

Taking stock of the Australian Asian vegetable industry

Alan Davey
Rural Industries R&D Corporation (RIRDC)

Project Number: VG09074

VG09074

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

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

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ISBN 0 7341 2504 6

Published and distributed by:
Horticulture Australia Ltd
Level 7
179 Elizabeth Street
Sydney NSW 2000
Telephone: (02) 8295 2300
Fax: (02) 8295 2399

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Taking Stock of the Australian Asian Vegetables Industry

RIRDC Publication No. 10/211



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**Rural Industries Research and
Development Corporation**

Taking Stock of the Australian Asian Vegetables Industry

by Barry Lee

November 2010

RIRDC Publication No. 10/211
RIRDC Project No. PRJ-0003601

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ISBN 978-1-74254-176-1
ISSN 1440-6845

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Publication No. 10/211
Project No. PRJ-003601

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Electronically published by RIRDC in November 2010
Print-on-demand by Union Offset Printing, Canberra at www.rirdc.gov.au
or phone 1300 634 313

Foreword

This report is targeted at all groups involved in the Australian Asian vegetable industry, and builds upon previous RIRDC studies to provide an up-to-dated snapshot of the industry.

A previous study showed that the Asian vegetables industry had grown from approximately \$50 million in 1994 to over \$135 million in 2002, a growth rate of 13% per annum. This is a strong rate of growth when compared to the overall Australian vegetable industry. This stocktake report provides an update on the industry's growth and outlook and shows that, based upon latest Australian Bureau of Statistics figures, the industry was worth \$204 million in 2007/08, representing an annual growth rate of 19% over the previous two years and accounting for 6% of sales in the broader Australian vegetable industry.

Market gardeners and larger scale producers represent the major groups of growers in the Asian vegetable industry. Recently, a third group of hydroponic growers has emerged and this technology has attracted new growers to the industry. Market gardeners represent the largest sector of the industry. It is a culturally diverse, geographically scattered and often isolated sector which represents the most significant risks to the industry. Although the growth of the industry needs to be based upon an approach which balances the commercial, environmental and social development needs of all three sectors of the industry, the long term future and sustainability of the industry as a whole depends on the success with which industry and government can engage with individual growers.

This project was jointly funded by RIRDC, and Horticulture Australia Limited (HAL).

This report is an addition to RIRDC's diverse range of over 2000 research publications and it forms part of our New Plant Products R&D program, which aims to facilitate the development of new industries based on plants or plant products that have commercial potential for Australia.

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Acknowledgments

Connectica International wishes to acknowledge the assistance of the following individuals with the compilation of this report:

- John Burt Department of Agriculture and Food, Western Australia
- David Chenu Horticulture Australia Ltd
- Vanessa Clark Bundaberg Fruit and Vegetable Growers
- Peter Del Santo AgAware Pty Ltd
- Maureen Dobra The Loose Leaf Lettuce Company
- Jenny Ekman Industry and Investment, NSW
- Patricia Flannery Consultant to the Northern Territory horticulture industry
- Lucinda Hogan Keringal P/L (for the Vegetable Industry Development Program)
- Ian James Australian Vegetable Industry Economist
- Alison MacGregor Scholefield Robinson Mildura
- Jan Paul Moort GHD Hassall
- Sophie Park Industry and Investment, NSW
- Melina Parker Milton Farm Pty Ltd
- Frances Parker University of Western Sydney
- Mike Redmond Virginia Horticulture Centre
- John Roach Fresh State
- Ingrid Smith Agricultural Produce Commission, Western Australia
- Soon Chye Tan Department of Agriculture and Food, Western Australia
- Hugh Tobin AUSVEG

Abbreviations

ABARE	Australian Bureau of Agricultural and Resource and Economics
ABN	Australian Business Number
ABS	Australian Bureau of Statistics
APC	Agricultural Produce Commission of Western Australia
BRS	Bureau of Rural Sciences
CAGR	Compound Annual Growth Rate
CALD	Culturally and Linguistically Diverse
DIMA	Department of Immigration and Multicultural Affairs
GAP	Good Agricultural Practice
Ha	Hectare
HAL	Horticulture Australia Limited
HACCP	Hazard Analysis Critical Control Point
IDO	Industry Development Officer
IHD	Institute of Horticultural Development, Knoxfield Victoria
IPM	Integrated Pest Management
\$K	Thousands of Dollars
LOTE	Language Other Than English
\$M	Million of Dollars
MAP	Modified Atmosphere Packaging
NESB	Non English Speaking Background
NORADA	Northern Rivers Agricultural Development Association
NSW	New South Wales
NT	Northern Territory
OH&S	Occupational Health and Safety
QLD	Queensland
RIRDC	Rural Industries Research and Development Corporation
SA	South Australia
SARDI	South Australian Research and Development Institute
T	Metric Tonnes
TAS	Tasmania
VIC	Victoria
VIDP	Vegetable Industry Development Program
VHC	Virginia Horticulture Centre
WA	Western Australia

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Executive Summary

What the report is about

With the growth of the Asian vegetables industry from approximately \$50 million in 1994 to over \$135 million in 2002, the industry grew at a rate of 13% per annum. This is a strong rate of growth when compared to the overall Australian vegetable industry. However since 2002, there has been no further study of the industry. This stocktake report provides an update to the industry's size, growth and characteristics, and the sustainability issues affecting the industry.

Who is the report targeted at?

This report is targeted at policy makers, industry representatives, researchers and facilitating arms of government.

Background

Asian vegetables have been seen as a specialised niche, the preserve of small market growers catering for Australians of Asian descent. In general, the growth of demand for Asian vegetables has been attributed to the recent growth in the number of immigrants from Asia. However, more recently there has been recognition that Asian vegetables are becoming an increasingly important part of the Australian diet. Nowhere is this reality more evident than on supermarket shelves where Asian vegetables have grown in both volume and variety.

RIRDC has supported the development of the Asian vegetable industry in Australia with its *Asian Foods* and subsequent *Cultural and World Foods* research programs. In particular, RIRDC has supported ongoing strategic reviews of the industry and these studies provided key information in identifying the priorities and research needs for the industry. This report builds on these previous industry reviews and provides a baseline of information for the industry.

Aims/objectives

The objectives of this study are to review and analyse the current situation in the Australian Asian vegetable industry and assess the sustainability of the industry and future priorities.

This study provides:

- a stocktake of the size and characteristics of the industry
- information critical to understanding the issues affecting industry productivity and sustainability
- key information for research planning by RIRDC and HAL, and other Government agencies
- an opportunity to better address key industry communications challenges, especially the engagement of growers with culturally diverse backgrounds.

Methods used

The approach of this study was two-fold:

- Firstly, to collate and analyse industry statistics for Asian vegetables. Prior to 2005/06, studies have been based upon a mixed collection of national, state and wholesale market data. This current study uses ABS data which has been collected since 2005/06 and provides the first reliable and consistent set of baseline data for the industry. This is important as the data and the methodology are repeatable, and will enable the identification of future industry changes and trends.
- Secondly, to meet with growers and other industry groups to 'ground truth' the above statistics and understand key issues at a farm level. While these discussions are subjective, they aim to

provide insights into the key issues impacting upon the sustainability of the industry. In turn, this can assist with reshaping research priorities and understanding industry priorities such as communication and training requirements.

Results

Industry Profile

The report shows that based upon recent Australian Bureau of Statistics figures (ABS, 2009) the value of the Australian Asian vegetables industry has grown to \$204 million, This represents an annual growth rate of 19% for the period 2005/06-2007/08. Based upon a value of \$3.4 billion for the Australian vegetable industry in 2007/08, the Asian vegetables industry contributes approximately 6% to the value of the Australian industry.

Leafy Asian vegetables (such as Chinese cabbage, *pak choy*, *choy sum*, *gai lan* and *kang kong*) are the most significant Asian vegetable by both value and volume. In 2007/08, the value and volume of leafy Asian vegetables were more than twice the value of other groups of Asian vegetables such as spring onions and shallots or parsley and herbs.

Queensland is the largest producer by both value and volume of production, followed by NSW and Victoria. This has changed since the previous studies where NSW was the largest producer, and this is due to the growth of ginger production in Queensland.

Grower numbers have varied but overall have grown by 19% to 1,414 growers during 2005/06-2007/08. However as discussed at Section 3.2, this number is likely to under-estimate the number of growers as the ABS data excludes growers who do not have an Australian Business Number, and with an annual turnover of less than \$5,000.

While ‘market gardeners’ and ‘scale producers’ represent the major number of growers in the Asian vegetable industry, a third group of hydroponic growers has emerged. This hydroponic grower group is significant as the utilisation of such technology has attracted new growers to the industry which is a positive sign of growth and investment in the industry.

Industry Concerns for Future Growth

- The Potential for Over-Supply of Asian Vegetables in Australia

With such strong growth rates on the supply side since the 1990’s, the industry is questioning the risk of pressures on pricing due to the potential for supply to exceed consumer demand. While HAL’s Vegetracker project shows that consumers are buying more Asian vegetables, since February 2008 the growth in purchasing has slowed to become more gradual. The sustainability of pricing in the industry may be threatened by an over-supply of Asian vegetables.

- The Decline in Export Markets

There has been a long-term trend of decline for exports of Asian vegetables. Chinese cabbage is the only major Asian vegetable for exports, and these are supplied by Queensland and Western Australia who together account for 98% of export volumes. Exports have been eroded by some 80% since 2003/04 due to market competition and the strength of the Australian dollar.

- Production Practices

It is likely that there will always be varying levels of knowledge and understanding of farming practices and associated regulatory issues by growers in this industry. While such issues must be addressed, the answer lies in providing adequate support for these growers. While regulation is important, growers facing fines because they are unable to read chemical labels will not assist in the growth of a sustainable industry. Extension and the provision of adequately resourced, effective support is essential. This study supports the approach advocated by previous researchers which is essentially a socio-technical extension model.

- **Biosecurity**

The message from industry is that their role in managing biosecurity for the Asian vegetables industry is not well understood. At present, many current biosecurity programs do not effectively engage growers and/or stakeholders. Communications in these programs tend to be top down, one way communications. A solution that goes beyond a simple communications program, into a participation program, has the potential to be more effective and self-sustaining in the longer-term.

- **Peri-Urban Pressures**

Asian vegetable production is but one of the many 'intensive' horticultural practices by groups involved in the peri-urban landscape. It is important to ensure that the Asian vegetable industry is supported by, and able to use, HAL's peri-urban tool kit. However, the additional challenge for the Asian vegetable industry is that of communication. The industry is widespread and disparate and for many growers, English is not their first language. As a result, their ability to understand the tool kit and respond to standard communication channels should not be assumed.

- **Communications and Extension**

Communication with growers of other major vegetables in the industry is relatively straightforward and is well serviced through the many existing industry, supplier and Government organisations. However, it is evident that many of the same communication channels have not responded or changed as a result of the growth in the number and cultural diversity of growers in the Asian vegetables industry. The diversity of growers is significant with many growers being from parts of not only East Asia, but also of Indian, Greek, Italian, Maltese and Lebanese background. Communication systems to date have overseen the assimilation, but not necessarily the integration of these culturally diverse growers into the industry.

To address the needs of the culturally diverse growers in the industry, communication and extension needs a 'bottom-up and top-down' approach:

- Bottom-up from the growers. Communication should occur at the social or community level to appreciate the 'realities of market gardening life' and the practical issues of gaining access to services. Most importantly, trust and relationships should be developed with community elders and should assist to identify potential industry leaders. Subject to community participation, technical education and skills may subsequently be integrated into these communications.
- Top-down from the Government. The co-ordination between various agencies that interact with growers should be improved. Many agencies have sound and well-intended programs however many of the programs are funded for short project periods which is not consistent with the fact that many issues are ever-present (e.g., the need for bilingual services). A strategic 'whole-of-Government' approach to engaging with especially first generation growers should be reviewed. Importantly it should be acknowledged that many first generation growers come from situations of war, civil unrest and distrust of Government. As a result, this approach may need to be 'inter-disciplinary' and include an agenda of social welfare advocacy and not just technical extension issues as related to Asian vegetable production.

Implications for relevant stakeholders

There are now three groups of growers in the industry involving traditional practice market gardeners, commercial scale producers and hydroponic growers. While a large proportion of market gardeners may have difficulty with literacy, limited capital and occupy smallholdings, they nonetheless dominate the industry. Industry support and research has been effective in shifting many in the industry from traditional practice employed by first generation growers to modern commercial practice. Research should continue to focus on facilitating this transition. However, this focus should not be at the expense of those who have made the transition to commercial production and require constant innovation and productivity improvements to deliver product competitively to markets.

The future of the industry lies with the support of all three groups of growers. The sustainable growth of the industry needs to be based upon an approach which balances the commercial, environmental and social development needs of all parts of the industry. Industry and government need to develop sustainability policies which incorporate ways in which to most effectively engage with all the growers in the Asian vegetables industry.

Recommendations

These recommendations have been developed to support the sustainable growth of the industry.

Objective: Development and growth of the Australian markets

- **Recommendation 1.** Support projects that develop the market through education of consumers about the many types of Australian Asian vegetables and their value and benefits.

Objective: Improvement of the commercial viability of the Asian vegetable industry

- **Recommendation 2.** Support development of best practice production and research which will improve industry productivity. Priority areas in this regard include:
 - the registration and use of minor use chemicals
 - pest and disease management to improve field and hydroponic production
 - technical support for Chinese cabbage (export) growers who need to transition to new crops
 - technology which is able to improve farm yields and product values
 - structural adjustment research for evaluating best practice production systems suitable to the environmental conditions of South Australia.

Objective: Improvement of the biosecurity capability of the Asian vegetable industry

- **Recommendation 3.** Support research that targets the improvement of growers' and institutional capacity for the surveillance and characterisation of pests and diseases.

Objective: Dissemination of HAL's peri-urban tool kit

- **Recommendation 4.** Ensure the Asian vegetable industry is able to access, comprehend and utilise HAL's peri-urban tool kit resource.

Objective: Communications and Extension

- **Recommendation 5.** To sustainably address the needs of the culturally diverse growers in the industry, communications and extension needs a 'bottom-up and top-down' approach. This should include:
 - the development of relationships with community groups to identify potential industry leaders
 - a strategic 'whole-of-Government' approach to engage with especially first generation growers.

RIRDC, AUSVEG and the new Vegetable Industry Development Program are potential resources which may be able to support co-ordination between growers.

Objective: Future Scope of Research

- **Recommendation 6.** RIRDC should continue to expand its scope of research to include other vegetable and 'multicultural' foods under its Cultural and World Foods research program.

1. Introduction

Asian vegetables have been seen as a specialised niche, the preserve of small market growers catering for the Australians of Asian descent. In general, the growth in the demand for Asian vegetables has been attributed to the recent growth in the number of immigrants from Asia. However, more recently there has been recognition that Asian vegetables are becoming an increasingly important part of the Australian diet. Nowhere is this reality more evident than on supermarket shelves where Asian vegetables have grown in volume and variety.

RIRDC has supported the development of the Asian vegetable industry in Australia with its Asian Foods Research Program. In particular, RIRDC supported strategic reviews of the industry by Hassall and Associates (2003) and Lee (1995), and these studies provided key information in identifying the priorities and research needs for the industry.

With the growth of the Asian vegetables industry from approximately \$50 million in 1994 to over \$135 million in 2002, the industry grew at a rate of 13% per annum. This is a strong rate of growth when compared to the overall Australian vegetable industry. However since 2002, there has been no further study of the industry. This stocktake report provides an update on the industry's size, growth and characteristics, and explores sustainability issues affecting the industry.

2. Objectives

The objectives of this study are to review and analyse the current situation in the Australian Asian vegetables industry and assess the sustainability of the industry and future priorities.

This study provides:

- a stocktake of the size and characteristics of the industry
- information critical to understanding the issues affecting industry productivity and sustainability
- key information for research planning by RIRDC and HAL, AUSVEG, and other Government agencies
- options that build upon key industry communications work with stakeholders, including those growers with culturally diverse backgrounds.

3. Methodology

3.1 Approach

The approach of this study was two-fold.

- Firstly, to adopt a traditional ‘objective’ and scientific approach to research and analysis of industry statistics for Asian vegetables. Since 2005/06 statistics for Asian vegetables have been published annually by the Australian Bureau of Statistics (ABS) and provide a reference for analysis in this study and future industry reviews. As prior studies have been based on a collection of national, state and wholesale market data, this ABS data provides, for the first time, a much more consistent set of baseline data. This is important as, from this report onwards, the data collection methodology are repeatable. This will greatly assist in the identification of future industry changes and trends.
- Secondly, to meet with growers and other industry groups to ‘ground truth’ the above statistics and understand key issues at a farm level. While these discussions are subjective, they aim to provide insights into the key issues impacting upon the sustainability of the industry. In turn, this can assist with research planning, industry knowledge and skills.

Overall, the methodology was based on desktop research and an extensive program of industry consultation. This was conducted throughout the stages discussed below.

Stage 1 - Industry Analysis

- This provided an overview of the industry in its current form at state and national levels. Industry and survey statistics were sourced from groups including AUSVEG, Australian Bureau of Statistics, Australian Bureau of Agricultural and Resources Economics (ABARE) and specialists such as the Australian Vegetable Industry Economist.

Stage 2 - Industry Surveys with Stakeholders

- These interviews included groups throughout the supply chain, especially the culturally diverse growers in the industry.

Stage 3 - Analysis of Industry Issues and Priorities

- This identified and analysed issues affecting the sustainability and capability of the industry.

3.2 Quality of Data

3.2.1 Background to the ABS Statistics

The vegetable industry has suffered because of poor data collection. The industry is diversified in terms of the range of vegetables produced, the geographic location and the distribution channels used. In addition, unlike most other agricultural industries the vegetable industry has never had a centralised marketing authority. In the early 2000’s the vegetable industry investigated a range of options for improved data collection. There has been an improved flow of data on the industry but a great deal of this is partial. To provide a more comprehensive map, the industry has utilised the resources of the ABS. The ABS has expanded its collections on agriculture to incorporate a supplementary vegetable section. This has enabled an expansion of the data collection to incorporate Asian vegetables.

However the data still has limitations and is likely to understate the size of the Asian vegetable industry. The data collections undertaken by the ABS are based on the Australian business register which covers enterprises with an Australian Business Number (ABN). Most vegetable growers have an ABN but not all. Also, the collections exclude growers with annual turnover of less than \$5000. As a result, many smaller enterprises may not be included in the ABS data. A Census is conducted every five years and it is compulsory for all producers to complete the ABS survey forms. In the years between the Censuses, the data used to update statistics is collected by survey which is a commonly used statistical technique. Data collected in the Census year of 2005/06 is likely to be more accurate than data collected in the survey years of 2006/07 and 2007/08 where approximately 35% of farms are

surveyed. The accuracy of data also diminishes with the size of the vegetable data collected and the geographical area covered. The greater the detail required, the less accurate the snapshot of actuality presented by the statistics. Nonetheless data at the national and state level are likely to be a reasonable reflection of production undertaken by commercially registered businesses. And while data at a local area in some cases, especially in the survey years and in localities where vegetable production is small, would be too suspect to rely on, it does provide an indication of localities where particular vegetables are an important crop.

With the above qualifications, the ABS data is able to provide insights on the characteristics of the Asian vegetable industry. This ABS data serves to establish a progressive baseline of data upon which future reviews may identify changes and trends in the industry.

3.2.2 Industry Consultations

It is noted that information from some industry groups was open and forthcoming while other groups declined to support this study. The researchers in this study respect and acknowledge the many organisations which supported this study. It is for this reason that all data in this study is presented in an aggregated form and no reference is made to commercial information from specific companies or organisations.

3.3 Defining Asian Vegetables

RIRDC supported two previous stocktakes of the Asian Vegetable Industry. The first was in 1995 and was undertaken by this author using data collected during 1993/94. In 2003 an update was provided by Hassall and Associates using data from 2001/02. The latter relied on data collected in the wholesale markets in the major capital cities although some estimates were made for sales outside the Sydney wholesale market for NSW. The use of wholesale market data has some drawbacks as it does not cover other distribution channels and is less accurate (as recognised in the report) for state production figures, as Asian vegetables may pass through one capital city market while being produced in other states. In addition, by necessity, the data that the vegetable industry has collected since 2006 is more broadly classified than that identified in the Hassall report. However, classification as to what to include as Asian vegetables is open to judgement. The vegetables covered in both the previous reports are largely covered in ten classifications of the ABS data:

- Leafy Asian vegetables
- Ginger
- Parsley
- Other herbs and spices
- Snow peas and sugar snap peas
- Spring onions bunching onions and shallots
- Asian gourds
- Bitter melons
- Okra
- Snake beans

The ABS advises that ‘other herbs and spices’ include some non-Asian herbs but much of the category would be Asian. Asian mushrooms are excluded from these figures and some other Asian vegetables may end up in a catch all ‘other vegetables’ in the data that the ABS collects. In addition, for this study snow peas and sugar snap peas have been excluded, especially as they have not been defined as Asian vegetables in the prior studies.

For this study, Asian vegetables have been further grouped as follows:

Group 1 - Asian leafy vegetables including *brassicas* such as *pak choy*, *buk choy*, *gai lan*, *choy sum*.

Group 2 - Spring onions and shallots.

Group 3 - Asian gourds, bitter melon, okra and snake beans.

Group 4 - Ginger.

Group 5 - Parsley and herbs including Asian herbs such as Thai basil and Vietnamese mint.

All these vegetables have been included in the previous studies by Hassall and Lee, and these groups they provide a more practical basis upon which to compare the ABS data.

3.4 The New Terminology of CALD - Culturally and Linguistically Diverse Cultures

DIMA (2001) reports that there has been an official shift away from using the term 'non English speaking background' (NESB) as a measure of cultural diversity and related need or disadvantage. NESB is no longer considered to be an appropriate measure of culturally related disadvantage, in terms of access to government services, for a variety of reasons:

- The term has many conflicting definitions.
- It groups people who are relatively disadvantaged with those who are not disadvantaged.
- It is unable to separately identify the many cultural and linguistic groups in Australian society.
- It has developed negative connotations.

In summary, NESB is seen as an oversimplified indicator of disadvantage which may result in inappropriate service provision and neglect the positive aspects of cultural and linguistic diversity. Consequently, the use of the term 'non English speaking background' and the NESB acronym in this report has been avoided. Similarly, this report no longer uses the term LOTE or Language Other than English.

CALD (Culturally and Linguistically Diverse)

While NESB is no longer frequently used, CALD has now emerged as a catch-all category, broader than NESB, referring to some migrants and even some people born in Australia. The phrase culturally and linguistically diverse is used in this report in an inclusive sense and it is noted that Caucasian-Australians contribute to the population's diversity.

4. State Profiles

4.1 New South Wales

4.1.1 Industry Size

The recent figures for NSW collected by the ABS for the three year period 2005/06-07/08 are shown in Table 1 and Figures 1 and 2. These figures show that during the three year period the value of the NSW industry has grown to \$44 million in 2007/08. For the three year period, this is a compound annual growth rate (CAGR) of 11% by value and 7% by volume. There is a major difference in the estimate of \$72 million by Hassall in 2001 and the \$36 million estimate by ABS in 2005/06. This would appear to be largely due to the differing sources of data used in the previous studies, and the ABS data being based upon those larger businesses with an ABN (as discussed at Chapter 3.2.1).

Year	Value (\$M)	Volume (Tonnes)
2005/06	36	9,584
2006/07	33	8,817
2007/08	44	10,936

(Source: ABS 2009)

Table 1 Size of the Asian Vegetable Industry in NSW by Value and Volume

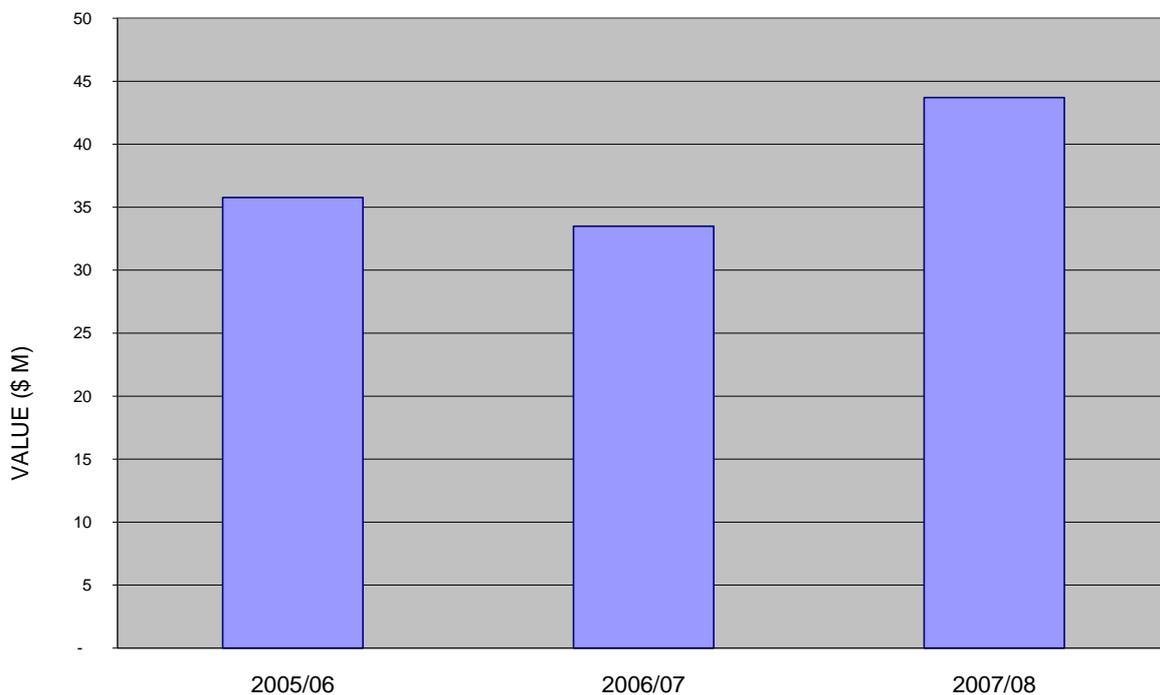


Figure 1 Estimates of Gross Value of Asian Vegetable Production in NSW

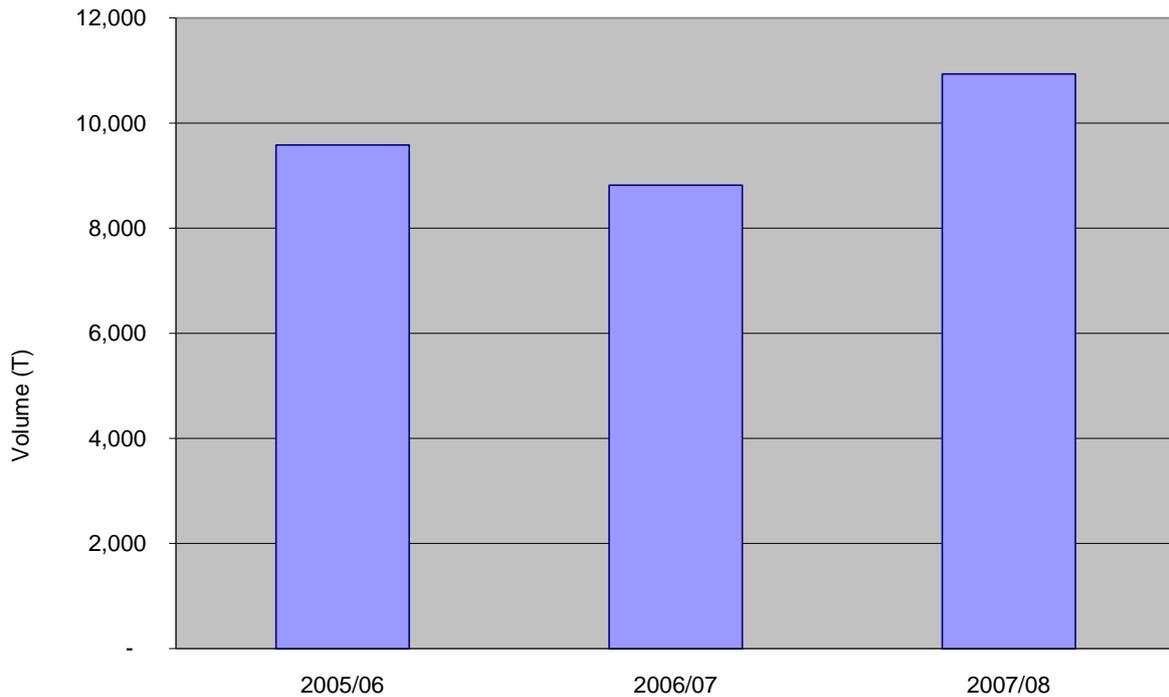


Figure 2 Estimates of Gross Volume of Asian Vegetable Production in NSW

4.1.2 Major Vegetables and Industry Location

Figures 3 and 4 show that during 2005/06-2007/08 leafy Asian vegetables dominated production in NSW by both value and volume. As per Hassall's previous report the major vegetables include pak choy, choy sum, gai lan, shallots, parsley and other (Asian) herbs.

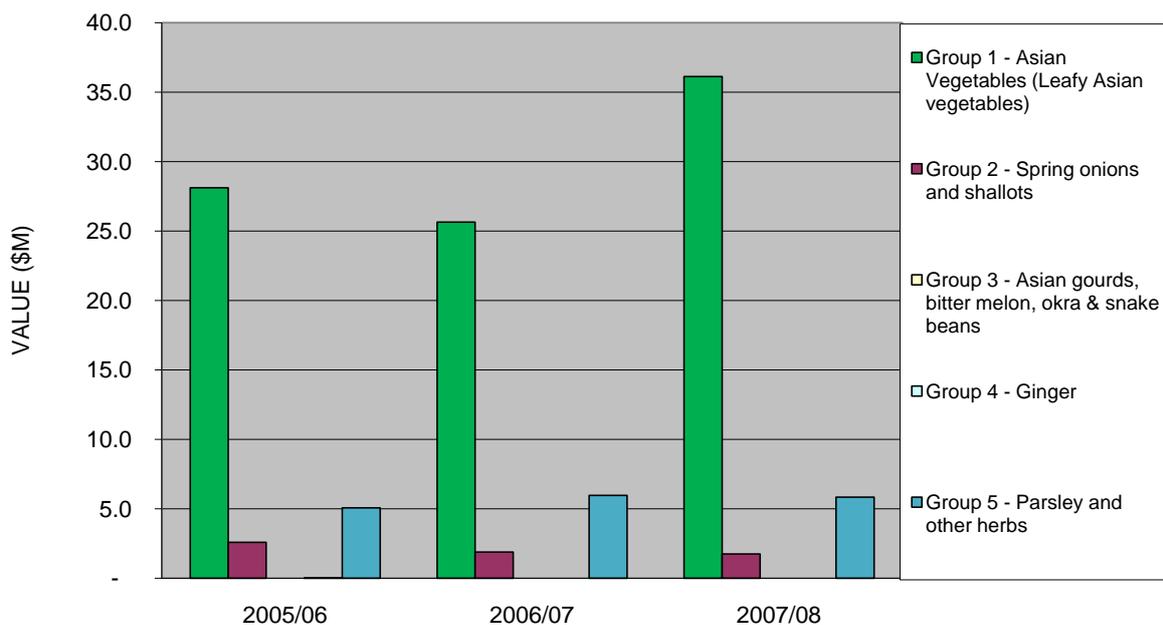


Figure 3 Comparison of Gross Value of Production in NSW by Asian Vegetable Group

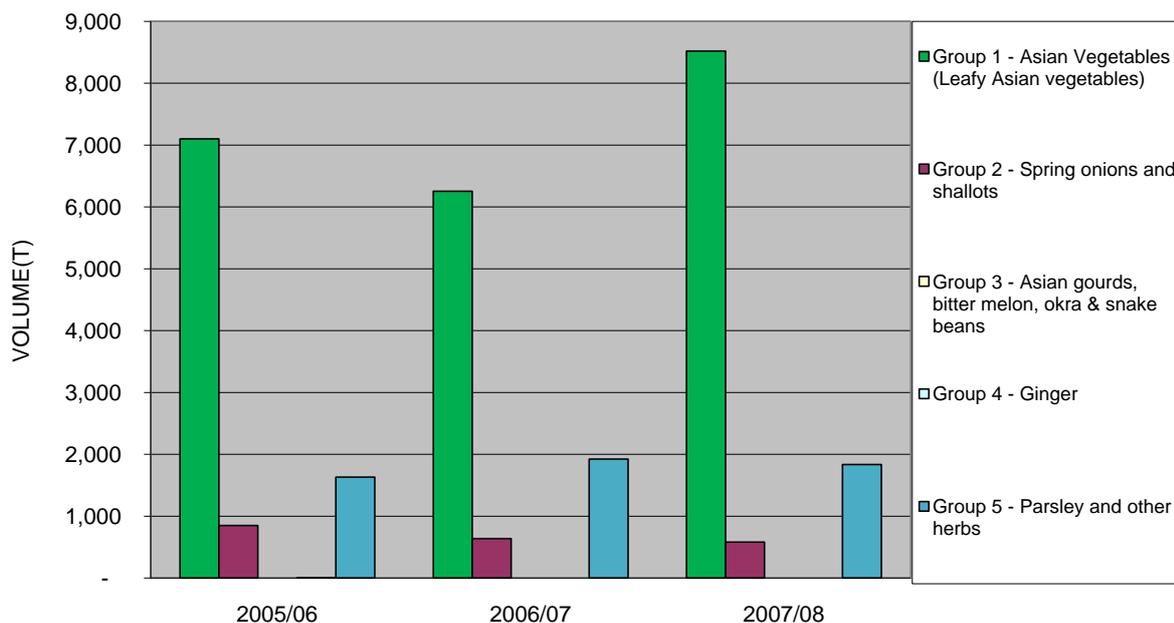


Figure 4 Comparison of Gross Volume of Production in NSW by Asian Vegetable Group

The production of Asian vegetables is largely based around the perimeter of the Sydney area with leafy Asian vegetables grown on small farms in Western Sydney in areas such as Liverpool, Hoxton Park, Austral, Rossmore, Annangrove, Leppington, Badgerys Creek, Kemp Creek, Kellyville, Windsor and Richmond (Len Tesoriero, *pers. comm.*, Terry Ha, *pers. comm.*). Asian herbs and parsley are grown in the Sydney Basin, Hunter Valley and Richmond-Tweed Valley areas. Spring onions are grown in the Sydney Basin, south-eastern NSW and Murray Valley areas.

In particular, Peats Ridge on the Central Coast of NSW has become a significant production area for Asian vegetables including pak choy, choy sum and Chinese broccoli and herbs. The site utilises hydroponic NFT technology to maximise crop yields while reducing water and fertiliser usage, and minimising the impact on the environment.

Activity in the Richmond-Tweed Valley region includes the grower members of the Northern Rivers Agricultural Development Association (NORADA)¹. NORADA has completed trials of taro and sweet potato production with export trials to Japan (Midmore et.al., 2006). Smaller amounts of bitter melon, winter melon, luffa, yam, water chestnuts and lotus are also grown in the northern rivers region.

4.1.3 Gross Unit and Yield Values

For NSW, gross unit values as collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 2 and Figure 5. This figure shows that during the three year period the gross unit value of the NSW industry has grown at a CAGR of 3.5%.

¹ NORADA also includes growers in South East Qld.

Year	Gross Unit Value (\$/Tonnes)	Gross Yield Value (\$K/Ha)
2005/06	3,730	54
2006/07	3,800	47
2007/08	4,000	62

Table 2 Asian Vegetable Industry in NSW by Gross Unit and Yield Values

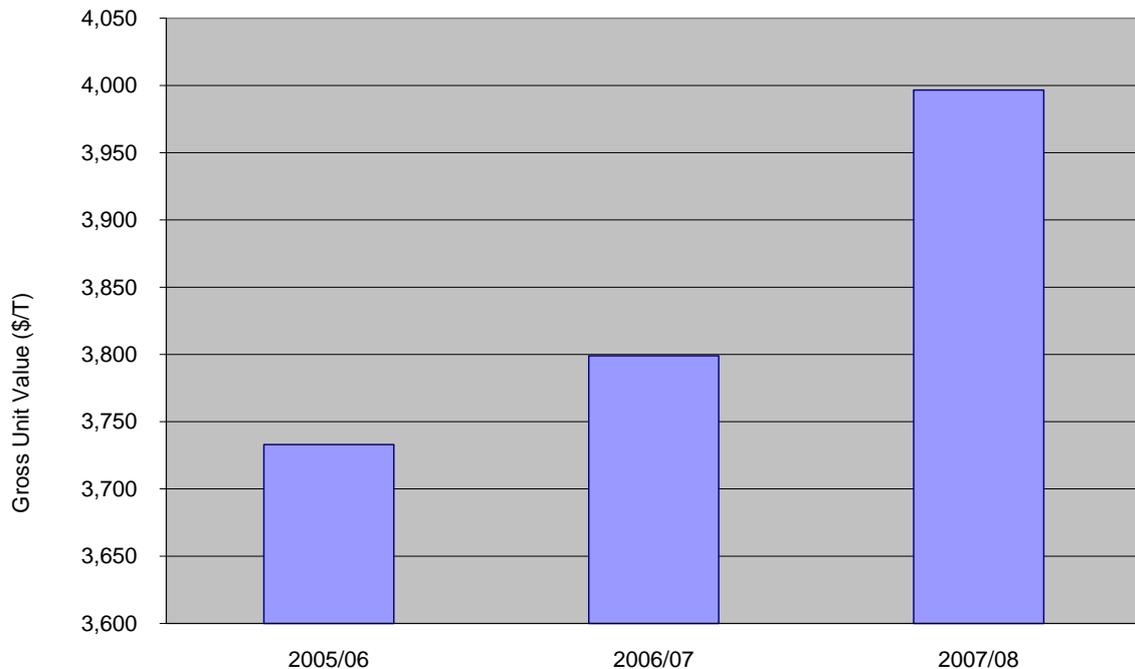


Figure 5 Gross Unit Value of Asian Vegetable Production in NSW 2005/06-2007/08

For NSW, yield values as collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 2. Figure 6 shows that during the three year period 2005/06-07/08 the yield value of the NSW industry has grown at a CAGR of 7.1%.

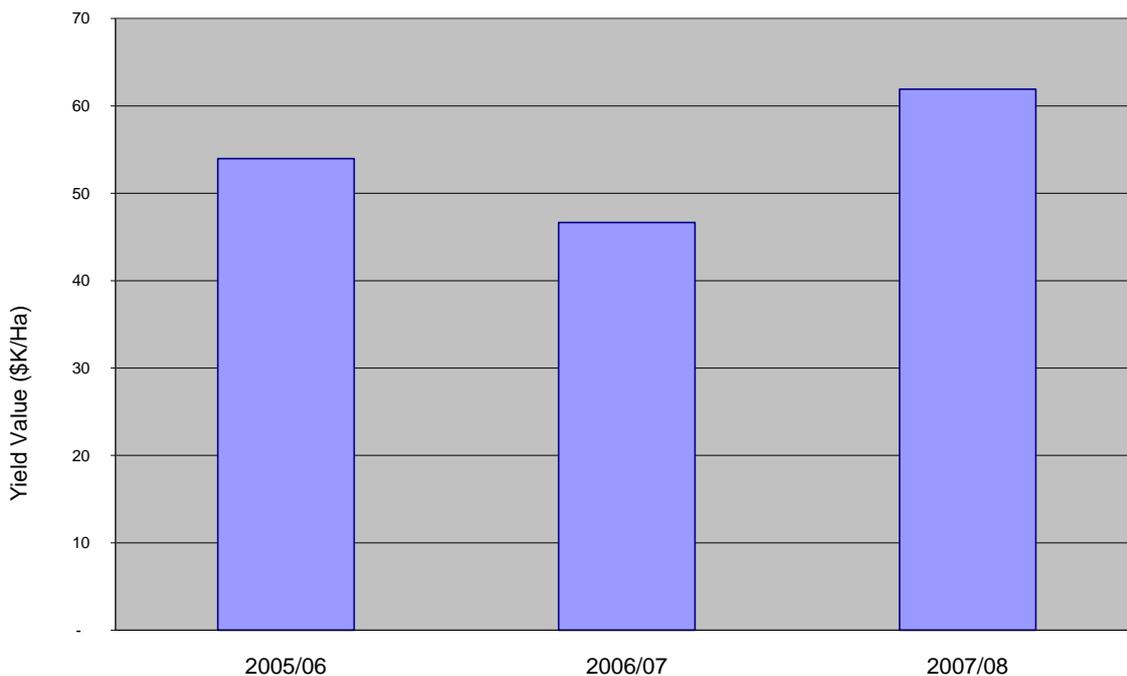


Figure 6 Gross Yield Value of Asian Vegetable Production in NSW 2005/06-2007/08

4.1.4 Grower Numbers

Per Table 3 and Figure 7, the ABS estimates that there were 604 growers of Asian vegetables in NSW during 2007/08 with Asian vegetables and parsley and (Asian) herbs being the largest vegetable groups.

Asian Vegetable Group	Number of Growers
Group 1 - Asian Vegetables (Leafy Asian vegetables)	207
Group 2 - Spring onions and shallots	108
Group 3 - Asian gourds, bitter melon, okra & snake beans	0
Group 4 - Ginger	0
Group 5 - Parsley and other herbs	289
Total	604

(Source: ABS 2009)

Table 3 Number of Asian Vegetable Growers in NSW 2007/08

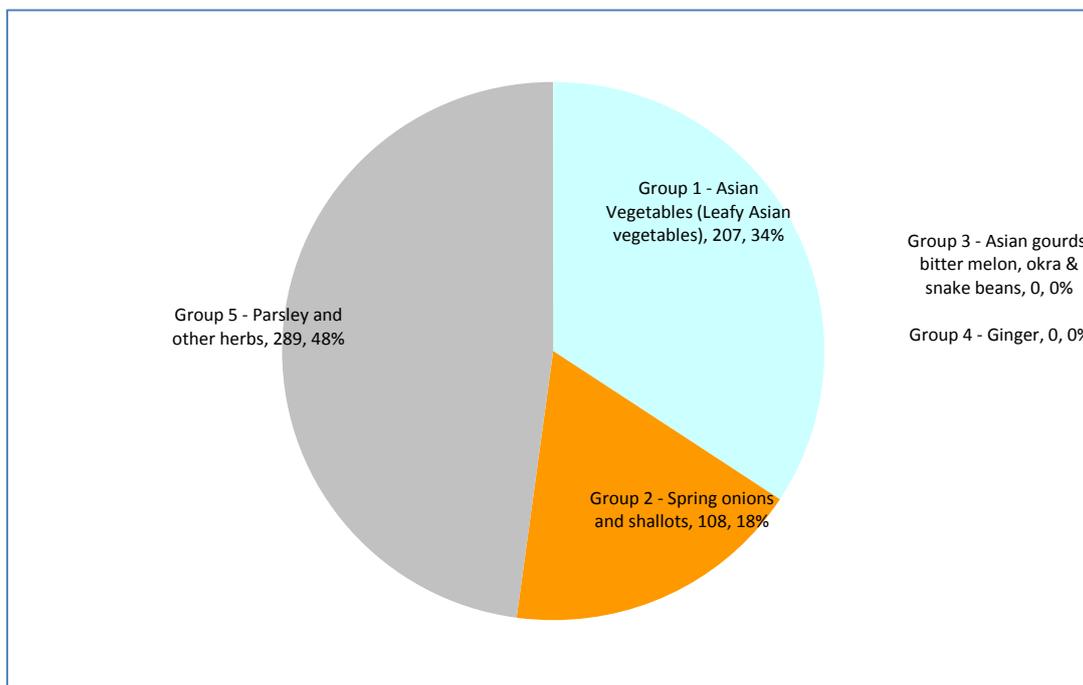


Figure 7 NSW Grower Numbers by Asian Vegetable Groups 2007/08

It should be noted that these statistics are considered to be quite conservative due to the data upon which they are based. AUSVEG(2005) estimates that there are over 400 growers of Asian vegetables in the Sydney basin. These include Chinese-speaking (growing leafy Asian vegetables, English spinach, shallots and herbs), Cambodian-speaking (growing snowpeas and snake beans), and Vietnamese-speaking (growing leafy Asian vegetables, kang kong, melons and herbs such as Thai basil and Vietnamese mint).

4.1.5 Industry Issues

- **Market prices.** The prices in the Sydney Basin area reflect the commodity nature of many leafy Asian vegetables. Prices become depressed during times of over-supply but during periods of shorter supply, higher prices are often limited due to (lower) prices offered by smaller market garden growers. Such commodity pricing means that larger scale capital intensive operations need to maximise their productivity in order to compete with low cost market garden operations.
- **Costs of land and water.** This was cited as an on-going issue as much of the industry is located near to suburban areas and is reliant upon reticulated or town water supplies.
- **Fragmented nature of the industry.** There are a range of grower types in Sydney and NSW. The industry is dominated by smaller market garden growers. Such growers are often first generation and require support in areas such as communication. However other larger scale growers in the Sydney and NSW areas require broader technical support services.
- **Urbanisation pressures.** The location of the small farms producing Asian vegetables has been changing relative to their proximity to urban areas. In the early 1990's these farms were located outside of the urban areas of Sydney, but with the growth of urbanisation many of these farms are now located within local government areas. In these situations, these farms have become part of Sydney's peri-urban agricultural landscape and have become subject to a range of new issues. These include competition for land and water, economic development, waste management and public health.

- **Industry ownership.** Not all growers own their land or businesses. Generally the more established growers own their land and businesses, however many growers may be operating on a leasehold basis. The priority of issues shall differ accordingly. For example, land owners are aware of their land values and the potential to sell their land for a capital gain. By comparison, tenant growers are mainly concerned about farm productivity and their continued livelihoods.
- **Lack of suitable labour.** Due to the predominantly market garden style of the industry in the Sydney Basin, there is a shortage of labour especially for bunching produce. This reflects upon the labour intensive nature of the operations.
- **Technical skills and research.** Production techniques to improve productivity are required but it was acknowledged that it was often difficult to have older and established growers change their farm practices.
- **Pests and diseases.** Tesoriero (2009) reports that some water-borne diseases have begun to appear in hydroponic systems (mostly in English spinach and coriander production) and these will require further research to develop management strategies.
- **Chemicals.** There is a lack of appropriate registered chemicals for small volume crop use. In addition, the current minor use permits have expiry dates that will require either re-issuing or full registration in the near future (Peter Dal Santo *pers.comm.*).
- **Biosecurity.** Growers seemed generally aware of the need for biosecurity but had little understanding of how to identify and manage pests and diseases.
- **Grower access to information.** Many CALD growers consider that they are marginalised due to their low levels of English literacy and are thus unable to easily understand key industry issues such as chemical use, and regulatory issues. While there have been examples of several successful projects with a range of Commonwealth, State and local government groups, these projects have been short term in nature with no on-going support and follow-up. The RIRDC project which supported Mr Ho Dang as a bilingual liaison officer with Vietnamese growers was cited as a successful example in the industry, but with the completion of the project and no further funding, there is a need for on-going support especially for new growers entering the industry.
- **Education versus training.** Growers considered that education and awareness of issues and regulations was important. However, hands-on skills training at the farm level with local pest and disease issues (e.g., club root) was considered essential but was often unavailable.
- **People development.** There is a high turnover of first generation growers with their children often moving into other endeavours. However, it was noted that some of these children are remaining on farms as they convert to hydroponic systems and the use of new technologies.

4.1.6 Future Priorities and Research Issues

- **Productivity to improve quality and commercial returns**
 - Research has been active in promoting good agricultural and best farm practices so that first generation immigrants may progress to modern commercial practice.
 - Research should continue to focus on this transition without neglecting those who have made the transition to commercial production.
 - There is a need to maintain this focus on best practice due to the high turnover in the industry.
- **Pests and diseases**
 - Dissemination to all growers of research on pests and diseases including new growers investing in hydroponic systems.
 - Basic pest and disease training and record keeping for growers should be part of on-going support program. As appropriate the training should be bilingual.
 - Further research is required on issues including root disease issues (e.g. ,English spinach, herbs such as coriander). It is understood that club root remains an issue and the prior research work for transplanting needs to be extended to direct seeding (Len Tesoriero, *pers.comm.*).

- **Biosecurity**
 - Pest and disease monitoring and characterisation need to become a standard practice and further education and community engagement is necessary.
- **Minor use chemicals**
 - There is a need to review the suite of minor use chemical registrations to ensure that these address all current and future potential diseases needs.
 - In view of the strategic shift of the industry towards hydroponic production, the applicability of these chemical registrations should also be assessed.
- **Availability of technical and research resources.** Industry and government groups have limited human and financial resources to service the industry. As a result, it is important to focus these limited resources and funds on those grower groups where information shall be the most benefit. Knowledge and technical information should include:
 - Recent research by NSW Agriculture on Integrated Pest Management (IPM) research for Asian vegetables.
 - Research and tool kit information funded by HAL on peri-urban issues for growers.
 - Chemicals training.
 - Biosecurity monitoring, surveillance and characterisation.
- **Community Communications Program**
 - For first generation growers, a key focus should be on technology adoption or transfer programs. In this regard, access to bilingual officers will be critical to facilitate education.
 - Key industry grower groups in the Sydney Basin should be consulted in the development of such programs. These should include the Chinese, Vietnamese, Cambodian and Lebanese growers in the Sydney Basin.

4.2 Queensland

4.2.1 Industry Size

The recent figures collected for Queensland by the ABS for the three year period 2005/06-2007/08 are shown in Table 4 and Figures 8 and 9. These figures show that during the three year period the value of the Queensland industry has grown to \$98 million. For the three year period, this is a CAGR of 23% by value and 17% by volume.

Year	Value (\$M)	Volume (Tonnes)
2005/06	65	16,100
2006/07	85	18,300
2007/08	98	22,000

(Source: ABS 2009)

Table 4 Size of the Asian Vegetable Industry in Queensland by Value and Volume

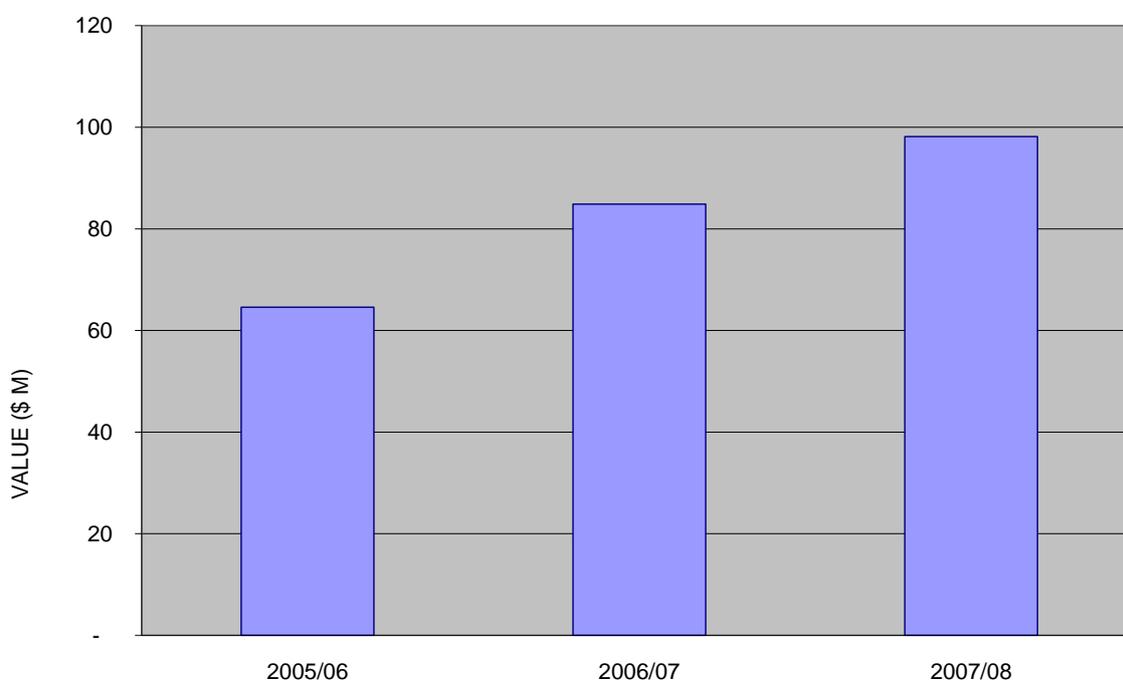


Figure 8 Estimates of Gross Value of Asian Vegetable Production in Queensland

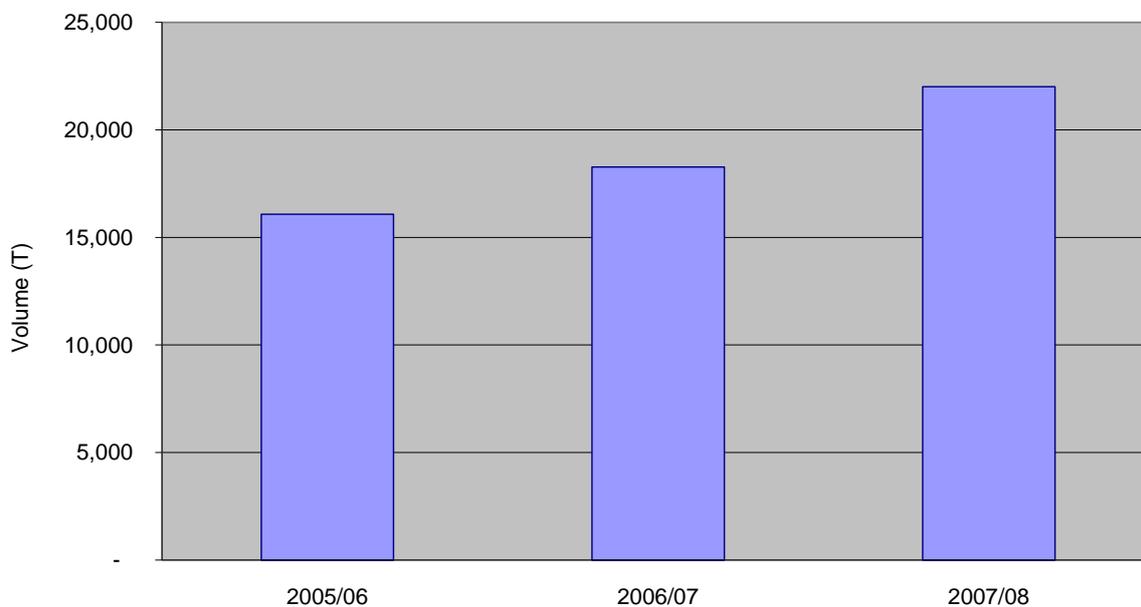


Figure 9 Estimates of Gross Volume of Asian Vegetable Production in Queensland

4.2.2 Major Vegetables and Industry Location

Figures 10 and 11 show that during 2005/06-2007/08, ginger dominated production in Queensland by both value and volume. However in 2007/08 the value of leafy Asian vegetables has grown to \$36 million which is almost equivalent to that of ginger which was \$37.9 million.

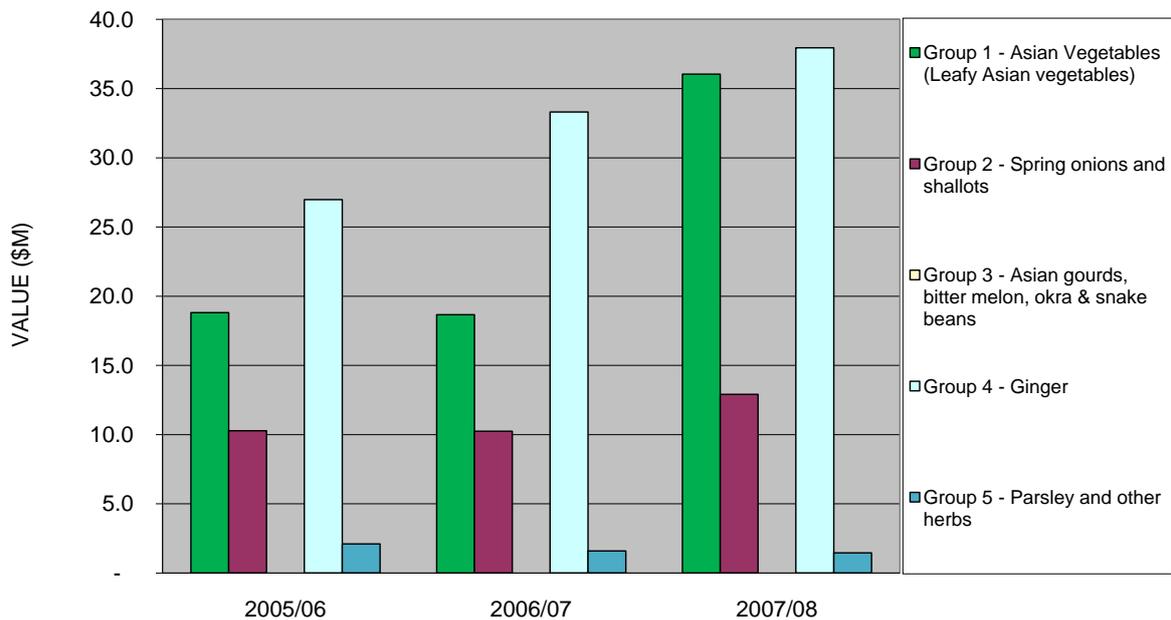


Figure 10 Comparison of Gross Value of Production in Queensland by Asian Vegetable Group

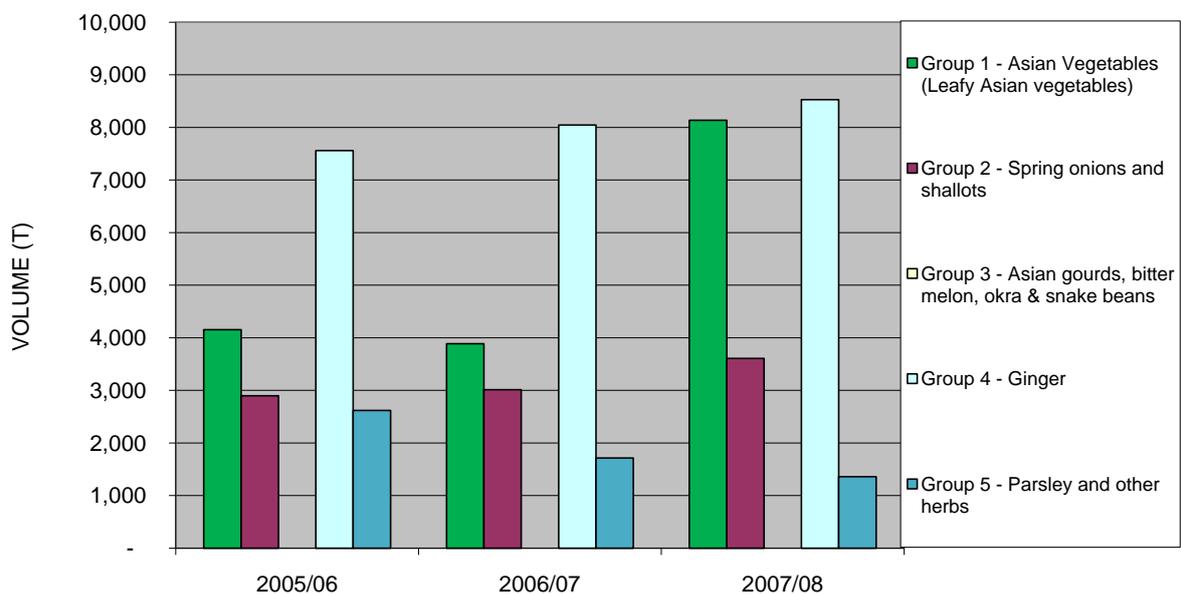


Figure 11 Comparison of Gross Volume of Production in Queensland by Asian Vegetable Group

Ginger tends to dominate in terms of tonnage, with the Sunshine coast region being the area producing the greatest volume of ginger.. However, for Asian vegetables as a whole, the major areas are the Darling Downs, Wide Bay-Burnett and West Moreton regions. These regions have traditionally serviced the Chinese cabbage market but with declining export volumes (as discussed later), leafy Asian vegetables have grown to become more important. It is also reported that a number of growers from southern states, have established growing areas for leafy Asian vegetables in the Darling Downs

area. In Far North Queensland, pak choy is grown on the Atherton Tablelands and Taro Pacific is grown on the coast while both Taro Pacific and Taro Supreme are grown on the Tablelands.

4.2.3 Gross Unit and Yield Values

For Queensland, gross unit values as estimated by the ABS for the three year period 2005/06-2007/08 are shown in Table 5 and Figure 12. This figure shows that during the three year period the gross unit value of the Queensland industry has grown at a CAGR of 5.4%.

Year	Gross Unit Value (\$/Tonne)	Gross Yield Value (\$K/Ha)
2005/06	4,020	63
2006/07	4,650	90
2007/08	4,460	98

Table 5 Asian Vegetable Industry in Queensland by Gross Unit and Yield Values

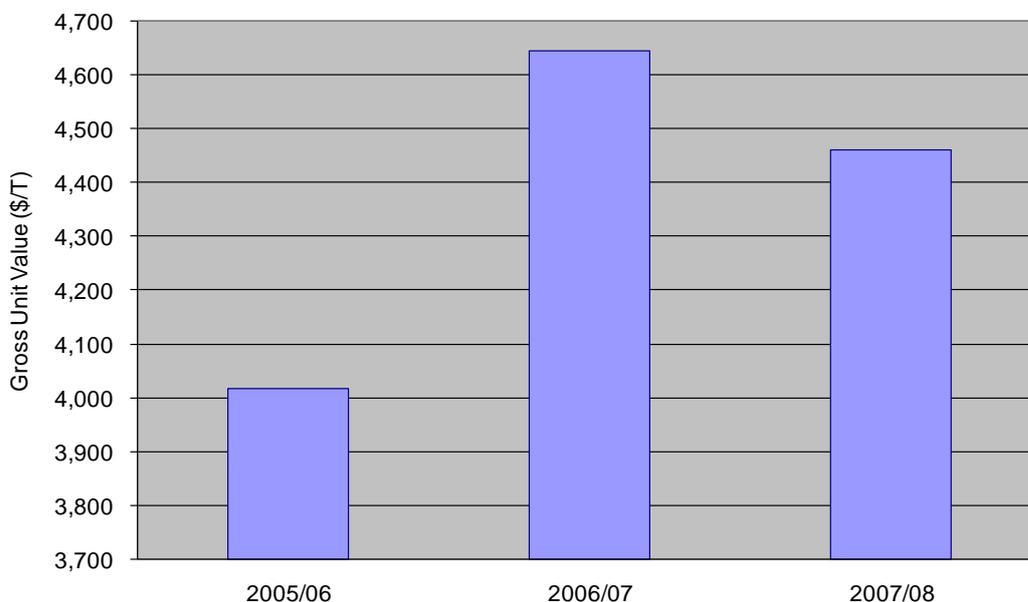


Figure 12 Gross Unit Value of Asian Vegetable Production in Queensland 2005/06-2007/08

For Queensland, yield values as reported by the ABS for the three year period 2005/06-2007/08 are shown in Table 6. Figure 13 shows that during the three year period 2005/06-07/08, the yield value of the Queensland industry has grown at a CAGR of 24.7%.

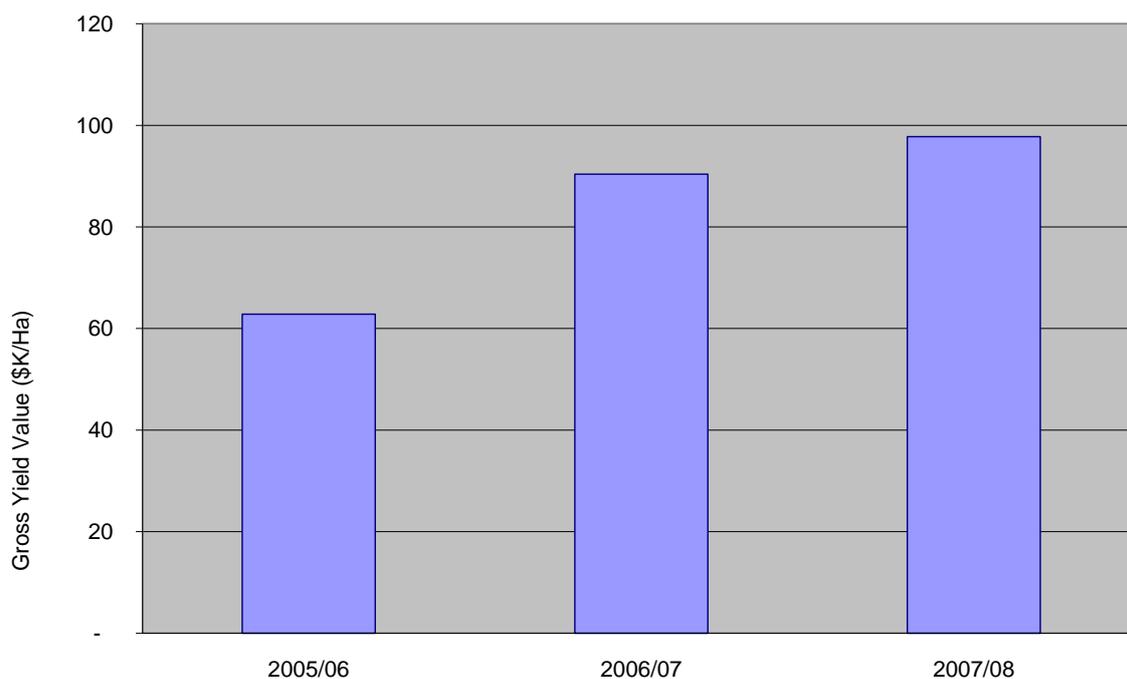


Figure 13 Gross Yield Value Asian Vegetable Production in Queensland 2005/06-2007/08

4.2.4 Grower Numbers

Per Table 6 and Figure 14, the ABS reports that there were 318 growers of Asian vegetables in Queensland during 2007/08 with Asian vegetables and parsley and (Asian) herbs being the largest vegetable groups.

Asian Vegetable Group	Number of Growers
Group 1 - Asian Vegetables (Leafy Asian vegetables)	77
Group 2 - Spring onions and shallots	51
Group 3 - Asian gourds, bitter melon, okra & snake beans	0
Group 4 - Ginger	51
Group 5 - Parsley and other herbs	139
Total	318

(Source: ABS 2009)

Table 6 Number of Asian Vegetable Growers in Queensland 2007/08

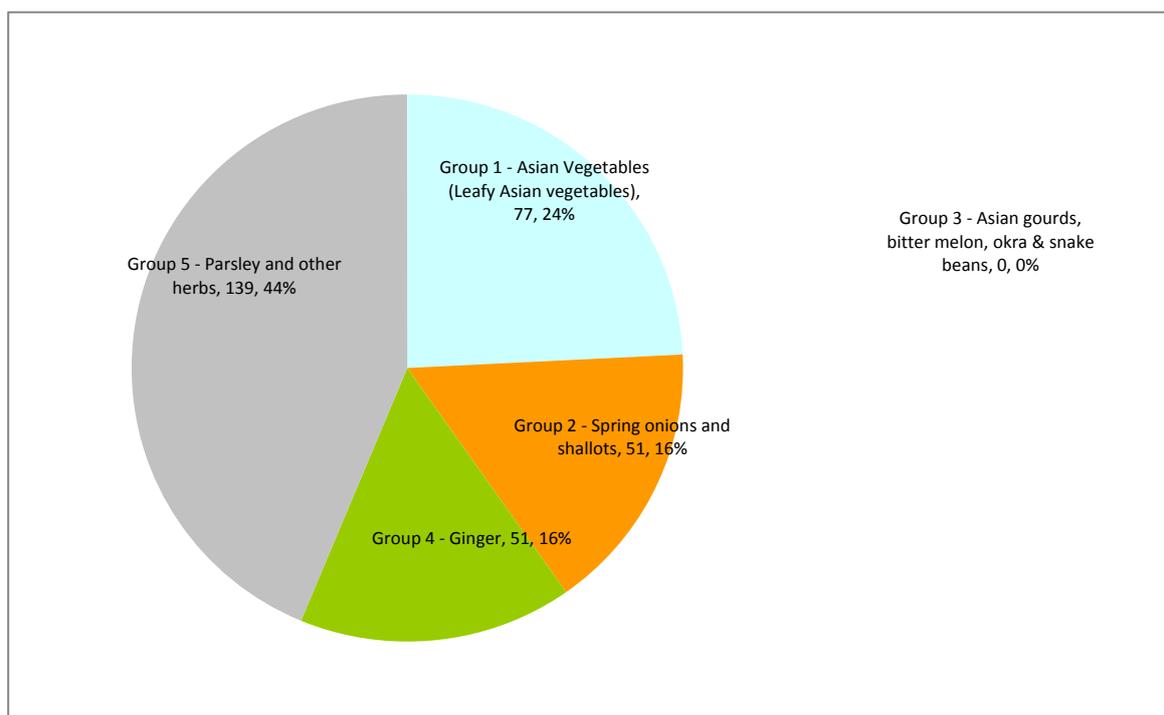


Figure 14 Queensland Grower Numbers by Asian Vegetable Groups 2007/08

Whilst production has tended to be largely by Caucasian Australians, it is reported that there are a growing number of Vietnamese farmers moving into the region. (Qld Vietnamese Farmers Association, *pers.comm.*). AUSVEG (2005) reports that there are over 300 growers of Asian vegetables. These comprise 180 Vietnamese/Cambodian, 150 Chinese and 43 Hmong.

As a result of the large number of producers of Asian vegetables being located in the greater Brisbane area, urbanisation has led to increased pressures of growers. This was the subject of an article in *Vegetables Australia* (November/December, 2008), and demonstrated the need for industry support and communications with local government agencies. Nevertheless, there is a clear sign that growers are moving away from the urban areas of Brisbane to regional areas (Bundaberg Fruit and Vegetable Growers, *pers.comm.*).

4.2.5 Industry Issues

- **Regional growth.** There is a trend for industry to relocate away from urban fringes to regional areas. Similar to the Sydney Basin area, growers in Queensland are also being subjected to urbanisation pressures.
- **Industry consolidation.** As a result of the peri-urban pressures, growers are consolidating their operations and farm sizes are generally increasing in size.
- **New capital investment.** New capital is flowing into the industry from the following areas:
 - Southern states are investing in new farms or funding existing farming operations.
 - Existing growers are investing in new technology such as hydroponics to improve their productivity and returns. This is occurring in both city and regional areas.
- **A new generation of growers.** With the inflow of new capital into the industry, there has also been an increase in new growers including children of first generation growers. It is reported that the children of first generation growers have usually pursued careers away from the farm, however the later generations are more interested due to the use of technology in hydroponic systems.
- **Markets and profitability.** Growers were conscious of the volatility of market pricing and the need to forecast which Asian vegetables they would grow. In this respect, it was noted that the gross margin tool funded by HAL and created by Scholefield Robinson Horticultural

Services was a potentially useful resource in making decisions about what Asian vegetables to grow.

- **Horticultural Code of Conduct.** A number of growers were unclear of their obligations under the new Horticulture Code. In particular, costs of transport was considered a controversial issue as smaller growers thought that the larger wholesale market agents are better placed to negotiate with transport companies.
- **Product promotion.** As with Sydney growers it was recognised that this is not the role of RIRDC, HAL or other government agencies. However, there is a need to promote consumer awareness of other Asian vegetables such as gourds and snake beans.
- **Access to information.** There is a large amount of extension material available to growers, however often the material was not available in a language other than English.
- **Industry publications.** Vegetables Australia and RIRDC's Asian Foods Newsletter was being received by key ethnic grower groups such as the Queensland Vietnamese Growers Association. These publications were considered a good source of information and the growers felt better informed about industry issues.
- **Industry leadership.** The Queensland Vietnamese Growers Association has participated in a number of industry forums and meetings. They have attended with both first and second generation growers and this have provided valuable feedback to industry and government. This was a good win-win example of communicating with industry leaders in ethnic grower groups.
- **RIRDCs Asian Foods Newsletter.** There is a high penetration of RIRDC Asian Foods Newsletter and the Chinese, Vietnamese and Cambodian language editions are well received. Growers indicated benefits arising from these publications included increased vegetable name recognition and hence capacity to supply buyer requests.

4.2.6 Future Priorities and Research Issues

- **Technical support for capital investment**
 - Pest and disease research relevant to the hydroponic production of Asian vegetables is a key area for further assessment. This can support the industry becoming more attractive to younger generation growers due to the investment in new hydroponic growing technology.
- **Best farming practice**
 - On-farm training and demonstration programs to show how Good Agricultural Practices (GAP) and biosecurity practices can improve product quality and commercial returns.
- **Support for peri-urban Asian vegetable growers**
 - Support the dissemination of information to assist growers to be able to understand and manage peri-urban issues.
- **Availability of information and technical training.**
 - Industry was keen to receive information and training about pests, diseases and biosecurity in a grower-friendly format and environment. Key industry grower groups especially in Queensland regional areas should be consulted in the development of such programs. These should include the Chinese, Vietnamese, Cambodian and Hmong growers throughout Queensland.
 - Further information about the Horticultural Code of Conduct is also required.

4.3 Victoria

4.3.1 Industry Size

The recent figures for Victoria collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 7 and Figures 15 and 16. These figures show that during the three year period the value of the Victorian industry has grown at a CAGR of 12%, and on a volume basis has decreased at a CAGR of minus 4%.

Year	Value (\$M)	Volume (Tonnes)
2005/06	23.2	7,400
2006/07	48.1	11,170
2007/08	29.0	6,900

(Source: ABS 2009)

Table 7 Size of the Asian Vegetable Industry in Victoria by Value and Volume

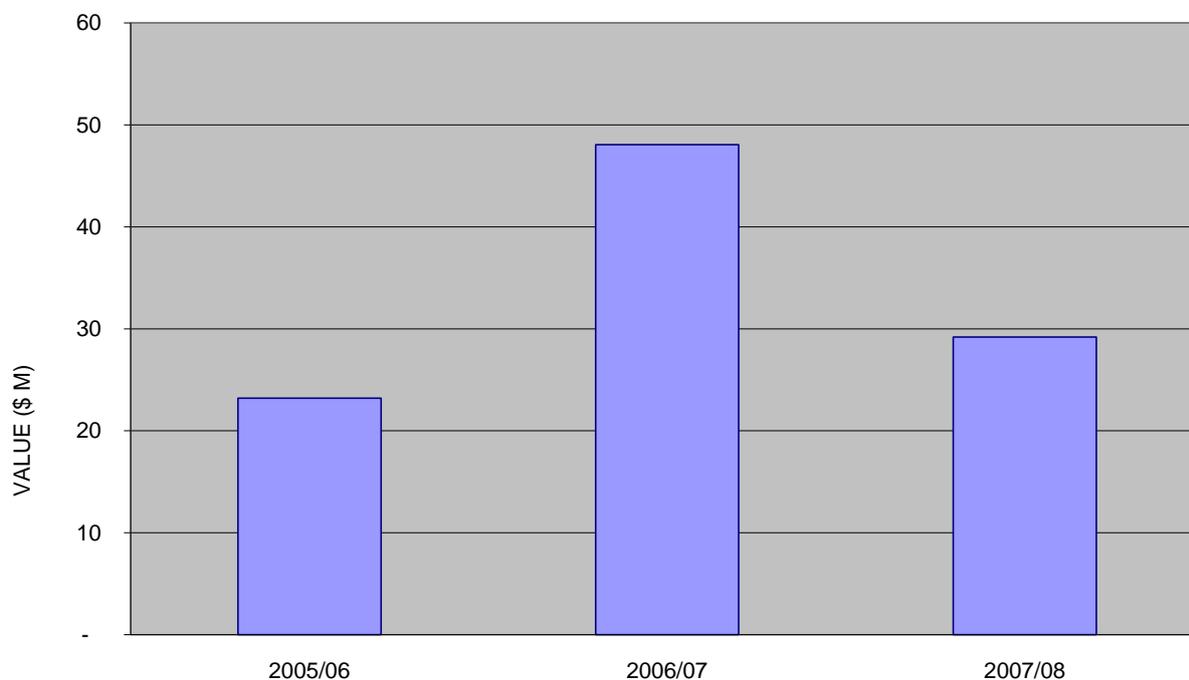


Figure 15 Estimates of Gross Value of Asian Vegetable Production in Victoria

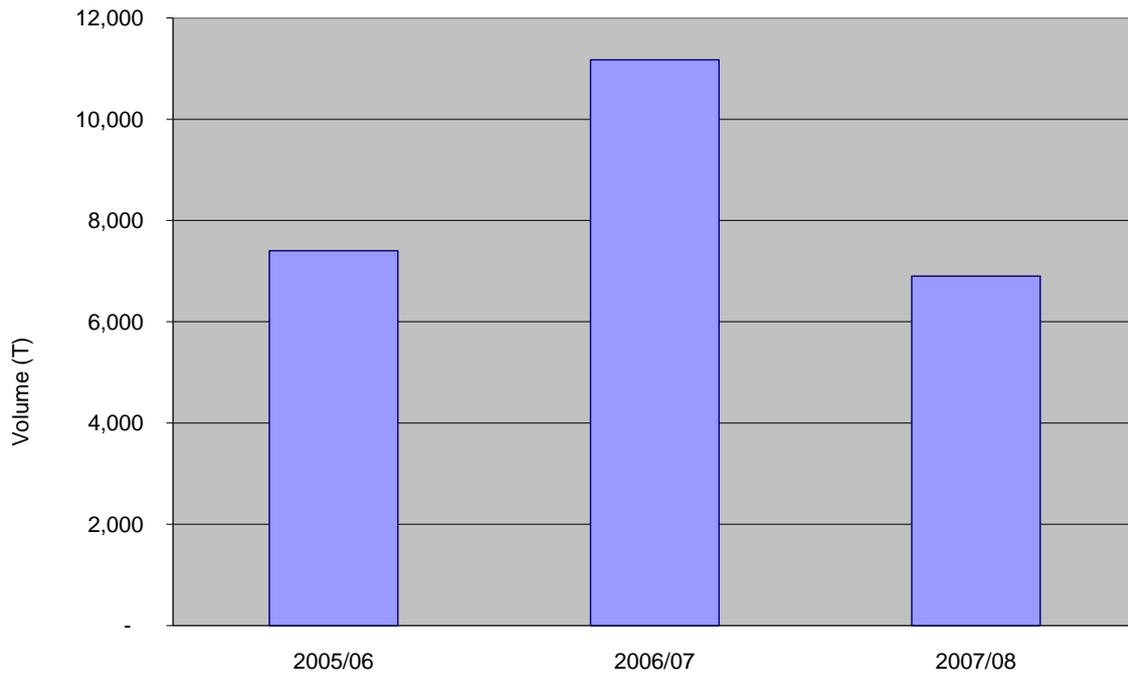


Figure 16 Estimates of Gross Volume of Asian Vegetable Production in Victoria

4.3.2 Major Vegetables and Industry Location

Figures 17 and 18 show that during 2005/06-2007/08, leafy Asian vegetables dominate production in Victoria by both value and volume. However in 2007/08 the value and volume of leafy Asian vegetables decreased significantly from the prior year. Spring onions and shallots are the next most valuable Asian vegetables.

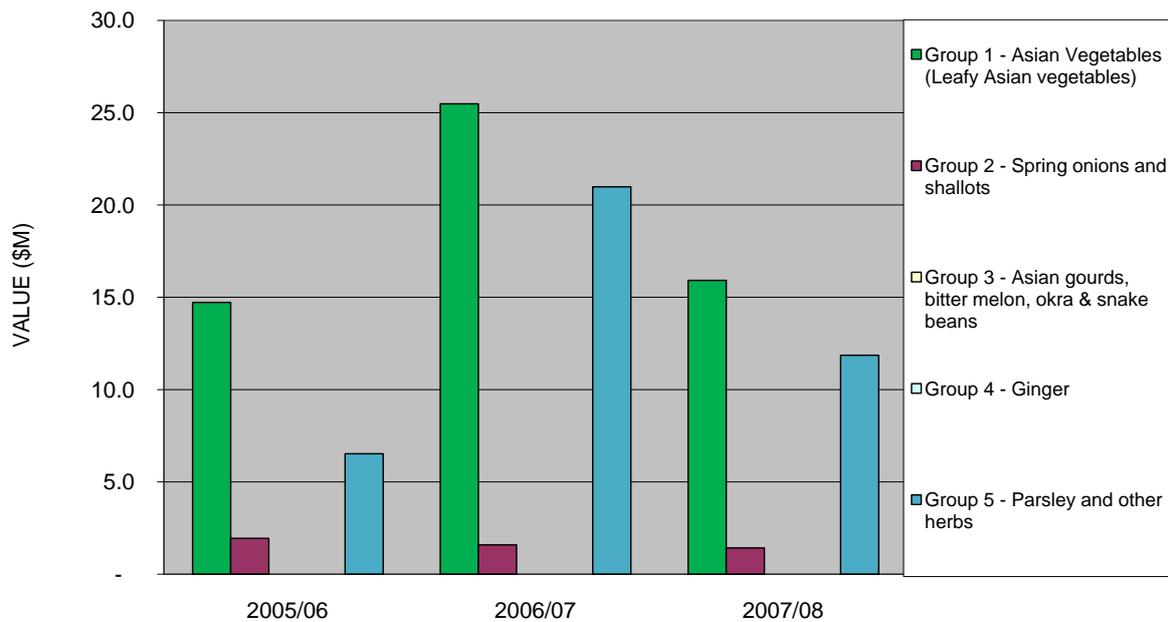


Figure 17 Comparison of Gross Value of Production in Victoria by Asian Vegetable Group

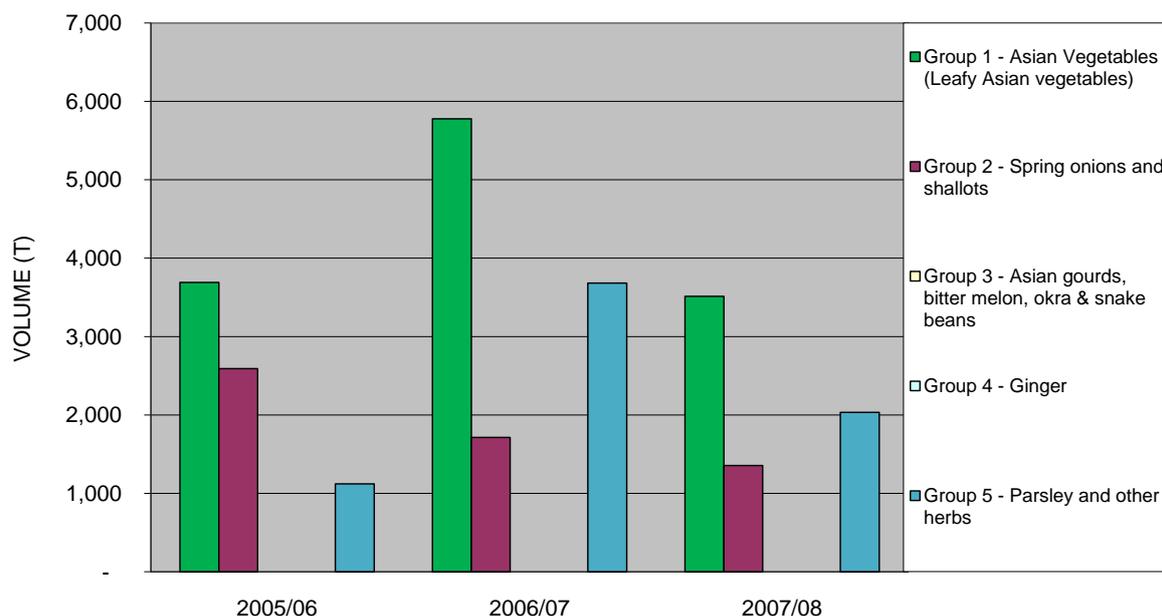


Figure 18 Comparison of Gross Volume of Production in Victoria by Asian Vegetable Group

The ABS data shows that the leafy Asian vegetables are grown particularly in the peri-urban areas of Melbourne (including Geelong) and also Barwon, Central Highlands and East Gippsland. By comparison, shallots and spring onions are grown in and around Melbourne and the Gippsland areas.

4.3.3 Gross Unit and Yield Values

For Victoria, gross unit values as reported by the ABS for the three year period 2005/06-2007/08 are shown in Table 8 and Figures 19 and 20. These figures show that during the three year period the gross unit value of the Victorian industry has grown at a CAGR of 16%, and on a yield value basis has grown at a CAGR of 30%.

Year	Gross Unit Value (\$/Tonne)	Gross Yield Value (\$K/Ha)
2005/06	3,130	29
2006/07	4,300	46
2007/08	4,230	49

Table 8 Asian Vegetable Industry in Victoria by Gross Unit and Yield Values

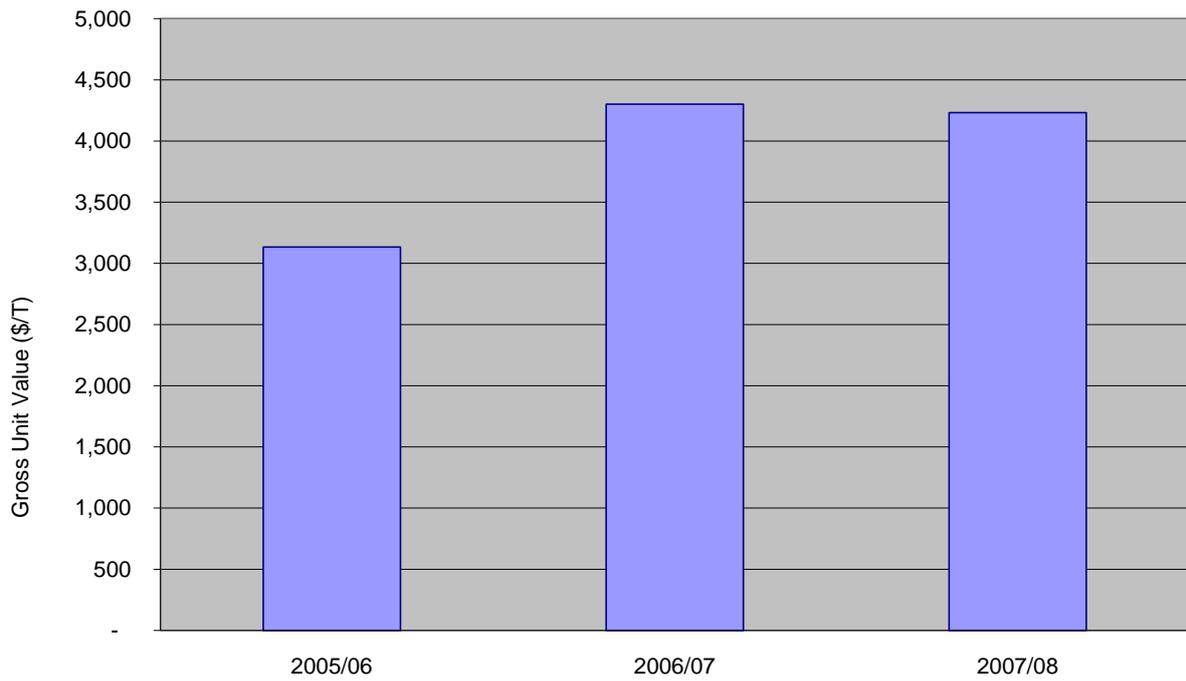


Figure 19 Gross Unit Value of Asian Vegetable Production in Victoria 2005/06-2007/08

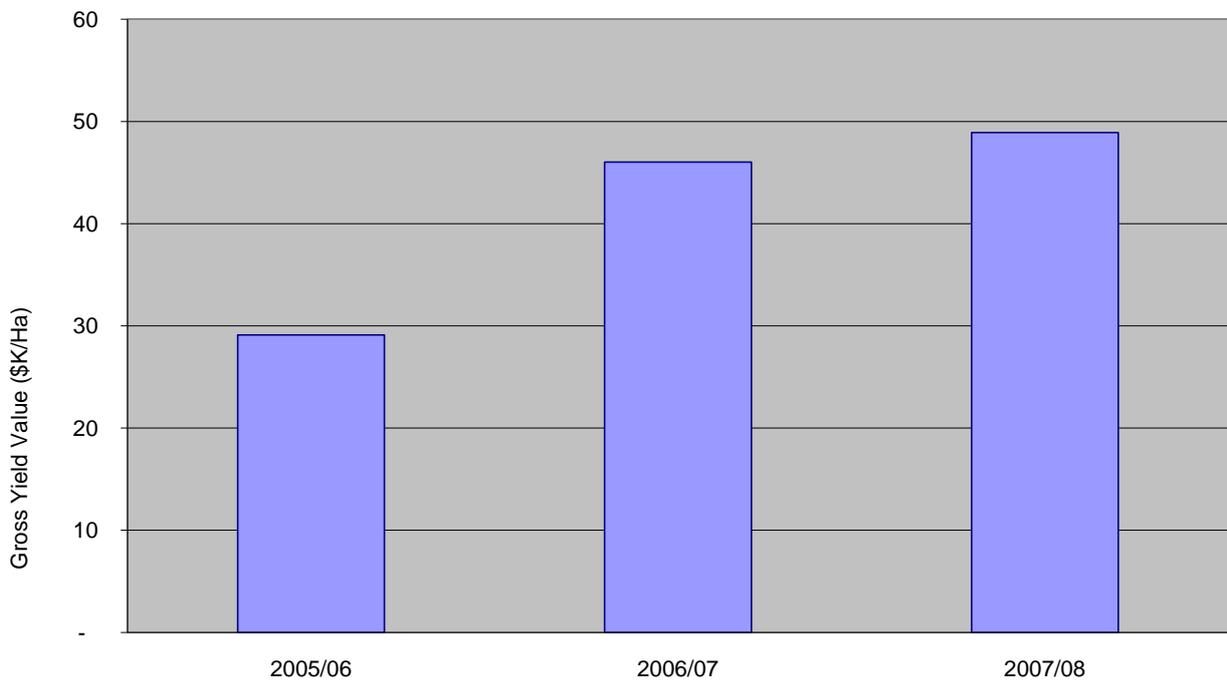


Figure 20 Gross Yield Value of Asian Vegetable Production in Victoria 2005/06-2007/08

4.3.4 Grower Numbers

Per Table 9 and Figure 21, the ABS reports that there were 146 growers of Asian vegetables in Victoria during 2007/08 with Asian vegetables and parsley and (Asian) herbs being the largest vegetable groups.

Asian Vegetable Group	Number of Growers
Group 1 - Asian Vegetables (Leafy Asian vegetables)	49
Group 2 - Spring onions and shallots	15
Group 3 - Asian gourds, bitter melon, okra & snake beans	0
Group 4 - Ginger	0
Group 5 - Parsley and other herbs	82
Total	146

(Source: ABS 2009)

Table 9 Number of Asian Vegetable Growers in Victoria 2007/08

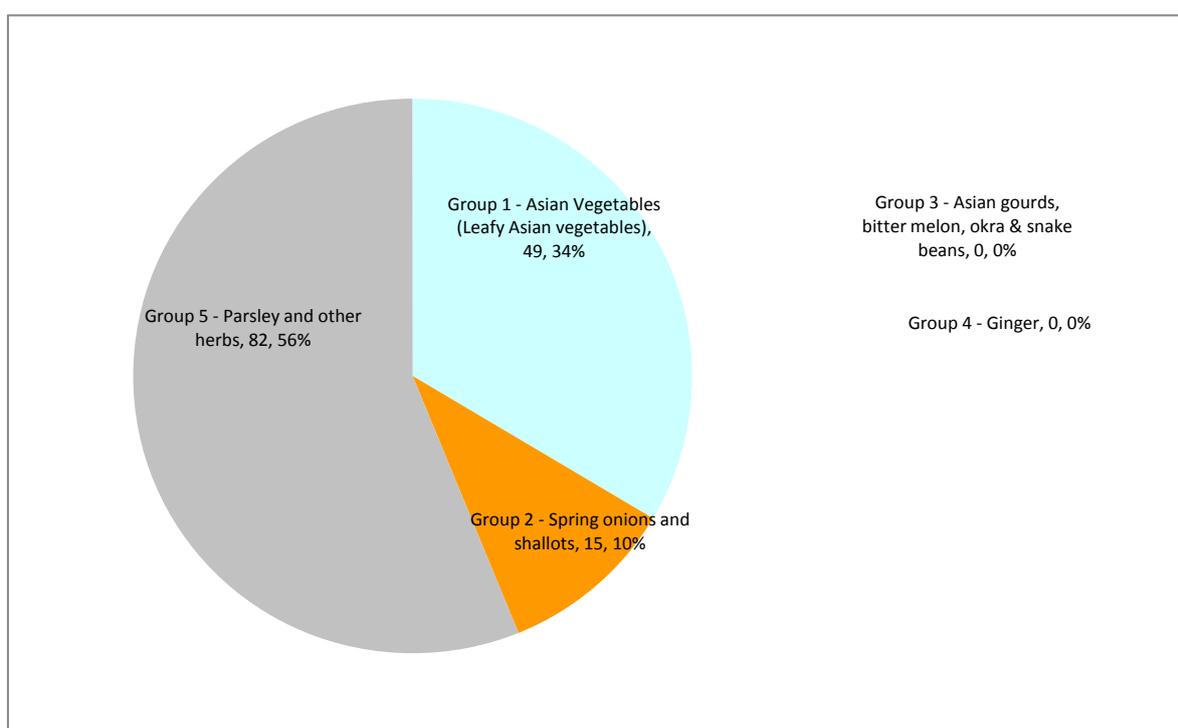


Figure 21 Victorian Grower Numbers by Asian Vegetable Groups 2007/08

Broadly, farm practices are undertaken by two distinct groups of growers: Asian producers, and traditional vegetable growers of Caucasian origin. As Asian vegetables move in to the main stream, more traditional growers are producing high volume products such as Chinese cabbage and pak choy on a larger scale. Traditional grower properties are characterised by their large-scale, use of specialised refrigerated storage and transport, new packing boxes, adherence to cool chain management and industry sponsored quality management practices. These growers are mainly based around peri-urban areas such as Bairnsdale and Cranbourne. Some of these growers are involved in the production of Asian leaf vegetables for baby salad leaf mixes and new stir-fry product lines.

AUSVEG (2005) and Hassall describe three main groups of Asian vegetable producers in Victoria:

- A Vietnamese group of approximately 25 growers who produce in the Geelong region. The second group of growers which are Chinese and Cambodian in origin. Their farms are scattered within a 150 km radius of Melbourne. Chinese origin growers mainly market their vegetables to restaurants and greengrocers' shops.
- The third group of growers are of Caucasian background including Anglo-Italian, Greek and Macedonian and are scattered throughout Victoria. Concentrations of activity occur in the East Gippsland, South East metropolitan and Dandenong Ranges.

4.3.5 Industry Issues

- **Lack of diversity of production.** Growers noted that when compared to NSW and Queensland, the climate of Victoria is relatively cooler, and thus limits the range of Asian vegetables that are grown. Production tends to concentrate on bunching lines of leafy Asian vegetables and a range of herbs and parsley.
- **Declining exports of Chinese cabbage.** Exports of Chinese cabbage have declined due to competition from other suppliers (such as China) and the strength of the Australian dollar. This has resulted in a decrease of the industry's value and volumes between 2006/07 and 2007/08.
- **Types of growers.** AUSVEG confirm that the largest percentages of vegetable growers in Victoria are second and third generation Anglo-Italian, Greek and Macedonian growers who have a first language of English. Many of these growers have traditionally grown Chinese cabbage over larger farm areas, but this production has reduced with the decline of export markets.
- **Peri-urban pressures.** As with Sydney, there is competition for land and water in urban fringe areas. In areas such as Bacchus Marsh, the lack of water has become extremely acute and emergency water supplies are being considered due to the lack of water for all vegetable production (Vegetables Australia, March/April 2010).
- **Declining capital investment.** It was noted that wholesalers in Melbourne are investing in new farms or funding existing farming operations in other states such as Queensland and Northern Territory.
- **Access to information.** It was reported that past communication from industry and Government appears to be ad hoc. However instances of translated publications from the Department of Primary Industries Victoria and RIRDC were acknowledged.
- **Industry leadership.** There is no industry group for Asian vegetables and it is reported that attempts to form a Vietnamese Growers Association had not been successful in the past.

4.3.6 Future Priorities and Research Issues

- **Industry support for the decline in export markets**
 - Opportunities to provide marketing and/or technical support should be evaluated for Chinese cabbage growers who need to transition to new crops.
- **Bilingual extension agronomist position**
 - The appointment of bilingual extension staff should be considered for the communication of key industry information with first generation growers in areas such as Geelong.
 - Knowledge and technical information should include:
 - Recent research on Integrated Pest Management (IPM) research for Asian vegetables.
 - Research and tool kit information funded by HAL on peri-urban issues for growers.
 - Chemicals training.
 - Biosecurity monitoring and surveillance.

4.4 Tasmania

4.4.1 Industry Size

The recent figures for Tasmania collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 10 and Figures 22 and 23. These figures show that during the three year period the value of the Tasmanian industry has grown at a CAGR of 62%, and on a volume basis has increased at a CAGR of 47%.

Year	Value (\$M)	Volume (Tonnes)
2005-06	2.1	494
2006-07	2.8	461
2007-08	5.6	1,074

(Source: ABS 2009)

Table 10 Size of the Asian Vegetable Industry in Tasmania by Value and Volume

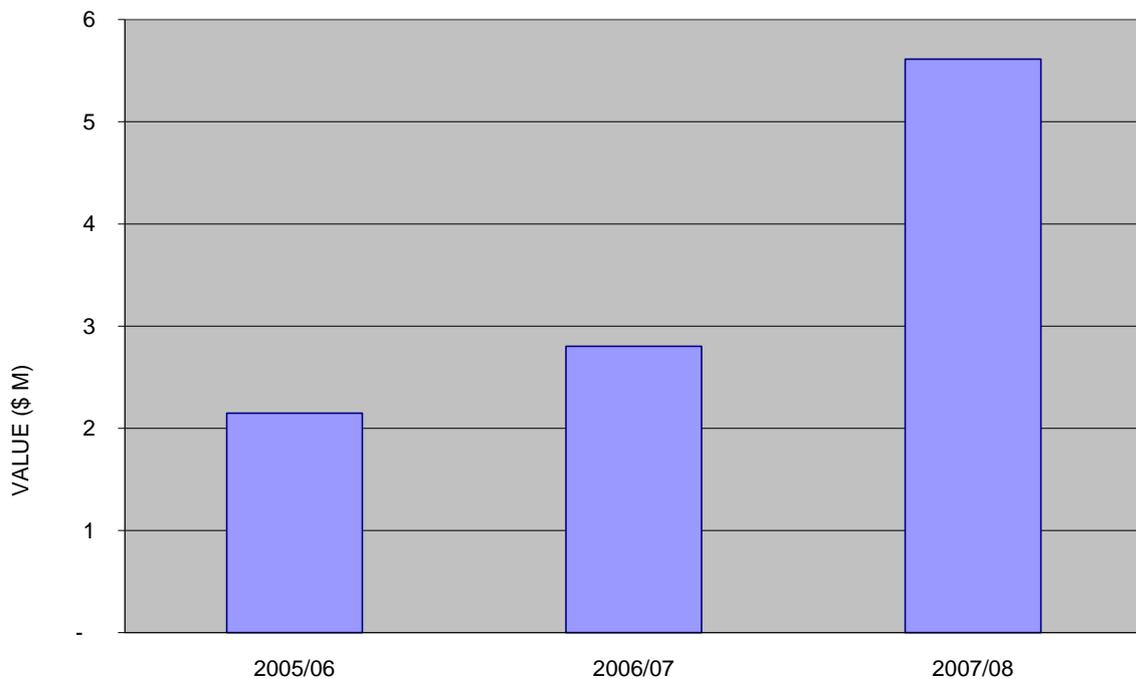


Figure 22 Estimates of Gross Value of Asian Vegetable Production in Tasmania

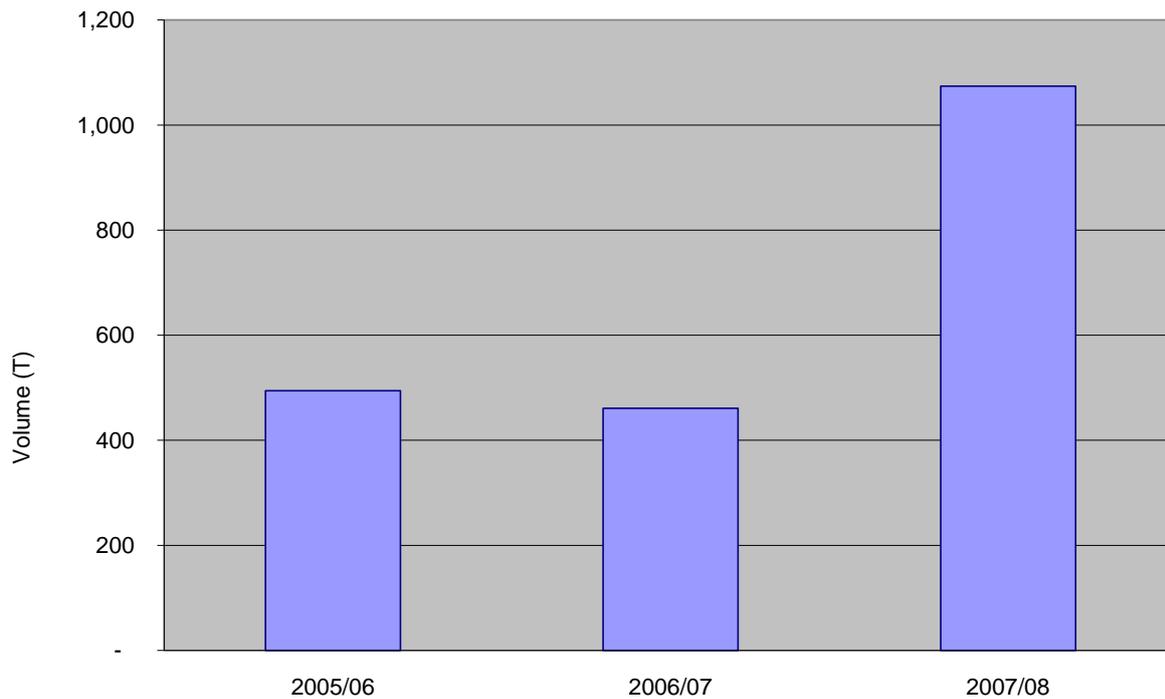


Figure 23 Estimates of Gross Volume of Asian Vegetable Production in Tasmania

4.4.2 Major Vegetables and Industry Location

Figures 24 and 25 show that during 2005/06-2007/08, parsley and other herbs dominate production in Tasmania by both value and volume. In the two years 2006/07-2007/08, the value and volume of parsley and herbs increased significantly from the prior year. This would appear to be largely due to the increased production of 'Australian herbs' and baby leaf Asian vegetables such as buk choy, tatsoi and mibuna for the use in pre-packed salads. Small volumes of wasabi have now become commercially available following research by RIRDC and commercial groups (Sparrow, 2009).

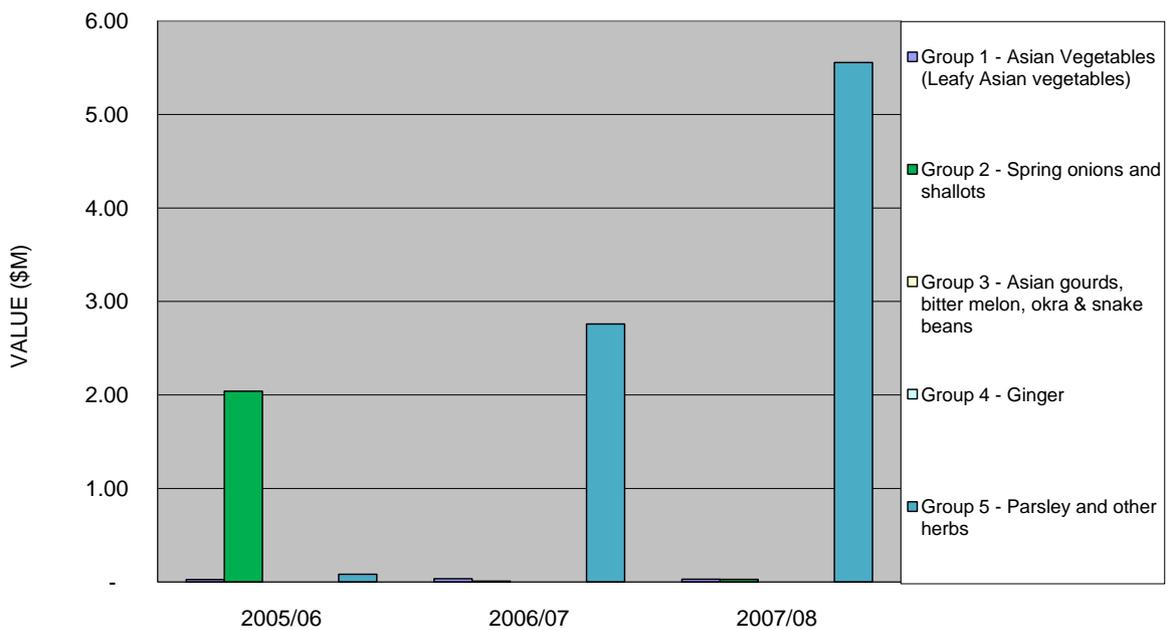


Figure 24 Comparison of Gross Value of Production in Tasmania by Asian Vegetable Group

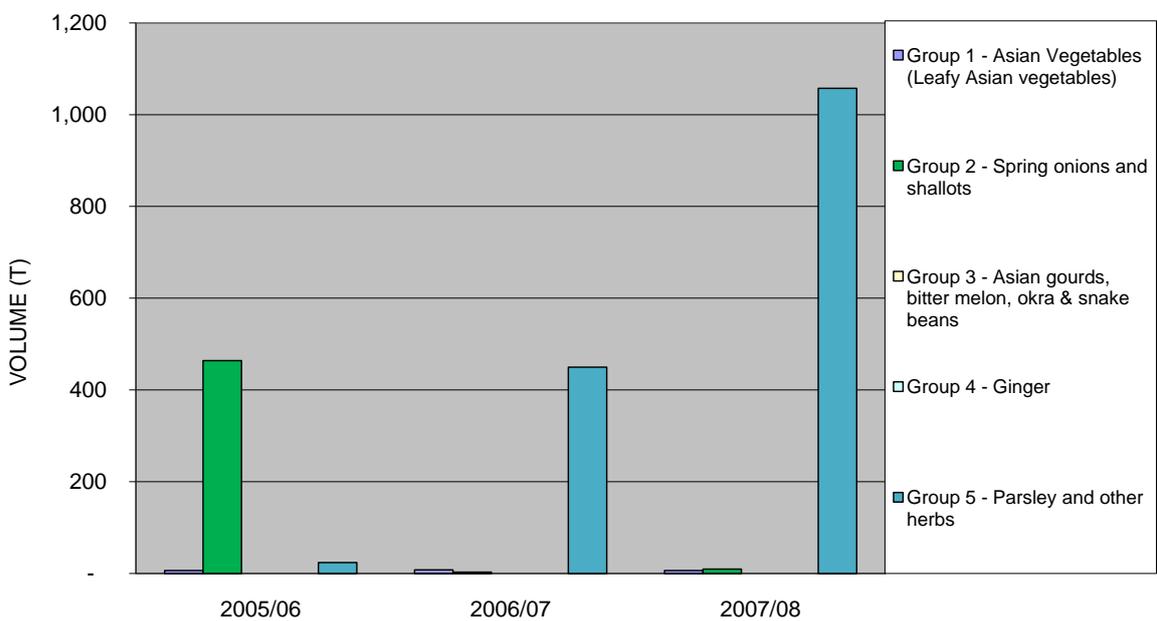


Figure 25 Comparison of Gross Volume of Production in Tasmania by Asian Vegetable Group

The ABS data shows that leafy Asian vegetables have declined to minimal amounts in 2007/08 whereas other herbs have grown significantly. These other herbs are grown particularly in the greater Hobart area followed by northern Tasmania and a small amount in the Mersey-Lyell area.

The production of Asian vegetables in Tasmania has been a relatively minor industry. A small domestic market and failure to secure major mainland or export markets has constrained growth potential. While kabocha and bunching onion bulbs have been major Asian vegetables produced in

Tasmania, the industry has been able to diversify with other Asian herbs such salad herbs, wasabi, edamame and specialty edible Asian fungi (e.g., shiitake mushrooms).

4.4.3 Gross Unit and Yield Values

For Tasmania, gross unit values as collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 11 and Figures 26 and 27. These figures show that during the three year period the gross unit value of the Tasmanian industry has grown at a CAGR of 10% and on a yield value basis, has decreased at a CAGR of minus 13%.

Year	Gross Unit Value (\$/Tonne)	Gross Yield Value (\$K/Ha)
2005/06	4,347	29
2006/07	6,082	20
2007/08	5,227	22

Table 11 Asian Vegetable Industry in Tasmania by Gross Unit and Yield Values

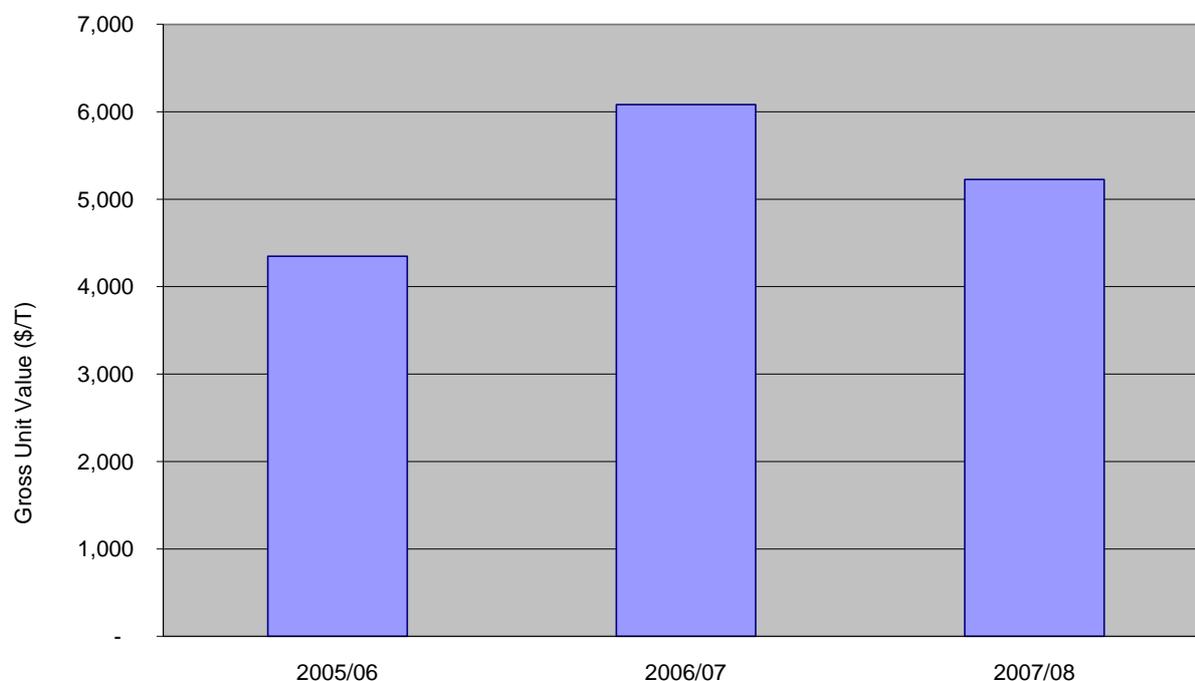


Figure 26 Gross Unit Value of Asian Vegetable Production in Tasmania 2005/06-2007/08

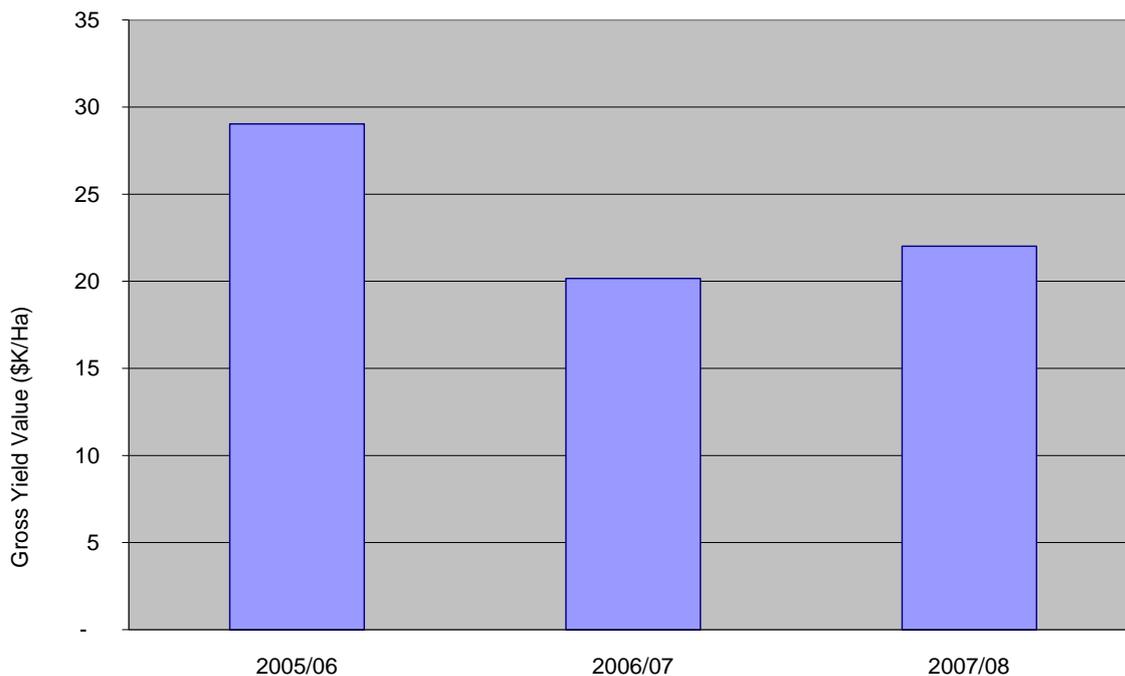


Figure 27 Gross Yield Value Asian Vegetable Production in Tasmania 2005/06-2007/08

4.4.4 Grower Numbers

Per Table 12 and Figure 28, the ABS reports that there were 32 growers of Asian vegetables in Tasmania during 2007/08 with parsley and other herbs being the largest vegetable group.

Asian Vegetable Group	Number of Growers
Group 1 - Asian Vegetables (Leafy Asian vegetables)	10
Group 2 - Spring onions and shallots	4
Group 3 - Asian gourds, bitter melon, okra & snake beans	0
Group 4 - Ginger	0
Group 5 - Parsley and other herbs	18
Total	32

(Source: ABS 2009)

Table 12 Number of Asian Vegetable Growers in Tasmania 2007/08

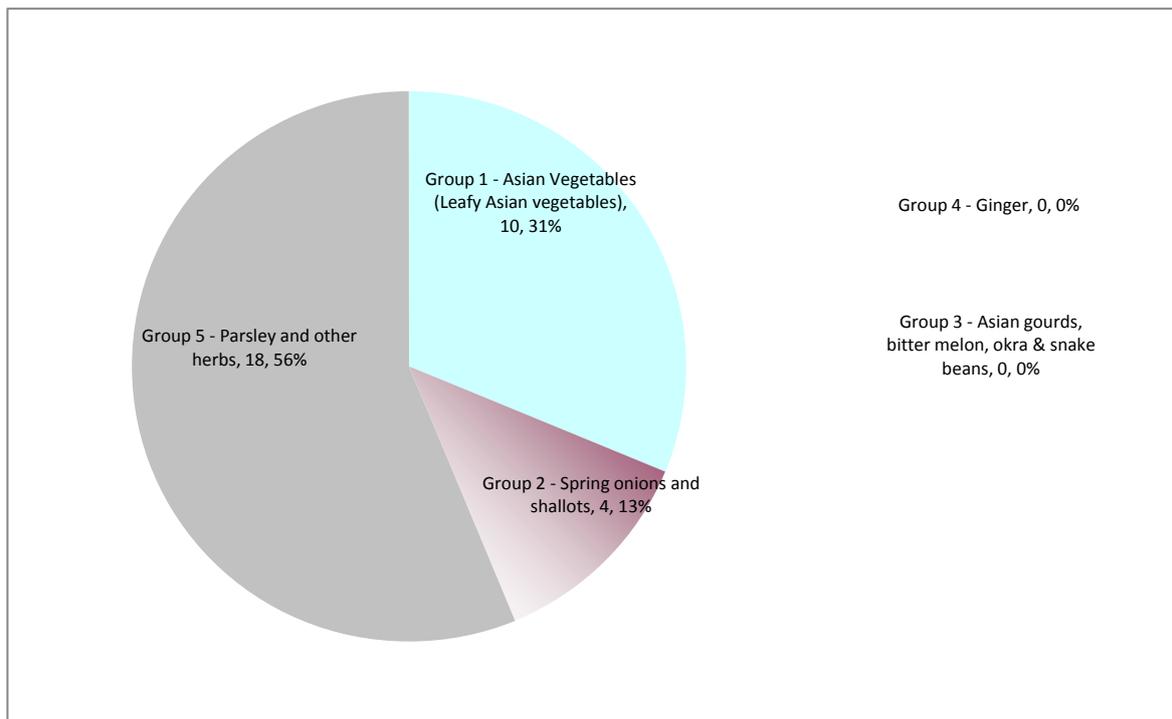


Figure 28 Tasmania Grower Numbers by Asian Vegetable Groups 2007/08

There are two main groups of Asian vegetable growers in Tasmania. They are market gardeners in the greater Hobart area and Caucasian growers in the north of the state. There are around ten growers in the Hobart area and a further twenty producing kabocha, parsley and herbs.

Growers close to Hobart are predominantly of Asian origin and are mainly Hmong people who originate from Thailand, Cambodia and Laos. Growers in the north of the state are Caucasians who mix kabocha production with mixed crops and livestock on holdings of between 100 ha and 150 ha. There is no known Asian vegetable growers association in Tasmania.

4.4.5 Industry Issues

- **Branding.** The Tasmanian industry needs to work together to maximise the opportunity of using the pristine environment of Tasmania as a competitive marketing advantage.
- **Diversification into specialty products.** The industry should continue to diversify into niche markets as demonstrated with specialty Asian herbs such as wasabi and herbs used in the pre-packaged salad industry.
- **Economic viability.** Farms should aim to improve their economic viability by:
 - Increasing their farm size and as a result achieve economies of scale.
 - Using new irrigation and IPM farming systems to reduce input costs associated with labour, water and chemicals.
- **Crop protection.** Strategies have been developed and improved as a result of collaboration between researchers and growers, and researchers should continue to test new protection strategies that have proven to be successful in other areas. Biosecurity is considered strategically important due to Tasmania's reputation for having a pure and natural environment.
- **Industry communication and leadership.** There is no known industry group for Asian vegetables. However, RIRDC's publication 'Asian Foods newsletter' and regular meetings of Tasmanian researchers are considered valuable communication resources.

4.4.6 Future Priorities and Research Issue

- **New market opportunities.** The industry should continue to identify opportunities to diversify into other specialty products especially those that provide export market opportunities.
- **New farm management systems.** Growers and researchers of Asian vegetables should continue to develop and improve new IPM systems and the use of soft agricultural chemicals. Trials are best conducted on growers' properties which provide environmental conditions relevant to the collaborative research.
- **Industry networking and leadership.** Industry groups should liaise and network to support industry development initiatives. Communication among researchers of Asian vegetables plays a vital role in the development of niche Asian vegetable industries.

4.5 South Australia

4.5.1 Industry Size

The recent figures for South Australia collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 13 and Figures 29 and 30. These figures show that during the three year period the value of the South Australian industry has decreased at a CAGR of minus 22%, and on a volume basis has decreased at a CAGR of 10%.

The reduced industry size is reported to be due to a number of factors including:

- South Australia has previously supplied inter-state markets such as Melbourne. However, this demand has changed with inter-state markets now being able to source Asian vegetables competitively from local growers.
- The market for Asian vegetables in South Australia is relatively small.
- Growers are able to gain increased returns from other crops such as tomatoes and capsicums.

Year	Value (\$M)	Volume (Tonnes)
2005/06	5.7	1,025
2006/07	4.1	815
2007/08	3.4	838

(Source: ABS 2009)

Table 13 Size of the Asian Vegetable Industry in South Australia by Value and Volume

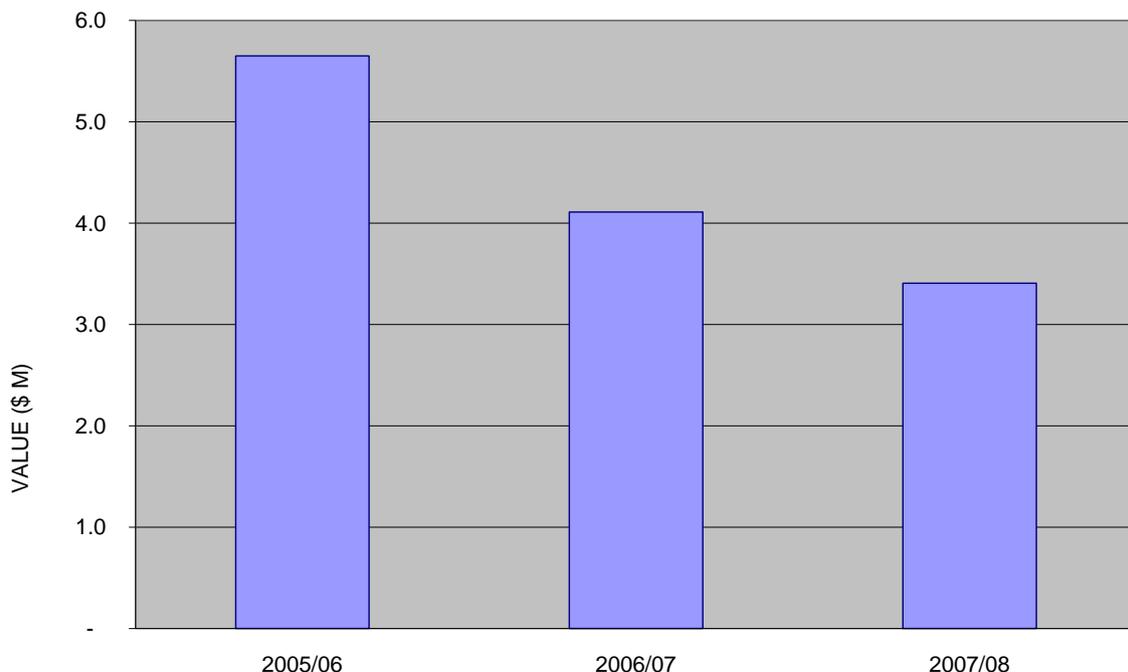


Figure 29 Estimates of Gross Value of Asian Vegetable Production in South Australia

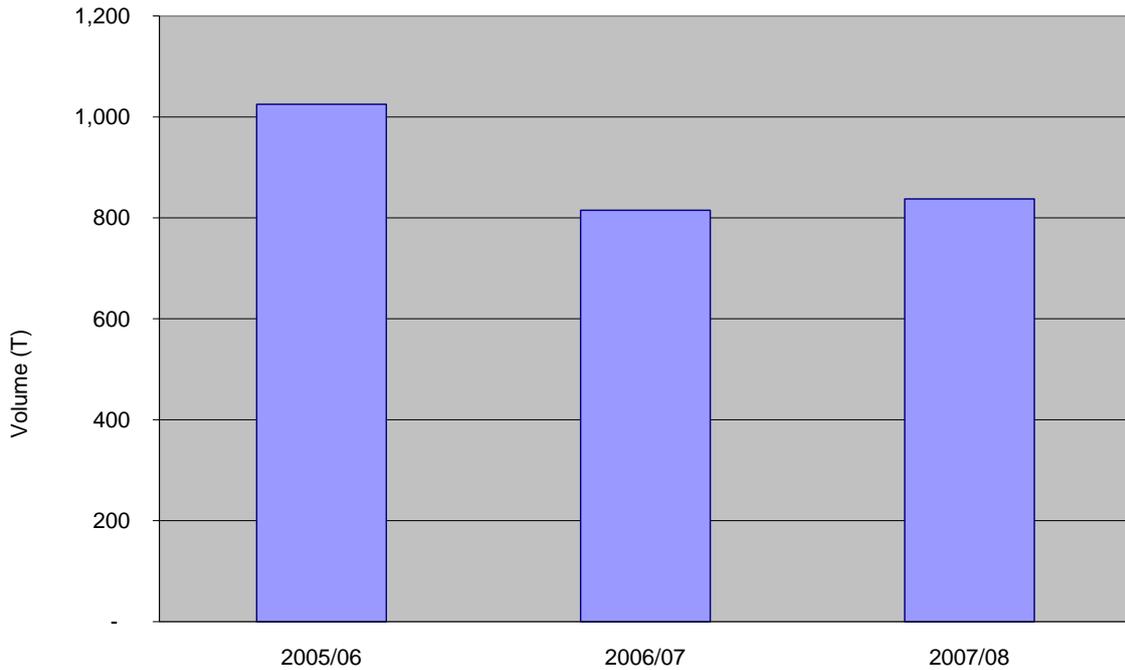


Figure 30 Estimates of Gross Volume of Asian Vegetable Production in South Australia

4.5.2 Major Vegetables and Industry Location

Figures 31 and 32 shows that during the three year period, spring onions and shallots have grown and dominates production in South Australia by both value and volume. By comparison, leafy Asian vegetables and parsley and herbs have decreased in value and volume.

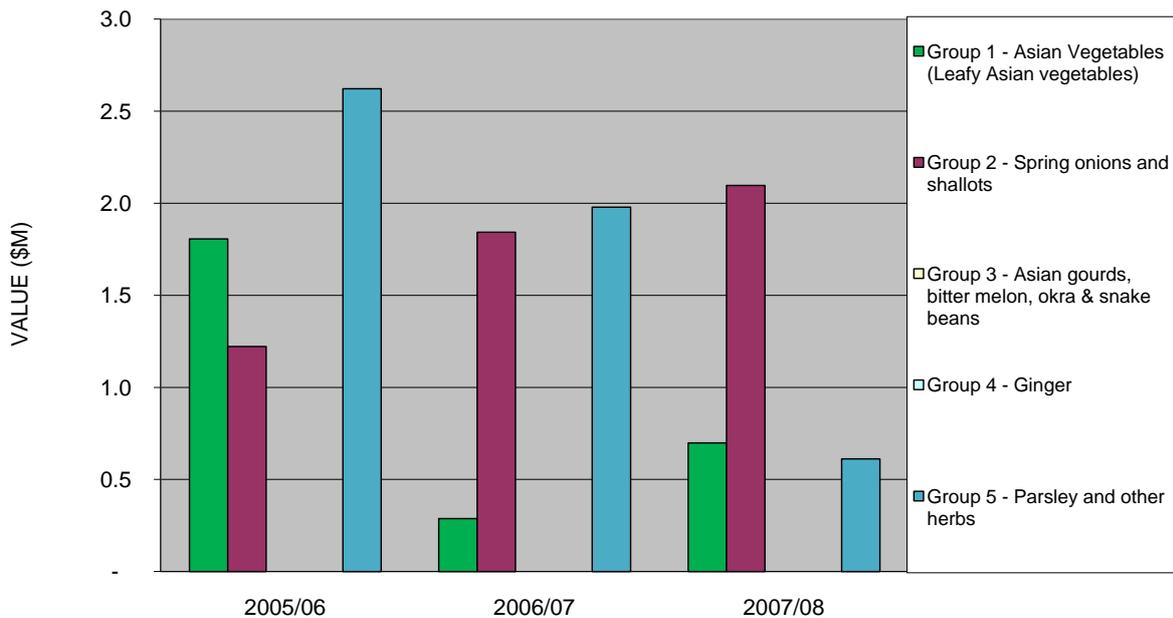


Figure 31 Comparison of Gross Value of Production in South Australia by Asian Vegetable Group

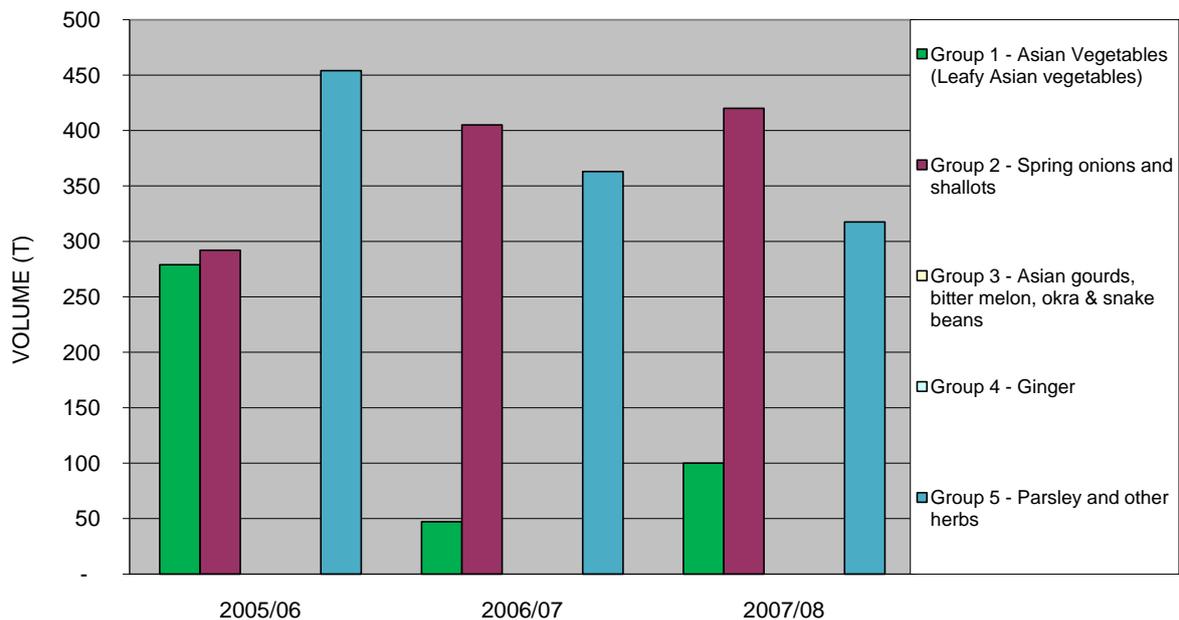


Figure 32 Comparison of Gross Volume of Production in South Australia by Asian Vegetable Group

There are relatively small amounts of Asian vegetables grown in South Australia. Mainstream vegetables such as tomatoes, cucumber, capsicum, carrots, potatoes and celery dominate production (Mike Redmond, *pers. comm.*). Growers indicate that there is very little commercial demand for Asian vegetables in South Australia, and only a small amount of produce is sold through the Adelaide Markets.

The Hassall and Lee audits previously identified spring onions, Chinese cabbage and some Asian vegetable seed as the major Asian vegetables, and industry confirms that these are still the dominant types. The ABS data shows that Adelaide and the Adelaide Plains area are the main growing areas generally for Asian vegetables but shallots and spring onions are not identified as growing in any specific area of South Australia.

4.5.3 Gross Unit and Yield Values

For South Australia, gross unit values as collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 14 and Figures 33 and 34. These figures show that during the three year period the gross unit value of the South Australian industry has decreased at a CAGR of minus 14%, and on a yield value basis has grown at a CAGR of 34%.

Year	Gross Unit Value (\$/Tonne)	Gross Yield Value (\$K/Ha)
2005/06	5,513	38
2006/07	5,041	20
2007/08	4,068	69

Table 14 Asian Vegetable Industry in South Australia by Gross Unit and Yield Values

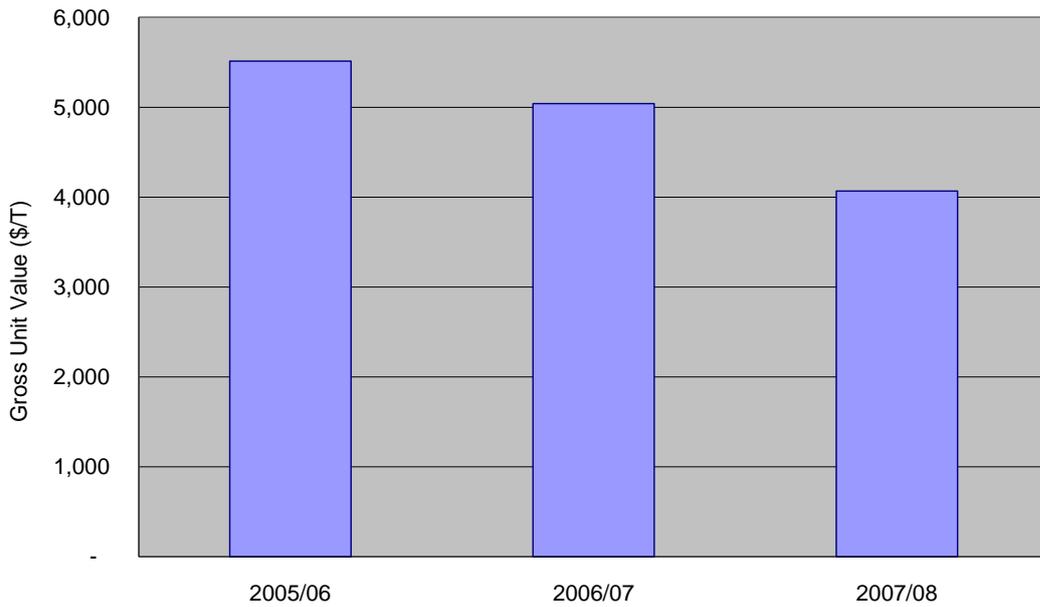


Figure 33 Gross Unit Value Asian Vegetable Production in South Australia 2005/06-2007/08

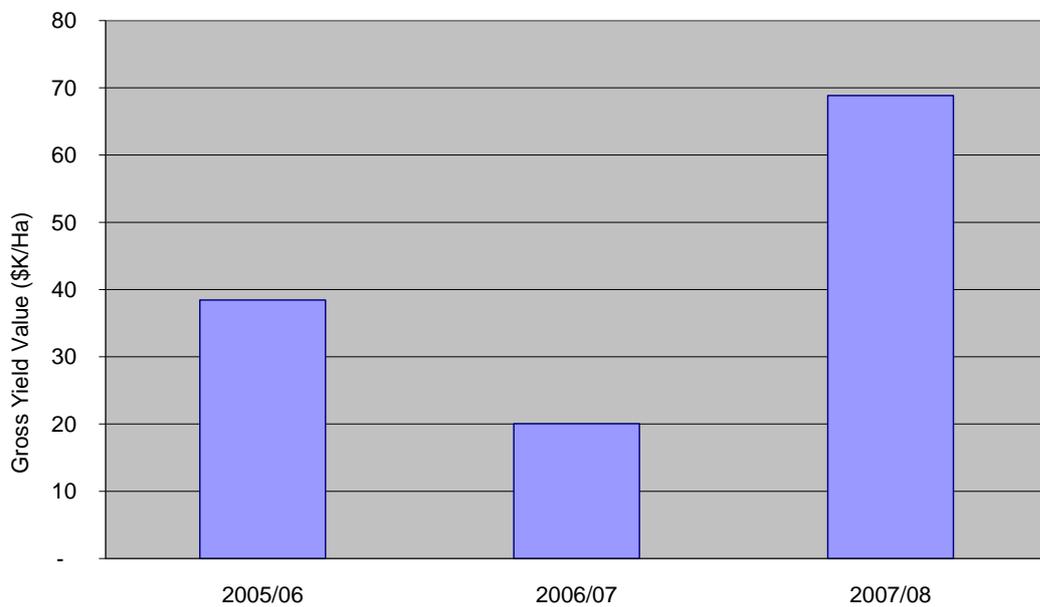


Figure 34 Gross Yield Value Asian Vegetable Production in South Australia 2005/06-2007/08

4.5.4 Grower Numbers

Per Table 15 and Figure 35, the ABS reports that there were 52 growers of Asian vegetables in South Australia during 2007/08 with parsley and others herbs being the largest vegetable group.

Asian Vegetable Group	Number of Growers
Group 1 - Asian Vegetables (Leafy Asian vegetables)	13
Group 2 - Spring onions and shallots	12
Group 3 - Asian gourds, bitter melon, okra & snake beans	0
Group 4 - Ginger	0
Group 5 - Parsley and other herbs	27
Total	52

(Source: ABS 2009)

Table 15 Number of Asian Vegetable Growers in South Australia 2007/08

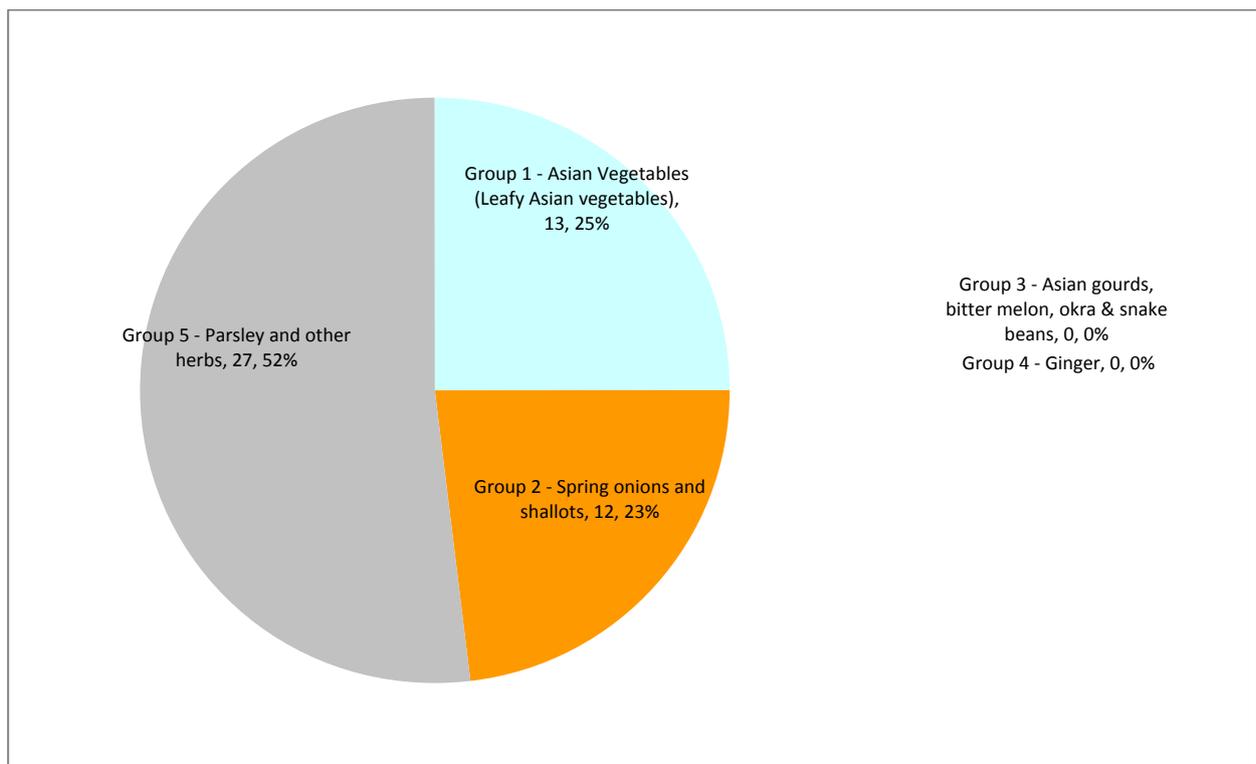


Figure 35 South Australian Grower Numbers by Asian Vegetable Groups 2007/08

The ABS data appears to under-estimate the grower numbers for Asian vegetables. AUSVEG (2005) report over half of South Australia's 1,100 vegetable growers are of CALD background, the vast majority being Vietnamese and a smaller number of Cambodians based in and around Virginia in the Northern Adelaide Plains. The remaining English speaking growers are mostly second and third generation Europeans, and there is a small population of first generation English speaking Turkish growers located at Murray Bridge.

As a result, there are two types of growers in South Australia. The first are the small semi-professional suppliers who operate close to Adelaide and supply produce direct to greengrocers and restaurants. Asian vegetables are produced using traditional practice. The second group of growers are the larger scale operators with best practice scale operations. It is reported that some growers are increasingly investing in hydroponic systems for the production of Asian (and non-Asian) vegetables.

4.5.5 Industry Issues

- **Market potential for Asian vegetables.** While the size of the Asian vegetable industry has declined in South Australia, growers believe that Asian vegetables are yet to achieve their market potential with consumers throughout Australia. Growers suggest that many Australian consumers are still to be educated on the preparation and use of leafy Asian vegetables and the associated nutritional benefits.
- **New production systems.** Growers believe that new protected and/or hydroponic production systems are suitable for the production of Asian vegetables in South Australia especially where efficient transport logistics are available. Such systems shall enhance the sustainability of agricultural land, however research into productivity and pests and diseases is considered important.
- **Attracting new growers to the industry.** Traditionally the children of first generation growers have not remained in the industry. However, growers believe that industry investment into new technology such as hydroponic NFT systems shall be attractive to younger future generations of growers. Of note, a South Australian Vietnamese Asian vegetable grower (who also grows tomatoes and capsicums) was a recent recipient of a Nuffield Scholarship for further research into hydroponic NFT systems.
- **Industry leadership.** Industry associations have been formed by both the Vietnamese and Cambodian growers. While not all growers are members of these associations, the associations nonetheless have been a basis upon which many industry initiatives have been developed. Various initiatives by SARDI, AUSVEG and RIRDC were acknowledged by growers.
- **Industry communications.** Vietnamese and Cambodian growers expressed a strong desire to receive further information on issues affecting the Asian vegetable industry.

4.5.6 Future Priorities and Research Issue

- **Structural adjustment industry planning.** Given the potential production resources of South Australia, industry should be supported to conduct a strategic evaluation for the production of Asian vegetables using new farm production systems. This should include growers and researchers of Asian vegetables collaborating to evaluating best practice production systems suitable to the environmental conditions of South Australia.
- **Industry networking and communications.** Communications with Vietnamese, Cambodian and Caucasian growers should be supported. Information on new production technologies and techniques should be disseminated widely throughout the industry.

4.6 Western Australia

4.6.1 Industry Size

The recent figures for Western Australia collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 16 and Figures 36 and 37. These figures show that during the three year period the value of the West Australian industry has grown at a CAGR of 41%, and on a volume basis has increased at a CAGR of 42%.

Year	Value (\$M)	Volume (Tonnes)
2005/06	10.0	2,554
2006/07	14.0	3,933
2007/08	19.9	5,115

(Source: ABS 2009)

Table 16 Size of the Asian Vegetable Industry in Western Australia by Value and Volume

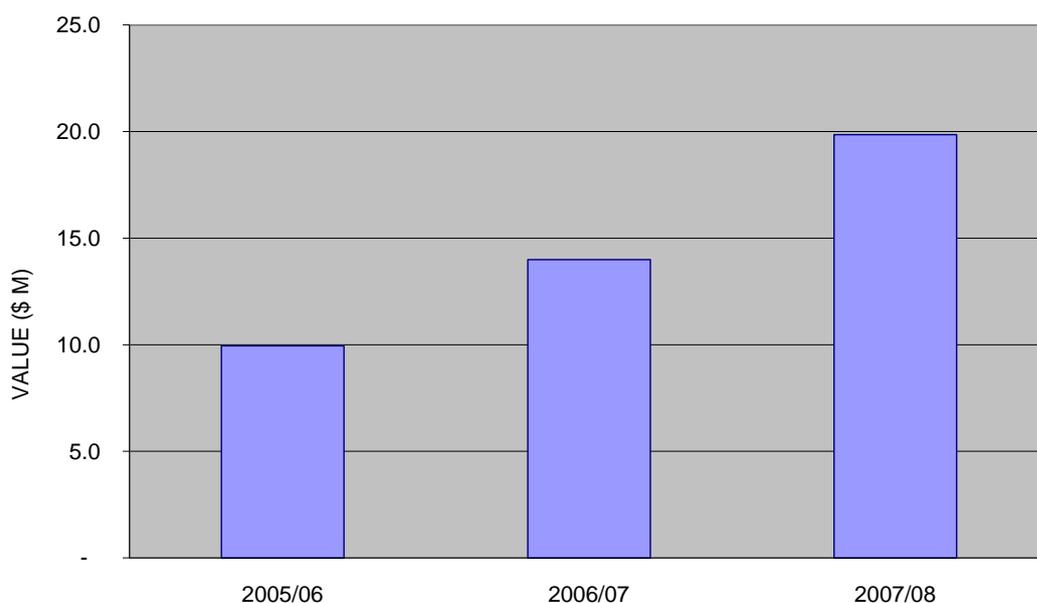


Figure 36 Estimates of Gross of Value of Asian Vegetable Production in Western Australia

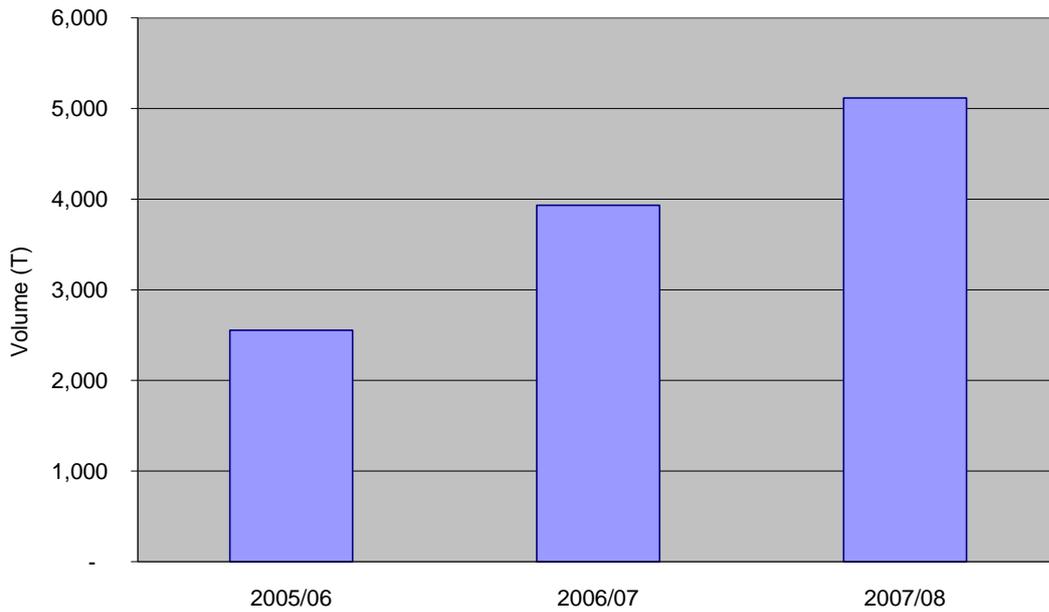


Figure 37 Estimates of Gross Volume of Asian Vegetable Production in Western Australia

4.6.2 Major Vegetables and Industry Location

Figures 38 and 39, shows that during the three year period, leafy Asian vegetables have grown and dominates production in Western Australia by both value and volume. The Agricultural Produce Commission of WA (APC) report that during 2006/07 to 2008/09, the leafy Asian vegetables which recorded the strongest growth included buk choy, pak choy and choy sum. Spring onions and shallots have also increased significantly in value and volume during the same period.

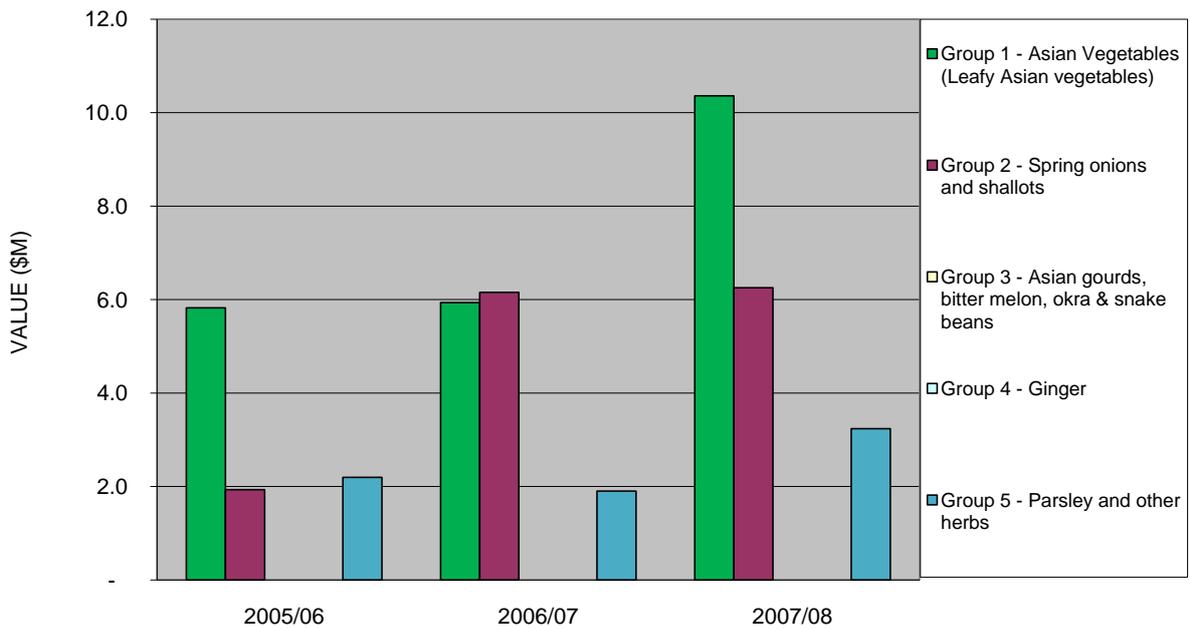


Figure 38 Comparison of Gross Value of Production in Western Australia by Asian Vegetable Group

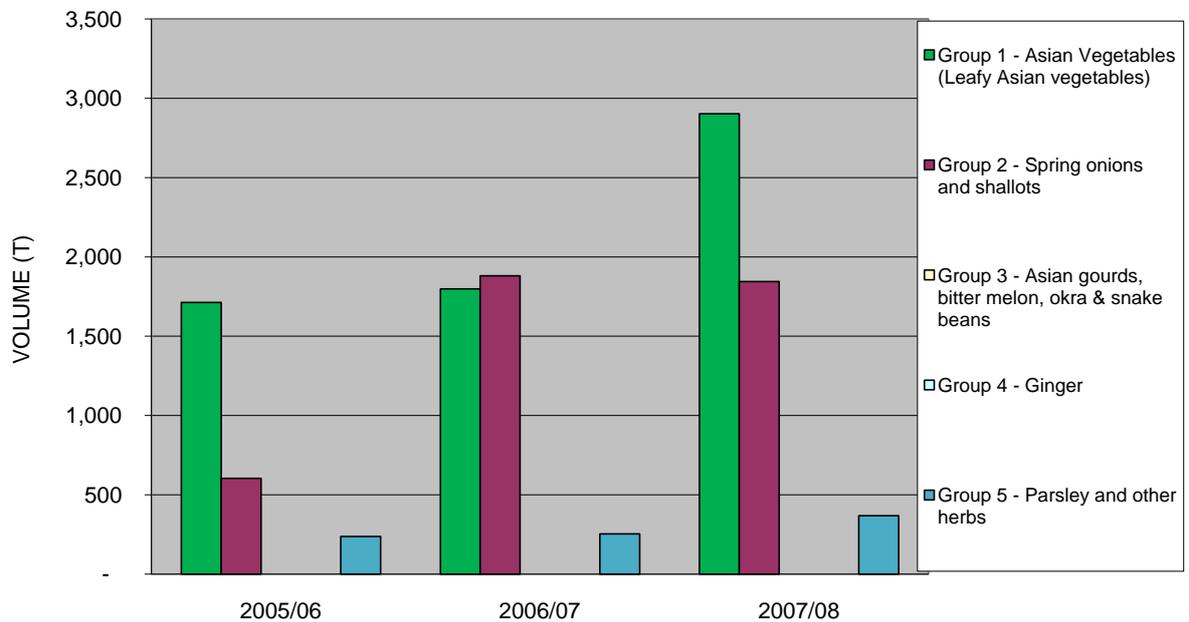


Figure 39 Comparison of Gross Volume of Production in WA by Asian Vegetable Group

The ABS data shows that Asian vegetables are grown particularly in the urban areas of Perth (such as Wanneroo) and also the south west and Midlands areas. The majority of the leafy Asian vegetable production is located around Perth. The growth of Asian vegetables for pre-packaged salad industry is growing. These vegetables include leafy herbs such as tatsoi and mizuna.

During the 1990's, there has been a significant Chinese cabbage industry in the south west near Manjimup, however due to low export prices, production is now small. (ABS, John Burt, *pers. comm.*)

4.6.3 Gross Unit and Yield Values

For Western Australia, gross unit values as collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 17 and Figures 40 and 41. These figures show that during the three year period the gross unit value of the West Australian industry has not grown, however on a yield value basis has increased at a CAGR of 29% per annum.

Year	Gross Unit Value (\$/Tonne)	Gross Yield Value (\$K/Ha)
2005/06	3,896	59
2006/07	3,557	101
2007/08	3,881	99

Table 17 Asian Vegetable Industry in Western Australia by Gross Unit and Yield Values

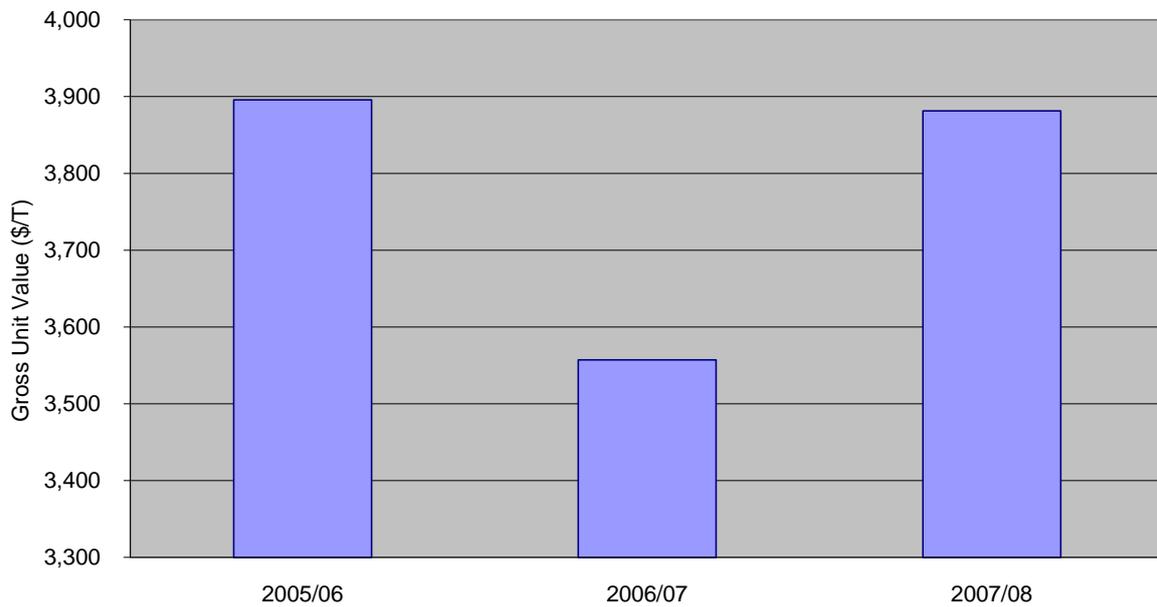


Figure 40 Gross Unit Value Asian Vegetable Production in Western Australia 2005/06-2007/08

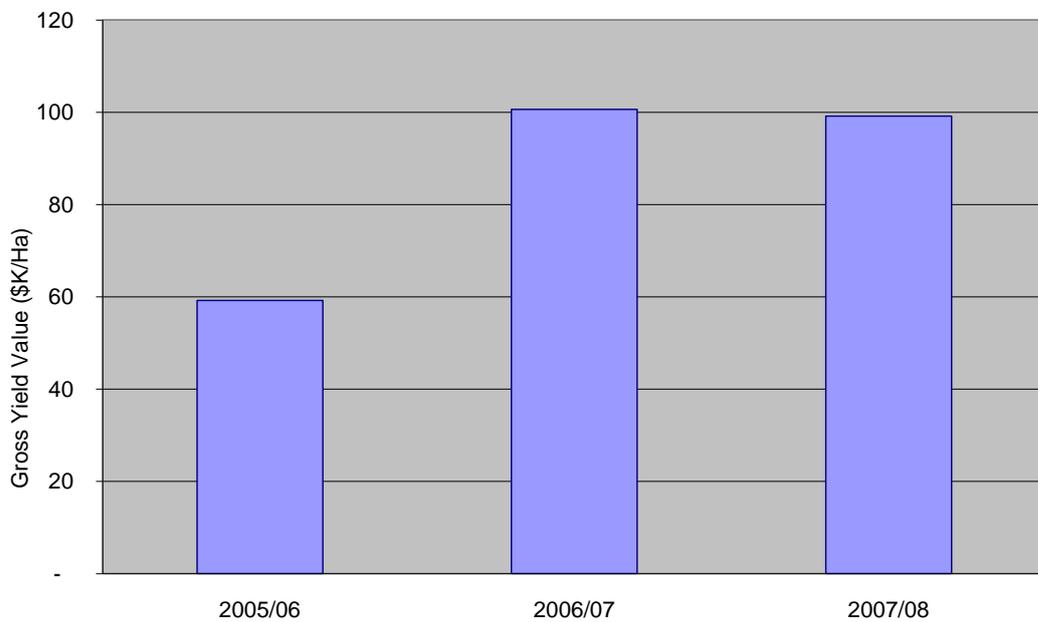


Figure 41 Gross Yield Value Asian Vegetable Production in Western Australia 2005/06-2007/08

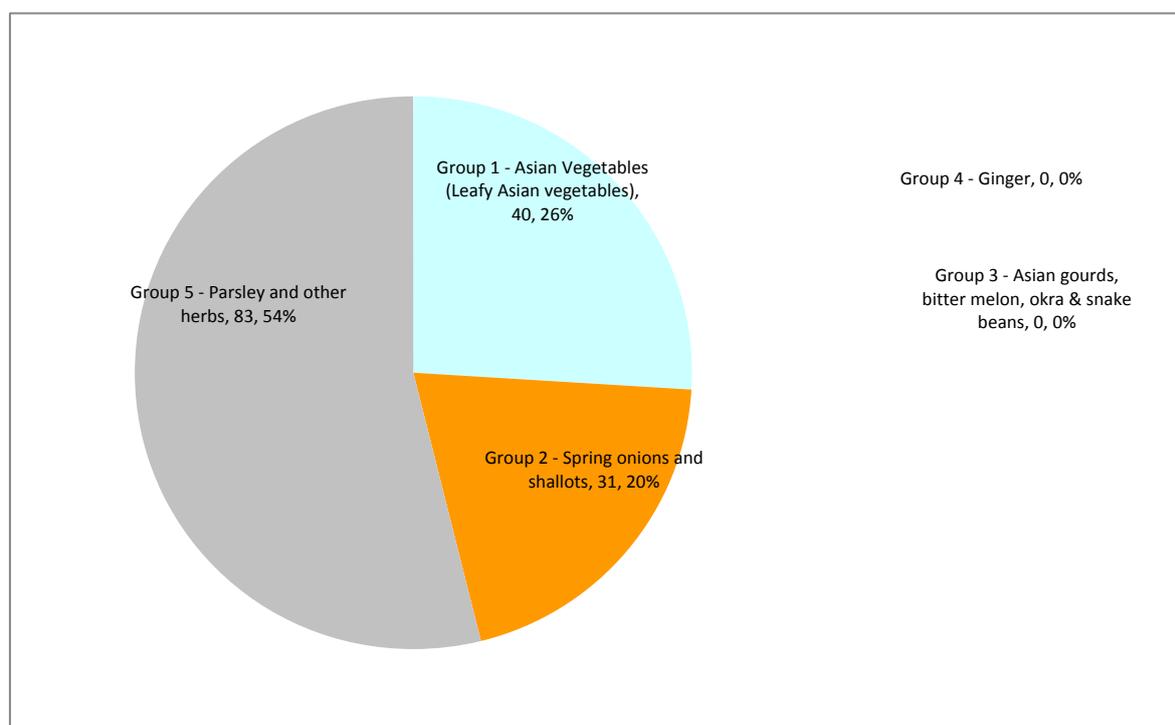
4.6.4 Grower Numbers

Per Table 18 and Figure 42, the ABS reports that there were 154 growers of Asian vegetables in Western Australia during 2007/08 with parsley and others herbs being the largest vegetable group.

Asian Vegetable Group	Number of Growers
Group 1 - Asian Vegetables (Leafy Asian vegetables)	40
Group 2 - Spring onions and shallots	31
Group 3 - Asian gourds, bitter melon, okra & snake beans	0
Group 4 - Ginger	0
Group 5 - Parsley and other herbs	83
Total	154

(Source: ABS 2009)

Table 18 Number of Asian Vegetable Growers in the Western Australia 2007/08



(Source: ABS 2009)

Figure 42 Western Australia Grower Numbers by Asian Vegetable Groups 2007/08

This ABS data appears relatively consistent with existing data. AUSVEG (2005) report that there were 210 vegetable growers of Vietnamese background however many of these grow crops other than Asian vegetables. Vietnamese grower association groups exist in Perth and these groups have participated in industry meetings and workshops.

In addition, established conventional vegetable growers of Caucasian backgrounds have continued to diversify into Asian vegetable production especially for leafy Asian vegetables which are used in pre-packaged salad products.

4.6.5 Industry Issues

- **Fragmented nature of the industry.** The industry is dominated by smaller market garden growers near Wanneroo in Perth. These growers are of Vietnamese background and require support in areas such as communications. However other larger scale Caucasian growers of Asian vegetables for pre-packaged salad products require support services such as new farming and irrigation techniques, IPM and biosecurity.
- **Lack of suitable labour.** While smaller farms in Perth use family labour, many other farms are dependent upon backpackers as their source of farm labour. In this instance it is difficult to ensure that backpackers have industry experience and a sufficient level of required skills.
- **Pests and diseases.** Virus diseases were a known issue and at the time of this study, a potato virus was the subject of a management plan with industry. While the virus did not directly affect Asian vegetable growers, the importance of biosecurity management was recognised. Further information on surveillance and characterisation was considered valuable.
- **Urbanisation pressures.** As in other states, farms near Wanneroo have become part of Perth's peri-urban agricultural landscape and are subject to a range of new issues including competing for land and water, economic development, local environmental planning, waste management and public health.

4.6.6 Future Priorities and Research Issues

- **Pests and diseases**
 - Dissemination of research into IPM for all growers.
 - Basic pest and disease training and record keeping for growers should be part of on-going support program.
- **Biosecurity**
 - Pest and disease surveillance and characterisation needs to become a standard practice and further education and community engagement is necessary.
- **Minor use chemicals**
 - There is a need to review the suite of minor use chemical registrations to ensure that these address all current and future potential diseases needs.
- **Community communications program**
 - For first generation grower groups, a key focus should be on technology adoption or transfer programs. In this regard, access to bilingual officers will be critical.

4.7 Northern Territory

4.7.1 Industry Size

The recent figures for the Northern Territory reported by the ABS for the three year period 2005/06-2007/08 are shown in Table 19 and Figures 43 and 44. These figures show that during the three year period the value of the Northern Territory industry has grown at a CAGR of 44%, and on a volume basis has increased at a CAGR of 12%. As with NSW, there is a major difference in the estimate of \$11 million by Hassall in 2001 and the \$1.9 million estimate by ABS in 2005/06. Again, this would appear to be largely due to the differing sources of data used in the previous studies, and the ABS data being based upon those larger businesses with an ABN (as discussed at Chapter 3.2.1).

Year	Value (\$M)	Volume (Tonnes)
2005/06	1.9	719
2006/07	4.0	898
2007/08(*)	4.0	898

(Source: ABS 2009)

(*) No ABS data available. Industry advise that 2006/07 estimates should be used.

Table 19 Size of the Asian Vegetable Industry in Northern Territory by Value and Volume

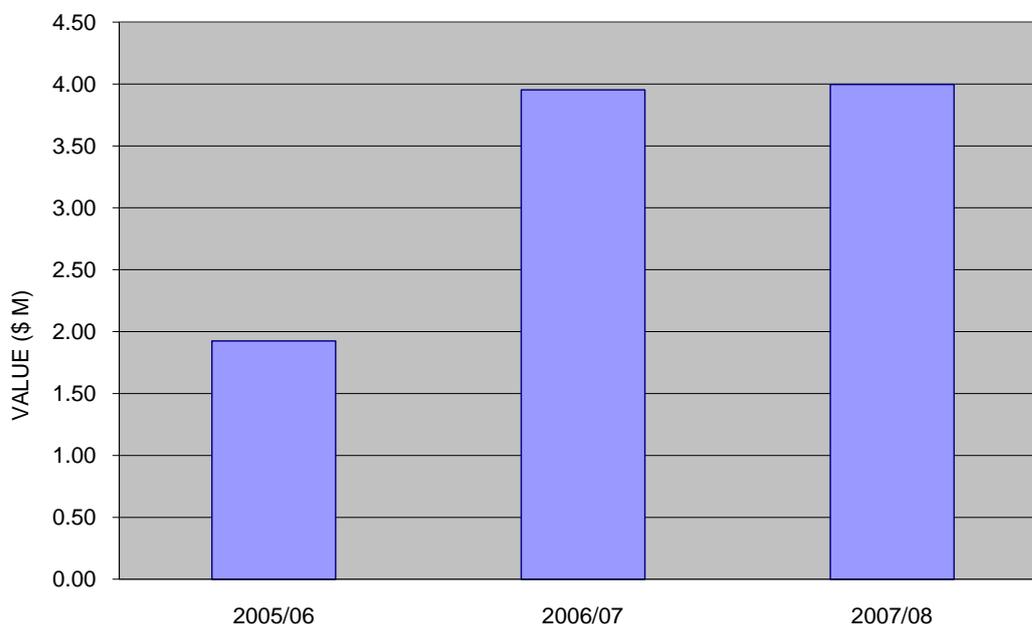


Figure 43 Estimates of Gross Value of Asian Vegetable Production in Northern Territory

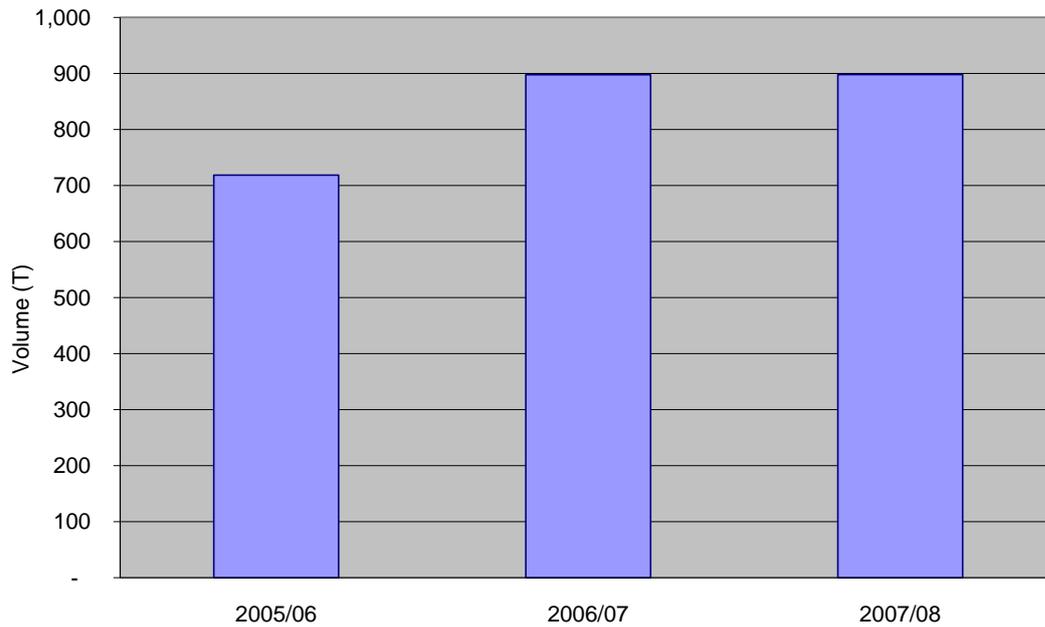


Figure 44 Estimates of Gross Volume of Asian Vegetable Production in Northern Territory

4.7.2 Major Vegetables and Industry Location

Figures 45 and 46 shows that during the three year period, Asian gourds, bitter melon, okra and snake beans have grown and dominates production in the Northern Territory by both value and volume. Of note, leafy Asian vegetables have also increased in value and volume.

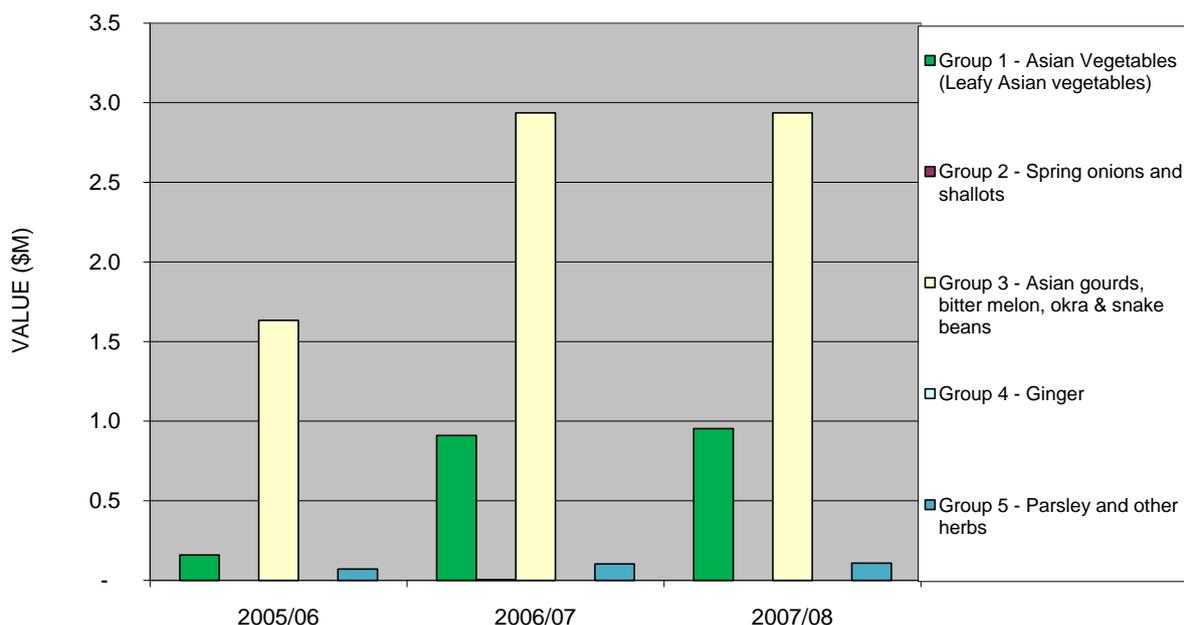


Figure 45 Comparison of Gross Value of Production in Northern Territory by Asian Vegetable Group

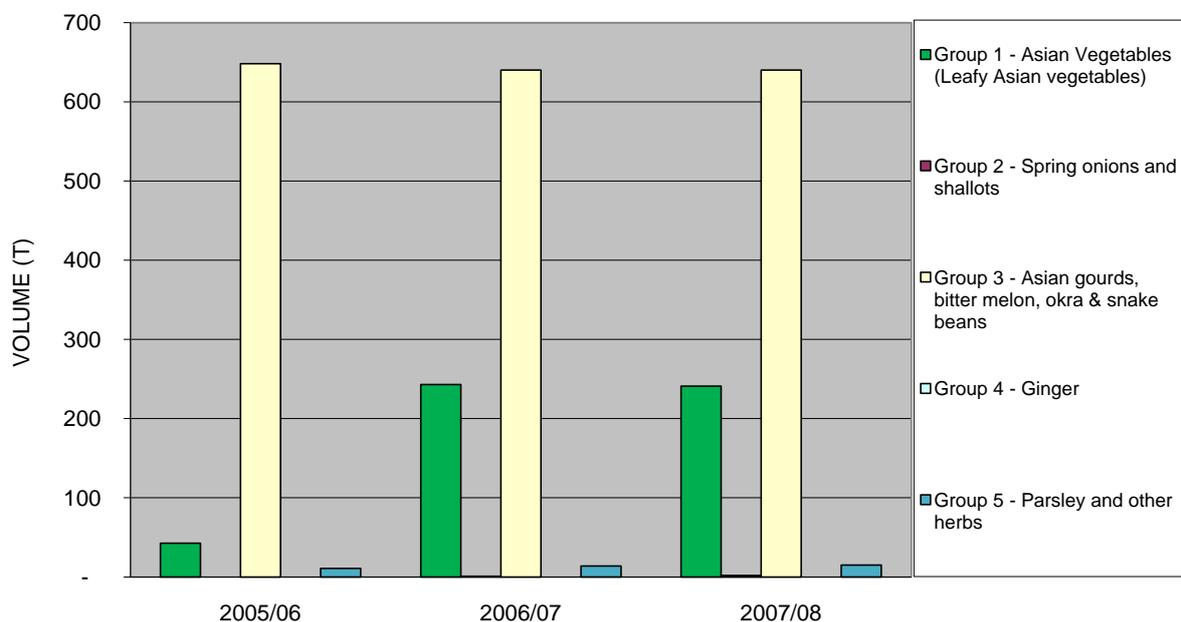


Figure 46 Comparison of Gross Volume of Production in NT by Asian Vegetable Group

The Territory's vast range of climatic conditions enables the production of a large range of vegetables however Asian vegetable production dominates the vegetable industry in the Northern Territory. The southern states have become the major market outlet for Asian vegetables grown in the NT. Major vegetables include gourds bitter melons, okra, snake beans and also long melons, hairy melons, taro, yams and kang kong. The ABS data does not specify any growing areas other than Darwin. However Leo (2008) and AUSVEG (2005) indicate that production occurs within 60 kilometres Darwin in areas such as Humpty Doo, Palmerston, Malak, Moonamah and Karama.

4.7.3 Gross Unit and Yield Values

For the Northern Territory, gross unit values as collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 20 and Figures 47 and 48. These figures show that during the three year period the gross unit value of the Northern Territory industry has grown at a CAGR of 29%, and on a yield value basis has increased at a CAGR of 17%.

Year	Gross Unit Value (\$/Tonne)	Gross Yield Value (\$K/Ha)
2005/06	2,679	14
2006/07	4,403	22
2007/08(*)	4,451	20

Table 20 Asian Vegetable Industry in the Northern Territory by Gross Unit and Yield Values

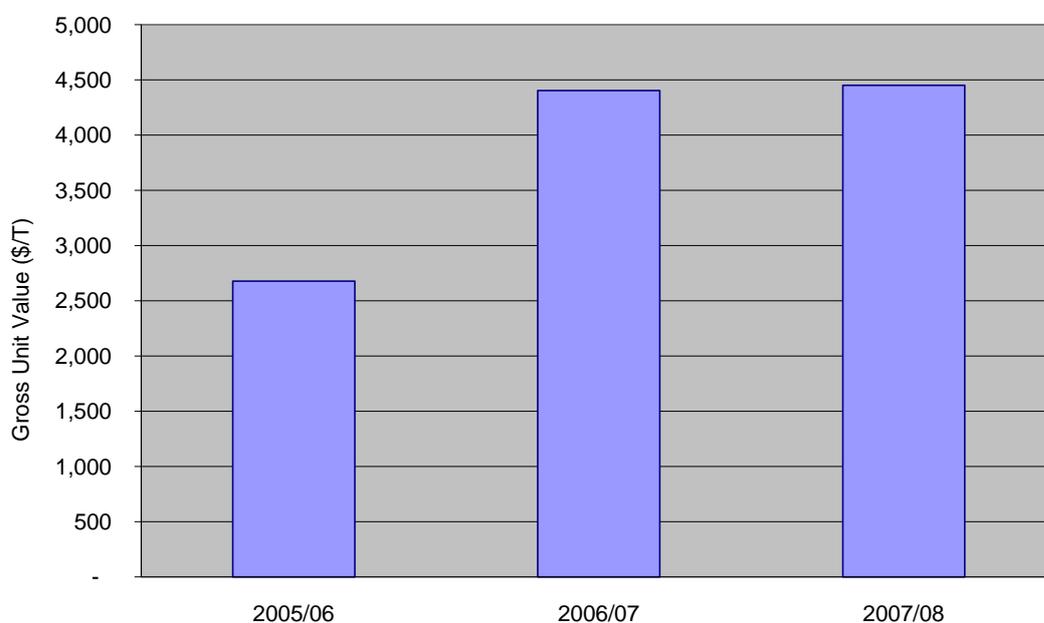


Figure 47 Gross Unit Value of Asian Vegetable Production in Northern Territory 2005/06-2007/08

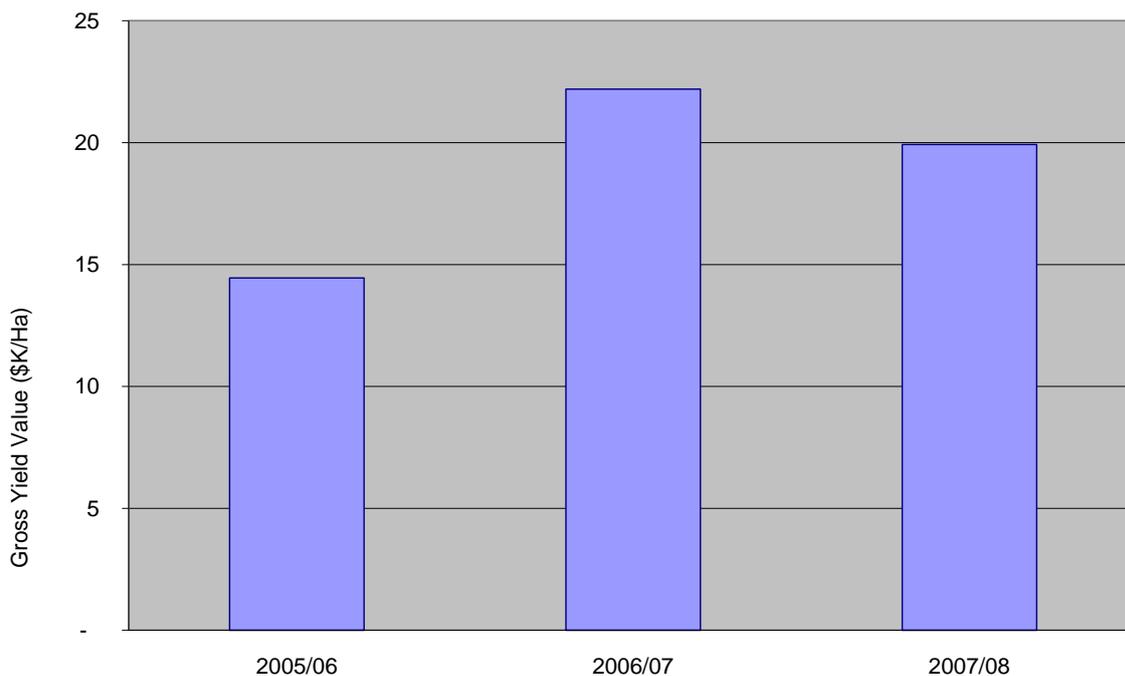


Figure 48 Gross Yield Value of Asian Vegetable Production in Northern Territory 2005/06-2007/08

4.7.4 Grower Numbers

Per Table 21 and Figure 49, the ABS reports that there were 103 growers of Asian vegetables in the Northern Territory during 2007/08 with Asian gourds, bitter melon, okra and snake beans being the largest vegetable group.

Asian Vegetable Group	Number of Growers
Group 1 - Asian Vegetables (Leafy Asian vegetables)	24
Group 2 - Spring onions and shallots	1
Group 3 - Asian gourds, bitter melon, okra & snake beans	70
Group 4 - Ginger	0
Group 5 - Parsley and other herbs	8
Total	103

(Source: ABS 2009)

Table 21 Number of Asian Vegetable Growers in the Northern Territory 2007/08

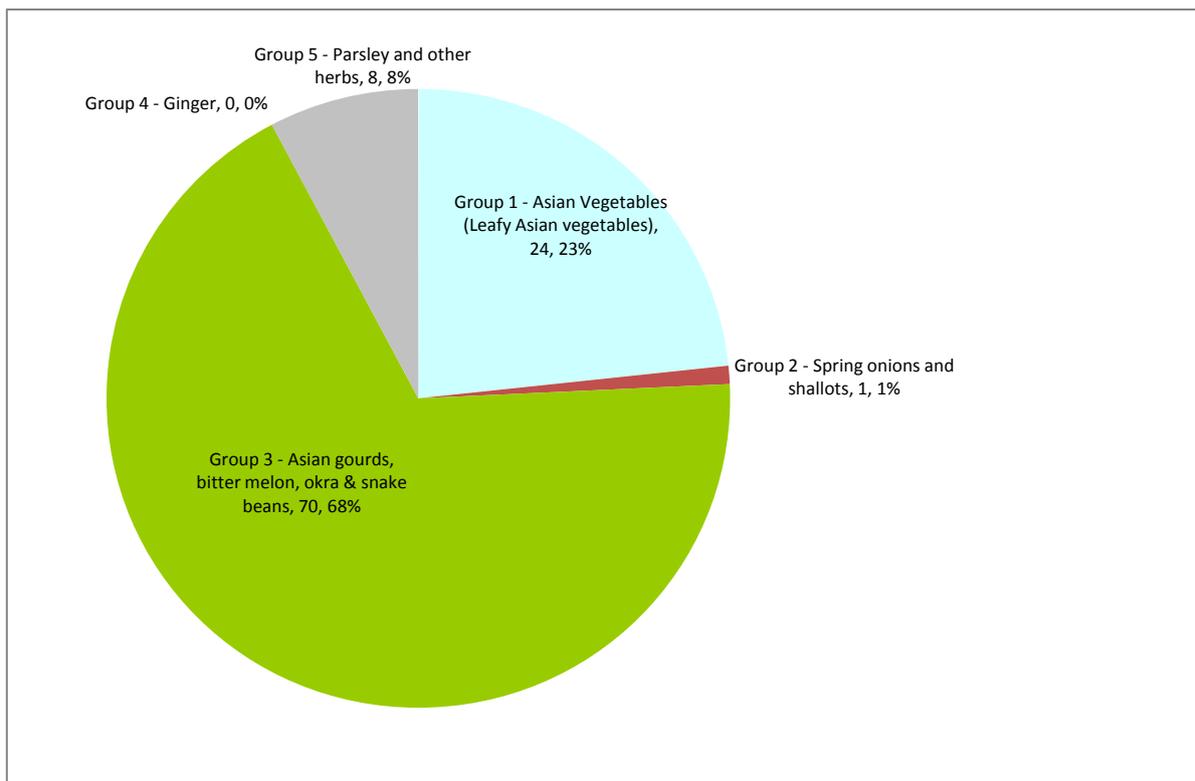


Figure 49 Northern Territory Grower Numbers by Asian Vegetable Groups 2007/08

4.7.5 Industry Issues

- **Industry growth.** The industry has grown rapidly and natural resource such as land and vegetation are under pressure from farming practices. Many growers are unaware of environmental issues and the long term sustainability of their farming practices.
- **Chemicals.** Growers are often unaware of the regulatory issues associated with the use of chemicals and pesticides. Translated information is considered important.
- **Types of growers.** There is a high turnover of first generation Asian vegetable growers. By comparison to many other states, the NT industry has very few if any Asian vegetable growers of Caucasian backgrounds.
- **Improved agronomic practices.** There is a gradual adoption of mulching and improved vegetable varieties. Breakthrough vegetable varieties have recently been adopted for both bitter melon and okra.
- **Lack of suitable labour.** Trellis crops such as snake beans require large amounts of labour during harvest and this labour is often not available.
- **High priced road transport.** Growers advise that transport costs to southern markets are a significant cost issue and question whether they or wholesale agents should pay for the cost of transport.
- **Farming skills and training.** Growers are requesting training in areas such as Chemcert and Farmcare courses. Extension materials in dot point English or translated into Vietnamese are also in demand.
- **Improved internal industry communication and grower cooperation.** Previously until 2003, there had been an Industry Development Officer (IDO) (Ms Kim Bui) who facilitated

communications between growers and industry (such as the NT Horticultural Association). However, the IDO role has not been replaced and there is currently no Asian vegetable growers association in the Northern Territory.

4.7.6 Future Priorities and Research Issues

- **Industry development plan.** There is a need to develop and implement an overall approach to Good Agricultural Practices and environmental sustainability.
- **Research and strategy formulation to overcome labour shortages.** Research is required on whether labour saving techniques for labour intensive crops are possible.
- **Inter-State Transport.** Growers require more cost effective transport to enable them to service the southern state markets.
- **Future communications.** Communications should occur in a variety of forms and at all levels and points of contacts with growers. Grower's report a high penetration of RIRDC's Access to Asian Foods Newsletter.

5. Discussion

5.1 National Assessment of the Australian Asian Vegetables Industry

5.1.1 Industry Size

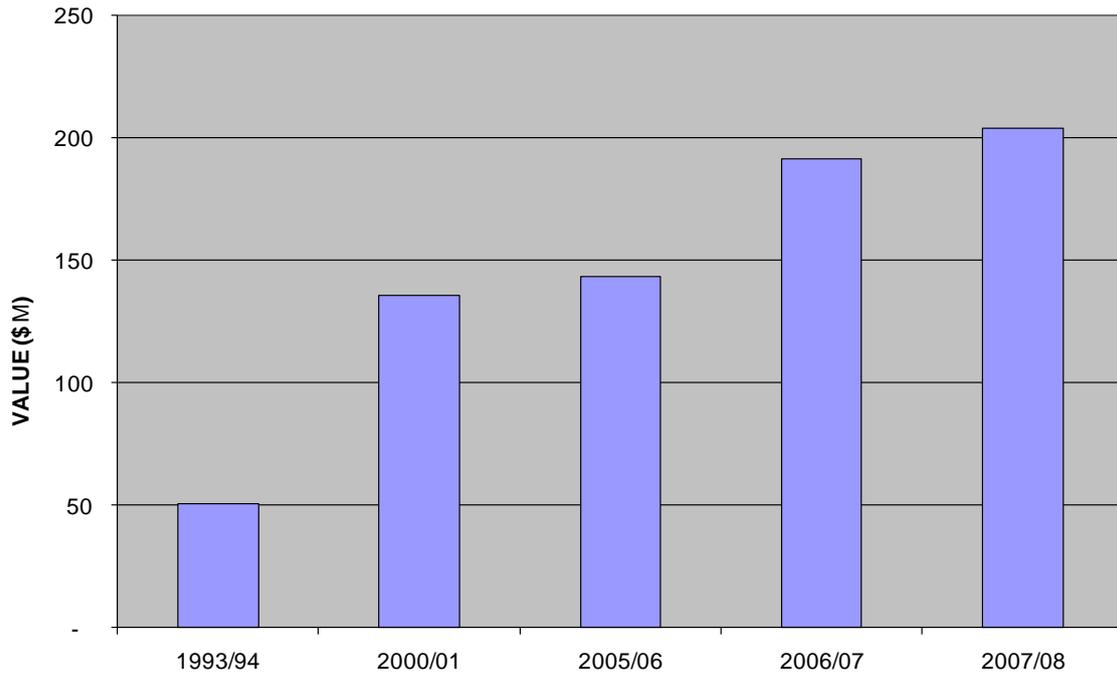
The Asian vegetable industry's value to Australia has previously been estimated at \$136 million (Hassall, 2002) and \$51 million (Lee, 1995). As shown in Chapter 4, the value and volume of production of Asian vegetables continues to grow in all states apart from South Australia.

The more recent figures for Australia collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 22 and Figures 50 and 51. For comparison purposes, Figure 50 includes the previous 1994 and 2001 values from the Lee and Hassall studies. These figures show that during the three year period the value of the Australian industry has grown to \$204 million which is a CAGR of 19%. On a volume basis, the industry has grown to a volume of 47,767 tonnes which is a CAGR of 12%.

Year	Value (\$ Million)	Volume (Tonnes)
2005/06	143	37,916
2006/07	191	44,374
2007/08	204	47,767

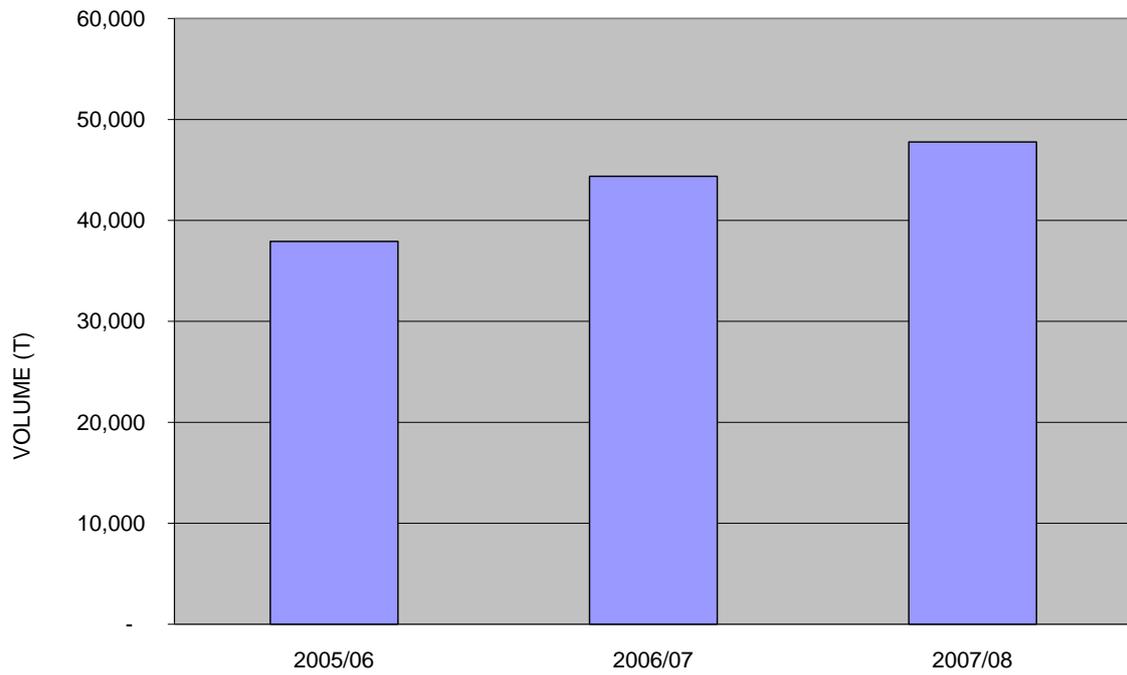
(Source: ABS 2009)

Table 22 Size of the Asian Vegetable Industry in Australia by Value and Volume



(Source: ABS 2009, Hassall and Associates 2003, Lee 1995)

Figure 50 Estimates of Gross Value of Asian Vegetable Production in Australia



(Source: ABS 2009)

Figure 51 Estimates of Gross Volume of Production of Asian Vegetable in Australia

5.1.2 Industry Share of National Vegetable Production

In 2007/08 the total value of Australian vegetables had grown to \$3.4 billion (ABS, 2010) and this study values the Australian Asian vegetables at \$204 million or 6% of total vegetable value. By comparison:

- In 2000/01 the total value of Australian vegetables had grown to \$1.8 billion (Australian Horticulture Statistics Handbook, 2000/01) and Australian Asian vegetables were valued at \$136 million (Hassall, 2003) or 7.5% of total vegetable value.
- In 1993/94 the Australian vegetable industry had a gross value at first point of sale of \$1.4 billion (ABS) and Australian Asian vegetables were valued at \$51 million (Lee, 1995) or 3.6% of total vegetable value.

5.1.3 Major Vegetables and State Location

a. Major Vegetables

Figures 52 and 53 shows that Group 1 Asian vegetables (leafy Asian vegetables) are the most significant Asian vegetable by both value and volume. In 2007/08, the value and volume of leafy Asian vegetables were more than twice the value of other groups such as spring onions and shallots or parsley and herbs.

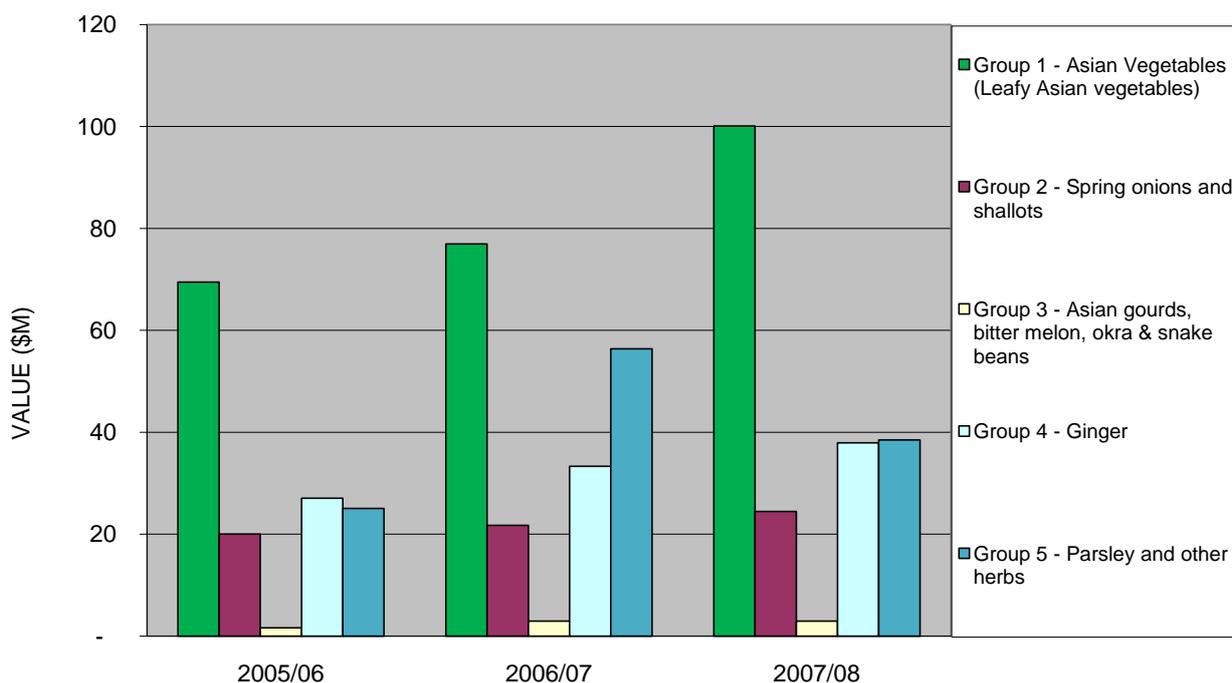


Figure 52 Comparison of Gross Value of Production by Asian Vegetable Group

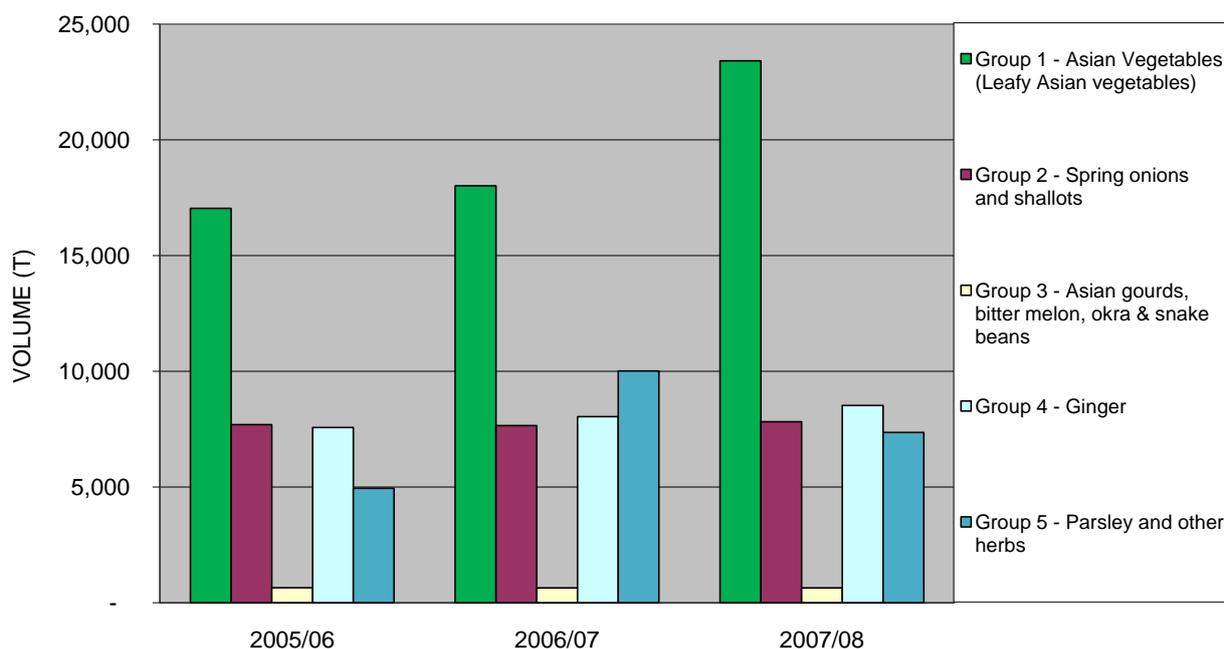


Figure 53 Comparison of Gross Volume of Production by Asian Vegetable Group

b. Industry Value and Volume by State

Based on the ABS data in 2007/08, Table 23 shows the values and volumes of production for Asian vegetables by state. Figures 54 and 55 shows that for the three year period 2005/06-2007/08, Queensland is the largest producer by both value and volume of production, followed by NSW and Victoria. This has changed since the Hassall study where NSW was the largest producer, and as shown in Chapter 4.2, is due to the growth of ginger production in Queensland.

State	Value (\$M)	Volume (Tonnes)
Queensland	98	22,003
NSW	44	10,936
Victoria	29	6,901
Western Australia	20	5,115
Tasmania	6	1,074
Northern Territory	4	898
South Australia	3	838
Total	204	47,765

(Source: ABS, 2009)

Table 23 Size of the Asian Vegetable Industry by State for 2007/08

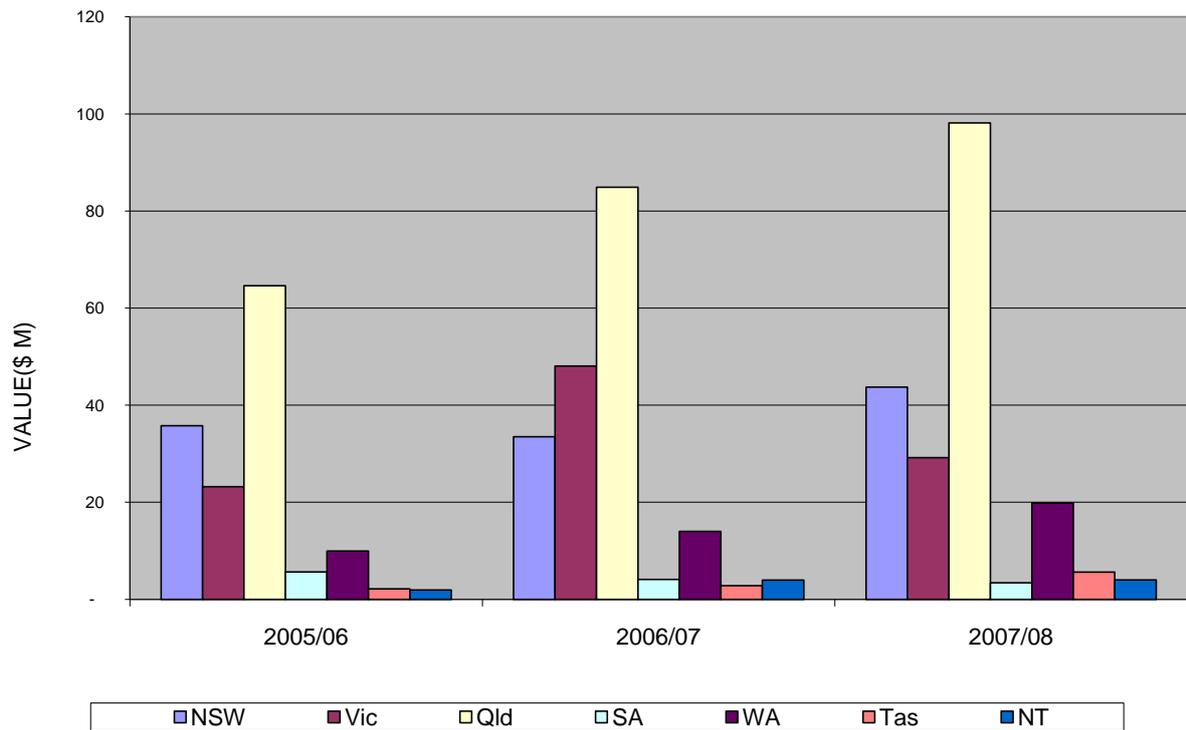


Figure 54 Gross Values of Asian Vegetables Production by State 2005/06-2007/08

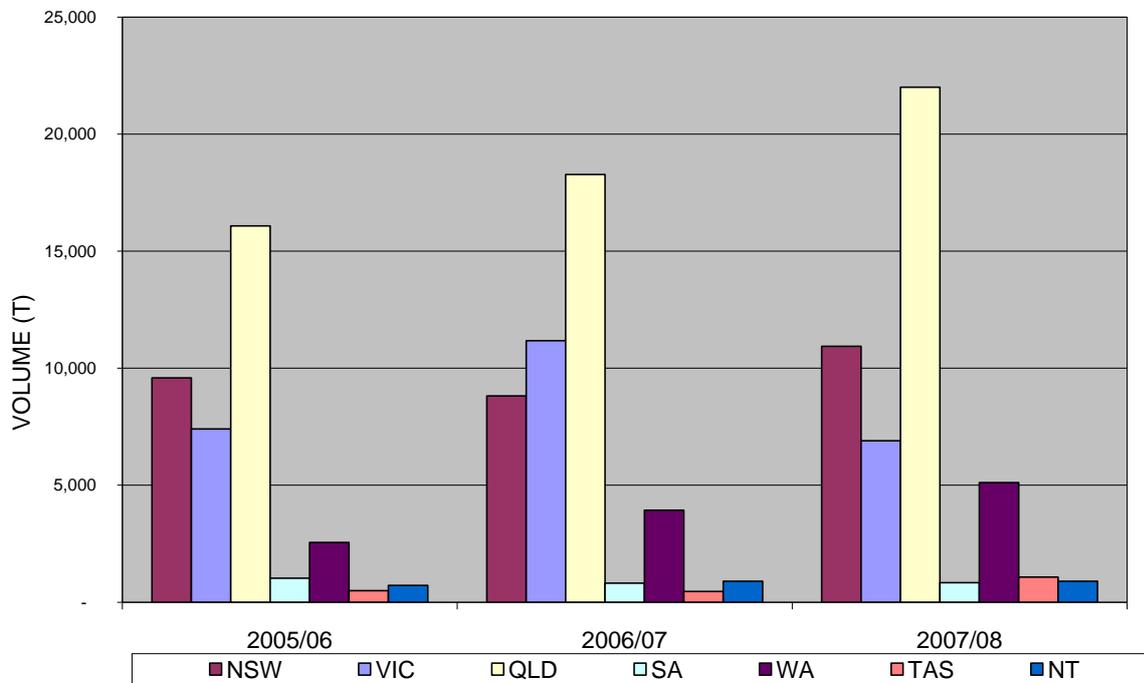


Figure 55 Gross Volumes of Asian Vegetables Production by State 2005/06-2007/08

On a value basis, the rate of growth in the states has varied widely. Figure 56 shows that by value Tasmania, Northern Territory and Western Australia were the fastest growing states with CAGR's of over 40% during 2005/06-2007/08. By comparison, South Australia had a CAGR of minus 22%.



Figure 56 CAGR % Changes in Gross Values of Asian Vegetable

On a volume basis, the rate of growth of production in the states has also varied. Figure 57 shows that by volume Tasmania and Western Australia were the fastest growing states with CAGR's of over 40% during 2005/06-2007/08. By comparison, South Australia had a CAGR of minus 9%.

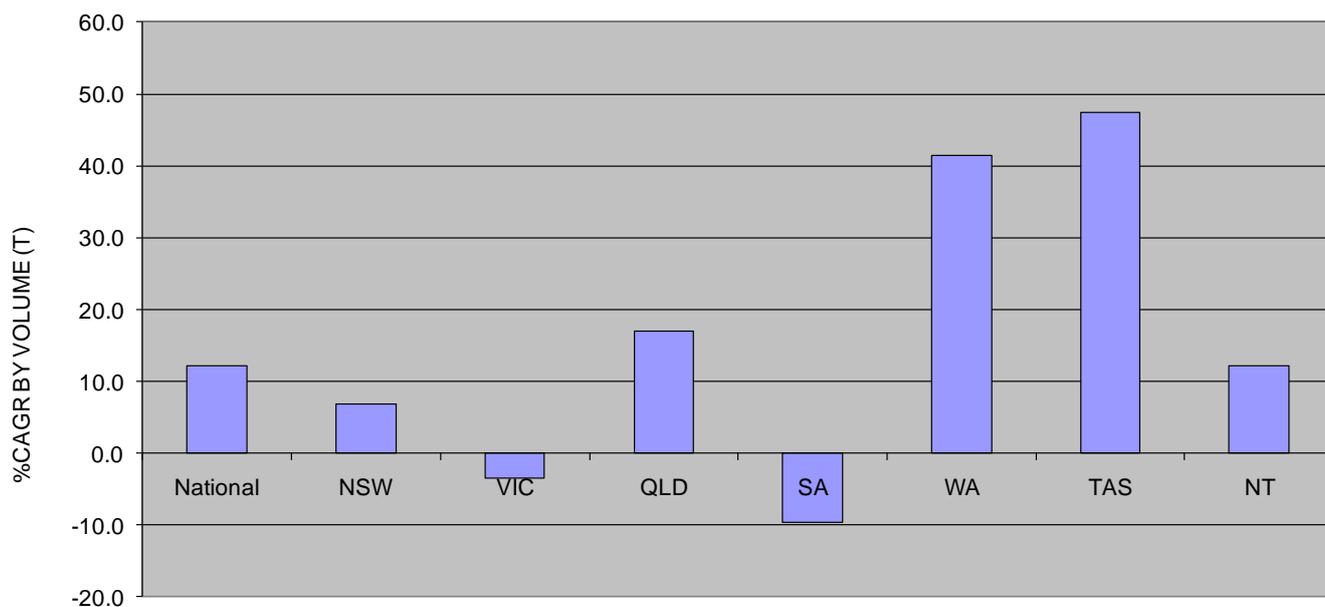


Figure 57 CAGR % Changes in Gross Volumes of Asian Vegetable

5.1.4 Gross Unit and Yield Values

For the Australian industry, gross unit values as collected by the ABS for the three year period 2005/06-2007/08 are shown in Table 24 and Figures 58 and 59. These figures show that during the three year period the gross unit value of the Australian industry has grown at a CAGR of 6%, and on a yield value basis has grown at a CAGR of 20%. This indicates that the industry has been able to improve its competitiveness and value during this period.

Year	Gross Unit Value (\$/Tonne)	Gross Yield Value (\$K/Ha)
2005/06	3,780	48
2006/07	4,310	57
2007/08	4,270	68

(Source: ABS 2009)

Table 24 Asian Vegetable Industry in Australia by Gross Unit and Yield Values

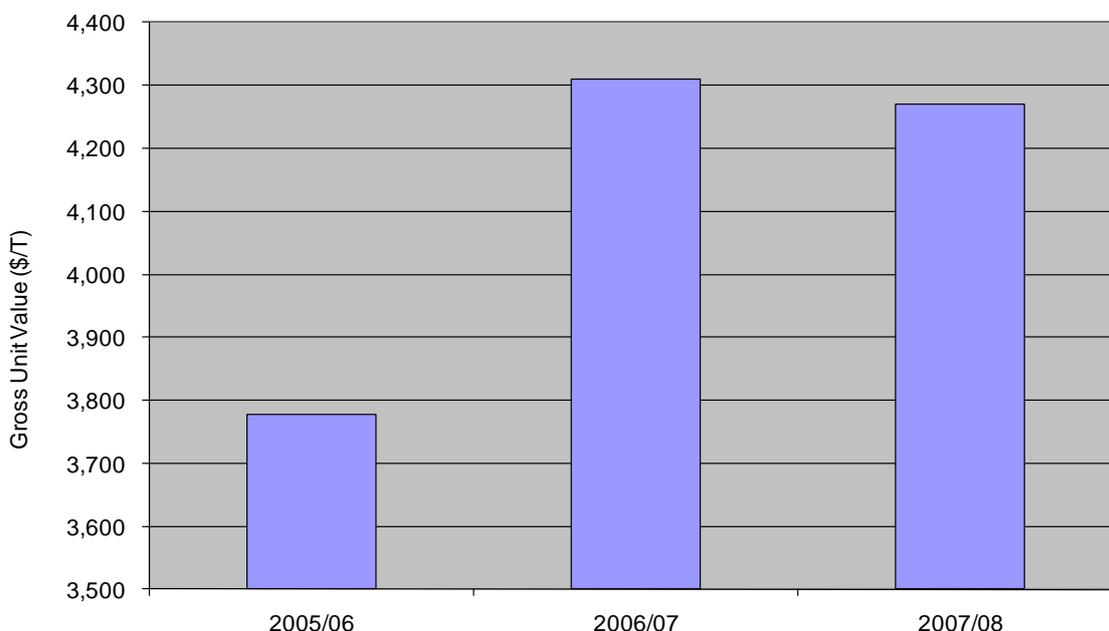


Figure 58 Gross Unit Value of Asian Vegetable Production in Australia

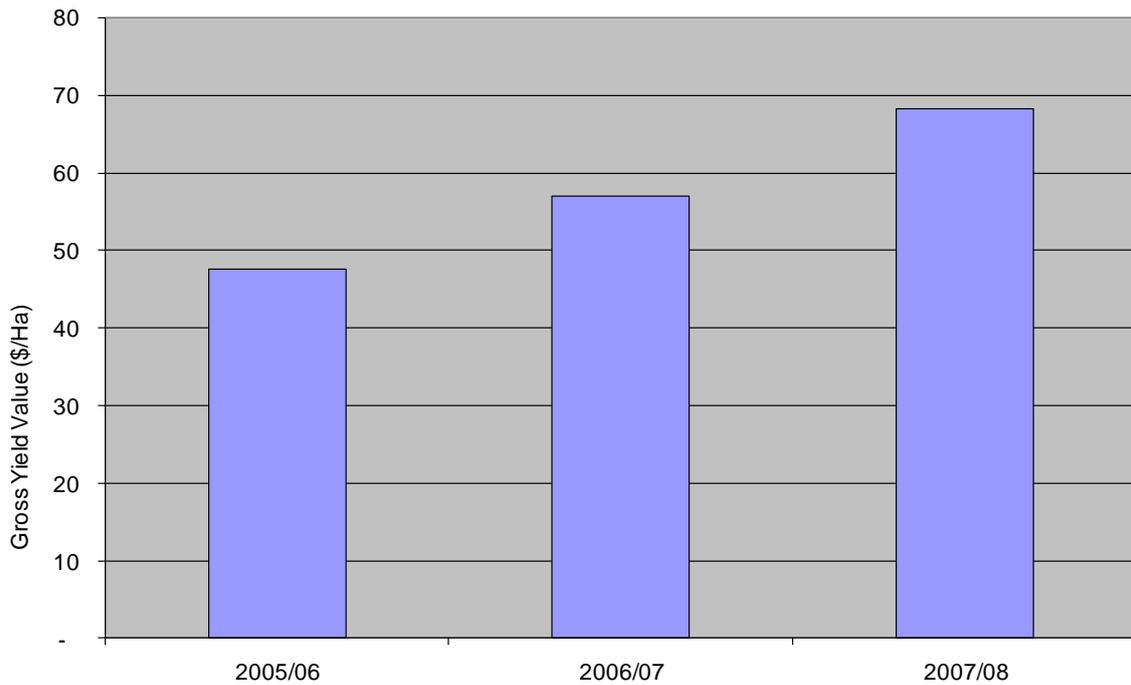


Figure 59 Gross Yield Value Asian Vegetable Production in Australia

5.1.5 National Grower Numbers

Table 25 and Figure 60 show that grower numbers has varied during the last 3 years but overall has grown by 19% to 1,414 growers in 2005/06-2007/08. However as discussed at Section 3.2, this number is likely to under-estimate the number of growers as the ABS data excludes growers who do not have an ABN number, and have an annual turnover of less than \$5,000 pa.

Year	No. of Growers
2005/06	1,193
2006/07	1,593
2007/08	1,414

(Source: ABS 2009)

Table 25 Number of Asian Vegetable Growers throughout Australia

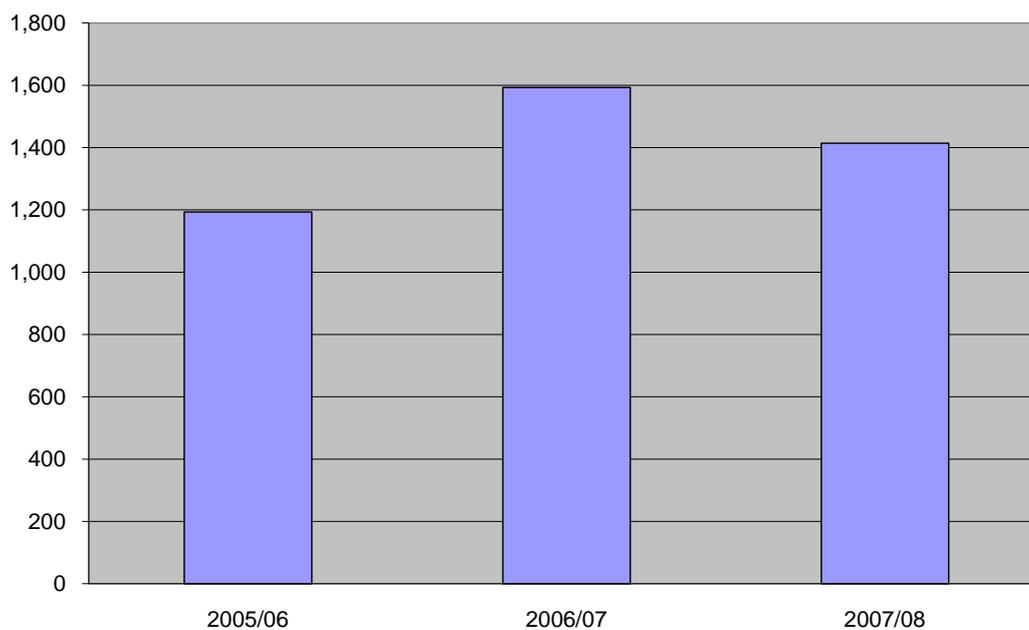


Figure 60 Numbers of Asian Vegetable Growers Throughout Australia

Table 26 and Figure 61 shows that the most number of growers are producing either Group 5 - Parsley and herbs or Group 1 - Asian vegetables. However Figure 62 shows that the Group 1 - Asian vegetables (leafy Asian vegetables) were the only group to have increased in grower numbers continuously during the three year period 2005/06-2007/08.

Asian Vegetable Group	No. of Growers
Group 1 – Asian vegetables (Leafy Asian vegetables)	421
Group 2 – Spring onions and shallots	222
Group 3 – Asian gourds, bitter melon, okra and snake beans	70
Group 4 – Ginger	51
Group 5 – Parsley and other herbs	650
Total	1,414

(Source: ABS 2009)

Table 26 Number of Growers defined by Asian Vegetable Groups 2007/08

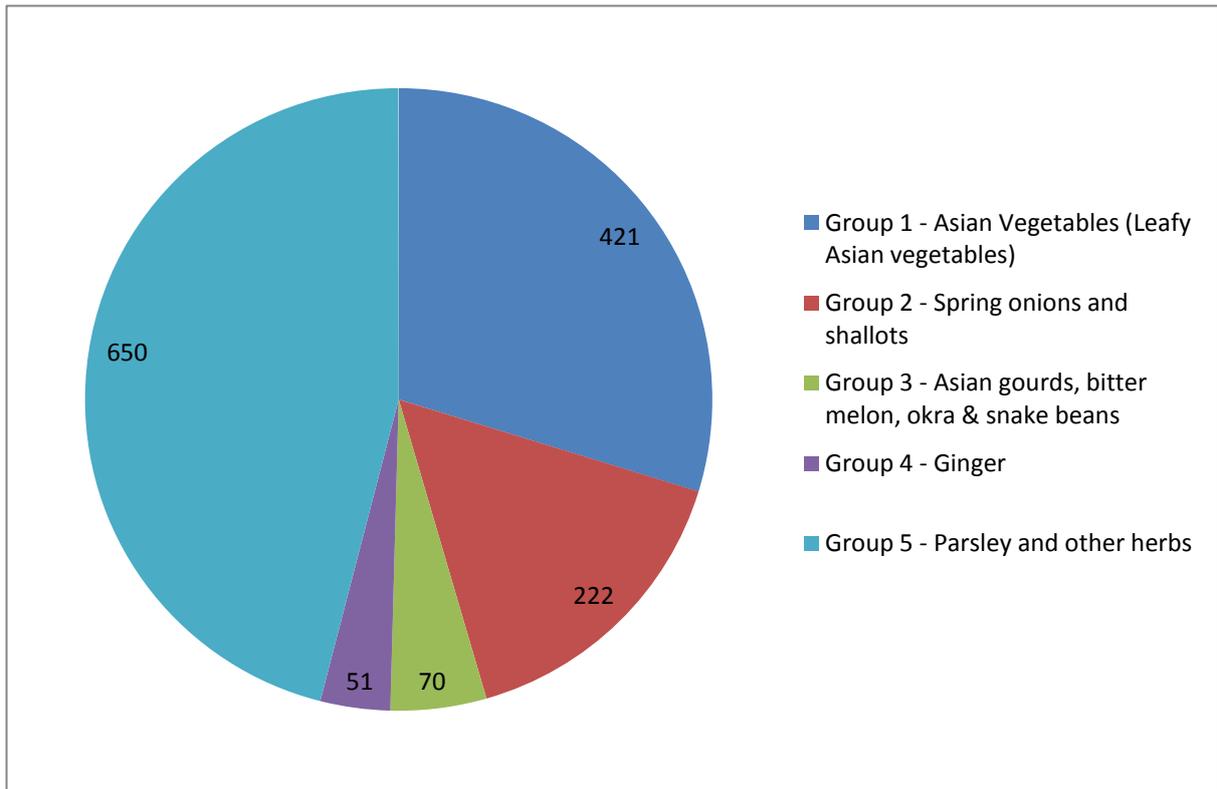


Figure 61 National Grower Numbers by Asian Vegetable Groups 2007/08

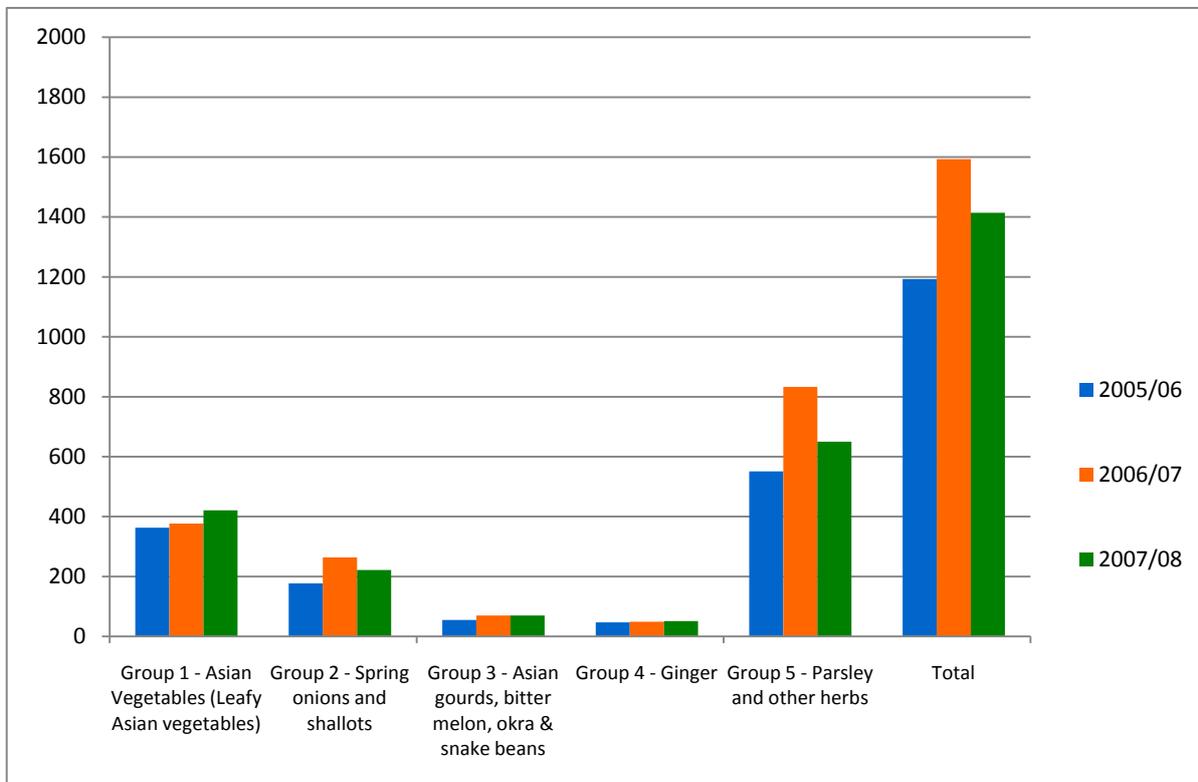


Figure 62 National Grower Numbers by Asian Vegetable Groups 2005/06-2007/08

5.1.6 Industry structure – The Evolution of a Third Group of Asian Vegetable Grower

The Hassall audit identified that the Asian vegetable industry consisted of two broad groups of Asian vegetable growers. These two groups were defined as ‘market gardeners’ and ‘scale producers’. While these two groups represent the major number of growers in the Asian vegetable industry, a smaller third group, is now represented by the ‘hydroponic growers’ of Asian vegetables.

This hydroponic grower group is significant as the utilisation of such technology has attracted new growers to the industry which is a positive sign of growth and investment in the industry. This small but growing hydroponic part of the industry is attracting both the market gardeners and the scale producers of Asian vegetable growers whether ethnic based or Caucasian (grower) groups. This technology is considered to be a platform technology from which the next generation of Asian vegetables growers may develop. As one grower commented ‘...my children are happy to be able to work in a clean factory environment using computers for hydroponic production, rather than work in the field using my tractor and tools’. While acknowledging that growers may not easily be described as one group or another, the broad differences in Asian vegetable grower groups are shown in Table 27.

Table 27 Industry Profile – An Industry with Three Grower Groups

Group 1 Market Gardeners	Group 2 Scale Field Producers	Group 3 Hydroponic Producers
Recent migrants and usually first generation growers.	Later generation Australians.	Children of migrants and later generation Australians.
Small scale market gardens (0.25 to 5 ha). May include green house production.	Large commercial operations (5 to 50 ha). May include green house production.	Commercial operations.
Small volume production and a large number of different vegetable types.	Fewer high volume products such as Chinese cabbage and pak choy.	Fewer high volume products such as pak choy, choy sum and shallots.
Supply fresh produce, especially bulk and bunched leafy lines to the domestic market.	Producers of boxed and graded product.	Producers of boxed and graded product.
Traditional practice and limited capital investment.	Best practice production techniques and technology with capital investment.	Best practice production techniques and technology with capital investment.
Often members of ethnic based grower groups.	Members of broadly based grower groups. Grow Asian and conventional vegetables.	Members of broadly based grower groups. Grow Asian and conventional vegetables.
Actively seek information.	Actively seek information.	Actively seek information.
Market to restaurants and smaller scale greengrocers.	Market to larger scale retail and food service markets.	Market to larger scale retail and food service markets.

5.2 Industry Concerns for Future Industry Growth

5.2.1 Market Demand

a. The Potential for Over-Supply of Asian Vegetables in Australia

A range of industry groups were consulted during this study and all reported that the domestic consumption of Asian vegetables continues to increase. While consumer research was not conducted during this study, industry consistently advised that consumers associate Asian vegetables with health and nutrition, convenience and novelty. This continued growth in demand is supported by the recent results of HAL's Vegetracker project. These results reported that 28% of respondents were buying more Asian vegetables in August 2009 compared to 23% of respondents in February 2009.

With the increased consumption of Asian vegetables, industry groups have reported that the product range, quality and availability has improved during the last ten years in most supermarkets, greengrocers and restaurants. In particular, supermarkets and food service groups reported double digit growth rates for Asian vegetables, and also noted that this is supported by the growth of the pre-packed salads category. Suppliers of pre-packed salads confirmed the strong growth in demand for Asian leafy products. These include baby *pak choy*, Chinese cabbage, *tatsoi* and Asian herbs including Asian mint, *mizuna* and *mibuna*.

However, industry groups also report that the increased demand for Asian vegetables does not necessarily result in increased industry profitability. The strong growth in supply has ensured that the market price is able to respond easily to the availability of Asian vegetables on the market. With such strong growth rates on the supply side since the 1990's, the industry is questioning the risk of pressures on price margins due to the potential for supply to exceed consumer demand. This cause for concern is also supported by the recent Consumer Price Index data released by the ABS for the quarter ending March 2010. This data shows a 1.1 per cent fall in the price of vegetables for the previous 12 months. And while HAL's Vegetracker project shows that consumers are buying more Asian vegetables, since February 2008 the growth in purchasing has slowed to become more gradual. Overall, the sustainability of price margins in the industry may be threatened by an over-supply of Asian vegetables.

b. The Decline in Export Markets

The only major export of Asian vegetables includes Chinese cabbage. The Hassall and Lee reports show a decline in Asian vegetable exports between 1994 and 2001, and the recent Chinese cabbage export data shows a continuation of this trend. As at 2008/09, total Chinese cabbage exports were valued at \$569,000 or a volume of just 500 tonnes. Figures 63 and 64 show the decline in Chinese cabbage export sales and volumes on a state-by-state basis for the last six years.

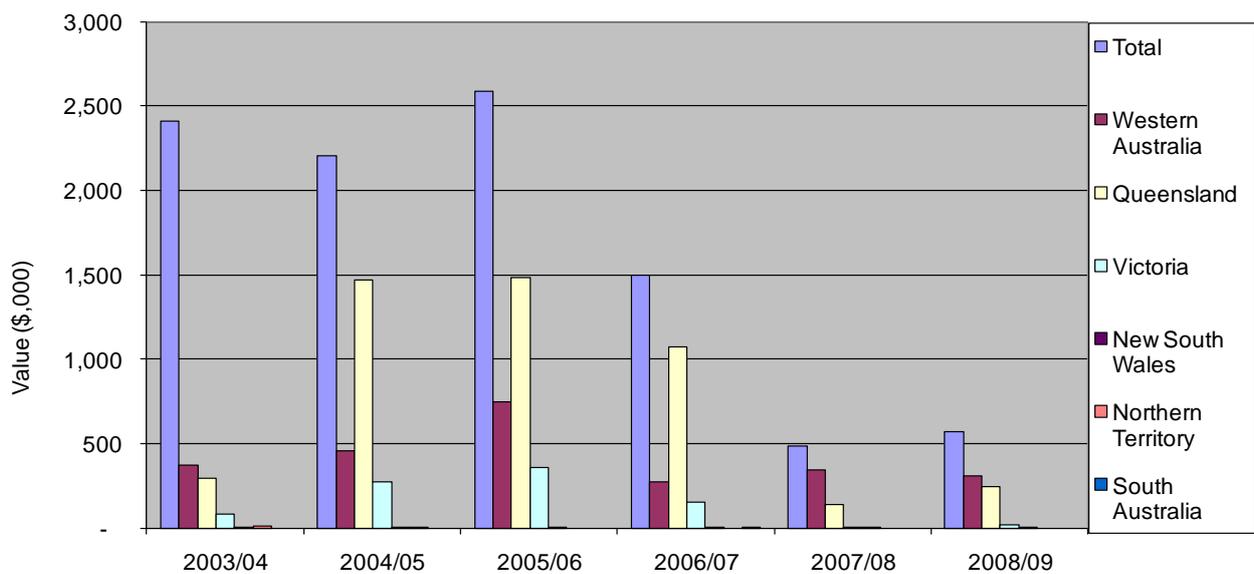


Figure 63 Gross Values of State Exports of Chinese Cabbage from Australia

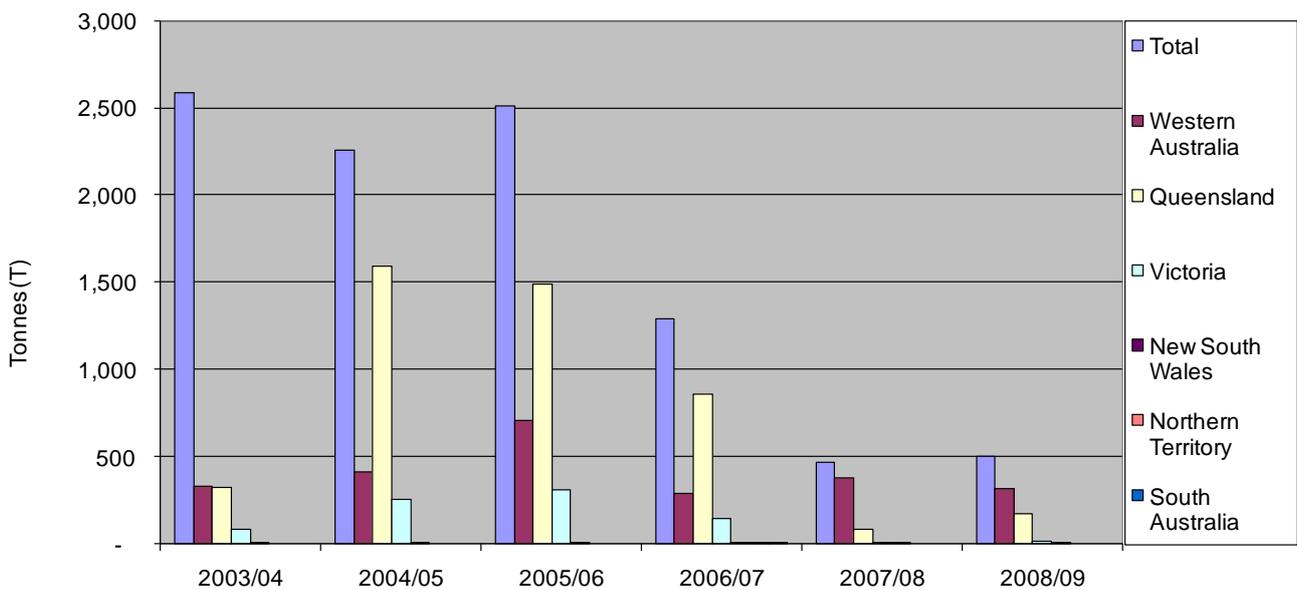


Figure 64 Gross Volumes of State Exports of Chinese Cabbage from Australia

In summary, exports of Asian vegetables are characterised by the following.

- Chinese cabbage being the only major Asian vegetable for exports.
- Chinese cabbage exports are supplied by Queensland and Western Australia, who together account for 98% of export volumes.
- Key export markets are Singapore, Indonesia and Papua New Guinea (ABS)

- Exports have been eroded by some 80% since 2003/04 due to market competition and the strength of the Australian dollar.

5.2.2 Production Practices

Industry support and research has been effective in shifting many in the industry from traditional practice employed by first generation growers to modern commercial practice. Research should continue to focus on facilitating this transition, but should not be at the expense of those who have made the transition to commercial production and require constant innovation and productivity improvements to deliver product competitively to markets.

However, due to the wide range of growers in the industry, the knowledge and skills associated with chemicals, pests and diseases and quality assurance can vary throughout the industry. Researchers (e.g., Brunton and Hall (2008), Hassall (2003), Parker (2000)) have repeatedly shown that while growers are hungry for education and knowledge, they often have limited access to support resources. Resources may be either in a regional centre distant from a grower, be based upon field data from other States, or for CALD growers the information may be in English only which is difficult for them to understand. This issue is relatively well-known and there have been many industry and Government initiatives to try and address the issue of poor or varied production practices. These initiatives have included AUSVEG's Enviroveg Program, RIRDC's funding of pest and disease research (Tesoriero, 2009) and the use of bilingual officers in various states. However as noted by AUSVEG (2010) the constant inflow or turn-over of first generation growers means that the issue of quality of production practices is an ever-present one and may never be fully addressed. Anecdotally it was reported that for many new immigrants, Asian vegetable market gardening was considered 'an unofficial strategy for re-settlement' as it provided employment, income and improved economic security for their families. For many it enabled them to reduce or eliminate their dependence upon Government welfare and social services.

Accordingly, it is likely that there shall always be varying levels of knowledge and understanding of farming practices and associated regulatory issues. This is not to be condoned but reports of growers facing fines from agencies because they are unable to read chemical labels are not an effective or sustainable approach for addressing poor production practices either. The key question is how can the issue be managed in a sustainable way? This study supports the approach of both Leo (2008) and Parker (2000) which is essentially a socio-technical extension model based upon of:

- Engagement with the ethnic communities to understand both their social and technical needs. For example, family health is often a priority and the safe use of agro-chemicals within this context is often more meaningful to growers and their families.
- Development of education and training approaches. For example, bilingual workshops with follow-up programs.
- Implementation of participatory and action based research in the field.

In the above context, the industry has the opportunity to work with the new Vegetable Industry Development Program (VIDP) to develop a holistic approach to sustainable production knowledge and skills in the industry.

5.2.3 Biosecurity – Watching Out through the Eyes of Industry

As with the all other horticultural industries, biosecurity is a major issue for the Asian vegetables industry. The industry is threatened by a range of endemic and exotic pests and diseases and has the potential to affect production and trade.

However, the message from industry is that their role in managing biosecurity for the Asian vegetables industry is not well understood. Kruger et.al. (2009) confirm this situation noting that many current biosecurity programs do not effectively engage growers and/or stakeholders. Communications in these programs tend to be top down, one way communications. Changing from communication programs to participatory programs has the potential to be longer-term and self-sustaining. This view is also

supported by Tesoriero (2009) where research showed that regular pest and disease monitoring through the eyes of growers needs to become standard practice in the industry.

However, for this to occur there is a need for:

- Capacity building for both surveillance and characterisation of pest and disease for both growers and institutions.
- Issues based research in collaboration with industry.
- Education and engagement with growers.

5.2.4 Productivity of Asian Vegetable Industry in Australia

Section 5.1.4 above shows that the unit yields and unit returns for Asian vegetables have increased during the three years from 2005/06. Productivity improvements are fundamental to the competitiveness and commercial viability of the industry. In this respect, the feedback from the states shows that the following factors are important to sustaining long-term productivity improvements:

- Utilisation of appropriate technology.
- Investment in research and development.
- The use of efficient extension services to enable growers to access the information about technology and research.

5.2.5 Peri-Urban Issues

GHD Hassall (2008a) report that land use planning is one of the 'top 5' policy issues impacting on horticulture in Australia. GHD Hassall cite that:

- In Victoria, peri-urban agriculture accounts for around one quarter of the State's land area but half of the agricultural production value.
- In Queensland, the southeast Queensland region constitutes only 1.3 per cent of Queensland yet accounts for 14 per cent of the State's total 'farm gate' turnover.

Similarly, Parker (2000) has reported on the pressures on agriculture in the Sydney Basin which supplies 90% of Sydney's fresh fruit and vegetables.

Due to the increasing potential of land use conflict in peri-urban areas, Government are aware of the planning challenges ahead. Competition for finite land and water resources is widespread and is expected to increase. As a result, GHD Hassall (2008b) was commissioned by HAL to produce a tool kit which provides fact sheets to understand land use planning in the peri-urban regions of Australia. The different tools aim to improve grower's understanding of the urban planning process.

Asian vegetable production is but one of the many 'intensive' horticultural practices by groups involved in the peri-urban landscape. As a result, it is important to ensure that the Asian vegetable industry is able to support and utilise the peri-urban tool kit resource. However, the additional challenge for the Asian vegetable industry is that of communication. As discussed, the industry is widespread and disparate and for many growers, English is not their first language. As a result, their ability to understand the tool kit should not be assumed. Communications through existing industry and community groups will go some way to addressing the issue but it is not a comprehensive approach for all the Asian vegetable industry.

5.2.6 Industry Communications and Extension

Communication with growers of other major vegetables in the industry is relatively straightforward and is well serviced through the many existing industry, supplier and Government organisations. However, it is evident that many of the same communication channels have not responded or changed as a result of the growth in the number and cultural diversity of growers in the Asian vegetables industry. As discussed above, the diversity of growers is significant with many growers being from parts of not only East Asia, but also of Indian, Greek, Italian, Maltese and Lebanese background. Communication systems to date have overseen the assimilation, but not necessarily the integration of

these culturally diverse growers into the industry. For example, poor production practices have occurred due to literacy or education issues with some growers, however it is also evident that in many cases the current communication and extension systems have flaws, and have not kept pace with grower needs in industry. One such major need is the availability of bilingual officers to assist with translation.

To date, there has been no one mechanism of communication throughout the industry. Rather it has been an approach involving multiple access points with RIRDC supporting many of these communication initiatives. A recent example is RIRDC's support of AUSVEG (2010) to improve communications with ethnic grower groups. The project aimed to raise awareness and provide an understanding of the vegetable industry structure, levy and increase grower participation in industry events. The major results of the project included:

- The strong support of growers to participate in the project.
- Interaction with ethnic associations or community groups.
- A greater understanding by industry of the hardship and difficulties that growers experience.
- Improved understanding of the importance of bilingual resources to help with translating industry R&D.
- Increased understanding of AUSVEG as the peak industry body, its funding and how it supports industry.

To sustainably address the needs of the culturally diverse growers in the industry, communications and extension needs a 'bottom-up and top-down' approach.

- *Bottom-up from the growers.* Communications should occur at the social or community level to appreciate the 'realities of market gardening life' and the practical issues of gaining access to services. Most importantly, trust and relationships should be developed with community elders and should assist to identify potential industry leaders. Subject to community participation, technical education and skills may subsequently be integrated into these communications. In summary, a socio-technical approach to extension.
- *Top-down from the Government.* The co-ordination between various agencies that interact with growers should be improved. Many agencies have sound and well-intended programs however many of the programs are funded for short project periods which is not consistent with the fact that many issues are ever-present (e.g., the need for bilingual services). A strategic 'whole-of-Government' approach to engaging with especially first generation growers should be reviewed. Importantly it should be acknowledged that many first generation growers come from situations of war, civil unrest and distrust of Government. As a result, this approach may need to be 'inter-disciplinary' and include an agenda of social welfare advocacy and not just technical extension issues as related to Asian vegetable production.

Again, the new Vegetable Industry Development Program has an important potential role of being a broker or facilitator between Government, agricultural suppliers and first generation growers on issues such as:

- Social and community inclusion.
- Bilingual resources.
- Education and training on environmental and biosecurity best practices.

6. Implications

The Australian industry continues to grow and evolve, and there appears to be no market failure for the supply of Asian vegetables. However, the issue of sustainability for the industry needs to remain a focus. Sustainability may be considered from not only the perspective of market economics (where large commercial groups are important), but also from a perspective of social inclusion and impact upon regional and community development. Environmental sustainability in the industry is a further and important parallel issue.

As a result, industry and government need to develop sustainability policies which incorporate ways in which to most effectively engage with all the growers in the Asian vegetable industry. Government and industry should include the following issues in their planning:

a. Economic Sustainability

The support and monitoring of consumer market research such as HAL's Vegetracker project can provide insights to the sustainability of consumer markets to support the growth in supply in Asian vegetables. The sustainability of pricing in the industry may be threatened by an over-supply of Asian vegetables.

b. Sustainability of Production Practices

Strategies should support grower education for Good Agricultural Production (GAP) practices with a focus on the industry productivity, the environment and biosecurity. This education should include the use of HAL's peri-urban tool kit so that urban land-use pressures are managed in a sustainable manner.

c. Social Inclusion and Integration with Industry

It is important to develop strategies that provide Asian vegetables growers and their communities with access to both technical and social services such as health and education. This will in turn support the development of 'leadership' programs in the Asian vegetable industry and the integration (and not just assimilation) of Asian vegetable growers into broader industry events and activities.

d. Industry Communications and Extension

Bottom-up communications from the grower should be facilitated to enable an appreciation of the 'realities of market gardening life' and the practical issues of gaining access to services. Most importantly, trust and relationships should be developed with community elders and this shall assist in identifying potential industry leaders.

Top-down communications from the Government should be reviewed with a strategic 'whole-of-Government' approach to engaging with industry especially the first generation growers. The various agencies that interact with growers should review opportunities to co-ordinate project funds and timelines between organisations and projects. This approach may need to be 'inter-disciplinary' and include an agenda of social welfare advocacy and not just technical extension issues for Asian vegetable production. RIRDC, AUSVEG and the new Vegetable Industry Development Program are potential resources which may be able to support co-ordination between growers.

e. The Future Direction for Asian Vegetables Research

RIRDC's Asian Foods research has been a catalyst for innovation and has grown to be part of RIRDC's Cultural and World Foods Program. However, the term Asian vegetable in Australia is usually perceived as pertaining to crops from East Asia. To date, many vegetables and herbs from Southern and Central Asia such as cucumbers, eggplant, saffron and turmeric are not considered to be Asian vegetables or herbs. However, with the changes in Australia's population and food culture the scope of future research should continue to expand to include other such vegetables and 'multicultural' foods.

7. Conclusions and Recommendations

7.1 Conclusions

The industry has grown to a value of over \$200 million which is a four-fold increase since the early 1990's. Consumer demand for Asian vegetables continues to grow.

There are now three groups of growers in the industry involving traditional practice market gardeners, commercial scale producers and hydroponic growers. While market gardeners may have difficulty with literacy, limited capital and occupy smallholdings, they nonetheless dominate the industry. Industry support and research has been effective in shifting the many in the industry from traditional practice employed by first generation growers to modern commercial practice. Research should continue to focus on facilitating this transition. However, this focus should not be at the expense of those who have made the transition to commercial production and require constant innovation and productivity improvements to deliver product competitively to markets.

The future of the industry lies with the support of all three groups of growers. The sustainable growth of the industry needs to be based upon an approach which balances the commercial, environmental and social development needs of all parts of the industry.

7.2 Recommendations

These recommendations have been developed to support the sustainable growth of the industry.

7.2.1 Objective: Development and Growth of the Australian Markets

- **Recommendation 1.** Support projects that develop the market through education of consumers about the many types of Australian Asian vegetables and their value and benefits.

7.2.2 Objective: Improvement of the Commercial Viability of the Asian Vegetable Industry

- **Recommendation 2.** Support best practice production and research aimed at improving industry productivity. This should include:
 - the registration and use of minor use chemicals
 - pest and disease management to improve field and hydroponic production
 - technical support for Chinese cabbage (export) growers who need to transition to new crops
 - technology which is able to improve farm yields and product values
 - structural adjustment research for evaluating best practice production systems suitable to the environmental conditions of South Australia.

7.2.3 Objective: Improvement of the Biosecurity Capability of the Asian Vegetable Industry

- **Recommendation 3.** Support research which shall improve growers' and institutional capacity for the surveillance and characterisation of pests and diseases.

7.2.4 Objective: Dissemination of HAL's Peri-Urban Tool kit Information

- **Recommendation 4.** Ensure the Asian vegetable industry is able to access, comprehend and utilise HAL's peri-urban tool kit resource.

7.2.4 Objective: Communication and Extension

- **Recommendation 5.** To sustainably address the needs of the culturally diverse growers in the industry, communications and extension needs a 'bottom-up and top-down' approach. This should include:

- the development of relationships with community groups to identify potential industry leaders
- a strategic 'whole-of-Government' approach to engage with especially first generation growers.

RIRDC, AUSVEG and the new Vegetable Industry Development Program are potential resources which may be able to support co-ordination between growers.

7.2.5 Objective: Future Scope of Research

- **Recommendation 6.** RIRDC should continue to expand its scope of research to include other vegetable and 'multicultural' foods under its Cultural and World Foods research program.

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Taking Stock of the Australian Asian Vegetables Industry

by Barry Lee

Publication No. 10/211

With the growth of the Asian vegetables industry from approximately \$50 million in 1994 to over \$135 million in 2002, the industry grew at a rate of 13% per annum. This is a strong rate of growth when compared to the overall Australian vegetable industry. However since 2002, there has been no further study of the industry. This stocktake report provides an update to the industry's size, growth and characteristics, and the sustainability issues affecting the industry.

This report is targeted at policy makers, industry representatives, researchers and facilitating arms of government.

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