important for all in the chain from "paddock to plate" maintain the recommended cool chain.

The cool chain – temperature monitoring is essential



NB: Importance of maintaining at RH of 95-100%. With normal cool storage at 0°C cauliflowers are not normally stored for more than 3 weeks. Otherwise quality deteriorates.

Table 36 - RECOMMENDED COOLING TECHNIQUES.

	Forced Air	**Vacuum Cooling**
• Cooling Rate (hours)	Fast (1-10) Forced Air Cooling temperature 0-2°C Bulk bins could take 2-4 hours Packed (wrapped Cauliflowers) cartons could take 12-24 hours	Fast (0.3-1)
• Method	Air is actively drawn through contain and cauliflowers by fans. Rapidly co produce by drawing cold air across cauliflowers	Cauliflowers are sealed inside a chamber and the atmospheric pressure reduced, water evaporates and t cauliflowers are cooled. Water is sometimes added the process.
• Ease of use	Simple: align bins/pallets against forced air fan in cool room. Turn fan to stop cooling.	Variable design. Usually loaded into 'cabinet' and unloaded when cooled.
• Relative capital cost	Low (if using existing cool room)	High. Cools product only without having to cool fans, walls etc.
• Water contact with product	No	No
• Main disadvantages	Low energy efficiency	Capital Cost
• Main benefits	Low capital cost rapid cooling system. Rapid cooling of packed cauliflowers.	Very rapid cooling system. Can avoid water contact on the cauliflowers. Does not require water resistant packaging.
• Recommended use	Large or small scale operation. Suita for a wide range of produce.	Suitable for specific commodities, eg leafy vegetables. Generally with a high surface area to volume ratio.

- **Temperature Monitoring**: For suppliers of equipment contact post harvest researchers. Two types of equipment are used -
  1) Data loggers:
  2) Hand Held Probes
- **Truck transport** – an important guide to selecting truck transport is the Cool Handling Project Team Brochure "Maintaining the Cool Chain – Refrigerated Road Transport". Below is a summary:

Truck type		Maximum travel time for produce at;		
		10 - 12°C	0 - 2°C	<-18°C
Open tray top	Double tarped load	1 hr	NR	NR
Tautliner	Unrefrigerated	3 hr	NR	NR
	Refrigerated*	6 hr	3 hr	NR
Insulated van	Unrefrigerated	3 hr	1 hr	NR
	Refrigerated	unlimited	unlimited	unlimited
Reefer	Unrefrigerated – no power	3 hr	1 hr	NR
	Refrigerated – Generator	unlimited	unlimited	unlimited
	* usually guaranteed to 15°C less than ambient temperature			

NR: Not recommended

Computerised operations and modern handling equipment are important to export industries

7.1.10 Post Harvest Technologies for Extended Shelf Life

Reference: Wilkinson et al (1995) ANL Seafreight Project Research Program for Cauliflower IND, Knoxfield, Victoria, HRDC Final Report.

Various technologies to extend life and maintain quality have been tested in recent years. During 2000/01 and over the 12 months of this project no advanced technologies were found to be in use for export of fresh cauliflowers, other than conventional cool storage of paper wrapped curds into unlined non waxed cardboard cartons. Non waxed cartons are considered to be less rigid than waxed cartons leading to less damage to cauliflowers. Also the Asian countries like to recycle cartons without wax.

Considerable research has taken place to identify the benefits of carton liners influencing atmosphere surrounding cauliflowers after harvest. The poor/nil adoption is possibly influenced by:

- traditional views.
- paper wrapped cauliflowers sweat less and,
- perceptions associated with container risks and possible heating/sweating/breakdown of cool chain and loss of cauliflowers in poly lined cartons between container unloading and the retailer (whilst paper is preferred in hot Asian countries, American exporters however, still use perforated plastic lined single layer cartons.

After considerable research and testing in Australia of various technologies listed below, none have been commercially adopted for cauliflower exports.

Technologies for post harvest management of cauliflower quality.

A) Modified Atmosphere Packaging (MAP)

Modified Atmosphere Packaging (MAP) is a bag or container system that is used to modify the atmosphere surrounding produce. The produce controls levels of CO_2 and O_2 and bag or container control is designed accordingly.

Wilkinson et al (1995) reported that:

CA trials have shown that while CA of cauliflower storage is slightly beneficial, (CO_2 5%, O_2 2%), CA has a significant effect in reducing senescence, rots and physiological disorders, for at least 6 weeks storage.

MAP with O_2 of 11-17% and CO_2 of 2-11% has been used to store cauliflowers for 21-60 days with similar outturn in quality (firm white curds with green leaves and reduced weight loss compared to air storage)

It is important to maintain a temperature of 0°C for successful prolonged MAP storage.

Different types of MAP

i) Plastic Liners (Bags)

Lifespan®: these flexible plastic carton liners are a commercially available Modified Atmosphere Packaging (MAP) product that provides O_2 and CO_2 interchange. Specific liners are recommended for different produce.

For cauliflowers being seafreighted at 0-3°C, storage time is up to 40 days. Benefits of Lifespan® bags are:

- no loss of cauliflower weight and,
- no discolouration of curd and no growth of rots.

The quality of cauliflowers at packing must be good.

Remember:

- Pack only good, sound cauliflowers.
- Pack cauliflowers at recommended pulp temperatures, of no more than 2°C.

ii) Active packaging

Active packaging is the same as MAP and is a system that usually includes a desiccant or O_2 absorber within or as part of packaging eg. Agless® - uses iron reactions to absorb O_2 from the atmosphere.

iii) Maxtend® shipping containers

Maxtend® is a commercially available "one trip" system that converts a standard refrigerated container into an accurately controlled modified atmosphere (MA) container. The container arrives on the farm, a controller is fitted, the container pre-chilled and cooled cauliflowers loaded.

The principle is similar to bags, the respiration of produce pulls O_2 levels down to a set level, below which a controller opens valves to vent the container to the set level.

B) Controlled Atmosphere:

Controlled atmosphere (CA) actively controls the atmosphere inside a room by altering O_2 and CO_2 levels.

Controlled atmosphere (CA) trials have shown the optimum atmosphere for cauliflower storage to be CO_2 5% plus O_2 2% CA can have a significant effect in reducing senescence. rots and physiological disorders for at least 6 weeks storage.

i) CA (Controlled Atmosphere) Containers

Some companies provide containers with full control of internal atmosphere by adding or removing O_2 and CO_2 in as required.

C) Relative Humidity (RH)

Some units for storing/transport of cauliflowers have ability to atomise water back into the atmosphere to increase/maintain RH and prevent weight loss of curds.

MAP – Summary, of research by Wilkinson et al;

- Perspiration – Respiration rates vary with cultivars, districts, time of year and post harvest handling. Pulp temperature should be below 4°C before bags are sealed. Some cultivars will not be suited for MAP if their respiration rates does not fall to within 11 ml/kg/hr within 3 days of harvest.
- Cultivars – Different cultivars grown at the same location can have different storage characteristics as can some cultivars grown at different locations. Black spotting and rots are the major quality problems. The exact causes are not clear cut, although cultivar influences are important. Recent work by WA Agriculture researchers confirms this.
- Curd size – Generally curds for export range 800 gm – 1.2 kg, smaller curds store better than large ones and curds less than 900 gm should be preferred for MAP and prolonged storage.
- Carton design – Wilkinson et al recommend a change from double layer to single layer cartons, to improve storage life, market quality and reduce physical damage.
- Trimming – Some of the small leaves should be retained to protect curds. In good MAP leaves remain green and attractive.
- Black spotting and Rots – Black spotting can develop during prolonged storage and is most likely due to minor physical injuries. Dehydration could also be a factor. CO_2 above 6% and cultivar selection reduce spotting.

  Controls of Rots:

  - Alternaria and mucor: - appropriate pre-harvest sprays
  - Bacterial soft rots – good hygiene, no soil contact and proper post harvest handling to avoid physical damage.
  - Proper shed hygiene in important to keep soil out.
  - Climate effects: In October curd quality was better than in June. Cultivar should be grown in the preferred timeslot/season.
  - Chlorine Dips: A chlorine dip before storage may be beneficial in reducing black spotting. However, benefits are not enough to justify use of chlorine except in hydro-cooling water.
  - Post-harvest Handling and Temperature Management; Rules are:

    i) Remove field heat fast, cool curds to 5°C within 3 hours of harvest.

    ii) During trimming, sorting and grading do not handle curds if pulp temperature is below 4°C – this prevents bruising, discolouration and decease entry.

    iii) Pack curds on day of harvest with pulp temperature of 4-5°C and do not seal liners until pulp temperature falls to 2°C or below. When packed curds are cooled with lines open to 0-1°C within 24 hours. Cooling reduced respiration and minimises risk of rots.

7.1.11 Black Spots, Rots and Blemishes

A key objective for cauliflower exporters is to handle and pack cauliflowers properly to prevent black spotting and blemishes developing further down the export chain.

Black spots are reported to be a concern from time to time. Western Australian researchers have identified measures that could help avoid this problem.

A key is handling and packaging to minimise bruising. Black spots are thought to be caused by bruising, dehydration, temperature influences, over-maturity and out of season production of cauliflowers and is more common in summer and autumn. Rots are caused by a secondary invasion of physically damaged curds by causing pathogens.

The golden rules for handling cauliflowers based on a number of research reports and export experiences are:

- *Avoid bruising*
- *Harvest at the correct maturity*
- *Pre-cool curds to 0-1°C before packing. Aim for this temperature in 3-5 hours (with forced air cooling)*
- *Do not delay cooling more than 8 hours. Aim for maximum 1 hour field to coolroom on warm/hot days.*
- *Maintain a RH of 95-100% in storage.*
- *Don't store cauliflowers with ethylene producing commodities*
- *Use chlorinated hydrocooling in preference to forced air cooling to remove field heat from curds.*
- *Maintain the cool chain from farm to consumer; eg road transport at 0°C and 95-100% RH.*
- *Monitor container temperature, RH and airflow. It is easier to maintain a 6m reefer compared to a 12m reefer.*

NB: WA research indicated bruising is related to maturity. Cultivars may be an issue.

USA research indicated bruising is related to

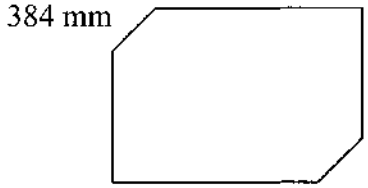
- Erwinia Soft Rot bacteria in soil on plants
- handling temperatures and,
- water content of cauliflowers.

Some researchers claim that the exact causes of black spotting are debatable.

7.1.12 Packaging

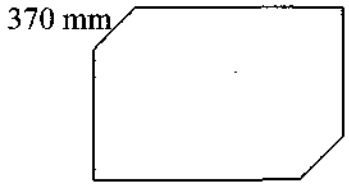
Cauliflowers exported from Australia are almost exclusively packed in unwaxed two piece cardboard cartons. Customers prefer these cartons and the cauliflowers individually wrapped in white waterproof paper.
Carton dimensions are:

- Capacity: 58 L
- Lid



Thickness: 4 mm

- Bottom



Thickness: 8 mm

Lids are labelled with:

- Grower/exporter
- Weight
- Country
- Commodity

Cartons are weighed after packing and double strapped. Bubble wrap is either used in bottom and top or top only of packed cauliflowers

Waxed cauliflowers would be preferred at harvest when field packing, they withstand moisture for example rain and dew and are less likely to move about when stacked on pallets. It is preferable to use one piece cartons that can be assembled without use of metal staples. They will be cheaper to assemble and are less of a food safety risk. Some exporters are concerned that rigid waxed cartons are more likely to lead to greater bruising of cauliflowers and so recommend non waxed cartons.

For comments on USA and Chinese packages, see market profiles in section 7.1.4.

7.1.13 Quality Assurance (QA) – meeting customers specification.

1. Introduction

To consistently provide safe quality cauliflower products that meets the needs and expectations of customers in the most cost effective way, a commitment to QA practices will be the critical factor underpinning a successful export business.

A "do it right the first time" attitude to management of crop production, harvest and post harvest activities on to the customer with special attention to packing and cool chain management, will be essential.

QA can be implemented at various levels of complexity depending on the requirements of customers. QA is a pathway from a simpler HACCP based Freshcare® level, through full HACCP supermarket vendor systems and SQF; to more complex QA using 1S0 and TQM systems. QA needs to be reviewed continually and improved when necessary.

2 QA - Freshcare® level – an example

2.1 Document required – see attached

2.2 Product and handling specifications – see attached

2.3 Product identification and traceability – see attached

2.4 Training – see attached

2.5 Quarantine Protocols (for Japan) – see attached

2.6 Reviewing practices:

2.7 Controlling quality hazards – from growing to packing shed

Monitoring weight of curds is part of QA and begins in the field at harvest time

2.1 List of Current Documents

Document types	Document Name	Code	Issue No	Date	Authorised
List of practices	Practices to control quality and food safety				
Product specifications					
Work instructions	Personal Hygiene Instructions				
Record forms	Owner's property record				
	Packing house plan				
	Property map				
	Production calendar				
	Operations record				
	Spraying record				
	Pest monitoring record				
	Irrigation record				
	Vegetable fertiliser record				
	Plant tissue analysis record				
	Harvest record				
	Work instructions for cleaning & pest control				
	Packinghouse cleaning & pest control record				
	Packing & delivery record				
Preference information					

2.2 Cauliflower Harvest, Handling & packing in the field

Product quality	• Practically uniform white, sound, clean and fresh appearance • Firm well formed, dense, typical of variety • Dome shaped or typical of variety and trimmed of all leaf • Evenly sized, not overmature • No diseases, back spotting, sunburn, insect damage, foreign smell or taste, floret browning or out of specified size. • Specified curd size., 800 gm – 1.2 kg, <250 mm diameter (20-25 per 58 L cardboard carton)
Cultivars	• Those selected for above specifications and good keeping qualities; eg meets specification and in good condition after 15 - 21 days cool storage.
Handling requirements	• Cauliflower must be delivered to coolroom, packing house within 2 hours of picking and within 1 hour on hot days – rapid cool curd, less than 4° within 3-5 hours of harvest & 0-1^0 C before packing. • Maintain curd pulp temperature in coolroom 0-1°C and 0-2°C and 95 – 100% RH in cool chain If packing in bins do not over fill. • Workers should wear protective clothing where appropriate. • Handle curds carefully, curds not dropped. Handle and pack carefully to avoid bruising and blemishing. • Avoid picking from unhealthy or stressed crops. • Harvest in coolest part of the day. • Keep out of direct sun. • Packages and bins must be free of dirt and any other foreign matter. • Container temperature set point: 0°C • Maximum total time for container off refrigeration: 3 hours • Container ventilation: 5-10 cubic metres per hour.
Packaging	• Use clean, white waterproof paper to wrap individual cauliflowers. Carton weights, minimum 18 kg. (range 18-23 kg), average 20 kg. • Use non waxed cartons, pack firmly and place a bubble wrap layer on top.
Food safety	• Levels of chemicals must be below the maximum Reside Limits (MRL) as specified in the Australian Food Standards Code. • Cauliflowers or containers must not contain any physical hazards.

2.3 Product identification and traceability

Each block or unit is clearly identified with a number peg, or code or sign.

Block or unit locations are recorded on the Owner's Property Record and the property map.

A harvest advice is completed for each delivery to the packinghouse in the Bin/Delivery Docket.

A Harvest Record is maintained, detailing the date of harvest, block or unit, variety, number of bins, delivery docket reference, product quality, pest levels or other comments.

A packing and delivery record is maintained for product leaving the farm.

2.4 Training

The person responsible for applying chemicals has a current national Farm Chemical Users Training Program Certificate demonstrating completion of an accredited training course.

All staff carrying out tasks critical to quality and food safety are thoroughly trained, to ensure that the product and handling specifications are achieved. This is recorded in the Training record.

Oral instructions on personal hygiene practices are provided to staff and reinforced with written instructions in the Personal Hygiene Practices shown in Sections ?

2.5 Quarantine protocols

Growers need to check with the packinghouse or export coordinator on any quarantine protocol in place for the export market.

Details growers will supply to the packinghouse/export coordinator include name, address (addresses of properties/blocks if different) and paddock numbers.

Growers should be undertaking sustainable farming practices and operate under IPM and BMP principles. They should also have in place procedures designed to reduce field pests for all export markets according to protocols. For instance IPM (Integrated Pest management) action to eliminate pest populations or reduce the risk from pests. During the export season continually monitor the farm and packinghouse for pests.

Maintain good hygiene and remove all rubbish which may harbour pests.

Monitor for the quarantine pests and diseases critical to export of vegetables. Staff have learned to identify the pests and diseases in the crops we grow.

It is important to note if any insects are found, Japanese authorities will use methylbromide if insects are found and this causes discolouration of cauliflowers.

Quarantine pests

- All species of aphids, caterpillars, thrips
- All species of fly
- Light Brown Apple Moth (LBAM) – *Epiphyas postvittana*
- All snails

Quarantine diseases/disorder

Any identifiable disease/disorder

Injurious Pests

NB: There is no defined lists for fresh vegetable Brassicas exported to Japan.

2.6 Reviewing practices:

Growers should conduct an annual review to confirm that all practices are being carried out as required. The results of the review are recorded in the review checklist.

2.7 Controlling quality hazards – from growing to packing shed

Fresh cauliflower products should be grown with the utmost care and staff advised on how to handle the product correctly. Records will need to be kept of all growing and packinghouse operations that includes observations on crop health and product specifications, including an analysis of soil and plant tissue as necessary to give an indication of crop nutritional needs for product quality. Crop monitoring of pests in the cauliflower field assists in the spray program. An IPM program should be followed to control pests and the application of pesticides recorded in the Spraying Record. A crop monitoring diary needs to be kept to record pest and beneficial insect details. All spraying equipment should be calibrated at least once a year and the results recorded on the Equipment Record.

The following summarises what can be done to control seen and unseen quality hazards in cauliflower products during growing, harvesting and packing.

In the field

- Carry out operations according to the information in the cauliflower sections of approved guides. Particular emphasis should be given to pest, soil and irrigation management as well as nutrition and crop maturity to grow uniform, healthy crops.
- To assist the management of quality in the field, carry out plant tissue analysis and record/monitor pests (monitoring Record) and plant health.

At harvest time:

- Only use clean, sharp cutting equipment.
- Bins, packages, harvest, handling and packing equipment should be free of dirt and any foreign matter that can cause abrasion to cauliflower products.
- Pickers need to avoid physical injury to the cauliflower curd.
- Curds are placed into containers, not dropped, and are emptied carefully.
- Do not overfill bins.
- To minimise heat related damage and maintain quality, harvest in the coolest part of the day.
- Avoid picking from crops that are stressed.
- Crop harvested should be sound with no rots, wounds or unacceptable pest damage.
- Deliver the crop to the packinghouse or cool room within 2 hours of picking and maintain a cool chain between 0 and 2°C.

The above information is a basic guide only to aspects considered in QA. Full HACCP (Hazzard Analysis Critical Control Points) QA will be more detailed eg:

Factors to consider for each operations below include (Source: Wilkinson I., 1993, Guidelines for Active Packaging Cauliflowers)

- **Hazzard** (risk to quality)
- **Control procedure**
- **Specification**
- **Person responsible**
- **Action when out of specification**

Operations to consider;

1. Preharvest
2. Harvest
3. Transport to shed
4. Rapid cooling
5. Cool storage unpacked cauliflowers
6. Sort, grade, trim and pack
7. Cool storage packed cauliflower
8. Load container
9. Transport container to wharf
10. Hold container at wharf
11. Transfer container to ship
12. Shipment
13. Transfer containers to wharf
14. Hold container at wharf
15. Transfer to import coolstore
16. Cool storage at importer
17. Transfer to retailer
18. Cool storage at retailer
19. Retail display

Table 37: Transport to shed

Risk to quality	Control procedure/ record	Specification	Person responsible/record	Action when out of specification
Bruising	Drive carefully	No Bruising	Field manager	• Retrain divers • Grade tracks
Delay between harvest and cooling excessive	Check time between harvest and arrival at cool room	Maximum 1 Hour	Grower Bin Record	• Reject cauliflowers for long term storage, shipment • Speed delivery and loading time to cool room
Notes: Reduce time between harvest and coolroom as pulp temperatures increase through the day.				

7.1.14 Logistics – Freight Councils and Australian Institute of Export

Logistics is the science and practice of moving (transporting) storing and supplying product (cauliflowers).

* Ports To Ports Transit

Logistics business provides important linkages in the export chains, for Business to Business (B to B) or Business to Customer (B to C). The Australian export horticultural industries are well served by existing logistics infrastructures from the farm gate to the customer in the importing country.

Air freight offers frequency, capacity and faster transit times. Frequency at Sydney (14 flights to Japan each week) for example provides competitive rates.

Sea freight offers frequency, greater capacity, economical freight rates and slower transit times that should not be a problem. Good cool chain management for sea and air freight services are critical. Innovations in e-commerce offers many advantages eg., use of internet to provide air freight customers with an on-line freight tracking service.

Table 38: Freight Service Summary; guide only. Refer to industry for latest details

Ex	Sea/month			Air/week		
	Japan	Taiwan	Hong Kong	Japan	Taiwan	Hong Kong
Sydney	14-16	14-16	14-16	14	3	14
Time	16 days	15-21 days	16-22 days	9 hrs	10 hrs	7.5 hrs
Brisbane	14-16	14-16	14-16	3	2	2
Time	9 days	9-17 days	12-18 days	8.5 hrs	9.5 hrs	7.0 hrs
Melbourne	14-16	14-16	17-19	2	1	4
Time	13 days	13-21 days	19 days	9 hrs	10.5 hrs	8 hrs

***Sea and Air Freight Councils:** Those are established in each state of Australia and a part of the Freight Council's Network

With membership representing Government and private enterprise the Councils prime objective is

'To identify impediments in the logistics chain and elsewhere to the global competitiveness of NSW producers, manufacturers and exporters; to deliver and initiate ways and means to provide cost efficient and practical outcomes; and to be a forum for strategic direction.'

'The Sea/Air Freight Council of NSW Inc. will work pro-actively towards achieving impediment free logistics chains to support Australia's trade and the Supermarket to Asia initiative.'

'It is essential that overseas markets have confidence that Australia has the ability to provide and deliver trade to overseas markets in a regular and reliable manner.'

'An impediment free logistics chain is an essential element in establishing that confidence.'

Contact details:

Sea – www.tradegate.org.au/sfcnsw

Air – www.austrainairfreight.com/afecnsw

***Australian Institute of Export** – provides advice and many helpful and informative publications that can assist new and experienced exporters eg.

"The Export Handbook" (17th Edition) – a comprehensive guide to practical aspects of exporting essential for both experienced and novice exporters and is recommended ad the authoritative reference on export practice.

Contact details: www.aiex.com.au

*Market Profile – logistics

These in section 7.1.4 provide details on distribution/logistics for Japan, Taiwan and Hong Kong.

It is important to note;

i) Increasing sales through supermarkets and they can buy direct from farms.

ii) Existing distribution structures (eg importers) can provide advice.

7.1.15 Trial Shipments and Specifications

Bathurst Fresh Cauliflower Exports

Trial Shipment to Taiwan, May 2001

To gain experience locally and to also test a new market, a trial shipment was sent to Taiwan and Singapore during May 2001. The Shipment was arranged through **Don Smith Produce** and the support of Don Smith, the Company's director is gratefully acknowledged. A summary of the trial follows along with product specifications.

In anticipation of the need for future exporting that requires scale of operation and consistency of supply and quality, grower networks and alliances will be necessary. In doing this a grower will not need to sacrifice existing domestic markets and can commit as desired, a smaller or larger area to export.

QUANTITY:	1.5 tonnes (72 x 22kg) average 22 x 1kg balded cauliflowers / ctn
EXPORTER:	Mr Don Smith, Don Smith Produce, Sydney
GROWERS:	Mr George Smith, 'Chevron' Bathurst Mr John Willott, 'Ravenswood' Bathurst Mr Gert Bravenboer, 'Orton Park' Bathurst Mr Vince Gallea, 'Kiallan' via Cowra
DESTINATION:	Taiwan
COOPERATORS:	Qantas Freight CT Freight Forwarders Sandro Baldi, Baldis Refrigerated Transport Des Hargraves, Hargraves Refrigerated Transport Dennis Stevens, AQIS
OPERATIONS:	1. Pre-harvest visits to assess crops 2. Harvest in field, trim, wrap, pack 3. Transport to cool room 4. Weigh and stamp cartons with weight and growers name and address 5. Forced air cooling to recommended 0 – 2^{0}C 6. AQIS inspection 7. Load refrigerated truck 8. Transport cartons to freight forwarder 9. Load container 10. Hold container at airport 11. Transfer container to aircraft 12. Air transport 13. Transfer container for inspection 14. Hold container at inspection 15. Unload container and transfer to importer coolstore 16. Cool storage at importer 17. Transfer to sales outlet 18. Cool storage at sales outlet 19. Sales outlet display
TIMES INVOLVED:	Operation 1: – Friday 25 May 2001 Operations 2: – 8 Monday 28 May 2001 Operations 9: – 12 Tuesday 29 May 2001
PACKAGES:	2 piece non waxed, double layer cardboard (380 x 560 x 280 mm) stapled. Cauliflowers individually wrapped with water proof paper and bubble wrap layer on top.
AGENT REPORT:	A satisfactory result, buyers were keen to source more supply. However cool chain management is a concern as product temperature was as high as 13^{0}C in some cartons.
COMMENT:	The cooperation of all involved is very gratefully acknowledged as many and often new tasks had to be undertaken for the first time. Cool chain management prior to leaving Bathurst could have been better but was difficult due to need to repack some cartons and weigh all. Consequently time to cool down cauliflowers was reduced. The importance and success of a network of growers to provide sufficient good quality product was clearly demonstrated by the four growers cooperating at short notice during a busy time of the year.

Cauliflower Export Specifications (Source: Donald Smith Horticulture Pty Ltd)

Colour: White

Size: 700gm – 1.2kg (preferred 800 – 900gm)

Shape: Domed and tightly packed

Presentation: Cauliflowers are trimmed of leaf, wrapped in dry waxed water repellent paper. Free from insects, soil, disease, blemishes, and physical damage. Cartons are firmly packed with a cushion bubble pad on top.

Packaging:

i. *Taiwan, Hong Kong*; 2 piece carton with double layer sides for extra protection. Preferred weight 22kg. Cartons are double strapped. (Size 380 x 560 x 280)

ii. *Japan;* 2 piece single layer carton holding 10 cauliflowers. (NB: Waxed cartons are thought to contribute to damage to cauliflowers).

Production System: Cauliflowers are cut, packed, wrapped, then forced air cooled within 4 hours of harvest. Once temperature and respiration are stabilised they are transported in refrigerated trucks to the airport for airfreight or sea port for sea freight to customer destination.

In Summary:

NB: Other export coordinators may provide other specifications to meet their own buyer(s) requirements.

A number of issues were identified during this shipment that had an impact on this projects workplan, especially:

i. The biggest opportunities will happen by bringing growers together to form a network or alliance that can work together with a coordinator at a local, regional or national level. Discussions and a workplan have also been initiated by the NSW Lachlan Valley Horticultural Network with QFVG and Lockyer Valley growers to establish such an alliance for the first time between NSW and Queensland vegetable growers.

ii. Whether or not to export a trial shipment if immediate on going supply has not been planned for. The trial shipment however has proven to be a valuable exercise for the inexperienced grower and others in the export chain enabling them to better understand the more complex requirements of exporting. Also customer relationships were starting to develop.

iii. The airfreight trial shipment from Central West of NSW, provided information on several issues, particularly:

- The importance of removing field heat from cauliflowers and keeping the cool chain integrity intact,
- The extra effort required in cutting, wrapping, packing and weighing etc.
- The need to move fast and coordinate thoroughly the delivery from the field to sea or airport departure.

iv. The May trial shipment was judged a satisfactory result. While temperature management was difficult, the buyers were positive in asking for more cauliflowers. **In the Central West, farm infrastructures would need to be improved**, eg. For weighing and double strapping cartons and cool chain management. A second trial shipment (0.75 tonnes) was sent to Mulgowry Farms in Queensland in September.

v. Chains for exporting have been identified (coordinators being either growers, packing house, export agency, export broker or e-commerce) and it will be the decision of the grower to decide which way to go.

vi. Packing is important and is discussed in section 7.1.12.

7.1.16 Insurance and Customs

Protection against various influences affecting payment and the value of cauliflowers or other export products is necessary.

Insurance to consider is

i. Inherent Vice -- to provide actual breakdown of product due to temperature fluctuations or freight company negligence

ii. Insurance against mechanical damage or failure to arrive (eg left our in sun, fell overboard, forgot to load)

iii. Failure to Pay – very important and the Export Finance and Insurance Corporation (EFIC) provides insurance. Telephone 1800 685 109

iv. Insurance against currency fluctuations – which will be less likely the exporter is dealing in US$

Irrevocable letter of Credit

This will ensure the exporter gets paid and can be arranged through a local bank with links to banks in the importer country.

Customs

Permits may be needed and it will be necessary to check. Telephone 1300 363 263 for confirmation

7.2 Domestic Marketing – Fresh Cauliflower

7.2.1 Background

The Australian fresh cauliflower industry has a strong domestic base and especially so on the eastern seaboard.

The industry is characterised by a number of trends during the 13 years, 1986-1999, (for more details see section 5.1.2.)

- A decline in total production of 25%.
- A decline of 10% through Sydney markets – Australia's largest wholesale market place.
- A significant decline in production of 48% and 52% in New South Wales and Victoria – both states have a domestic market focus in comparison to Western Australia which is export focussed and Tasmania which is processing orientated and Queensland which has only recently turned from a declining production base to significant growth.
- Per capital consumption has fallen 52% from 6.0 kg in 1986 to 2.9 kg in 1999.
- Most states have reduced per hectare yields since 1986.
- Western Australian value per tonne of cauliflower is usually twice that of other states, indicating the value of exports to generate greater wealth.

It is likely that the cauliflowers importance to Australian consumers has begun to fade, production on farms is declining and the industry needs revitalisation.

To better understand the market trends, customer needs, and opportunities for domestic marketing the following brief research was undertaken;

1. **A study of consumers and**
2. **Discussions with retailers, wholesalers and food writers.**

The major **implication** of this limited domestic research has been to establish baseline data, a benchmark for future research and marketing recommendations to give cauliflowers a more contemporary place in Australians weekly meals for future industry directions.

7.2.2 Consumers (cauliflower buyers) Study:

An understanding of consumer buying patterns, attitudes and needs was considered an important beginning for developing a profile of the domestic marketplace.

Two approaches were considered, either

- Qualitative research; usually using selected focus groups or small groups of people to sit down with and conduct in-depth discussions that provides information on perceptions, attitudes and motivation and/or
- Quantitative research; usually asking key questions of consumers to also identify similar information as for qualitative research.

Due to budgeting constraints, AC Nielsen was commissioned to undertake a quantitative study.

Aim of study

The aim of the research was to evaluate the consumption, spending patterns and attitudes of consumers toward cauliflowers.

Methodology

An omnibus survey via telephone was undertaken on a sample of 706 people aged 18 years and older in Sydney and Melbourne during April 2001

Omnibus is a cost effective and timely survey technique whereby a number of companies contribute to a weekly questionnaire, each participant including their own exclusive questions (in this case relating to cauliflowers).

The information was collected from the respondents in households randomly selected using an electronic version of the "white pages", so avoiding fax and business numbers.

Interviewers read questions from a VDU and entered respondents answers into a computer which were then analysed.

The computer controls which questions are asked and those which are skipped. The full report is listed in the appendices.

Questions: The questions asked were:

Q.1 On average, how many meals prepared in your household, per week, would include the vegetable cauliflower?

1. 1-2 meals
2. 3-4 meals

3. 5-6 meals
4. 7-8 meals
5. None SKIP TO Q.4

Q.2 Where would you normally purchase cauliflower?

1. Supermarket
2. Fruit Market
3. Greengrocer
4. Corner Store
5. Other specify

Q.3 On average, how much would you normally spend on cauliflower, per kilogram?

1. $0.99 or less
2. $1.00-$2.00
3. $2.01 -$3.00
4. $3.01-$4.00
5. $4.01-$5.01
6. More than $5.01

Q.4 Which of the following best describes your attitude toward cauliflower?

1. Cauliflower is good value for money
2. It is cumbersome to cook cauliflower
3. I don't like the taste of cauliflower
4. I like the taste of cauliflower
5. Cauliflower is good for our diets
6. The quality of cauliflower is poor

IF QUESTIONS 4= CODE 2, 3 OR 6 ASK QUESTION 5.
ALL OTHERS SKIP TO NEXT TOPIC.

Q5 Why did you say that?

Profile of Respondents

The following table shows the distribution of the survey sample

Table 2

		No.	%
	Total sampled	706	100
Sex	Male	353	50
	Female	353	50
Age group	18-24 years	127	18
	25-39 years	220	31
	40-54 years	193	27
	55+	166	24

Other details gained for each question were:

• **Respondent Life Stage**	% of respondents
Partnership without child	31
Partnership with child	26
Single without child	29
Single with child	2
Wid/sep/div., without child	9
Wid/sep/div., with child	2
Not stated	0
• **Respondent occupation**	
Upper white	16
Lower white	23
Upper blue	14
Lower blue	11
Not paid	35
Not stated	1
• **Respondent work status**	
Full/part/casual	66
Home duties	9
Student/ret/unemp	25
Not stated	0
• **Respondent income**	
> $10,000	14
$10,000-$20,000	14
$20,000-$30,000	11
$30,000-$40,000	13
$40,000-$50,000	9
$50,000-$60,000	8
<$60,000	13
Not stated	17
• **Principal grocery buyer**	
Yes	74
No	26

Significantly, 74% of respondents were the principal grocery buyers.

Consumers response to the survey

Q.1 How many meals per week include fresh cauliflower?

A surprisingly high number (34%) of respondents do not eat cauliflower and a majority (47%) of respondents only eat cauliflower 1-2 each week. (Table 3).

When considering age (Figure 1), the proportions who eat cauliflower at different times remained similar as age increases except for some difference for non, when the younger age groups dominate, 34% vs 29% ie the younger people are eating less cauliflower. This is similar to a study by Lewis, Fresh Potato Marketing Research, in 1994 (sample size 1000) which showed (Figure 2) an increase in potato consumption with age. The important implication for the potato industry being a projected decrease in fresh potato consumption from 35kg to 31.5 kg in 2003 to 28 kg in 2002.

Will fresh cauliflower consumption follow in a similar way?

Table 39: Meals per week as a %

	Cauliflower	Potato
1-2	47	19
3-4	14	36
5-6	4	28
7-8	2	14
9-10	NA	0.2
11+	NA	1
None	34	1.8
At least 1 meal/wk	66	98.2

Figure 3: Cauliflower meals per week by age group

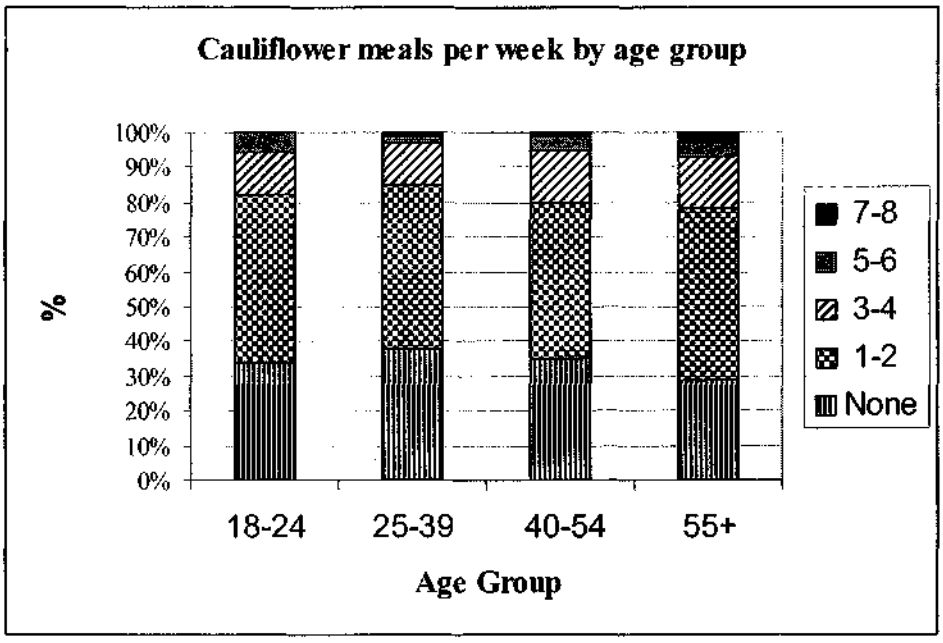
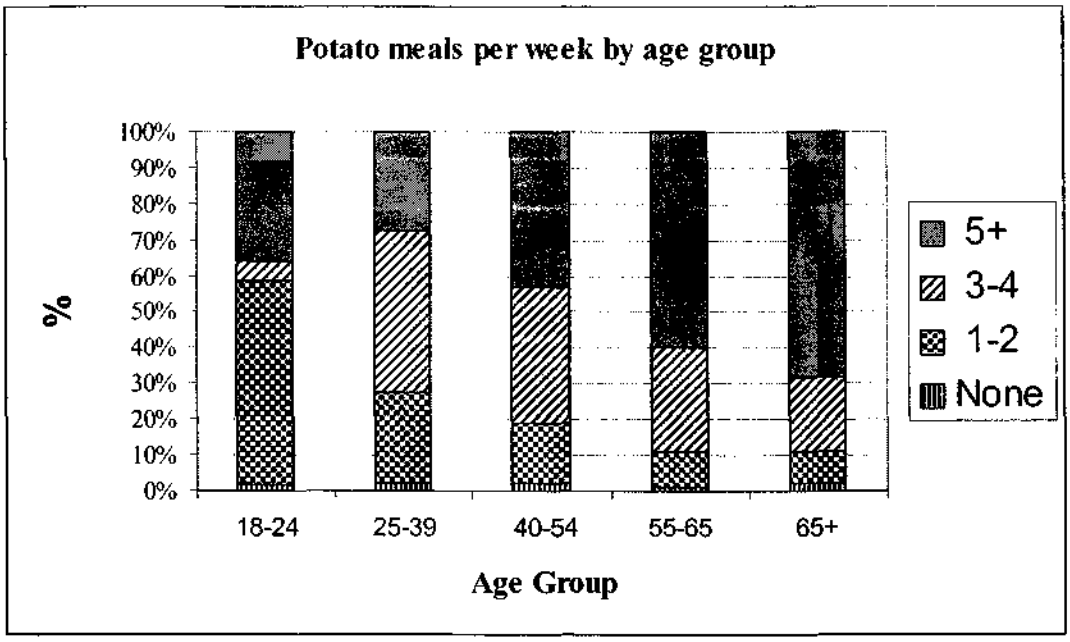


Figure 4: Potato meals per week by age group



Vegetables eaten most often

In the Lewis study the survey respondents were asked to identify the five or six vegetables most frequently eaten in their home were:

Vegetable	%	Vegetable	%
Potatoes	81	Mushrooms	7
Carrots	75	Cucumber	5
Broccoli	54	Capsicum	5
Beans	44	Parsips	3
Peas	42	Eggplant	2
Pumpkin	39	Sweet Potato	2
Cauliflower	39	Choko	1
Onions	23	Squash	1
Tomatoes	20	Swedes	1
Cabbage	20	Broad beans	1
Lettuce	14	Turnips	1
Zucchini	14	Spring onions	1
Spinach	10	Snow peas	1
Sweet Corn	10	Leeks	1
Brussel Sprouts	9	Herbs	<1
Celery	8	Other	3

While cauliflowers remain popular, broccoli is more popular and could be one of the reasons for a decline in cauliflower production and per capita consumption.

Question 2: Where would you purchase cauliflowers

	% of respondents
Supermarket	60
Fruit Market	27
Green grocer	25
Corner store	1

Other	3

There was very little difference between the sexes in their preferences, however the majority (75%) of younger people in the 18-24 year age group preferred the supermarket, compared with older age groups (which ranged 55-60%) who were less likely to shop at supermarkets.

Supermarkets are more popular with the people in the workplace, students, the retired and the unemployed. A busy work schedule, less time for shopping, and perceived value for money are likely factors in favour of supermarket shopping.

Question 3: On average how much would you normally spend on cauliflower per kilogram?

Considered an important influence on purchase habit, the price of cauliflowers, was surveyed. The majority of respondents paid $3.00 or less per kg, with the most popular price range (46%) being $1 to $2 per kg.

A reasonable percentage (11%) did not purchase by the kg, however sales by kg clearly dominate.

	% of respondents
$0.99 or less	15
$1.00-$2.00	46
$2.01-$3.00	19
$3.01-$4.00	6
$4.01-$5.00	1
$5.01 or more	2
Don't purchase by kg	11

The principal grocery buyer, clearly preferred a price in the $1.00-$2.00/ kg range and if not purchase by the kg, were most likely to buy other than per kg.

Melbourne appeared to be a far cheaper city than Sydney to buy cauliflowers eg in the $0.99 or less per kg ranges, Melbourne is 21% versus Sydney's 9%.

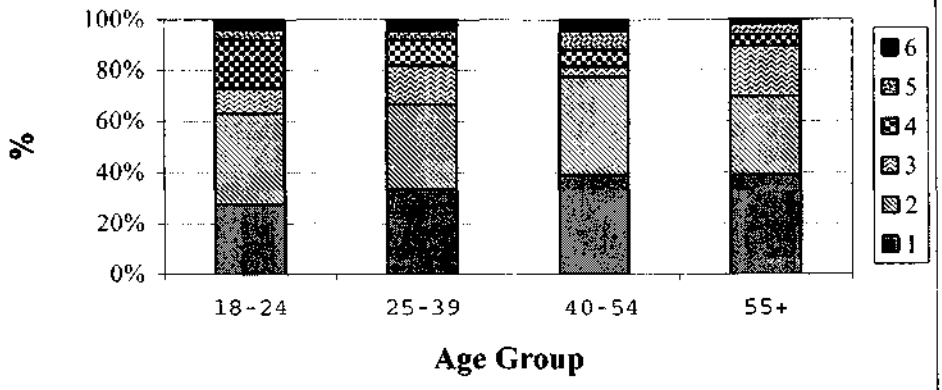
Questions 4: Which of the following best describes your attitude toward cauliflower?

Respondent attitude to cauliflower was assessed by asking a series of questions listed below . This being variable questioning, meant that the total of percentages was over 100. A negative attitude promoted the question 5 - "Why did you say that?" and the responses are shown in Q5.

Generally the older consumers were positive and liked cauliflower taste and dietary benefits. Cauliflower value for money was less of strong point particularly amongst the younger 18-24 year olds (ie, only 15% of 18-24 year olds said it was good value for money) and the principal grocery buyer (83%). Overall, poor quality was not a major problem.

Positive attitude	% of all respondents
1. I like Cauliflower	59
2. Cauliflower is good for our diet	56
3. Cauliflower is good value for money	30
Negative attitude	
4. I don't like the taste of cauliflower	14
5. It is cumbersome to cook cauliflower	8
6. The quality of cauliflower is poor	6

Figure 4: Best describtion of attitudes toward cauliflowers by age group



NB: *1 – I like cauliflowers, 2 – cauliflower is good for our diets, 3 – cauliflower is good value for money 4 – I don't like the taste of cauliflower, 5 – it is cumbersome to cook cauliflower, 6 – the quality of cauliflower is poor*

People in Melbourne (in contrast with Sydney consumers) considered cauliflower quality was poor but liked the taste and were more likely to agree that cauliflowers were good value for money (see also Question 3) with only 44% of Sydney consumers agreeing versus 56% from Melbourne.

The reason why consumers are negative towards cauliflowers

The negative responses and reasons why, are issues the cauliflower industry need to focus on and hopefully turn around consumer negativity and declining per capita consumption.

Whilst only 28% of all the responses felt negativity towards cauliflowers (see Question 4), changing demographics and competition from other foods means cauliflower industries need to be pro active in domestic marketing. Effective strategic planning needs to underpin any measures responses and initiatives.

Question 5: Respondents asked why they are negative towards cauliflowers

	% of Respondents
Don't like the taste/bland/boring	27
Prefer other vegetables/just don't eat it	19
Poor quality, never looks fresh	11
Don't like look/Small	9
Like the taste/family likes	7
Too big, cumbersome to cook/can't buy in small quantities	7
Very seasonal doesn't last long	5
Too expensive	4
Vegetables are not healthy	4
Too much preparation/difficult to cook	4
Childhood phobia	3
Easy to cook/prepare/different/good with other vegetables	9
Don't like vegetables	3
None/nothing	2
Other	8
Don't know	3

There are many reasons for the negative attitude and the 25-39 and 40-54 age groups along with the principal grocery buyer were the most negative respondents.

Competition from other foods – rice and pasta (reference 1).

The Lewis Report, identified rice and pasta as important competing foods.

Rice and pasta is today consumed in 90% of households and the frequency of rice and pasta consumption was shown to be the inverse (Figures 4 and 5) of potatoes and also cauliflowers. Younger age groups are more frequent consumers of rice and pasta than older people.

Figure 5: Number of meals prepared with rice a week by age of respondents (ref Lewis 1994)

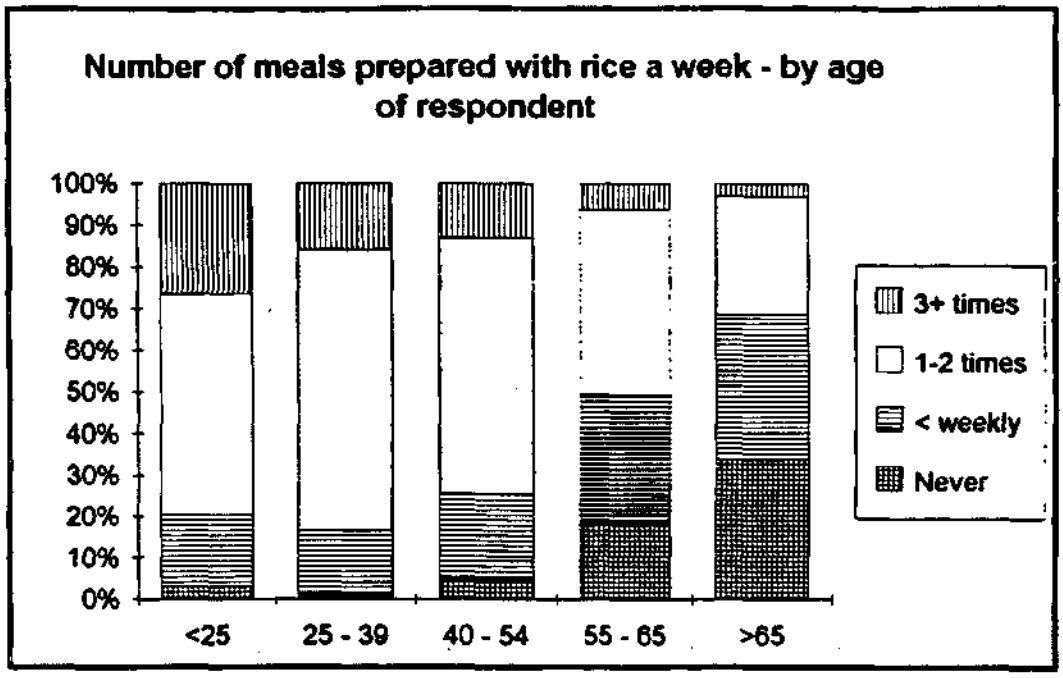
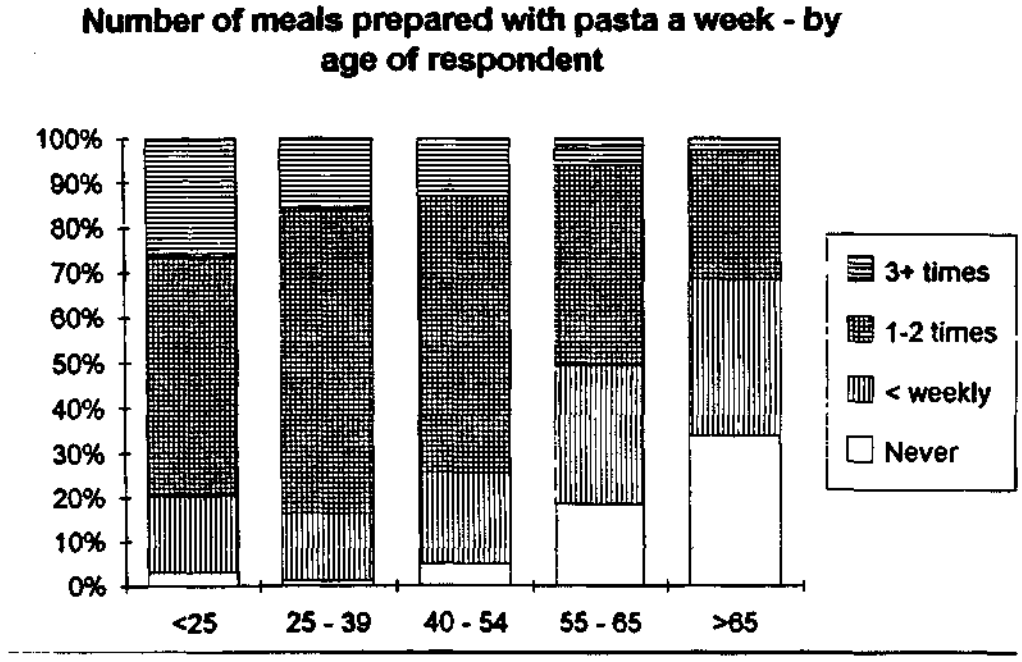


Figure 6: Number of meals prepared with pasta a week – by age of respondent (ref Lewis 1994)



Both rice and pasta have many competitive strengths especially:

- Strong branded competition in product development and significant promotion
- Keep well.
- Quick and easy to cook.

Other foods like takeaway, fast foods and even noodles are also major competitors.

Changes in Diet

Lewis (1994) identified people of non English speaking backgrounds, an emphasis on innovative cooking and healthy diets as important influences in dietary changes underway in Australian homes.

Other factors influencing Lewis identified as affecting potato consumption (and therefore cauliflower) were:

- Less time for cooking.
- Less time for shopping.
- Single person households.
- Both partners are working.
- More meals eaten away from home (restaurants, etc).
- Increased utilisation of home delivery eg Pizza and,
- Loss of family meal tradition with more single/individual meal preparation leading to an emphasis on convenience foods and quickly prepared foods.

Opportunities:

Whilst changing demographics are having likely to have an impact on fresh cauliflower consumption, important opportunities in the future are expected to be in

- Value adding
- Processing
- Food service industries market development (eg retirement homes, hospitals, defence forces etc.)
- Promotion (eg market agents claim that demand picks up with supermarket promotions then falls after promotion ends with a slight residual increase however that goes onto increase overall consumption).
- Consumers are price sensitive and it will be important that all participants in the supply chain are cost conscious. Grower profitability is critical and given that our growers farm production is worlds best, and that cauliflowers are not cheap to produce, then careful management and efficiencies/past farm gate will be important.
- The younger age groups need educating as to the benefits of cauliflowers in their diets.

A number of issues raised in the consumer survey are addressed in the wholesaler, retailer, food writer interview in a report by Ms Sue Dodds that follows. The full report is in Appendices.

7.2.3 Wholesale, Retail and Food Writer Viewpoint –

Cauliflower is a versatile vegetable that most consumers like. However it appears that cauliflower has lost market share to broccoli and Asian leafy green vegetables and it **is not perceived as a contemporary vegetable**.

Cauliflowers are **thought of as a cool weather vegetable**. May to September being the ideal time to enjoy cauliflowers as the quality and price is appealing and the meals, being prepared by consumers during these months are ideal for incorporating cauliflowers, they are associated with comfort food and are best enjoyed hot.

The ten retailers, five wholesalers and 4 food editors interviewed considered cauliflowers to be **"old fashioned"** and **needs "smarting up"**. When asked how they prepare cauliflowers and how they think the average household prepare cauliflowers, they mentioned, soups, stir- fries, served with a cheese sauce or in a mornay style.

Quality and price seem to be a reoccurring point through all my interviews, $1-$2 is an attractive retail price over $2 consumers are price sensitive. In was interesting to note that no interviewee mentioned taste or flavour in reference to quality and price, this indicates that **consumers are buying cauliflowers as an impulse buy based on appearance and a low price.**

Supermarkets believe that quality is matching their specifications however independents feel that supplies available through Sydney Markets were at times inconsistent. It is felt that some hybrid varieties are not being grown in the most suitable environment. They also acknowledge that some growers are doing a great job.

Some independent retailers and food editors believe that growers have extended the season too far. If cauliflower had a shorter season it would give consumers something to look forward too.

Consumers are time poor and want to prepare quick and easy meals. **Convenience is the single most overriding consumer food trend.**[3] The use of convenience products is widespread.

Variety and quality is what consumers are looking for when shopping for their fruit and vegetables. They don't like to buy more than they can use. If they buy a whole large cauliflower and they don't use it all before it gets mildew or black spots than they most likely will be reluctant to buy for a few more weeks, perhaps longer.

There is an opportunity for growers to produce a smaller cauliflower (entrée or bread and butter plate size) that could be individually wrapped. The wrapping would give growers and opportunity to **include cooking instructions, storage & nutritional information and a recipe.** In this way retailers could sell a whole cauliflower that was well presented.

Food writers felt that people under **30 years old would not know how to prepare or select a good cauliflower.**

It is interesting to note that **cauliflower was traditionally served with roast beef or corned beef. Australians are now eating more white meat (chicken, fish, pork) and when you serve cauliflower with these meats the plate looks very insipid.** Meat and Live Stock Australia research indicated that consumers are still roasting however they are cooking smaller roasts, and cooking on hooded barbecues. **Roasts are now being served with baked potatoes, easy salads or with stir-fried vegetables not the traditional vegetables such as cauliflower.**

According to a Food In Focus Report undertaken by Danger Research in June 2001 **over 90% of households own a wok. Cauliflower needs to be positioned more strongly as a stir-fry vegetable** to take advantage of this trend.

There is an **opportunity to market more cauliflower by selling them in florets perhaps in combination with broccoli in a punnet.** Time poor consumers like convenience, to pick up an easy to carry punnet that can be placed straight into the refrigerator has no waste and gives consumer tips on preparation has appeal, however price would be an issue.

However the **packing would have to be smart** and not look like a retailer has chopped up an old cauliflower for a quick sale.

Cauliflowers need to be talked up. In terms of '**value**', ie **nutritional value and value for money.** Consumers over 20 years old are increasingly interested in nutrition.

I would like to **recommend that growers consider sharing their consumer research findings** with wholesalers and retailers so everyone is well informed on what are consumer expectations for the ideal cauliflower.

Australian women's and lifestyle magazines are not incorporating a lot of cauliflower recipes in to their pages. When quizzed on why this is so, most indicated that they had simply forgotten about cauliflower however they were quick to offer to include more information and recipes in the future.

Asian, Mediterranean and Eastern Mediterranean cooking is the style of cookery **that is currently popular. Cauliflowers are often associated with Anglo Saxon cooking** – three meat and vegetables, cauliflower and cheese. However cauliflowers actually originated in the Middle East and could be promoted as an integral ingredient in Northern Indian vegetarian cooking and associated with spicy Middle Eastern cooking.

Consumers need re-educating and need inspiration on how to use cauliflowers. Creamy and cheese dishes are consisted high fat and not nutritious. Growers may like to consider producing recipe cards or brochures that provide simple, creative low fat ways to serve cauliflowers. They would also serve to talk up cauliflowers and freshen up their image.

Growers should consider undertaking some public relations exercise and promotion activities with the food writers and food service industry, promotions and retailers to reinvigorate interest in cauliflowers and to reposition them as a favourite vegetable and talk them up as good value, versatile, nutritious and easy to prepare.

Retailers and wholesalers need to understand consumers better, some are out of touch with consumer expectations in terms of size, so I would also recommended that growers where appropriate share their research findings with the people you who sell their product.

[3] Dangar Research Food In focus Research June 2001

Meat and Livestock Australia (MLA) would be a great partner for the cauliflower industry to work with to revive the partnership of meat and cauliflowers. Meat and Livestock Australia undertake a lot of work with the food service industry and it could be advantageous to investigate opportunities to work together, this is an economical way to extend the use of your product. I understand that the Australian Mushroom Growers have work with MLA, along the same lines successfully.

Another opportunities that could be investigated is liaising **with companies who make convenience products** ie simmer sauces and curry bases to see if cauliflower could be incorporated into their label recipes.

Sydney Markets is extending its retailer support program to incorporate product education classes whereby growers, wholesaler and retailers can exchange information on products. **I recommend that cauliflower growers participate in this program.**

Overall I **don't think** cauliflowers have **totally lost their appeal**. If growers produce a white, tight head then consumers will buy them. **What is required is marketing** to put them back on the consumer shopping list, **giving them a more contemporary place** in Australian's weekly meals.

Any marketing or public relations should also serve to **position cauliflower as good value at a price higher than $2-a head retail**. In this way everyone in the supply chain would benefit financially.

8.0 Business Support

Government at the three levels, local state and federal offer a range of support programs that can be considered when developing an export business. For the astute managers, this support can be significant. Networking and lobbying could also be important.

Andrew Ford, formerly Agribusiness Development Manager with NSW Department of State and Regional Development summaries key programs and assistance.

8.1 Key Federal government programs

- ***Regional Solutions Program***

http://www.dotrs.gov.au/regional/solutions/

Regional Solutions provides some $90 million of funding over four years to enable communities to put into action development projects that will lead to stronger local economies and improved access to services.

The Program primarily aims to work with rural and regional communities facing economic challenges, a declining population due to industry restructuring, a lack of development opportunities, or high levels of unemployment and social disadvantage.

- ***Regional Assistance Program (RAP)***

www.dewrsb.gov.au/employment/programmesAndServices/rap

The fundamental purpose of the Regional Assistance Program (RAP) is to generate employment in metropolitan, regional and remote Australia by encouraging local community action to boost business growth and create sustainable jobs. It provides seed funding for innovative, quality projects of value to the community.

Proposals could include, for example:

- Small business support and development projects such as supply chain networks and business cluster strategies,
- Projects aimed at diversifying the economic base of a region, through generating new business, industry, investment or tourism activities;
- Projects that support infrastructure development in local communities,
- Projects that identify skill gaps and ways to improve links between schools, training providers and industry,
- Projects specifically addressing the employment needs of and opportunities for disadvantaged groups.

- ***Food and Fibre Chain Program***

www.supermarkettoasia.com.au/chainsprogramme

The Food and Fibre Chain Program assists Australian businesses improve their competitive performance by implementing superior demand chain practices. FFCP projects range across Horticulture, wool, grains, meat and packaged consumer goods.

- ***New Industries Development Program (NIDP) - Pilot Commercialisation Project (PCP)***

www.affa.gov.au/docs/food/nidp/pilot

PCP funding is available to assist in taking a new product, service or technology from initial market assessment and R&D (laboratory or trial crop stage) through formation of chain relationships, pilot trials and development of business strategies and proposals to a state of readiness for full-scale commercial investment. Grants for pilot commercialisation projects are provided on a matched dollar for dollar basis with the applicant, to a maximum NIDP contribution of $100,000.

- ***NIDP - In-Market Experience Scholarships:***

www.affa.gov.au/docs/food/nidp/index

The New Industries Development Program (NIDP) is offering up to 15 In-Market Experience Scholarships to innovative Australian agribusinesses to enhance the rate of commercialisation of new niche agribusiness products,

technologies or services. The NIDP will provide support to innovative Australians to build on known strengths, explore new opportunities, commercialise market-driven solutions based on innovation and compete successfully with the best the world has to offer.

Up to 15 scholarships (including at least one from each State and the Northern Territory (with the ACT and NSW classed as a single jurisdiction) may be awarded to a maximum of $30,000 each.

Scholarships awarded will be used to assist selected small-medium sized agribusiness enterprises (SME's) to fully participate in alliances, build relationships with potential customers and gain experience in new areas of business and markets.

- ***FarmBis***

www.affa.gov.au/farmbis/

The Farmbis program aims to help primary producers participate in business management training to improve their business. The program can help a farm management team meet identified training needs and provides funding for training activities including:

- financial management;
- marketing;

- ***R & D Start***

www.ausindustry.gov.au

The R & D Start program assists Australian companies undertaking R & D projects to improve their commercial viability. The program concentrates on small to medium sized enterprises with a strong focus on innovation.

- ***Commercialising Emerging Technologies (COMET)***

www.ausindustry.gov.au

COMET is a Commonwealth Government program focusing on innovation and its commercialisation. COMET is designed to increase the commercialisation of innovative products, processes and services, by providing individuals, early-stage growth firms, and spin-off companies with a tailored package of support to improve their potential for successful commercialisation.

Help for successful applicants will include supporting paths to commercialisation such as;

- Raising capital from 'business angels' or venture capital funds,
- Borrowing money,
- Licensing,
- Joint ventures or strategic alliances.

- ***Biotechnology Innovation Fund***

http://www.ausindustry.gov.au/documents/dir84/doc536484.html

The Biotechnology Innovation Fund aims to increase the rate of commercialisation of Australian Biotechnology ventures by reducing the cost of demonstrating "proof of concept" for new biotech initiatives. Grants of up to $250 000 are available on a dollar for dollar basis.

- ***Tradex***

http://www.ausindustry.gov.au/documents/dir65/doc507265.html

Tradex is an industry assistance program, which will allow for the importation of goods without payment of customs duty or other taxes, provided the goods are subsequently exported or incorporated in other goods that are exported.

- ***Innovation Investment Fund***

http://www.ausindustry.gov.au/documents/dir29/doc501129.html

The Innovation Investment Fund (IIF) Program is designed to promote the commercialisation of Australian R&D, through the provision of venture capital to small, high-tech companies at the seed, start up or early expansion stages of their development.

- ***Regional Telecommunications Infrastructure Fund***

www.dcita.gov.au/graphics_welcome

Networking the Nation will provide funding for regional, rural and remote communities to identify their communications needs and develop projects that meet those needs. The scope of projects that may be funded through Networking the Nation is broad. Examples of the types of projects which could be considered for funding, include:

- infrastructure-one-off capital funding to improve the quality of telecommunications infrastructure;
- innovative technology-funding for trials or pilots of innovative technology;
- planning-funding to assist in identifying community needs for particular telecommunications services and uses;
- service access-such as funding to establish Internet hubs, or remove the STD charge for rural and remote access to the Internet;
- awareness-funding for elements of an overall project aimed at increasing community awareness or creating demand for online and related communications services;
- training-training elements of broader projects, or funding for academic or training groups as part of a coordinated proposal;
- Employment-start up or relocation and training costs to help establish communication network assistance services, such as Operator Assistance Services for phone companies and information services for industries such as airlines, insurance and so on.

- ***Export Market Development Grants***

www.austrade.gov.au

The EMDG provides aspiring and current exporters a reimbursement of up to 50% on certain marketing and export expenses. Information kits and applications are available through AUSTRADE. Exporter must spend over a predetermined amount before qualifying for the program.

- ***Agriculture – Advancing Australia***

  www.affa.gov.au/aaa

  The AAA is a Federal Government Initiative aimed at helping primary producers become more competitive, sustainable and profitable.

  AAA Programs include

  - AAA-Farm Innovation Program

    www.affa.gov.au/farminnovation

    Grants to adopt innovation
  - AAA – Farm Growth Through Export Growth

    www.affa.gov.au/exportgrowth

    maintaining and improving market access

8.2 Key State Assistance

NSW Department of State and Regional Development: www.business.nsw.gov.au

- ***Agribusiness Development Managers***

The Agribusiness Alternatives Program provides a range of business services to agricultural-based enterprises and communities. It aims to ensure that these can maximise their profitability and sustainability, and take up opportunities in alternative industry sectors where relevant. Services are offered through a network of twelve Agribusiness Development Officers who offer a range of non-financial support.

- *Business Development Managers*

Business Development Managers provide a range of non-financial assistance and support, including enterprise improvement programs, small business analysis & improvement support, export marketing and strategic planning support. Their role is through project facilitation and a mentoring process.

- *Export Advisors*

A regional export advisor network has been established with advisors in 6 regional locations around NSW. The program aims increase participation in export marketing and to ensure regional businesses are export ready prior to entering new international markets.

- ***Industrial Supplies Office (ISO)***

The ISO organisation has offices throughout Australia and New Zealand. ISO exists to assists businesses source their supplies from locally and Australian manufactured goods and services in stead of imported goods.

Other States and Territories have organisations, which deliver similar programs to help business and industry

Key Programs delivered by NSW Department of State and Regional Development:

- ***Regional Business Development Scheme (RBDS)***

The RBDS aims to assist sustainable regional enterprises and boost employment and investment in regional areas. The RBDS may subsidise costs in areas including feasibility analysis of a location, business planning consultancy subsidies, plant & equipment removal costs and skills training for firms entailing substantial investment and job creation projects.

- ***New Market Expansion Program (NMEP)***

The objective of the NMEP is to provide assistance to actively change the culture of regional businesses, to assist firms to build confidence, networks and skills to research and target new markets and break the cycle of dependence on traditional local markets. New markets are defined as outside the region the business is currently operating within, it may include new regions, other states and international markets.

- ***New Export Opportunities Program***

The objective of the New Export opportunities program is to encourage and increase participation by regional NSW companies in International markets by hosting and organising International trade missions and market visits. The program is available to businesses that can demonstrate they are export ready.

- ***Developing Regional Resources (DRR)***

The Developing Regional Resources Program aims to develop best practice methods in local economic development, which are transferable to other NSW locations. It also assists local development agencies to respond to the needs of their regional communities. Assistance is provided to regional development agencies and organisations as a part contribution toward the cost of employing short-term external personnel to address the region's development priorities. Funding is provided on a project basis and is not ongoing.

- ***Small Business Expansion Program (SBEP)***

The small business expansion program gives small business owners a chance to access external support to innovate and grow. The program assists small businesses with a subsidy towards business planning, operational issues and changes, market development and financial strategies.

- ***High Growth Program***

This programs aims to help business that are demonstrating consistently high business growth capacity. The program aims to enhance the performance of these fast growing companies to help them reach their full potential. Assistance is tailored to the demand of each business and includes export market planning, market entry strategies, systems reviews and networking opportunities.

- **Technology Diffusion Program**

This program is a joint effort between the Commonwealth and NSW Department of State and regional Development to assist small to medium size enterprises accelerate their adoption of appropriate new technologies. The program aims to raise the awareness of new technologies and management practices and assist businesses identify, evaluate and adopt the most appropriate technologies for their business.

- ***Australian technology Showcase (ATS)***

The ATS is an international campaign to promote the best of Australia's new innovations. The overriding aim of the program is to increase exports of new Australian innovations and attract investment into local companies by promoting the capabilities of Australian Developed technologies. Participants who are selected for the ATS will be able to show that their project is recognized and supported by the industry and scientific community and represents a standard of technological or design excellence.

USEFUL WEBSITES:

New Crops DOOR-Marketing – Do Our Own Marketing Research Information Booklet *has a list of more than 250 useful websites for agribusinesses.*

Australian Agricultural Web site	www.agnet.com.au
Agriculture, Fisheries & Forestry - Australia	www.affa.gov.au
Australian Commonwealth Government	www.fed.gov.au
Australia New Zealand Food Authority (ANZFA)	www.anzfa.gov.au
Australian Taxation Office	www.ato.gov.au
Australian Technology Showcase	www.techshowcase.nsw.gov.au
AusIndustry	www.ausindustry.gov.au
AUSTRADE	www.austrade.gov.au
Business Entry Point	www.business.gov.au
Department of Primary Industry	www.dpie.gov.au
Horticulture Australia	www.horticulture.com.au/
NSW Department of State & Regional Development	www.business.nsw.gov.au
Rural Industry, Research & Development Corporation	www.rirdc.gov.au
Smallbiz	www.smallbiz.nsw.gov.au

9. DISCUSSION

The future survival and prosperity of the Eastern Australian cauliflower industry (along with other vegetable industries) will be very much dependent on the success of export market development. This research has proven that it possible to develop the export cauliflower industry and that new markets like Japan are viable.

Grower networks and alliances do work and are the critical link necessary for providing consistency of quality, continuity of production and scale of production that is so important in today's competitive marketplaces.

Without doubt exporting requires a commitment and dedication over and above domestic marketing, but all the evidence shows that those industries with a good export base are the most successful and prosper far more. This is why it is so important for industry to not only nurture the tentative first steps for export development undertaken in association with this research, but to go on and provide far greater commitment, dedication and production for exporting.

A successful domestic market base will underpin viable export business. Sections of the Australian cauliflower industry that remain domestic market focussed have an additional challenge in turning around cauliflowers loss of appeal in the eyes of Australian consumers.

All sections of the industry will benefit from planned new domestic marketing initiatives that gives the cauliflower a more contemporary place in Australian weekly meals, put them back on the shopping list as good value for money and reposition them as a nutritious favourite vegetable.

10. Bibliography and Recommended Reading

McVeigh V., et al (1998) *Export Cauliflower Quality Improvement 1996-1998.* Research Final Report, VG94043, Horticulture Australia Limited.

Lopresti, J et al (2000) *Better Handling and Quality Management of Broccoli Handbook*, IHD, Department of Natural Resources and Environment, Victoria.

Palmer, M., Dahlenburg, A. *1999 Vegetables: Quality is Cool (Cool Handling Vegetables Manual)* Horticulture Australia Limited and South Australian Research and Development Institute.

Evaluation of Cauliflower and Broccoli Varieties (1999-2001) Plantings 1-16. Department of Agriculture, Manjimup, Western Australia.

Gartrell, P. (1997) *Vegetable Budgeting Handbook for the Manjimup District*, Agriculture Western Australia.

Carriér Transicold, *Controlled Atmosphere Handbook* – A Guide for Shipment of Perishable Cargo in Refrigerated Containers, Carrier Corporation, New York, USA.

Supermarket to Asia, 1999, *Food Exporters Guide to Government Services*, Locked Bag 4911, Kingston, ACT.

Steps to Successful Exporting – Austrade Booklet

Developing an Approved Supplier Program for Fresh Produce a guide for customers and suppliers. QDPI 1999

Approved Supplier Requirements for Fresh Produce Murrumbidgee College of Agriculture Shortcourse

Code of practice for the safe use of chemicals in agriculture.

Beckingham, CR., et al (1999) *Approved Supplier (Freshcare©) Manual*, Cauliflower Growing and Packing Examples, NSW Agriculture.

Wilkinson, I., 1995, *Guidelines for Use of Active Packaging – Cauliflower*, Natural Resources and Environment, Victoria.

Lewis, T., 1994 *Fresh Potato Marketing,* Horticulture Australia Limited (formerly Horticultural Research & Development Corporation), Report No PT 201

Story A, Simons D., 1989, *Fresh Produce Manual: Handling and Storage Practices for Fresh Produce,* Australian United Fresh Association

Story A., 1996, *Code of Practice for the Road Transportation of Fresh Produce.* AUF Transport Advisory Council

11. APPENDICES

- Domestic Markets
    - A C Neilsen Consumer Survey
    - Sue Dodd Retailer, Wholesaler and Food Writer Survey

- Technology Transfer – on going

(i) Publicity

- Lachlan Sets Up Shop in Japan – The Land, 15 November 2001
- Asian Export Opportunities – Western Times, 22 March 2001
- Top Prices for Best Caulis – The Land, 5 April 2001

(ii) Group Activities

- 23 October 2001 – Grower visit to Sydney Sea and Air Freight Ports
- 5 November 2001 – Grower Meeting Bathurst – Report Back
- 7-8 June 2001 – meeting between Lachlan Valley Horticultural Network and Queensland Fruit & Vegetable Growers
- 2 April 2001 – grower meeting – Planning Trial Shipment